FM 3-04.111 (FM 1-111)

Aviation Brigades

AUGUST 2003

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HEADQUARTERS, DEPARTMENT OF THE ARMY

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Field Manual
No. 3-04.111

Headquarters
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Contents

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Preface

The operational concepts in this field manual (FM) are based on Army doctrine as established in FM 1 (FM 100-1) and FM 3-0 (FM 100-5). This manual is intended for all Army aviation commanders, staffs, and any U.S. military personnel expecting to conduct operations with Army aviation units.

This FM applies to the transition force across the full range of military operations—stability and support operations (SASO), small scale contingencies (SSC), and major theater war (MTW).

This FM covers each type aviation brigade in the Army, based on transition force organization and force structure. The focus throughout this manual is how to fight and sustain. It also will help Army branch schools teach Army aviation brigade operations.

To standardize doctrine and simplify updates, the United States Army Aviation Center (USAAVNC) is standardizing the format of aviation battalion and air cavalry squadron manuals to match FM 3.04-111 (FM 1-111). Each manual will contain the same chapter titles, in the same sequence, and corresponding chapters of each manual will contain similar content. All appendices to this manual also apply to the manuals listed below. When rewritten, these manuals will not contain appendices unless a special demand exists for unit-specific information.

- FM 3-04.112 (FM 1-112).
- FM 3-04.113 (FM 1-113).
- FM 3-04.114 (FM 1-114).

This manual applies to the Active Component (AC), Reserve Component (RC), and Army civilians. It builds on the collective knowledge and experience gained through recent operations, many exercises, and the deliberate process of informed reasoning. It is rooted in time-tested principles and fundamentals, while addressing new technologies and diverse threats to national security. Finally, this FM furnishes a foundation for subordinate doctrine, force design, materiel acquisition, professional education, and individual and unit training.

The proponent for this publication is the USAAVNC. Send comments and recommended changes to Commander, USAAVNC, ATTN: ATZQ-TDS-D, Fort Rucker, AL 36362.

Unless this publication states otherwise, masculine nouns or pronouns do not refer exclusively to men.

Chapter 1

Fundamentals, Missions, Organization

"Good ships and good guns are simply good weapons, and the best weapons are useless save in the hands of men who know how to fight with them."

President Theodore Roosevelt, Medal of Honor
Message to Congress, December 1901

The aviation brigade is organized and equipped to support both Joint and Army operations. It conducts continuous combat, combat support (CS), and combat service support (CSS) operations throughout the depth and breadth of the battlefield. Aviation brigades are found at every echelon from the division to corps, field army, and theater command. Although their organization and composition are different at each level, and their principal focus can range from attack to support, each brigade follows time-tested fundamentals to achieve success on the battlefield. Those fundamentals are discussed in section I of this chapter. Following Section I are sections for each of the 11 brigade-sized organizations, their principal mission focus, and general comments.

SECTION I – GENERAL

1-1. Aviation brigades support the force commander in planning, coordinating, and executing operations. The aviation brigade—through coordination, liaison, command and control (C^2), and situational awareness (SA) and understanding—sets the conditions for the brigade's success. The aviation brigade is the continuity between the supported organization and all aviation operations within that commander's battle space. Although the aviation brigade commander may or may not have complete C^2 over aeromedical evacuation, fixed-wing, and unmanned aerial vehicle (UAV) units, he ensures all aviation operations are coordinated and synchronized.

BRIGADE TYPES

1-2. The *Transition Force* consists of 11 distinct types of aviation brigades. The following brigade-sized organizations called *regiments* or *group are included*:

- Corps Aviation Brigade.
- Attack Helicopter Regiment (Corps Aviation Brigade).
- Aviation Group (Corps Aviation Brigade).
- Division Aviation Brigade (Heavy Division).
- Division Aviation Brigade (Light Division).

- Division Aviation Brigade (Airborne Division).
- Attack Helicopter Brigade (Air Assault Division).
- Air Assault Brigade (Air Assault Division).
- Theater Aviation Brigade (TAB).
- Division Combat Support Aviation Brigade (DCSA Bde).
- Army Special Operations Aviation Regiment (ARSOAR).

ORGANIZATION

1-3. A brigade-sized organization has at least one headquarters and headquarters company (HHC) and three subordinate battalions. Throughout this manual, for readability, the term HHC includes a headquarters and headquarters troop (HHT); and the term battalion includes squadron. The terms HHT and squadron may be used when specifically discussing cavalry organizations.

1-4. The HHC provides personnel and equipment for the C^2 functions of the brigade and security and defense of the command post (CP).

1-5. The numbers and types of subordinate battalions are based on the brigade's mission. Although separate companies may be assigned, attached, or under operational control (OPCON) to brigades, it presents challenges for C^2 as the brigade staff must also prepare plans and orders on the level of detail normally found at the battalion level.

BRIGADE MISSIONS

1-6. Each brigade is tailored for specific missions as discussed in this chapter. However, each brigade accepts other organizations and performs missions not necessarily defined in the table of organization and equipment (TOE) mission statement.

1-7. When task-organized with the appropriate assets from other aviation brigades, all brigades can perform any of the traditional combat, CS, and CSS missions. Each brigade, despite its structure, can plan, coordinate, and execute reconnaissance, security, attack, air assault, air movement, and C^2 operations. However, depending on their level of training, the TAB, the aviation group in the corps aviation brigade, and the air assault division's assault brigade may require augmentation to their staffs to conduct cavalry and attack missions. Conversely, the attack regiment in the corps aviation brigade and the air assault division's attack helicopter brigade may require augmentation to their staffs to conduct air assault operations.

1-8. The appropriate section in this chapter describes each brigade's mission. Chapters four through six describes each brigade’s operational aspects.

COMBAT MISSIONS

1-9. Aviation maneuver forces engage in destroying enemy forces by direct and indirect fire. These missions include—

- Reconnaissance/surveillance.
- Security.

- Attack.
- Air assault.
- Fire support (FS).
- Joint Air Attack Team (JAAT).
- Defensive air combat.

1-10. Aspects of security missions include the following:

- All aviation maneuver forces can conduct screening operations. When task-organized with ground units, they can screen over wider areas and for longer time.
- Commensurate with their level of training to operate with ground forces, when task-organized with the appropriate ground units, aviation units can conduct guard operations.
- Aviation units normally do not conduct covering force operations, but do participate in covering force operations as part of a larger force.

COMBAT SUPPORT MISSIONS

1-11. CS missions include—

- Command, control, communications, and intelligence (C^3I).
- Air movement of units.
- Liaison officer (LNO) movement.
- Message delivery.
- Fast rope insertion/extraction system (FRIES) and special patrol insertion/extraction system (SPIES).
- Air traffic services (ATS).
- Aerial mine delivery operations (Volcano).
- Nuclear, biological, and chemical (NBC) surveys.

COMBAT SERVICE SUPPORT MISSIONS

1-12. CSS missions include—

- Aerial sustainment.
- Aircraft recovery.
- Casualty evacuation (CASEVAC) in coordination with medical evacuation (MEDEVAC).

FUNDAMENTALS

1-13. Commanders and staffs must be fully aware of the battlefield operating systems (BOS):

- Intelligence.
- Maneuver.
- FS.
- Air defense (AD).
- Mobility, countermobility, and survivability.
- CSS.

- C^2.

1-14. All aviation brigades must be able to conduct—

- Strategic deployment by land, sea, or air (Appendix C).
- Administrative and tactical movements (Appendix D).

1-15. All aviation brigade headquarters must simultaneously—

- C^2 multiple and diverse subordinate units.
- Conduct multiple current operations.
- Plan multiple future operations.
- Protect and sustain their forces.

1-16. All aviation brigade headquarters must conduct liaison simultaneously with—

- Higher headquarters main, tactical CP, rear CP.
- Forward brigades.
- The reserve.

1-17. Corps and division aviation brigades, groups, and regiments must simultaneously—

- C^2 ground maneuver units.
- Coordinate as required with the deep operations coordination cell (DOCC).

1-18. All aviation units must accomplish operations during any of the following conditions:

- As a subordinate unit assigned, attached, OPCON, or tactical control (TACON), to another service.
- Near ground forces.
- Day or night.
- Limited visibility (crew instrument meteorological conditions [IMC] proficiency is critical).
- NBC.
- High altitude flight operations (engine power management skills are paramount).
- All environments, such as desert, mountain, rolling hills, dense forest, jungle, plains, urban, extreme cold weather, over water, shipboard.
- Operations with external fuel tanks (except OH-58D).

1-19. Each aviation unit must be proficient in the following areas:

- Ground gunnery (crew-served and individual weapons).
- Defensive air combat.
- Passage of lines.
- Formation flight.
- Terrain flight (low-level, contour, nap-of-the-earth [NOE]).
- Movement techniques (travelling, travelling overwatch, bounding overwatch).
- Airfield and forward arming and refueling point (FARP) operations.
- Emergency procedures (aircraft, refueling, weapons malfunction).

- Base defense (includes emergency evacuation under all weather conditions).
- NBC exposure avoidance and decontamination.
- Other basic tactical skills (mission training plans [MTPs], aircrew training manuals [ATMs], soldier training publications [STPs]).

1-20. Each attack and air cavalry unit must be proficient in the following areas:

- Reconnaissance and security operations.
- Attack helicopter operations (includes JAAT operations).
- Air assault security.
- Aerial gunnery (running fire, hovering fire, remote launch, and air-to air engagements).

1-21. Each UH-60 and CH-47 unit must be proficient in the following areas:

- Landing zone (LZ) and pickup zone (PZ) operations.
- Air assault and air movement.
- External and internal load operations.
- Door gunnery.
- SPIES and FRIES (selected crews only).
- Mine delivery using Volcano (UH-60 only).
- C^2 support, if equipped.

1-22. Each fixed-wing aviation unit must be proficient in the following areas:

- Airfield operations.
- Tactical flight.
- C^2 support.
- Cargo transport, as appropriate.

TRAINING

1-23. The key to successful training is to assemble the required elements and to train to standard (combined arms training strategies [CATS], MTPs, ATMs, STPs), beginning at home station and extending to all operations. Critical to effective training are opposing forces (OPFOR); observer controllers (OCs); feedback systems, such as the multiple integrated laser engagement system/air-ground engagement system (MILES/AGES) II, tactical engagement simulator system (TESS), or aviation survivability equipment trainer (ASET IV); higher and adjacent headquarters; and supported headquarters for air-ground integration.

1-24. Training can be a major challenge, especially if the other elements of the corps or division are not available for concurrent training. That challenge is further complicated if MILES/AGES II, TESS, or ASET-IV is not available for feedback. When those elements are not available, the aviation brigade must develop alternatives. Elements that represent supporting, supported, and higher elements (usually called white cells) can be assembled and trained to represent those headquarters. Vehicles from within the brigade can be organized to replicate OPFOR target arrays. The ground elements of the cavalry squadron can replicate the supported force for divisional brigades.

If the AD battalion is available, they can augment the OPFOR. MILES/AGES II, TESS, and ASET-IV can be available if requested far enough in advance.

SECTION II – CORPS AVIATION BRIGADE

CORPS AVIATION BRIGADE MISSION

1-25. The corps aviation brigade's TOE mission is to plan, coordinate, and execute aviation and combined arms operations to support the corps scheme of maneuver. This brigade (Figure 1-1) supports each of the corps. Its focus encompasses all aspects of aviation operations and may include ground maneuver operations. Attack helicopter units destroy enemy forces by fire and maneuver and conduct reconnaissance and security operations. Utility and heavy helicopter units transport combat personnel, supplies, and equipment. They support air assault operations. They provide C^2 aircraft and ATS for Army airspace command and control (A^2C^2) integration, airspace information, and terminal and forward area support services (see Appendix G). They also support combat search and rescue (CSAR) and CASEVAC, when required.

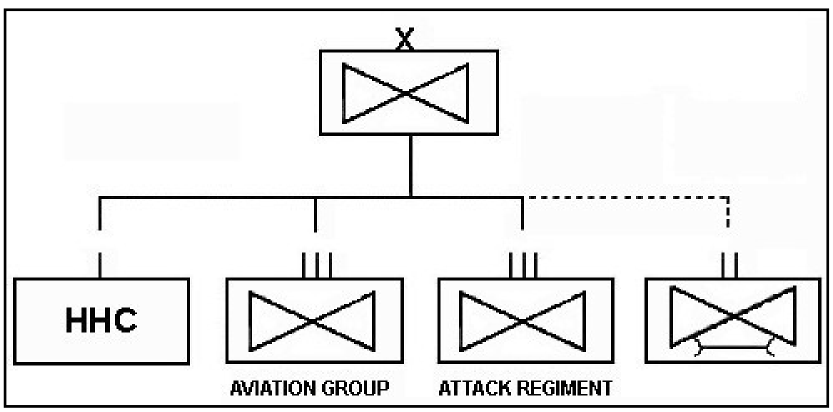


Figure 1-1. Corps Aviation Brigade

CORPS AVIATION BRIGADE ORGANIZATION

1-26. A corps aviation brigade's normal structure includes an HHC, an aviation group, and an attack helicopter regiment (see next two sections). It receives its aviation maintenance support from the Aviation Maintenance Battalion, Corps Support Command (COSCOM).

CORPS AVIATION BRIGADE FUNDAMENTALS

1-27. Besides the fundamentals discussed in Section I of this chapter, the corps aviation brigades must—

- Support corps and division shaping operations.
- Support division close combat operations.

- Coordinate with the Corps DOCC.
- Maintain intelligence preparation of the battlefield (IPB).
- C^2 the subordinate units of the aviation group until the group headquarters is activated, certified, and deployed.
- Act as or provide the maneuver headquarters for operations to react to rear area threats.

1-28. The corps aviation brigade may conduct maneuver operations independently, with or without the attachment of ground elements, or in support of corps maneuver units. Support operations may be conducted in either a direct support (DS) or general support (GS) role. Corps brigade units may also augment or support the aviation brigades of subordinate divisions or the aviation elements of separate brigades and the corps cavalry regiment. Support to subordinate elements normally is in the form of additional C^2, logistics support, or attack helicopter units. Corps aviation units may conduct corps rear area security and may serve as or support a tactical or operational reserve.

SECTION III – ATTACK HELICOPTER REGIMENT (CORPS AVIATION BRIGADE)

CORPS ATTACK HELICOPTER REGIMENT MISSION

1-29. The corps attack helicopter regiment's TOE mission statement is to plan, coordinate, and execute aviation and combined arms operations to support the corps aviation brigade scheme of maneuver. This regiment (Figure 1-2) destroys enemy forces using fire, maneuver, and shock effect. Its secondary missions are reconnaissance, security, defensive air combat, and support of division close combat operations.

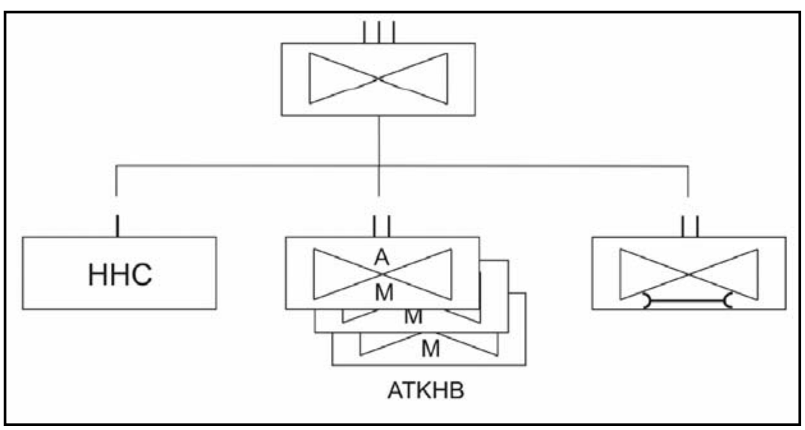


Figure 1-2. Corps Attack Helicopter Regiment

CORPS ATTACK HELICOPTER REGIMENT ORGANIZATION

1-30. A corps attack regiment has one HHC and three attack helicopter battalions (ATKHB). It receives dedicated C^2 and logistics support from the corps aviation group.

1-31. The ATKHB consists of one HHC, three attack helicopter companies (ATKHC) with seven AH-64s each, and one aviation unit maintenance (AVUM) company.

1-32. The attack helicopter regiment receives its aviation maintenance support from the Aviation Maintenance Battalion, COSCOM.

CORPS ATTACK HELICOPTER REGIMENT FUNDAMENTALS

1-33. Besides the fundamentals discussed in Section I of this chapter, the corps attack helicopter regiment must be able to—

- Support corps and division shaping operations.
- Support division close combat operations.
- Coordinate with the corps DOCC.
- Maintain IPB.
- Act as or provide the maneuver headquarters for operations to react to rear area threats.

1-34. The attack regiment is an armor killer that is very effective against massed, moving targets. It is effective against enemy field artillery (FA), AD, communications, and logistics units. It also is effective against point targets (such as cave entrances, bunker apertures, windows in buildings) and other hard or soft targets. It cannot occupy terrain; however, it can deny terrain for a limited time by dominating it with direct and indirect fires. The attack regiment enables the corps commander to mass combat power rapidly at the decisive time to shape the battlefield for decisive operations or to conduct decisive operations. It is an excellent reserve force against an armor threat or massed forces.

1-35. In its reconnaissance and security role, the attack regiment provides critical intelligence, sets the stage for attack helicopter and ground maneuver operations. It clears the way for air assault and aerial mining missions and secures routes for aerial and ground resupply. Attack helicopter sensor video recording capability provides the corps or supported commander excellent reconnaissance and battle damage assessment (BDA) information. Subordinate attack units of the regiment must be proficient in reconnaissance and security, attack, and defensive air combat.

1-36. When task-organized with ground maneuver forces, it can conduct cover and guard operations.

1-37. The corps attack regiment frequently operates far forward of corps ground units at distances that often outstrip normal radio communications ranges. Overcoming the operational challenges requires the application of the latest technical solutions for communications. Among those solutions are satellite communications (SATCOM), aerial retransmission, aerial radio relay, and high frequency (HF) radio.

SECTION IV – AVIATION GROUP (CORPS AVIATION BRIGADE)

AVIATION GROUP MISSION

1-38. The corps aviation group TOE mission is to plan, coordinate, and execute aviation and combined arms operations to support the corps aviation brigade scheme of maneuver. This group's (Figure 1-3) principal mission focus is C^2, air assault, air movement, aerial delivery of mines, and ATS.

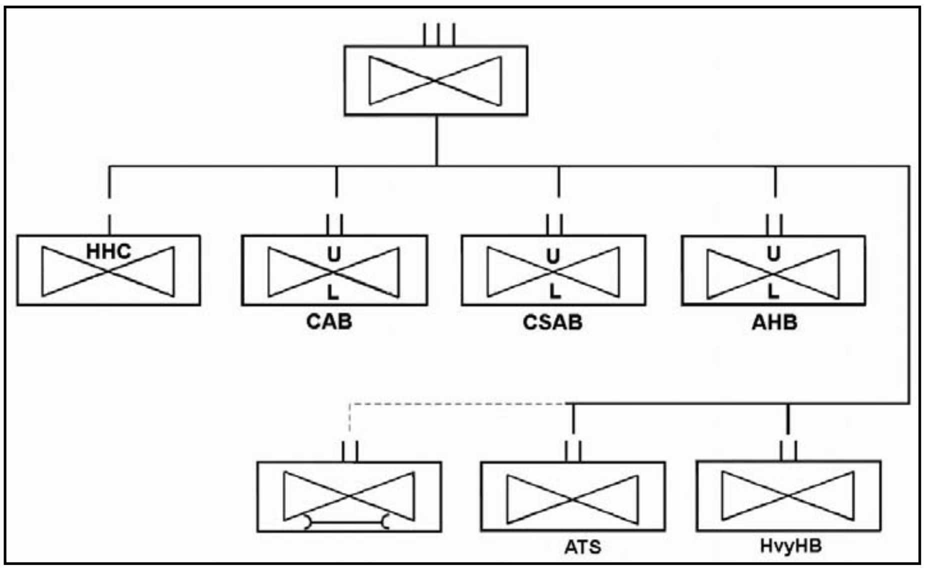


Figure 1-3. Corps Aviation Group

AVIATION GROUP ORGANIZATION

1-39. A corps aviation group's normal structure includes an HHC, a command aviation battalion (CAB), a combat support aviation battalion (CSAB), an assault helicopter battalion (AHB), a heavy helicopter battalion (HvyHB), and an ATS battalion.

- The CAB consists of one HHC, three command aviation companies (CAC) with eight UH-60s each, and one AVUM company.
- The CSAB consists of one HHC, three support aviation companies (SAC) with eight UH–60s each, and one AVUM company.
- The AHB consists of one HHC, three assault helicopter companies (AHC) with eight UH–60s each, and one AVUM company.
- The HvyHB consists of 1 HHC and 4 heavy helicopter companies (HvyHC) with 14 CH-47s each.

1-40. The corps aviation group receives its aviation maintenance support from the Aviation Maintenance Battalion, COSCOM.

AVIATION GROUP FUNDAMENTALS

1-41. Besides the fundamentals discussed in Section I of this chapter, the corps aviation group must be able to—

- Maintain IPB.
- Support attack helicopter regiment missions.
- Manage the support requirements for the corps.
- Maintain air assault proficiency within the AHB and CSAB.

1-42. The aviation group provides continuous C^2 support to the corps command group, the corps aviation brigade, and the attack helicopter regiment. As the number of C^2 platforms is limited, close coordination with the corps G3 is essential to establish priorities.

1-43. The aviation group supports air movement requirements for the corps headquarters and subordinate unit air assault or air movement requirements with the AHB. It provides logistics support, air movement support, and air assault support with the HvyHB.

1-44. The aviation group augments or supports the aviation brigades of divisions or the aviation elements of separate brigades and the corps cavalry regiment. It supports rear area security and a tactical or operational reserve.

1-45. The aviation group operates over vast distances that often outstrip normal radio communications ranges. Overcoming the operational challenges requires the application of the latest technical solutions for communications. Among those solutions are SATCOM and radio integration with corps communications nodes.

SECTION V – DIVISION AVIATION BRIGADE (HEAVY DIVISION)

AVIATION BRIGADE (HEAVY DIVISION) MISSION

1-46. The heavy division aviation brigade's TOE mission is to find, fix and destroy enemy forces using maneuver to concentrate and sustain combat power at the critical time and place, as an integrated member of the combined arms team. This brigade (Figure 1-4) destroys enemy forces using fire, maneuver, and shock effect. It conducts reconnaissance and security operations and provides C^2 support. It conducts air movement operations and aerial delivery of mines. The attack helicopter and air cavalry units have a secondary mission of defensive air combat.

AVIATION BRIGADE (HEAVY DIVISION) ORGANIZATION

1-47. The brigade has an HHC, a divisional cavalry squadron, a general support aviation battalion (GSAB), and an ATKHB.

- The cavalry squadron consists of one HHT, three armored cavalry troops equipped with cavalry fighting vehicles (CFV) and M1 Abrams tanks, two air cavalry troops (ACTs) equipped with eight OH–58Ds or eight AH-64As each, and one AVUM troop.

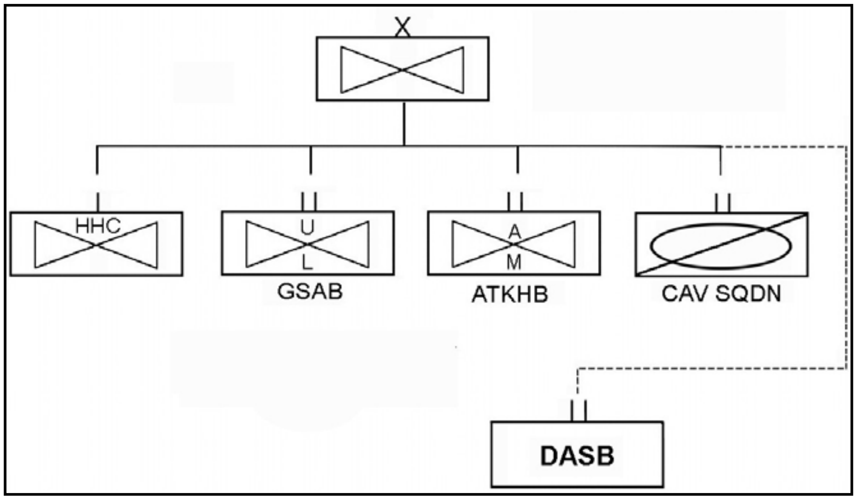


Figure 1-4. Heavy Division Aviation Brigade

- The GSAB consists of one HHC, one CAC with eight UH–60s, one SAC with eight UH–60s, and one AVUM company.
- The ATKHB consists of one HHC, three ATKHCs equipped with six AH–64S each, and one AVUM company.

1-48. The ATKHB is an armor killer that is very effective against massed, moving targets. It is also effective against enemy FA, AD, communications, and logistics units. It also is effective against point targets (such as cave entrances, bunker apertures, windows in buildings) and other hard or soft targets. It cannot occupy terrain; however, it can deny terrain for a limited time by dominating it with direct and indirect fires. The ATKHB enables the division commander to mass combat power rapidly at the decisive time to shape the battlefield for decisive operations or to conduct decisive operations. It is an excellent reserve force against an armor threat or massed forces.

1-49. Division Support Command (DISCOM) supports the division aviation brigade with a division aviation support battalion (DASB).

AVIATION BRIGADE (HEAVY DIVISION) FUNDAMENTALS

1-50. Besides the fundamentals discussed in Section I of this chapter, the aviation brigade must be able to—

- Maintain IPB.
- Execute attack helicopter operations near ground forces.
- Support division decisive operations.
- Conduct division shaping and decisive operations.
- Participate in or command guard and cover missions when task-organized with ground maneuver forces.
- Act as or provide the maneuver headquarters for operations to react to rear area threats.

1-51. The heavy division aviation brigade is the principal integrator of aviation assets within the heavy division. Its primary role is to set the conditions for success for each of its units in their support of the ground maneuver commander. The brigade must be prepared to fight as a whole. It must be prepared to provide aviation support for multiple missions requiring pure or task-organized units.

1-52. The cavalry squadron fights under division or aviation brigade control. Its primary missions are reconnaissance and security.

1-53. The ATKHB fights in close coordination with divisional ground units and conducts shaping operations. It also conducts reconnaissance and security missions.

1-54. The GSAB provides DS and GS to all elements of the division. These include ground brigades, DISCOM, division artillery (DIVARTY), signal battalion, the aviation brigade, the cavalry squadron, the ATKHB, and the DASB.

SECTION VI – DIVISION AVIATION BRIGADE (LIGHT DIVISION)

AVIATION BRIGADE (LIGHT DIVISION) MISSION

1-55. The light division aviation brigade's TOE mission is to plan, coordinate, and execute aviation and combined arms operations to support the division scheme of maneuver. This brigade (Figure 1-5) destroys enemy forces using fire, maneuver, and shock effect. It conducts reconnaissance and security operations, air assault and air movement operations, and aerial delivery of mines. It also provides C² support. The attack helicopter and air cavalry units have a secondary mission of defensive air combat.

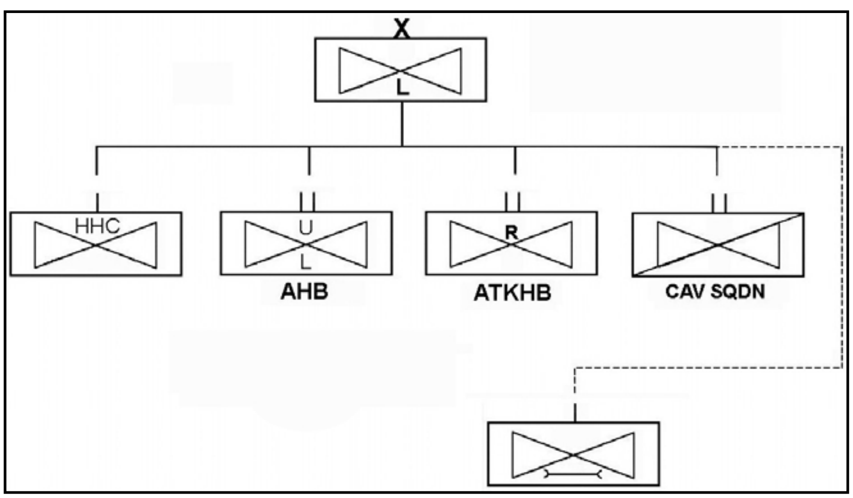


Figure 1-5. Light Division Aviation Brigade

AVIATION BRIGADE (LIGHT DIVISION) ORGANIZATION

1-56. The light division aviation brigade has an HHC, a divisional cavalry squadron, an AHB, and an ATKHB (OH-58D).

- The cavalry squadron consists of one HHT, one ground cavalry troop equipped with light wheeled vehicles, two ACTs equipped with eight OH-58Ds each, and one AVUM troop.
- The AHB consists of 1 HHC, 1 CAC with 8 UH–60s, 2 AHCs with 15 UH–60s each, and one AVUM company.
- The ATKHB consists of one HHC, three ATKHCs equipped with eight OH–58Ds each, and one AVUM company.

1-57. DISCOM supports the division aviation brigade with an aviation maintenance company from the Main Support Battalion (MSB), DISCOM.

AVIATION BRIGADE (LIGHT DIVISION) FUNDAMENTALS

1-58. Besides the fundamentals discussed in Section I of this chapter, the aviation brigade must be able to—

- Maintain IPB.
- Conduct air assault operations with own assets and attached assets from the corps and other divisions.
- Execute attack helicopter operations near ground forces.
- Support division decisive operations.
- Conduct division shaping and decisive operations.
- Participate in or command guard and cover missions when task-organized with ground maneuver forces.
- Act as or provide the maneuver headquarters for operations to react to rear area threats.

1-59. The aviation brigade is the principal integrator of aviation assets within the division. Its primary role is to set the conditions for success for each of its units in their support of the ground maneuver commander. The brigade must be prepared to fight as a whole. It must be prepared to provide aviation support for multiple missions requiring pure or task-organized units.

1-60. The cavalry squadron fights under division or aviation brigade control. Its primary missions are reconnaissance and security.

1-61. The ATKHB fights in close coordination with divisional ground units and is an excellent force for conducting reconnaissance and security missions. The battalion does not normally execute operations in deep areas; however, it can execute a deep area mission or raid against the right target array.

1-62. The AHB provides air assault, air movement, and a robust logistics capability to the division. The CAC provides C^2 support to the division command group, aviation brigade, cavalry squadron, and ATKHB.

SECTION VII – DIVISION AVIATION BRIGADE (AIRBORNE DIVISION)

AVIATION BRIGADE (AIRBORNE DIVISION) MISSION

1-63. The airborne division aviation brigade's TOE mission is to find, fix, and destroy enemy forces using fire and maneuver to concentrate and sustain combat power to support division operations. This brigade (Figure 1-6) destroys threat forces using fire, maneuver, and shock effect. It conducts reconnaissance and security operations and provides C^2 support. It conducts air assault and air movement operations and aerial delivery of mines. Its attack and air cavalry units have a secondary mission of defensive air combat.

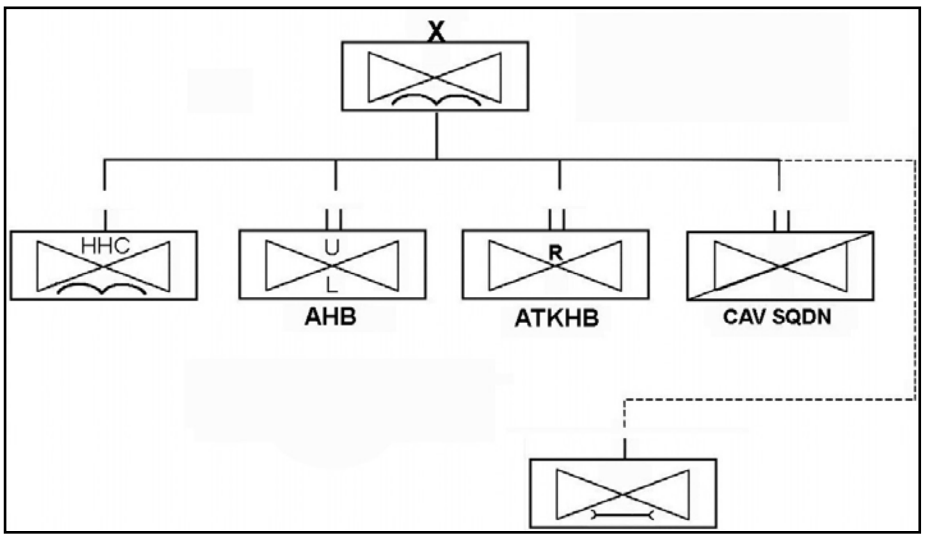


Figure 1-6. Airborne Division Aviation Brigade

AVIATION BRIGADE (AIRBORNE DIVISION) ORGANIZATION

1-64. The airborne division aviation brigade has an HHC, a divisional cavalry squadron, an AHB, and ATKHB, (OH-58D).

- The cavalry squadron consists of one HHT, one ground cavalry troop equipped with light, air-droppable wheeled vehicles, three ACTs equipped with eight OH–58Ds each, and one AVUM troop.
- The AHB consists of 1 HHC, 1 CAC with 8 UH–60s, 2 AHCs with 15 UH–60s each, and 1 AVUM company.
- The ATKHB consists of one HHC, three ATKHCs equipped with eight OH–58Ds each, and one AVUM company.

1-65. DISCOM supports the division aviation brigade with a provisional DASB.

AVIATION BRIGADE (AIRBORNE DIVISION) FUNDAMENTALS

1-66. Besides the fundamentals discussed in Section I of this chapter, the aviation brigade must be able to—

- Maintain IPB.
- Conduct air assault operations with own assets and attached assets from the corps and other divisions.
- Execute attack helicopter operations near ground forces.
- Support division decisive operations.
- Conduct division shaping and decisive operations.
- Participate in or command guard and cover missons when task-organized with ground maneuver forces.
- Act as or provide the maneuver headquarters for operations to react to rear area threats.

1-67. The aviation brigade is the principal integrator of aviation assets within the division. Its primary role is to set the conditions for success for each of its units in their support of the ground maneuver commander. The brigade must be prepared to fight as a whole. It must be prepared to provide aviation support for multiple missions requiring pure or task-organized units.

1-68. The cavalry squadron fights under division or aviation brigade control. Its primary missions are reconnaissance and security.

1-69. The ATKHB fights in close coordination with divisional ground units and is an excellent force for conducting reconnaissance and security. The battalion does not normally execute operations in deep areas; however, against the right target array it can execute a deep area mission or raid.

1-70. The AHB provides air assault, air movement, and a robust logistics capability to the division. The CAC provides C^2 support to the division command group, aviation brigade, cavalry squadron, and ATKHB.

SECTION VIII – ATTACK HELICOPTER BRIGADE (AIR ASSAULT DIVISION)

ATTACK HELICOPTER BRIGADE (AIR ASSAULT DIVISION) MISSION

1-71. The air assault division attack helicopter brigade's TOE mission is to plan, coordinate, and execute aviation operations as an integrated maneuver element of the combined arms team to support division operations. This brigade (Figure 1-7) destroys enemy forces using fire, maneuver, and shock effect. It conducts reconnaissance and security operations and provides C^2 support. It conducts air assault and air movement operations and aerial delivery of mines. The attack and air cavalry units have a secondary mission of defensive air combat.

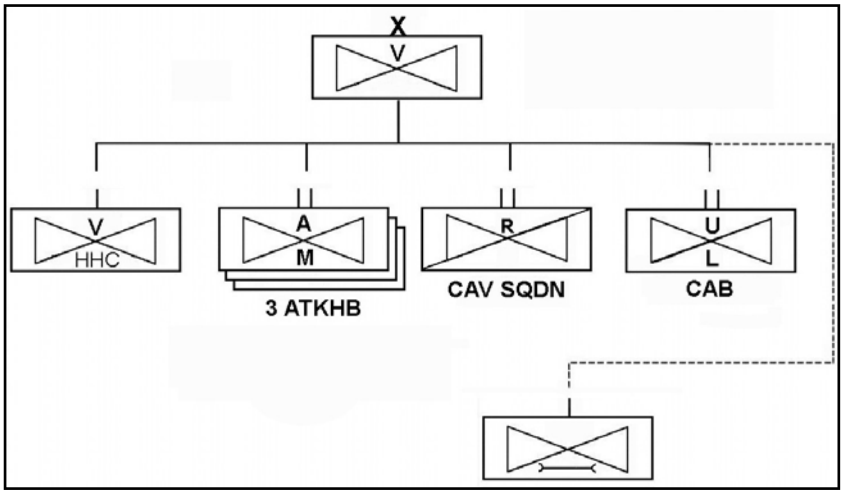


Figure 1-7. Attack Helicopter Brigade (Air Assault Division)

ATTACK HELICOPTER BRIGADE (AIR ASSAULT DIVISION) ORGANIZATION

1-72. The air assault division attack helicopter brigade structure has one HHC, three ATKHBs, one air cavalry squadron, and one CAB. (Note: TOE documents show the CAB in the air assault brigade; however, the division has placed the CAB in the attack helicopter brigade.) This decision provides an aerial mine delivery capability and C^2 support for the attack helicopter brigade. The attack helicopter brigade's CAB provides C^2 support for the division.

- The ATKHB consists of one HHC, three ATKHC with six AH-64s each, and one AVUM company.
- The air cavalry squadron consists of one HHT, three ACTs with eight OH–58Ds each, and one AVUM troop.
- The CAB consists of one HHC, two CACs of eight UH-60s each, one SAC of eight UH-60s, and one AVUM company.

1-73. The ATKHBs are armor killers that are very effective against massed and moving targets. They are especially effective against enemy FA, AD, communications, and logistics units. They are also effective against point targets (such as cave entrances, bunker apertures, windows in buildings) and other hard or soft targets. They cannot occupy terrain; however, they can deny terrain for a limited time by dominating it with direct and indirect fires. The attack helicopter brigade enables the division commander to mass combat power rapidly at the decisive time to shape the battlefield for decisive operations or to conduct decisive operations. It is an excellent reserve force against an armor threat or massed forces.

1-74. The attack helicopter brigade receives its aviation maintenance support from the Aviation Maintenance Battalion, DISCOM.

ATTACK HELICOPTER BRIGADE (AIR ASSAULT DIVISION) FUNDAMENTALS

1-75. Besides the fundamentals discussed in Section I of this chapter, the aviation brigade must be able to—

- Maintain IPB.
- Execute attack helicopter operations near ground forces.
- Provide air assault security as required.
- Support division decisive operations.
- Conduct division shaping and decisive operations.
- Participate in or command guard and cover missions when task-organized with ground maneuver forces.
- Act as or provide the maneuver headquarters for operations to react to rear area threats.

1-76. The attack helicopter brigade, reinforced with utility and heavy helicopter elements, conducts operations to accomplish division objectives.

1-77. The attack helicopter brigade conducts up to three separate attack operations to support division operations. These attack operations may be under attack helicopter brigade control, under OPCON of a ground brigade, or a combination of the two.

1-78. The brigade may support up to three aviation task forces, one for each ground brigade. Support may be balanced for each brigade or task-organized as required to support the division scheme of maneuver. The following is an example of support for a three-brigade operation:

- A heavy aviation task force would support one brigade.
- A light aviation task force would support a second brigade.
- A third brigade would receive aviation GS of CS and CSS missions.

SECTION IX – AIR ASSAULT BRIGADE (AIR ASSAULT DIVISION)

AIR ASSAULT BRIGADE (AIR ASSAULT DIVISION) MISSION

1-79. The air assault division aviation brigade's TOE mission is to plan, coordinate, and execute aviation operations as an integrated maneuver element of the combined arms team to support division operations. This brigade's (Figure 1-8) primary mission focus is air assault operations to support division combat operations. It also conducts air movement operations and aerial delivery of mines. (Note: TOE documents show the CAB in the air assault brigade; however, the division has placed the CAB in the attack helicopter brigade.) This decision provides an aerial mine delivery capability and C^2 support for the attack helicopter brigade. The attack helicopter brigade's CAB provides C^2 support for the division.

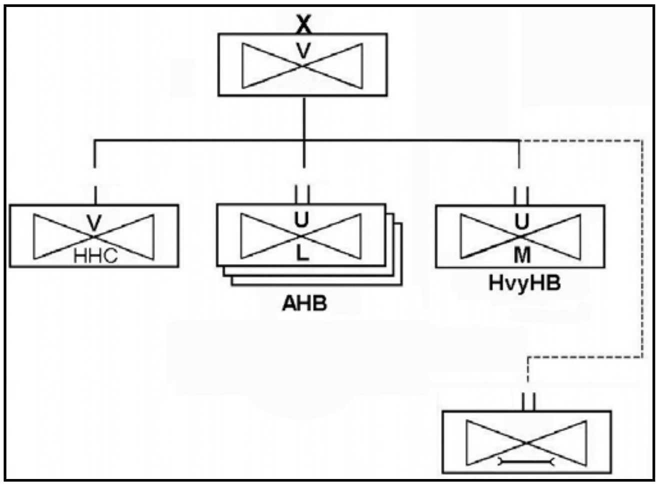


Figure 1-8. Air Assault Brigade (Air Assault Division)

AIR ASSAULT BRIGADE (AIR ASSAULT DIVISION) ORGANIZATION

1-80. The air assault division air assault brigade has one HHC, three AHBs, and one HvyHB.

- The AHB consists of 1 HHC, 3 AHCs with 10 UH–60s each, and 1 AVUM company.
- The HvyHB consists of 1 HHC, 3 HvyHCs with 14 CH-47s each, and 1 AVUM company.

1-81. The air assault brigade receives its aviation maintenance support from the Aviation Maintenance Battalion, DISCOM.

AIR ASSAULT BRIGADE (AIR ASSAULT DIVISION) FUNDAMENTALS

1-82. Besides the fundamentals discussed in Section I of this chapter, the aviation brigade must be able to—

- Maintain IPB.
- Conduct air assault operations with own assets and attached assets from the corps and other divisions.
- Support division sustaining operations.
- Act as or provide the maneuver headquarters for operations to react to rear area threats.

1-83. The air assault brigade, reinforced with elements from the attack helicopter brigade, forms three air assault task forces to support each of the three ground brigades simultaneously. This support may be balanced for each brigade or task-organized as required to support the division scheme of maneuver.

1-84. The air assault brigade, reinforced with elements from the attack helicopter brigade, forms two air assault forces to support two of the division's three ground brigades. These air assault task forces may be balanced or task-organized as required to support the division scheme of maneuver. The division's third ground brigade would receive, at a minimum, CS and CSS aviation GS.

1-85. The air assault brigade, reinforced with elements from the attack helicopter brigade, conducts operations to move a ground brigade in two lifts.

SECTION X – THEATER AVIATION BRIGADE

THEATER AVIATION BRIGADE MISSION

1-86. The TAB's TOE mission is to plan, coordinate, and execute aviation operations to support the theater. This brigade (Figure 1-9) supports echelons above corps (EAC) organizations. Its principal focus is C^2 support for the EAC headquarters and logistics support for the theater.

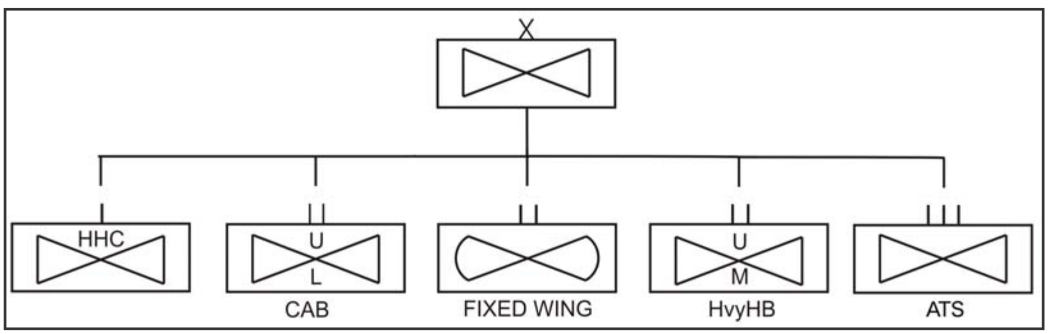


Figure 1-9. Theater Aviation Brigade

THEATER AVIATION BRIGADE ORGANIZATION

1-87. A TAB is designed, tailored, and configured for the specific theater in which it operates. The Army component commander organizes the brigade based on the mission guidance from the theater combatant commander. The brigade's normal structure includes an HHC, a CAB, a TAB, a HvyHB, and an ATS group.

- The CAB consists of one HHC, three CACs with eight UH-60s each, and one AVUM company.
- The TAB consists of one HHC, three theater aviation companies (TACs), with eight C-12s each, one TAC with eight C-23s, and one AVUM company.
- The HvyHB consists of 1 HHC and 2 HvyHCs with 14 CH-47s each.
- The ATS Group consists of an HHC and the appropriate ATS battalions and companies.

1-88. The theater support command (TSC) provides aviation maintenance support. This normally is accomplished by an aviation maintenance company, but it could be provided by contractor supported aviation facility or a combination of both.

THEATER AVIATION BRIGADE FUNDAMENTALS

1-89. Besides the fundamentals discussed in Section I of this chapter, the TABs must be able to C^2—

- Fixed- and rotary-wing aircraft as they support the C^2 requirements of the EAC headquarters throughout the theater.
- Fixed-wing aircraft as they support the C^2 requirements of the EAC headquarters for flight external to the theater.
- Logistics aircraft as they support EAC units.
- Air assault or air movement operations in reaction to rear area threats.
- ATS needs for the theater (through its ATS Group).

1-90. One of the TAB's largest challenges is communications. It operates over vast distances that often outstrip normal radio communications ranges. Overcoming the operational challenges requires the application of the latest technical solutions for communications. These connections include SATCOM and radio integration with theater communications nodes.

1-91. The TAB may augment or support the aviation brigades of subordinate corps or divisions or the aviation elements of separate brigades and the corps cavalry regiment. Support to subordinate elements normally is additional C^2 or logistics support. Theater aviation units may conduct theater rear area security and may support a tactical reserve.

SECTION XI – DIVISION COMBAT SUPPORT AVIATION BRIGADE

DIVISION COMBAT SUPPORT AVIATION BRIGADE MISSION

1-92. The DCSA Bde's TOE mission is to find, fix and destroy enemy forces using maneuver to concentrate and sustain combat power at the critical time and place, as an integrated member of the combined arms team. This brigade (Figure 1-10) provides C^2, air movement, and air assault support to selected AC divisions when those divisions deploy.

1-93. The aviation elements of the DCSA Bde train to accomplish the mission of their associated AC division.

DIVISION COMBAT SUPPORT AVIATION BRIGADE ORGANIZATION

1-94. A DCSA Bde normal structure includes an HHC, GSABs, AHBs, and a HvyHC. It also has two ground cavalry troops.

- The GSAB consists of one HHC, two SACs (or one SAC and one CAC) of eight UH-60s each, and one AVUM company.
- The AHB consists of 1 HHC, 2 AHCs of 10 UH-60s each, and 1 AVUM company.
- The HvyHC consists of one company headquarters and two heavy helicopter platoons of seven CH-47s each.

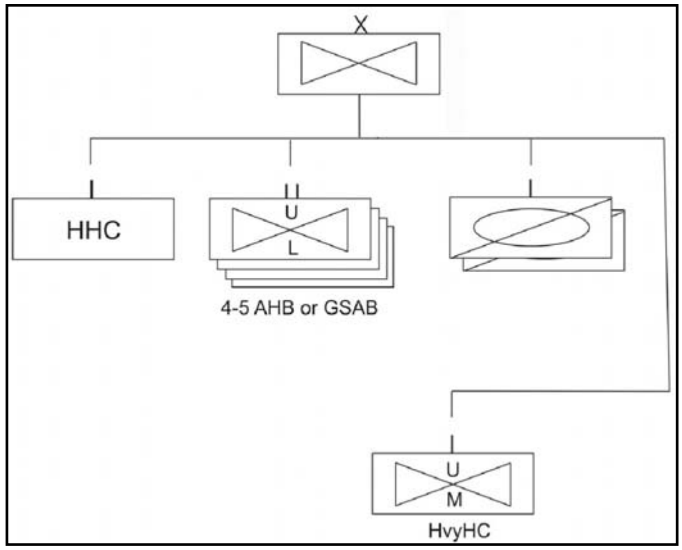


Figure 1-10. Division Combat Support Aviation Brigade

DIVISION COMBAT SUPPORT AVIATION BRIGADE FUNDAMENTALS

1-95. The DCSA Bde trains its subordinate units to accomplish the tasks of the AC divisions with which they are scheduled to deploy. This training should consist of home station training according to the AC unit's mission essential task list (METL). It also should consist of training at the combat training centers (CTC).

1-96. The DCSA Bde concept is emerging and could change over time. If so, message addendums from USAAVNC and the National Guard (NG) Bureau will serve as interim doctrine until the concept is set.

SECTION XII – ARMY SPECIAL OPERATIONS AVIATION REGIMENT

1-97. ARSOAR's mission is to plan, support, and conduct special air operations by clandestinely and covertly penetrating hostile and denied airspace. ARSOAR supports special operations forces (SOF) conducting joint, combined, interagency, and coalition operations in regional crises, major conflicts, or as directed by the President and Secretary of Defense. ARSOAR organizes, equips, trains, validates, sustains, and employs assigned aviation units for the U.S. Army Special Operations Command.

ORGANIZATION

1-98. The ARSOAR (Figure 1-11) consists of an HHC, three battalions, separate forward-deployed companies, a special operations aviation training company (SOATC), and a systems integration and maintenance office (SIMO). The ARSOAR's rotary-wing aircraft include the AH/MH-6, MH-60, MH-60 variant known as the defensive armed penetrator (DAP), and MH-47.

ARSOA units are designed to plan, conduct, and support special operations missions unilaterally or jointly in all theaters and at all levels of conflict. To accomplish this mission, ARSOA units are task-organized according to the unit they will support, the theater of operations, and expected missions. ARSOA task organizations are formed around one of the regiment's battalions.

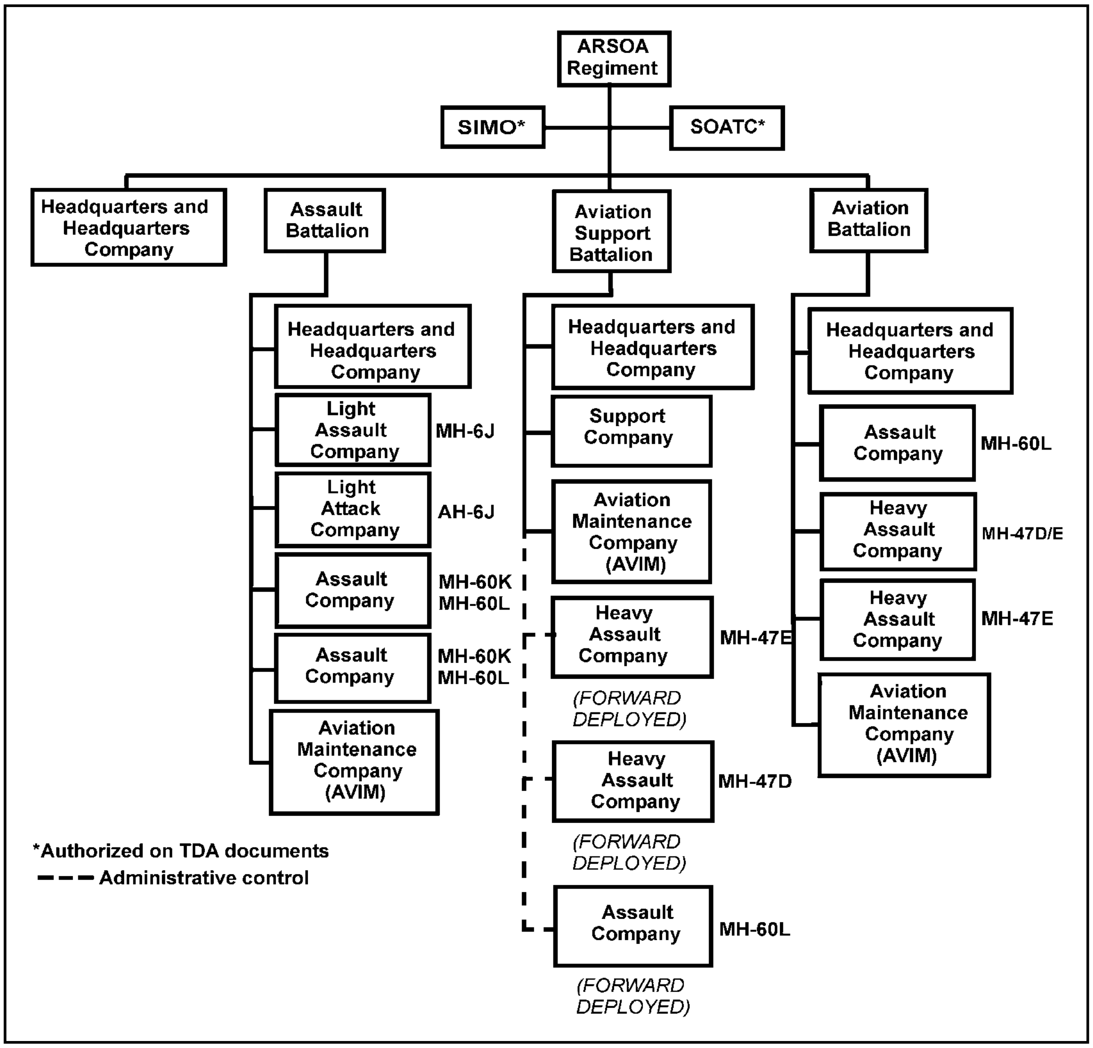


Figure 1-11 Army Special Operations Aviation Regiment

FUNDAMENTALS

1-99. ARSOA units are trained and equipped to infiltrate, resupply, and exfiltrate U.S. SOF and other designated personnel. Training is tailored specifically to profiles that support the SOF mission. Units prefer to operate at night, using night vision goggles (NVG) or night vision systems (NVS) and low-level flight profiles. Training is conducted in all operational environments and terrain—desert, mountain, jungle, urban, over water. Inherent in the training is the ability to operate from maritime platforms.

Emphasis is placed on precise navigation over long range and under adverse weather conditions.

1-100. ARSOA aircraft are modified to add the capability for aerial refueling and to enhance precise navigation, secure communications, long-range flight performance, and increased weapons lethality. These enhancements give ARSOA the unique capability to take advantage of adverse weather, limited visibility, or low-cloud ceilings. These conditions provide concealment for air operations and help achieve surprise.

1-101. Organic attack helicopter aircrews are specifically trained to provide close air support (CAS) and terminal guidance for precision munitions to support SOF.

Chapter 2

Battlefield Dynamics and Framework

Our soldiers and equipment operate in the physical domain. The information they need for battle is created, manipulated, and shared in the information domain. However, to succeed in network-centric warfare, we must transform our operations into the knowledge domain. This is where our force can develop and share high-quality SA. The knowledge domain is where our force can develop a shared knowledge of the commander's intent. It also is where our force can self-synchronize its operations. What this means is that we are on the cusp of achieving Sun Tzu's dream to know our enemy and know ourselves fully. We use this knowledge so that we need not fear a hundred battles, terrorism, or any other threat. We also use this knowledge to transform our Army to meet any challenge it faces in the 21st Century.

The physical domain is combat. The information domain is SA. The knowledge domain is the commander's intent. The combination of the information and knowledge domains yields situational understanding (SU).

The Army Battle Command System (ABCS) can enable commanders to transform operations into the knowledge domain. It can provide the synergy necessary to multiply the force.

SECTION I – KEY OPERATIONAL CONSIDERATIONS

INTRODUCTION

2-1. The modern battlefield may be linear, nonlinear, or both. Despite its configuration, commanders employ decisive, shaping, and sustaining operations to accomplish assigned missions. The aviation brigade is a key maneuver and support force for these operations.

DECISIVE, SHAPING, AND SUSTAINING OPERATIONS

2-2. FM 3-0 (FM 100-5) defines three all-encompassing categories of operations—decisive, shaping, and sustaining.

- *The decisive* operation conclusively determines the outcome of a battle or engagement.
- *Shaping* operations establish conditions for a successful decisive operation.
- *Sustaining* operations generate and maintain combat power.

2-3. Commanders direct simultaneous and sequential decisive, shaping, and sustaining operations by synchronizing their forces in time, space, resources, purpose, and action.

Decisive, Shaping, and Sustaining Vignette

An Army division (minus) is in a lodgment area conducting a defense while awaiting the follow-on forces. Enemy forces attack to destroy the division lodgment area. The division's decisive operation is the successful defense of the lodgment area. Its shaping operation is the destruction of the enemy's mobile reserve before it can be committed. Its sustaining operations are those actions to ensure ammunition, fuel, parts, food, water, and health service support (HSS) are provided. The aviation brigade participates in the operation as an element of the decisive operation, the shaping operation, and the sustainment operations. Attack and air cavalry forces, with UH-60 Volcano mine systems and UH-60 C^2 aircraft, attack to destroy the enemy's mobile reserve. This operation to destroy the enemy mobile reserve is a shaping operation by the division and a decisive operation for the aviation brigade. Assault and heavy lift forces emplace FARPs. UH-60 aircrews support the division staff or ground maneuver brigades with C^2. The emplacement of FARPs is both a division and aviation brigade sustaining operation.

DECISIVE OPERATIONS

2-4. There is only one decisive operation for any major operation, battle, or engagement for any given echelon. It may include multiple actions conducted simultaneously throughout the area of operations (AO). Commanders weight the decisive operation by economizing combat power allocated to shaping operations.

2-5. The aviation brigade participates in and supports decisive operations by—

- Finding, fixing, and destroying enemy forces.
- Conducting air assaults and air movement.
- Emplacing minefields.
- Supporting C^2 operations.

SHAPING OPERATIONS

2-6. Shaping operations establish conditions for the successful decisive operation by setting the battlefield to our advantage. Shaping includes lethal and nonlethal operations to make the enemy vulnerable to attack and impede or divert his attempts to maneuver. It also facilitates the maneuver of friendly forces, enhances deception, or otherwise dictates the time and place for decisive battle. Through shaping, commanders gain the initiative, preserve momentum, and control the tempo of combat.

2-7. When expressing their intent, commanders clearly and succinctly define how the effects of shaping operations support the decisive operation. Shaping operations may occur with, before, or after initiation of decisive operations. They may involve any combination of forces.

2-8. Some shaping operations, especially those that occur simultaneously with the decisive operation, are economy of force actions. If the available force does not permit simultaneous decisive and shaping operations, the commander sequences shaping operations around the decisive operation. A shaping operation may become the decisive operation if circumstances or opportunities dictate. In that case, the commander weights the new decisive operation at the expense of other shaping operations.

2-9. The aviation brigade can shape by turning, blocking, fixing, and disrupting enemy forces. This can be done with helicopter-emplaced minefields, attack helicopters, air assault forces, and mobile C^2 platforms.

SUSTAINING OPERATIONS

2-10. Sustaining operations generate and maintain combat power. Failure to sustain normally results in failure of the overall effort. Sustaining operations at any echelon are those that help the shaping and decisive operations by assuring freedom of action and continuity of operations, such as CSS and C^2. Sustaining operations include CSS, sustainment base security and maintenance, movement control, terrain management, and protection of lines of communication (LOC) and headquarters.

2-11. Sustaining operations are inseparable from decisive and shaping operations, although they are not by themselves decisive or shaping. Sustaining operations occur throughout the AO. They underwrite the tempo of the overall operation, assuring the ability to take advantage of any opportunity without delay.

2-12. The assault and HvyHBs are ideal for sustaining operations. Air cavalry and attack forces, coupled with the mobile and agile aerial C^2 platforms, are excellent forces for protecting sustainment forces as they move from one location to another or in their assembly areas (AAs).

NONLINEAR OPERATIONS

2-13. Nonlinear operations now characterize mission environments more than ever. A nonlinear battlefield lacks the traditional grid of close, deep, and rear areas. The resulting battle space is fluid, changing throughout mission preparation and execution. In the nonlinear environment, aviation is an essential force for success.

2-14. Within the nonlinear environment, maneuver units may be deployed in contiguous or noncontiguous AOs (Figures 2-1 and 2-2). Even when operating in contiguous AOs, maneuver forces orient on assigned objectives without geographic reference to adjacent forces. These operations typically focus on multiple decisive points. Most decisive results occur when distributed operations (attacking the enemy at multiple locations) are synchronized to achieve simultaneous effects. SASO normally are nonlinear with noncontiguous AOs.

2-15. Nonlinear and linear operations are not mutually exclusive. Depending upon perspective and echelon, operations often combine nonlinear and linear characteristics. For example, a brigade may be deployed in a nonlinear manner, while its battalions or some companies are deployed linearly with respect to each other.

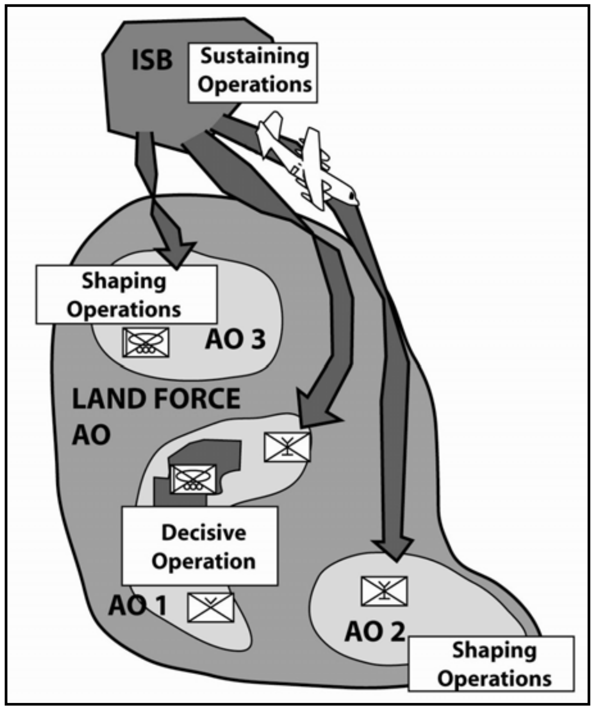


Figure 2-1. Example of Offensive Operation—Nonlinear, Noncontiguous

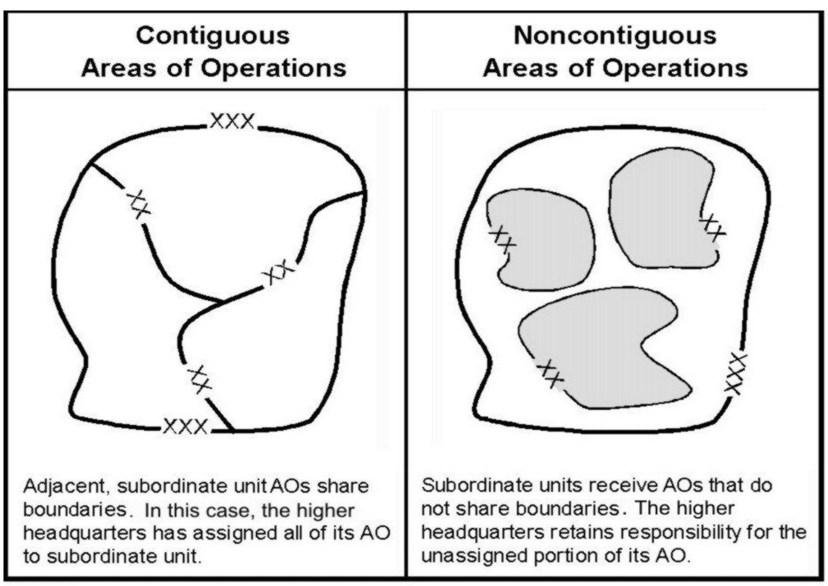


Figure 2-2. Contiguous and Noncontiguous Areas of Operations

LINEAR OPERATIONS

2-16. Traditional linear operations involve conventional combat and concentrated maneuver forces. Ground forces share boundaries and orient against a similarly organized enemy force. Terrain or friendly forces secure flanks and protect CSS operations.

2-17. Despite the increasing nonlinear nature of operations, linearity still characterizes many operations or phases of operations. When U.S. forces lack sufficient information, are severely outnumbered, or when the threat to LOCs reduces freedom of action, a force may conduct linear operations to concentrate and synchronize combat power. In some multinational operations, the capabilities and doctrine of partners may dictate this spatial organization of the AO. In such situations commanders direct and focus on close, deep, and rear area operations. The aviation brigade contributes in combat, CS, and CSS by providing reconnaissance, security, attack, assault, utility, heavy helicopter, CASEVAC, and C^2 forces (Figure 2-3).

CLOSE AREAS

2-18. The close area is that area where the commander envisions close combat taking place or being imminent. Here he seeks to overmatch the enemy by synchronizing combat effects using maneuver and supporting fires to produce a decision. Subordinate commanders engaged in the force commander's close area designate their own close, deep, and rear areas.

2-19. Fratricide avoidance is an especially important consideration when operating near friendly ground forces. Avoidance is enhanced by—

- Detailed planning and coordination by the aviation brigade and its subordinate units with supported ground units.
- Accurate unit locations, times, frequencies, and recognition signals.
- Well-rehearsed plans, fully supported by tested battle drills involving all elements of the air and ground force.
- Common standing operating procedures (SOP) and exercises to hone skills.

DEEP AREAS

2-20. The deep area is an area forward of the close area that commanders use to shape enemy forces before they are encountered or engaged in the close area. Typically, the deep area extends from the forward boundary of subordinate units to the forward boundary of the controlling echelon. Thus, the deep area relates to the close area not only in terms of geography but also in terms of purpose and time. The aviation brigade depends heavily on its higher headquarters to develop the intelligence necessary to successfully execute operations in deep areas.

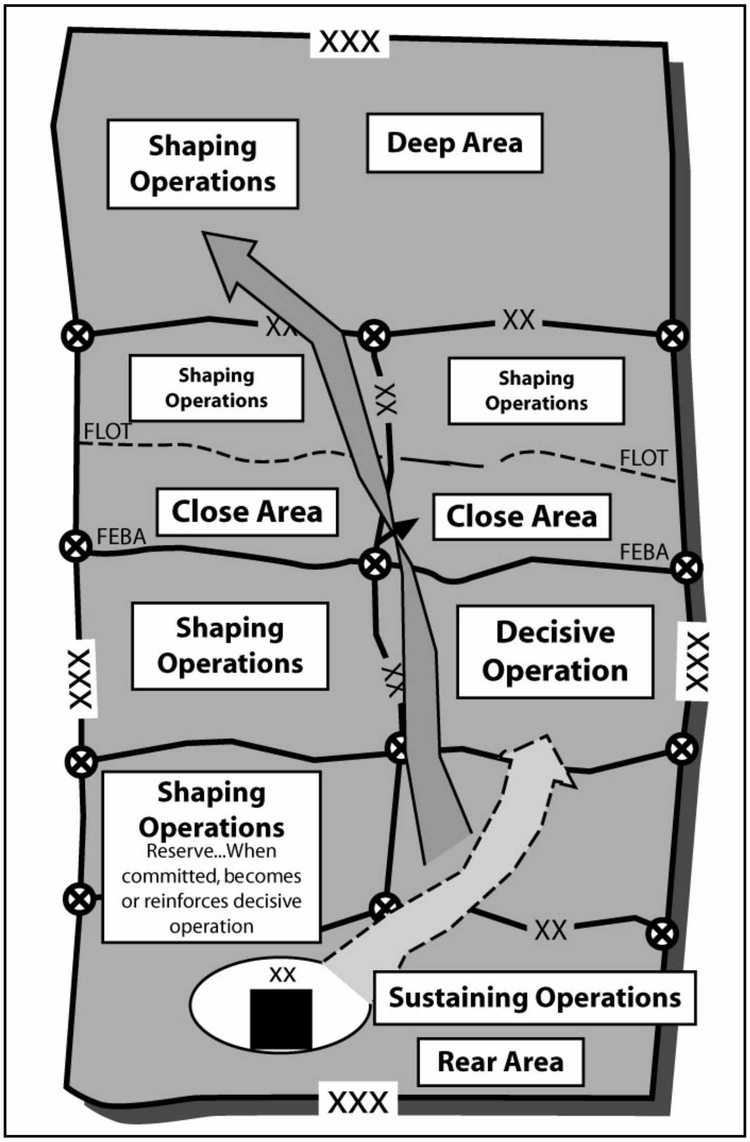


Figure 2-3. Example Defense Operation-Linear Contiguous

REAR AREAS

2-21. The rear area is a specific area within the AO used primarily for the performance of support functions. The majority of sustaining operations occur in the rear areas. Operations in rear areas assure freedom of action, continuity of operations, sustainment, and C^2. The rear area may be contiguous with or separate from a close area. On a linear battlefield, the rear area for any particular command is the area extending forward from its rear boundary to the rear of the area assigned to the next lower level of command. On the nonlinear battlefield, it may be difficult to define rear areas. In essence, rear areas are wherever there are no ground maneuver forces within the higher headquarters AO. The ability of the aviation brigade to rapidly react to enemy incursions and to move personnel and cargo allows it to contribute greatly to rear area operations. However, the potential for fratricide may be the greatest in the rear area. Detailed planning and coordination, preplanned reaction drills, SOPs, and rehearsals serve to reduce this risk.

RULES OF ENGAGEMENT, RULES OF INTERACTION

2-22. All personnel must be thoroughly familiar with the higher headquarters rules of engagement (ROE) and rules of interactions (ROI) limitations. These restrictions must be carefully considered, particularly regarding civilian effects, the legal status of isolated persons, and restrictions on fires and types of weapons. ROE and ROI should be briefed and rehearsed on a regular basis to ensure understanding and to disseminate changes. Realistic scenarios must be war-gamed and rehearsed so all members of the unit fully understand whether to engage, and the degree of force to use if engaging (see Appendix N).

SECTION II – BATTLEFIELD OPERATING SYSTEMS

INTELLIGENCE BATTLEFIELD OPERATING SYSTEM

2-23. Accurate and timely intelligence is central to the effective employment of combat power. Information dominance enables the commander to see the battlefield and to dictate, in terms of time and space, maneuver against identified enemy positions. The intelligence system plans, directs, collects, processes, produces, and disseminates intelligence on the threat and environment to perform IPB and the other intelligence tasks, such as—

- Situation development.
- Target development and support to targeting.
- Indications and warning.
- Intelligence support to BDA.
- Intelligence support to force protection.
- Intelligence support to personnel recovery .

SOURCES

2-24. Highly accurate SA is generated from many sources. These sources include national assets, UAV, Army aviation, and the many other command, control, communications, computers, intelligence, surveillance, and reconnaissance (C^4ISR) assets.

2-25. The front line soldier is another extremely valuable intelligence source. Commanders should instill in *all* crew members that they are reconnaissance soldiers. Their sightings and reporting of any activity may make the difference between victory and defeat.

INTELLIGENCE PREPARATION OF THE BATTLEFIELD

2-26. A critical part of IPB involves collaborative, cross-BOS analysis at each level of command. Accurate intelligence, sound assessments, and target development can reduce many uncertainties about the battlefield. The IPB process is the principal tool the S2 uses to analyze the enemy and the effects of the weather and terrain. FM 2-01.3 (FM 34-130) contains detailed information on the IPB process.

2-27. The ability to see the battlefield, whether linear or nonlinear, is possible only by harnessing the capabilities available to the echelons above the aviation brigade. Procedures to ensure an accurate and continually updated IPB must be developed between the brigade and its higher headquarters. These procedures should be established as soon as possible and should be reflected in the SOP before deployment.

INTELLIGENCE TEMPLATES

2-28. The S2 section provides graphic displays of doctrinal, situation, event, and decision support templates (DSTs).

Templates and Asymmetric Forces

2-29. During the Cold War, most nations patterned their doctrine after those of the two super powers—the United States of America and the Union of Soviet Socialist Republics. Consequently, many military operations around the world demonstrated a high degree of consistency. However, today, a large number of threat forces and operatives are evolving differently. Given this, it may be much harder to determine the doctrine used by threat forces and operatives. However, a pattern of operations can be determined over time, and *asynchronous* templates developed to predict patterns of operation.

Doctrinal Template

2-30. Doctrinal templates illustrate the disposition and activity of enemy forces and assets conducting a particular operation unconstrained by the effects of the battle space. They represent the application of enemy doctrine under ideal conditions. Ideally, doctrinal templates depict the enemy's normal organization for combat, frontages, depths, boundaries and other control measures. The staff uses the doctrinal template as a guide and modifies the portrayed dispositions to take advantage of available defensive terrain. It also uses doctrinal templates to determine the likely locations of high-value targets (HVTs). For unconventional operations, asynchronous templates can be developed as enemy patterns of operations emerge.

Situation Template

2-31. Situation templates are graphic depictions of expected threat dispositions should the threat adopt a particular course of action (COA). They usually depict the most critical point in the operation as agreed upon by the intelligence and operations officers. The staff uses situation templates to support staff war gaming and develops event templates.

Event Template

2-32. The differences between the named areas of interest (NAI), indicators, and target priority lists (TPL) associated with each COA form the basis of the event template. The event template is a guide for collection and intelligence, surveillance, and reconnaissance (ISR) planning. It depicts where to collect the information that will indicate which COA the threat has adopted.

Decision Support Template

2-33. The DST depicts decision points (DPs), timelines (movement of forces and the flow of the operation), and other key items of information required to execute a specific friendly COA. It translates intelligence estimates and the operation plan (OPLAN) into graphic form. This template is a total staff effort to help the commander synchronize assets and make timely decisions through war-gaming friendly and enemy COAs. The commander uses the template to confirm or deny enemy COAs, exploit assailable enemy flanks, and select HVTs for engagement. The commander may also plan to interdict critical points that will force the enemy to abandon a COA.

INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE PLAN

2-34. Collection management by the S2 is based on intelligence requirements not answered at this point by the IPB process. The ISR plan is updated continually. Frequent ISR adjustment gives the commander a time-phased picture of the battlefield. It also provides viable options for using critical assets in a timely manner.

COMMANDER'S INTENT

2-35. A clearly stated commander's intent, combined with specific commander's critical information requirements (CCIR), is fundamental to gain the intelligence information needed for the unit to accomplish its missions. These also provide the focus required to understand critical information throughout the aviation brigade.

MANEUVER BATTLEFIELD OPERATING SYSTEM

2-36. Infantry, armor, cavalry, and aviation forces are organized, trained, and equipped primarily for maneuver. Commanders maneuver these forces to gain positions of advantage against the enemy, thereby creating conditions for tactical and operational success. By maneuver, friendly forces can destroy enemy forces or hinder their movement by direct and indirect application of firepower, or the threat of its application.

2-37. The aviation brigade headquarters shapes the battle space to maximize its units' capabilities to find and fix the enemy and destroy enemy assets. It also provides firepower, supports air assaults, conducts air movement, and enhances C^2 to support ground forces.

FIRE SUPPORT BATTLEFIELD OPERATING SYSTEM

2-38. Commanders integrate and synchronize fires and effects to delay, disrupt, or destroy enemy forces, systems, and facilities. The FS system includes the collective and coordinated use of target acquisition data and indirect fire weapons. It also includes fixed-wing aircraft, armed helicopters, electronic warfare (EW), and other lethal and nonlethal means to attack targets. FS plans must be integrated and synchronized with the aviation brigade scheme of maneuver, consistent with the commander's intent, and with A^2C^2.

AIR DEFENSE BATTLEFIELD OPERATING SYSTEM

2-39. The AD system protects the force from air and missile attack, and from aerial surveillance. It prevents the enemy from interdicting friendly forces while freeing commanders to synchronize maneuver and firepower. All members of the combined arms team perform AD tasks; however, ground-based air defense artillery (ADA) units execute most Army AD operations. Air cavalry and attack aircraft sensors can help identify inbound enemy aircraft that may have evaded AD detection systems. Armed helicopters also can conduct limited defensive air combat operations to protect maneuver forces, augment AD forces, or provide self-defense for aviation forces.

MOBILITY/COUNTERMOBILITY/SURVIVABILITY BATTLEFIELD OPERATING SYSTEM

2-40. The aviation brigade contributes directly or indirectly to each of these operations.

MOBILITY

2-41. Mobility operations preserve friendly force freedom of maneuver. They include breaching obstacles, increasing battlefield circulation, improving or building roads, providing bridge and raft support, and identifying routes around contaminated areas. Aviation assets can perform reconnaissance to find adequate sites and routes, insert personnel and equipment, and provide overwatch for ground operations.

COUNTERMOBILITY

2-42. Countermobility denies mobility to enemy forces. It limits the maneuver of enemy forces and enhances the effectiveness of friendly fires. Countermobility missions include obstacle building and smoke generation. Aviation can perform reconnaissance to find appropriate sites and routes for obstacle emplacement. They can insert engineers and materiel to create obstacles and provide overwatch for ground operations. Selected UH-60s can emplace minefields with the Volcano system, while air cavalry and attack assets can provide fires to cover obstacles and employ white phosphorous rockets to provide smoke.

SURVIVABILITY

2-43. Survivability operations protect friendly forces from the effects of enemy weapons systems and from natural occurrences. Hardening of facilities and fortification of battle positions (BPs) are active survivability measures. Military deception, operations security (OPSEC), and dispersion also increase survivability. NBC defense measures are essential survivability tasks. Aviation can perform reconnaissance to find adequate sites and routes. They can insert or extract personnel and equipment and provide overwatch for ground operations. They also can conduct aerial surveys of known or suspected NBC contaminated areas.

2-44. The brigade enhances aircrew survivability by mission planning, coordination, and aircraft survivability equipment (ASE) settings based on threat analysis. Appendix J addresses aircraft survivability.

COMBAT SERVICE SUPPORT BATTLEFIELD OPERATING SYSTEM

2-45. The CSS system sustains forces. It includes use of host nation infrastructure and contracted support. CSS provides supply, maintenance, transportation, HSS, personnel support, legal support, finance, religious support, and distribution management. It also includes most aspects of CMO. Aviation forces conduct air movement operations to move personnel, supplies, and equipment to support ground forces, refugees, or disaster victims. Air cavalry and attack assets perform reconnaissance to identify routes, overwatch transport, and provide PZ or LZ security.

COMMAND AND CONTROL BATTLEFIELD OPERATING SYSTEM

2-46. C^2 is the exercise of authority and direction by a commander over assigned and attached forces. C^2 has two components—the commander and the C^2 system. Communications systems, intelligence systems, and computer networks form the backbone of C^2 systems. They allow commanders to lead from any point on the battlefield. The C^2 system enables the commander's to make informed decisions, delegate authority, and synchronize the BOS. Moreover, the C^2 system enables the commander's to adjust plans for future operations, even while focusing on the current fight.

2-47. Staffs work within the commander's intent to direct units and control resource allocations. They also are alert to spotting enemy or friendly situations that require command decisions and advise commanders concerning them. The aviation brigade enhances the supported commander's C^2 flexibility and mobility by providing UH-60 aircraft equipped with C^2 systems, and by transporting key personnel, LNOs, and high-priority messages and orders.

SECTION III - OPERATIONS

CHARACTERISTICS OF OPERATIONS

2-48. Aviation brigade missions are offensively oriented and are typically the same whether the division or corps is attacking or defending. Fundamental to the success of operations are the characteristics of surprise, concentration, tempo, and audacity.

SURPRISE

2-49. Surprise is attacking the enemy at a time or place or in a manner for which they are unprepared and do not expect. It delays enemy reactions, overloads and confuses their C^2 systems, and induces psychological shock. It also forces them to make decisions they are not prepared to make. Surprise, however, may be difficult to achieve. Especially in SSC operations, enemy forces are generally small formations imbedded in urban and restrictive terrain, and tend to be engaged at relatively close range. At all levels of conflict, the enemy has access to global news, intelligence from sympathetic factions, possible assistance from local nationals, and discreet reconnaissance provided by other potential adversaries. Cellular telephones, electronic mail, and Internet instant messenger services may also speed the enemy's receipt and dissemination of information.

2-50. Commanders and staff must perform a thorough analysis of their CCIR and guard them to preserve the element of surprise. Use of well-planned, effective deception operations also can preserve the element of surprise. Raids and air assaults at unexpected times and places can disrupt enemy operations. The air cavalry can screen the friendly force to preclude similar surprise by the enemy.

CONCENTRATION

2-51. Concentration is the massing of overwhelming combat power to achieve a single purpose. Commanders concentrate forces to the degree necessary to achieve overwhelming effects. They balance the necessity for concentrating forces with avoiding large formations that are vulnerable to attack. Synchronization is key to successful concentration.

TEMPO

2-52. Tempo is the rate of military action. After gaining the initiative, the attacker sets the tempo to maintain relentless pressure on the enemy. This forces the enemy to make decisions for which they are unprepared, to conduct maneuver they have not rehearsed, and prevents them from recovering from the initial shock of the attack. The key to maintaining the appropriate tempo is to anticipate enemy reaction within the military decision-making process (MDMP), prepare the necessary plans, rehearse as required, and then quickly maneuver forces to seize opportunities when presented. The aviation brigade's ability to rapidly exploit enemy weaknesses enhances friendly tempo.

AUDACITY

2-53. Audacity is a simple plan of action, boldly executed. It seizes and exploits the initiative. Commanders must be prepared to act quickly to exploit opportunities.

CONSIDERATIONS FOR NONLINEAR OPERATIONS

2-54. Nonlinear operations occur in contiguous and noncontiguous AOs. The AO normally is very large in comparison to the number of troops deployed for an operation. Enemy forces may be widely dispersed and numerically superior. Especially in SSC, the enemy can be expected to take advantage of restrictive and urban terrain. The fluid nature of the nonlinear battlefield and the changing disposition of attacking and defending forces, increases the potential for fratricide. The presence of noncombatants further complicates operations. Commanders must exercise prudence when clearing fires, both direct and indirect, within this setting. Appendix N contains a detailed discussion of ROE.

PLANNING CONSIDERATIONS

2-55. The aviation brigade's organization and capabilities require some unique planning considerations. A general discussion follows. Chapter 4 contains more detailed information, including identification of brigade planning responsibilities versus those of the battalion.

AIR-GROUND INTEGRATION

2-56. Air and ground assets require effective integration to conduct operations successfully and minimize the potential for fratricide and civilian casualties. Integration starts at home station with the implementation of effective tactical SOPs, habitual relationships, and training. It continues through planning, preparation, and execution of the operation (see Appendix Q).

Fundamentals

2-57. To ensure effective integration, commanders and staffs must consider some fundamentals for air-ground integration. The fundamentals that provide the framework for enhancing the effectiveness of both air and ground maneuver assets include—

- Understanding capabilities and limitations of each force.
- Use of SOPs.
- C^2.
- Maximizing and concentrating the effects of available assets.
- Employment methods.
- Coordination of direct and indirect fires.
- Synchronization.

Command and Control

2-58. Aviation assets normally remain under aviation brigade or battalion control. Subordinate battalion and company commanders operate on the command network but coordinate detailed actions on other nets or face-to-face. The commander ensures the focus of subordinate elements remains synchronized while executing various missions. He also clarifies coordination priorities and issues orders to each subordinate element, particularly on support issues, such as FARP. This does not preclude direct coordination between ground and aviation elements.

Air-Ground Control

2-59. An alternate method of C^2 is the formation of air-ground task forces or teams. This normally is a temporary relationship to deal with a specific situation. OPCON is the normal command relationship. Specific employment guidelines must be established before operations. Air-ground teams are best used when decentralized company operations are required. Based on mission, enemy, terrain and weather, troops and support available, time available, and civil considerations (METT-TC), control may reside with either the ground or air commander. Rehearsals are essential.

SECURITY/FORCE PROTECTION

2-60. Aviation units have limited capability to secure unit AAs while concurrently conducting operations and performing maintenance. A battlefield of a nonlinear, asymmetric nature requires that aviation forces carefully consider security force requirements. This battlefield rarely has clearly defined flanks or rear areas. Forces must be allocated to protect critical assets against conventional and terrorist attacks. Mutual support can reduce the amount of dedicated security needed by aviation forces.

LOGISTICS SUPPORT

2-61. The combination of the nonlinear battlefield and the diversity of the aviation brigade's battalions often requires that FARPs and maintenance teams operate simultaneously at different locations. Establishment and resupply operations require careful planning and coordination. When possible, these activities should be part of the mission rehearsal.

Chapter 3

Battle Command

Leadership is based on the knowledge of men. Man is the fundamental instrument in war; other instruments change but he remains relatively constant. Unless his behavior and elemental attributes are understood, gross mistakes will be made in planning operations and troop leading. In the training of the individual soldier, the essential considerations are to integrate individuals into a group and to establish for that group a high standard of military conduct and performance of duty without destroying the initiative of the individual.

Chapter 4, Page 27
War Department Field Manual FM 100-5
Field Service Regulations
Operations
War Department, 15 June 1944

SECTION I - GENERAL

CONCEPT OF BATTLE COMMAND

3-1. Battle command is the art of combat decision-making, leading, and motivating soldiers—and their organizations—into action to accomplish missions. It visualizes the current and future status of friendly and enemy forces, then formulates concepts of operations to accomplish the mission. It assigns missions, prioritizes and allocates resources, and assesses risks. It also selects the critical time and place to act, and knows how and when to make critical adjustments during the fight. Commanders must see, hear, and understand the needs of seniors and subordinates, and guide their organizations toward the desired end. The concept of battle command incorporates three vital components—***decision making***, ***leadership***, and ***control***. These components are discussed below.

DECISION-MAKING

3-2. Decision-making is knowing whether to decide, then when and what to decide. These are tactical and operational judgments, but can be strategic judgments. To command is to—

- Anticipate the activities that will be put into motion once a decision is made.
- Know how irretrievable some commitments will be once put into motion.
- Know the consequences of deciding.
- Anticipate the outcomes that can be expected from implementing a decision.

LEADERSHIP

3-3. Leadership is taking responsibility for decisions. It is loyalty to subordinates, inspiring and directing assigned forces and resources toward a purposeful end, and establishing a teamwork climate. The climate should produce success and demonstrate moral and physical courage in the face of adversity. It also provides the vision that both focuses and anticipates the future course of events.

3-4. "The duty of every leader is to be competent in the profession of arms. Competence requires proficiency in four skill sets: interpersonal, conceptual, technical, and tactical. Army leaders hone these skills through continual training and self-study. . ..." [1]

CONTROL

3-5. Control is inherent in battle command. Control monitors the status of organizational effectiveness. It identifies deviations from standards and corrects them. Control provides the means to regulate, synchronize, and monitor forces and functions. These tasks are performed through collection, fusion, assessment, and dissemination of information and data.

3-6. Commanders control operations. Commanders lead from critical points on the battlefield, delegate authority, and synchronize aviation actions with other battlefield operations. Skilled staffs work within command intent to direct and control units. Skilled staffs resource allocations to support the desired end.

SECTION II – COMMAND AND CONTROL

COMMAND AND CONTROL SYSTEM

3-7. The C^2 system is defined as the facilities, equipment, communications, procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned forces.

3-8. ABCS provides the electronic architecture in which we build SA. Signal planning increases the commander's options by providing the requisite signal support systems for varying operational tempos. These systems pass critical information at decisive times; thus, they leverage and exploit tactical success and make future operations easier. The three levels of ABCS are—

- Global Command and Control System—Army (GCCS-A).
- Army tactical command and control system (ATCCS).
- Force XXI Battle Command Brigade and Below (FBCB2).

3-9. Appendix K contains additional information on ABCS.

3-10. The C^2 system gives the commander structure and means to make and convey decisions and to evaluate the situation as it develops. The decisions and higher-level intent are then translated into productive actions. The

[1] FM 3-0, *Operations*, 14 June 2001, para. 4-17, p. 4-7.

decisions are based on the information derived from the C^2 process, which consists of the following:

- Acquire information.
- Assess whether new actions are required.
- Determine what these actions should be.
- Direct subordinates to take appropriate actions.
- Supervise and assess.

3-11. Effective and efficient C^2 is a process that begins and ends with the commander. The commander must develop techniques and procedures that promote an expeditious flow of information throughout the entire C^2 process. These techniques and procedures should be in the unit's tactical SOP. FM 5-0 (FM 101-5) and FM 1-02 (FM 101-5-1) discusses various techniques.

COMMAND AND SUPPORT RELATIONSHIPS

3-12. Command and support relationships are fundamental to aviation operations. Table 3-1 depicts relationships and responsibilities.

COMMAND RELATIONSHIPS

3-13. The command relationships are assigned, attached, OPCON, or TACON. An aviation brigade unit is attached only to a unit that can support its logistics needs. The aviation unit is placed under OPCON or TACON when it is to be used for a specific mission, the effective time of the relationship is short, or the gaining unit is unable to provide logistics support. Normally, the parent headquarters retains control of the aviation unit. Subordinate units may also be assigned, attached, OPCON, and TACON. The air cavalry and attack units, pure or task-organized are—

- Attached to other aviation brigades; however, some support may still have to come from the parent headquarters depending on the duration, or intensity of the mission.
- Placed under OPCON or TACON of the gaining unit when the unit is to be used for a specific mission, the effective time of the relationship is short, or the gaining unit is unable to provide logistics support.

Assigned

3-14. *Assigned* is to place units or personnel in an organization where such placement is relatively permanent. The organization controls and administers the units or personnel for the primary function, or greater portion of the functions, of the unit or personnel.

Table 3-1. Command Relationship To Inherent Responsibility

If Relationship Is:		Inherent Responsibilities Are: Has command relationship with:	May be task-organized by:	Receives CSS from:	Assigned position or AO by:	Provides liaison to:	Establishes/ maintains commo with:	Has priorities established by:	Gaining unit can impose further command or support relationship of:
Command	Attached	Gaining unit	Gaining unit	Gaining unit	Gaining unit	As required by gaining unit	Unit to which attached	Gaining unit	Attached; OPCON; TACON; GS; DS
Command	OPCON	Gaining unit	Parent unit and gaining unit; gaining unit may pass OPCON to lower HQ Note 1	Parent unit	Gaining unit	As required by gaining unit	As required by gaining unit and parent unit	Gaining unit	OPCON; TACON; GS; DS
Command	TACON	Gaining unit	Parent unit	Parent unit	Gaining unit	As required by gaining unit	As required by gaining unit and parent unit	Gaining unit	GS; DS
Command	Assigned	Parent unit	Parent unit	Parent unit	Gaining unit	As required by parent unit	As required by gaining unit	Parent unit	Not applicable
Support	DS	Parent unit	Parent unit	Parent unit	Supported unit	Supported unit	Parent unit; supported unit	Supported unit	Note 2
Support	GS	Parent unit	Parent unit	Parent unit	Parent unit	As required by parent unit	As required by parent unit	Parent unit	Not applicable

NOTE 1: In NATO, the gaining unit may not task-organize a multinational unit.

NOTE 2: Commanders of units in DS may further assign support relationships between their subordinate units and elements of the supported unit after coordination with the supported commander.

Attached

3-15. *Attached* is the placement of units or personnel in an organization where such placement is relatively temporary. Subject to limitations imposed by the attachment order, the commander of the unit receiving the attachment provides sustainment support above its organic capability. Normally, the parent unit is responsibility for transfers, promotion of personnel, nonjudicial punishment, courts martial, and administrative actions.

Operational Control

3-16. *OPCON* is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. OPCON may be delegated. It includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. OPCON normally provides full authority to organize commands and forces and to employ those forces as the commander considers necessary to accomplish assigned missions. OPCON does not, in and of itself, include authoritative direction for logistics or matters of administration, discipline, internal organization, or unit training.

Tactical Control

3-17. *TACON* is the command authority that is limited to the detailed and, usually, local direction and control of movements or maneuvers necessary to accomplish missions or tasks assigned. TACON is inherent in OPCON. TACON may be delegated. TACON allows commanders to apply force and direct the tactical use of logistics assets but does not provide authority to change organizational structure or direct administrative and logistical support.

SUPPORT RELATIONSHIPS

3-18. The support relationships of utility and heavy helicopter assets are DS and GS. Specific definitions and missions are listed below.

Direct Support

3-19. DS is a mission requiring a force to support another specific force and authorizing it to answer directly to the supported force's request for assistance. Assault and heavy helicopter units will often be placed in a DS role for air movement operations, particularly logistics movement. When operating in a DS role, the missions can be coordinated directly between the aviation unit and the supported unit.

General Support

3-20. GS is the support that is given to the supported force as a whole and not to any particular subdivision thereof. As an example, assault helicopters units assigned at EAC and corps levels may be placed in GS to several units within the theater or corps. These units will receive missions from their parent headquarters based upon support priorities established by theater and corps commanders. When operating in a GS role, the supported unit must request aviation support from the appropriate headquarters (division G3 for divisional aviation assets, corps G3 for corps aviation assets).

PLANNING

3-21. The aviation brigade develops its OPLANs as an integral part of its higher headquarters staff, at its own headquarters, or both.

PLANNING AT THE BRIGADE'S HIGHER HEADQUARTERS

3-22. The major advantage of the aviation brigade assisting the higher headquarters staff in the development of the overall plan is that it saves time. The intelligence situation and air tasking order (ATO) changes and restrictions are immediately available to all planners. Additionally, because aviation expertise is involved throughout the planning process, it ensures that aviation-related issues are resolved concurrently with plan development. All of the above preclude the time-consuming queries associated with planning at different locations, thus saving critical time in developing and distributing the required orders to execute the plan.

PLANNING AT THE AVIATION BRIGADE HEADQUARTERS

3-23. In addition to the planning for the operational mission, the aviation brigade must ensure the myriad details of aviation operations are also accomplished. Those details are planned, coordinated, and rehearsed concurrently with OPLAN development. Examples of ongoing preparation include—

- Task organization actions, such as unit movements or exchange of liaison personnel.
- Airspace C^2 coordination.
- Theater air-ground system (TAGS), airspace control order (ACO), ATO, and special instructions (SPINS).
- Selected rehearsals and training.
- FARP movement, composition, and emplacement.
- Maintenance support movement, composition, and emplacement.
- Downed aircrew recovery plans and procedures.
- Weather checks and analysis.
- Passage of lines planning.
- AD status.
- Weapons configurations and loads.
- External fuel tank distribution and management.
- Internal configuration of utility and cargo aircraft.
- Communications planning.
- Personnel recovery planning.

MILITARY DECISION-MAKING PROCESS

3-24. To effectively plan and coordinate missions, the commander and staff follow the MDMP. FM 5-0 (FM 101-5) discusses the process in detail.

TROOP-LEADING PROCEDURES

3-25. Although the MDMP is essential to accomplish the mission, effective troop-leading procedures are equally important. For this reason troop-leading procedures must be a matter of SOP and checklists within that SOP. Although personality can accomplish much in certain circumstances, a missed step can easily lead to mission shortfalls or failure. Written troop-leading procedure steps provide a guide the leader applies in ways that are consistent with the situation, the leader's experience, and the experience of subordinate leaders.

3-26. Troop-leading procedures ensure rapid setup, tear down, and movement of C^2 elements. The brigade C^2 elements and supporting signal units must practice to ensure they relocate in a timely manner.

3-27. Figure 3-1 shows the relationship between the MDMP and troop-leading procedures.

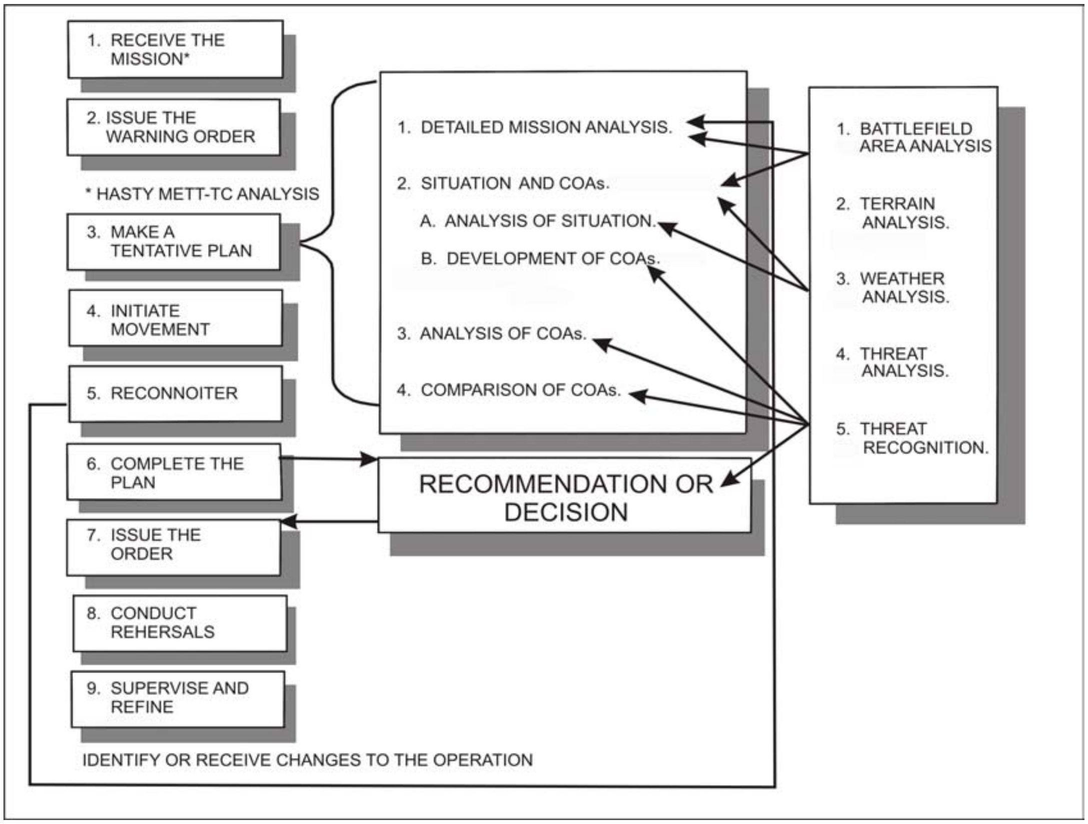


Figure 3-1. The MDMP Model and Troop-Leading Procedures

DECIDE, DETECT, DELIVER, ASSESS METHODOLOGY

3-28. Decide, detect, deliver, assess (D^3A) methodology facilitates the attack of the right target or objective with the right asset at the right time. It was developed principally for targeting. Although D^3A applies to Army aviation, it does so in a slightly different manner. Aviation flies manned aircraft (and coordinates for UAV and other support) to a target area to deliver ordnance, and when required, conducts air assaults to achieve the desired results. For aviation, D^3A is much more than targeting. The D^3A process outlined below offers a method for aviation commanders to make the optimal use of the process.

DECIDE, DETECT, DELIVER, ASSESS UTILIZATION

3-29. D^3A is used in every aspect of mission planning. What must be accomplished may be included in the orders/directives from higher headquarters or it may fall squarely on the commander. D^3A helps the commander decide what to attack, how to acquire necessary enemy information, when best to attack, and how to attack in a way that meets the higher commander's intent. Finally, it enables the commander to know whether the guidance has been met. D^3A is a dynamic process. It must keep up with the changing face of the battlefield.

3-30. A HVT is a target the enemy commander requires for the successful completion of the mission. The loss of HVTs would be expected to seriously degrade important enemy functions throughout the friendly commander's area of interest.

3-31. A high-payoff target (HPT) is a target whose loss to the enemy will significantly contribute to the success of the friendly COA. HPTs are those HVTs, identified through war gaming, that must be acquired and successfully attacked for the success of the friendly commander's mission.

DECIDE

3-32. The *decide* function is the first step of the D^3A process. It is based on current intelligence and helps define further intelligence development requirements. Targeting priorities must be addressed for each phase or critical event of an operation. The products developed include the high-payoff target list (HPTL). The HPTL is a prioritized list containing those targets whose loss to the enemy will contribute to the success of the friendly COA. It also includes the main targets and those targets that protect it. It provides the overall focus and sets priorities for intelligence collection, target selection standards (TSS) and attack planning. The *decide* function should answer the following questions:

- What targets or objectives should be acquired and attacked?
- In what priority should targets or objectives be attacked?
- When and where are the targets or objectives likely to be found?
- What routes are required for Army aviation ingress and egress?
- Who or what can locate the targets?
- How accurately must the target location be known to initiate the attack?
- What channels are needed to provide acquisition on a real-time basis?

3-33. The *decide* function is facilitated and supported by—

- The intelligence collection plan (which may include external assets such as UAVs, Air Force, Navy, and Marine assets) that answers the commander's priority information requirements (PIR), to include those HPTs designated as PIR. At division level and below, an ISR plan supports the intelligence collection plan (see FM 2-00.21 [FM 34-2-1]).
- The TSS that address target location accuracy or other specific criteria that must be met before targets can be attacked.
- The attack guidance matrix that is approved by the commander addresses which targets will be attacked, how, when, and the desired effects.

HIGH-PAYOFF TARGET LIST

3-34. The HPTL indicates the prioritized targets to be acquired and attacked for each phase of the battle. The number of target priorities should not be excessive. Too many priorities dilute intelligence collection, acquisition, and attack efforts. The HPTL is used as a planning tool to determine attack guidance and to refine the intelligence collection/ISR plan. This list may indicate the commander's operational need for BDA of the specific target and the time window for collecting and reporting it.

DETECT

3-35. The *detect* process finds the HPTs (critical enemy forces) that must be attacked to accomplish what has been decided for each phase of an operation. Target acquisition assets and agencies execute the intelligence collection plan and focus on specific areas of interest. Mobile HPTs must be detected and tracked to maintain a current target location. Target tracking is inherent to detection and is executed throughout the collection plan. Tracking priorities are based on the commander's concept of the operation and targeting priorities. The *detect* function should answer the following questions:

- What is the target description and its size?
- Where are the targets?
- What objective must be secured?
- How long will the enemy remain in the desired target area once acquired?
- Do any ingress or egress routes have to be changed or modified?

Collection

3-36. The S2 is the main figure in directing the effort to detect the HPTs identified in the *decide* function. He determines accurate, identifiable, and timely requirements for collection systems. The *detect* function involves locating HPTs accurately enough to engage them. It primarily entails executing the intelligence collection plan.

DELIVER

3-37. The *deliver* function of the process executes the attack guidance and supports the commander's battle plan once the HPTs have been located and identified. Both tactical and technical decisions affect the selection of the attack systems and the units to conduct the attack. The decisions are reflected in the staff's earlier development of the attack guidance matrix, schemes of maneuver, and FS plans for planned targets. The decision to attack targets of opportunity follows the attack guidance. It is based on factors such as target activity, dwell time, and payoff compared to other targets currently being processed for engagement. The *deliver* function should answer the following questions:

- When should the target or objective be attacked?
- What is protecting the target and how will those targets be neutralized or destroyed?
- What is the desired effect/degree of damage?
- What attack system (aviation, artillery, other service, lethal or nonlethal) should be used?
- What unit(s), including ground forces, will conduct the attack?
- What are the number and type of munitions to be employed?
- What is the response time of the attacking unit(s)?

Attack Guidance

3-38. Attack guidance is recommended by the staff, approved by the commander, and distributed via the attack guidance matrix. The guidance should detail a prioritized list of HPTs; when, how, desired effects, SPINS, and those HPTs that require BDA. The S3 or fire support officer (FSO) recommends the attack system for each target. All attack assets, including ground forces, should be considered. The attack should optimize the capabilities of—

- Ground and SOF.
- Helicopters.
- Armed UAVs.
- Indirect fire assets: artillery, mortars, Naval surface fire support (NSFS).
- Combat air operations—CAS and air interdiction (AI).
- Engineers (countermobility: helicopter and artillery delivered mines).
- ADA.
- Cruise missiles.
- EW.
- Psychological operations (PSYOP).
- Civil affairs.
- Deception.

Attack Criteria

3-39. Effects refer to the target or objective attack criteria. The S3/FSO specifies attack criteria according to higher headquarters guidance. Target criteria should be given in quantifiable terms. Criteria may be expressed as a percentage of casualties, destroyed elements, time on target (TOT), duration of fires, number of tubes or launchers, allocation or application of assets. If ground forces are required to achieve the desired effects, the size of force, time on the ground, extraction, and linkup plans must be determined. Additionally, the S3/FSO should identify accuracy or time constraints, required coordination, limitations on amount or types of ammunition (Table 3-2), use of ground forces, and BDA requirements.

Table 3-2. Munitions Selection

PREFERRED MUNITIONS	TYPE TARGETS
Missile, radar frequency (RF) Hellfire	Heavy armor, bunkers, cave entrances, helicopters, slow-moving fixed-wing aircraft, other hard targets. Used when minimizing exposure is essential for survival.
Missile, semiactive laser (SAL) Hellfire	Heavy armor, bunkers, cave entrances, helicopters, slow-moving fixed-wing aircraft, other hard targets. Used when a good line of sight (LOS) to target is available and to conserve RF missiles
Missile, Stinger	Helicopters, slow-moving fixed-wing aircraft.
Cannon, 30 mm high explosive, dual purpose	Materiel, personnel, and helicopters.
Machine Gun, .50 caliber ball	Personnel and unarmored targets.
Machine Gun, .50 caliber tracer	Observation of trajectory, incendiary effect, signaling.
Machine Gun, .50 caliber, armor piercing	Light armor, concrete shelters, and similar bullet resistant targets.
Machine Gun, .50 caliber, incendiary	Hardened or armored targets to ignite flammable material.
Machine Gun, .50 caliber, armor piercing incendiary	Combined effects of armor piercing and incendiary rounds.
Machine Gun, 7.62 mm ball	Personnel and unarmored targets.
Machine Gun, 7.62 mm tracer	Observation of trajectory, incendiary effect, signaling.
Machine Gun, 7.62 mm armor piercing	Light armor, concrete shelters, and similar bullet resistant targets.
Rocket, high explosive	Materiel, personnel.
Rocket, high explosive multi-purpose	Light armor, wheeled vehicles, materiel, personnel.
Rocket, flechette	Personnel, unarmored vehicles, and helicopters.
Rocket, illumination	Battlefield illumination, shut-down of enemy night vision devices (NVDs).
Rocket, white phosphorous (smoke)	Target marking, incendiary.

Danger Close

3-40. FM 3-09.32 (FM 90-20) provides risk-estimates for fixed- and rotary-winged aircraft-delivered ordnance.

3-41. FM 3-09.32 (FM 90-20) designates danger close for Army aircraft systems as—

- Hellfire, 75 m.
- Rockets, 175 m.
- Guns, 150 m.

WARNING
These estimates and the resultant danger close ranges are for use in combat and are not minimum safe distances for peacetime training use. The supported commander must accept responsibility for the risk to friendly forces when targets are inside the danger close range.

3-42. Aviation commanders must consider aircrew proficiency when operating near ground troops, especially with rockets and guns.

ASSESS

3-43. Combat assessment is the determination of the overall effectiveness of force employment during military operations. Combat assessment is composed of the following three major components:

- BDA.
- Munitions effectiveness assessment.
- Reattack recommendation.

3-44. BDA is the timely and accurate estimate of damage resulting from the application of military force. BDA provides commanders with snapshots of their effectiveness on the enemy and an estimate of the enemy's remaining combat effectiveness, capabilities, and intentions. It provides essential information for determining if a reattack is required.

3-45. Munitions effectiveness assessment is conducted concurrently with BDA. It is the basis of recommendations for changes to increase the effectiveness of—

- Methodology.
- Tactics.
- Weapon system.
- Munitions.
- Weapon delivery parameters.

3-46. Reattack and other recommendations should address operational objectives relative to—

- Target.
- Target critical elements.
- Target systems.
- Enemy combat force strengths.

INTEGRATION OF THE DECIDE, DETECT, DELIVER, ASSESS PROCESS INTO THE DECISION-MAKING PROCESS

3-47. The D^3A process is integrated into the unit's MDMP. As the staff develops plans for future operations, they use the D^3A methodology to ensure the synchronization of the plan.

MISSION ANALYSIS

3-48. During mission analysis, the S2 provides the HVT that result from aviation brigade and higher headquarters analysis of the enemy COAs. The HVT list details the capabilities and limitations of each target. Additionally, each staff member reviews the assets available to acquire (*detect*), attack (*deliver*), or *assess* targets.

COMMANDER'S GUIDANCE

3-49. The commander issues guidance following approval of the restated mission. This guidance provides the staff an initial planning focus. The commander identifies the enemy COA considered most probable or most dangerous, along with its associated HVTs. The commander also identifies an initial focus on targets deemed critical to mission success. While issuing guidance on the scheme of maneuver, the commander issues initial attack guidance, indicating the desired effect on targets.

COURSE OF ACTION DEVELOPMENT

3-50. During the development of each COA, the staff determines the targets that, if successfully attacked, would contribute to the success of the mission. Forces are arrayed to acquire and attack these tentative HPTs to meet the commander's guidance.

COURSE OF ACTION ANALYSIS AND COMPARISON

3-51. The staff analyzes the COAs by risk assessment, war gaming, and a comparison of the war game results. During war gaming the staff prioritizes the HPTs and determines which assets are available to acquire the targets (this becomes the basis for the S2's ISR plan). The staff also determines which attack mechanisms are available to achieve the desired effects on the target. TSS are determined to identify the time and accuracy requirements necessary to destroy HPTs. Additionally, war gaming establishes the criteria for a successful attack, actions to achieve BDA, and reattack options. During COA comparison the staff can use the COA's ability to achieve the commander's attack guidance as a criterion. The results of the war gaming are reflected in the development of the initial targeting synchronization matrix.

AVIATION MISSION PLANNING SYSTEM

3-52. Aviation mission planning system (AMPS) is an automated mission planning and synchronization tool designed specifically for aviation operations. Generally, it is used in the flight planning sections or tactical operations center (TOC) operations cells of aviation brigades, battalion/squadrons and company/troops. AMPS functions include tactical planning, mission management, and maintenance management functions.

AVIATION MISSION PLANNING SYSTEM TACTICAL PLANNING FUNCTION

3-53. The tactical planning function includes brigade and battalion/ squadron level planning tasks, such as intelligence data processing, route, communications, and navigation planning. This facilitates review and preparation of the air mission brief. Additional AMPS uses are—

- Detailed terrain analysis.
- Determining LOS and intervisibility between a BP and an engagement area (EA).
- Determining prominent terrain along the route to be flown, using the perspective view feature.

3-54. Each of the LNOs that support ground maneuver brigades, and the LNOs supporting the division main (DMAIN) and tactical CPs, have an AMPS available to assist COA development and war gaming during the MDMP, reverse-planning and coordination. During air assaults, the ground maneuver air assault task force staff can exploit AMPS and the LNO to simplify preparation of the landing plan, air movement plan and loading plan. The division DOCC similarly may employ AMPS to plan shaping operations and integrate aviation routes with other deep joint suppression of enemy air defense (JSEAD)/shaping fires and AI.

3-55. Because LNOs, aviation brigade, and battalion and below planners have AMPS access, planning can occur concurrently. Planners can use AMPS to pass aviation brigade, DOCC, and ground maneuver planning to lower echelons to update their plans. The orders function of AMPS assists operation order (OPORD), warning order (WARNORD), and fragmentary order (FRAGO) development and distribution to lower echelons. This facilitates the passing of up-to-date information and changes from higher headquarters and supported units.

3-56. The mission management function also facilitates company and platoon level planning. These tasks include aircraft performance planning, weight and balance calculations, flight planning, and fighter management. The tasks also include OPLAN changes and OPORD development. It helps companies and platoons conduct rehearsals using the route visualization and intervisibility features of AMPS.

AVIATION MISSION PLANNING SYSTEM MISSION MANAGEMENT FUNCTION

3-57. AMPS and maneuver control system (MCS) work together as complimentary systems. During the mission, MCS receives enemy locations, friendly locations, preplanned artillery locations, and forecast weather and transfers data to AMPS. AMPS applies the technical characteristics of the aircraft (speed, range, and payload) to give the commander mission alternatives.

3-58. When mission changes occur, commanders at all echelons can direct staffs to employ AMPS to speed the development of revised plans and new FRAGOs. This can involve new and alternate routes to a changing EA or objective of air assaults.

3-59. As one phase of a mission completes, the download of aircraft data into AMPS and subsequently MCS, can assist development of intelligence for higher echelons and staffs planning follow-on missions.

AVIATION MISSION PLANNING SYSTEM MAINTENANCE MANAGEMENT FUNCTION

3-60. The maintenance management function primarily assists unit level maintenance. This function permits postmission downloading of aircraft data by maintenance personnel.

AVIATION MISSION PLANNING SYSTEM DATA

3-61. Aviation units may save AMPS data on a data transfer cartridge (DTC) used to upload mission data to the aircraft via the data transfer module (DTM). Data created at battalion level is given to the company for its own detailed planning down to platoon level. Printed output products can include weight and balance forms, strip maps, flight planning data, OPORDs, route navigation, and communications cards. After mission completion, aircrews use the DTC to download mission history to AMPS. Units can transfer AMPS postmission products, such as enemy locations and BDA, to MCS to update the tactical situation. Aviation units also can employ AMPS, with a tactical communication interface module (TCIM), to view video cross link (VIXL) imagery sent from the OH-58D. Video imagery sent using VIXL requires the transmitting aircraft to address the image directly to a specific AMPS.

AVIATION MISSION PLANNING SYSTEM MAPS

3-62. AMPS can generate maps, created from a compressed ARC digitized raster graphic (CADRG) and digital terrain elevation data (DTED) media available from the National Imagery and Mapping Agency (NIMA) databases. Digitally-cut compact discs-read only memory (CD-ROMs) store maps for a particular AO for ready transfer to floppy disks, compact discs ReWritable (CD-RWs) or the AMPS hard drive. Units can maintain and organize different AO databases or various scale maps on floppy disks.

AVIATION MISSION PLANNING SYSTEM LIMITATIONS

3-63. Because nearly all Army aircraft employ different DTCs, a single AMPS planning database cannot fill the DTCs for all aircraft types involved in any given mission. Units may employ a local area network (LAN), CD-RW, or floppy disc to transfer the planning database of one AMPS to another. Once this database transfers, the gaining AMPS operator can modify the data to fit the specific aircraft and use that aircraft's DTC to download mission information.

3-64. The long-term solution for data transfer is a standardized Personal Computer Memory Card International Association data transfer card such as that for Comanche. Future requirements exist to update planning in flight via joint variable message format (JVMF) message to the aircraft improved data modem (IDM).

BATTLE RHYTHM

3-65. Successful continuous operations require a tactical SOP that covers the management of rest, especially for critical personnel. For the purposes of describing the aspects of that requirement, the commonly accepted term battle rhythm is used.

OPERATIONAL TEMPO AND BATTLE RHYTHM

3-66. The aviation brigade should be staffed for 24-hour operations; however, it also conducts cyclical missions. SOPs establish methods of ensuring the right personnel are available for either cyclical or 24-hour operations. Regardless of the methods used, practice during exercises must determine the strengths and weaknesses of each shift. Such knowledge allows leaders to focus on the critical areas that require additional training.

Absence of Battle Rhythm

3-67. Without the procedures to establish battle rhythm, leaders and units reach a point of diminished returns. This typically occurs between 72-96 hours of operations. As leader fatigue sets in, information flow, the planning process, execution, and CSS suffer—often greatly. Symptoms of diminished battle rhythm include—

- Leader fatigue.
- Leaders who are not fully aware of critical DPs.
- Leaders who are not available at critical DPs.
- Disjointed timelines between various levels of command.

Presence of Battle Rhythm

3-68. Battle rhythm allows units and leaders to function at a sustained level of efficiency for extended periods. Effective battle rhythm permits an acceptable level of leadership at all times. It can focus leadership at critical points in the fight or during particular events. Procedures and processes that facilitate efficient decision-making and parallel planning are critical to achieving battle rhythm. Every component of battle rhythm makes unique contributions to sustained operations.

Training

3-69. It is difficult, if not impossible, to establish battle rhythm while simultaneously conducting operations. Preplanning makes it happen. Planning, preparing, and training before deployment lays a solid foundation for a viable battle rhythm during operations.

Battle Rhythm Elements

3-70. Battle rhythm is a multifaceted concept that includes the following elements:

- Sleep/rest plans.
- Trained second and third-tier leadership in CPs and administrative and logistics operations centers (ALOCs).
- Synchronized multiechelon timelines.

- Established processes and SOPs.

Staff Depth

3-71. Established processes and SOPs relieve many antagonistic effects of extended operations. SOPs that establish and maintain battle rhythm by facilitating routine decisions and operations are a step in the right direction. Soldiers who are trained to do the right things in the absence of leaders or orders can relieve commanders and staff of many of the time-consuming tasks that rob them of essential rest. Examples of areas that noncommissioned officers (NCOs) and junior officers can accomplish for the commander and staff include—

- Battle summaries and updates during a fight.
- Intelligence updates before, during, and after a battle.
- CSS updates before, during, and after a battle.
- Updates to the next higher commander.
- Shift change briefings.

Challenges of Battle Rhythm

3-72. Challenges to battle rhythm include NCO and junior officer duties and field grade duties. They also include synchronization of planning, execution, and rehearsal timelines.

Noncommissioned Officer and Junior Officer Responsibilities

3-73. NCOs and junior officers can provide valuable contributions to operations. However, NCOs and junior officers manning CPs and ALOCs are sometimes relegated to menial tasks, such as CP/ALOC security and TOC setup and teardown. They contribute little to the tactical missions. The improper use of personnel produces the following results:

- Key leaders become exhausted.
- Battle staff trained NCOs fade into obscurity during operations.
- The initiative of trained subordinates is stifled, and the incentive to train is diminished.

3-74. The following techniques ensure proper use of personnel:

- Appropriate tasks are assigned to junior NCOs and specialists.
- Routine things are done routinely. Effective training and SOPs will instill trust in the officers and confidence in junior NCOs and specialists.
- Field grade officer duties are examined. This ensures that they are not tasked with taking spot reports, updating maps, and manning the CP during noncritical times.

Continuous Operations and Timelines Synchronization

3-75. Timelines for the operation at hand must consider not only the next operation, but also extended continuous operations. Synchronized, multiechelon timelines assist units in achieving battle rhythm. If units do not address critical events at least one level up and down, disruption results. An example of an unsynchronized timeline is a brigade rehearsal that conflicts with company inspections or other events in their internal timeline. Lower echelon units seldom recover from a poor timeline directed by a higher headquarters. Development of SOPs that include planning, rehearsal, and execution timelines two levels below brigade prevents these conflicts.

Sleep Plans

3-76. Units must develop detailed rest plans and enforce them. Leaders have to rest to maintain their effectiveness; however, some leaders attempt to get involved in every aspect of planning and execution. This phenomenon is linked to trust and confidence building. The attitude that it is easier to do something yourself than it is to train someone else to do it can unhinge any rest plan. An integral part of the planning process is to determine when senior leader presence is required. It is just as important to identify when a leader's presence is not required. The planning process should include the following supporting techniques:

- Include a sleep plan in the METT-TC analysis.
- Ensure that leaders have confidence in the second and third echelon of leadership and their ability to make routine decisions.
- Instill trust and confidence in the officers, junior NCOs, and specialists by effective training and SOPs.
- Consider contingencies and establish criteria for waking leaders.
- Post sleep plans in CPs.
- Synchronize sleep plans with higher and subordinate headquarters.

STANDING OPERATING PROCEDURES UTILIZATION

3-77. SOPs must be practiced and reviewed during professional development and sergeants' time. The existence of an SOP will not resolve troop-leading challenges unless the SOP is practiced often and internalized by unit members. Checklists are critical, as many leaders will often find themselves rushed, physically fatigued, distracted, and deprived of sleep. Checklists ensure that each step is considered even when leaders are exhausted. Appendix B addresses tactical SOP considerations:

PILOTS' BRIEFS

3-78. Pilots' briefs normally are not conducted at the brigade level. However, the brigade commander, his staff aviators, senior flying warrant officers, and flight surgeon (FS) should attend subordinate unit pilot briefs on a routine basis. This ensures their own familiarity with subordinate unit personnel, operations, and tactics, techniques, and procedures (TTP). Additionally, regular attendance at pilots' briefs provide the brigade and subordinate commanders and staffs with direct feedback on the interaction between brigade and battalion operations. Lastly, subordinate commanders, operations personnel, standardization, safety, and maintenance officers (MOs) should attend periodically the pilots' briefs of other units to understand the level of standardization within the brigade.

SECTION III – REHEARSALS

GENERAL

3-79. A rehearsal is essential for success in operations. Appendix G, FM 5-0 (FM 101-5) contains a discussion of rehearsal types, techniques, responsibilities, and conduct. Items critical to aviation operations are discussed below.

3-80. Rehearsal types include—

- Confirmation Brief.
- Backbrief.
- Combined Arms Rehearsal.
- Support Rehearsal.
- Battle Drill or SOP Rehearsal.

3-81. Rehearsal techniques include—

- Full Dress Rehearsal.
- Reduced Force Rehearsal.
- Terrain Model Rehearsal.
- Sketch Map Rehearsal.
- Map Rehearsal.
- Radio Rehearsal.

3-82. Once commanders are satisfied that personnel understand the concept of operation, they must rehearse the plan. Rehearsals are accomplished at all levels. They may be conducted separately at each echelon, in one large rehearsal, or using a combination of the two. An appropriate large rehearsal would be operation in a deep area or cross-forward line of own troops (FLOT) air assault. An appropriate by-echelon rehearsal would be normal support to daily operations. Rehearsals are as detailed as time and resources permit. They may be a series of full-up, live-fire rehearsals or as simple as a quick review on the map. All rehearsals must include reviewing or conducting—

- Actions on the objective.
- Maneuver, movement, and fires.
- Critical event rehearsals (FARP, PZ).
- Contact drills en route.
- Contingencies.

REHEARSAL SEQUENCE AND ATTENDANCE

3-83. The rehearsal's sequence of events and who attends are both critical. All critical members of the units should attend. Critical members are those who have key parts in the operation and whose failure to accomplish a task could cause mission failures. Rehearsals should start at the objective. One major reason for starting at the objective is time. If time becomes critical during the rehearsal, then give adequate attention to the most critical part of the mission. If time allows, the rehearsal should also cover—

- Actions on the objective.
- Actions on contact.
- Occupation of reconnaissance or surveillance positions, BPs, and landing plans.
- Passage of lines.
- En route and return route plans.
- Actions in the AA (outfront boresight, communication checks, line-up for take-off, take-off, landing upon return).
- Loading plan (ammunition for attack and reconnaissance; troops, cargo, and equipment for assault).
- CASEVAC procedures.
- CSAR procedures.
- In-stride downed aircrew recovery procedures.
- Contingency plans (change of mission, aircraft equipment malfunction).

REHEARSAL QUESTION RESOLUTION

3-84. The brigade commander and staff may conduct the rehearsal or observe it. Regardless, detailed questions serve to ensure that the units who will execute the mission thoroughly understand it, and that the brigade has accomplished its planning. The following questions are examples of critical questions that should be answered during the rehearsal:

- Contingency drills at the objective. What if the enemy does this? Or that?
- Who is responsible for calls for fire? Whom do they call?
- Who provides rear or flank security?
- Who collects and sends spot reports? Whom do they call, and on which net?
- Who initiates fires for the attack?
- Where do crews get the time sequencing for Have Quick (unless automatic)?
- Who is talking to the Air Force for JAAT operations?
- Who initiates communications checks?
- Who coordinates with the ground force commander?
- Who confirms all call signs, nets, and authenticators?
- What radio calls (digital and voice) are required during the operation?
- What are the success criteria, and how do we know if they have been met?
- What are the mission criteria, and who makes that decision?
- What are the divert criteria, and who makes that decision?
- What are the in-stride downed aircrew procedures?
- What are the CASEVAC procedures?
- What are the ROE? Review scenarios to ensure understanding.

- What are the ASE requirements and settings?
- Who makes BDA reports, to whom, and when?

CONFLICT RESOLUTION AT THE REHEARSAL

3-85. Conflicts may arise during a rehearsal. The commander must ensure conflicts are resolved and the rehearsal does not become a war game. War gaming should have been accomplished during the planning process. The rehearsal ensures that all members of the unit understand their roles and how they contribute to success. It is not the time to develop a new plan.

REHEARSAL COMPLETION

3-86. At the end of any rehearsal the commander should receive correct responses from every member present about the—

- Mission/actions at the objective.
- Commander's intent.
- Timetable for mission execution.

SECTION IV – SPLIT-BASED OPERATIONS

3-87. The aviation brigade can conduct split-based operations as defined in FM 1-02 (FM 101-5-1). "The dividing of logistics, staff, management, and command functions so that only those functions absolutely necessary are deployed, allowing some logistics, staff, management, and command functions to be accomplished from the CONUS or another theater."[2]

3-88. The aviation brigade requires personnel and equipment augmentation if it is to operate and fight in two different locations.

3-89. Battalions and squadrons are not designed or organized to conduct split-based operations. If these operations are required, the unit requires significant augmentation.

SECTION V – COMMAND AND STAFF RESPONSIBILITIES

BRIGADE COMMANDER

3-90. The brigade commander commands, controls, and coordinates the aviation brigade. He is responsible for the outcome of his force's combat actions. The variety and impact of tasks confronting him are unique. Although he commands a brigade-level organization, his focus of employment is at division and corps level, and often higher. These tasks require cooperation of many people, integration of complex systems that span into the joint community, and sensible division of work. The brigade commander C^2s organic, assigned, or attached forces. He must task-organize these forces to accomplish all specified and implied tasks. He must integrate the critical

[2] FM 101-5-1, Operational Terms and Graphics, 30 September 1997, p. 1-143.

support provided by other friendly elements. His main concerns are to accomplish the mission and to ensure the welfare of his soldiers. The successful commander delegates authority and fosters an organizational climate of mutual trust, cooperation, and teamwork.

3-91. The brigade commander is the force behind tactical planning. He analyzes and defines the mission and directs its execution. He issues mission-oriented orders that are detailed only to the extent necessary for coordination within a broad scope. The commander acknowledges the professional competence and expertise of his subordinate commanders who have extensive latitude within his intent in how they execute their missions.

3-92. The brigade commander is a critical advisor to senior commanders in developing the campaign plan. He must analyze the long-term aspects of the brigade's employment in the campaign and provide the necessary advice.

3-93. The brigade commander must understand the impact of his unit's actions and the actions of his soldiers on the modern battlefield. He must institute necessary training for his soldiers in media operations and ROE. Such training serves to eliminate or mitigate actions that would require much of the commander's time to resolve if they occurred.

3-94. All plans and orders are in concert with the senior commander's intent. Subordinate unit commanders and staffs must understand this intent. Thus, they can act appropriately when communications fail or local situations change. The brigade commander controls the ongoing battle. He provides guidance for planning future operations.

3-95. The aviation brigade's forces influence the spectrum of deep, close, and rear area operations; therefore, the commander must see the battlefield from the same perspective as the higher commander. Tactical decisions constantly must be aimed at synchronizing his combat efforts with those of other force assets. The commander must know the enemy as well as he knows his own forces. His guidance should reflect the products of a detailed mission analysis supported by a thorough and current IPB.

3-96. The brigade commander relies on his staff and subordinate commanders to advise and help plan and supervise operations. He must understand his staff's capabilities and limitations. He must train them to execute operational concepts in his absence. He institutes cross-training among the staff; thus, the unit can still operate when combat losses occur. He also is responsible for safety and standardization during all conditions—peacetime or combat. He develops and directs a brigade safety and standardization program.

COMMANDER'S PRESENCE

3-97. When not in battle, the brigade commander normally operates in the main CP. During battle, he moves to a position to best make the decisions necessary to influence the outcome of the fight. He must be in a position to affect operations while maintaining communications with higher, lower, and adjacent units. The best location for the commander could be the main CP, the tactical CP, or forward with the battle. This decision is based on METT-TC as well as the commander's assessment of whether personal presence may be key to mission accomplishment. Even as digital linkages improve the ability to see the battle, at times personal presence may be the best option.

COMMANDER'S AIRCRAFT

3-98. The brigade commander selects the type helicopter that gives him the best visualization of the situation, time on station, or personal presence. The aviation brigade commander should be rated in more than one of the brigade's aircraft. The commander also should be current in his primary aircraft before assuming command.

DEPUTY BRIGADE COMMANDER (CORPS AVIATION BRIGADE)

3-99. The deputy commander is responsible to the brigade commander for duties as assigned. Normally he supervises high-priority missions that are beyond the brigade commander's span of control. For example, if the brigade is conducting an air assault while simultaneously supporting a ground operation with the attack helicopter regiment, the aviation brigade commander could place the deputy commander at either location. This ensures that all brigade-level issues can be quickly resolved.

EXECUTIVE OFFICER

3-100. The executive officer (XO) is second in command and the principal assistant to the commander. The scope of the XO's duties are often tailored by the desires of the commander. Normally, the XO directs, supervises, and ensures coordination of staff work except in those specific areas reserved by the brigade commander. During combat operations, the XO usually is positioned in the main CP to direct and coordinate the staff. The XO remains current on the tactical and logistics situations and is always prepared to assume command. The commander should allow the XO to assume command during selected training exercises so that he will be prepared to assume command in combat.

3-101. As staff coordinator and supervisor, the XO—

- Formulates and announces staff operating policies.
- Ensures that the commander and staff are informed on matters affecting the command.
- Supervises the main CP operations.
- Ensures execution of staff tasks and the coordinated efforts of staff members.
- Ensures that the staff performs as a team; assigns definite responsibilities.
- Transmits the commander's decisions to the staff and to subordinate commanders, when applicable, for the commander. Staff members can deal directly with the commander; however, they are obligated to inform the XO of the commander's instructions or requirements.
- Establishes and monitors liaison and liaison activities.
- Supervises the information program.
- Serves as the materiel readiness officer.

ASSISTANT AVIATION OFFICER

3-102. The assistant aviation officer (AAO) is a critical position, but is not yet recognized in any brigade-level TOE. He is the brigade's senior liaison to its higher headquarters and usually works in the corps or DMAIN CP or DOCC. He is the critical link between the aviation brigade commander and the supported force commander and staff. The responsibilities of this position require an experienced field grade officer, well versed in all aspects of aviation operations.

COMMAND SERGEANT MAJOR

3-103. The command sergeant major (CSM) acts in the name of the commander and is his primary advisor concerning enlisted soldiers. The CSM focuses attention on functions critical to the success of the operation. The CSM assists the commander in the following ways:

- Monitors NCO development, promotions, and assignments.
- Identifies, plans, and assesses soldier training tasks to support the performance of collective (unit) tasks on the METL.
- Monitors subordinate unit morale.
- Provides recommendations and expedites procurement and preparation of enlisted replacements for subordinate units.
- Monitors food service and other logistics operations.
- Conducts informal investigations.
- Assists in controlling brigade movements.
- May lead the brigade advance or quartering party during a major movement, coordinating closely with the HHC Commander.
- Monitors the CSS effort when the XO is in the TOC or forward.

BRIGADE STAFF ELEMENTS

3-104. The paragraphs below provide brief descriptions of the key aviation brigade staff elements. Where necessary and appropriate, further discussion is contained elsewhere in this manual.

GENERAL

3-105. The brigade staff consists of the officers and enlisted personnel who plan, supervise, and synchronize combat, CS and CSS according to the brigade commander's concept and intent. Except in scope, duties and responsibilities of the brigade staff are similar to those of higher echelon staff. Key personnel must be positioned on the battlefield where they can carry out their duties.

BRIGADE STANDING OPERATING PROCEDURE AND THE STAFF

3-106. The SOP must clearly define the responsibilities of key personnel to preclude conflicts and ensure that all functions are supervised. SOPs streamline the reports process by showing standard briefing formats and identifying individuals who request, receive, process, and disseminate information.

REDUCTION OF DEMANDS ON THE COMMANDER'S TIME

3-107. Staff members reduce the demands on the commander's time. The staff—

- Obtains, analyzes, and provides information.
- Anticipates the situation.
- Makes recommendations. (The staff does not ask the commander for solutions. It presents issues, offers COA, and recommends one of those COA.)
- Prepares plans and orders.
- Supervises the execution of orders.
- Coordinates the operation.

MAINTAINS THE SITUATION

3-108. The staff gives the commander an accurate picture of the AO. Delays in receiving or disseminating critical information adversely affect the entire operation. The staff must identify key indicators and *push* for quick and accurate reports from both subordinate and higher headquarters. Information flow—both horizontally and vertically—must be on a priority basis. Operational conditions dictate priorities.

ESTIMATES

3-109. Staff estimates may be informal at brigade level and below; however, they must address battlefield activity, project COA, and predict results. Careful IPB, selection of the most important enemy indicators, and development of contingency plans facilitate estimates and allow timely response. The key person in this process is the XO. He ensures that the staff maintains a proper perspective.

STAFF COMMUNICATIONS WITH THE COMMANDER

3-110. Information flow is critical. For some information, the commander must be notified immediately. The commander must provide the staff with guidance on the types of information he considers critical. Many commanders post a list in the TOC of information categories that they want to be notified about immediately.

3-111. The staff must provide the commander with critical, concise, accurate information. The XO establishes the guidance and the training that ensures briefs do not burden the commander with time-consuming, lengthy, or meandering discussions. Critical information is communicated to the commander on a priority basis set by his guidance. The commanders set priorities for communicating critical information. Established briefings to the commander are open and frank, but follow a set agenda.

ADJUTANT

3-112. The Adjutant (S1) assesses unit readiness and combat effectiveness for the organization. The S1 provides the following support to soldiers and their families:

- Manning the unit.
- Personnel readiness.
- Strength accounting.
- Casualty operations.
- Replacement operations.
- Mail operations.
- Morale, welfare, and recreation.
- Other essential personnel support and services.

3-113. The S1 also has coordinating responsibility for finance, religious activities, public affairs, and legal services support for the unit. The S1 is normally collocated with the S4 in the ALOC. The S1 and S4 must cross-train to enable them to conduct continuous operations.

INTELLIGENCE OFFICER

3-114. The Intelligence Officer (S2) provides combat intelligence, which includes collecting and processing information. The S2 provides current information and analyzed intelligence of tactical value concerning terrain, weather, and the enemy. This intelligence helps to facilitate planning and execution of combat operations. The S2 performs the following functions:

- Converts the information requirements of the commander into the CCIR.
- Facilitates the IPB process.
- Helps develop the DST.
- Coordinates intelligence activities.
- Frequently updates the commander and staff on the enemy situation.
- Maintains isolated personnel reports (ISOPREP).
- Works closely with the fire support element (FSE) and S3 section to ensure information is passed throughout the brigade.

OPERATIONS OFFICER

3-115. The Operations Officer (S3) is responsible for matters pertaining to the organization, employment, training, and operations of the brigade and supporting elements. The S3 section provides planning and task organization of brigade elements for combat operations, including personnel recovery. The S3 monitors the battle, ensures necessary CS assets are provided when and where required, and anticipates developing situations. The S3 section maintains routine reporting, coordinates the activities of liaison personnel, and is always planning ahead. In the area of command, control, communications, computers, and intelligence (C^4I), the S3, through the communications-electronics officer (S6), ensures that procedures are in place to resolve complexities posed by the different communications systems, ATCCS, and connectivity in each type aircraft. For example, the TOC usually does not have HF, ultra high frequency (UHF), or very high frequency (VHF) radios; the AH-64 has only one FM radio; CH-47s may not have Have Quick; and not all aircraft have HF radios. The S3 maintains close coordination with the S4 and the S1 for logistics and personnel statuses. If possible, the S3 should be rated in more than one of the brigade's aircraft.

CHEMICAL OFFICER

3-116. The chemical officer advises the commander on NBC operations, decontamination, smoke, obscurants, and flame. The chemical officer works directly for the S3 and integrates NBC into all aspects of operations. The chemical officer may have other S3 section responsibilities, and can act as an assistant S3 when directed.

CHEMICAL OPERATIONS CELL

3-117. The chemical operations cell provides advice to the commander and staff on NBC defense matters, decontamination, equipment maintenance, NBC reconnaissance, and support contingency requirements.

ASSISTANT S3 (FLIGHT OPERATIONS OFFICER)

3-118. NCOs and flight operations specialists assist the assistant S3. The assistant S3—

- Obtains and distributes applicable portions of the SPINS and ATO.
- Obtains A^2C^2 control measures and directives from the A^2C^2 element.
- Incorporates applicable A^2C^2 measures into the scheme of maneuver.
- Maintains the A^2C^2 overlay.
- Establishes and monitors the flight following net (ATS network) for brigade aircraft, when required.
- Helps the S3 and the FSO plan JSEAD fires.
- Coordinates for additional aviation support, such as CH-47 movement of unit equipment, supplies, ammunition, and fuel.
- Maintains the flying-hour program and monitors fighter management.

AIR LIAISON OFFICER

3-119. Depending on the type of brigade and the expected types of missions, an air liaison officer (ALO) may be provided. The ALO is an Air Force officer who is a member of the tactical air control party (TACP). He may serve as a forward air controller (FAC) or have additional officers assigned to the ALO as FACs. The ALO advises the commander and staff on the employment of air support, including CAS, AI, JSEAD, aerial reconnaissance, and airlift. In the absence of an ALO, the S3 ensures these duties are accomplished.

DIVISION LIAISON OFFICER

3-120. The two division LNOs provide necessary liaison between the aviation brigade and the DMAIN and tactical CPs. Each liaison team consists of a captain LNO and aviation operations NCO. Like the brigade LNOs, each division LNO team has an AMPS, mobile subscriber equipment (MSE) telephone, and FM radio to help plan/coordinate the aviation brigade portions of missions with the division. When an LNO is located at the aviation brigade TOC, he works as an assistant S3 or performs other duties as assigned by the S3. LNOs should be advanced course graduates, pilots in command (PCs), and possess a strong knowledge of the capabilities of all aircraft in the brigade.

BRIGADE LIAISON OFFICER

3-121. The LNO represents the S3 at the headquarters of another unit, effecting coordination between the two units. The LNO, as such, is a staff officer and an extension of the S3. He ensures the aviation brigade commander's intent is embedded in the other unit's plan. He must be careful not to commit aviation assets or approve changes to a plan without coordinating with the aviation brigade S3 or commander. When an LNO is located at the aviation brigade TOC, he works as an assistant S3 or performs other duties as assigned by the S3. LNOs should be advanced course graduates, PCs, and possess a strong knowledge of the capabilities of all aircraft in the brigade.

3-122. As stated in Chapter 1, all aviation brigade headquarters must conduct liaison with higher headquarters main, tactical, and rear CPs; the forward brigades; and the reserve simultaneously. Although only three of these six positions have been recognized on existing TOEs, each is critical.

3-123. LNOs must have the necessary vehicles to move with the supported headquarters. They must have the necessary communications to communicate with the aviation brigade headquarters and aviation units.

LIAISON OFFICER TEAMS

3-124. An LNO team supports each authorized LNO position. A team consists of one commissioned officer, one tactical operations warrant officer, and two enlisted soldiers. When an LNO team is located at the aviation brigade TOC, it performs other duties as assigned by the S3.

LIAISON OFFICERS TO THE BRIGADE

3-125. LNOs from other units usually work with the aviation brigade S3. The LNO facilitates exchange of information and ensures mutual understanding and unity of purpose before, during, and after combat operations. LNOs from other units may include supporting personnel and equipment.

BRIGADE STANDARDIZATION INSTRUCTOR PILOT

3-126. The standardization instructor pilot (SP) is a primary advisor to the commander for the standardization program. He develops, integrates, implements, monitors, and manages the aircrew training and standardization programs. He also advises, as required, on the crew selection process, employment of aircraft systems, sensors, and weapons. The brigade SP acts as the coordinating staff officer for the standardization of reading files. He is also a principal trainer and peer leader for subordinate unit IPs.

The brigade SP often flies as the other crew member for the brigade commander or the S3. If the brigade commander does not use the SP as his pilot, he may want an SP rated in an aircraft other than the ones in which the commander is rated to expand available expertise.

BRIGADE SAFETY OFFICER

3-127. The safety officer (SO) assists the commander during the risk management process and monitors all brigade and subordinate unit missions to identify and address potential hazards. He recommends actions that allow safe mission accomplishment. The SO is frequently the other crew member for the brigade commander or the S3. The brigade SO is responsible to the brigade SP for the standardization of the safety contents of the reading files. He is also a principal trainer and peer leader for the subordinate unit SOs. The SO must be rated in the highest-density type aircraft in the brigade.

BRIGADE TACTICAL OPERATIONS OFFICER

3-128. The tactical operations officer's primary duty is to advise the brigade commander and staff on appropriate ASE techniques and procedures, airspace planning, and integration of Joint assets for each major mission. The tactical operations officer conducts the ASE part of the risk management process. He integrates the unit's OPLAN into the theater airspace structure. He also manages the organization's personnel recovery program. He is frequently the other crew member for the brigade commander or S3. He is also a principal trainer and peer leader for the battalion tactical operations officers. The tactical operations officer must be rated in the highest-density type aircraft in the brigade.

BRIGADE AIR TRAFFIC SERVICES OFFICER

3-129. The air traffic services officer (ATSO) is responsible for matters pertaining to the organization, employment, training, and operations of the supporting ATS element. Normally, he is the commander of the ATS battalion or supporting ATS element. The ATS section plans and task-organizes ATS elements and recommends methods of employment. The ATSO monitors operations and ensures ATS assets are provided, when and where required. The ATS officer maintains close coordination with higher ATS elements.

BRIGADE AVIATION LIFE SUPPORT OFFICER

3-130. The aviation life support officer (ALSO) is a critical position, but is not yet recognized in any brigade or battalion-level TOE. Usually one of the subordinate unit ALSOs serves as both the unit and brigade ALSO. This technique precludes additional *borrowed* military manpower for the subordinate units. Chapter 8, Army Regulation (AR) 95-1 lists the responsibilities of the ALSO. They include, but are not limited to, the duties listed below.

- Assists, advises, and represents the commander in all matters pertaining to aviation life support system (ALSS) and aviation life support equipment (ALSE).
- Keeps an up-to-date ALSS maintenance SOP.
- Monitors the ALSS maintenance programs of subordinate units to ensure completeness and standardization.
- Develops and executes a training program that maintains and tracks the proficiency of ALSE technicians.
- Develops, in coordination with the S3, a standardized training program that indoctrinates aircrew members in appropriate wear and use of assigned ALSE.
- Monitors unit missions to ensure the brigade and its subordinate units have the ALSE needed to meet mission requirements.
- Monitors the inventory control records of subordinate units to account for and ensure all ALSS shop-assigned property such as vests, radios, life preservers, and test equipment are maintained.

AVIATION LIFE SUPPORT EQUIPMENT NONCOMMISSIONED OFFICER

3-131. The ALSE NCO is a critical position, but is not yet recognized in any brigade or battalion-level TOE. He should be an E-6, or above, and possesses ASI Q2. He should be a graduate of either the U.S. Air Force C3AABR92230-000, U.S. Navy LSE C-602-2010, or U.S. Army 860-ASIQ2 ALSE school. The ALSE NCO—

- Monitors the performance of scheduled and unscheduled ALSE maintenance.
- Monitors the processing of ALSE test equipment for calibration and shipping of equipment requiring repair at a higher maintenance level.
- Maintains a skill efficiency level sufficient to perform his technical supervisory responsibilities.

LOGISTICS OFFICER

3-132. The logistics officer (S4), as the brigade's logistics planner, coordinates with battalion S4s or separate company supply officers or first sergeants (1SGs) about status of maintenance, equipment, and supplies. He coordinates with supporting units and higher headquarters staffs to ensure logistics support is continuous. The S4 section provides supervision and coordination of food service, supply, transportation, and maintenance support for the brigade.

BRIGADE AVIATION MAINTENANCE OFFICER

3-133. The aviation maintenance officer (AMO) is a staff officer assigned to the S4 section. He is an advisor to the brigade commander and staff for aviation maintenance issues. The AMO ensures close coordination with the AVUM and supporting aviation intermediate maintenance (AVIM) commanders. He is responsible to the SP for the standardization of the aviation maintenance contents of the reading files. The brigade AMO is a trainer and peer leader for the subordinate unit AMOs. He should be rated in the highest-density type aircraft in the brigade.

BRIGADE MAINTENANCE OFFICER

3-134. The MO is the primary advisor to the brigade commander and staff for ground maintenance issues. He is a key figure in the management of the ground maintenance program. He is empowered to speak for the commander and XO regarding ground maintenance issues. The brigade MO is a trainer and peer leader for the subordinate unit ground MOs.

CIVIL-MILITARY OPERATIONS OFFICER

3-135. A Civil-Military Operations (CMO) (S5), if assigned, is normally not available to the brigade. However, in certain operations, a CMO may be designated or attached. The S3 is responsible for CMO when no CMO is provided. In operations where the areas of responsibility for the S3 and the CMO overlap, the CMO is subordinate to the S3. S5 personnel working in any of the brigade's subordinate unit areas are subordinate to the commander of that subordinate unit, regardless of rank.

CIVIL-MILITARY OPERATIONS

3-136. Civil-military operations (CMOs) are activities that support military operations embracing the interaction between the military force and civilian authorities. These operations foster the development of favorable emotions, attitudes, and behavior in neutral, friendly, or hostile groups.

CIVIL-MILITARY OPERATIONS CENTER

3-137. When accomplishing CMO duties, the designated officer may have to coordinate with a civil-military operations center (CMOC). This is an operations center formed from civil affairs assets. It serves as the primary interface between the U.S. armed forces and the local civilian population, humanitarian organizations, nongovernmental organizations, private volunteer organizations, other international agencies, multinational military forces, and other agencies of the U.S. government. The CMOC ensures continuous coordination among the key participants regarding civil-military matters. It is a flexible, mission-dependent organization that can be formed at brigade and higher-level headquarters.

COMMUNICATIONS-ELECTRONICS OFFICER

3-138. The Communications-Electronics Officer (S6) advises the commander on signal matters, CP location, signal facilities, signal assets, and signal activities for deception. The S6 section plans for, coordinates, and oversees implementation of communications systems. It performs unit-level maintenance on ground radio and field wire communications equipment. It installs, operates, and maintains the radio retransmission site. The S6 monitors the maintenance status of signal equipment, coordinates the preparation and distribution of the signal operation instructions (SOI), and manages communications security (COMSEC) activities. The S6 section's responsibilities include supervision of electronic mail on both the unclassified and classified nets and the LAN.

3-139. An automation officer, a signal systems technician (warrant officer), and three enlisted LAN managers support the S6.

CHAPLAIN AND UNIT MINISTRY TEAM

3-140. The chaplain provides religious support to all personnel assigned or attached to the brigade staff and HHC. He also supervises the subordinate unit chaplains and provides backup services as required. These include nondenominational coverage and ministry for casualties and hospitalized members of the brigade. The chaplain advises the commander on religious, moral, and soldier welfare issues. He establishes liaison with unit ministry teams (UMTs) of higher and adjacent units. The chaplain and chaplain's assistant compose the UMT, which usually operates from the same location as the S1.

ENGINEER OFFICER

3-141. An engineer officer is not normally available. When available, the engineer officer is the commander or leader of the engineer unit supporting the brigade. He is a terrain expert and an excellent resource for assisting the S2 on the effects of terrain and weather with respect to the IPB. The engineer officer also assists with Volcano operations. In the absence of an engineer officer, the S3 is responsible for engineer functions. The S3 may designate someone to act as the engineer officer.

ENGINEER UNITS

3-142. Engineer units normally support the brigade for construction of protective works or facilities as required by the situation and according to the engineer priority of work.

FIRE SUPPORT OFFICER

3-143. A FSO may be provided to an aviation brigade, especially attack brigades. The primary duty of the FSO is to support the scheme of maneuver with fires. The FSO accomplishes this by close coordination with the S3 and brigade commander. The FSO plans, controls, and synchronizes all lethal and nonlethal FS for brigade operations. He coordinates JSEAD. The FSO integrates and coordinates offensive information operations (IO) into FS planning. He works with the TOC and the A^2C^2 element regarding FA firing unit locations, changes to fire support coordinating measures (FSCM) and airspace control measures (ACM). The FSO maintains digital and voice communications with supporting artillery. In the absence of a supporting FSO, the S3 section ensures FSO tasks are accomplished.

FLIGHT SURGEON

3-144. The brigade FS advises and assists commanders on matters concerning the medical condition of the command including preventive, curative, and restorative care. The FS periodically flies with aircrews to monitor medical and environmental factors that affect crew readiness. He, with subordinate unit FSs, conducts flight physicals for unit personnel. The FS determines requirements for the requisition, procurement, storage, maintenance, distribution, management, and documentation of medical equipment and supplies for the brigade HHC. The FS operates the brigade aid station that is normally located in the AA.

MEDICAL TREATMENT TEAM

3-145. The medical treatment team provides unit-level HSS for the brigade HHC, and medical oversight for subordinate unit medical sections. The medical treatment team also provides emergency medical treatment, advanced trauma management, and routine sick call services.

HEADQUARTERS AND HEADQUARTERS COMPANY ELEMENTS

3-146. The company headquarters, in addition to supporting the aviation brigade staff, has operational elements listed below.

HEADQUARTERS AND HEADQUARTERS COMPANY COMMANDER

3-147. The HHC commander is responsible for all the unit does or fails to do. He leads the HHC and mentors, guides, and inspires the soldiers of the company. He serves as the headquarters commander for the brigade AA, and answers to the brigade XO. The HHC commander should have qualified as a PC in his previous assignment, but it is not necessary that PC status be sustained for this position. The HHC commander supports, secures, and moves the main CP, and supports all elements of the HHC.

HEADQUARTERS AND HEADQUARTERS COMPANY EXECUTIVE OFFICER

3-148. The XO is the second in command of the company, usually a successful ex-platoon leader. He should have qualified as a PC in his previous assignment, but it is not necessary that PC status be sustained for this position. The XO is a key figure in assisting the HHC commander. The XO—

- Coordinates with the brigade when the company commander is not available.
- Receives new orders and begins troop-leading procedures when the commander is operating forward.
- Leads the company when the company commander directs.
- Manages company logistics requirements.

HEADQUARTERS AND HEADQUARTERS COMPANY FIRST SERGEANT

3-149. The HHC 1SG acts in the name of the commander when dealing with the other NCOs in the unit. He is the commander's primary advisor concerning the enlisted soldiers. The 1SG focuses unit attention on any function critical to the success of their mission. The 1SG assists the commander in the following ways:

- Monitors NCO development, promotions, and assignments.
- Identifies, plans, and assesses soldier training tasks to support the performance of collective (unit) tasks on the METL.

- Monitors morale of the company.
- Provides recommendations and expedites the procurement and preparation of enlisted replacements for the company.
- Coordinates medical, mess, supply, administrative, and other logistics support.
- Conducts informal investigations.
- Leads company ground movements when required.

SUPPLY SECTION

3-150. The supply section provides unit-level supply support for the brigade HHC. It requests, receives, stores, issues, turns in, and accounts for necessary supplies and equipment. It maintains supply records and secures weapons and other equipment. The supply section is often only one or two persons and may not be able to handle all weapons, which include NVS and other sensitive items. It performs unit maintenance on all individual and crew-served ground weapons.

AUTOMOTIVE MAINTENANCE SECTION

3-151. The automotive maintenance section provides unit maintenance and recovery operations for vehicles, generators, and other ground equipment.

FOOD SERVICE SECTION

3-152. The food service section determines subsistence requirements and requests supplies. It prepares, cooks, and serves food for the brigade HHC. It maintains food service records and prepares subsistence reports.

Water Storage

3-153. The company headquarters is equipped with a water trailer. It supplies water necessary to perform various maintenance functions and satisfy the company's daily requirement for potable water.

SECTION VI – BRIGADE COMMAND AND CONTROL FACILITIES

GENERAL

3-154. CPs throughout the brigade serve the C^2 needs of the commander and staff. The dynamics of the battlefield require the highest level of organizational and operational efficiency within every CP. C^2 facilities include—

- Command group
- Main CP.
- TOC.
- ALOC.
- Tactical CP.
- Rear CP.
- Alternate CP.

EMERGING COMMAND AND CONTROL SYSTEMS

3-155. The introduction of automated systems will minimize the time required for administrative and operational processing of information. Whether manual or automated, C^2 systems must accurately—

- Depict the situation (friendly, enemy, noncombatant).
- Depict readiness status of friendly units.
- Provide data verification and audit trails.
- Provide other information, as required.

Digitized Challenges

3-156. As digitized systems are fielded, C^2 nets and procedures will change. The challenge will be to integrate those changes and train to standard to ensure that the increased capabilities of new systems are maximized. This requires focused initial training and sustainment training.

Command and Control Warfare

3-157. Confronted by overwhelming combat power, the enemy often resorts to asymmetric responses to offset our advantages. For example, potential adversaries may attempt to counter U.S. advantages in precision firepower with a focused attack on C^4I systems. Advanced jamming systems may be used from ground and airborne platforms or emplaced by artillery. electromagnetic pulse (EMP) effects are sufficient to disable electronic components at tactical ranges and make protection of sensitive electronic components difficult. Direction finding and emitter location equipment are improving and are available worldwide. As these technologies advance, signature reduction and electronic deception become increasingly critical. An adversary can threaten digital systems in three fundamental ways:

- Compromises data by gaining access to sensitive or classified information stored within information systems.
- Corrupts data by the alteration of electronically stored or processed information so that it becomes misleading or worthless.
- Disrupts of operations by destruction, damage, or delays (physically or electronically).

3-158. Threats include spoofing, electronic attack, signals intelligence, technical attack, directed energy, malicious code (viruses), physical destruction, and unconventional warfare. Individually or collectively, these threats can distort the picture of the battlefield. They can affect tempo, lethality, survivability, and battlefield synchronization. All can affect the mission performance.

Traditional Tactics, Techniques, and Procedures

3-159. Digitized units must be able to operate in various stages of system degradation. Enemy asymmetric attacks and system failures can interrupt ABCS subsystems. Degradation of digital operational capability should not lead to major reduction of SA and the lethality, survivability, and operating tempo (OPTEMPO) that characterize digitized forces. In case of catastrophic system failure, commanders may find it necessary to make significant changes to the operation or reduce the size of their battle space. SOPs and nondigital contingency plans must ensure operational continuity.

COMMAND POST SURVIVABILITY

3-160. CPs present electronic, thermal, acoustic, visual, and moving-target signatures that are easy to detect. Upon detection, CPs can be destroyed through overt enemy action or disrupted and exploited by electronic means unless measures are taken to reduce vulnerability. Measures include—

- Maintaining local security.
- Locating on reverse slopes to deny enemy direct and indirect fire effects.
- Locating in urban areas to harden and reduce infrared (IR) or visual signatures. Collateral damage to the local population must be considered if exercising this option.
- Remotely locating and dispersing antennas.
- Dispersing CP subelements.
- Displacing as required by METT-TC.
- Using low probability of interception (LPI) techniques—landlines, directional antennas, and messengers.
- Providing ommunications security.

3-161. In most cases, survivability requires that the above techniques be combined. These measures must also be balanced against retaining effectiveness. Frequent displacement might reduce the vulnerability of a CP; but such movement may greatly degrade its C^2 functions.

COMMAND POST LOCATION

3-162. CPs are arrayed on the battlefield according to METT-TC. Three common methods are—

- CPs set up separately from unit locations.
- CPs set up with units.
- CPs use a combination of the above.

3-163. Setting up the CP separate from subordinate units separates the signatures associated with CP and helicopter operations. However, it makes face-to-face coordination more difficult unless adequate digital connectivity is available. Commanders decide which method to use during the IPB process.

COMMAND POST STANDING OPERATING PROCEDURE

3-164. CP organization, operations, and sustainment must be standardized in the SOP. All personnel associated with a CP must be completely knowledgeable of all aspects of the CP. Training drills are essential for CP movement, setup, tear down, security, and operations. Drills to counter loss of critical personnel and equipment must be standardized and practiced both day and night. Critical SOP items include—

- Personnel duties for each phase of CP operations and movement.
- Communications setup priorities—radio, wire, LAN, tactical internet (TI), SATCOM.

- Critical friendly and enemy information reporting.
- Maintenance of maps and graphics.
- Maintenance of C^4I equipment.
- Set-up, tear down, and movement duties.
- Camouflage priorities.
- Light and noise discipline.
- Maintenance of generators.
- COMSEC changeover times.
- Maintenance of journals.
- CP security and admission procedures.

MAIN COMMAND POST

3-165. The main CP includes the soldiers, equipment, and facilities needed to provide C^2 for the brigade. The brigade XO is responsible for the main CP.

MAIN COMMAND POST ELEMENTS

3-166. The main CP consists of the TOC, ALOC (if not part of the rear CP), HHC support elements, and associated CS assets, such as communications. Most of the brigade staff operates from the main CP. The staff includes the S2, S3, FSO, ALO, S6, and personnel of the signal platoon. It also includes the S1 and S4, if they are not required to establish a rear CP. Other representatives can be included, such as engineer, AD, and the United States Air Force (USAF) weather team.

MAIN COMMAND POST FUNCTIONS

3-167. The main CP coordinates, directs, and controls operations and plans for future operations. The main CP—

- Communicates with subordinate, higher, and adjacent units.
- Informs and assists the commander and subordinate commanders.
- Operates on a 24-hour basis.
- Plans ahead continuously.
- Estimates the situation continuously.
- Maintains SA across the BOS.
- Maintains the status of the reserve.
- Receives, evaluates, and processes tactical information from subordinate units and higher headquarters.
- Maintains maps that graphically depict friendly, enemy, and noncombatant situations.
- Maintains journals.
- Validates and evaluates intelligence.
- Controls all immediate FS including CAS for units under aviation brigade C^2 (may also be done by tactical CP).
- Coordinates airspace C^2 and AD operations.
- Relays instructions to subordinate units.
- Coordinates combat, CS, and CSS requirements.

- Coordinates terrain management for C^2 facilities.
- Maintains CS and CSS capabilities and status.
- Submits reports to higher headquarters.
- Makes recommendations to the commander.
- Prepares and issues FRAGOs, OPORDs, OPLANs, intelligence summaries (INTSUMs), intelligence reports (INTREPs), and situation reports (SITREPs).

MAIN COMMAND POST CRITICAL ITEM REPORTING

3-168. The commander must be notified immediately of factors that affect the mission.

Friendly Factors

3-169. The status of friendly forces that can affect the mission include—

- Changes in higher, subordinate, or adjacent unit mission.
- Changes in task organization.
- Changes in boundaries.
- Changes in supporting fires or tactical air (TACAIR) priority.
- Loss of unit combat effectiveness including DS or attached units, whether maneuver, CS, or CSS.
- Critical changes in Class III and V availability or location.
- Changes in status of obstacles and contaminated areas.
- Employment of smoke.
- Employment of nuclear and directed-energy weapons.
- Other elements of information according to the brigade commander's guidance.
- Status of the reserve.

Enemy Factors

3-170. Enemy factors that can affect the mission include—

- Contact with or sighting of enemy maneuver or FS forces.
- Absence of enemy forces in an area or zone.
- Movement of enemy units—withdrawal, lateral, or forward.
- Employment of the enemy's reserve.
- Employment of NBC weapons or sighting of NBC capable equipment.
- Employment of directed-energy weapons.
- Employment of smoke.
- AD forces.
- Logistical stockpiles.
- Other elements of information according to the brigade commander's guidance.

MAIN COMMAND POST SITE SELECTION

3-171. The most important considerations for selecting any CP site are security and communications with higher, subordinate, and adjacent headquarters. Range of enemy artillery, accessibility to adequate entry and departure routes, cover, concealment, drainage, space for dispersing are other considerations. An adequate LZ should be nearby. The S3 selects the general location of the main CP. The HHC commander and S6 normally select the exact location. When selecting the general location of the CP, the S3 selects at least one alternate site should the primary site prove inadequate.

OFFENSIVE OPERATIONS

3-172. During offensive operations, the main CP should be well forward. In fast-moving operations, the main CP may have to operate on the move. Staff coordination and communications are usually degraded when CPs are moving; thus, CPs must train to operate while moving.

DEFENSIVE OPERATIONS

3-173. During defensive operations, the main CP normally locates farther to the rear to minimize its vulnerability. The exact location depends on the enemy, terrain, the road network, and the ability to communicate.

URBAN OPERATIONS

3-174. The main CP often sets up in built-up areas. Barns, garages, and warehouses minimize the need for detailed camouflage. Basements offer protection from enemy fires. Built-up areas also reduce IR and electromagnetic signatures.

REVERSE SLOPES

3-175. Reverse slopes cover and conceal CPs from direct observation and fires. Reverse slopes can degrade the enemy's ability to collect, monitor, and jam electronic transmissions. Electronic profiles run by the S6 provide the information to determine the ability to transmit and receive. Analysis of those profiles by the S2 provides the information to determine the enemy's ability to degrade CP capabilities or intercept traffic.

PROMINENT TERRAIN FEATURES

3-176. Prominent terrain features or major road junctions should be avoided to make it harder for the enemy to determine CP location. Such features are often enemy preplanned artillery and air targets.

MAIN COMMAND POST DISPLACEMENT

3-177. The main CP displaces in either a single or a phased move. The method selected depends on METT-TC, the distance to be moved, and communications requirements. Movement degrades communication on all nets; however, the higher headquarters, brigade, and subordinate command nets must be maintained. An administrative move may entail both the TOC and the tactical CP moving simultaneously to a new AO. Maintaining contact with higher headquarters may require alternate communications means, such as aircraft or vehicle mounted systems. When operations are ongoing, moving the main CP is accomplished in a phased move requiring displacement of the tactical CP. During displacement, critical aspects of C^2 must be maintained. Displacements are planned to ensure that the main CP is stationary during critical phases of the battle.

DISPLACEMENT STEPS

3-178. The S3 establishes the general area for the new CP. The HHC commander, signal officer, and a NBC team conduct detailed reconnaissance. Steps for the reconnaissance are listed below.

- The reconnaissance party identifies possible routes and sites. Locations must provide effective communications and accommodate all required vehicles and equipment. Several possible sites must be identified, reconnoitered, and planned to provide flexibility and alternate sites.
- The reconnaissance party makes route and site sketch maps showing the exact element locations within the new CP location.
- The S3 or commander approves the primary and alternate sites.
- A movement order is published. An SOP that has been practiced and drilled greatly reduces the effort required to produce the order.
- Security and guides are dispatched. The security force ensures the area is clear of enemy and contamination, and the guides prevent wrong turns and assist elements in occupation. Signals are especially important for low visibility and night displacements.
- Reporting and coordinating functions are shifted as required. This may be within main CP echelons, to the tactical CP, or to the rear or alternate CP.
- CP and HHC elements prepare and execute movement per SOP. The main CP may displace in one echelon if the tactical CP can provide C^2 for the interim. If the tactical CP cannot execute the required C^2, the main CP displaces in two echelons. The first echelon displaces with enough assets and personnel to establish minimum C^2. The second echelon remains is place and provides C^2 until the first echelon assumes control, then it displaces.

MAIN COMMAND POST AUSTERITY

3-179. The main CP is a major source of electromagnetic and IR energy. If the enemy detects these emissions, they can fix its location and place indirect fire, CAS, or EW strike on it. In such an environment, frequent movement is required.

- The TOC should be as light as possible and drilled in rapid tear down, movement, and setup. The larger and more elaborate a CP, the less rapidly it can move.
- Movement for movement's sake should be avoided. Too frequent movement hinders TOC operations, degrades communications, and sacrifices time. It may also increase the chances of enemy detection.

MAIN COMMAND POST SECURITY AND DEFENSE

3-180. The HHC commander plans and organizes the security and defense of the main CP. The plan establishes teams, squads, sections, and platoons and a chain of command for perimeter defense and the quick reaction force (QRF). The brigade XO approves the plan.

3-181. Positions are well prepared, mutually supporting, and known to all. Alarms are established and known to all. Minimum alarms include ground attack, air attack, and NBC attack. Rehearsals are conducted. All actions are greatly simplified if they are part of the SOP and drills are conducted often to ensure readiness. For unit personnel who have not been in combat, commanders should demonstrate what enemy personnel look like when advancing at night. Such training precludes erroneous sightings and time-consuming reactions to false alarms.

3-182. The staff supports the HHC commander by providing personnel for defense and security. In an actual attack, the main CP continues C^2 of the brigade unless the situation compels the use of all personnel in the defense.

Reaction Forces

3-183. Reaction forces and attachments must be fully integrated into the overall plan. Each individual must have a clear and current SU of friendly and enemy forces in the AO. For example, a CP reaction force should know if military police (MP) are conducting mounted patrols near the CP. The overall reaction force plan must integrate those MP units or establish boundaries between the reaction force and the MP unit.

3-184. A clear chain of command and training supported by battle drills are essential for reaction force preparedness. They must assemble and be ready to fight in no more than 10 minutes.

- Alarms should be the same throughout the brigade, division, and corps. These alarms should be in the SOP.
- Reaction plans are rehearsed and executed on a routine basis. Prior to deployment and at in-country training centers, MILES gear and live or blank ammunition supplemented by pyrotechnics should be used whenever possible to enhance the realism. The reaction to a night attack on the main CP must be second nature if the enemy force is to be repelled.

3-185. Each reaction force assembles based on an alarm or orders. Personnel move to a predetermined rally point, establish communications, and conduct operations as required to counter the threat.

Preparation for the Security and Defense of the Main Command Post Site

3-186. Physical preparation for the defense of the main CP site includes—

- Ensuring each soldier is briefed, has a copy the ROE, and understands the ROE (for complicated ROE, it is often necessary to conduct situational training exercises to ensure understanding).
- Concealment—use of urban areas and camouflage.

- Cover—fighting positions, protective shelters.
- Vehicle revetments, transitory vehicle dismount points and parking areas.
- Protective wire barriers.
- Prepared defensive positions.
- Prepared alternate and supplementary positions.
- Prepared routes for supply and evacuation.
- Minefields to cover avenues of approach, if approved for use. Adherence to correct procedures makes mine recovery less dangerous when it is time to displace. Minefields must be observed.
- Prepared sleep areas that are dug in or revetted to protect against enemy direct or indirect fires.
- Listening posts/observation posts (LPs/OPs) that cover approaches to the main CP. These positions must be prepared so they cannot be seen when approaching them from the front.
- Devices such as ground surveillance radar, personnel detection devices, and field expedients to enhance early warning of enemy approach or infiltration.
- Crew served weapons emplaced to cover suspected avenues of approach. Cleared fields of fire.
- Wire and directional antennas to prevent detection by enemy EW elements.
- Air and ground patrols to inhibit observation and attack of the main CP. Returning aircraft should be given patrol areas to surveil before landing. Ground patrols should conduct reconnaissance as required to detect enemy observers or civilians who may be enemy informants.
- Daily stand-to is to establish and maintain a combat-ready posture for combat operations on a recurring basis. Stand-to includes all steps and measures necessary to ensure maximum effectiveness of personnel, weapons, vehicles, aircraft, communications, and NBC equipment. Units assume a posture during stand-to that enables them to commence combat operations immediately. Although stand-to is normally associated with begin morning nautical twilight (BMNT), unit operations may dictate another time.

TACTICAL OPERATIONS CENTER

3-187. The TOC is the primary C^2 structure for the brigade. Its primary mission is to control operations and prepare and publish orders and plans. The commander operates from the TOC when not operating from the tactical CP, command vehicle, or an aircraft. The XO is responsible for all aspects of TOC operations. The TOC is usually organized into two groups— the operations cell and the plans cell. The operations cell usually operates in shifts to ensure 24-hour ability. The plans cell may or may not operate on a 24-hour cycle, and may or may not be in a separate facility from the TOC. The TOC—

- Is composed of the S2, S3, and S6 sections, representatives from attached combat and CS elements, and the tactical CP when it is not deployed. The TOC also includes the FSE, ALO, engineer, and S5, when available.

- Monitors and assists in C^2 by maintaining contact and coordination with higher, subordinate, and adjacent units and continuously updating the enemy and friendly situation.
- Analyzes and disseminates tactical information (including A^2C^2).
- Maintains situation maps.
- Ensures reports are submitted and received on time.
- Plans future operations and forecasts requirements.
- Coordinates with the ALOC to ensure that CSS is integrated and synchronized into the mission effort.

OPERATIONS CELL

3-188. The operations cell includes the following functional positions:

- The battle captain is usually the most experienced S3 officer other than the S3. He continuously monitors operations within the TOC to ensure proper personnel are available for the mission at hand. He does not command the battle, but performs battle tracking and makes operational decisions within assigned responsibilities.
- The operations NCO is the noncommissioned officer in charge (NCOIC) of the TOC. He moves and sets up the TOC. He is responsible for the physical functioning of the TOC. He also is responsible for shift schedules, organization within the TOC, and other functions as assigned.
- The TOC NCOIC is assisted by other S3 NCOs and assigned personnel, who maintain unit status, receive and process reports, and keep the unit journal.
- The S2, S2 NCO, and intelligence analysts are responsible for all intelligence functions. They alert the commander, XO, or S3 to situations that meet the established CCIR. Intelligence personnel receive incoming tactical reports and process intelligence information. They also assist in moving, setting up, and the physical functioning of the TOC.
- When available, the FSO and fire support noncommissioned officer (FSNCO), as part of the FSE, are responsible for FS. They coordinate for responsive fires and expedite clearance of fires. They assist in moving, setting up, and the physical functioning of the TOC.
- Radio telephone operators (RTO) are critical links in the C^2 structure. They often use radio headsets, answer telephones, and operate computer consoles. As such, they may be the only people who hear transmissions or see a critical piece of information. They must be aware of the operation so they can alert the leadership of any situation that might require their attention. RTOs cannot assume that all calls, information, and reports they monitor are also monitored or seen by the TOC at large.

PLANS CELL

3-189. The plans cell is activated as required. It consists of personnel required to plan for the operations, such as S2, S3, FS, ALO, S1, S4, S6, engineer, S5, and attached units. Normally the chief of the plans cell is the senior S3 representative.

TACTICAL OPERATIONS CENTER AND TACTICAL COMMAND POST

3-190. The TOC remains operational even when the tactical CP has the battle. When communications allow, the TOC monitors the actions of the tactical CP and is always prepared to assume control of the battle if the tactical CP is disabled or destroyed. In cases where the TOC can control the battle without employment of the tactical CP, tactical CP assets and personnel augment the TOC.

ADMINISTRATIVE AND LOGISTICS OPERATIONS CENTER

3-191. The ALOC is the primary C^2 structure for the brigade's CSS operations. The ALOC is composed mostly of the S1 and S4 sections, and representatives from attached CSS elements. The S6 section supports its communications requirements. The ALOC—

- Monitors and assists in C^2 of CSS assets by maintaining contact and coordination with higher and adjacent units, while continuously updating the personnel and logistics situation. The ALOC must have SA and understanding to ensure CSS elements are not adversely affected by enemy actions, friendly movements, or ongoing operations.
- Analyzes and disseminates CSS information, maintains the CSS situation map, and requests and synchronizes CSS as required.
- Ensures reports are submitted and received on time.
- Plans for future operations in synchronization with the TOC to ensure that CSS is integrated into the mission effort.

ADMINISTRATIVE AND LOGISTIC CENTER ORGANIZATION

3-192. The ALOC normally is organized into two sections—personnel and logistics. Two areas generally are established within the ALOC—an S1 area for personnel, ministry, and medical actions; and an S4 area for all other CSS requirements. Other considerations are listed below.

- The S4 is generally the ALOC officer in charge (OIC). He coordinates closely with the S1 to monitor CSS operations and ensure proper personnel and equipment are available to support the mission.
- The ALOC NCOIC is generally the S4 NCO. He moves and sets up the ALOC. He is responsible for the physical functioning of the ALOC. The ALOC NCOIC is also responsible for shift schedules, organization within the ALOC, and other functions as assigned.
- The ALOC NCOIC is assisted by the other ALOC NCOs and personnel. Among other duties, they maintain unit status, receive and process reports, and keep the CSS journal.

- RTOs are as critical in the ALOC as in the TOC and perform the same functions.

ADMINISTRATIVE AND LOGISTIC CENTER LOCATION

3-193. Until digital communications allow greater separation, the ALOC is frequently near the main CP to ensure close coordination within the brigade staff. However, the ALOC may form the central part of the rear CP and operate the rear assembly area (RAA). It may operate a split-section with the S4 section as part of the main CP and the S1 section as part of the rear CP or vice versa.

ADMINISTRATIVE AND LOGISTIC CENTER AND TACTICAL COMMAND POST

3-194. ALOC functions continue from the ALOC even when the tactical CP controls operations. When the main CP displaces, the ALOC normally sends at least an S4 representative to the tactical CP to monitor CSS operations until the ALOC is reestablished.

TACTICAL COMMAND POST

3-195. The tactical CP is established to enhance C^2 of current operations. It is employed when operations might be degraded or distances are too extended to operate from the main CP. It must communicate with higher headquarters, adjacent units, the employed subordinate units, and the main CP. The normal mode of communications at the tactical CP is radio and MSE. The tactical CP helps the commander control current operations by—

- Maintaining SA and understanding.
- Analyzing information for immediate intelligence.
- Developing combat intelligence of immediate interest to the commander.
- Maneuvering forces.
- Controlling and coordinating FS.
- Coordinating operations.
- Coordinating with adjacent units and forward AD elements.
- Monitoring and communicating CSS requirements(Classes III and V) to the main CP.

3-196. The tactical CP is small in size and electronic signature to facilitate security and rapid, frequent displacement. Its organization layout, personnel, and equipment must be in the unit SOP. The TOE tactical CP paragraph provides a tactical operations warrant officer, four 15P positions, and a 96B intelligence specialist as a dedicated tactical CP contingent; however, the tactical CP section must be augmented for most operations.

3-197. Designated personnel from the appropriate staff sections augments the tactical CP. The S3 section is responsible for the tactical CP. Augmentation may include—

- SP, Tactical Operations Officer, SO, and other selected warrant officers.
- S2, FSO, ALO, engineer, and S5, if assigned.
- Representatives from the ALOC (if the main CP is displacing).

3-198. METT-TC may dictate that an effective tactical CP operates from a C^2- equipped UH-60.

REAR COMMAND POST

3-199. A rear CP may be used to coordinate sustainment. If used, it may be within the EAC, corps, or division support area (DSA) or elsewhere in the rear. The S4 or S1 normally is the rear CP commander. However, if the TSC, COSCOM, or DISCOM commander agrees, the AVIM company commander or aviation support battalion commander may serve as the brigade rear CP commander.

3-200. The rear CP commander is responsible for the security of rear area units of the aviation brigade. He ensures that they are integrated into an established base or base-cluster defense for mutual security. The brigade XO monitors the operations of the rear area. The S4 and S1 maintain continuous contact with the main CP to coordinate the required support. They also coordinate extensively with higher echelon, support command elements for their support functions.

ALTERNATE COMMAND POST

3-201. The commander may designate an alternate CP to ensure continuity of operations during displacements or in case of serious damage to the TOC. The alternate CP may be the tactical CP, rear CP, or a subordinate battalion headquarters. Provisions for an alternate headquarters are normally established in unit SOPs.

COMMAND GROUP

3-202. The command group consists of the brigade commander and the representatives from the brigade staff and supporting units that the commander chooses. At a minimum this normally will be the S3, an S2 representative, and the FSO and ALO, if they are available. The command group may operate from ground vehicles or an aircraft. The command group is not a command facility per se, but a grouping of critical decision makers that may operate separately from the main CP or the tactical CP periodically. The command group may deploy when personal observation or presence is necessary to accomplish the mission.

SECTION VII – COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE

OVERVIEW

3-203. C^2 is the exercise of authority and direction by a designated commander of assigned and attached forces. Command includes both the authority and responsibility for effectively using available resources to accomplish missions. Communications and computer systems provide the means to collect, transport, process, disseminate, and protect information.

ISR is an integral part of information support. It combines to produce information about enemy, weather, and terrain necessary to make critical decisions.

COMMAND

3-204. Command at all levels is the art of motivating and directing people and organizations to accomplish missions. Command requires visualizing the current state of friendly and enemy forces, the future state of those forces that must exist to accomplish the mission, and formulates concepts of operations to achieve victory. Prior to execution, commanders influence the outcome of operations by—

- Defining his intent.
- Assigning missions.
- Designating the priority efforts.
- Prioritizing and allocating CS and CSS.
- Deciding what level of risk to accept.
- Placing reserves.
- Assessing the needs of subordinates and seniors.
- Guiding and motivating the organization toward the desired end.

3-205. Once operations begin, commanders influence the operations by—

- Changing task organization.
- Changing allocation of CS.
- Changing priority of CSS.
- Changing boundaries.
- Allocating more time.
- Personal presence.

CONTROL

3-206. To control is to regulate forces and functions to execute the commander's intent. Control of forces and functions helps commanders and staffs compute requirements, allocate means, and integrate efforts. Control is necessary to determine the status of organizational effectiveness, identify variance from set standards, and correct deviations from these standards. Control permits commanders to acquire and apply means to accomplish their intent and develop specific instructions from general guidance. Ultimately, it provides commanders a means to measure, report, and correct performance. Control allows commanders freedom to operate, delegate authority, place themselves in the best position to lead, and synchronize actions throughout the operational area. Commanders exercise authority and direction through and with the assistance of a C^2 system. The C^2 system consists of the facilities, equipment, communications, procedures, and personnel essential for planning, directing, and controlling operations of forces pursuant to the missions assigned.

COMMAND AND CONTROL

3-207. While C^2 may be discussed separately for understanding, in practice, C^2 is an entity. The commander cannot command effectively without control, and cannot exercise control without command. The commander uses C^2 to make effective decisions, manage the uncertainty of combat, employ forces efficiently, and direct successful execution of military operations. In short, the goal of C^2 is mission accomplishment, while the object of C^2 is force effectiveness. The staff is the commander's most important resource to exercise C^2 when he is unable to exercise it by himself.

COMMUNICATIONS AND COMPUTERS

3-208. Communications, often aided by computers, allow the exchange of intelligence, intent, orders, plans, and direction in a timely manner. The mission and structure of the brigade determine specific information flow and processing requirements. In turn, the brigade's information requirements dictate the general architecture and specific configuration of the communications and computer systems. Unit SOPs should address the use of communications and computers.

INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE

3-209. ISR are distinct from the larger framework of information support because they focus primarily on the enemy. Poor intelligence has been the immediate cause for innumerable defeats. Inadequate surveillance and reconnaissance are prime contributors. Conversely, excellent intelligence breeds bold action that can negate enemy superiority. Normally, timely and accurate intelligence depends on persistent surveillance and aggressive, efficient reconnaissance.

3-210. The brigade is a key supplier of ISR; however, it is also a consumer of higher echelon (Army, joint force, and national) ISR products. By its tie-in to the higher echelon ISR information, the brigade executes its mission in an environment characterized much more by what is known rather than what is unknown.

COMMUNICATIONS

3-211. Reporting combat information and exploiting that information is fundamental to combat operations. This information and the opportunities it presents are of interest to other maneuver units and higher headquarters staffs. It requires wide and rapid dissemination. Brigade elements frequently operate over long distances, wide fronts, and extended depths from their controlling headquarters. Communications must be redundant and long range to meet internal and external requirements. Long-range communications can be augmented through signal support. The systems must be in place before they are needed.

HIGHER TO SUBORDINATE

3-212. The brigade headquarters ensures that its communications architecture (command, operations and intelligence (O&I), administrative and logistics (A&L), FS, MSE, and SATCOM) are operational at all times.

The retransmission system is dedicated to on-call restoration of communications on any net. Possible retransmission locations must be identified and checked before starting operations. The brigade must have MSE support during operations over great distances from higher headquarters.

SUBORDINATE TO HIGHER

3-213. Battalions and separate companies continually monitor the brigade nets as directed (usually command and O&I). Likewise, the brigade continually monitors its higher headquarters nets.

SUPPORTING TO SUPPORTED

3-214. Liaison elements supporting the brigade maintain communications between their organization and the brigade.

COMMUNICATIONS DISRUPTION

3-215. Communications, particularly electromagnetic, are subject to disruption. Disruption may result from unintentional friendly interference, intentional enemy action, equipment failure, atmospheric conditions, EMP, or terrain interference. To compensate for these, the commander should—

- Provide for redundancy in means of communication.
- Ensure subordinates understand the commander's intent so they know what to do during communications interruptions.
- Avoid overloading the communications systems.
- Minimize use of radio.
- Ensure signal security and COMSEC practices are followed.

COMMUNICATION RESPONSIBILITIES

3-216. All levels of command gain and maintain communications with the necessary headquarters and personnel. Communications methods and procedures should be established in unit SOPs and practiced during battle drills and flight operations. Traditional communications responsibilities are—

- **Higher to lower.** The higher unit establishes and maintains communications with a lower unit. An attached unit of any size is considered lower to the command to which it is attached.
- **Supporting to supported.** A supporting unit establishes and maintains communications with the supported unit.
- **Reinforcing to reinforced.** A reinforcing unit establishes and maintaines communications with the reinforced unit.
- **Passage of lines.** During passage of lines (forward, rearward, or lateral), the passing unit establishes initial contact with the stationary unit. However, the primary flow of information must be from the unit in contact.
- **Lateral communications.** Establishing communications between adjacent units may be fixed by the next higher commander, by order, or

by SOP. If responsibility is not fixed, the commander of the unit on the left establishes communications with the unit on the right.

- **Rear to front communications.** The commander of a unit positioned behind another unit establishes communications with the forward unit.

RESTORATION

3-217. Regardless of establishment responsibility, all units take prompt action to restore lost communications.

MEANS OF COMMUNICATION

3-218. The brigade uses the full spectrum of communications means.

MOBILE SUBSCRIBER EQUIPMENT

3-219. The MSE system is the backbone of the higher headquarters communications system. It provides voice and data communications from the corps rear boundary forward to the maneuver brigade's main CP. The MSE integrates the functions of transmission, switching, control, COMSEC, and terminal equipment (voice and data) into one system. MSE provides a switched telecommunications system extended by mobile radiotelephone and wire access. Users can communicate throughout the battlefield in either a mobile or static situation.

VIDEO TELECONFERENCE

3-220. Video teleconferences (VTCs) among corps, divisions, and brigades are becoming more common. Some brigades are already fielded with that capability. VTCs are an excellent method for coordination over long distances and can save commanders time.

WIRE/COMMERCIAL LINES

3-221. Normally wire is used for communications within the CP, AA, and support area. It is the primary means of communication whenever the situation permits. Initially, wire is laid on the ground. Then, if time permits, wire is buried or installed overhead. Buried wire is the preferred method to counter enemy intrusion and EMP. However, wire should be overhead when crossing roads, except where culverts and bridges are available. Overhead wire should be a minimum of 18 feet above ground. Wire should be tagged according to a system in the SOP. At a minimum, tags should be at the ends of each line. This facilitates reattaching wires when they are pulled out or cut. Overhead wire in vicinity of helipads and airfields should be avoided; however, if used, overhead wires must be clearly marked.

3-222. Commercial lines are used when approved by higher headquarters. To deny enemy collection efforts, secure devices should be used with commercial lines. If a unit is forced to withdraw, and with the approval of higher headquarters, existing wire lines (including commercial lines) are cut and sections removed so the enemy cannot use them.

RADIO

3-223. Operations often depend on radio as the primary means of communication. This is especially true during mobile combat operations. Radio communications should be kept to an absolute minimum until enemy contact is made.

3-224. FM communications are the primary O&I and A&L nets, and the means of communicating with ground forces. However, aviation has a broad range of other radios that facilitate joint, internal, long-range and NOE communications. These radios include—

- HF—long distance and NOE communications.
- UHF—internal communications and communication with joint aircraft.
- VHF—internal communications and communications with ATS.
- Tactical satellite (TACSAT) and SATCOM—long distance communications.

Appendix E discusses these systems.

3-225. To avoid detection by enemy direction finding equipment, the brigade uses all other means of communication to supplement radio. Although secure equipment may prevent the enemy from knowing the content of the communications, location and volume are easy to detect and analyze. This gives the enemy valuable combat information.

RADIO RETRANSMISSION

3-226. The brigade retransmission stations are employed according to the tactical situation to provide FM radio communications between stations too far apart to communicate directly. The brigade can deploy both ground and air retransmission stations. Ground retransmission normally support the brigade command net. Airborne retransmission has a limited time on station, but is a vulnerable asset. Preplanning is essential to the effective use of airborne retransmission. Moving ground retransmission by sling load is an efficient and effective method of emplacing radio retransmission.

MESSENGERS

3-227. Messengers may be used anywhere but normally are used for critical communications between CPs, trains, and higher and lower headquarters. Messengers also are used during electronic and radio silence. While ground messengers are slower than other means of communications, aviation provides a rapid capability if preplanned. Aviation messengers may be particularly useful in carrying A&L messages when en route to and from rear units. They can be used even if units are in contact and especially when jamming or interception hampers radio communication. During electronic and radio silence, opening and closing flight plans by land lines may be required to control helicopter movements.

Message And Document Delivery

3-228. The electronic transmission of messages and documents may not be possible because of nuclear weapons employment, enemy jamming operations, imposition of radio silence, or inoperable equipment. Messages and documents that may warrant aerial delivery include combat plans and orders, written coordination and control measures, and graphics. They also include public affairs materials to sustain public understanding and support for the Army's continued operations. Using aviation to deliver messages or documents is a sound technique; however, it is most efficient when there is a prepared plan for execution. If an aviation messenger service is anticipated, it should be part of the aviation brigade and higher headquarters SOPs.

VISUAL AND AUDIO

3-229. Visual and audio signals are in the SOI or SOP. SOP may establish signals not included in the SOI. Commanders and staff planners carefully determine how sound and visual signals will be used and authenticated. Sound and visual signals include pyrotechnics, hand-and-arm, flag, metal-on-metal, rifle shot, whistles, horns, and bells. Visual cues are especially valuable in the FARP.

OPERATIONS SECURITY

3-230. OPSEC includes measures taken to deny the enemy information about friendly forces and operations. OPSEC consists of physical security, information security, signal security, deception, and counter-surveillance. Because these categories are interrelated, the commander normally chooses to employ multiple techniques to counter a threat. Commanders analyze hostile intelligence efforts and vulnerabilities, execute OPSEC countermeasures, and survey the effectiveness of countermeasures. Commanders can then counter specific hostile intelligence efforts.

LINES OF COMMUNICATION

3-231. LOCs include roads, supply routes, relay and retransmission sites, critical signal nodes, microwave facilities, and telephone and wire systems. The brigade may conduct reconnaissance and security operations of any of the critical LOCs on a periodic basis or for a specified time to keep the route open and update information about the route.

AIRBORNE COMMAND AND CONTROL

3-232. Inherent in the brigade mission, less those brigades without assigned UH-60 and fixed-wing aircraft, is transport for commanders and staff officers so they can see the battlefield and more effectively C^2 their units.

3-233. When fielded, the Army airborne command and control system (A^2C^2S) will provide tactical CP with the same digital capabilities as the ground tactical CP. Appendix L provides additional information.

LIAISON OFFICER TRANSPORT

3-234. Aerial transport can help effect vital liaison between units. Since the UH-60 is in great demand, movement of LNOs must be planned and executed at the higher headquarters.

AERIAL RECONNAISSANCE

3-235. Brigade elements may be employed to verify unit locations or even their existence. For example, if the higher headquarters commander loses communications with a subordinate unit, that commander may ask the aviation commander to verify the unit's location and status.

RADIO RELAY/RETRANSMISSION

3-236. The brigade can insert and resupply ground retransmission teams into sites inaccessible by ground. Brigade aircraft may carry retransmission equipment, relay equipment, or both. Aircrews also can transmit or relay with onboard equipment.

SECTION VIII – COMMUNICATION NETS

3-237. Each aviation brigade communicates by one or more of the following systems:

- LAN (secure and nonsecure).
- Amplitude modulated (AM)/frequency modulated (FM) radio.
- HF radio.
- SATCOM.
- MSE.
- MCS/FBCB2.
- Commercial lines.
- Wire.

AMPLITUDE MODULATION/FREQUENCY MODULATION RADIO NETS

3-238. Brigades normally operate on their own and their higher headquarters command, O&I, and A&L nets. Aviation maneuver brigades also operate on fire nets. Additionally, each aviation brigade must often monitor lower, adjacent, and supported unit radio nets. This can be especially valuable when supporting and conducting air assaults and close fires.

3-239. Critical higher headquarters radio nets must be monitored at all times.

- Higher command net. The brigade commander, all brigade CPs, and the S3 enter and operate.
- Higher O&I net. The S2 and all brigade CPs enter and operate.
- Higher A&L net. The S1 and S4 and the ALOC enter and operate.
- Other staff sections and staff officers enter other higher nets as appropriate.

BRIGADE COMMAND NET

3-240. A secure command net, controlled by the S3, is used for C^2 of the brigade. All subordinate and supporting combat and CS units normally operate in this net. As a rule, only commanders, XOs, or S3s will communicate on the net (Figure 3-2).

BRIGADE OPERATIONS AND INTELLIGENCE NET

3-241. The S2 controls the O&I net. Routine operations and INTREPs are sent on this net. It functions as a surveillance net when required. O&I is not normally monitored by the brigade or subordinate commanders. The net is for details and discussion that leads to analysis. That analysis, when completed, is relayed to the appropriate commander. The unit XO, operating in the TOC, ensures that analysis is done and relayed in a timely manner and by the appropriate means. If the rear CP is used, it also monitors O&I. This allows the rear CP to anticipate critical support requirements and problems (Figure 3-3).

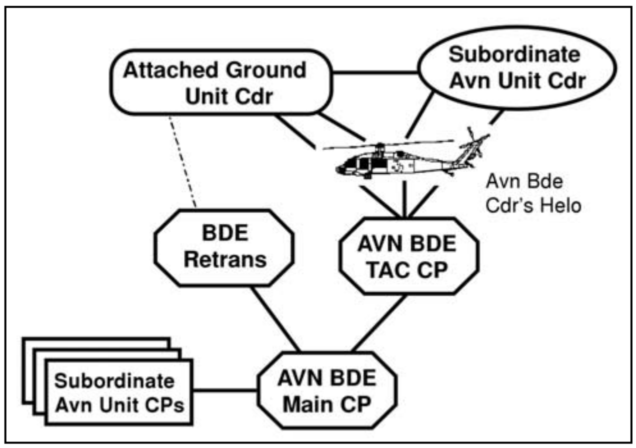


Figure 3-2. Brigade Command Net

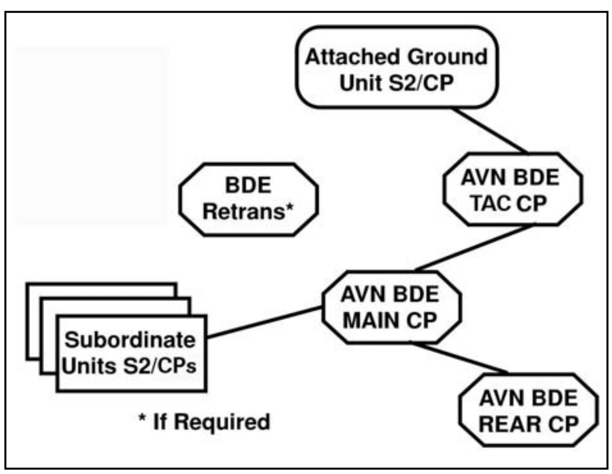


Figure 3-3. Brigade O&I Net

BRIGADE ADMINISTRATIVE AND LOGISTICS NET

3-242. This net is controlled by the S1 and S4. It is used for A&L traffic. The A&L net, like the O&I net, normally is not monitored by the brigade or subordinate commanders. The net is for details and discussion that leads to the resolution of administration and logistics matters. Critical information is relayed to the appropriate commander or discussed on the command net. The unit XO, operating in the TOC, ensures that analysis is done and relayed in a timely manner and by the appropriate means. If the rear CP is used, it also monitors O&I. This allows the rear CP to anticipate critical support requirements and problems (Figure 3-4).

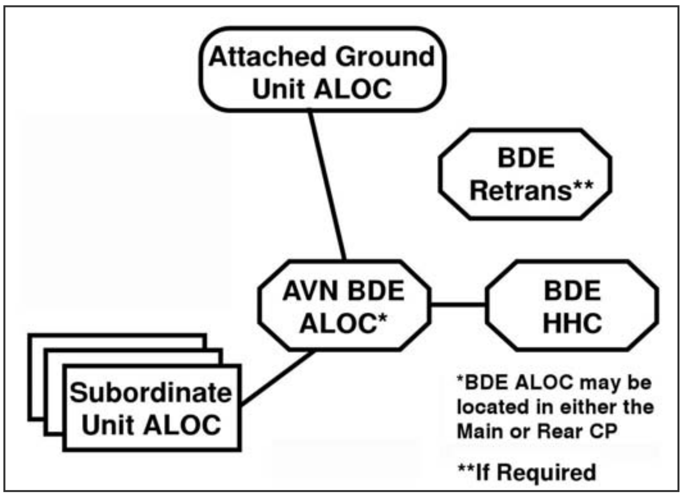


Figure 3-4. Brigade A&L Net

COMBAT AVIATION NET

3-243. The air mission commander (AMC), air assault task force commander (AATFC), infantry force commanders, and PZ control officer use this secure FM net for air-to-ground communication at the PZ/LZ and to transmit situation reports and mission changes. All aviation forces monitor this net, especially in the vicinity of the PZ/LZ.

FIRE CONTROL NETS

3-244. The FSO operates in the supporting FA command net and in a designated fire direction net to coordinate artillery fires. The USAF ALO, when attached, controls TACAIR through a USAF TACAIR request net (HF/single side band [SSB]) and a UHF/AM air–ground net.

MONITORED RADIO NETS

3-245. Aviation brigades must often monitor the nets of subordinate, adjacent, supporting, or supported units. This can be especially valuable in complex or fast moving operations.

3-246. During Desert Storm, an aviation brigade supported a ground brigade with attack helicopter fires. The aviation brigade tactical CP monitored the supported ground brigade command net and its subordinate battalions' command nets. The aviation brigade tactical CP—listening to its own command net, the attack battalion command net, and the command nets of the supported ground battalion—detected a friendly fire incident and issued a cease fire before other friendly elements were engaged, averting an even worse catastrophe.

3-247. The brigade commander should have three FM nets, one UHF/VHF net, one HF radio and one SATCOM radio—all in addition to brigade and higher headquarters command nets. These nets enable him to monitor subordinate unit, supported unit command, O&I, A&L, or any other nets he deems important to the missions at hand.

STANDARD ARMY MANAGEMENT INFORMATION SYSTEMS NETS

3-248. Standard Army management information systems (STAMIS) consist of computer hardware and software systems that automate diverse functions based on validated customer requirements and facilitate the vertical flow of logistics and maintenance status information to units Army wide. Chapter 8 addresses the STAMIS architecture.

ARMY BATTLE COMMAND SYSTEM NETS

3-249. Appendix K addresses digitized unit nets.

Chapter 4

Common Operational Procedures

SECTION I – FUNDAMENTALS

GENERAL

4-1. Aviation brigades are tailored to execute operations that support the unit to which they are assigned. The principal role of the brigade is to set the conditions for success for its units.

4-2. Each aviation brigade can C^2 combat, CS, and CSS missions as a whole, or with one or more of its subordinate units. However, each brigade is tailored for its specific TOE mission and does not have the *organic* assets to accomplish the full range of combat, CS, and CSS missions. For example, a TAB can C^2 attack helicopter operations, but it is not organized with attack helicopter assets because its TOE mission is air movement and C^2 support. The corps aviation brigade, through its attack regiment and aviation group, conducts the full gamut of aviation operations. However, if it requires fixed-wing support, it must coordinate for that support from the TAB. Because combat operations may cause task organizations that differ from the brigade's primary mission focus, brigade commanders and staff should be familiar with the current doctrinal literature for all elements of each type brigade.

TIME REQUIRED TO PLAN

4-3. Planning time is critical for every type of military mission. While aviation units can *move* rapidly, planning time is essential for coordination, clearing routes, mission briefings to soldiers and leaders, and unit SOP compliance. WARNORDs maximize time available by allowing subordinate units to prepare for pending action. Planning and operations are greatly simplified by SOPs that are understood, followed, and internalized through training.

WARNING ORDER

4-4. A WARNORD is a preliminary notice of an order or action that will follow. It serves as a planning directive that describes the situation, allocates forces and resources, and establishes command relationships. It provides other initial planning guidance and initiates subordinate unit mission planning. Planning and coordination begin when the unit receives a notice of mission. The aviation commander, LNO, or a staff officer may be sent to a supported commander's headquarters to assist in planning. Aviation units may begin to reconfigure or reposition to support the upcoming operation.

COMMANDER'S CRITICAL INFORMATION REQUIREMENTS

4-5. Commanders personally designate critical information that derives from their intent—the CCIR. The CCIR are elements of information required by commanders that directly affect decision-making and dictate the successful execution of military operations.

4-6. As part of the MDMP, commanders visualize the battlefield and the fight. Information collected to answer the CCIR either confirms the commander's vision of the fight or indicates the need to issue a FRAGO or execute a branch or sequel.

4-7. CCIR must be focused enough to generate relevant information. Unfocused requests, such as "I need to know if the enemy moves," may provide data but not much useable information. However, "I need to know when the enemy lead brigade reaches NAI 2" or "I need to know if the multinational unit on our right flank advances beyond Phase Line Blue" are examples of CCIR specific enough to focus collection and information management priorities.

FRIENDLY FORCE INFORMATION REQUIREMENTS

4-8. Friendly force information requirements (FFIR) are information the commander and staff need about the forces available for the operation.

PRIORITY INTELLIGENCE REQUIREMENTS

4-9. Priority intelligence requirements are intelligence requirements that the commander has anticipated and designated a priority in planning and decision making.

ESSENTIAL ELEMENTS OF FRIENDLY INFORMATION

4-10. Essential elements of friendly information (EEFI) are the critical aspects of a friendly operation that, if known by the enemy, would subsequently compromise, lead to failure, or limit success of the operation; therefore, they must be protected from enemy detection. EEFI help commanders understand what enemy commanders want to know about friendly forces and why (see FM 6-0 [FM 100-34]). They tell commanders what cannot be compromised. For example, a commander may determine that if the enemy discovers the movement of the reserve, the operation is at risk. In this case, the location and movement of the reserve become EEFI. EEFI provides a basis for indirectly assessing the quality of the enemy's SU (if the enemy does not know an element of EEFI, it degrades his SU).

COMMON PLANNING PROCESS

4-11. The planning process for aviation brigade operations does not differ from the doctrinal processes already in place. Because the brigade may have units joining it from each aviation mission area, it is critical to discuss the commonality and the differences that each brings to the brigade. Critical planning includes reconnaissance, security, attack, air assault, air movement, aerial mine emplacement, AD, A^2C^2, FS, CAS, C^2, and aeromedical evacuation. Brigade planners may be available from each aviation mission area. If not available, planners still must plan missions to the same level of expertise and detail expected of a mission area subject matter expert.

REVERSE PLANNING PROCESS

4-12. Planning begins with the terminal end of the mission—actions at the objective, the cargo delivery point, and the passenger drop-off point. Table 4-1 shows the commonality of the planning phases of each mission area. It is intended as a starting point to assist in team building.

Table 4-1. Planning Phases

Air Assault	Attack	Air Cavalry	Air Movement	Command and Control
Ground tactical plan	EA plan	Observation/ engagement plan	Pax and cargo delivery plan	C^2 support plan
Landing plan	BP/holding area (HA) occupation plan	Recon/OP occupation plan	Landing plan	Landing plan
Air movement plan	Air movement plan	Air movement plan	Air movement plan	Air movement plan
Loading plan (pax and equip)	Loading plan (ammo)	Loading plan (ammo)	Loading plan (pax and cargo)	Loading plan (cdrs and staff)
Staging plan (PZ)	Staging plan (forward assembly area [FAA])	Staging plan (FAA)	Staging plan (PZ)	Staging plan (pickup point)

SITUATIONAL AWARENESS

4-13. SA involves knowing enemy and friendly positions and capabilities, as well as the status of environmental factors (weather, terrain, civilian populations). SA is critical to achieving SU and operational success.

SITUATIONAL AWARENESS FOR COMMAND POSTS

4-14. CP personnel must remain situationally aware. Among systems assisting them are the intelligence systems of the division, corps, and EAC, as well as the brigade's own force

4-15. s. Every CP must know the current situation and be able to present COAs to the commander on demand, along with a recommendation for the best COA.

SITUATIONAL AWARENESS FOR AIRCREWS

4-16. The navigation systems in the AH-64 and the OH-58D allow commanders and aircrews to know their exact location. The same is true of UH-60s equipped with global positioning system (GPS). Other information, friendly and enemy, is available through the AMPS planning and preparation process. The OH-58D also has a moving map display, and other aircraft are scheduled to receive them.

SITUATIONAL AWARENESS FOR THE AH-64D

4-17. The AH-64D Longbow Apache (LBA) has vastly superior SA capabilities over other aviation brigade aircraft. Each Longbow crew can query the location of other AH-64Ds automatically and provide their accurate locations. It can receive and post digital messages automatically from other friendly forces. Aircraft systems automatically post and show the crew digital messages and enemy information from the fire control radar (FCR).

TYPES OF OPERATIONS

4-18. There are four types of operations: offensive, defensive, stability, and support (Tables 4-2 through 4-5).

Table 4-2. Types of Offensive Operations

OFFENSE	DEFINITION
Movement to Contact	Used to develop the situation, establish, or regain contact with the enemy.
Attack	An operation characterized by movement supported by fire. The purpose is to destroy, delay, disrupt, or attrit the enemy.
	Hasty attack: An operation in which preparation time is traded for speed to exploit an opportunity.
	Deliberate attack: An action characterized by preplanned, coordinated employment of fires, and movement to close with and destroy the enemy.
	Special Purpose: Special purpose attacks achieve objectives different from those of other attacks. Spoiling attacks and counter attacks are usually phases of a larger operation. Raids and ambushes are generally single-phased operations conducted by small units. Feints and demonstrations are military deception operations.
Exploitation	The follow-up of gains to take full advantage of success in battle.
Pursuit	An action against a retreating enemy force.

Table 4-3. Types of Defensive Operations

DEFENSE	DEFINITION
Mobile	Orients on the defeat or destruction of the enemy force by allowing it to advance to a point where it is exposed to a decisive attack.
Area	Orients on denying the enemy designated terrain. Conducted to defend specified terrain, when the enemy enjoys a mobility advantage over the defending force, when well-defined avenues of approach exist, and the defending force has sufficient combat power to cover the likely enemy avenues of approach.
Retrograde (Delay)	Mission that trades space for time while retaining flexibility and freedom of action.
Retrograde (Withdrawal)	A planned, voluntary disengagement that anticipates enemy interference.
Retrograde (Retirement)	A force not in contact with the enemy moves away from the enemy.

Table 4-4 Types of Stability Operations

STABILITY	DEFINITION
Peace Operations (PO)	Operations conducted to support diplomatic efforts to establish and maintain peace.
Foreign Internal Defense (FID)	Operations in support of a foreign government to free and protect its society from subversion, lawlessness, and insurgency.
Security Assistance	A group of programs that support U.S. national policies and objectives by providing defense articles, military training, and other defense-related services to foreign nations by grant, loan, credit, or cash sales.
Humanitarian and Civic Assistance	Assistance provided with military operations and exercises.
Support to Insurgencies	On National Command Authority (NCA) order, Army forces (ARFOR) support insurgencies that oppose regimes that threaten U.S. interests or regional stability.
Support to Counter-Drug Operations	ARFOR always conduct counter-drug operations that support other U.S. government agencies. When conducted inside the U.S. and its territories, they are *domestic support operations*.
Combatting Terrorism	Operations to deter or defeat terrorist attacks.
Noncombatant Evacuation Operations (NEO)	Operations to relocate threatened civilian noncombatants from locations in a foreign nation to secure areas.
Arms Control	Conducted to prevent escalation of a conflict and reduce instability.
Show of Force	Conducted to bolster and reassure allies, deter potential aggressors, and gain or increase influence.

Table 4-5. Types of Support Operations

SUPPORT	DEFINITION
Domestic Support Operations	Assistance to U.S. civilian authorities in activities such as civil disturbance control, counter-drug operations, combatting terrorism, and law enforcement.
Foreign Humanitarian Assistance	Operations to relieve or reduce the results of natural or man-made disasters including conditions such as pain, disease, hunger, or privation that present a serious threat to life or loss of property.

COMMON TERMS

4-19. The terms defined below are terms common to aviation operations.

ASSEMBLY AREAS

4-20. There are three types of AAs used by Army aviation units—heavy assembly areas (HAA), FAA, and RAA. Appendix D contains additional information on AAs.

General

4-21. An AA is a location where the unit prepares for operations. Activities include planning, orders, maintenance, and Class I, III, and V resupply. AAs should be located out of enemy medium artillery range and be large enough for dispersion of the unit. AAs should not be located along an axis of advance. Other considerations involved in selecting appropriate AAs are—

- Security.
- Concealment.
- Accessibility to main supply routes (MSR).
- Air avenues of approach.
- Location of friendly units.
- Suitability of ingress and egress routes.

Heavy Assembly Areas

4-22. HAAs are locations where aviation units conduct routine maintenance, resupply, planning, and other preparations for combat operations. They contain all the life support requirements for combat crews and are the normal place for crew endurance activities. The main CP always locates in the HAA. All elements in this area can relocate while unit aircraft are fighting forward. HAAs relocate according to METT-TC (Figure 4-1).

Figure 4-1. Heavy AA

Forward Assembly Areas

4-23. Units use FAAs to reduce response time, plan mission changes, conduct final planning, and task-organize as required by the situation or mission changes. Normally, only operational helicopters and tactical CPs (brigade and battalion) are found in an FAA. Because of the FAA's distance from the HAA, some circumstances require a contact team to provide a more timely response to maintenance needs. Vehicles other than those assigned to the tactical CP are the exception rather than the norm. Units normally use FAAs for no more than 6 to 12 hours (Figure 4-2).

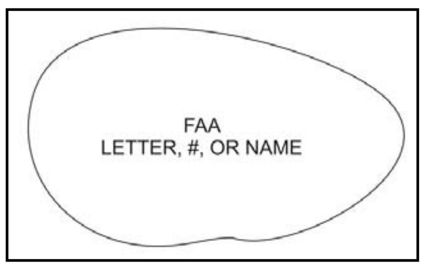


Figure 4-2. Forward AA

Rear Assembly Areas

4-24. Units establish RAAs for aircraft maintenance not feasible in the HAA because the unit HAA may have to move often. When the enemy air threat is not high, the RAA collocates with the HAA to better facilitate aviation maintenance. The RAA relocates according to METT-TC. If withdrawing, units may have to destroy disabled aircraft. The AVIM should position so that it moves as little as possible to allow more time to conduct maintenance (Figure 4-3).

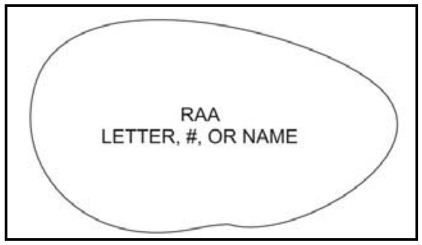


Figure 4-3. Rear AA

BATTLE POSITIONS

4-25. BPs are areas in which aviation units can maneuver and fire into a designated EA or engage targets of opportunity. BPs contain firing positions (FPs) and attack positions (Figure 4-4).

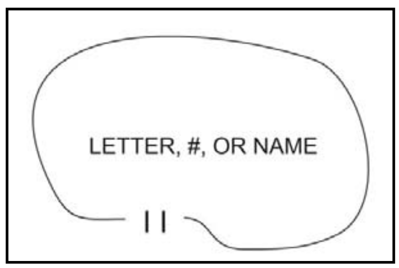


Figure 4-4. Battle Position

HOLDING AREAS

4-26. HAs provide cover and concealment from enemy direct fire or observation. Units establish HAs to loiter short of FPs to resolve timing errors, and conduct reconnaissance or final coordination before attack. Helicopters should not shut down or go to auxiliary power units in HAs without a thorough risk assessment. Do not use HAs to plan unless absolutely necessary. Planning should be done in a FAA or HAA (Figure 4-5).

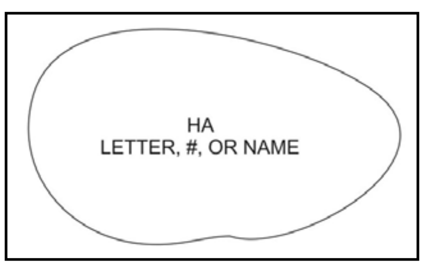


Figure 4-5. Holding Area

FIRING POSITIONS

4-27. Units use FPs to engage the enemy. Standoff must be maintained. As a general guideline, FPs are no closer to the enemy than the distances shown below. Ranges may be altered by METT-TC (Figure 4-6).

- Rockets: 5,500 meters.
- Hellfire: 5,000 meters.
- 30mm: 2,500 meters.

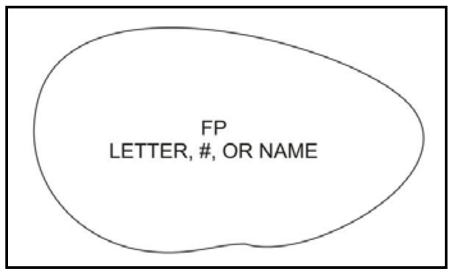


Figure 4-6. Firing Position

ATTACK BY FIRE

4-28. *Attack by fire* (ABF) are fires (direct and indirect) employed to destroy the enemy from a distance, normally used when the mission does not dictate or support occupation of the objective. This task is usually given to the supporting element during the offensive and as a counterattack option for the reserve during defensive operations. An ABF is not done in conjunction with a maneuvering force. When assigning this task, the commander must specify the intent of the fire—either to destroy, fix, or suppress. ABF positions are less restrictive than BPs and better suited to a fluid battlefield. They allow the unit to maneuver and engage the enemy, but not maneuver over the enemy (Figure 4-7).

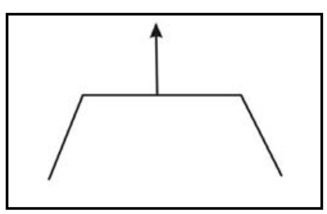


Figure 4-7. Attack by Fire

SUPPORT BY FIRE

4-29. *Support by fire* is a tactical task in which a maneuver element moves to a position on the battlefield where it can engage the enemy by direct fire. It supports a maneuvering force by either support by fire by overwatching or by establishing a base of fire. The maneuver element does not attempt to maneuver to capture enemy forces or terrain (Figure 4-8).

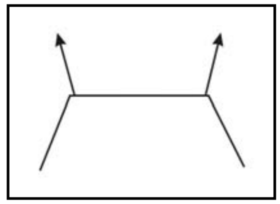


Figure 4-8. Support By Fire

RALLY POINT

4-30. Units designate a rally point to reassemble separated or dispersed elements (Figure 4-9). A rally point is used to—

- Reform units before, during, or after an operation.
- Regroup a team, platoon, or company after a hasty withdrawal from contact.
- Assemble personnel after their position has been overrun.
- Assemble reaction teams.

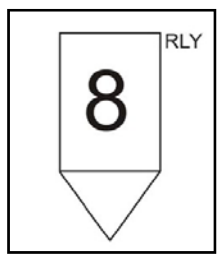


Figure 4-9. Rally Point

FLIGHT MODES AND MOVEMENT TECHNIQUES

4-31. Flight modes include low-level, contour, and NOE. Movement techniques include traveling, traveling overwatch, and bounding overwatch. Aviation elements choose the flight mode and movement technique based on available terrain and the probability of enemy contact.

Traveling

4-32. Traveling is used for moving rapidly over the battlefield when enemy contact is unlikely, or the situation requires speed to evade the enemy. All aircraft move at the same speed. Units often employ low-level flight with the traveling movement technique.

Traveling Overwatch

4-33. Traveling overwatch is used when speed is essential and enemy contact is possible. Lead aircraft move constantly and trail aircraft move as necessary to maintain overwatch of lead. Units often employ contour flight with the traveling overwatch technique.

Bounding Overwatch

4-34. Bounding overwatch is used when expecting enemy contact. It is the slowest movement technique. It uses alternate or successive bounds, with lead aircraft moving to a position while trail aircraft overwatch. The overwatching aircraft then bound to a position ahead of the lead aircraft. Each aircraft bounds separately while the other overwatches the movement. Length of the bound depends on the terrain, visibility, and the effective range of the overwatching weapon system. Units normally employ NOE flight with the bounding overwatch technique.

AVIATION BRIGADE OPERATIONS

4-35. An overview of the brigade's major mission categories follows.

AIR ASSAULT AND AIR MOVEMENT

4-36. All aviation brigades can C^2 multibattalion air assaults or air movements, as well as small team movements. However, proficiency in large-scale air assaults or air movements requires training and rehearsals. Air cavalry and attack helicopters normally provide aerial escort, overwatching fires, route reconnaissance, and security for air assaults. Careful analysis of the factors of METT-TC and a detailed, precise, reverse planning sequence lead to successful execution of air assault operations. Planning begins with the ground tactical plan and works backwards to the staging plan as indicated in Figure 4-10. Reverse planning is imperative, as each successive planning step impacts the phase that precedes it. For example, the landing plan helps air assault planners determine the sequence and composition of lifts during the air movement phase.

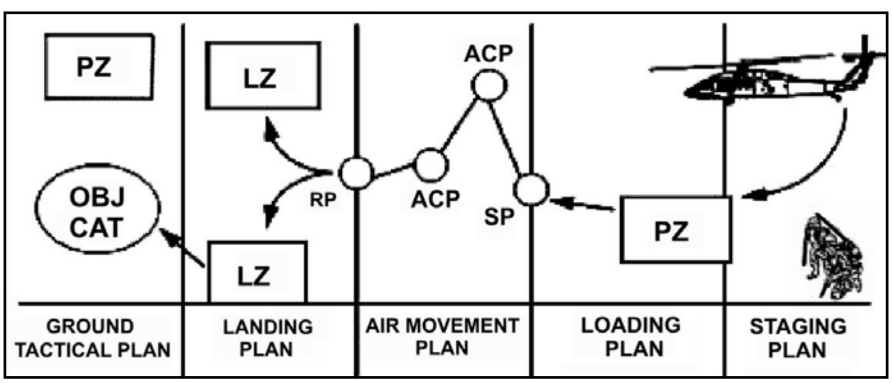


Figure 4-10. Air Assault Planning Stages

SLINGS AND RIGGING EQUIPMENT

4-37. The aviation brigade must ensure supported units understand their responsibility to supply all slings and rigging equipment for air movement and air assaults. The supported unit prepares all loads for movement. Failure to establish this responsibility early in the planning process may lead to major mission delays and even mission failure. Aviation brigades should work with their higher headquarters to ensure that this fact is part of the higher headquarters SOP.

ATTACK

4-38. The primary attack mission is to destroy enemy ground forces. A well-suited secondary mission is cavalry operations—reconnaissance, counter-reconnaissance, and security. A third mission is defensive air combat against enemy helicopter forces. Given USAF capabilities to establish air superiority, Army counter-air training lacks emphasis. However, at a minimum, attack units must plan for and practice defensive counter-air.

4-39. Attack units can conduct operations in deep areas or attack with ground maneuver units during close and rear battle operations. Attack units normally are most effective when used in mass on the enemy's flanks and rear. An aviation brigade may be called upon to conduct attack operations as a whole, or with one or more subordinate units. Assault and heavy helicopter units provide substantial flexibility in resupply of Class III/V, mine emplacement, and insertion of ground troops at blocking positions or OPs.

4-40. Attack aviation normally operates under aviation brigade control. Based on METT-TC, the aviation brigade staff backward plans (just as in air assault operations) from actions in the EA, method of employment (continuous, phased, or maximum destruction), occupation of BPs, HAs, air movement routes (to include passage of lines, if required), to preparatory actions in the AA.

4-41. In the example shown in Figure 4-11, the aviation brigade has a mission to attack to destroy the enemy reserve tank regiment. The aviation brigade commander decides to attack with two battalions simultaneously and to keep his third battalion in reserve. The first battalion, in the north, moves via route Hawk to positions to ABF the northern half of EA Chris. The second battalion, in the south, moves via route Wren to attack positions to attack by fire the southern half of EA Chris. The aviation brigade commander acts as the AMC to ensure coordination of the attacks and inflict maximum destruction. The brigade provides its own UH-60 aircraft, or another brigade provides UH-60 aircraft to conduct airborne C^2, CASEVAC, downed aircrew recovery, and, if required, to conduct emergency resupply of the FARP. For this operation, attacking with two battalions simultaneously, no attack helicopter fires across the battalion boundaries are allowed. This reduces the potential of fratricide. FM 3-04.112 (FM 1-112) contains a detailed discussion of attack helicopter operations.

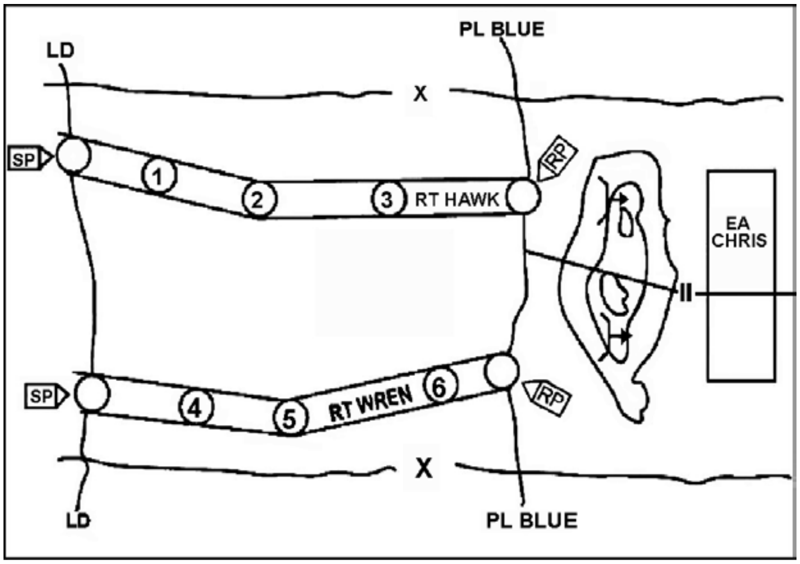


Figure 4-11. Attack Mission Planning

CAVALRY

4-42. Each type of aviation brigade, when task-organized, is an adequate air cavalry force. The divisional brigades, the air assault division brigades (task-organized), the corps aviation brigade, and the corps attack regiment (with support from the corps aviation group) are ideally suited to conduct reconnaissance, screens, and economy of force operations. Inherent in all cavalry operations is counter-reconnaissance. When augmented with ground forces and UAV support, aviation brigades are even more capable. They can operate as a reaction force to develop the situation, occupy ground OPs, seize key terrain, and conduct raids. METT-TC determines whether the brigade commander operates with battalions pure or task-organized. Even though the UH-60 lacks sophisticated weapons and sensors, when pressed, the brigade may use assault units to conduct limited reconnaissance and screening, according to METT-TC. The level of training in the aviation brigade will dictate its ability as an air cavalry or cavalry force (Figure 4-12).

Reconnaissance

4-43. Reconnaissance is a focused collection effort to obtain information about the activities and resources of an enemy or about the meteorological, hydrographic, or geographic characteristics of an area. It is performed before, during, and after other combat operations to provide information. Reconnaissance missions are divided into five categories—route, zone, area, reconnaissance in force, and multi-dimensional. FM 3-04.114 (FM 1-114) and FM 3-20.95 (FM 17-95) address these categories.

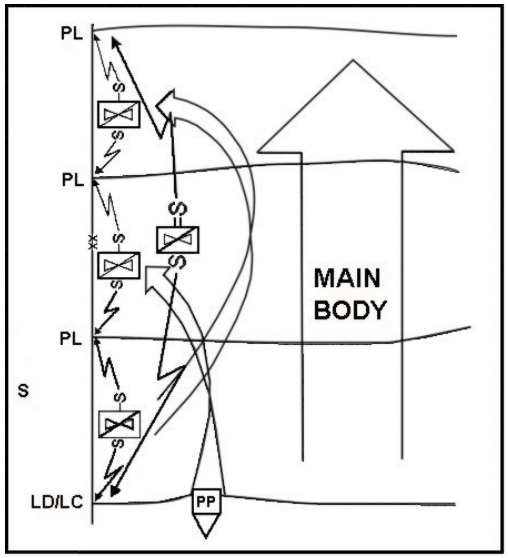


Figure 4-12. Cavalry Screen

Security

4-44. Security operations are undertaken to—

- Provide early and accurate warning of enemy operations.
- Provide the force being protected with time and maneuver space within which to react to the enemy.
- Develop the situation to allow the commander to effectively use the protected force.

4-45. Security operations are characterized by reconnaissance to reduce terrain and enemy unknowns, gaining and maintaining contact with the enemy to ensure continuous information flow, and providing early and accurate reporting of information to the protected force. Pure aviation security missions are limited to screening. When augmented with the appropriate ground forces, it can guard. The brigade participates in covering force operations as a part of a larger force. To act as the covering force headquarters, the aviation brigade requires ground maneuver forces and DS artillery. FM 3-04.114 (FM 1-114) and FM 3-20.95 (FM 17-95) contain detailed discussions of security operations.

Screen Lines

4-46. The graphical symbol for the screen (lightning bolts) indicates the general area for screening operations. In no way does the symbol indicate a requirement for physical occupation.

4-47. Once the order to screen is received, the aviation brigade S3 coordinates with all units that will be adjacent to the screen. The S3 establishes boundaries, contact points, passage points (PPs), and other coordinating measures as required to allow the cavalry squadron to pass through and operate in vicinity of main body units.

4-48. The cavalry squadron then provides the orders and graphics necessary to accomplish the screen. The squadron provides exact OP locations, how long OPs will be occupied, routes between OPs, and other graphics required.

4-49. The cavalry troops then execute the screen mission from the OPs assigned by squadron.

AIR TRAFFIC SERVICES

4-50. An ATS battalion provides ATS throughout the corps. Supported brigades provide the DS ATS companies with Class I, maintenance, and fuel. Whenever they deploy, they must be sustained by their supported brigade. The supported brigade must include the DS ATS company in all of its movement, CS, and CSS plans.

SECTION II – PLANNING CONSIDERATIONS

GENERAL

4-51. Planning considerations are predicated on METT-TC. Some of these elements are specific to the mission and are discussed in the appropriate chapter of this manual. This section addresses planning considerations that are common to any mission the brigade might be assigned.

MISSION

4-52. Higher headquarters assign missions to the aviation brigade. Commanders determine their specified and implied tasks by analyzing their assigned mission and coordinating with supported units. The results of that analysis yield the essential tasks that, together with the purpose of the operation, clearly indicate the actions required. The mission includes what tasks must be accomplished; who is to do them; and when, where, and why the tasks are to be done. It includes risk management considerations.

MISSION CRITERIA

4-53. For any mission, the commander seeks to establish criteria that will maximize his probability of success (such as ground conditions, visibility, and force ratios). The supported commander and the brigade higher headquarters set mission criteria. During the planning process, mission criteria are quantified and stated in easily understood terms. If any of the stated criteria are achieved before or during the mission, the designated commander should execute predetermined actions.

ENEMY

4-54. Analysis of the enemy includes information about his strength, location, activity, and capabilities. Commanders and staffs also assess the most likely enemy COAs. Analysis includes adversaries, potentially hostile parties, and other threats to success. Threats may include the spread of infectious disease, regional instabilities, or misinformation. Commanders consider asymmetric as well as conventional threats.

THREAT ANALYSIS

4-55. The brigade conducts a threat analysis during planning, based upon the IPB prepared by it and higher headquarters. A common mistake is to orient too much on terrain as opposed to the enemy. Knowing the enemy's location, his forces, capabilities, and intentions are key to success. Knowledge of the enemy ensures the best use of terrain to exploit his weaknesses and capitalize on friendly strengths.

TERRAIN AND WEATHER

4-56. Terrain includes man-made features such as cities, airfields, bridges, railroads, ports, and contaminated areas. Terrain and weather also have pronounced effects on ground and air maneuver, precision munitions, air support, and CSS. To find tactical advantages, commanders and staffs analyze and compare the limitations of the environment on friendly, enemy, and neutral forces.

TERRAIN ANALYSIS

4-57. Commanders and staffs perform terrain analysis whether using digitized tools or paper maps. They evaluate terrain for cover and concealment, its impact on maneuver, and the enemy's movements. The key elements of terrain analysis are summarized in the following mnemonic OCOKA:

- Observation and fields of fire.
- Cover and concealment.
- Obstacles to movement.
- Key terrain.
- Avenues of approach.

OBSTACLES

4-58. Obstacles and reinforcement of terrain must be included in the tactical plan. Engineers use obstacles to disrupt, fix, turn, or block the enemy. *Disruptive* obstacles cause enemy formations to separate or bunch up, which disrupts their maneuver and attack. *Fixing* obstacles slow enemy progress and allow friendly fires the opportunity to mass effects. *Turning* obstacles drive the enemy toward friendly EAs and massed fires or force them to expose their flanks. *Blocking* obstacles deny the enemy access to an area or prevent advance in a given direction. Although the brigade probably will not have engineer support to establish obstacles, the commander must understand the ground force commander's obstacle plan and use it to his advantage.

TERRAIN RECONNAISSANCE

4-59. Because maps are sometimes inaccurate or incomplete, commanders should conduct detailed, personal reconnaissance. Brigade commanders should create the conditions where battalion commanders can ensure their aircrews are familiar with the terrain and scheme of maneuver. If possible, battalion commanders—and their crews—should perform a map reconnaissance; visit LZs, PZs, and BPs and FPs; and conduct rehearsals. These actions help them understand the scheme of maneuver and commander's intent, and quicken their reactions during the chaos of battle. Commanders consider all sources of intelligence. Aerial photographs, satellite imagery, and human intelligence (HUMINT) can be critical.

WEATHER

4-60. Weather affects soldiers, equipment, operations, and terrain. Cloud cover, wind, rain, snow, fog, dust, light conditions, and temperature extremes combine in various ways to affect human efficiency. They also limit the use of weapons and equipment. Weather impacts both friendly and enemy assets. For example, rain can degrade forward looking infrared (FLIR) systems, but it also inhibits the cross-country maneuverability of enemy forces. Each system used on the battlefield has its strong and weak points in relation to the weather. Commanders must know the strengths of their systems and use them to attack the weaknesses of the enemy systems.

VISIBILITY

4-61. Limited visibility affects operations and often favors ground maneuver. Fog and smoke reduce the effective range of many weapon systems, including AD weapons, and friendly SAL Hellfire. Commanders use the concealment of limited visibility to maneuver forces to a positional advantage. The brigade should plan operations to maximize the advantages of its superior sensor systems.

TROOPS AND SUPPORT AVAILABLE

4-62. Commanders assess the training level and psychological state of friendly forces. The analysis includes availability of critical systems and joint support. They examine combat, CS, and CSS assets, including contractors. The status of all aviation brigade units should be readily available for the commander and the staff per SOP.

FORWARD ARMING AND REFUELING POINT CONSIDERATIONS

4-63. A brigade normally employs FARPs and rapid refueling points (no ammunition) in a DS or GS role. In DS, FARPs support cavalry and attack units, while rapid refueling points support assault and heavy helicopter units. In GS, FARPs support all units in the AO, while other FARPs move or set up in new locations for future operations. Also, brigades can set up FARPs in GS and keep others in reserve or it can set up all FARPs in one location, providing mass support to units as they rotate through.

AIRSPACE COORDINATION

4-64. Total familiarity with the TAGS is essential to deconflict operations and prevent mission delays. Brigades may need to comply with provisions in the ACO, ATO, and SPINS. They have strict timelines and FSCMs to take into account during brigade and subordinate planning cycles.

SUPPORTED UNIT COORDINATION

4-65. All aspects of the mission must be thoroughly planned, coordinated, and rehearsed with the supported unit. Supported unit graphics are essential for SU. Aviation often conducts passage of lines with supported units, and those operations require close coordination. Fires must be considered to ensure the necessary artillery is available when called.

TIME AVAILABLE

4-66. Commanders assess time available for planning, preparing, and executing the mission. They consider how friendly and enemy forces will use the time and the possible results. Proper use of time available can be a key to success. The one-third, two-thirds rule should be used whenever possible. Concurrent planning makes the best use of time. Emerging digital systems enhance concurrent planning capabilities. For operations in deep areas, concurrent planning also must involve the aviation brigade's higher headquarters staff.

CIVIL CONSIDERATIONS

4-67. Civil considerations relate to civilian populations, culture, organizations, and leaders within the AO. Commanders consider the natural environment (Appendix O), to include cultural sites, in operations directly or indirectly affecting civilians. They include political, economic, and information matters, as well as more immediate civilian activities and attitudes.

CIVIL IMPACT

4-68. Civil considerations at the tactical level generally focus on the immediate impact of civilians on current operations; however, they also consider larger, long-term diplomatic, economic, and information issues. Civil considerations can tax the resources of tactical commanders. The local population and displaced persons influence commanders' decisions. Their presence and the need to address their control, protection, and welfare affect the choice of COAs and allocation of resources. In stability operations and support operations, civilians can be a central feature of planning.

POLITICAL BOUNDARIES

4-69. Political boundaries of nations, provinces, and towns are important considerations. Conflict often develops across boundaries, and boundaries may impose limits on friendly action. Boundaries, whether official or not, determine which civilian leaders and institutions can influence a situation.

MEDIA PRESENCE

4-70. Media presence guarantees that a global audience views military activities in near real-time. The activities of the force—including individual soldiers—can have far-reaching effects on domestic and international opinion (see appendix M).

PLANNING MODELS

4-71. Aviation brigades plan missions to support ground units. An air assault is an example of a mission in support of a ground unit. They also plan missions that are commanded and controlled by the aviation brigade. A deliberate attack across the FLOT by attack helicopters is an example of a mission under the C^2 of the aviation brigade.

4-72. Each type mission requires a model to guide the planning and execution. Examples of each are shown in Figures 4-13 and 4-14.

BRIGADE AND SUBORDINATE PLANNING RESPONSIBILITIES

4-73. For most operations the brigade and battalions plan at different levels. Table 4-6 provides a general guide for planning responsibilities.

Table 4-6. Brigade and Battalion Planning Responsibilities

AVIATION BDE PROVIDES	BATTALION DETERMINES
General timings	Exact speeds, routes, flight modes and timings
H-Hour (line of departure [LD], LZ).	Exact planning times from AA to LD, PP, BP, PZ, or LZ.
PP locations.	Exact flight route.
Suppression of enemy AD (SEAD) / JSEAD Plan.	Adjustments as LD time nears.
EAs, LZs, PZs, battle areas or potential BPs.	Release points (RPs), rally points, FPs, ABF positions, exact BPs, kill zones, landing areas.
Flight axes.	Exact flight routes.
NAI / target areas of interest (TAI) / DPs.	Exact surveillance plan.

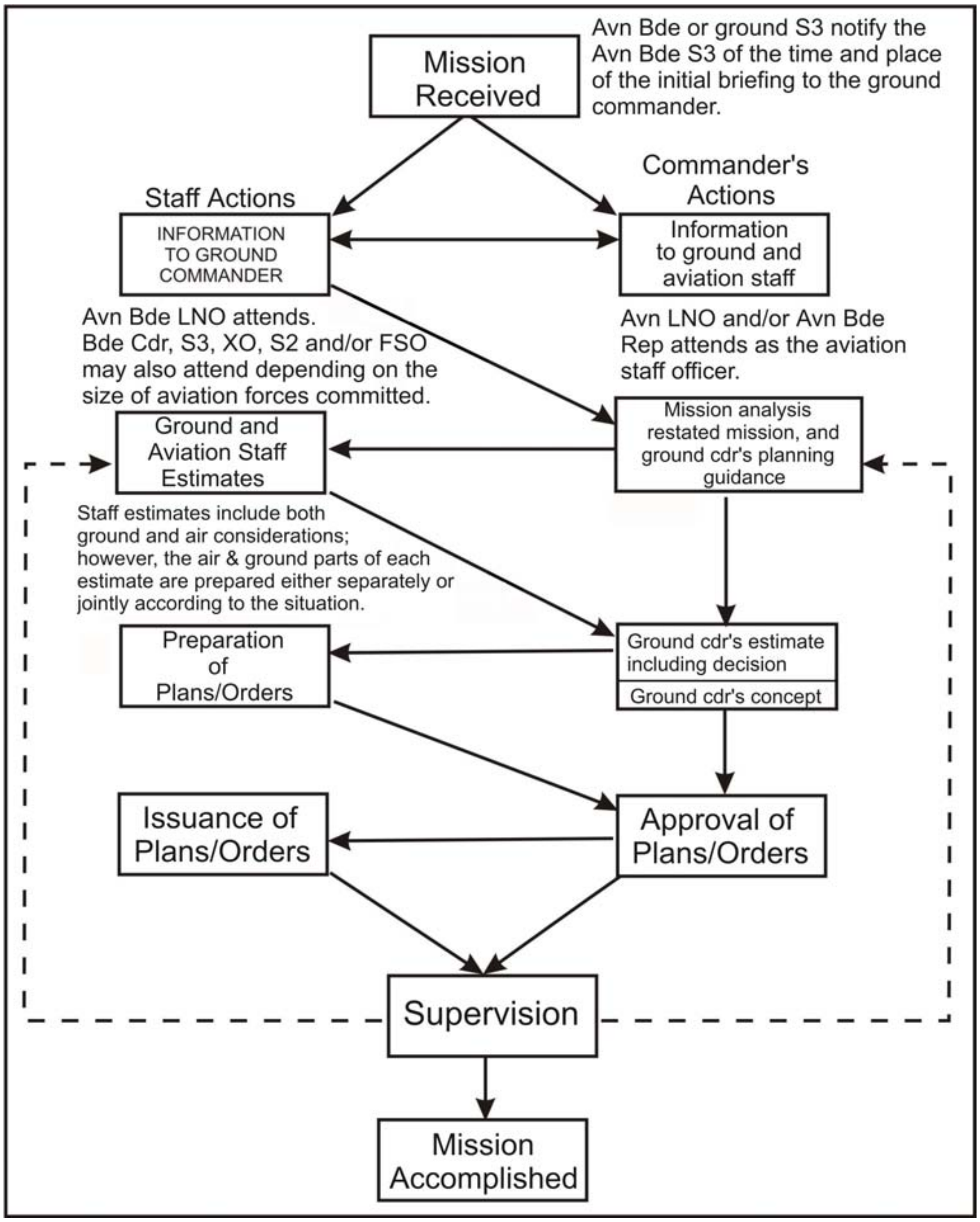


Figure 4-13. Brigade Planning Responsibilities, Aviation Forces In Support of a Ground Unit

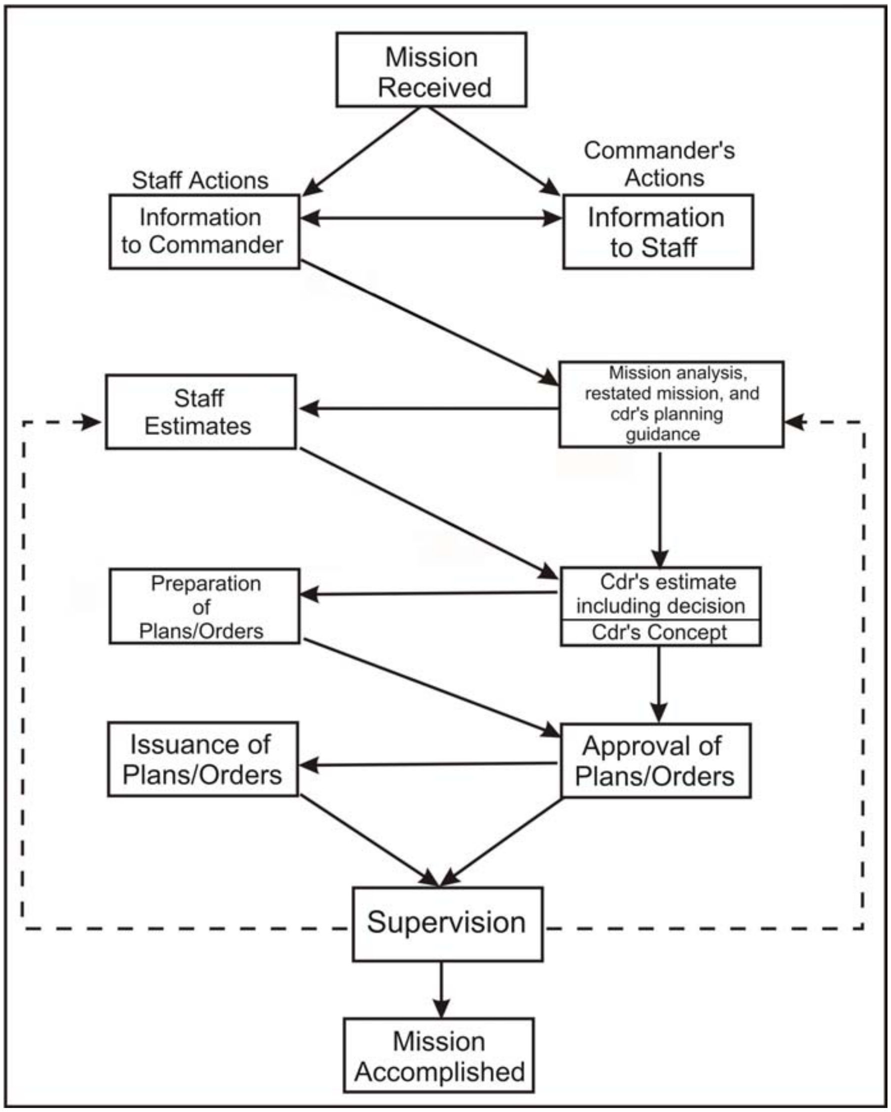


Figure 4-14. Brigade Planning Responsibilities, Aviation Forces Under Aviation Brigade Control

4-74. Figures 4-15 through 4-18 graphically depict the planning responsibilities between the brigade and the battalion, and incorporate the general rules in Table 4-6. They also include some of the planning steps of the aviation brigade's higher headquarters.

4-75. Figure 4-15 depicts a deliberate attack by the aviation brigade forward of the FLOT. Figure 4-16 depicts an air assault supported by the aviation brigade. Figure 4-17 depicts an aviation brigade supporting a ground brigade within the ground brigade sector both in front of and behind the FLOT.

Figure 4-18 depicts the aviation brigade supporting a ground brigade in a counter-penetration mission.

4-76. Times and airspeeds depicted in these figures are examples. Additionally, circumstances may require the brigade to provide the exact routes (airspace coordination) and exact times to effect timely coordination with supporting elements.

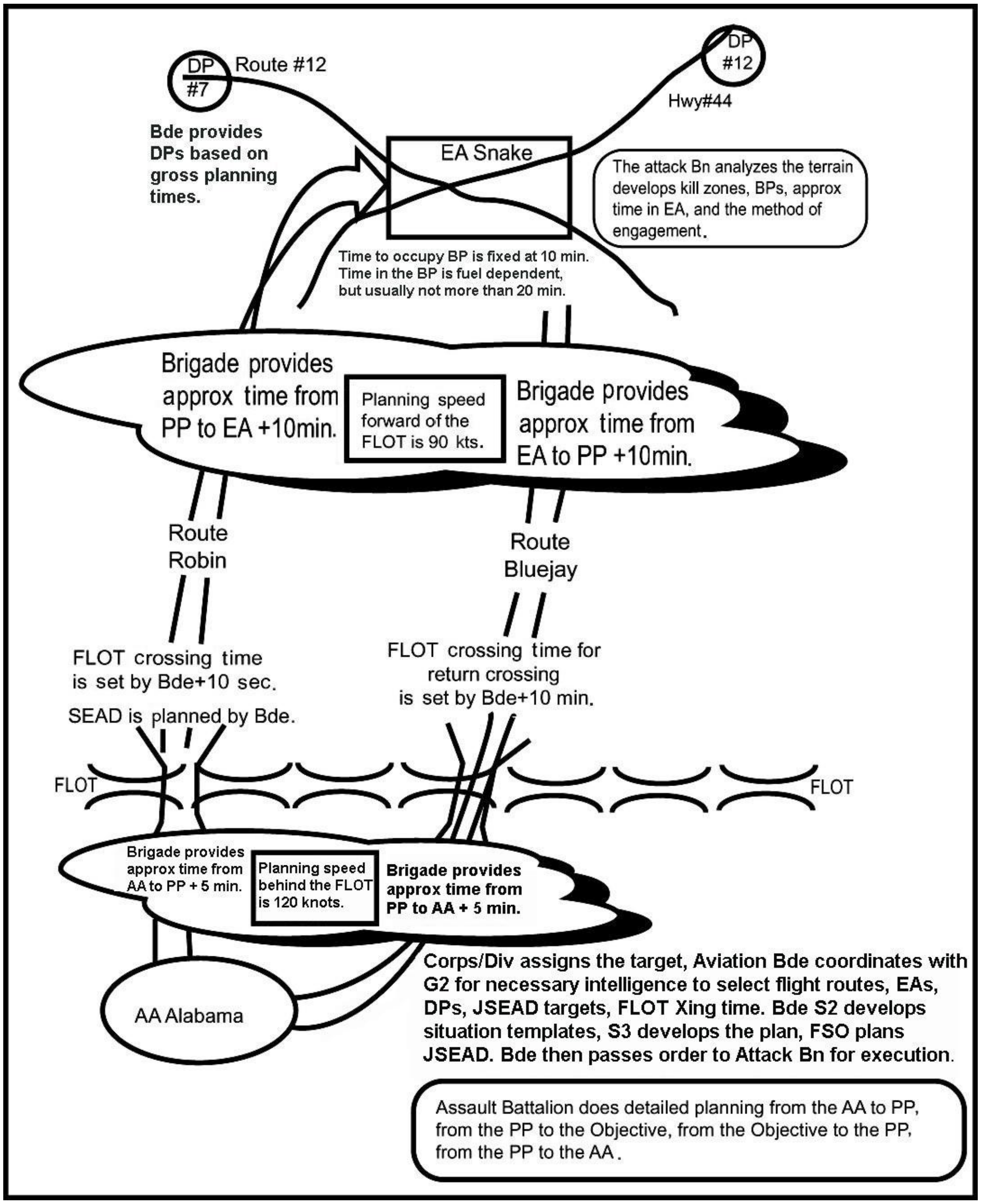


Figure 4-15. Aviation Brigade Conducts A Deliberate Attack

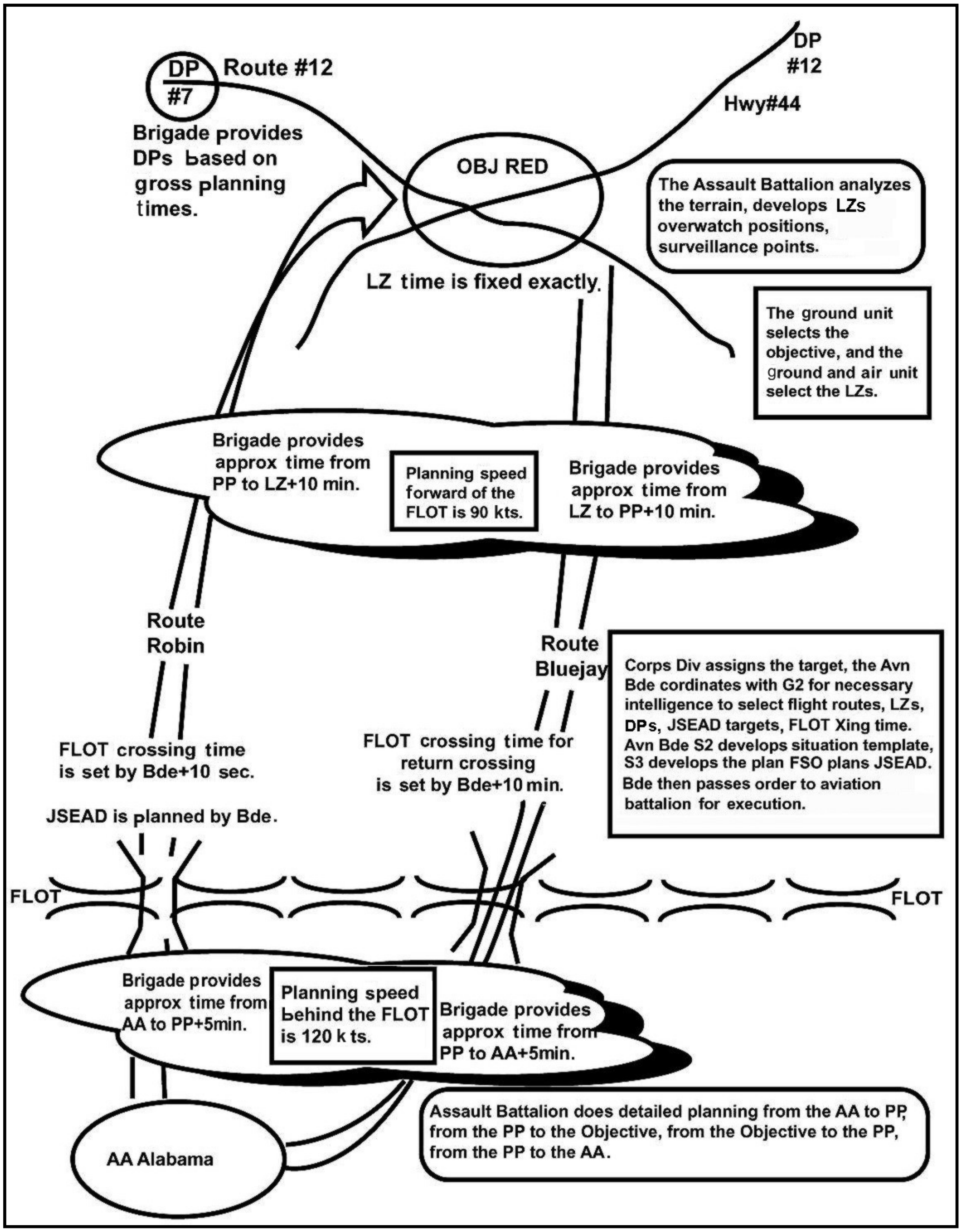


Figure 4-16. Aviation Brigade Supports An Air Assault

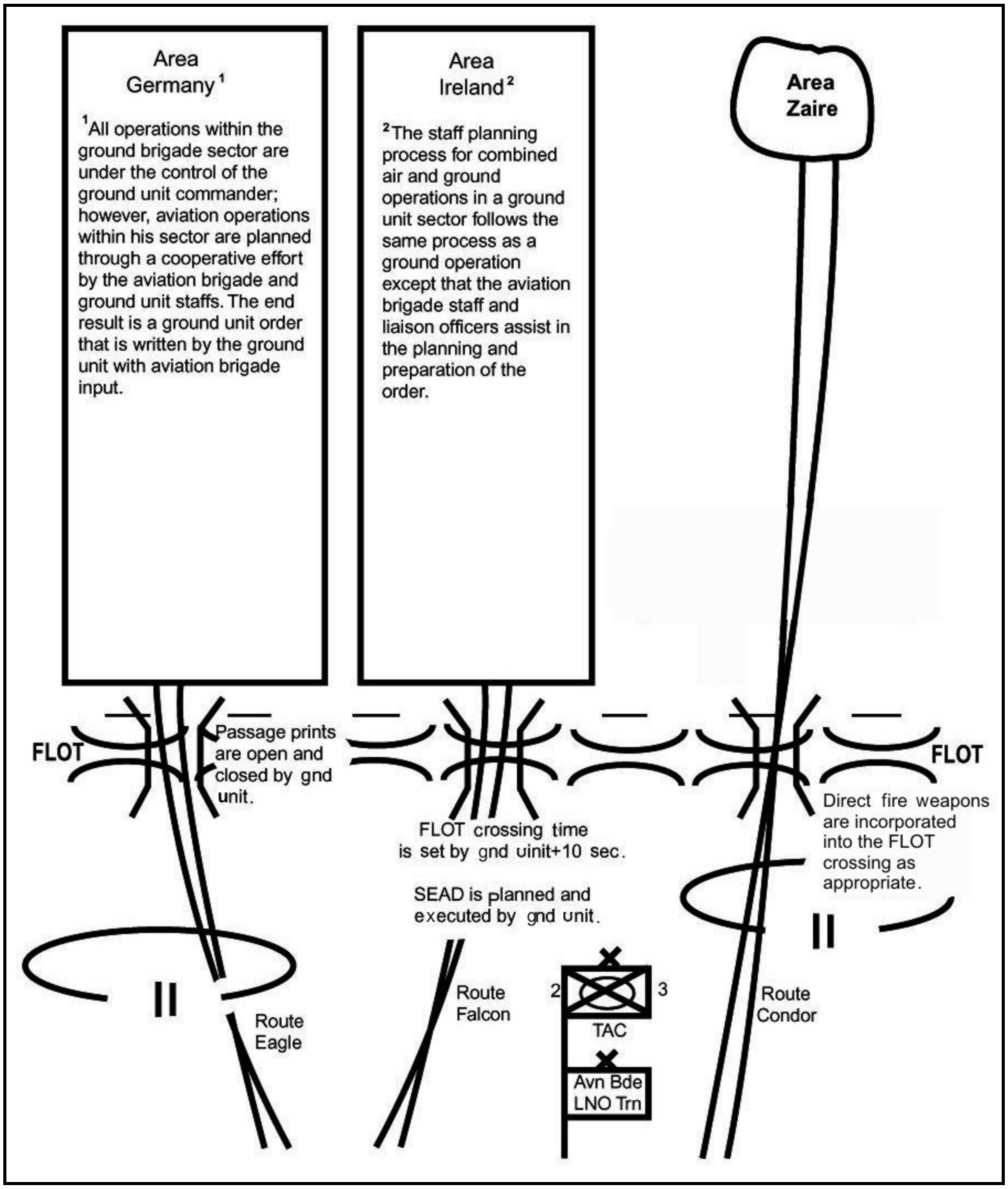


Figure 4-17. Aviation Brigade Supports Ground Brigade Operations

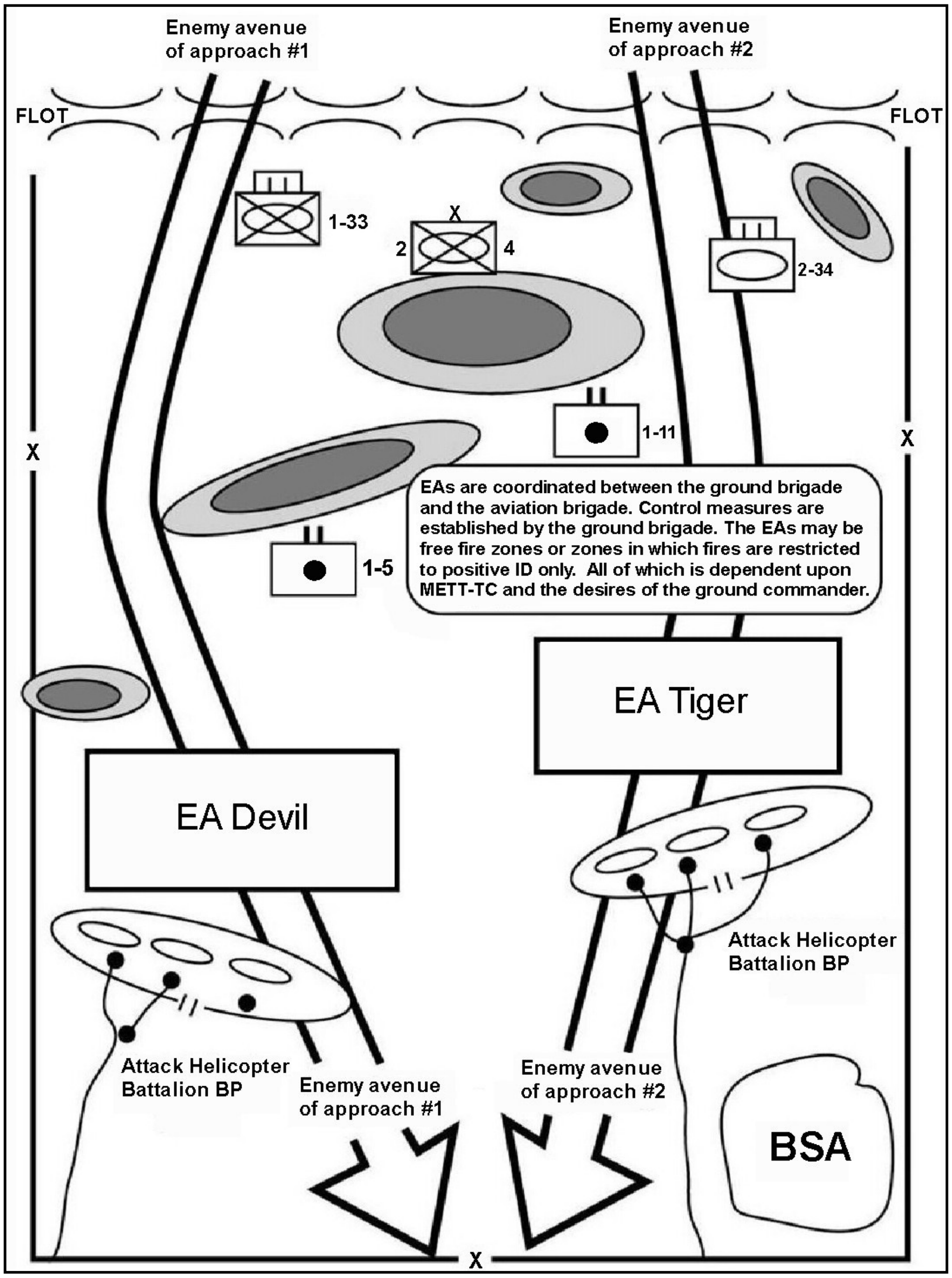


Figure 4-18. Aviation Brigade Conducts a Counter-Penetration Mission in a Ground Brigade Sector

SECTION III – NUCLEAR, BIOLOGICAL, AND CHEMICAL WEAPONS

4-77. U.S. forces are likely to encounter an NBC environment, especially when facing a militarily less-capable threat that resorts to asymmetric responses. The aviation brigade must avoid the effects of NBC weapons, respond to their use, take protective measures, and continue the mission. SOPs and training are the best preparation for operations in an NBC environment.

4-78. The commander must consider the exposure guidance from higher headquarters, the enemy's capability, the mission, and the condition of the unit when establishing the unit's mission oriented protective posture (MOPP). Because of the degradation in aircrew effectiveness in MOPP equipment, intensive fighter management is required. To reduce risk in an NBC environment, units must—

- Avoid detection.
- Retain mobility.
- Seek terrain shielding by carefully selecting AAs and preparing shelters and fighting positions.
- Instill discipline and physical conditioning to prepare troops for the confusion and physical demands of a NBC environment.
- Plan for continued operations if attacked.

CONTAMINATION AVOIDANCE

4-79. The term *avoidance* does not necessarily mean aborting a mission or suspending operations. Soldiers go into contaminated areas only when necessary. Normally, it is preferable to bypass these areas. The NBC warning and reporting system, reconnaissance, monitoring, and surveys identify contaminated areas.

PROTECTIVE MEASURES

4-80. When elements cannot avoid contamination, or are under direct attack, soldiers must take appropriate actions to survive. Specific actions are taken before, during, and after attack. To sustain operations in an NBC environment, personnel must understand and practice individual and collective protection. *Individual protection* involves those measures each soldier must take to survive and continue the mission. These measures include immediately donning MOPP gear, seeking cover, and using other protective equipment and devices. *Collective protection* provides a contamination-free environment for selected personnel and precludes the continuous wear of MOPP gear. Considerations for NBC protection include—

- Positioning NBC reconnaissance assets at likely locations for enemy employment.
- Combining reach-back intelligence with battlefield sources to anticipate enemy use of weapons of mass destruction.
- Using smoke to support disengagement.

SECTION IV – SPECIAL ENVIRONMENTS

4-81. The brigade will be called upon to execute its mission in a variety of environments. It is imperative that commanders understand the impact of these environments on their soldiers and equipment. Commanders need to think through the impact of environmental conditions and provide necessary training. The Army's concept of "just in time" training, supported by the use of distance learning products, provides opportunities for commander's to meet some of the unique training challenges that special environments demand.

URBANIZED TERRAIN

4-82. In urban areas, fields of fire are restricted, landing areas are limited, and buildings provide cover for enemy forces to engage helicopters with near impunity. The presence of noncombatants, protected structures, and important resources and facilities normally demands careful weapons and munitions selection to avoid collateral damage. The proximity of enemy and friendly ground forces increases the risk of fratricide. Communications may be degraded by many structures. Thermal effects from paved surfaces and the channeling effects of buildings can cause wind conditions to vary significantly from point to point. Special, restrictive ROE should be expected. Standoff is key to aviation survival. Chapter 6 and Appendix R cover Urban Operations.

MOUNTAINS AND HIGH ALTITUDE TERRAIN

4-83. While high altitude limits load-carrying capabilities, compartmentalized mountain terrain enhances rapid movement to the flanks and rear of an isolated enemy force. Enemy mechanized forces are slowed and channelized as they move up steep grades and down narrow valleys or are restricted to roads and trails. Mountains provide excellent terrain masking and allow easy avoidance of radar and visual acquisition; however, high ridges also provide effective FPs for AD guns and hand-held missiles. Mountain flying techniques are critical to taking advantage of this terrain.

HIGH ALTITUDE TRAINING SITE

4-84. High altitude training site (HATS), located at Eagle, Colorado, provides excellent high altitude and power management training for rotary-wing aviators. If possible, all PCs should attend the course before deploying. The course is valuable for operating at high gross weights or high altitude. Course length is one week.

SNOW, ICE, EXTREME COLD WEATHER

4-85. Operations in snow, ice, and extreme cold weather pose operational and maintenance challenges. Ice can prevent weapons and missile function. Blowing snow can create whiteout conditions, especially during takeoff, landing, or hovering. Aircraft flying low and slow may produce large snow clouds that the enemy can easily detect. Low flying aircraft can also blow snow off trees, thus leaving a trail visible to enemy aircrews or UAV. Uncovered aircraft exposed to these conditions require frequent checks and services to prevent icing. Aircraft that become ice-covered may take hours to deice. Aircraft skis may also be required. Units that normally do not operate in these conditions should request unit SOPs and guidance from units experienced in these conditions.

JUNGLES

4-86. Dense jungles and wooded areas degrade fields of fire and target identification, and can negate the advantages afforded by superior acquisition systems. Humid, tropical air decreases the effectiveness of optics. It also decreases payload capacity. While tropical jungle can be some of the harshest terrain available for aviation operations, mobility advantages offered by aviation over ground forces are exponentially increased.

DESERTS

4-87. The brigade can operate effectively in the desert, but open desert terrain increases the unit's vulnerability to enemy long-range observation and acquisition. The lack of navigational aids (NAVAIDs) and prominent terrain features, man-made or natural, makes navigation extremely difficult without GPS, Doppler, or some other form of navigation assistance. Heat limits weapon and fuel loads, while sand and dust cause damage and increases maintenance requirements. Placing FARPs closer to the objective areas can mitigate the effects of reduced payload capabilities. Aircraft flying low and slow produce large dust clouds that the enemy can easily detect. Dust clouds also obscure aircraft acquisition systems.

OVER-WATER OPERATIONS

4-88. Over-water operations may be necessary to defeat enemy waterborne operations or to move from one location to another. As in desert environments, openness increases the unit's vulnerability to enemy long-range observation and acquisition. The lack of NAVAIDs and prominent terrain features makes navigation extremely difficult without GPS, Doppler, or some other form of navigation assistance. Over-water operations require special equipment and training. For example, water wings, rafts, and helicopter emergency egress device (HEED). Units that normally do not operate in these conditions should request unit SOPs and guidance from units experienced in these conditions.

SMOKE AND OBSCURANTS

4-89. Smoke and obscurants are integral parts of most potential adversaries' doctrine, tactics, equipment, and training. Enemy forces will use smoke to increase their effectiveness and reduce their vulnerability. Specifically, the enemy can use smoke to—

- Deny information.
- Mask the use of chemical weapons.
- Disrupt movement, operations, and C^2.
- Restrict NOE and contour flight.

- Reduce the effectiveness of sensors, range finders, target designators, and visual observation.

FRIENDLY SMOKE

4-90. Through the use of smoke, the brigade can—

- Suppress visually sighted enemy AD systems and small arms.
- Sector portions of EAs, isolating part of the enemy force.
- Obscure LZ or PZ operations from enemy view.
- Screen the displacement of attack or reconnaissance aircraft while they move or break contact.

SECTION V – SHIPBOARD OPERATIONS

4-91. Shipboard operations provide many options to joint force and component commanders. Army helicopter operational capabilities are greatly expanded when ships are available for operations near large bodies of water and islands. Shipboard operations require special training that must be accomplished before helicopters can be landed on or operate from ships. (See FM 3-04.564 [FM 1-564] and the joint shipboard helicopter integration process [JSHIP] website [http://www.jship.jcs.mil/].)

SECTION VI – UNMANNED AERIAL VEHICLE OPERATIONS

4-92. UAVs linked to brigade assets enhance operations. Maximum use of UAV and joint assets can greatly reduce the requirements on the commander's internal resources for security. UAV units can perform all the basic observation tasks, thus freeing helicopters for higher priority actions. UAV integration can reduce flying-hour requirements and support crew rest. While TTP governing UAV operations are emerging, every opportunity to use UAVs should be exploited (see Appendix H).

4-93. Communications and coordination with UAV controllers are essential to integrate UAVs. UAVs normally are controlled from within intelligence sections whereas cavalry organizations are controlled by the command group. If a UAV unit conducts the screen of an area, accepts handover from or handover to a cavalry unit, the necessary C^2 must be planned in great detail to ensure proper coverage of the security area. The C^2 of UAV and cavalry is further complicated if the intelligence section controlling the UAVs is at another headquarters location or at the higher headquarters location.

4-94. Combined UAV and cavalry operations are an excellent force multiplier. SOPs, battle drills, rehearsals, and training exercises contribute to success.

UNMANNED AERIAL VEHICLE IN RECONNAISSANCE, SURVEILLANCE, AND TARGET ACQUISITION OPERATIONS

4-95. UAV capabilities make them ideal to support brigade reconnaissance and security missions. Locating enemy AD systems is a critical mission for UAVs. They can jam acquisition and tracking emissions, but otherwise remain in the passive mode. UAVs can cue brigade forces during screen, guard, and cover missions. Likewise, during economy of force missions, UAVs can alert dispersed brigade forces to mass effects on a particular enemy force. Communications retransmission capabilities provide dispersed brigade elements a means to communicate combat information.

CONCEPTS OF UNMANNED AERIAL VEHICLE AND AVIATION BRIGADE COOPERATIVE EMPLOYMENT

4-96. Three options on how to employ brigade and UAV assets together are discussed below.

UNMANNED AERIAL VEHICLE TO AVIATION UNIT HANDOVER

4-97. The staff section controlling UAVs acquire the enemy force and maintain observation. After staff analysis, the high priority targets are handed off to the brigade for continued observation or destruction. This option enhances brigade survivability but increases UAV risk (Figure 4-19).

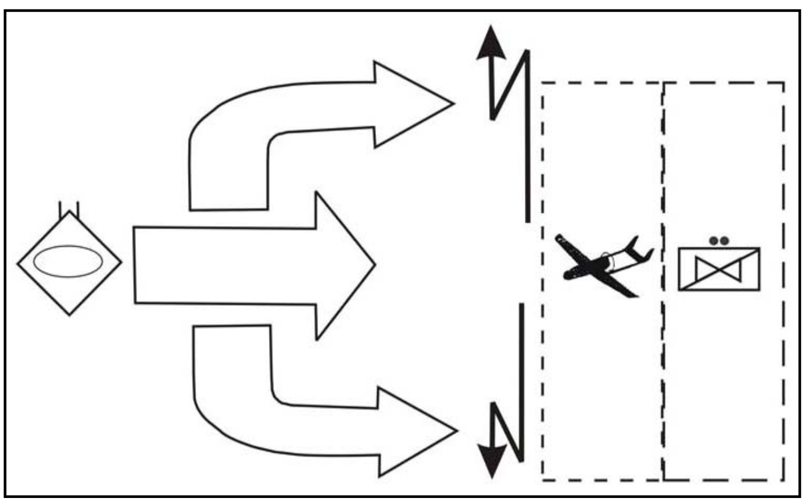


Figure 4-19. UAV to Aviation Unit Handover

AVIATION UNIT TO UNMANNED AERIAL VEHICLE HANDOVER

4-98. The brigade acquires the enemy force and maintains observation. High priority targets are then handed over to the staff section controlling UAVs for continued observation and engagement by FA or CAS. The brigade then conducts a bypass of the enemy forces and continues the reconnaissance effort or moves back to an FAA or the AA. This option enhances brigade survivability and increases UAV risk (Figure 4-20).

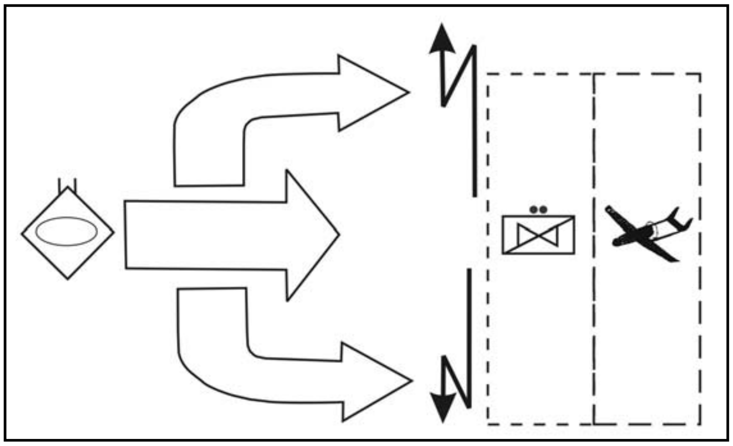


Figure 4-20. Aviation Unit to UAV Handover

AVIATION UNIT AND UNMANNED AERIAL VEHICLE SECTORS

4-99. The brigade and the staff section controlling UAVs are assigned sectors based on METT-TC. If the situation dictates, they can switch sectors. This option maximizes the capabilities of both systems; however, it requires the most coordination. This option allows the brigade to extend its AO and to concentrate manned elements on the most critical sector (Figure 4-21).

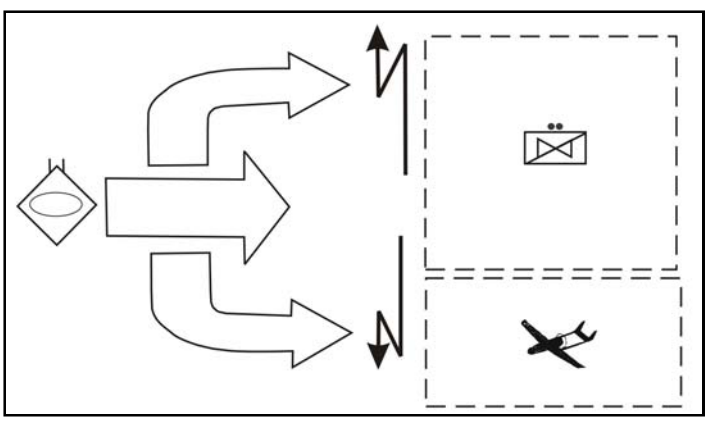


Figure 4-21. Aviation Unit and UAV Sectors

SECTION VII – INSTRUMENT FLIGHT PROFICIENCY

4-100. Tactical combat operations may be fought in marginal weather conditions. Maintaining instrument flight proficiency at the crew level is a matter of force protection. Maintaining instrument flight proficiency at the unit level is a matter of mission accomplishment.

AIR MOVEMENT/SELF-DEPLOYMENT

4-101. To accomplish the mission, some tactical movements and self-deployments may have to be conducted under IMC or a combination of IMC and visual meteorological conditions (VMC). Training is essential to accomplish these missions.

INADVERTENT INSTRUMENT METEOROLOGICAL CONDITIONS

4-102. IMC may not be avoidable during some tactical operations. Units must have a rehearsed plan for inadvertent encounter of IMC. To ensure successful recovery, necessary ATS coordination must be accomplished. The unit must also have a self-recovery plan when ATS is not available.

GROUND ATTACK

4-103. If ground forces attack a brigade location during IMC, the unit may have to relocate aircraft under instrument conditions. Units must have a rehearsed plan for aircraft evacuation under IMC.

SECTION VIII – FORMATION FLIGHT

4-104. A formation (multihelicopter operation) is a flight in which two or more aircraft are so near each other that any movement of the lead aircraft must be replicated by the others. The flight operates as a single aircraft regarding navigation and position reporting. Formations concentrate maximum combat power and maintain unit integrity. They also reduce aircraft exposure time—providing the threat less time to react. Formations also facilitate security and control requirements. Formation flight provides a means to rapidly deliver and place a maximum number of troops/fires on the LZ/objective in the shortest possible time. The type of formation used for a particular mission is largely determined by METT-TC.

PLANNING CONSIDERATIONS

4-105. The following factors are considered in determining the best formation or sequence of formations:

- Mission of the supported unit and the aviation unit.
- Current enemy situation, enemy AD capability and placement, and vulnerability to enemy visual or electronic surveillance.
- Artillery support available, LZ preparation planning, air support availability and requirements, Naval surface weapon systems (including planned types of ordnance), and en route JSEAD.
- Configuration of en route obstacles or corridors; size, shape and surface of the LZ; obstacles affecting approaches to the LZ; ceiling and visibility; wind and turbulence, ambient light levels; and IR crossover throughout the mission.
- Possible changes in the mission or the situation and evasive tactics to be used.
- Number and type of armed escort aircraft required and available.

- Degree of control required and the method of control such as radio, visual signals, and prearranged timing.
- Type of NVDs used.
- OPSEC and safety measures required.
- Level of crew training and experience.
- Aircraft capabilities.

4-106. When different types of aircraft operate in a formation, the external lighting characteristics of each type must be evaluated. Additionally, when aircraft types are mixed at night, the differences between NVDs and FLIR must be identified and considered in planning.

SECTION IX – RECONSTITUTION

4-107. Reconstitution consists of extraordinary actions taken by a commander to restore a unit to a desired level of combat effectiveness. A unit is not reconstituted just because it has lost its combat effectiveness. Reconstitution decisions must be based upon an assessment of the overall battlefield. Available resources are limited and must be used where they will have the greatest effect. FM 4-100.9 (FM 100-9) and FM 3-04.500 (FM 1-500) outline reconstitution in detail.

OVERVIEW

4-108. Reconstitution actions are implemented immediately after a commander's determination that a unit is not sufficiently effective to meet operational requirements. Possible actions include reestablishing or reinforcing C^2; cross-leveling or replacing personnel, supplies, and equipment; and conducting essential training.

4-109. If reconstitution is necessary, commanders have two options—reorganization and regeneration. Often these are executed together.

REORGANIZATION

4-110. Reorganization shifts internal resources within a degraded unit to increase its combat effectiveness. Equipment and personnel are redistributed among internal elements to balance combat capabilities, match operational weapon systems with crews, and form composite units. Reorganization is categorized as either *immediate* or *deliberate*.

Immediate Reorganization

4-111. *Immediate* reorganization is the quick, temporary restoration of degraded units to minimum levels of combat capability.

Deliberate Reorganization

4-112. *Deliberate* reorganization restores degraded units to a specified degree of combat capability. It involves more extensive repair and cross-leveling procedures, and is usually conducted farther to the rear than immediate reorganization.

REGENERATION

4-113. Regeneration rebuilds a unit through large-scale replacement of personnel, equipment, and supplies. C^2 is reestablished and mission-essential training is conducted. Regeneration is the more challenging reconstitution option. It requires more time and resources. Regeneration is categorized as either *incremental* or *whole-unit*.

- *Incremental regeneration* is accomplished by adding personnel and equipment to an existing unit.
- *Whole-unit regeneration* is the replacement of entire units or definable subelements in an organization.

Chapter 5

Employment

SECTION I – GENERAL

5-1. This chapter addresses employment aspects for each type aviation brigade. Those operations common to all brigades are covered in Chapter 4, and are not repeated here. However, within this chapter, some brigade sections repeat information from other brigade sections, as some employment factors are common to more than one, but not all brigades. This ensures that each brigade section stands alone.

5-2. The aviation brigade's primary role is to set the conditions for success. To do that it must—

- Ensure the required C^2 facilities are in place and operational.
- Ensure SU—enemy, friendly, and allied.
- Ensure the necessary liaison to and from other organizations is in place.
- Coordinate the brigade's movements and operations within the battlespace.
- Have the necessary CS and CSS.

SECTION II – CORPS AVIATION BRIGADE

OVERVIEW

5-3. The corps aviation brigade is the primary headquarters for Army aviation operations conducted by the corps. Within the brigade there is an attack regiment and an aviation group. All aviation group headquarters are in the RC, while many subordinate battalions and companies are AC. The corps aviation brigade commander and staff must control these active units until the group headquarters activates, certifies, and deploys. This additional C^2 requirement is manageable in peace. However, it limits the brigade's wartime agility and flexibility to accomplish multiple, diverse missions while concurrently planning future operations. The brigade needs a large staff augmentation until the group headquarters arrives. Peacetime training exercises are critical to the timely integration of RC units when mobilized.

TASK ORGANIZATION CONSIDERATIONS

5-4. Normally, even when dispersed to support other organizations, the attack regiment and aviation group remain under corps aviation brigade C^2. Subordinate elements of the attack regiment and the aviation group, however, may operate under control of other aviation brigades, such as another corps aviation brigade or division aviation brigade.

AIRFIELDS

5-5. Some corps aviation brigade assets will operate from airfields. This airfield may be part of the host nation infrastructure, a captured enemy airfield, another service's airfield, or one built by Army or other service engineers. Airfields may be used when the air and missile threat is low.

HOW TO FIGHT

5-6. The corps aviation brigade's primary role is to set the conditions for success for each of its units. It conducts attack, reconnaissance, security, air assault, C^2, air movement, and ATS. It plans, coordinates, and executes aviation operations to support the corps scheme of maneuver. It can be expected to operate anywhere in the corps area.

5-7. The attack regiment conducts corps shaping operations and augments division attack battalions to support decisive operations. The attack regiment can also conduct guard operations when task-organized with ground maneuver forces. The attack regiment is an ideal air cavalry force.

5-8. The aviation group coordinates the corps's myriad aviation support requirements.

- The CAB moves commanders and staffs to coordinate and execute operations.
- The CSAB accomplishes critical CS and CSS missions for the corps and divisions and may augment air assault operations.
- The AHB provides air assault support for corps and division operations.
- The HvyHB provides heavy lift capability for combat and support missions.
- The ATS battalion provides ATS throughout the corps.

INTELLIGENCE

5-9. The S2 prepares intelligence estimates and conducts the IPB process. Regardless of the nature and intensity of conflict, this involves a time-tested process. FM 2-01.3 (FM 34-130) contains appropriate checklists and an aviation-specific section. IPB results are used to develop the products to support collection management, identify potential enemy COAs, and support the development of the commander's scheme of maneuver (to include branches and sequels).

5-10. The brigade has many sources of intelligence; however, the corps G2 section is key. Close coordination with the corps G2 section is essential to maintain SA and understanding. The brigade S2 contacts corps and division intelligence sections to ensure the latest information is available for operations and aircrews. Corps aviation units may have access in their CPs to Joint Surveillance Target Attack Radar Systems (JSTARS) ground station modules or common ground stations. These provide continuous access to moving target indicator (MTI) ground tracks, and synthetic aperture radar, UAV, and satellite imagery. If not, the brigade accesses via liaison or staff presence in the corps intelligence section.

MANEUVER

5-11. The corps aviation brigade C^2s operations to support the corps commander's tactical and OPLANs.

5-12. Corps aviation brigades plan, coordinate, and execute attacks on enemy C^2 facilities; moving armor, artillery, and troop formations; communications nodes; supply depots; delivery systems for weapons of mass destruction (theater missile defense [TMD]); and other hard and soft targets. For the TMD mission, Longbow aircraft with extended range fuel tanks can search using the FCR to detect vehicles, and FLIR—augmented by joint assets—to detect missile launches. Utility and heavy lift aircraft insert air assault forces. AH-64 aircraft conduct both attack and search and attack missions.

5-13. When corps aviation brigade forces conduct operations in deep areas, air assaults, and raids against any target, the commander plans and conducts maneuver functions, supporting fires, and JAAT assets through mission-type orders or as part of the ATO. Attack, assault and heavy helicopter assets also support division close battle requirements. The corps commander may employ corps assault and attack assets as a reaction force against level III rear area threats.

5-14. Brigade UH-60 and AH-64 aircraft may conduct in-stride recovery of downed aircrews, or support Air Force CSAR missions if in-stride recovery is not possible. The Longbow can assist ingress and egress security through its FCR SA, and augment supporting fires for recovery aircraft. UH-60s, within capabilities, can insert ground security forces.

FIRE SUPPORT

5-15. The brigade's attack helicopter regiment aircraft may provide laser designation for other service aircraft, its own aircraft, and precision fires delivered by Army or other service units. The corps aviation brigade can also coordinate Army tactical missile systems (ATACMS), multiple launcher rocket system (MLRS), cannon artillery, and NSFS. Heavy helicopter and utility assets may transport towed howitzers, their crews, ammunition, and prime movers. Heavy helicopters may air transport ATACMS, MLRS, and cannon artillery ammunition for corps and division units. Air transport of forward observers, mortar crews, and Q-36 Firefinder radars also are potential missions.

AIR DEFENSE

5-16. The attack helicopter regiment may conduct defensive air combat and team insertions against enemy forces performing operations deep in our rear areas. In operations in enemy deep areas, attack helicopter regiment elements may conduct overwatch and defensive air combat to defend the main body. AH-64D aircraft with FCR can identify and engage enemy helicopters with RF and SAL missiles, flechette rockets, and guns.

5-17. Because corps attack regiments often use airfields as AAs, the brigade requires AD against both air and tactical ballistic/cruise missiles to protect against attack while on the ground.

5-18. Brigade elements employ active and passive AD. Active measures include use of integral systems and door guns for defensive air combat. Passive measures include terrain flight, camouflage, and selection of locations that provide cover and concealment for CPs, AAs, and FARPs. Air guards for vehicle movements and road marches provide early warning. Convoy discipline, such as maintaining proper distances between vehicles, limits damage from air attack. Elements use identification friend or foe (IFF) codes to avoid fratricide. A^2C^2 plans, procedures, and orders ensure AD elements are aware of aircraft AAs and ingress and egress routes.

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

5-19. Corps aviation brigade aircraft routinely support engineer mobility and countermobility efforts. Road construction and improvement are major mobility efforts that can require helicopter transport of outsize loads such as metal pipes for culverts and bridge materiel. Volcano-equipped aircraft, escorted by armed helicopters, can emplace minefields. Helicopters may also transport survivability materiel such as concertina and sandbags for base camp security.

5-20. Group aircraft move MP reaction forces and traffic control teams, chemical reconnaissance teams, and decontamination teams. They also transport firefighters and water buckets in relief missions.

COMBAT SERVICE SUPPORT

5-21. The corps aviation brigade conducts air movement, aerial resupply, and CASEVAC. Utility and heavy aircraft may emplace and resupply FARPs to support operations in deep areas. For its own operations, the brigade often requires Class III/V support from other units, and may require Class IX support.

5-22. AVIM support is provided by COSCOM. Because some corps aviation units may not displace as often as other corps or division units, the corps aviation brigade may desire to have those units conduct most of their own phase maintenance inspections. If unit displacements increase, passing these inspections to the COSCOM, or out of theater, is prudent.

COMMAND AND CONTROL

5-23. The corps aviation brigade accomplishes its mission through its subordinate units—the attack regiment and the aviation group. However, the aviation group is in the RCs and must be activated, certified, and deployed before this essential C^2 headquarters can contribute to the battle.

5-24. Communication is a major challenge for the corps aviation brigade. Although improved communications capabilities exist, the brigade will seldom maintain continuous contact with all its in-flight aircraft. Methods such as opening and closing flight plans via telephone are tried and true methods of maintaining positive control.

5-25. Adequate communications must be on board for high priority missions supporting division commanders and staffs. C^2 aircraft availability requires close management. Some missions require flying backups to provide relay and ensure timely self-recovery in case of mechanical problems to C^2 aircraft.

5-26. Corps aviation brigades support their own C^2 through the CP structure and employment of relays for LOS combat net radios. HF radios provide an alternate non-line of sight (NLOS) communications means for longer distance missions and NOE communications. SATCOM may be required to support both C^2 aircraft customers and the brigade's own C^2 needs.

SECTION III – CORP ATTACK HELICOPTER REGIMENT

OVERVIEW

5-27. Within each corps aviation brigade, a subordinate attack regiment controls the ATKHBs. The regimental headquarters and its battalions may be in the active or RC. For those units in RCs, peacetime training is critical to timely integration.

TASK ORGANIZATION CONSIDERATIONS

5-28. ATKHBs normally remain under regimental control during corps shaping operations. In decisive operations, individual battalions may be attached to divisions. Division aviation brigades are well suited to accept regimental ATKHBs. The attack regiment may also be tasked to form an aviation task force that includes one or more attack companies, assault elements from the corps aviation group, and ground forces to conduct rear area operations.

5-29. The regimental commander has flexibility in task-organizing battalions to support different efforts. He could split one company from an ATKHB and attach it to another corps ATKHB supporting the division that is the corps' main effort. The remaining smaller ATKHB would retain sufficient assets to support secondary efforts, such as corps reserve, or continued shaping operations as the close battle proceeds. The commander could detach a company from each of two different battalions to form a smaller third battalion held in reserve that he, the S3, or XO could command. Alternatively, these two companies could be attached directly to division ATKHBs.

5-30. The attack helicopter regiment can receive armored cavalry squadrons or other maneuver battalions OPCON.

5-31. Corps attack regiments receive C^2 support from the aviation group's CAB, while CS/CSS is provided by the aviation group's CSAB.

HOW TO FIGHT

5-32. The attack regiment's primary role is to set the conditions for success for each of its units. It conducts corps shaping operations and augments division attack battalions to support decisive operations. The attack regiment is also an excellent air cavalry force.

- During initial entry, attack helicopter regiments often fight as part of a joint force. They may conduct joint shaping operations as a matter of necessity to defend the lodgement. These operations may be conducted from Navy ships. Operations may be under Army or other service command.

- The attack helicopter regiment conducts shaping operations for the ARFOR or corps commander. These operations usually are directed and planned by a DOCC and supported by other services. The regimental commander and staff routinely participate in DOCC planning and execution. The combatant commander for the AO may or may not require missions to appear on the ATO.
- During the close battle, the regiment can OPCON one or more battalions to one or more divisions while it plans and executes other operations with its remaining battalions.
- The deep nature of attack helicopter regiment operations may require aircraft to fly with auxiliary fuel tanks. Training the use of these tanks and the resultant reduction in munitions is essential. It must be part of the unit SOP.
- Longbow-equipped regiments can employ RF missiles with greater freedom and rapidity of launch because the deep nature of many missions reduces fratricide risk.

INTELLIGENCE

5-33. The S2 prepares intelligence estimates and conducts the IPB process. Regardless of the nature and intensity of conflict, this involves a time-tested process. FM 2-01.3 (FM 34-130) contains appropriate checklists and an aviation-specific section. IPB results are used to develop the products to support collection management, identify potential enemy COAs, and support the development of the commander's scheme of maneuver (to include branches and sequels).

5-34. The regiment has many sources of intelligence; however, the corps G2 section is key. Close coordination with the corps G2 section is essential to maintain SA and understanding. The regimental S2 contacts corps and division intelligence sections to ensure the latest information is available for operations and aircrews. As a primary corps asset for shaping operations, the regiment routinely accesses high-priority intelligence assets like JSTARS, Airborne Warning and Control System (AWACS), Guardrail C-12, RC-135 Rivet Joint, UAV and satellite imagery, signals intelligence, and electronic intelligence. Training with these systems and close coordination with the corps intelligence staff is essential and should be a matter of SOP. C^2 aircraft are required to ensure access to UAV, JSTARS, and other information while executing missions. The regiment's aircrews also are a great source of combat information.

MANEUVER

5-35. The regiment normally conducts operations as a regiment. It may OPCON one or two ATKHBs to other aviation units; but normally it will retain at least one ATKHB to act as an element of the corps reserve. It may also control ground maneuver units as part of a guard, covering force, or corps reserve mission.

5-36. Corps operations in deep areas require extensive planning. The attacks themselves are often joint and may include cruise missile, MLRS, ATACMS, armed UAV, AI assets, NSFS, and Marine attack helicopters. The ATKHBs attack simultaneously in a maximum destruction attack or in a phased or continuous attack. The threat, availability of ingress and egress routes, size of the target, availability of terrain from which to attack, and distance to the target are factors that determine which method of attack is used.

5-37. The DOCC is a key part of ensuring all aspects of coordination are accomplished. Every aspect of coordination should be a matter of SOP and incorporated into checklists and execution matrices.

5-38. Corps attack helicopter regiments play a critical role in support of light, airborne, and air assault divisions. These early deploying divisions have limited mobile ground antiarmor assets. Corps attack helicopter regiments are an excellent means of weakening enemy armor approaching lighter divisions prior to arrival of sea-deploying heavy forces (Figure 5-1).

5-39. To support the close battle, fratricide issues that effect division attack battalions also apply to corps attack regiments. Training and SOPs are essential to avoid fratricide. Ground units and ATKHBs employ control measures that limit where and when each can fire, and aircrews identify targets before engagement.

FIRE SUPPORT

5-40. Corps attack regiments ensure JSEAD is planned and coordinated. Both lethal and nonlethal means are used to ensure suppression or destruction. ATACMS, MLRS, AC-130, F-16C Block 50 Wild Weasel, F/A-18, EA-6B, EC-130H Compass Call, and helicopter weapons systems are employed. Fires in the objective area are planned to ensure all available fires are placed on the enemy. Units also employ on-call fires during the close battle, and preplan protective fires around airfields, AAs, and FARPs.

AIR DEFENSE

5-41. The regiment employs both active and passive AD measures. Active measures include use of Stinger missiles, gun, Hellfire, and rocket ammunition to conduct defensive air combat. Passive measures include terrain flight, use of camouflage nets, and locations that provide cover and concealment for CPs, AAs, and FARPs. Using air guards for vehicle movements and road marches provides early warning. Convoy discipline, such as maintaining proper distances between vehicles, limits damage from air attack. A^2C^2 plans, procedures, and orders ensure AD elements are aware of aircraft AAs and ingress and egress routes.

5-42. Corps attack helicopter regiments conducting operations in deep areas have a greater likelihood of encountering enemy rotorcraft and fighters. AH-64D aircraft with FCR can identify enemy rotorcraft and engage with RF and SAL missiles, flechette rockets, and guns. JSTARS and AWACS may or may not provide adequate early warning for joint assets to destroy enemy aircraft before they engage friendly forces. During the deep battle, the risk of fratricide increases from friendly joint assets conducting combat air patrols and from friendly AD during the return to friendly lines. IFF procedures are critical. IFF systems may be turned off while in enemy territory to avoid emitting, but that choice must be balanced with the fratricide risk from other service and allied aircraft. IFF must be on before returning to friendly lines. Regiments may designate and arm aircraft to provide security for regimental deep strikes and conduct rear area defensive air combat against infiltrating enemy rotorcraft.

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

5-43. Aerial delivery of mines can support operations in deep areas. These operations may be conducted just before or simultaneous to the regiment's attack. Aerial mining operations must be planned with the same level of detail as a operation in a deep area to ensure the slow-moving mine delivery aircraft are not interdicted by enemy action (Figure 5-1).

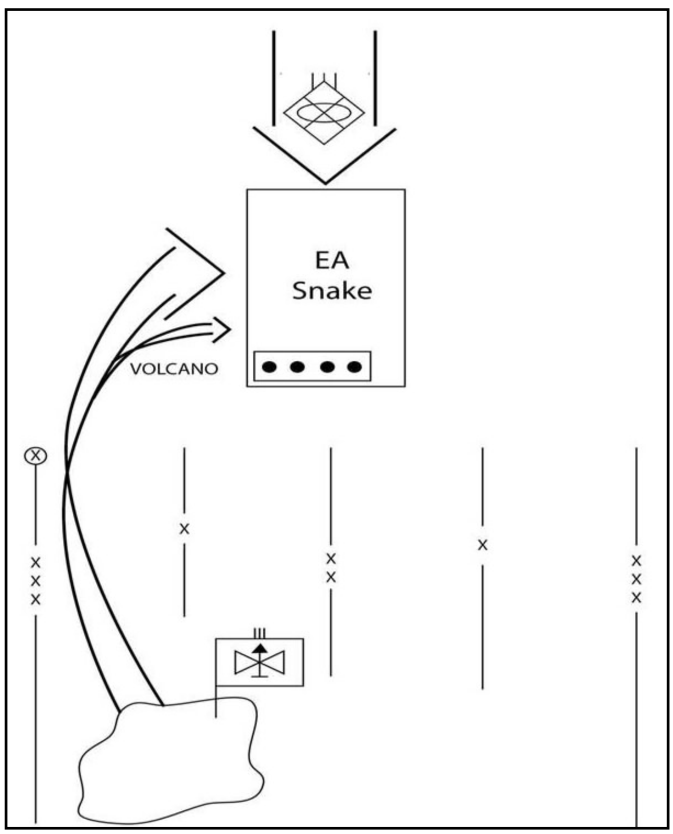


Figure 5-1. Corps Attack Regiment Conducts Corps Shaping Operation

COMBAT SERVICE SUPPORT

5-44. Regiments may be tasked to provide security along MSRs and for large CSS convoys. Regiments need corps aviation group support to set up cross-FLOT FARPs. Corps FARP asset slices may accompany attack battalions attached to divisions. The regiment may support its aircraft on an area GS basis or in DS of individual battalion efforts.

5-45. At the corps level, AVIM support is provided by COSCOM. OPTEMPO and frequency of displacements could make phase maintenance inspections at the AVUM level very difficult or impossible. If unit displacements increase, passing these inspections to the COSCOM, or out of theater, is prudent.

COMMAND AND CONTROL

5-46. Regimental operations in deep areas require UH-60 C^2 aircraft from the corps aviation group. Units may request joint C^2 aircraft to relay communications and coordinate with joint aircraft. Theater C-12 aircraft can also be outfitted with additional communications equipment to provide an Army relay and C^2 platform.

SECTION IV – CORP AVIATION GROUP

OVERVIEW

5-47. Within each corps aviation brigade, a subordinate aviation group controls the assault, command aviation, CS aviation, heavy helicopter, and ATS battalions. Because all corps aviation group headquarters are in the RC, the corps aviation brigade commands the group's active battalions and companies until the group activates and deploys. This diverse command structure consists of UH-60, CH-47, and ATS assets with varying missions and capabilities that support combat, CS, and CSS missions.

TASK ORGANIZATION CONSIDERATIONS

5-48. Corps aviation group elements normally are assigned support roles of DS or GS, rather than OPCON or attached. Maintaining centralized control of assets ensures aircrew access to information required for safe and tactically sound flight. Dispersed assets under OPCON of nonaviation units can easily miss critical aviation-related updates unless steps are taken to ensure access.

5-49. The CAB supports C^2 with highly capable C^2 aircraft. It often has its helicopters remain with supported commanders; however, crews maintain contact with their headquarters for the reasons stated above. The CSAB and HvyHB support CS and CSS air movement and aerial resupply for the corps. They are assigned DS and GS missions performed by single or multiple aircraft. Air assault missions may be given to the CSAB and HvyHB as a whole, or to subordinate elements. CSAB elements may be attached or OPCON to the AHB. HvyHB companies provide DS or GS. They normally are not attached, even to other aviation units, except another heavy helicopter unit.

5-50. The AHB supports air assault missions for the corps and divisions, and inserts and extracts teams. It can support logistics efforts throughout the corps; however, units that support logistics efforts for long periods may require additional rehearsal time to better support air assaults. The battalion normally operates in DS or GS. If the AHB is placed under the command of a division aviation brigade or another aviation group, it is usually assigned, attached, or OPCON. This command relationship may be short- or long-term. A light division could have the AHB assigned to it for the remainder of the campaign.

5-51. Group CH-47 and UH-60 elements may be attached to corps attack helicopter regiments for FARP and C^2 support. ATS battalions support corps and division airfields, AAs, rapid refuel points, and A^2C^2 requirements. ATS companies and platoons provide habitual support to corps and division aviation units.

5-52. Many group headquarters, heavy helicopter and utility units are RC. Training before employment is essential for maximum operational capability.

HOW TO FIGHT

5-53. Until the group headquarters activates and deploys, the corps aviation brigade commander accomplishes the required C^2 functions of the aviation group. The group's primary role is to set the conditions for success for each of its units. It establishes a close relationship through liaison and presence with the corps staff and COSCOM to coordinate the corps's myriad aviation support requirements. Missions for the group are approved by the corps G3 and given to the group directly or through the corps aviation brigade:

- The CAB moves commanders and staffs to coordinate and execute operations.
- The CSAB accomplishes critical CS and CSS missions for the corps and divisions, and may augment air assault operations.
- The AHB provides air assault support for corps and division operations.
- The HvyHB provides heavy lift capability for combat and support missions.
- The ATS battalion provides ATS throughout the corps.

5-54. During SASO and SSC, individual UH-60 battalions and CH-47 companies may activate to support specific missions or for a specific duration in a rotation.

5-55. During peacetime, units must form habitual training relationships to ensure wartime readiness. Peacetime RC missions to support disaster relief and air movement of personnel indirectly provide training for wartime air movement and C^2 support, but not for air assaults.

INTELLIGENCE

5-56. The S2 prepares intelligence estimates and conducts the IPB process. Regardless of the nature and intensity of conflict, this involves a time-tested process. FM 2-01.3 (FM 34-130) contains appropriate checklists and an aviation-specific section. IPB results are used to develop the products to support collection management, identify potential enemy COAs, and support the development of the commander's scheme of maneuver (to include branches and sequels).

5-57. The group obtains its intelligence support from the corps aviation brigade and supported units. Many of its aircraft operate singularly or in small groups. Information support is essential to timely and efficient operations. Units need information about the AD threat to ascertain how close they can safely conduct operations.

5-58. Tactical intelligence support normally comes from the supported unit. Air assaults, Volcano mine delivery, and air movement missions receive intelligence support from corps and national assets. Some units do not have the aviation expertise to ensure all required information is requested. To prevent that from occurring, prior coordination for aviation-related intelligence support is essential. This can be accomplished by placing group intelligence personnel with the supported unit.

5-59. UAVs and other intelligence collection platforms may support assault battalion operations with time-sensitive intelligence. Their feeds should be managed intensively to ensure the information and perhaps the feeds themselves go directly to the AATFC and AMC in their aerial or ground CPs. The group's aircrews are a great source of combat information.

MANEUVER

5-60. During initial entry, the aviation group often deploys as part of a joint force. They support operations to defend the lodgment. These operations may be under Army or other service command.

5-61. The group supports aviation operations for the ARFOR or corps commander. Many of their operations are directed and planned by a DOCC. The aviation group commander and staff routinely participate in DOCC planning and execution. The combatant commander for the AO may or may not require missions to appear on the ATO.

5-62. The deep nature of corps operations may require aircraft to fly with auxiliary fuel tanks. Training to use these tanks and the resultant reduction in payload and power available is essential. It must be part of the unit SOP.

5-63. During close area operations the group may place some of its units OPCON to one or more divisions while it plans and executes other operations with its remaining units. Light and airborne divisions benefit greatly from group aircraft for larger scale air maneuver of forces. Heavy divisions conduct air assaults with dismounted mechanized infantry or attached light infantry to secure the terrain inaccessible to Bradley Fighting Vehicles during river and gap-crossing efforts. Group CH-47s also have key roles in tactical transport of troops and equipment. The ability to carry up to 60 troops (with seats removed) provides a capability to insert tremendous combat power with one aircraft; however, it also places those soldiers in grave danger if the threat is high (Figure 5-2).

5-64. In all operations, group units can expect to transport U.S. and allied soldiers and to operate with allied helicopter units. In SASO and SSC, units may also perform a reconnaissance function or carry civilian or military observers.

FIRE SUPPORT

5-65. Group UH-60 aircraft transport forward observer teams. Corps CH-47s externally-transport mortar and towed artillery units and Q-36 Firefinder radars for support in terrain with little road access, or for artillery raids. UH-60s can move lighter artillery loads. U.S. aircraft may transport allied mortar teams and towed artillery to base camps and mountaintop vantage points to ensure coverage and observation.

AIR DEFENSE

5-66. Aviation group elements employ both active and passive AD measures. Active measures include use of door guns to conduct defensive air combat. Passive measures include terrain flight, camouflage, and selection of locations that provide cover and concealment for CPs, AAs, and FARPs. Air guards for vehicle movements and road marches provide early warning. Convoy discipline, such as maintaining proper distances between vehicles, limits damage from air attack. Elements use IFF codes to avoid fratricide. A^2C^2 plans, procedures, and orders ensure AD elements are aware of aircraft AAs and ingress and egress routes.

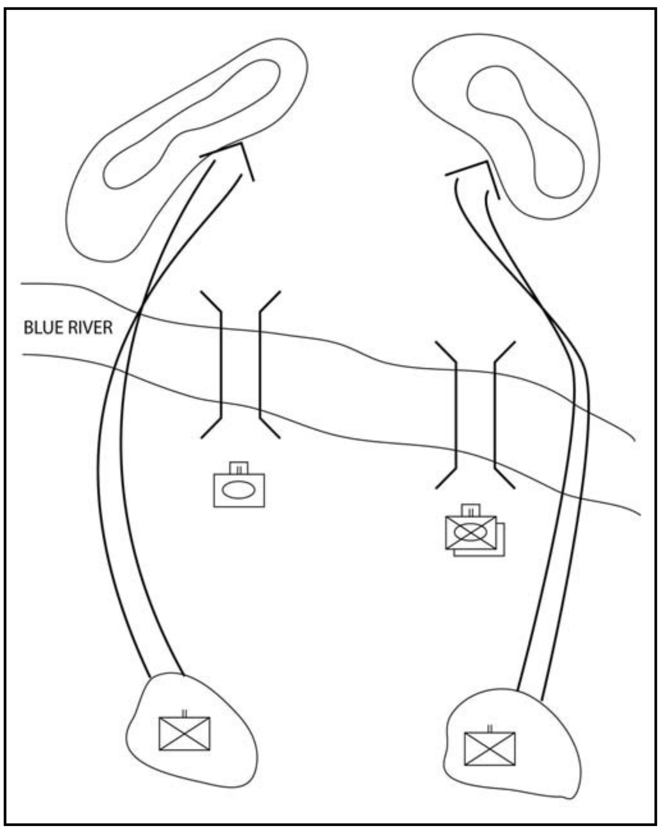


Figure 5-2. Corps Aviation Group Assets Assist Heavy Brigade River Crossing

5-67. CH-47s can externally transport Patriot engagement control station and information and coordination central shelters, and electric power unit trailers. CH-47s can internally transport Patriot missiles.

5-68. In SASO and SSC, an air threat may not exist; however, aircraft may be required to trail drug smuggling aircraft prior to handoff to the Drug Enforcement Administration (DEA), Coast Guard, or host nation air forces. These aircraft may perform evasive maneuvers or fly at high speeds to avoid capture. Missions such as these require additional training because they are not normally part of a unit's METL.

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

5-69. Aviation group aircraft routinely support engineers. Road construction and improvement are major mobility efforts that can require helicopter support to transport outsize loads such as metal pipes for culverts, bridge materiel, and personnel. Heavy helicopters can assist river crossings by lifting ribbon bridge bays into place. Volcano-equipped aircraft escorted by attack helicopters can emplace minefields. Helicopters may also transport survivability materiel such as concertina and sandbags to support security for base camps.

5-70. Group aircraft conduct air movement of MP reaction forces and traffic control teams, as well as, movement of chemical reconnaissance and decontamination teams. They also transport firefighters and water bucket to support relief missions.

COMBAT SERVICE SUPPORT

5-71. During combat operations, the group may provide extensive aerial resupply and air movement for light, airborne, and air assault divisions. It provides heavy divisions similar support but generally for higher priority supplies and equipment. Group CH-47D may be OPCON to division aviation brigades and task forces that lack heavy helicopter assets. Group CH-47s provide aircraft recovery for corps and division aviation units. They transport multiple litter patients to hospital ships and other distant care facilities. Group CS aviation battalions provide dedicated support for CS and CSS missions.

5-72. Group aircraft may transport relief workers, civilian medical personnel, and refugees following natural disasters. Aircraft can transport food, water, medicine and medical supplies, and construction material to assist war-damaged or disaster-damaged civilian infrastructure.

5-73. At the corps level, AVIM support is provided by COSCOM. OPTEMPO and frequency of displacements could make conducting phase maintenance inspections at the AVUM level very difficult or impossible. If unit displacements increase, passing these inspections to COSCOM, or out of theater, is prudent.

COMMAND AND CONTROL

5-74. One of the major functions of the aviation group is to provide C^2 aircraft to the corps and corps units. This may include augmentation to divisions for critical operations. Units can expect to transport U.S. and allied military and civilian leaders as they inspect units, C^2, and monitor the situation. Utility and heavy helicopters can air-emplace communications equipment/teams and provide aerial relay.

SECTION V – DIVISION AVIATION BRIGADE (HEAVY DIVISION)

OVERVIEW

5-75. The heavy division aviation brigade is the primary headquarters for Army aviation operations conducted by the division. The brigade has an ATKHB, a divisional cavalry squadron with two ACTs (except 1st Infantry Division), and a GSAB.

TASK ORGANIZATION CONSIDERATIONS

5-76. An aviation brigade tasked with a main effort, covering force, or an economy-of-force mission must have additional forces attached or OPCON. Corps attack asset attachments occur on a regular basis. Heavy helicopter support can occur because the division lacks these assets. The brigade may receive additional assault helicopter and ground forces.

HOW TO FIGHT

5-77. The aviation brigade is the primary integrator of aviation assets within the division. Its primary role is to set the conditions for success for each of its units. The brigade must prepare to fight as a whole, to support other units using pure or task-organized units, and to conduct multiple independent missions requiring pure or task-organized units. Heavy division aviation brigade missions include—

- Conducting movement to contact as part of the division's guard. Forces may include all aviation brigade's organic assets (less those supporting division C^2 missions), one or two heavy task forces, supporting artillery, and other divisional elements.
- Conducting operations with the cavalry squadron under brigade or division control.
- Conducting decisive or shaping operations for division attacks, with its ATKHB and mine-dispensing aircraft from the GSAB.
- Supporting the maneuver brigades with direct aerial fires and indirect rocket fires, conducting counterattacks, and overwatching fires,upon completion of decisive or shaping operations.
- Inserting and extracting reconnaissance teams. Conducting cross-FLOT air assaults to seize key terrain or destroy enemy forces. Emplacing minefields at chokepoints and primary enemy avenues of advance using mine-dispensing aircraft. Inserting and extracting special operating forces to conduct raids, surveillance, or reconnaissance.
- Providing C^2 aircraft support.
- Supporting DISCOM air movement and aerial resupply.

5-78. The aviation brigade allocates resources based on METT-TC, the scheme of maneuver, available assets, and the division commander's priorities.

5-79. The brigade commander requires units to maintain collective training proficiency among battalions within the brigade.

INTELLIGENCE

5-80. The S2 prepares intelligence estimates and conducts the IPB process. Regardless of the nature and intensity of conflict, this involves a time-tested process. FM 2-01.3 (FM 34-130) contains appropriate checklists and an aviation-specific section. The IPB results are used to develop the products to support collection management, identify potential enemy COAs, and support the development of the commander's scheme of maneuver (to include branches and sequels).

5-81. Intelligence is provided from many sources; however, the major intelligence source will be the division G2 section, attached military intelligence (MI) assets, and subordinate unit reports. The brigade S2 is the key intelligence coordinator.

5-82. The division may task the brigade with conducting intelligence liaison with other elements to gather aviation-specific information. This could be as simple as flying to the closest Air Force intelligence source, or as complicated as placing LNOs with allied and joint forces. The brigade may be provided with a common ground station to display JSTARS feed. UAV support for aviation missions is essential to identify threats without risking manned aircraft. The brigade's aircrews also are a great source of combat information.

MANEUVER

5-83. The ATKHB and ACTs are the aviation maneuver forces for the heavy division. The GSAB has a critical CS role with its mine-dispensing Volcano systems, team insertion, C^2 platforms, and limited air assault capability.

5-84. The aviation brigade conducts shaping operations with the ATKHB, and may support operations with air cavalry and aerial mine delivery. In the economy-of-force role, it may advance with or without ground maneuver, and with or without air assault forces in an effort to hold enemy forces in check while the bulk of the division's ground maneuver forces advance on another axis. As the division reserve, it may respond to rear area threats, support the division commander's scheme of maneuver when he needs to exploit success, conduct pursuit, or reinforce ground forces.

5-85. The ATKHBs may support or be OPCON to heavy maneuver brigades as a guard or part of a covering force. They may also operate in an overwatch and support-by-fire capacity. Division and ground brigade commanders may employ aircraft directly on top of or slightly behind ground maneuver forces to maintain awareness of their location vis-à-vis friendly armor. When employed in this manner, aviation forces are vulnerable to enemy artillery attack and direct fires intended to target friendly forces, and may reveal ground force locations. The greater range of Hellfire missiles allows overwatch and support-by-fire to occur without keeping attack helicopters directly over ground forces, but this can lead to confusion with respect to target priorities. The FCR is a valuable source of combat information for the digitized ground maneuver force (Figure 5-3).

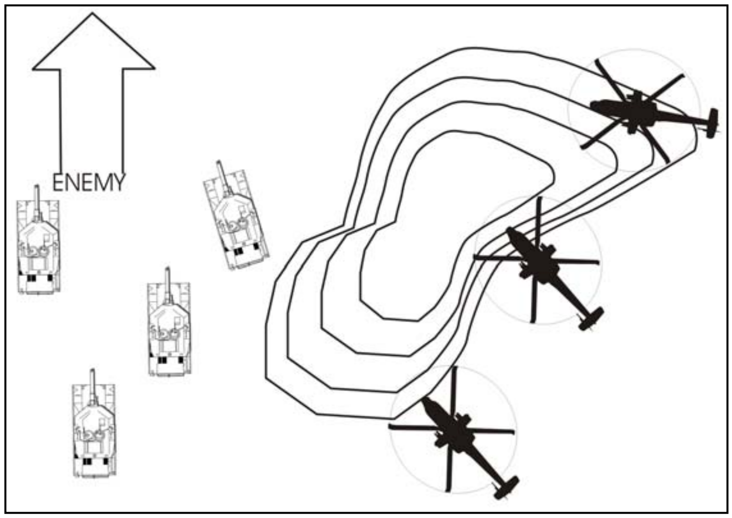


Figure 5-3. Heavy Division Close Operations—Deliberate Attack

5-86. Employment of attack aviation with armored forces requires coordinated force-oriented control measures that allow aviation forces to fix and weaken the enemy at extended ranges, then to reinforce ground unit fires. This type of employment requires constant practice and very close coordination.

5-87. The cavalry squadron operates under division control or aviation brigade control. It may operate with the attack battalion as the division guard. It may screen a vulnerable flank of the division advance. The cavalry squadron may provide security at the airhead or port of entry during the deployment and redeployment phases.

5-88. The GSAB supports limited-size air assaults. It provides C^2 aircraft to support missions. Volcano-equipped UH-60 aircraft emplace minefields. Aircraft insert and extract reconnaissance teams forward of the FLOT. For larger air assaults, heavy divisions require corps assault augmentation and light infantry forces to allow heavy infantry to remain with their combat system in coordinated simultaneous attacks.

5-89. Brigade UH-60, attached UH-60/HH-60L air ambulances, and OH-58D aircraft may provide assets for CSAR to recover downed joint and Army aviators.

FIRE SUPPORT

5-90. Aviation brigades ensure JSEAD is planned and coordinated to include nonlethal means. The ATKHB and cavalry squadron exploit preplanned and on-call fires to engage targets. Proper application of fires can destroy lightly armored targets and disrupt armored targets. Armed aircraft can designate laser guided artillery and other service munitions. If supporting fires are not adequate, attack and cavalry aircraft can launch 2.75-inch rockets and

Hellfire to provide suppressive fires of their own, but such fires detract from their primary mission. Guns can be effective if enemy AD sites are unexpectedly encountered at close ranges. Utility aircraft can transport forward observers to observation points and quickly relocate them.

AIR DEFENSE

5-91. Brigade elements employ both active and passive AD measures. Active measures include use of Stinger missiles, gun, Hellfire, and rockets for defensive air combat. Passive measures include terrain flight, camouflage, and selection of locations that provide cover and concealment for CPs, AAs, and FARPs. Air guards for vehicle movements and road marches provide early warning. Convoy discipline, such as maintaining proper distances between vehicles, limits damage from air attack. Elements use IFF codes to avoid fratricide. A^2C^2 plans, procedures, and orders ensure AD elements are aware of aircraft AAs and ingress and egress routes.

5-92. In SASO and SSC, an air threat may not exist; however, aircraft may be required to trail drug smuggling aircraft before handoff to the DEA, Coast Guard, or host nation air forces. These aircraft may perform evasive maneuvers or fly at high speeds in an attempt to avoid capture. Missions such as these require additional training because they are not normally part of a unit's METL.

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

5-93. Division aviation brigade aircraft routinely support the mobility and countermobility efforts of engineers in MTW, SSC and SASO. Road improvements are major mobility efforts that can require helicopter support to transport outsize loads such as metal pipes for culverts, bridge materiel, and personnel. Supporting heavy helicopters can assist river crossings by lifting ribbon bridge bays into place. Volcano-equipped aircraft escorted by attack helicopters security can emplace minefields. Helicopters may also transport survivability materiel such as concertina and sandbags to support security for base camps.

5-94. Division brigade aircraft also conduct air movement of MP reaction forces and traffic control teams, as well as, movement of chemical reconnaissance and decontamination teams. They also transport firefighters and water bucket to support domestic missions.

COMBAT SERVICE SUPPORT

5-95. The division attack battalion must provide its own Class III/V support even when under OPCON of heavy brigades. Brigades and battalions coordinate CSS throughput whenever possible to support continuous FARP operations. The division aviation brigade supports CSS air movement, aerial resupply, and CASEVAC. Division utility helicopters air-emplace and resupply FARPs.

5-96. At the division level, the DISCOM provides AVIM support. Unit OPTEMPO and frequency of displacements could make conducting phase maintenance inspections at the unit AVUM level very difficult or impossible.

If unit displacements increase, passing these inspections to the DISCOM or COSCOM, or out of theater, is prudent.

COMMAND AND CONTROL

5-97. Communication is a major challenge for the heavy division aviation brigade. Being near the threat requires terrain flight altitudes that make LOS communications difficult. CPs and aircrews may employ radio relay, retransmission, or alternate communications to maintain contact. HF radio with automatic link establishment (ALE), in both voice and data mode, provides alternate NLOS communications for longer distance missions and NOE communications. SATCOM is available to support both C^2 aircraft customers and the brigade's own C^2 needs.

5-98. For high priority missions supporting division commanders and staffs, the necessary communications must be on board. Some missions require flying backups to provide relay and ensure timely self-recovery in case of mechanical problems to C^2 aircraft.

5-99. Division signal units may require air transport of equipment and personnel to maintain vital division communications.

SECTION VI – DIVISION AVIATION BRIGADE (LIGHT DIVISION)

OVERVIEW

5-100. The light division aviation brigade is the primary headquarters for Army aviation operations conducted by the division. The brigade has an AHB, ATKHB, and a divisional cavalry squadron with two ACTs.

5-101. The aviation brigade practices to deploy with as little as two days notification. The division sacrifices some combat power by using OH-58D in lieu of AH-64 in the attack battalion to enhance air-deployability.

TASK ORGANIZATION CONSIDERATIONS

5-102. Internal task organization to accomplish air assaults, movement to contact and screening operations is routine. The aviation brigade is an appropriate covering or guard force if additional forces are attached or OPCON, such as one or two light infantry battalions, a corps ATKHB, artillery, engineers, and corps utility and heavy helicopter units. The brigade will often receive additional assault helicopter forces from the corps or uncommited divsions to augment its air assault capability. With augmentation from habitual-support NG DCSA Bde AHBs, the division's air assault capability doubles. With further attachment of corps air assault and HvyHBs, the lift capacity of the light division can approach that of the air assault division. UAVs forces should support all operations.

5-103. A brigade from a light division frequently deploys to support contingencies requiring infantry to fight on difficult terrain. As such, the aviation brigade may deploy an aviation task force to support that brigade. The task force may also deploy in SASO or as part of a rotation of forces.

When the entire division deploys, elements of DCSA Bdes may be attached to the division to augment assault support.

HOW TO FIGHT

5-104. The aviation brigade is the primary integrator of aviation assets within the division. The brigade's primary role is to set the conditions for success for each of its units. The brigade must prepare to fight as a whole, to support other units using pure or task-organized units, and to conduct multiple independent missions requiring pure or task-organized units. Light division aviation brigade missions include—

- Conducting a movement to contact as part of the division's guard. Forces may include all aviation brigade organic assets (less those supporting division C^2 missions), one to two light infantry battalions, supporting artillery, and other divisional elements to include OPCON tanks or armored gun systems if available.
- Supporting the division's main attack with the attack battalion. Conducting and supporting an air assault to achieve ground brigade or division objectives. Supporting the DISCOM with utility aircraft. Inserting and extracting reconnaissance teams forward of the FLOT. Conducting a screen with the cavalry squadron or attack battalion under brigade or division control.
- Conducting cross-FLOT air assaults to seize key terrain or destroy enemy forces. Providing C^2 aircraft supporting these assaults. Emplacing minefields at chokepoints and along primary enemy avenues of advance using mine-dispensing aircraft. Inserting and extracting special operating forces and light infantry units to conduct raids, surveillance, or reconnaissance. Supporting DISCOM air movement and aerial resupply with utility aircraft. Providing C^2 aircraft support. Supporting the forward brigades with aerial fires and conduct counterattacks as required.

5-105. The aviation brigade allocates resources based on METT-TC, the scheme of maneuver, available assets, and the division commander's priorities.

5-106. The brigade commander requires units to maintain collective training proficiency among the ATKHB, cavalry squadron, AHB, and units they habitually support.

INTELLIGENCE

5-107. The S2 prepares intelligence estimates and conducts the IPB process. Regardless of the nature and intensity of conflict, this involves a time-tested process. FM 2-01.3 (FM 34-130) contains appropriate checklists and an aviation-specific section. IPB results are used to develop the products to support collection management, identify potential enemy COAs, and support the development of the commander's scheme of maneuver (to include branches and sequels).

5-108. Intelligence is provided from many sources; however, the major intelligence source will be the division G2 section, attached MI assets, and subordinate unit reports. The brigade S2 is the key intelligence coordinator.

5-109. The division may task the brigade with conducting intelligence liaison with other elements to gather aviation-specific information. This could be as simple as flying to the closest Air Force intelligence source, or as complicated as placing LNOs with allied and joint forces. The brigade may have access to a JSTARS common ground station that can provide real-time intelligence access from a variety of sources. UAV support for aviation missions is essential to identify threats without risking manned aircraft. The light division cavalry squadron and brigade aircrews also are a great source of combat information.

MANEUVER

5-110. The light infantry division exploits terrain and urban areas for both offensive and defensive operations. Aviation forces can support light infantry in any terrain, day or night. Aviation's rapid mobility can quickly assist the light division's ground forces as they move under the concealment of night and the cover and concealment of restricted terrain.

5-111. The aviation brigade conducts limited shaping operations with the ATKHB and may support those operations with air cavalry and aerial mine delivery. The brigade also conducts economy-of-force or reserve missions. In the economy-of-force role it may advance with or without air assaults forces to hold enemy forces in place while the division maneuvers toward the main objective. As the division reserve, it may respond to area battle threats, support the division commander's scheme of maneuver when he needs to exploit success, conduct pursuit, or reinforce ground forces.

5-112. ATKHBs may support or be OPCON to light maneuver brigades as a guard or part of a covering force. They may also operate in an overwatch and support-by-fire capacity. Division and ground brigade commanders may employ aircraft directly on top of or slightly behind ground maneuver forces to maintain awareness of their location vis-à-vis friendly forces. When employed in this manner, aviation forces are vulnerable to enemy artillery attack and direct fires intended to target friendly forces, and may reveal ground force locations. The greater range of Hellfire missiles allows overwatch and support-by-fire to occur without keeping attack helicopters directly over ground forces. However, this can lead to confusion with respect to target priorities.

5-113. Employment of attack aviation with ground forces requires coordinated force-oriented control measures that allow aviation forces to fix and weaken the enemy at extended ranges and then to reinforce ground unit fires with missile, rocket, and .50 cal fires. This type of employment requires constant practice and very close coordination.

5-114. The cavalry squadron operates under division control or aviation brigade control. It may operate with the attack battalion as the division guard. It may also screen a vulnerable flank of the division advance. It also provides security before, during, and after air assaults. The cavalry squadron may provide security at the airhead or port of entry during the deployment and redeployment phases.

5-115. Attack and cavalry conduct attacks against enemy artillery units that can devastate light infantry forces. They can also conduct limited overwatch of bridges along key enemy avenues of approach, and obstacles and minefields at key chokepoints in mountainous and densely forested, or swampy terrain.

5-116. The AHB conducts air assaults to support seizure of key terrain or to allow light forces to gain a maneuver advantage over enemy forces. It can conduct a battalion-sized air assault without augmentation. Helicopters can transport troops to the objective or rapidly move them after they infiltrate to it. They can also insert and extract reconnaissance teams forward of the FLOT. Aviation units normally conduct false insertions at multiple LZs to disguise true force deployments. Assault aircraft can drop forces atop ridgelines, altitude and threat permitting, to allow them to fight down or along the ridge. The assault battalion emplaces minefields using Volcano to reinforce natural obstacles or to block chokepoints. It supports the division command group, other brigades, the cavalry squadron, and the ATKHB with C^2 helicopters (Figure 5-4).

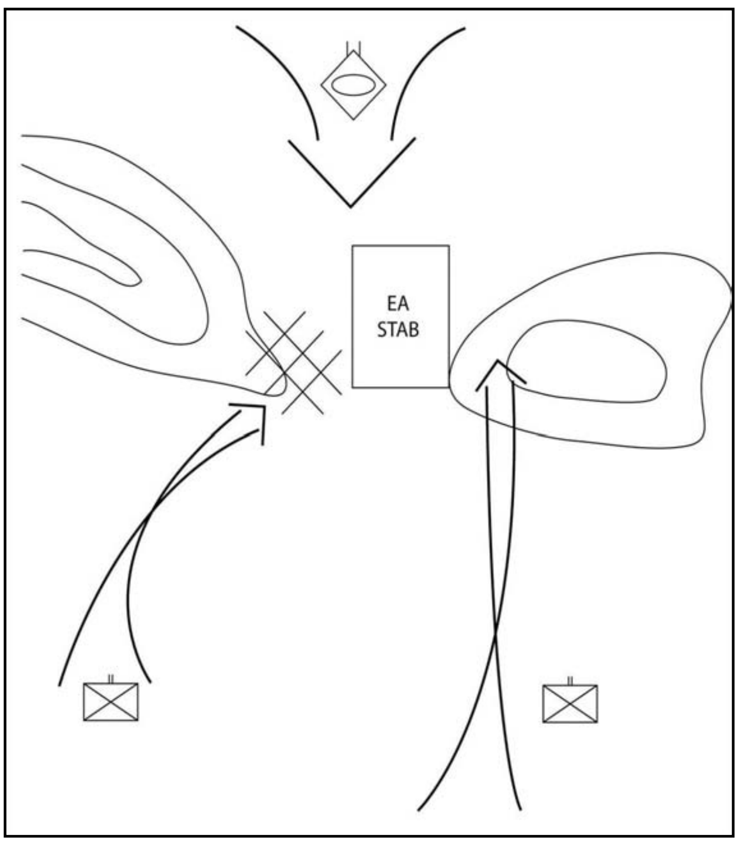


Figure 5-4. Light Infantry Battalion Air Assault in Armor Chokepoint

5-117. In an urban environment, helicopters emplace forces on rooftops, in parks, stadiums, parking areas, and other similar areas. The presence of wires, poles, antennas, and other obstacles may limit some landing areas. ATKHB and cavalry aircraft cover landings by engaging targets using running fire or from standoff ranges. Helicopters must minimize ground time and hovering to avoid sniper, grenade and rocket propelled grenade (RPG) engagement when inserting or overwatching forces (see Appendix R).

5-118. Brigade UH-60, attached UH-60/HH-60L air ambulances, and OH-58D aircraft may provide assets for CSAR to recover downed joint and Army aviators.

FIRE SUPPORT

5-119. Aviation brigades ensure JSEAD is planned and coordinated to include nonlethal means. Utility aircraft externally transport 105 mm howitzers and Q-36 Firefinder radars. They also transport forward observer teams. Attack units may need to coordinate closely with artillery Firefinder units to find and destroy enemy artillery and mortars that threaten light infantry. OH-58D aircraft in the cavalry squadron and ATKHB are well-equipped to support on-call fires and laser designate for joint laser-guided munitions. They also have limited 2.75-inch rocket capability to suppress and destroy maneuver forces and ADs.

AIR DEFENSE

5-120. Brigade elements employ active and passive AD measures. Active measures include use of Stinger missiles, guns, Hellfire, and rockets ammunition to conduct defensive air combat. Passive measures include terrain flight, camouflage, and selection of locations that provide cover and concealment for CPs, AAs, and FARPs. Air guards for vehicle movements and road marches provide early warning. Convoy discipline, such as maintaining proper distances between vehicles, limits damage from air attack. Elements use IFF codes to avoid fratricide. A^2C^2 plans, procedures, and orders ensure AD elements are aware of aircraft AAs and ingress and egress routes.

5-121. In SASO and SSC, an air threat may not exist; however, aircraft may be required to trail drug smuggling aircraft before handoff to the DEA, Coast Guard, or host nation air forces. These aircraft may perform evasive maneuvers or fly at high speeds to avoid capture. Missions such as these require additional training because they are not normally part of a unit's METL.

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

5-122. Division aviation brigade aircraft routinely support the mobility and countermobility efforts of engineers in MTW, SSC and SASO. Road improvements are major mobility efforts that can require helicopter support to transport outsize loads such as metal pipes for culverts, bridge materiel, and personnel. Supporting heavy helicopters can assist river crossings by lifting ribbon bridge bays into place. Volcano-equipped aircraft escorted by attack helicopters can emplace minefields. Helicopters may also transport survivability materiel such as concertina wire and sandbags to support security for base camps.

5-123. Division brigade aircraft also conduct air movement of MP reaction forces and traffic control teams, as well as, movement of chemical reconnaissance and decontamination teams. They also transport firefighters and water bucket in support of domestic missions.

COMBAT SERVICE SUPPORT

5-124. Assault battalion aircraft are a primary means of air movement (personnel, equipment, and supplies) for light infantry brigades. CASEVAC is another key mission. During SSC, UH-60 aircraft provide substantial CSS to light infantry division forces operating in dispersed areas. During SASO and disaster relief missions, UH-60s may transport civilian casualties and refugees. They can also expect to transport supplies, medical and relief personnel, firefighters, and water buckets. Cavalry and attack units may provide MSR and convoy security.

5-125. At the division level, AVIM support is provided by the DISCOM. Unit OPTEMPO and frequency of displacements could make conducting phase maintenance inspections at the unit AVUM level very difficult or impossible. If unit displacements increase, passing these inspections to the DISCOM or COSCOM, or out of theater, is prudent.

COMMAND AND CONTROL

5-126. The CAC provides aircraft for key personnel transport and airborne C^2 support, and when fielded, the A^2C^2S. The latter offers enhanced communication capability and access to the C^2 systems of the BOSs except CSS. During SASO and disaster relief, utility aircrews will transport domestic and foreign civilian leaders surveying damage and directing peace enforcement or relief efforts. C^2 system-equipped aircraft can provide critical communications support when disasters interrupt phone service. Utility aircraft can also transport civilian communications workers and their equipment to set up or repair critical nodes.

SECTION VII – DIVISION AVIATION BRIGADE (AIRBORNE)

OVERVIEW

5-127. The airborne division aviation brigade is the primary headquarters for Army aviation operations conducted by the division. The brigade has AHB, ATKHB, and a divisional cavalry squadron with three ACTs.

5-128. The aviation brigade practices to deploy on short notice. The division sacrifices some combat power by using OH-58D in lieu of AH-64 in the attack battalion to enhance air-deployability. The brigade is nearly identical to light infantry division aviation brigades except for the cavalry squadron, which has a third air reconnaissance troop and a single ground troop.

TASK ORGANIZATION CONSIDERATIONS

5-129. A brigade from the airborne division is on continuous division ready-brigade status for deployment worldwide within 18 hours. As such, the airborne division aviation brigade may deploy an aviation task force to support that brigade contingency. As part of a rotation of forces or when the entire division deploys, elements of DCSA Bdes may be attached to augment assault support. Corps heavy helicopter and AH-64D assets may task-organize with the brigade or its task force for some missions.

HOW TO FIGHT

5-130. The aviation brigade is the primary integrator of aviation assets within the division. Its primary role is to set the conditions for success for each of its units. The brigade must prepare to fight as a whole, to support other units using pure or task-organized units, and to conduct multiple independent missions requiring pure or task-organized units. Airborne divisional aviation brigade missions include—

- Employing the cavalry squadron to screen the lodgement. Emplacing minefields using Volcano-equipped aircraft during initial entry lodgement defense. Conducting a movement to contact as the division's guard, once the airhead is secure. Forces include all aviation brigade organic assets (less those supporting division C^2 missions), one to two airborne infantry battalions, supporting artillery, and other divisional elements to include tanks and armored gun systems, if available.
- Supporting the DMAIN attack with the ATKHB. Supporting forward brigades with aerial fires, and conducting counterattacks as required. Conducting and supporting air assaults to achieve ground brigade or division close battle objectives. Supporting DISCOM air movement and aerial resupply with UH-60 aircraft. Inserting and extracting reconnaissance teams forward of the FLOT. Conducting flank screens with the cavalry squadron under brigade or division control.
- Conducting cross-FLOT air assaults to seize key terrain or to destroy enemy forces. Emplacing minefields at chokepoints and primary enemy avenues of advance using Volcano-equipped aircraft. Inserting and extracting special operating teams conducting raids, surveillance, or reconnaissance. Supporting DISCOM air movement and aerial resupply with utility aircraft. Supporting the forward brigades with aerial fires and conducting counterattacks as required.

5-131. The aviation brigade allocates resources based on METT-TC, the scheme of maneuver, available assets, and the division commander's priorities.

5-132. The brigade commander requires units to maintain collective training proficiency among the attack battalion, cavalry squadron, AHB, and units they habitually support.

INTELLIGENCE

5-133. The S2 prepares intelligence estimates and conducts the IPB process. Regardless of the nature and intensity of conflict, this involves a time-tested process. FM 2-01.3 (FM 34-130) contains appropriate checklists and an aviation-specific section. IPB results are used to develop the products to support collection management, identify potential enemy COAs, and support the development of the commander's scheme of maneuver (to include branches and sequels).

5-134. Intelligence is provided from many sources; however, the major intelligence source will be the division G2 section, attached MI assets, and subordinate unit reports. The brigade S2 is the key intelligence coordinator.

5-135. Intelligence is provided from many sources; however, the major intelligence source will be the division G2 section, attached MI assets, and subordinate unit reports. The brigade S2 is the key intelligence coordinator.

5-136. The division may task the brigade with conducting intelligence liaison with other elements to gather aviation specific information. This could be as simple as flying to the closest Air Force intelligence source or as complicated as placing LNOs with allied and joint forces. The brigade may have access to a JSTARS common ground station that can provide real-time intelligence access from a variety of sources. UAV support for aviation missions is essential to identify threats without risking manned aircraft. The airborne division cavalry squadron and brigade aircrews also are a great source of combat information.

MANEUVER

5-137. The airborne division fights and exploits terrain and urban areas for both offensive and defensive operations. Airborne division aviation forces can support light infantry in any terrain day or night. Aviation's rapid mobility can quickly assist the division's ground forces as they move under the concealment of night and the cover and concealment of restricted terrain (Figure 5-5).

5-138. The attack and reconnaissance elements employ OH-58D aircraft to enhance limited airlift capacity of Air Force aircraft. However, this limits overall ordnance loads, which increases the division's reliance on corps AH-64 assets for deep missions and defense against large armored forces. As part of an early entry force, attack and reconnaissance force elements may be part of a forcible entry and subsequent lodgement defense. They may deploy from ships or intermediate staging bases in adjacent allied territory. If airlifted directly to the lodgement, rapid aircraft reassembly is critical.

5-139. Both attack and reconnaissance elements may be important parts of the initial screening and security force for the lodgement. In subsequent offensive missions, aircraft provide security for air assaults, and conduct autonomous attack missions, and provide support for parachute infantry regiment forces in contact. Aircraft have limited time on station and frequently use the continuous employment technique to rotate companies through the FARP to support ground troops. Reconnaissance elements destroy enemy scouts as part of guard or screening force and provide early warning and security for the division.

5-140. The aviation brigade conducts limited shaping operations with the attack battalion and may support those operations with air cavalry and aerial mine delivery. The brigade also conducts economy-of-force or reserve missions. In the economy-of-force role it may advance with or without air assaults forces to hold enemy forces in place while the division maneuvers toward the main objective. As the division reserve, it may respond to rear area threats, support the division commander's scheme of maneuver when he needs to exploit success, conduct pursuit, or reinforce ground forces.

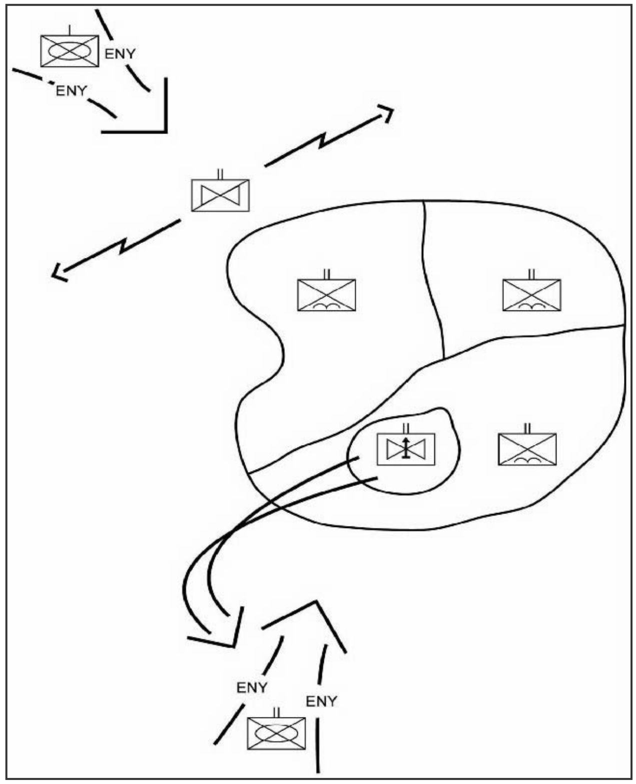


Figure 5-5. Airborne Division Forcible Entry/ Defense of Lodgment

5-141. ATKHBs may support or be OPCON to light maneuver brigades as part of a guard or covering force. They may also operate in an overwatch and support-by-fire capacity. Division and ground brigade commanders may employ aircraft directly on top of or slightly behind ground maneuver forces to maintain awareness of their location vis-à-vis friendly forces. When employed in this manner, aviation forces are vulnerable to enemy artillery attack and direct fires intended to target friendly forces and may reveal ground force locations. The greater range of Hellfire missiles allows overwatch and support-by-fire to occur without keeping attack helicopters directly over ground forces. However, this can lead to confusion with respect to target priorities.

5-142. Employment of attack aviation with ground forces requires coordinated force-oriented control measures that allow aviation forces to fix and weaken the enemy at extended ranges and then to reinforce ground unit fires with missile, rocket, and .50 cal fires. This type of employment requires constant practice and very close coordination.

5-143. The cavalry squadron operates under division control or aviation brigade control. It may operate with the attack battalion as the division guard. It may also screen a vulnerable flank of the division advance. It also provides security before, during, and after air assaults. The cavalry squadron may provide security at the airhead or port of entry during the deployment and redeployment phase.

5-144. Attack and cavalry can conduct attacks against enemy artillery that can devastate light infantry forces. They can also conduct limited overwatch of bridges along key enemy avenues of approach, and obstacles and minefields at key chokepoints in mountainous and densely forested, or swampy terrain.

5-145. The AHB conducts air assaults to support seizure of key terrain or to allow light forces to gain a maneuver advantage over enemy forces. It can conduct a battalion-sized air assault without augmentation. For larger air assaults, the division requires corps or other division augmentation. Helicopters can transport troops to the objective or rapidly move them after they infiltrate to it. They can also insert and extract reconnaissance teams forward of the line of own troops. Aviation units may conduct false insertions as part of the deception plan. Assault aircraft can drop forces atop ridgelines, altitude and threat permitting, to allow them to fight down or along the ridge. The assault battalion emplaces minefields using Volcano to reinforce natural obstacles or to block chokepoints. It supports the division command group, other brigades, the cavalry squadron, and the attack battalion with C^2 helicopters.

5-146. In an urban environment helicopters can emplace forces on rooftops, in parks, stadiums, parking areas, and other similar areas. The presence of wires, poles, antennas, and other obstacles may limit some landing areas. Attack battalion and cavalry aircraft cover landings by engaging targets using running fire or from standoff ranges. Helicopters must minimize ground time and hovering to avoid sniper, grenade and RPG engagement when inserting or overwatching forces.

5-147. Brigade UH-60, attached UH-60/HH-60L air ambulances, and OH-58D aircraft may provide assets for CSAR to recover downed joint and Army aviators.

FIRE SUPPORT

5-148. Aviation brigades ensure JSEAD is planned and coordinated to include nonlethal means. Utility aircraft externally transport 105 mm howitzers and Q-36 Firefinder radars. They also transport forward observer teams. Attack units may need to coordinate closely with artillery Firefinder units to find and destroy enemy artillery and mortars that threaten light infantry. OH-58D aircraft in the cavalry squadron and ATKHB are well-equipped to support on-call fires and laser designate for joint laser-guided munitions. They also have limited 2.75-inch rocket capability to suppress and destroy maneuver forces and ADs. Guns can be effective if enemy AD sites are unexpectedly encountered at close ranges.

AIR DEFENSE

5-149. Brigade elements employ both active and passive AD measures. Active measures include use of Stinger missiles, gun, Hellfire, and rocket ammunition to conduct defensive air combat. Passive measures include terrain flight, camouflage, and selection of locations that provide cover and concealment for CPs, AAs, and FARPs. Air guards for vehicle movements and road marches provide early warning. Convoy discipline, such as maintaining proper distances between vehicles, limits damage from air attack. Elements use IFF codes to avoid fratricide. A^2C^2 plans, procedures, and orders ensure AD elements are aware of aircraft AAs and ingress and egress routes.

5-150. In SASO and SSC, an air threat may not exist; however, aircraft may be required to trail drug smuggling aircraft before handoff to the DEA, Coast Guard, or host nation air forces. These aircraft may perform evasive maneuvers or fly at high speeds to avoid capture. Missions such as these require additional training because they are not normally part of a unit's METL.

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

5-151. Division aviation brigade aircraft routinely support the mobility and countermobility efforts of engineers in MTW, SSC and SASO. Road improvements are major mobility efforts that can require helicopter support to transport outsize loads such as metal pipes for culverts, bridge materiel, and personnel. Volcano-equipped aircraft escorted by attack helicopters can emplace minefields. Helicopters may also transport survivability materiel such as concertina and sandbags to support security for base camps.

5-152. Division brigade aircraft also conduct air movement of MP reaction forces and traffic control teams, as well as, movement of chemical reconnaissance and decontamination teams. They also transport firefighters and water bucket in support of domestic missions.

COMBAT SERVICE SUPPORT

5-153. OH-58D aircraft can conduct Wet Hawk and Fat Hawk refueling to increase range or assault assets can air-emplace FARPs. The division can paradrop 500-gallon drums, which could allow UH-60s to internally transport ammunition and forward area refueling equipment (FARE) to permit lower terrrain flight altitudes during deep air assaults. UH-60 aircraft can support air movement and aerial resupply for airborne forces dropped deep or conducting forward reconnaissance. Aircraft may also air transport supplies from ships to lodgements ashore. Aircraft also evacuate casualties to ships in some cases.

5-154. At the division level, AVIM support is provided by the DISCOM. Unit OPTEMPO and frequency of displacements could make conducting phase maintenance inspections at the unit AVUM level very difficult or impossible. If unit displacements increase, passing these inspections to the DISCOM or COSCOM, or out of theater, is prudent.

COMMAND AND CONTROL

5-155. The AHB provides airborne C^2 support to the division, the aviation brigade, the cavalry squadron, the attack battalion, and the DASB. The aviation brigade allocates resources based on division priorities. A^2C^2S aircraft, when fielded, will be well-equipped to provide commanders communication, transportation, and access to intelligence and other BOS information while in flight or on the ground.

SECTION VIII – ATTACK HELICOPTER BRIGADE (AIR ASSAULT DIVISION)

OVERVIEW

5-156. The air assault division attack helicopter brigade has three ATKHBs, one air cavalry squadron, and one CAB. Its AH-64Ds differentiate it from other light divisions that have OH-58Ds. It also has more attack battalions than any other division.

5-157. The brigade prepares to deploy within 36 hours of notification.

5-158. It plans, synchronizes, and executes aerial fires as an element of an air assault combined arms team. Its CAB supports the division C^2 mission, performs Volcano and team insertion missions, and provides an organic source of FARP and other CSS aerial sustainment.

TASK ORGANIZATION CONSIDERATIONS

5-159. During operations in deep areas, the attack helicopter brigade may receive a heavy helicopter slice from the division's air assault brigade to support Fat Cow FARP operations beyond the capabilities of the CAB. Attack units may be under the OPCON of an air assault task force that includes ground forces. Attack battalions form habitual relationships with the ground maneuver brigade they support. During deployments of a single ground brigade, attack units often task-organize with utility and HvyHC to form a supporting an aviation task force.

HOW TO FIGHT

5-160. The attack helicopter brigade's primary role is to set the conditions for success for each of its units. The brigade must prepare to fight as a whole, to support other units using pure or task-organized units, and to conduct multiple independent missions requiring pure or task-organized units.

5-161. The attack helicopter brigade conducts division shaping or decisive operations. It fights as a brigade or as a brigade (minus) with one or all of its attack battalions operating to support the ground brigades. The air cavalry squadron fights under brigade or division control, but normally under brigade control. Its mine delivery capability found in the CAB supports brigade operation, or operates in DS of a ground brigade. The attack helicopter brigade is an excellent unit to support guard or covering force operations. When task-organized with ground units, it can conduct both guard and cover operations.

- During initial entry, the attack helicopter brigade often fights as part of a joint force. Additionally, they may conduct joint shaping operations as a matter of necessity to defend the lodgement. These operation may be conducted from Navy helicopter ships or aircraft carriers. These operations may be under the command of Army or other service headquarters.
- The attack helicopter brigade conducts shaping operations for the ARFOR or division commander. These shaping operations are usually directed and planned by a DOCC and supported by other services. The brigade commander and staff routinely participate in DOCC planning and execution. The combatant commander for the AO may or may not require missions to appear on the ATO.
- The deep nature of attack brigade operations may require aircraft to fly with auxiliary fuel tanks. Training to use these tanks and the resultant reduction in munitions is essential. It must be part of the unit SOP. Longbow-equipped attack regiments can employ RF missiles with greater freedom and rapidity of launch because the deep nature of many missions reduces fratricide risk.
- During the close battle, the attack regiment can OPCON one or more battalions to one or more brigades while it plans and executes other operations with its remaining attack battalions and air cavalry squadron. It also provides air assault security for all air assault operations with attack helicopter, air cavalry, mine delivery, and airborne C^2 support.

5-162. The CAB provides continuous C^2 and mine delivery support to the division. It also provides C^2, mine delivery, and limited sustainment support to the attack brigade.

INTELLIGENCE

5-163. The S2 prepares intelligence estimates and conducts the IPB process. Regardless of the nature and intensity of conflict, this involves a time-tested process. FM 2-01.3 (FM 34-130) contains appropriate checklists and an aviation-specific section. IPB results are used to develop the products to support collection management, identify potential enemy COAs, and support the development of the commander's scheme of maneuver (to include branches and sequels).

5-164. Intelligence is provided from many sources; however, the major intelligence source will be the division G2 section, attached MI assets, and subordinate unit reports. The brigade S2 is the key intelligence coordinator.

5-165. The attack brigade's size, and early entry mission give it greater access to JSTARS Ground Station Module and Common Ground Station as well as other joint and theater intelligence support like Trojan Spirit II. The CAB, unique to this brigade, has an additional mission of emplacing long range surveillance team members. The cavalry squadron provides another robust source of combat information for the brigade. UAVs support cavalry operations by detecting enemy scouts and advance bodies. Cavalry then destroy the enemy or maintain contact while UAVs continue to search. UAVs also support air assaults and operations in deep areas, and must identify threats en route and at the objective, while allowing brigade, division, and higher commanders/staffs to *see* the battlefield (Figure 5-6). The brigade's aircrews are a great source of combat information.

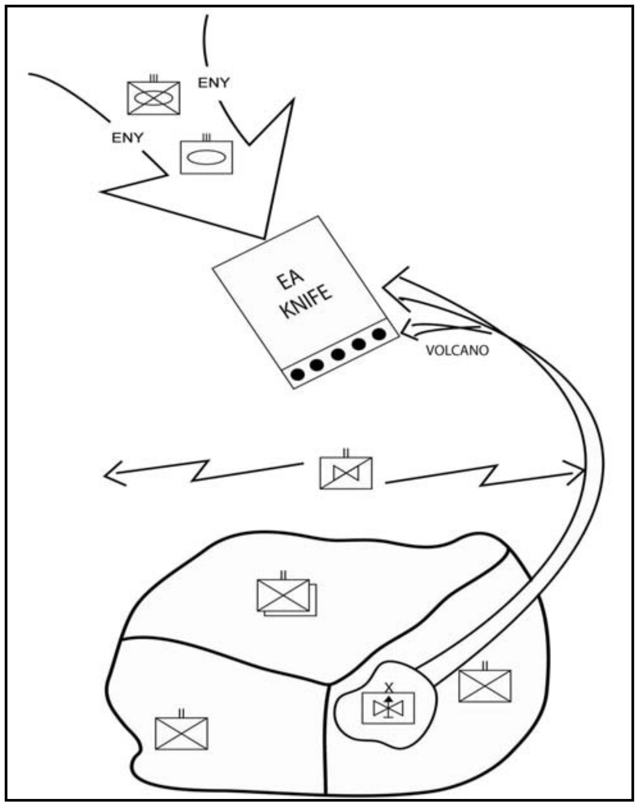


Figure 5-6. Attack Brigade Conducting Deep Operations From Forward Operating Base

5-166. The division may task the brigade with conducting intelligence liaison with other elements to gather aviation-specific information. This could be as simple as flying to the closest Air Force intelligence source, or as complicated as placing LNOs with allied and joint forces.

MANEUVER

5-167. The air assault division's attack brigade is comparable in size to corps attack regiments and has more attack aircraft than any other division. This gives the division a formidable antiarmor capability during independent attacks or to support air assaults. While assault battalions provide habitual support to individual infantry brigades, the attack battalions may do the same or may fight independently depending on the division commander's priorities for shaping versus decisive operations.

5-168. When providing habitual support for ground air assault brigades, one battalion supports each brigade with antiarmor and suppressive rocket and 30mm gun fires. Some attack battalion companies provide security during air assaults while others continue attacks on the objective area. The brigade can accept augmentation from corps attack and utility/heavy helicopter units.

5-169. The brigade conducts independent shaping and decisive operations as the division commander dictates. It conducts hasty, deliberate, and spoiling attacks, and counterattacks. It also conducts raids, feints, and demonstrations. The attack brigade, with ground and assault force augmentation, conducts movement to contract, pursuit and exploitation. During initial lodgement and as conditions dictate, the brigade conducts mobile and area defense, but even in the defense, its actions are offensive.

5-170. Cavalry and attack elements provide initial security and reconnaissance during initial entry/lodgement. Conduct route, area and zone reconnaissance and reconnaissance-in-force. The brigade can act as division guard when augmented with ground units. It conducts flank screens with its attack or cavalry assets, and provides security for MSRs and rear areas.

5-171. Brigade UH-60, attached UH-60/HH-60L air ambulances, and OH-58D aircraft may provide assets for CSAR to recover downed joint and Army aviators.

FIRE SUPPORT

5-172. Aviation brigades ensure JSEAD is planned and coordinated to include nonlethal means. Brigade aircraft can provide supporting rocket and gun fires for ground forces, assault elements, and shaping operations. Aircrews can initiate preplanned and on-call fires from supporting towed howitzers and MLRS units. Cavalry aircraft in the brigade will habitually employ FS as part of its security and reconnaissance mission. Longbow and Kiowa Warrior aircraft are well-equipped to provide on-call FS for air assault task forces. They also have organic 2.75-inch rockets to provide suppressive and destructive fires. Finally, they can laser designate for joint laser-guided bombs.

AIR DEFENSE

5-173. The brigade employs both active and passive AD measures. Active measures include use of Stinger missiles, gun, Hellfire, and rocket ammunition to conduct defensive air combat. Passive measures include terrain flight, camouflage, and selection of locations that provide cover and concealment for CPs, AAs, and FARPs. Air guards for vehicle movements and road marches provide early warning. Convoy discipline, such as maintaining proper distances between vehicles, limits damage from air attack. Elements use IFF codes to avoid fratricide. A^2C^2 plans, procedures, and orders ensure AD elements are aware of aircraft AAs and ingress and egress routes.

5-174. Corps attack units conducting operations in deep areas have a greater likelihood of encountering enemy rotorcraft and fighters. AH-64D aircraft with FCR can identify enemy rotorcraft and engage with RF and SAL missiles, flechette rockets, and guns. JSTARS and AWACS may or may not provide adequate early warning for joint assets to destroy enemy aircraft before they engage friendly forces. During deep battle the risk of fratricide increases from friendly joint assets conducting combat air patrols and from friendly ADs during the return to friendly lines. IFF procedures are critical.

IFF systems may be turned off while in enemy territory to avoid emitting, but leaving them on must be balanced with the fratricide risk from other service and allied aircraft. IFF must be on before returning to friendly lines. Brigades may designate and arm aircraft to provide defensive air combat security for regimental deep strikes and conduct rear area defensive air combat against infiltrating enemy rotorcraft.

5-175. In SASO and SSC, an air threat may not exist; however, aircraft may be required to trail drug smuggling aircraft before handoff to the DEA, Coast Guard, or host nation air forces. These aircraft may perform evasive maneuvers or fly at high speeds in an attempt to avoid capture. Missions such as these require additional training because they are not normally part of a unit's METL.

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

5-176. Aerial delivery of mines can support regimental operations in deep areas. These operations may be conducted just before or simultaneous to the regiment's attack. Aerial mining operations must be planned with the same level of detail as an operation in a deep area to ensure the slow moving mine delivery aircraft are not interdicted by enemy action.

COMBAT SERVICE SUPPORT

5-177. Aircraft can provide rear area support for CS and CCS units operating in the rear area. Cavalry and attack aircraft can provide security for vehicles travelling along MSRs. Brigade aircraft may require group aircraft FARP emplacement and resupply support.

5-178. At the division level, AVIM support is provided by the DISCOM. Unit OPTEMPO and frequency of displacements could make conducting phase maintenance inspections at the unit AVUM level very difficult or impossible. If unit displacements increase, passing these inspections to the DISCOM or COSCOM, or out of theater, is prudent.

COMMAND AND CONTROL

5-179. During many missions, brigade attack battalions require C^2 system-equipped aircraft support to facilitate better comunications and intelligence en route. The presence of the CAB in the brigade simplifies this support. The A^2C^2S aircraft, when fielded, will greatly enhance attack operations by providing en route access to JSTARS, UAV, and other intelligence support.

SECTION IX – AIR ASSAULT BRIGADE (AIR ASSAULT DIVISION)

OVERVIEW

5-180. This unique brigade has three assault battalions, and a HvyHB. The TOE CAB is permanently attached to the division's attack helicopter brigade. The brigade prepares to deploy within 36 hours of notification. It plans, synchronizes and executes air assault, air sustainment, and air movement operations as an integrated element of an air assault combined arms team.

TASK ORGANIZATION CONSIDERATIONS

5-181. During air assaults, attack elements augment brigade assets as part of a larger air assault brigade or battalion task force. The attack brigade may receive OPCON of assault and heavy helicopter assets to support FARP operations. An aviation task force combining utility, heavy helicopter, and attack assets may form to support an air infantry brigade deployment. Elements of a DCSA Bde may augment air assault brigade during large deployments and rotations of forces. DCSA Bde augmentation is essential to achieve doctrinal lift requirements.

HOW TO FIGHT

5-182. The air assault brigade is the primary integrator of utility and heavy helicopter assets within the division. Its primary role is to set the conditions for success for each of its units. The aviation brigade must prepare to fight as a whole and to support individual ground brigades using pure or task-organized battalion-sized units. It must prepare to conduct multiple independent missions requiring pure or task-organized units. The brigade provides habitual support for air assault infantry brigades for combat, CS, and CSS missions.

- The brigade should be able to move the assault forces of a ground brigade and its supporting artillery in one lift. However, emerging force constraints may reduce that ability to two or three lifts.
- It can form air assault task forces to support all three brigades and enable each brigade to move the assault forces of a ground battalion and an artillery battery in one lift.
- It should be able to form a heavy air assault task force to support one brigade with the ability to move the assault forces of two ground battalions and two artillery batteries in one lift. It should be able to provide an air assault task force to support another brigade with the ability to move the assault forces of a ground battalion and an artillery battery in one lift. However, emerging force constraints may reduce that ability to two or three lifts (Figure 5-7).
- The HvyHB can move large amounts of supplies, equipment, and troops. It can do that as a battalion or as separate companies and platoons. HvyHC normally support the ground brigades as part of an air assault task force.
- The ATS company provides ATS throughout the division.

INTELLIGENCE

5-183. The S2 prepares intelligence estimates and conducts the IPB process. Regardless of the nature and intensity of conflict, this involves a time-tested process. FM 2-01.3 (FM 34-130) contains appropriate checklists and an aviation-specific section. IPB results are used to develop the products to support collection management, identify potential enemy COAs, and support the development of the commander's scheme of maneuver (to include branches and sequels).

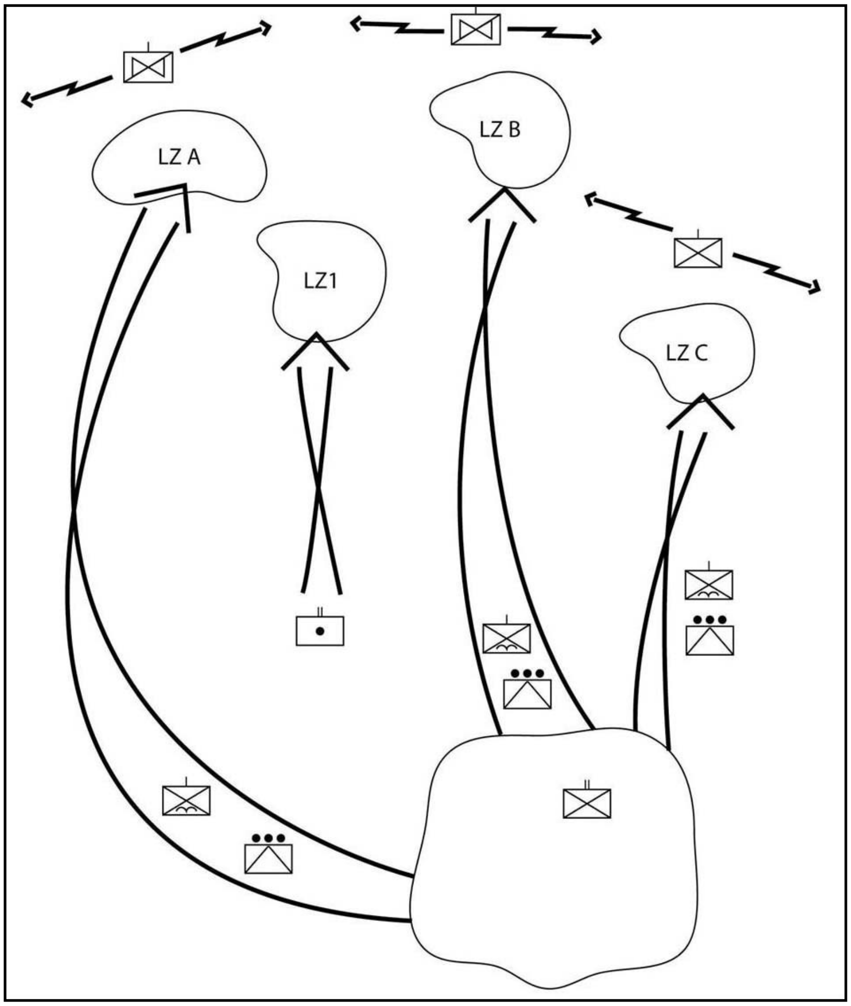


Figure 5-7. Battalion Air Assault In One Lift

5-184. Intelligence is provided from many sources. However, the major intelligence source will be the division G2 section, attached MI assets, and subordinate unit reports. The brigade S2 is the key intelligence coordinator.

5-185. The division may task the brigade with conducting intelligence liaison with other elements to gather aviation-specific information. This could be as simple as flying to the closest Air Force intelligence source, or as complicated as placing LNOs with allied and joint forces.

5-186. Assault elements routinely insert and extract long range surveillance detachment soldiers from the MI battalion. The division commander may task-organize this mission and unit to the attack brigade. The brigade requires detailed intelligence on threats en route during air assaults and potential threats and terrain and weather considerations at the LZ. A similar level of intelligence is necessary for false insertions, that may be part of an air assault or a separate diversionary mission.

5-187. The brigade may have access to a JSTARS common ground station that can provide real-time intelligence access from a variety of sources. UAV support for aviation missions is essential to identify threats without risking manned aircraft. The brigade's aircrews are a great source of combat information.

MANEUVER

5-188. The brigade's UH-60 and CH-47 aircraft are a primary means of tactical transport for division soldiers. A typical deployment task force includes an infantry brigade and a towed artillery battalion, an assault battalion, an attack battalion, a CH-47 company, supporting engineers, and CS/CSS units. This gives the brigade task force adequate capability to move infantry forces and much of the supporting artillery in multiple lifts with UH-60 seats removed and Kevlar blankets installed.

5-189. Such a brigade task force may perform forcible entry from ships or intermediate staging bases in adjacent allied territory. It may conduct assisted or unassisted entry as an airlifted force deployed to a lodgement airfield. It subsequently defends the lodgement and conducts shaping air assault and operations in deep areas as required to deter attacks on the lodgement. As more forces deploy or if the brigade force is adequate to attack the threat, the brigade task force may conduct a movement to contact, deliberate and hasty attacks, and exploitation and pursuit.

5-190. Brigade aviation assault forces are well-suited to conduct mobile strikes with infantry and supporting artillery to seize forward operating bases from which attack aviation elements can conduct sustained operations in deep areas. Assault elements can lift smaller infantry teams conducting raids and ambushes to destroy limited objectives. They can conduct false and brief insertions to deceive the enemy through feints and demonstrations.

5-191. To support SASO and SSC, the brigade deploys elements as part of mutifunctional battalion task force that may tranport allied soldiers fighting inurgency forces. Aircraft may operate out of remote base camps supporting patrolling forces and reaction teams, as well as counterdrug efforts.

5-192. Brigade UH-60, attached UH-60/HH-60L air ambulances, and OH-58D aircraft may provide assets for CSAR to recover downed joint and Army aviators.

FIRE SUPPORT

5-193. Aviation brigades ensure JSEAD is planned and coordinated to include nonlethal means. Utility aircraft transport forward observer teams. Heavy helicopters transport towed 155mm howitzers and Q-36 Firefinder radars. Many aircraft are available to resupply artillery units supporting the ground and aviation brigades. AATFCs preplan JSEAD fires to support ingress operations and preplan fires near the LZ and objective. Radio systems aboard assault aircraft can be employed by FSEs to initiate on-call fires as needed.

AIR DEFENSE

5-194. Brigade elements employ both active and passive AD measures. When conducting air assaults and large air movements the brigade can expect to have AH-64 units in support. Their active measures include use of Stinger missiles, gun, Hellfire, and rocket ammunition to conduct defensive air combat. Utility and heavy helicopters organic to the brigade lack self-defense missiles and guns but their door guns provide limited AD capability. Utility assets may internally transport Stinger teams and externally transport Avenger systems. Passive measures include terrain flight, camouflage, and selection of locations that provide cover and concealment for CPs, AAs, and FARPs. Air guards for vehicle movements and road marches provide early warning. Convoy discipline, such as maintaining proper distances between vehicles, limits damage from air attack. Elements use IFF codes to avoid fratricide. A^2C^2 plans, procedures, and orders ensure AD elements are aware of aircraft AAs and ingress and egress routes.

5-195. In SASO and SSC, an air threat may not exist. However, aircraft may be required to trail drug smuggling aircraft before handoff to the DEA, Coast Guard, or host nation air forces. These aircraft may perform evasive maneuvers or fly at high speeds to avoid capture. Missions such as these require additional training because they are not normally part of a unit's METL.

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

5-196. Brigade aircraft routinely support the mobility and countermobility efforts of engineers in MTW, SSC and SASO. Heavy helicopters can assist river crossings by lifting ribbon bridge bays into place. Volcano-equipped aircraft escorted by attack helicopters can emplace minefields. Helicopters also may transport survivability materiel such as concertina wire and sandbags to support security for base camps.

5-197. Division brigade aircraft also conduct air movement of MP reaction forces and traffic control teams, as well as, movement of chemical reconnaissance and decontamination teams. They also transport firefighters and water bucket to support domestic missions.

COMBAT SERVICE SUPPORT

5-198. Brigade aircraft to provide CSS air movement and aerial sustainment for the division are ample. However, an additional assault battalion and GSAB from the NG DCSA Bde provide habitual augmentation support as needed. CH-47D aircraft provide aircraft recovery and mass CASEVAC, as well as external transport of heavier equipment. Both CH-47D and UH-60 aircraft support the extensive FARP requirements of the division.

5-199. At the division level, AVIM support is provided by the DISCOM. Unit OPTEMPO and frequency of displacements could make conducting phase maintenance inspections at the unit AVUM level very difficult or impossible. If unit displacements increase, passing these inspections to the DISCOM or COSCOM, or out of theater, is prudent.

COMMAND AND CONTROL

5-200. The CAB that provides dedicated C^2 support for the air assault division is in the attack brigade. C^2 system-equipped aircraft provide communications support for division leaders. The A^2C^2S aircraft, when available, provides additional communications capability and access to other BOS C^2 networks. CH-47 and UH-60 aircraft are also able to air transport communications equipment, such as that supporting MSE nodes, to enhance division communication.

SECTION X – THEATER AVIATION BRIGADE

OVERVIEW

5-201. The TAB is the primary aviation headquarters for Army aviation operations conducted by its parent headquarters. The brigade has a CAB, a fixed-wing battalion, a HvyHB, and an ATS Group.

TASK ORGANIZATION CONSIDERATIONS

5-202. Normally, even when dispersed to support other organizations, aviation assets remain under TAB C^2. Subordinate elements, however, may operate under control of other aviation brigades, such as a corps aviation brigade. Centralized control by the TAB ensures that brigade assets remain focuses on the higher commander's priorities. In a large theater of war additional fixed-wing assets could be added to include commercial airframes appropriate for transport and en route C^2 functions.

5-203. When any company from the TAB is sent to operate semi-independently or independently, it must be augmented from its parent battalion HHC at a minimum and may require support external to the brigade. If more than one company is operating independently, support from outside the brigade is essential.

5-204. If an entire fixed-wing company is required to operate separately, augmentation from the battalion staff is essential for operations and logistics planning. Augmentation from the HHC is essential for basic support requirements such as fuel, mess, and HSS. Additionally, maintenance support for Army fixed-wing units is accomplished by contract maintenance. Contract maintenance support, by the terms of the contract, deploy to support fixed-wing units for both peacetime and combat operations.

AIRFIELDS

5-205. The TAB normally operates its fixed-wing assets from airfields. These airfields may be part of the host nation infrastructure, a captured enemy airfield, another service's airfield, or one built by Army or other service engineers. According to METT-TC, the other assets of the TAB may use airfields.

HOW TO FIGHT

5-206. The TAB's primary role is to set the conditions for success for each of its units. It accomplishes its mission through responsive C^2 and logistics support.

- TAB fixed-wing and C^2 helicopter units assist EAC commander and staff movement within the AO to coordinate and execute warfighting.
- Heavy and utility helicopter assets support critical EAC logistics and CS.
- The TAB may provide C^2 for aviation support operations such as air assaults against rear area threats.

INTELLIGENCE

5-207. The S2 prepares intelligence estimates and conducts the IPB process. Regardless of the nature and intensity of conflict, this involves a time-tested process. FM 2-01.3 (FM 34-130) contains appropriate checklists and an aviation-specific section. IPB results are used to develop the products to support collection management, identify potential enemy COAs, and support the development of the commander's scheme of maneuver (to include branches and sequels).

5-208. Many sources provide intelligence for the TAB; however, the major sources for brigade intelligence will be the EAC intelligence section. For operations into subordinate unit areas, the brigade S2 contacts the intelligence sections of corps and division units to gain the latest information for aircrews moving commanders and staff to and from EAC HQ to subordinate unit locations.

MANEUVER

5-209. The TAB may C^2 maneuver operations; however, this is not its normal function. The brigade's primary contribution to maneuver is its support of higher echelon C^2 and logistics. One possible brigade maneuver operation may be support to level III rear area threats. The brigade may either support or control U.S. ground maneuver forces, allied forces, or MP units in the reaction to such threats. In some theaters, no AC utility and heavy helicopters may exist at corps level. In that case, TAB assets play the major role in assault support until corps assets activate and deploy.

FIRE SUPPORT

5-210. Support for theater level or subordinate unit FS units is a mission for the TAB. Such support normally includes transport of equipment and ammunition. Examples include external transport of towed artillery, air transport of key FS ammunition for the ATACMS and MLRS, and transport of Q36 Firefinder radars.

AIR DEFENSE

5-211. Brigade elements employ both active and passive AD measures. Active measures include use of door guns to conduct defensive air combat. Passive measures include terrain flight, camouflage, and selection of locations that provide cover and concealment for CPs, AAs, and FARPs. Air guards for vehicle movements and road marches provide early warning. Convoy discipline, such as maintaining proper distances between vehicles, limits damage from air attack. Elements use IFF codes to avoid fratricide. A^2C^2 plans, procedures, and orders ensure AD elements are aware of aircraft AAs and ingress and egress routes.

5-212. At theater level, Patriot missile systems have a primary missile defense mission besides AD functions. Because of their high priority theater heavy helicopters may support Patriot batteries by transporting missiles.

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

5-213. TAB aircraft routinely support the mobility and countermobility efforts of engineers in MTW, SSC and SASO. Road construction and improvement are major mobility efforts that can require helicopter support to transport outsize loads such as metal pipes for culverts, bridge materiel, and personnel. Heavy helicopters can assist river crossings by lifting ribbon bridge bays into place. Helicopters may also transport survivability materiel such as concertina and sandbags to support security for base camps.

5-214. Theater brigade aircraft also conduct air movement of MP reaction forces and traffic control teams, as well as, movement of chemical reconnaissance and decontamination teams. They also transport firefighters and water bucket to support domestic missions.

COMBAT SERVICE SUPPORT

5-215. The TAB may require Class III support from other forward units, and also may require Class IX support. Prior coordination is essential for this support. The TAB supports CSS air movement, aerial resupply, and CASEVAC, particularly in theaters where corps utility and heavy helicopters have not activated and deployed.

5-216. At the theater level, AVIM support is provided by the TSC. As theater units do not displace as often as corps or division units, the TAB may desire to have its battalions conduct most if not all of their own phase maintenance inspections. However, if unit displacements increase, passing these inspections to the TSC, or out of theater, is prudent.

COMMAND AND CONTROL

5-217. Communication is a major challenge for the TAB. Although improved communications capabilities exist, the brigade will seldom maintain continuous contact with its aircraft in flight. Old methods such as opening and closing flight plans via telephone are tried and true methods of maintaining positive control of unit aircraft.

5-218. For high priority missions supporting EAC commanders and staffs, the necessary communications must be on board. Some missions require flying backups to provide relay and ensure timely self-recovery in case of mechanical problems to C^2 aircraft.

5-219. TABs support their own C^2 through the CP structure, and employment of relays for LOS combat net radios. HF radios provide an alternate NLOS communications means for longer distance missions and

NOE communications. SATCOM may be available to support both C^2 aircraft customers and the brigade's own C^2 needs. C-12 aircraft may also support C^2 for corps aviation units.

SECTION XI – DIVISION COMBAT SUPPORT AVIATION BRIGADE

OVERVIEW

5-220. The DCSA Bde is the primary headquarters for Army aviation operations conducted by its division. The brigade normally includes GSABs, AHBs, and a HvyHC.

5-221. The fielding of large numbers of UH-60s in the context of a smaller number of active and RC divisions provides the opportunity to create a new kind of aviation brigade to support war and military operations other than war (MOOTW). There are two DCSA Bde equipped exclusively with UH-60 aircraft that provide peacetime C^2, training and logistics support and wartime/MOOTW habitual augmentation of active divisions. Each DCSA Bde has multiple AHBs that support light, airborne, and air assault divisions and GSAB that support heavy divisions, and the air assault division. Many of these batttalions are currently equipped with UH-1H aircraft but will transition to UH-60s.

TASK ORGANIZATION CONSIDERATIONS

5-222. During wartime deployment and SASO rotations, battalions from the DCSA Bde can augment the division for which they provide habitual support. Existing AVIM capability in each active division provides support. Each DCSA Bde has a DASB for peacetime maintenance support, and a slice element during independent battalion deployments. Elements of the DCSA Bde could be deployed as part of an aviation task force. They also have important state disaster-relief missions that may involve task organization with other units from that state.

HOW TO FIGHT

5-223. Unlike other aviation brigades, the DCSA Bde commander generally will not fight the subordinate battalions in his command. The subordinate battalions augment the assault and GS capabilities of the respective divisions they support. As such they generally operate under the division aviation brigade commander during major deployments, and whatever task force commander is in charge during more minor rotation of forces. The same assault and GS missions performed by division utility battalions also apply to the DCSA Bde.

INTELLIGENCE

5-224. The S2 prepares intelligence estimates and conducts the IPB process. Regardless of the nature and intensity of conflict, this involves a time-tested process. FM 2-01.3 (FM 34-130) contains appropriate checklists and an aviation-specific section. IPB results are used to develop the products to support collection management, identify potential enemy COAs, and support the development of the commander's scheme of maneuver (to include branches and sequels).

5-225. Battalions of the DCSA Bde receive intelligence support from the parent division and division aviation brigade. Assault elements may insert and extract long range surveillance detachment soldiers from the MI battalion. The brigade requires detailed intelligence of threats en route during air assaults and potential threats and terrain/weather considerations at the LZ. A similar level of intelligence is necessary for false insertions, that may be part of an air assault or a separate diversionary mission.

MANEUVER

5-226. With downsizing of division utility units, DCSA Bde UH-60s will play an increasing role in air assaults, TACAIR movement, and aerial sustainment. Extended range fuel tanks give UH-60s extensive range and endurance for mobile strikes. Light, and airborne divisions are particularly dependent on DCSA Bde aircraft for larger scale air maneuver of forces. DCSA Bde GS battalions augment heavy divisions conducting air assaults with dismounted mechanized infantry to secure the far side during gap-crossing efforts. Air assault of dismounted infantry may also occur to seize chokepoints before the arrival of mechanized and armor forces. DCSA Bde aircraft are also available to insert and extract infantry patrols and SOF during raids and reconnaissance missions.

5-227. In SASO, DCSA Bde units can expect to transport U.S. and allied soldiers who may be fighting guerillas. Guerillas may fire small arms, and RPGs at group aircraft. In SASO and SSC, units may perform a reconnaissance function or carry civilian or military observers. Urban operations may be a primary activity requiring group aircraft to exercise caution from both an enemy sniper and safety perspective given the presence on noncombatants, wires, and antennas (see Appendix R).

FIRE SUPPORT

5-228. Utility aircraft transport forward observer teams. Aircraft can externally transport towed 105mm howitzers and resupply artillery units supporting the ground and aviation brigades. AATFCs preplan JSEAD fires to support ingress operations, and preplan fires near the LZ and objective. FSEs aboard assault aircraft can employ aircraft radios to initiate on-call fires as needed. Aircraft can transport infantry mortar teams and Q-36 Firefinder radars.

AIR DEFENSE

5-229. UH-60 units transport Stinger teams and Avenger systems. During air assaults, DCSA Bde battalions require attack or reconnaissance unit security against air attack. Passive measures include terrain flight, camouflage, and selection of locations that provide cover and concealment for CPs, AAs, and FARPs. Air guards for vehicle movements and road marches provide early warning. Convoy discipline, such as maintaining proper distances between vehicles, limits damage from air attack. Elements use IFF codes to avoid fratricide. A^2C^2 plans, procedures, and orders ensure AD elements are aware of aircraft AAs and ingress and egress routes.

5-230. In SASO and SSC an air threat may not exist. However, units involved in drug interdiction may trail drug smuggling aircraft before handoff to DEA, Coast Guard, or host nation air forces. These aircraft may perform evasive maneuvers or fly at high speed attempting to avoid capture.

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

5-231. UH-60 aircraft support engineer, MP, and chemical soldiers in their mobility, countermobility and survivability efforts. Aircraft transport engineers teams and their equipment during road and obstacle construction. Utility aircraft can assist engineers in river crossing by lifting security elements to the far side. Utility aircraft transport MPs performing rear area, peacekeeping, and mobility missions. Aircraft may transport enemy prisoners. Chemical teams may require air movement to areas where suspected chemical attacks have occurred, such as areas hit by tactical ballistic and cruise missiles.

COMBAT SERVICE SUPPORT

5-232. DCSA Bde utility battalions provide critical aerial sustainment capability to supported divisions. External and internal transport capabilites vary dependent on whether battalions have UH-1H, UH-60A, or UH-60L aircraft. All are capable of effective air movement and aerial resupply in a variety of environments. The GSAB tends to transport critical supplies in the heavy divisions it supports. The assault battalions carry a larger variety of bulk supplies and may be primary means of resupplying many light forces deployed well forward or deep in terrain lacking roads. During SASO and disaster relief, aircraft can expect to provide aerial sustainment for both military forces and civilians.

COMMAND AND CONTROL

5-233. The DCSA Bde GSABs have two GS companies with eight UH-60 aircraft each and can support movement of key division leaders and communications personnel and equipment. The DCSA Bde assault battalions may require airborne C^2 support during air assaults for the task force commander's CP aircraft. UH-1H and UH-60 C^2 aircraft offer enhanced airborne communications for all key leaders supported. The DCSA Bde brigade headquarters has a challenging C^2 mission, itself, given the dispersed nature of brigade assets in the NG. DCSA Bde aircraft can expect to transport military and civilian leaders during SASO missions and domestic disaster relief.

SECTION XII – ARMY SPECIAL OPERATIONS AVIATION REGIMENT

5-234. FM 3-05.60 (FM 1-108) addresses employment of the ARSOAR .

Chapter 6

Other Tactical Operations

SECTION I – PASSAGE OF LINES AND BATTLE HANDOVER

PASSAGE OF LINES

6-1. A passage of lines is an operation in which one force moves through another force's position, without interference, with the intent of moving into or out of contact with the enemy. Aviation units can conduct a passage as a part of reconnaissance, security, attack, or air assault operations. There are occasions when other units pass through an aviation unit's position. Also, the aviation unit may facilitate another unit's movement by monitoring its progress through PPs and contact points.

- **Forward Passage.** Executed during offensive operations to continue an attack; to conduct a penetration, envelopment, or a pursuit; or to pass another unit for any reason. In the defense, a forward passage of lines may be conducted as part of a counterattack of one unit through another.
- **Lateral Passage.** Conducted in the same manner as a forward passage.
- **Rearward Passage.** Conducted as part of a retrograde operation or when an aviation or ground unit returns from a cross-FLOT mission.

CONSIDERATIONS

6-2. When the aviation unit is the passing force, it is particularly vulnerable because aircraft may be overly concentrated, stationary force fires may be temporarily masked, and the unit passed through may not be positioned to react to enemy actions. Reconnaissance and coordination ensure passage is conducted quickly and smoothly.

6-3. Contact points for ground elements should be located along the designated passage phase line to allow the passed unit to provide overwatching fires. Contact points normally should be at easily identifiable terrain features, such as road junctions. For terrain without many identifiable terrain features, GPS coordinates are an excellent backup.

6-4. Other considerations include—

- Security measures during passage.
- Tactical cover and deception plans to retain secrecy and aid in gaining or maintaining surprise.
- Priorities for movement control (priority to passing unit).
- Time or circumstances when responsibility for control of the AO will be transferred.

- Command relationship between passing and passed units concerning CS and CSS.

6-5. Graphic control measures should include—

- Battle handover line (BHL).
- Contact points.
- PPs.
- Passage lanes.
- Passage routes.
- RP.
- AA.
- Infiltration points.

COORDINATION

6-6. Timely and specific coordination before the operation is essential. The most desirable method is a face-to-face exchange of information. As a minimum, the exchange should include—

- Intelligence information.
- Tactical plans.
- SOPs.
- Period of time required for the passage.
- Locations of PPs and friendly unit locations.
- Disposition and scheme of maneuver of friendly units.
- Enemy situation in sector, including air activity.
- Types and numbers of aircraft to pass.
- Methods of communication, to include frequencies and call signs, visual signals, and backups.
- Control of friendly supporting fires, including restrictive FS coordination.
- AD weapon control status.
- Friendly minefields and obstacles.
- Contingency plans for stationary and passing units, if they are attacked during passage.

PASSAGE PLANNING

6-7. The aviation commander analyzes the higher commander's intent and provides guidance for the S3 to prepare the plan for the passage of lines. The following factors are emphasized:

- **Organization.** When possible, unit integrity is maintained to provide better C^2.
- **C^2.** Techniques of C^2 depend on the number of PPs. Ideally, multiple PPs are established to facilitate decentralized control. Control measures are developed as required to maintain positive control throughout the passage. Commanders position themselves where they can best influence the operation.

- **Order of Movement.** Order of movement is prescribed based on the number of PPs and degree of security required. The enemy situation and the terrain also influence the order of movement and the priorities for who moves when.
- **Actions on Contact.** Contingency plans are developed for both the passing unit and stationary unit for actions required if the enemy attacks during the passage.

Aviation Support of Ground Unit Passage of Lines

6-8. When one ground unit is conducting a passage of lines through another ground unit, air cavalry or attack units may support by conducting a reconnaissance of the PPs, initiating and maintaining liaison, or conducting screening or overwatch operations. Air cavalry and attack assets can help prepare for a forward passage of lines by reconnaissance of routes to, through, and beyond the area of passage. They also may reconnoiter existing unit locations and proposed positions. Care must be taken not to compromise unit locations and intentions. Air cavalry or attack assets may also assist in a passage of lines by screening between the enemy and the passing force to provide early warning and overwatching fires.

BATTLE HANDOVER

6-9. A battle handover (BHO) is a coordinated operation between two units that transfers responsibility for fighting an enemy force from one element to another. The BHO maintains continuity of the combined arms fight and protect the combat potential of both forces. Ground BHOs, such as cavalry passing back through friendly lines, usually are associated with a passage of lines. BHO may occur during offensive or defensive operations.

BATTLE HANDOVER LINE

6-10. A BHL is the location where the passing force (forward passage of lines) or stationary force (rearward passage of lines) assumes control of the battle. The common commander specifies where the handover occurs and defines the resulting responsibility for the zone or sector. For rearward passage, the BHL must enable the stationary force to engage the enemy with direct fire systems.

PLANNING CONSIDERATIONS

6-11. Clear SOPs enable units to quickly effect the coordination required to preclude loss of momentum in the attack. Control measures should be simple and standardized. As a minimum, coordination should include—

- Establishment of communications.
- Exchange of friendly and enemy information.
- Collation of C^2.
- Placement of representatives at contact points.
- Status of obstacles and routes.

6-12. In air-ground operations, participating air and ground commanders often handover an enemy force in contact. BHO governs this process in terms of close coordination, FS, and mutual understanding of responsibilities.

6-13. Whenever the situation permits, face-to-face, air-to-ground, and air-to-air linkups between the units should be made. There is significant benefit to landing next to the relieving counterpart and showing that person, on a map, the battlefield situation.

BREAKING CONTACT WITH THE ENEMY

6-14. Technology advances can enable immediate and accurate electronic handovers; however, not all aircraft have the required equipment. Of those that do, mechanical failures or other limitations may reduce their effectiveness. Units ensure proper handover before breaking contact.

6-15. Units in radio contact with the ground force or aviation unit headquarters maintain contact until a positive handover to other friendly air or ground units is made. Positive handover means that the relieving unit can see the targets. Units not in radio contact with the ground force or aviation unit headquarters have an aircraft temporarily break station to report the sighting.

SECTION II – AIR COMBAT OPERATIONS

6-16. Deliberate and chance encounters with enemy aircraft may occur throughout the AO.

PLANNING CONSIDERATIONS

6-17. Generally, air combat between Army helicopters and enemy rotary- or fixed-wing aircraft is not desired. Although the aviation brigade staff sets the battle space to minimize the probability of undesired aerial encounters, commanders must anticipate the possibility of chance air combat operations and plan accordingly. Priority remains to the assigned mission.

AVOID DETECTION

6-18. During the MDMP, the staff plans the operation to minimize the enemy's ability to detect Army aircraft. Missions are planned to avoid known and suspected enemy locations, if feasible. Appropriate maneuver, terrain masking, cloud cover, obscurants, night operations, and FS are used to degrade enemy detection capabilities. The tactical operations officer, with the S2 and S3, recommends ASE settings to thwart the capabilities of known and suspected threat detection systems.

PROVIDE EARLY WARNING

6-19. The staff coordinates with various intelligence elements, AD units, UAV units, and AWACS to provide early warning of enemy aircraft that could affect the operation. Appropriate ASE settings, the OH-58D thermal imaging system (TIS), and the AH-64D LBA's FCR can help see the enemy first.

PROVIDE FOR SUPPORT

6-20. The staff coordinates for rapid fighter support. This support protects Army aircraft if they come under air attack.

COORDINATING INSTRUCTIONS

6-21. The brigade OPORD should contain the commander's instructions regarding subordinate unit action upon contact with enemy aircraft, if his desires or priorities during the operation vary from actions specified in the SOP. Actions available to aircrews, in order of preference, are to avoid, evade, threaten, or engage threat aircraft.

ARMY AIRCRAFT WEAPONS CAPABILITIES IN AIR COMBAT

6-22. Army aircraft weapons systems were not designed for air combat; however, they have varying degrees of effectiveness in that role. The staff takes these capabilities into account during the MDMP. Appendix I provides additional information on aircraft weapons systems.

AIR-TO-AIR STINGER

6-23. Depending on the armament configuration for a particular mission, this system may be mounted on some or all OH-58Ds. Air-to-air Stinger (ATAS) on some or all AH-64Ds is a potential future capability. The ATAS should be used at or near maximum range. Although the ATAS may be used in short-range firings (under 1,000 meters), the minimum arming range may affect its lethality. In extended-range firing, the ATAS has a detectable smoke signature under certain atmospheric conditions.

CANNON (30 MILLIMETER)

6-24. This system is standard on the AH-64A and AH-64D. The projectile's excellent accuracy, range, penetration, and explosive properties make it effective against close-range targets. However, its slow rate of fire may make aerial engagement difficult.

MACHINE GUN (7.62 MILLIMETER)

6-25. Depending on the armament configuration for a particular mission, 7.62 machine guns may be mounted on some or all UH-60s or CH-47s. This weapon may not be effective against armored areas of enemy aircraft, but it can cause significant damage to unprotected areas. It should be used only as a means to break contact or for self-defense at close ranges.

MACHINE GUN (.50 CALIBER)

6-26. Depending on the armament configuration for a particular mission, this system may be mounted on some or all OH-58Ds. This weapon may be only marginally effective against armored areas of enemy aircraft, but it will cause significant damage to unprotected areas. Because this weapon lacks a flexible firing mode, aircrews must orient their aircraft directly at the target to engage it. It should be used only as a means to break contact or for self-defense at close ranges.

FOLDING FIN AERIAL ROCKET (2.75-INCH)

6-27. Depending on the armament configuration for a particular mission, this system may be mounted on some or all OH-58Ds, AH-64As, or AH-64Ds. The multipurpose submunition round can be a good weapon for placing effective fires on enemy helicopter formations, for breaking contact, or for firing on helicopters in LZs. Flechette rounds may be the optimal rocket munitions for air combat.

HELLFIRE MISSILE

6-28. Depending on the armament configuration for a particular mission, the SAL Hellfire may be mounted on some or all OH-58D, AH-64A, or AH-64D aircraft. Only the AH-64D has the necessary systems to employ the RF Hellfire (see Appendix I). The Hellfire is an effective weapon against attacking enemy aircraft. It can be used in either the direct or indirect fire mode. Ideally, aircrews should engage with Hellfire using indirect fire if terrain masking protects the firing aircraft. In the direct fire mode it can be used against head-on, tail-on, or slow-flying enemy helicopters.

SECTION III – DECEPTION OPERATIONS

6-29. Deception operations most commonly performed by aviation units are the *feint* and the *demonstration*. Deception operations are almost always conducted as part of a larger operation.

FEINT

6-30. A feint is a limited attack to divert an enemy's attack or to deceive him as to the friendly force's intentions. Feints are frequently used for deception before or during a main attack. To succeed, this feint must appear to be the main attack. Additional feints are conducted to cause the enemy to reveal its defensive posture and to disrupt its decision-making cycle. Feints reduce the resistance that the main attacking force will encounter by holding enemy units in the area of the feint.

6-31. Aviation brigade elements normally conduct reconnaissance and security operations to support ground feints. Aviation can also conduct feints independently. Assault units can assist in feint operations by executing false or actual air assault operations.

DEMONSTRATION

6-32. A demonstration serves the same purpose as a feint, but does not involve contact with the enemy. The objective of a demonstration is to deceive and confuse the enemy as to the real intentions of the attacking force. For a demonstration to succeed, the enemy must observe the demonstrating force's operation and be deceived by it, but not actively engage the force. The nature of a demonstration allows the use of decoys, simulations, and tactically inoperable equipment to portray additional strength. Demonstrations also may be used to provide security or to conduct reconnaissance to assess the enemy reaction.

6-33. Aviation brigade elements normally conduct reconnaissance and security operations to support a ground demonstration. Aviation can also conduct demonstrations independently. Assault units may execute false air assault operations.

SECTION IV – SEARCH AND ATTACK OPERATIONS

6-34. The search and attack mission is a variant of the movement to contact by smaller, light maneuver units and air cavalry or air assault forces in large areas to destroy enemy forces, or deny area to the enemy. Search and attack operations may be conducted against a dispersed enemy in close terrain unsuitable for armored forces, in rear areas against enemy SOF or infiltrators, or as an area security mission to clear assigned zones.

6-35. The search and attack technique is best used when the enemy is operating in small teams using hit-and-run tactics over a large area in a generally decentralized manner. The purpose of this operation is defined as one or more of the following:

- Destruction of the enemy.
- Area denial.
- Force protection.

AVIATION'S ROLE

6-36. From an aviation perspective, the search and attack mission is performed like a movement to contact or a force-oriented area security mission.

ELEMENTS OF SEARCH AND ATTACK

6-37. The major elements of the search and attack are to *find*, *fix*, and *finish* the enemy.

FIND THE ENEMY

6-38. Aviation finds the enemy by performing a movement to contact or a force-oriented area security mission. The reconnaissance is specifically focused on the enemy force location and composition, not on destruction. Stealth by the reconnaissance force is of great importance. If the reconnaissance force can locate the enemy without being detected, it allows the commander time to develop the situation with the fixing and the finishing elements.

FIX THE ENEMY

6-39. Aviation fixes the enemy by performing attack-by-fire or hasty attack operations. If aviation is the fixing unit, consideration must be given to augmentation with engineers, ground cavalry, or light infantry unless the requirement is to fix by fires. The most common tactic for fixing is to block an enemy element from moving along its most likely avenue of departure. This can be accomplished by mounted or dismounted elements, aviation forces, mines, or obstacles covered by fire. The key is to ensure the fixing unit has sufficient combat power and can react to the enemy in unanticipated locations.

FINISH THE ENEMY

6-40. Any maneuver force with the combat power to destroy the designated enemy force may accomplish the finishing portion. Aviation finishes the enemy by massing fires in a hasty or deliberate attack, either independently or with ground forces. The key to success for this part of the mission is to bring the finishing force's combat power to bear at the key time when the fixing force has halted the enemy's movement.

COMMAND AND CONTROL

6-41. The search and attack mission should not be assigned lower than the battalion level because subordinate headquarters lack adequate assets to C^2 the different aspects of this mission. The controlling headquarters must clearly define the operational roles of subordinate troops, companies, and attached forces, including bypass and engagement instructions.

COORDINATION

6-42. Effective search and attack operations require a great deal of coordination between the subordinate elements. SA is extremely important because of the fluid environment in which this mission is conducted. Subordinate commanders must keep abreast of current activities and the locations of other air and ground elements to ensure they have their units in the proper location and mission posture to deal with enemy contact.

GRAPHIC CONTROL MEASURES

6-43. The controlling headquarters provides graphic control measures that are sufficient to enable close coordination between subordinate units. The ground maneuver headquarters boundaries, not its search areas, should define the zone for aviation operations. Conducting an area or zone reconnaissance for each of the ground force's smaller search areas restricts aircraft capabilities and increases the likelihood of aircrews missing the seams between each area.

SECTION V – RAIDS

6-44. A raid is an attack into enemy-held territory for a specific purpose other than gaining and holding ground. It usually ends with a planned withdrawal after the mission has been accomplished, and before the enemy can effectively react (Figure 6-1). Typical raid missions include—

- Destruction or capture of enemy materiel, installations, facilities, or personnel.
- Disruption of enemy C^2.
- Rescue of friendly personnel.
- Deception or harassment of enemy forces.
- Collection of specific information about the enemy.

6-45. Aviation assets may provide reconnaissance and security, but usually do not move with a raiding ground force because of mobility differences. They may link up with the ground force at the objective to add firepower and enhance security. Armed helicopters can destroy, confuse, and divert the enemy. They also can deny him reinforcement while the ground force completes its mission.

6-46. In case of a major enemy reaction, armed helicopters can provide suppressive fires to cover the ground force's withdrawal. They also can destroy abandoned friendly vehicles and weapon systems.

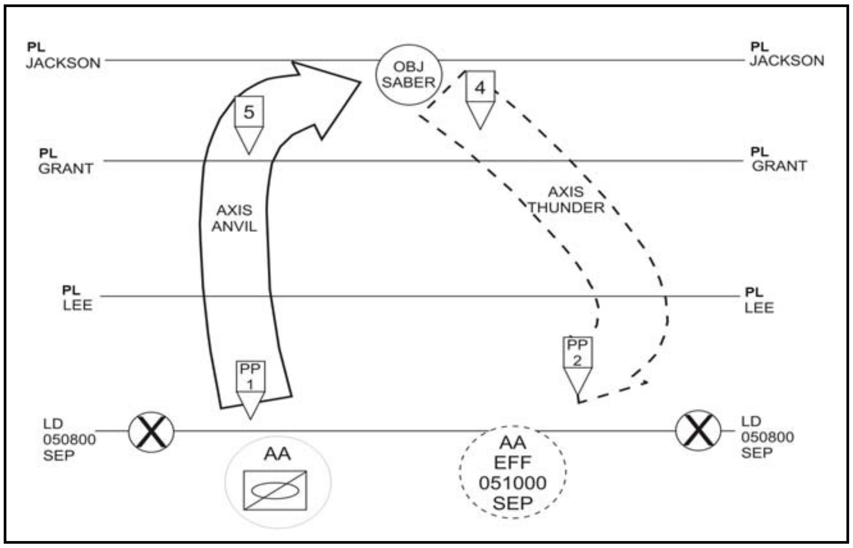


Figure 6-1. Raid

6-47. Assault helicopter units can be task-organized under a ground maneuver headquarters to conduct air assault operations as part of a raid. They also may be used in the withdrawal or emergency extraction of the ground force. Waiting aircraft are extremely vulnerable to attack; therefore, if extraction by helicopter is planned, the ground force should be inserted by other means.

6-48. A pure armed helicopter force may perform a raid to destroy an enemy CP, AD site, artillery site, ammunition supply point (ASP), and similar targets.

SECTION VI – JOINT AIR ATTACK TEAM EMPLOYMENT

6-49. JAAT is an engagement technique used to increase the effectiveness of offensive or defensive operations by combining the firepower of fixed-wing aircraft with that of Army rotary-wing aircraft. FA or NSFS fires, along with direct fires from ground forces, should be employed whenever possible to increase the synergistic effect. These operations require extensive training to reduce planning time and enhance synchronization between the various members of the JAAT team. Appendix P contains additional information.

SECTION VII – OPERATIONS IN URBANIZED TERRAIN

6-50. Man-made structures and the density of noncombatants in urbanized terrain affect the tactical options available to commanders and aircrews. Whether engaged in MTW, SSC, or SASO, the aviation brigade probably will conduct operations in urbanized terrain. This is partly because of growing populations, but also results from a potential adversary's tendency to create a nonlinear battlefield rather than attempt to face U.S. forces directly. Potential adversaries can be expected to use urbanized terrain for cover and concealment, and to reduce U.S. combat superiority by taking advantage of weapons restrictions and reduced options available to commanders under ROE, ROI, and Law of War. ROE and ROI must be rehearsed, practiced, and reinforced continually throughout the operation. FM 3-06.1 (FM 1-130) and Appendix R of this manual contain additional information.

CONDUCTING OPERATIONS IN URBANIZED TERRAIN

6-51. U.S. forces may conduct operations in urbanized terrain for the following reasons:

- The unit is force-oriented and the enemy occupies a built up area.
- The political importance of the urban area justifies using time and resources to liberate it.
- The area controls key routes of commerce and provides a tactical advantage to the commander who controls it.
- The enemy in the urban area, if bypassed, might be able to interdict LOCs.
- Critical facilities within the urban areas must be retained or protected.

6-52. U.S. forces may avoid operations in urbanized terrain for the following reasons:

- The enemy, if bypassed, presents no substantial threat to friendly operations.
- The commander does not have sufficient forces to seize and clear the area.
- The urban area is declared an open city, making an attack illegal under the Law of War.

PLANNING AND EXECUTION OF URBAN OPERATIONS

6-53. Operations in urban terrain generally follow the same planning and execution concepts as in other terrain; however, special planning and consideration of the characteristics unique to urban terrain is required. Aircraft must standoff to engage targets in urban areas. Overflight and engagement of targets within urban areas may require night operations and special preparation because of possible enemy direct fire at very close range.

Hovering in urban areas exposes aircraft to small arms fires and should only be done if essential to the mission and adequate overwatch fires are available. Wire, tower, and antenna hazards are especially prevalent and must be considered in the IPB. Other examples include—

- Demographics of the local population.
- Subterranean, ground level, and above ground terrain analysis.
- Civilian maps and diagrams.
- Airfields, helipads, and rooftops that can be used as LZs.
- Structures and areas protected by the Law of War or restricted by ROE.
- Supplementary electronic and visual signals to differentiate friend from foe.
- Weapons selection to produce the desired effect while minimizing collateral damage, and maximizing standoff.

CIVIL CONCERNS

6-54. Operations in urbanized terrain almost always will have significant impact on noncombatants. Special considerations are required. Units should maintain liaison with local police, ATS, civil, and military authorities.

Care of Civilians

6-55. Civilians may be removed from the area or protected in their homes. In some cases, the aviation brigade may be required to arrange for supply, transportation, medical care, and other support for civilians.

Security

6-56. The threat of espionage, sabotage, and terrorism must be carefully considered and guarded against.

Civilian Interference with Military Operations

6-57. The aviation brigade must ensure that civilians do not interfere with the execution of military operations. The aviation brigade relies on MPs, Staff Judge Advocate (SJA) representatives, and HUMINT teams to liaison with local law enforcement officials. They gain their aid in controlling displaced civilian flow while they help identify and interrogate any suspicious displaced persons moving through the AO.

SECTION VIII – STABILITY AND SUPPORT OPERATIONS

GENERAL

6-58. SASO are two, separate activities that do not necessarily involve armed conflict between organized forces.

GOVERNMENT, HOST NATION, AND INTERNATIONAL AUTHORITIES

6-59. During SASO, aviation brigades can expect to work with U.S. government, host nation, and international agencies. These agencies may not have the military style chain of command to which U.S. soldiers are accustomed. Prior coordination and flexibility are keys to mission success. The chain of command, support responsibility, reporting requirements, and authority to approve specific actions must be clearly understood by all parties before initiating the mission. Units must maintain liaison with local police, ATS, civil, and military authorities.

EMPLOYMENT

6-60. The majority of missions assigned to aviation brigades during SASO will either conform to or build upon their standard reconnaissance, security, attack, air assault, and air movement roles. Generally, the major differences in unit operations during SASO will be in the C^2 relationships between the aviation brigade and its higher headquarters, and the greater requirement for restraint in potentially hostile situations.

SPECIAL CONSIDERATIONS

6-61. There are several key employment guidelines for the aviation commander to consider during the planning process. These guidelines are preparation, specialty personnel augmentation, host nation requirements, and ROE.

Preparation

6-62. The aviation brigade should expect a wide range in the tempo of operations and plan accordingly. The staff must be able to adjust rapidly to many different operational considerations. They must plan ahead and have contingency plans for many situations not normally addressed in the unit's METL. These situations can be identified and trained at home station. Some subjects that should be addressed are civilians on the battlefield, media relations, public affairs, and defense against terrorism.

Specialty Personnel Augmentation

6-63. The operational conditions of SASO frequently require the integration of specialty personnel with the aviation unit staff including civil affairs, PSYOP, SJA, and Special Forces personnel. Besides the specialty staff personnel, the aviation brigade may be required to operate with infantry, armor, artillery, engineer, CSS, or a combination of these and other assets. Whatever the composition, the staff must be fully integrated to coordinate and plan operations. LNOs from the aviation brigade to other units and from supporting units to the aviation brigade are critical.

Host Nation Requirements

6-64. Airspace restrictions, flight clearances, refueling procedures, civil and military laws, radio frequency usage, ground convoy clearances, and product disposal procedures vary from country to country. The aviation brigade commander must adapt unit procedures to the host nation's operating environment and procedures. Serious complications can develop when host nation requirements are not met, with repercussions ranging from mission restrictions to mission failure. In some situations, aviation units conducting SASO may be included on the air component commander's ATO to ensure SA and reduce the possibility of fratricide.

Rules of Engagement

6-65. All commanders must clearly understand the ROE and be prepared for them to change at any time during an operation. All personnel must be briefed on the ROE before every mission. For ROE assistance, the commander should consult with the SJA representative (Appendix N).

CATEGORIES OF OPERATIONS

6-66. During *stability* operations, the aviation brigade primarily performs its METL-related tasks and remains prepared for the potential escalation to full armed conflict. During *support* operations, it uses the capabilities of its combat systems to increase the effectiveness of the overall effort. Again, the aviation brigade must remain prepared for renewed hostilities or civil disorder. Many of these missions will be performed as an integrated piece of the overall U.S. military capability—often with forces from other nations, other U.S. agencies, nongovernmental organizations, and United Nations forces. Therefore, leaders should familiarize themselves with joint operational procedures and terms.

STABILITY OPERATIONS

6-67. Combatant commanders employ ARFOR in stability operations *outside* the U.S. and its territories to promote and protect U.S. national interests. Stability operations are designed to influence the threat, political, and information dimensions of the operational environment. They include developmental, cooperative activities during peacetime and coercive actions in response to crisis. Stability operations are normally nonlinear and often conducted in noncontiguous AOs. There are ten types of stability operations that have some potential to result in armed conflict. FM 3-0 (FM 100-5) contains additional information.

PEACE OPERATIONS

6-68. PO encompass peacekeeping operations (PKO) and peace enforcement operations (PEO) that are conducted to support diplomatic efforts to establish and maintain peace.

Peacekeeping Operations

6-69. PKO are undertaken with the consent of all major parties to a dispute. They are designed to monitor and facilitate implementation of a cease-fire, truce, or other such agreement, and support diplomatic efforts to reach long-term political settlements. PKO usually involve observing, monitoring, or supervising and assisting parties to a dispute. ARFOR use or threaten force only in self-defense or as a last resort. Air and ground assets are frequently employed in screening a demilitarized zone.

Peace Enforcement Operations

6-70. PEO apply military force or threaten its use—normally pursuant to international authorization—to compel compliance with resolutions or sanctions to maintain or restore peace and order. Unlike PKO, PEO do not require the consent of all parties. PEO maintain or restore peace and support diplomatic efforts to reach a long-term political settlement. ARFOR apply combat power for self-defense and to forcibly accomplish assigned tasks. Units must also be prepared to transition to PKO. The aviation brigade can expect to perform all its METL-related missions to protect the U.S. and allied forces involved, with tightly controlled applications of force.

FOREIGN INTERNAL DEFENSE

6-71. FID is participation by civilian and military agencies of one government in programs taken by another government to free and protect its society from subversion, lawlessness, and insurgency. It involves all elements of national power and can occur across the range of military operations. FID is a primary program that supports friendly nations operating against or threatened by hostile elements. Aviation forces provide indirect support, DS (not involving combat operations), or conduct combat operations to support a host nation's efforts. In a noncombat environment, the aviation brigade's missions usually concentrate on air movement, C^2 enhancement, and reconnaissance.

SECURITY ASSISTANCE

6-72. Security assistance refers to a group of programs that support U.S. national interests and objectives by providing defense articles, military training, and other defense-related services to foreign nations. Aviation units may be required to provide transportation, training teams, and maintenance support personnel. They may be called on to perform or assist in humanitarian activities.

HUMANITARIAN AND CIVIC ASSISTANCE

6-73. Humanitarian and civic assistance programs consist of assistance provided with military operations and exercises. They can enhance the security interests of both the U.S. and the host nation. Aviation support primarily is in the form of air movement.

SUPPORT TO INSURGENCIES

6-74. When ordered, ARFOR support insurgencies that oppose regimes that threaten U.S. interests or regional stability. While any ARFOR can be tasked to support an insurgency, SOF usually receive these missions. Forces supporting insurgencies may provide logistic and training support but normally do not conduct combat operations.

SUPPORT TO COUNTER-DRUG OPERATIONS

6-75. ARFOR may be employed in various operations to support other agencies that detect, disrupt, interdict, and destroy illicit drugs and the infrastructure (personnel, materiel, and distribution systems) of drug trafficking entities. ARFOR always conduct counter-drug operations to support other U.S. government agencies. When conducted *outside* the U.S. and its territories, counter-drug operations are considered stability operations. When conducted *inside* the U.S. and its territories, they are domestic support operations (discussed later in this section). Army units do not engage in direct action during counter-drug operations. Aviation units may be used to support counter-drug efforts by providing air movement and reconnaissance. They may also be tasked with monitoring and detecting drug movements and suspected drug production areas.

COMBATTING TERRORISM

6-76. Terrorism is the calculated use of unlawful violence or threat of unlawful violence to instill fear. ARFOR routinely conduct operations to deter or defeat terrorist attacks. Offensively oriented operations are categorized as counter-terrorism; defensively oriented operations are antiterrorism.

Counter-Terrorism

6-77. Counter-terrorism consists of offensive measures taken to prevent, deter, or respond to terrorism. Actions include strikes and raids against terrorist organizations and facilities outside the U.S. and its territories. Counter-terrorism is a specified mission for selected SOF that operate under direct control of the NCA or under a combatant command arrangement. Commanders who employ conventional forces against organized terrorist forces operating inside their AO are conducting conventional offensive operations, not counter-terrorism operations.

Antiterrorism

6-78. Antiterrorism consists of defensive measures used to reduce the vulnerability of individuals and property to terrorist attacks, to include limited response and containment by local military forces. Antiterrorism is a consideration for all forces during all types of military operations. Commanders take the security measures necessary to accomplish the mission and protect the force against terrorism. Soldiers are most vulnerable during off-duty periods and in recreational locations. Soldiers and families who reside outside protected installations are ideal targets for terrorists.

NONCOMBATANT EVACUATION OPERATIONS

6-79. NEO relocate threatened civilian noncombatants from locations in a foreign nation to secure areas. NEO may take place in permissive, uncertain, or hostile environments. Normally, these operations involve U.S. citizens whose lives are in danger either from the threat of hostilities or from a natural disaster. They may also include host nation citizens and third country nationals. A ground or aviation unit may evacuate noncombatants. The aviation brigade can conduct reconnaissance to help locate noncombatants, identify clogged routes, and provide security for all stages of their assembly and movement.

ARMS CONTROL

6-80. ARFOR normally conduct these operations to support arms control treaties and enforcement agencies. The aviation brigade can help ground forces in locate, seize, and destroy weapons of mass destruction. Other actions include escorting deliveries of weapons and materials to preclude loss or unauthorized use.

SHOW OF FORCE

6-81. Shows of force are conducted to bolster and reassure allies, deter potential aggressors, and gain or increase influence. They are designed to demonstrate a credible and specific threat to an aggressor or potential aggressor. These operations usually involve the deployment or buildup of forces, an increase in the readiness and activity of designated forces, or a demonstration of operational capabilities by forces already in the region. Although actual combat is not desired, shows of force can rapidly and unexpectedly escalate. Typical aviation missions include area and route security, screen, air assault rehearsals, and other tactical demonstrations.

SUPPORT OPERATIONS

6-82. Support operations use ARFOR to assist civil authorities, foreign and domestic, as they prepare for or respond to crises and relieve suffering. ARFOR provide essential support, services, assets, or specialized resources to help civil authorities deal with situations beyond their capabilities. The purpose of support operations is to meet the immediate needs of designated groups for a limited time, until civil authorities can do so without Army assistance. In extreme or exceptional cases, ARFOR may provide relief or assistance directly to those in need. More commonly, they help civil authorities or nongovernmental organizations provide support. Support operations usually are nonlinear and noncontiguous. Support operations *within* the U.S. and its territories are domestic support operations. Support operations *outside* the U.S. and its territories are Foreign Humanitarian Assistance.

DOMESTIC SUPPORT OPERATIONS

6-83. During declared disasters or emergencies within the U.S., the aviation brigade may be called upon to supplement the efforts and resources of state and local governments. Such operations may include responding to natural or man-made disasters, controlling civil disturbances, conducting counter-drug activities, combatting terrorism, or aiding law enforcement. The aviation brigade may be employed to augment C^2 requirements, provide air movement, search for casualties, and assess damage.

FOREIGN HUMANITARIAN ASSISTANCE

6-84. These operations are conducted to relieve or reduce the results of natural or man-made disasters in foreign countries. They also are conducted to relieve conditions such as pain, disease, hunger, or privation that present a serious threat to life or loss of property. ARFOR supplement or complement the efforts of host-nation civil authorities or agencies that provide assistance. The aviation brigade may be employed to augment C^2 requirements, search for casualties, provide air movement, or assess damage.

STABILITY AND SUPPORT OPERATIONS PLANNING CONSIDERATIONS

6-85. The aviation brigade commander faces challenges that may differ from those involved in conventional operations. Some of the planning factors that commanders must consider are discussed below.

MISSION ANALYSIS

6-86. Perhaps the greatest obstacle for the commander to overcome in SASO is defining the mission for the unit. When he receives the OPLAN, OPORD, or implementing instruction (INPIN) mission analysis begins. The commander must pay particular attention to limitations placed upon him by the ROE or political considerations.

TASK ORGANIZATION

6-87. Task organization for SASO is METT-TC driven. The commander must assess the aviation brigade's capabilities to determine if the task organization can accomplish assigned missions. If not, the commander should modify the organization.

COMMAND RELATIONSHIPS

6-88. It is critical that the command relationships for SASO be established early. Elements of the aviation brigade may deploy for SASO without its parent headquarters. It also is possible that the aircraft may work for another service or U.S. nonmilitary agency, such as the DEA or the Federal Bureau of Investigation (FBI). A clear understanding of the C^2 relationship helps reduce confusion and allows the unit to integrate with their controlling headquarters early.

ADVANCE PARTY OPERATIONS

6-89. Advance party personnel need a comprehensive overview of their unit's mission, capabilities, requirements, and commander's intent before deployment. They must coordinate with the gaining or outgoing command, higher headquarters, and local population. The commander must carefully select advance party personnel. For example, deploying to another country with an undeveloped logistics base may require the advance party to be heavily logistics weighted and contain foreign language specialists, while other missions such as counter-drug operations can be weighted with operational personnel. Whichever the commander chooses, the advance party must receive guidance and focus before deployment. The advance party must also keep the commander informed about their actions and the current situation.

SPLIT-BASED OPERATIONS

6-90. The aviation brigade, or some of its elements, will often deploy on SASO into a theater that has an immature logistics base. Logistics operations may be conducted in theater from the unit's home station. This is termed *split-based* operations. The commander who deploys on an operation that is split-based must consider the type of support required from home station. He must pay special attention to communications between the theater of operations and the home station, and to the transportation means available to provide a timely flow of logistics.

FORCE PROTECTION

6-91. Force protection is essential throughout SASO. Coordination for an external security force should be accomplished before deployment to the AO. A continually updated intelligence picture, coupled with aggressive local patrolling, is an essential element of force protection.

RULES OF ENGAGEMENT

6-92. ROE are designed to control the application of force. ROE are prepared and issued by higher headquarters. Commanders must clearly understand the ROE and ensure that all the soldiers in the unit understand them. ROE situations should be rehearsed in detail before deploying or executing a mission. No situation should occur in which personnel are unsure whether they should use force, and what types of force—to include deadly force—are warranted (Appendix N).

HOST NATION CONSIDERATIONS

6-93. Commanders may have to adapt to local procedures to accomplish the mission. Civil and military laws, airspace procedures, radio frequency usage, ground convoy clearances, flight restrictions, local customs, and host nation contracting are all factors the commander must consider prior to executing SASO.

Chapter 7

Combat Support

SECTION I – MILITARY INTELLIGENCE

7-1. Intelligence enables the commander to see the battlefield and directly influence the effectiveness of maneuver, FS, and force protection. The aviation brigade relies on its higher headquarters for information other than it receives from its own sources.

ENABLERS

7-2. Ground support radar, remote sensors, UAVs, or other MI assets may be placed under OPCON or attached to the brigade to enhance reconnaissance and security capabilities. The S2 incorporates these assets into the ISR plan and recommends employment methods to the commander.

COUNTER-INTELLIGENCE

7-3. The essence of counter-intelligence (CI) is to support force protection. CI are those actions that counter the hostile intelligence threat; safeguard the command from surprise; deceive enemy commanders; and counter sabotage, subversive, and terrorist activities. FM 2-01.2 (FM 34-60) contains more information on CI.

ELECTRONIC WARFARE

7-4. EW employs electromagnetic and directed energy to control the electromagnetic spectrum (EMS) or attack the enemy while retaining its use for friendly forces. The S2 works with his higher headquarters counterpart to accomplish offensive and defensive EW tasks. Appendix J addresses aircraft survivability.

ELECTRONIC WARFARE SUBDIVISIONS

7-5. The three subdivisions of EW are electronic attack, electronic protection (EP), and electronic support (ES).

Electronic Attack

7-6. Electronic attack (formerly electronic countermeasures) is to use jamming, electronic deception, or directed energy to degrade, exploit, or destroy the enemy's use of the EMS. Electronic attack can attack the enemy anywhere from their tactical formations to their national infrastructure.

Electronic Protection

7-7. EP (formerly electronic counter-countermeasures) is protection of the friendly use of the EMS. EP covers the gamut of personnel, equipment, and facilities. For example, self- and area-protection systems can interfere with the enemy's target acquisition and engagement systems to prevent destruction of friendly systems and forces.

Electronic Support

7-8. ES (formerly electronic support measures) is conflict-related information that involves actions tasked by or under the direct control of an operational commander to search for, intercept, identify, and locate sources of intentional and unintentional radiated electromagnetic energy to detect immediate threats. ES is the embodiment of combat information and capitalizes on the timelines of sensor-to shooter systems.

SECTION II – FIRE SUPPORT

PLANNING

7-9. Fires are used to set the conditions for operations. The objective of effects-based fires is to apply a desired effect to achieve a specified purpose (shaping, protective, decisive). Fires may be used for many effects, including—

- Suppression, neutralization, or destruction of forces.
- Isolation of forces.
- Slowing, canalizing, or interdicting enemy maneuver.
- Obscuration of the battlefield.
- Reduction of the effects of enemy artillery with counter-fire.

7-10. Two critical pieces that must be in place to effectively employ FA are the fire plan and a quick-fire net.

PREPLANNED FIRES

7-11. Preplanned fires are for relatively known situations and target locations, such as in deliberate attacks and air assaults. This fire plan is distributed and rehearsed before execution. Preplanned fires use an H-Hour sequence.

ON-CALL FIRES

7-12. On-call fires are used for unknown situations such as a movement to contact, screen, and zone reconnaissance. The brigade coordinates fires for battalions, and establishes priorities. Usually the FSO in the battalion tactical CP (or S3 if no FSO is available), conducts calls for fire relayed by scout or attack crews because these helicopters usually operate too low to establish communication directly with the artillery. When direct communication can be attained, scout and attack crews may call directly. Direct contact with the FA must be previously coordinated in the plan or cleared by the battalion tactical CP.

DIGITAL FIRE SUPPORT NET

7-13. Brigades and battalions equipped with the advanced FA tactical data system can establish digital FS nets with digitally equipped aircraft. Aircraft can send digital calls for fire direct to the brigade or battalion FSE over the FM digital FS net.

QUICK-FIRE NETS

7-14. The aviation brigade often does not have artillery in DS. Quick fire nets provide a means to request and receive responsive fires. An artillery unit is assigned the nonstandard mission to *answer calls for fires from* the participating unit. The FSO establishes communications with the designated FA TOC on the appropriate fire net. The artillery TOC monitors the net to ensure the appropriate FA unit processes requested fire missions or provides additional fires as required.

GROUPS AND SERIES

7-15. Each target series or group is associated with a templated or known enemy unit. If that unit moves then the appropriate target, group, or series moves with it. Identify target groups and series with the same names as the objectives or targets with which they are associated. If a target is an enemy unit in Objective Soccer, then the target group is also named Soccer. Figure 7-1 shows this concept.

JOINT PRECISION-GUIDED FIRES

7-16. ARFOR may laser-designate targets for precision-guided munitions delivered by joint assets; however, there are stringent training requirements that must be accomplished before Army personnel may perform this function. Check current regulations before directing Army personnel to designate for joint assets. See CAS and NSFS paragraphs below.

FIRE SUPPORT COORDINATING MEASURES

7-17. FSCMs are used to facilitate the rapid engagement of targets while providing safeguards for friendly forces. As a minimum, measures provide—

- A graphic depiction of the control measure.
- An abbreviated name of the control measure.
- The headquarters that established the control measure.
- An effective date-time group and termination date-time group, if appropriate.

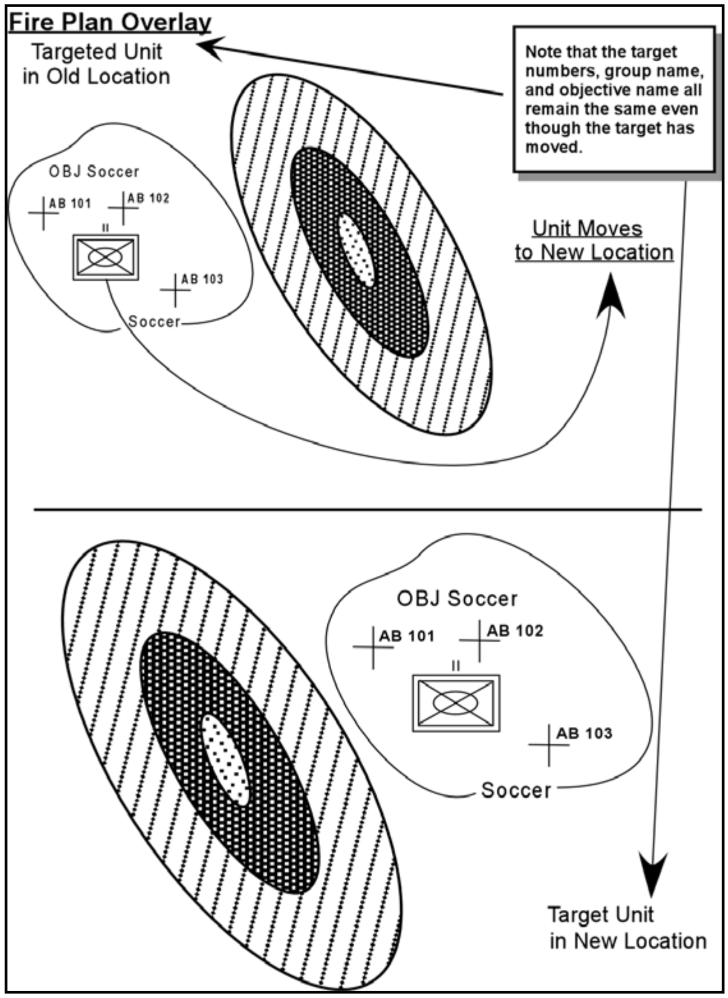


Figure 7-1. Fire Plan Overlay

Coordinated Fire Line

7-18. The coordinated fire line (CFL) is a line beyond which conventional direct and indirect surface FS means may fire at any time within the boundaries of the establishing headquarters without additional coordination. The purpose of the CFL is to expedite the surface-to-surface attack of targets beyond the CFL without coordination with the ground commander in whose area the targets are located. Air-to-surface fires on either side of the CFL require coordination with the ground commander. It usually is established by brigade or division but may be established by a maneuver battalion (Figure 7-2) (see FM 3-09 [FM 6-20], FM 6-series, and FM 3-21.90 [FM 7-90]).

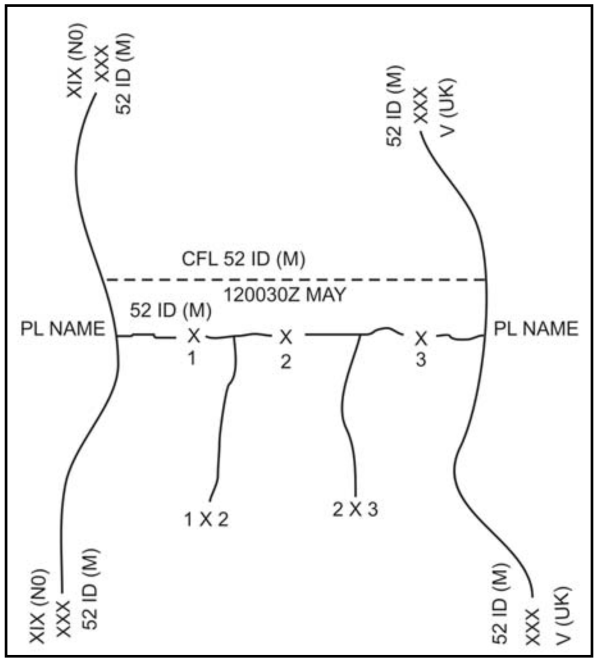


Figure 7-2. Coordinated Fire Line

Fire Support Coordination Line

7-19. A fire support coordination line (FSCL) is established by the appropriate land or amphibious force commander to ensure coordination of fire not under the commander's control but which may affect current tactical operations. The FSCL is used to coordinate fires of air, ground, or sea weapons systems using any type of ammunition against surface targets. The FSCL should follow well-defined terrain features. The establishment of the FSCL must be coordinated with the appropriate TACAIR commander and other supporting elements. Supporting elements may attack targets forward of the FSCL without prior coordination with the land or amphibious force commander provided the attack will not produce adverse surface effects on or to the rear of the line. Attacks against surface targets behind this line must be coordinated with the appropriate land or amphibious force commander. (Army)—A permissive fire control measure established and adjusted by the ground commander in consultation with superior, subordinate, supporting, and other affected commanders. It is not a boundary; synchronization of operations on either side of the FSCL is the responsibility of the establishing commander out to the limits of the land component forward boundary. It applies to all fires of air, land, and sea weapon systems using any type of ammunition against surface targets. Forces attacking targets beyond the FSCL must inform all affected commanders to allow necessary coordination to avoid fratricide (Figure 7-3). (See boundary, CFL, and FSCM.) (See FM 6-20 series, FM 3-21.20 [FM 7-20] , FM 3-21.30 [FM 7-30], FM 3-20.95 [FM 17-95], FM 3-91 [FM 71-100], FM 3-90.123 [FM 71-123], FM 3-0 [FM 100-5], FM 3-92 [FM 100-15], and Joint Publication [JP] 3-0.)

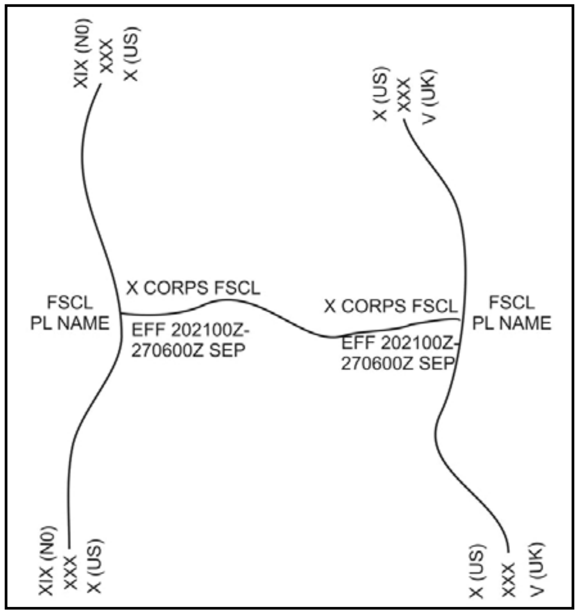


Figure 7-3. Fire Support Coordination Line

Free Fire Area

7-20. The free fire area (FFA) is a specific designated area into which any weapon system may fire without additional coordination with the establishing headquarters. Normally, it is established on identifiable terrain by division or higher headquarters (Figure 7-4) (see FM 6-20 series).

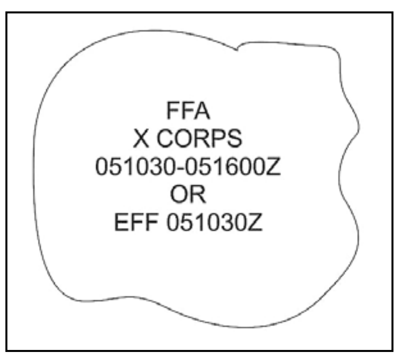


Figure 7-4. Free Fire Area

Restrictive Fire Area

7-21. The restrictive fire area (RFA) is an area in which specific restrictions are imposed. Fires that exceed those restrictions may not be delivered without prior coordination with the establishing headquarters (Figure 7-5) (see FM 6-series).

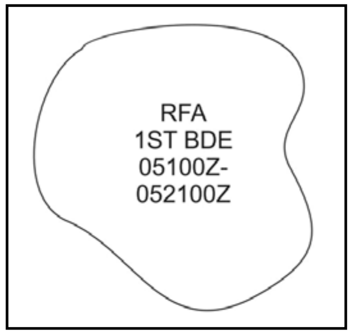


Figure 7-5. Restrictive Fire Area

No-Fire Area

7-22. The no-fire area (NFA) is an area in which no fires or effects of fires are allowed. Two exceptions are when establishing headquarters approves fires temporarily within the NFA on a mission basis, and when the enemy force within the NFA engages a friendly force, the commander may engage the enemy to defend his force (Figure 7-6).

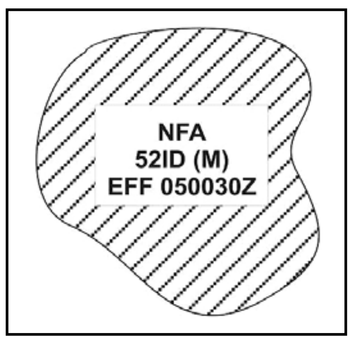


Figure 7-6. No-Fire Area

Airspace Coordination Area

7-23. The airspace coordination area is the airspace defined by the boundaries of the AO. It may be divided into airspace control subareas (Figure 7-7) (see FM 3-52 [FM 100-103]).

AIRSPACE COORDINATION AREA
53ID (M)
MIN ALT: 500
MAX ALT: 3000
GRIDS NK2313 TO KN 3013
TO NK2320 TO NK3022
EFF: 281400ZAPR-
281530ZAPR

Figure 7-7. Airspace Coordination Area

NONLETHAL EFFECTS

7-24. Nonlethal systems are discussed below.

7-25. **Electronic attack and special IO** are used to degrade, neutralize, or destroy enemy C^2. They include deception and computer network attack.

7-26. **PSYOP** influence enemy force behavior in support of U.S. national interests and other information-related activities.

7-27. **Civil affairs** teams are used to influence relations between military forces and civil authorities.

7-28. **Public affairs** teams provide media support according to the public affairs information strategy and conduct media facilitation, as necessary.

CLOSE AIR SUPPORT

7-29. CAS missions are air strikes against hostile targets close to friendly forces. These missions require detailed integration with the fire and maneuver of supported forces to increase effectiveness and avoid fratricide. The ALO and TACP integrate CAS and other USAF fires. Chapter 3 discusses ALO duties.

PREPLANNED AND IMMEDIATE REQUESTS

7-30. CAS missions are executed based on preplanned or immediate requests.

Preplanned Requests

7-31. Preplanned requests permit detailed planning, integration, and coordination with the ground tactical plan. Munitions can be tailored precisely to the target, and complete mission planning can be accomplished. The aviation brigade S3, FSO, and ALO review unit requests for suitability of the target and potential airspace conflicts. As a minimum, they integrate the request into the FS plan. The S3 may add the missions to other preplanned requests, consolidate it with other requests, or assign it a priority. The consolidated preplanned mission request is then forwarded to the higher headquarters S3/G3 Air.

Immediate Requests

7-32. Immediate requests fulfill urgent, unforeseen requirements. Details of the mission are generally coordinated while CAS aircraft are held on airstrip alert or are airborne. The aviation brigade S3 and ALO evaluate the request and pass it to higher headquarters.

GROUND AND AIR ALERTS

7-33. The commander may request CAS to be placed on either ground or air alert. Planning for either of these options can improve the responsiveness of CAS. CAS assets on air alert close behind the forward edge of the battle area (FEBA) may be able to respond to a preplanned request within five minutes. Conversely, even in response to an immediate request, diverted aircraft or aircraft on ground alert may require 30 to 60 minutes for launch and transit.

The specific tactical situation and type CAS aircraft available dictate the better option.

CLOSE AIR SUPPORT TARGET ACQUISITIONING AND TARGETING

7-34. CAS also can acquire targets. S3 personnel work closely with the ALO to ensure that other means are used to attack acquired targets not suitable for air attack. To be effective, CAS must be employed against targets that present the most immediate threat. Almost any threat encountered inside the FSCL and near the FLOT may be suitable for CAS targeting. Indiscriminate use of CAS may increase aircraft attrition and the chances of fratricide. Mobile massed armor formations present the most immediate threat to friendly ground forces and, thus, are prime candidates for air attack.

CLOSE AIR SUPPORT CAPABILITIES AND LIMITATIONS

7-35. JP 3-09.3 provides key employment guidelines, capabilities, and limitations.

Capabilities

7-36. CAS capabilities include high-speed and long-range support, versatile weapon/ammunition mixes, and accurate delivery. CAS pilots have an excellent air-to-ground communications capability and can strike moving targets. In addition, night CAS is available using AC-130 gunships that can provide accurate support for extended periods.

Limitations

7-37. CAS aircraft are limited by resource scarcity, delivery restrictions caused by limited visibility, adverse weather, or the proximity of friendly forces. CAS flight restrictions caused by enemy ADs may impose delayed response and short loiter times, or may limit reattack capabilities.

CLOSE AIR SUPPORT COORDINATION AND CONTROL

7-38. A TACP advises the ground commander and staff on the integration of CAS with ground operations. The TACP also coordinates and directs close air strikes. In an emergency, a qualified Army person designated by the ground commander may control an air strike. When this occurs, the ground commander assumes responsibility for the safety of ground units. When ordnance is a factor in the safety of friendly units, the aircraft's axis of attack should be parallel to the friendly forces. The person controlling the air strike locates and describes the target, identifies friendly positions, and relays this information to the pilots. Although most fighter aircraft have FM radio capability, the ground commander may have to relay this information through an Army aircraft that has both FM and UHF capabilities.

NAVAL SURFACE FIRE SUPPORT

7-39. NSFS can provide large volumes of immediate, responsive FS to land combat forces operating near coastal waters. Naval ships may be assigned missions in DS or GS. Ships assigned the mission of DS provide fires for a committed maneuver unit. Ships assigned the mission of GS provide fires for a committed maneuver brigade or larger unit. Naval gunfire liaison sections may be attached to Army and allied headquarters from the maneuver company to division level.

SECTION III – AIR DEFENSE

7-40. It is possible that the enemy occasionally will control some of the airspace above the battlefield. Beyond its supporting AD systems, the aviation brigade may have to contribute directly to the AD effort.

PLANNING AND EMPLOYMENT

7-41. When deployed, the aviation brigade is augmented with an AD element. The commander analyzes the AO, terrain, numbers and types of enemy aircraft expected, and likely fixed- and rotary-wing air avenues of approach. He then balances the threat analysis against the available AD weapons. After the commander establishes priorities, the S3 and AD officer determine the specifics of AD weapons allocation and positions to be occupied. The S3 coordinates and supervises supporting AD activities throughout the operation.

7-42. In digital units, the air and missile defense work station (AMDWS) assists the commander in AD planning and interface.

AIRSPACE FIRE CONTROL MEASURES

7-43. Airspace fire control measures are used to facilitate the rapid engagement of targets while providing safeguards for friendly forces. JP 3-52 and FM 3-52.2 [FM 100-103-2] provide additional information.

Air Defense Operations Area

7-44. An AD operations area is an area and the airspace above it where procedures are established to minimize mutual interference between AD and other operations. It may include designation of one or more of the following: AD action area, AD identification zone, or firepower umbrella.

Weapons Engagement Zone

7-45. A weapons engagement zone (WEZ) is airspace of defined dimensions where the responsibility for engagement normally rests with a particular weapon system (Figure 7-8). Some examples of WEZs are—

- Fighter engagement zone (FEZ).
- High altitude missile engagement zone. (HIMEZ).
- Joint engagement zone (JEZ). JEZ is airspace of specific dimensions where friendly surface-to-air missiles and fighters are simultaneously employed.
- Low altitude missile engagement zone (LOMEZ).
- Short range AD engagement zone (SHORADEZ).

Figure 7-8. Missile Engagement Zone

High Density Airspace Control Zone

7-46. A high density airspace control zone (HIDACZ) is a defined area of airspace in which there is a concentrated employment of weapons and airspace users. The zone has defined dimensions that usually coincide with geographical features or NAVAIDs (Figure 7-9).

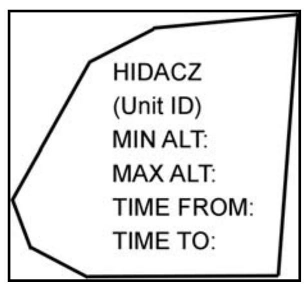


Figure 7-9. High-Density Airspace Control Zone

Weapons Free Zone

7-47. A weapons free zone (WFZ) is an AD zone established for the protection of key assets. It is a zone where weapons systems may be fired at any target not positively identified as friendly (Figure 7-10).

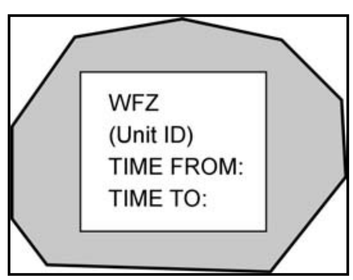


Figure 7-10. Weapons Free Zone

Restricted Operations Area/Restricted Operations Zone

7-48. Restricted operations areas (ROAs) and restricted operations zone (ROZs) are synonymous terms for defining a volume of airspace set aside for a specific operational mission or requirement. This procedure restricts some or all airspace users from this area until termination of the mission. It normally is used for drop or LZ activity and search and rescue (SAR) operations (Figure 7-11).

Figure 7-11. Restricted Operations Zone

Minimum Risk Route

7-49. Minimum risk route (MRR)s are temporary corridors of defined dimensions recommended for use by high-speed, fixed-wing aircraft that presents the minimum known hazards to low flying aircraft transiting the theater airspace. MRRs normally extend from the corps rear boundary to the FSCL. Low-level transit routes (LLTR) are employed in a similar fashion in North Atlantic Treaty Organization (NATO) (Figure 7-12).

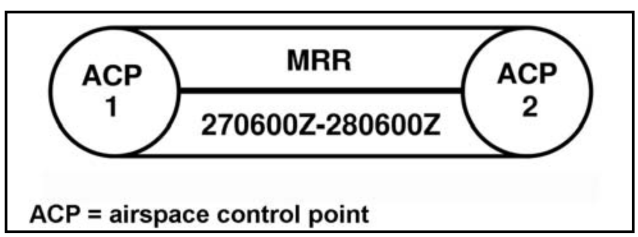


Figure 7-12 Minimum Risk Route

Standard Use Army Aircraft Flight Route

7-50. Standard-use army aircraft flight route (SAAFRs) are routes established below the coordinating altitude to allow the Army commanders to safely route movement of their aviation assets performing CS and CSS missions. Although jointly recognized, these routes do not need airspace control authority approval. SAAFRs normally are located in the corps through brigade rear areas but may be extended to support logistics missions (Figure 7-13).

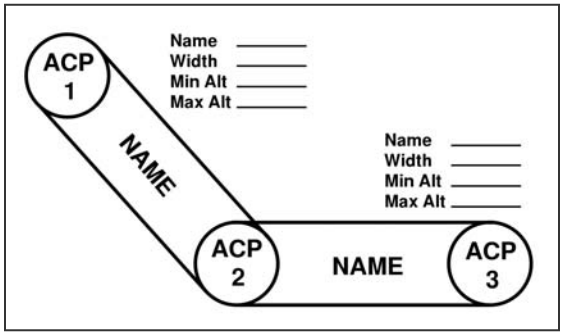


Figure 7-13. Standard use Army Aircraft Flight Route

ACTIVE AIR DEFENSE

7-51. Active AD is direct action taken to destroy enemy aerial platforms or reduce their effectiveness. The aviation brigade can attempt to engage and destroy threat aircraft with its air-to-air systems, vehicular-mounted weapons, and small arms. Generally, units should not engage enemy aircraft with ground fire unless they are being attacked. Primary defense is good camouflage, to include camouflage of helicopters. FM 3-01.8 (FM 44-8) details the use of small arms in the AD role.

PASSIVE AIR DEFENSE

7-52. The aviation brigade takes measures to avoid detection by enemy aircrews. Such measures are known as passive AD. Threat aircrews may or may not need to see and identify a target to attack it. The effectiveness of enemy helicopters and high-performance aircraft is greatly reduced when units take advantage of terrain for cover and concealment.

STATIONARY UNITS

7-53. Stationary units should take the following precautions:

- Occupy positions that offer cover and concealment.
- Immediately wipe out vehicle track marks leading to and around the position.
- Ensure new tracks follow existing paths, roads, fences, or natural lines in the terrain pattern.
- Avoid silhouetting vehicles against the skyline or against an area of a different color.
- Post air guards in dismounted positions to provide warning of approaching aircraft.
- Rotate air guards frequently because scanning for long periods dulls visual perception.
- Disperse vehicles to make detection difficult, and to reduce the possibility of multiple losses from a single engagement.

- To reduce glare, place camouflaged coverings on the windshields, mirrors, and headlights of vehicles and on aircraft canopies. Exposed vehicles should be thoroughly camouflaged.
- Open vehicle hoods to break up silhouettes and allow for more rapid cooling of engines to counter enemy IR detection devices.
- Hide or camouflage aircraft as required.
- Operate during limited visibility as much as possible.
- Establish a scatter plan from the AA.

MOVING UNITS

7-54. Moving units should take the following precautions:

- Travel in open columns with 80 to 100 meters between vehicles. Dispersion decreases target density and reduces the lethal effects of enemy ordnance.
- Post air guards on vehicles to provide warning of approaching aircraft.
- Rotate air guards frequently because scanning for long periods dulls visual perception.
- Maintain COMSEC.
- Use covered and concealed routes.
- If attacked, turn vehicles 90 degrees from the direction of attack.
- Limit movements to periods of limited visibility as much as possible.
- Use armed helicopters for convoy security.

SECTION IV – ENGINEER SUPPORT

7-55. The aviation brigade may receive engineer support for a specified mission or time.

PLANNING CONSIDERATIONS

7-56. The senior engineer officer advises the commander about using engineers and their equipment. When planning engineer support for tactical operations, the commander should consider that engineers will accompany lead ground elements and be employed as far forward as possible.

FUNCTIONS

7-57. Engineer units provide countermobility, survivability, and sustainment support. Engineer support should be incorporated into the defense plan. Engineer units can also perform infantry combat missions, if essential. FM 3-34 (FM 5-100) contains detailed information about engineer combat operations.

COUNTERMOBILITY SUPPORT

7-58. Part of the countermobility task is to disrupt attackers or turn them into selected areas such as EAs. These operations canalize the enemy, degrade their ground mobility, and increase their time in the killing zone.

Countermobility efforts also ensure that maximum combat power is massed on enemy concentrations. The aviation brigade can support these operations through the emplacement of aerial delivered minefields.

SURVIVABILITY SUPPORT

7-59. Engineer survivability operations protect semifixed positions from enemy observation and fires. Engineers provide this protection for CPs, FARPs, maintenance, sleeping, and other facilities. They can also build aircraft revetments and perimeter defenses.

INFANTRY COMBAT MISSION

7-60. When engineers perform as infantry, their ability to accomplish specialized engineer missions is significantly degraded. The infantry mission is assigned only when essential. The aviation brigade must provide its own perimeter defense. Perimeter defense is not an engineer function.

SECTION V – MILITARY POLICE SUPPORT

7-61. The aviation brigade may find itself working with or in support of MPs, particularly in SASO. MPs perform missions critical to the success of the tactical commander's intent and concept of operation. They expedite movement of combat resources on MSRs leading into rear areas, and patrol their AO to protect critical locations and facilities. They evacuate enemy prisoners of war (EPW) from forward areas and conduct law-and-order operations. These services include investigating criminal offenses, performing law enforcement operations, and confining U.S. military prisoners. FM 3-19.10 [FM 19-10] discusses MPs.

BATTLEFIELD MISSIONS

7-62. The specific operations MPs perform at a given time are determined by the tactical commander's needs and the availability of MP resources.

BATTLEFIELD CIRCULATION CONTROL

7-63. Battlefield circulation control (BCC) helps move military traffic along MSRs. MPs reroute traffic to meet changes in tactical situations, enforce MSR regulations, reconnoiter primary and alternate MSRs, and control refugees and stragglers. As MPs perform these functions they collect and report information on friendly and enemy situations. They monitor road and traffic conditions and report the status of key terrain influencing the military road network.

AREA SECURITY

7-64. MPs protect designated facilities, units, convoys, MSR critical points, and people from enemy activity in the rear area. They also conduct area reconnaissance to gather and document information about enemy activity.

REAR AREA OPERATIONS

7-65. MPs conduct rear area operations to identify, intercept, and destroy small enemy forces before they can close on their objective. They normally are designated as a response against Level II threat attacks on bases and units that cannot defeat the enemy without assistance. MPs determine the size and intent of Level III threat forces, delay and disrupt their progress, and hand over the battle to regular combat forces.

AREA DAMAGE CONTROL OPERATIONS

7-66. MPs perform these operations to reduce the damage caused by hostile actions, natural disasters, and man-made disasters. They provide support including BCC and limited local physical security when required.

ENEMY PRISONER OF WAR CONTROL

7-67. MPs control the flow of EPWs from capture to internment. They operate a forward EPW collecting point at the brigade and central collecting points at division and corps.

LAW AND ORDER

7-68. If needed, MPs provide police services on the battlefield. These services include investigating criminal offenses, performing law enforcement operations, and confining U.S. military prisoners.

SECTION VI – PSYCHOLOGICAL OPERATIONS

7-69. PSYOP teams use persuasion to influence perceptions and encourage desired behavior. The cornerstone of PSYOP is truth, credibly presented to convince a given audience to cease resistance or take actions favorable to friendly forces.

GENERAL

7-70. PSYOP teams enable commanders to communicate information to large audiences via radio, television, leaflets, loudspeakers, and internet-based distribution (particularly in a SASO environment). They seek to demoralize the enemy by causing dissention and unrest in their ranks, while at the same time persuading the local population to support U.S. troops. PSYOP teams are also provided with continuous analysis of the attitudes and behavior of enemy forces so they can develop, produce, and employ information communication successfully.

AVIATION IN PSYCHOLOGICAL OPERATIONS

7-71. The aviation brigade may be called upon to enhance C^2 or fly missions whose intent is purely psychological (such as dropping leaflets, show of force, and loud speaker platform). Other missions whose intent is purely tactical can produce residual psychological effects. An example is an attack company raid that destroys a logistics site 100 km behind the FLOT. The psychological effect on the enemy force in contact could be as demoralizing as a direct fire engagement.

SECTION VII – CIVIL AIR SUPPORT

7-72. Civil affairs teams are the commander's link to the civil authorities in the AO. They assist a host government in meeting its peoples' needs and in maintaining a stable and viable civil administration.

GENERAL

7-73. Civil affairs specialists identify critical requirements of civilians in war or disaster situations. They also can—

- Locate civil resources to support military operations.
- Help minimize civilian interference with operations.
- Support national assistance activities.
- Plan and execute noncombatant evacuation.
- Support counter-drug operations.
- Establish and maintain liaison or dialogue with civilian personnel agencies, commercial organizations, and private organizations.

AVIATION IN CIVIL AFFAIRS OPERATIONS

7-74. The aviation brigade may airlift supplies and equipment, assist in evacuation of noncombatants, conduct reconnaissance (locate noncombatants, suspected drug facilities), and provide security for all stages of these missions. During counter-drug operations, armed aircraft could be called on to attack and destroy drug-making or storage facilities.

SECTION VIII – AIR FORCE WEATHER TEAM SUPPORT

7-75. Weather teams provide information essential to the commander's tactical decision-making and aircrews' flight planning. This support is required on a continuous basis.

WEATHER TEAMS

7-76. Weather teams exist at brigade and higher echelons. Depending on the echelon, teams consist of a staff officer with forecasters and observers. In those instances where aviation elements are operating independent of the aviation brigade, necessary coordination must be made to insure availability of weather support for aviation operations.

Chapter 8

Combat Service Support

SECTION I – OVERVIEW

SUSTAINMENT IMPERATIVES

8-1. Operations and CSS are inextricably linked. Sustaining the battle requires commanders and staffs to adhere to the following CSS characteristics (FMs 3-0 [FM 100-5] and 4-0 [FM 100-10]):

- Responsiveness.
- Simplicity.
- Economy.
- Flexibility.
- Attainability.
- Sustainability.
- Survivability.
- Integration.

RESPONSIVENESS

8-2. Responsiveness is the key characteristic of CSS. It means providing the right support in the right place at the right time, and the ability to meet changing requirements on short notice. Logisticians anticipate events and requirements by understanding the commander's plan and foreseeing events as operations unfold. This involves forecasting and providing necessary on-hand assets, capabilities, and information necessary to meet support requirements. On the other hand, accumulating materiel and personnel reserves to address every possible contingency wastes resources and may deprive other units in need.

SIMPLICITY

8-3. Complexity should be avoided in the planning and execution of maintenance and logistics operations. Mission orders, drills, rehearsals, and SOPs contribute to simplicity.

ECONOMY

8-4. If not properly prioritized, resources may become limited. Commanders prioritize resources according to mission requirements.

FLEXIBILITY

8-5. The key to flexibility lies in adapting available logistics structures and procedures to changing situations, missions, and concepts of operations. Improvised methods and support sources can maintain CSS continuity when the preferred method is undefined or not usable to complete the mission. Extraordinary methods may be necessary to get things done, particularly when the brigade is conducting separate, simultaneous operations throughout the AO.

ATTAINABILITY

8-6. Attainability is procuring the minimum essential supplies and services necessary to begin operations. Commanders determine minimum acceptable levels of support and sustainment operations. This includes replenishment actions to comply with authorized stockage lists (ASL) levels.

SUSTAINABILITY

8-7. Sustainability is maintaining continuous support during all phases of campaigns and major operations.

SURVIVABILITY

8-8. Being able to protect support functions from destruction or degradation contributes to survivability. Robust and redundant support contributes to survivability, but may run counter to economy.

INTEGRATION

8-9. Integration consists of synchronizing CSS operations with all aspects of tactical operations. Logistics units must be organized to execute *fix forward* doctrine while giving the commander the greatest possible freedom of action.

FUNDAMENTALS OF SUPPORT

8-10. Units take advantage of host-nation resources through formal agreements, pursue ad hoc measures, forage, and use captured materiel. These factors are essential to the success of sustained operations.

8-11. Under the direction of the XO, the S1 and S4 coordinate supply, maintenance, personnel support, and health service activities with the S3 and S2 to support combat operations. CSS operations are conducted primarily through the HHC and AVIM companies. The brigade also depends on CSS from DISCOM or COSCOM.

8-12. Priorities for CSS are based on the tactical plan. Effective communications between aviation units, supporting staffs, and AVIM units enable the support commander to emphasize the flow of supplies rather than the buildup of stocks. Stockage of critical supplies near points of anticipated consumption may be necessary to permit continued operations in case the CSS system is disrupted, but such action should not impede the mobility of the maneuver battalions. Constant and complete coordination is necessary to ensure effective and integrated transportation support.

COMBAT MISSION

8-13. The combat mission is the foremost consideration. Maintenance, supply, and other support elements must be far enough forward to be immediately responsive to the requirements of maneuver units. Resources and priorities must be tailored to changing combat situations.

Offensive Operations

8-14. Maintenance support in offensive operations must enable maneuver units to maintain the momentum. Maintenance managers prepare and organize for offensive operations based on the particular type of operation to be supported and the nature of the battlefield. Support of offensive operations must provide—

- Forward positioning of prescribed load list (PLL) support package and supplies.
- Maximum use of maintenance support teams (MST) in forward areas.
- Use of airlift and airdrop for resupply of PLL items and supplies.
- Adequate communications between supported and supporting units.
- Means to ensure that maintenance preparation for the offense does not interfere with tactical plans and operations.

Defensive Operations

8-15. Maintenance managers work with tactical commanders to ensure they can effectively support the wide range of operations available to the tactical commander. Maintenance managers should—

- Make maximum use of MST to repair equipment as far forward as possible.
- Ensure that PLL items and supplies in the forward main battle area are adequate.
- Keep their units mobile.
- Ensure that downed aircraft recovery teams (DARTs) are formed to remove disabled aircraft.

8-16. During tactical retrograde operations, efforts should be made to establish maintenance elements in depth and rearward, to limit the flow of maintenance repair parts and supplies forward to only the most combat-essential elements, and to keep supply and evacuation routes open. Fallback points along withdrawal routes are preplanned for evacuation of supplies and equipment.

Support Operations on the Nonlinear Battlefield

8-17. Maintenance managers may be required to support in two or more areas simultaneously. The composition of the aviation force and availability of U.S. or allied bases influence the composition of the aviation logistics and maintenance package. To support these types of operations, maintenance managers evaluate maintenance mission requirements and form MSTs to support mission requirements and operations. If supporting from multiple areas is to be long term, additional personnel and equipment should be requested..

COMBAT SERVICE SUPPORT FUNCTIONS

8-18. DISCOMs and COSCOMs provide CSS to aviation brigades. CSS assets of the brigade normally operate in combat and field trains configurations during MTW, and as determined by the factors of METT-TC for SSC and

SASO. This chapter concentrates on supply and maintenance, but provides brief summaries and references for the other CSS functions.

SUPPLY

8-19. Supply involves acquisition, management, receipt, storage, and issue of all classes of supply except Class VIII. FM 3-04.500 (FM 1-500) gives more details on supply operations. FM 3-04.500 (FM 1-500), FM 4-0 (FM 100-10), JP 4-0, JP 4-03, and FM 4-20 (FM 10-1) contain additional information.

MAINTENANCE

8-20. Maintenance entails keeping materiel in operational condition, returning it to service, or updating and upgrading its capability. It includes performance of preventive maintenance checks and services (PMCS); recovery and evacuation of disabled equipment; diagnosis of equipment faults; substitution of parts, components, and assemblies; exchange of serviceable materiel for unserviceable materiel; and repair of equipment. FM 3-04.500 (FM 1-500) gives more details on aviation maintenance operations. FM 4-0 (FM 100-10) and FM 4-30.3 (FM 9-43-1) contain additional information.

TRANSPORTATION

8-21. Transportation is movement and transfer of units, personnel, equipment (including disabled vehicles and aircraft), and supplies to support the concept of operation. It incorporates military, commercial, and supporting nation capabilities. Transportation assets include motor, rail, air/water modes and units; terminal units, activities, and infrastructure; and movement control units, activities, and systems. FM 4-0 (FM 100-10) and JP 4-01 contain additional information.

HEALTH SERVICE SUPPORT

8-22. HSS is defined as all services performed, provided, or arranged to promote, improve conserve, or restore the mental or physical well-being of personnel in the Army and, as directed, in other services, agencies, and organizations. The functional areas of HSS are—

- Medical treatment (area support).
- MEDEVAC and medical regulating.
- Hospitalization.
- Veterinary services.
- Preventive medical services.
- Dental services.
- Combat operational stress control.
- Health service logistics.
- Medical laboratory services.
- Medical C^{4}I.

8-23. JP 4-02, FM 4-0 (FM 100-10), and FM 4-02 (FM 8-10) contain additional information.

FIELD SERVICES

8-24. Field services involve feeding, clothing, and providing personal services. It encompasses clothing exchange, laundry, shower, textile repair, mortuary affairs, aerial delivery, and food services. FM 4-0 (FM 100-10), FM 4-20 (FM 10-1), and JP 4-06 contain additional information.

EXPLOSIVE ORDNANCE DISPOSAL SUPPORT

8-25. Explosive ordnance disposal (EOD) support can neutralize domestic or foreign conventional, NBC munitions, as well as improvised devices. FM 4-0 (FM 100-10), FM 3-100.38 (FM 100-38), and FM 4-30.5 (FM 9-15) contain additional information.

PERSONNEL SUPPORT

8-26. Personnel support provides activities and functions to sustain manning the force and personnel service support. It ensures that trained personnel in the right quantities are available when and where they are required. It involves personnel readiness management, replacement, and career management; strength accounting; replacement operations; casualty operations; postal operations; human relations programs; morale, welfare, and recreation; and community support activities. FM 4-0 (FM 100-10), FM 1-0 (FM 12-6), and JP 1-0 contain additional information.

FINANCIAL MANAGEMENT OPERATIONS

8-27. Finance operations are necessary to conduct contracting and to provide real-time information, accounting, and services. Resource management operations ensure that operational policies and procedures adhere to law and regulation, develop command resource requirements, and leverage appropriate fund sources to meet them. FM 4-0 (FM 100-10), FM 1-06 (FM 14-100), and JP 1-06 contain additional information.

LEGAL SUPPORT

8-28. Legal support provides operational law support in all legal disciplines (including military justice, international law, contract and fiscal law, administrative and civil law, claims, and legal assistance) to support the command, control, and sustainment of operations. FM 4-0 (FM 100-10), and FM 1-04.0 (FM 27-100) contain additional information.

RELIGIOUS SUPPORT

8-29. Religious support includes pastoral care, religious counseling, spiritual fitness training and assessment, religious services of worship, and advising the command on matters of religion, morals and ethics, and morale. FM 4-0 (FM 100-10), FM 1-05 (FM 16-1), and JP 1-05 contain additional information.

SECTION II – SUPPLY AND MATERIEL OPERATIONS

8-30. AR 710-2, Department of the Army Pamphlet (DA Pam) 710-2-1, and DA Pam 710-2-2 address supply procedures and policies.

METHODS OF DISTRIBUTION

8-31. Supplying units distribute supplies to using units by different methods.

PUSH SYSTEM DISTRIBUTION

8-32. This is the initial go-to-war supply system in an undeveloped theater. Initial quantities are based on strength data and historical demand. When the theater stabilizes, the supply system in some cases becomes a *pull* system based on actual demand.

SUPPLY POINT DISTRIBUTION

8-33. The supplying unit issues from a supply point to a receiving unit. The receiving unit goes to the supply point and uses its own transportation in moving the supplies to its area.

UNIT DISTRIBUTION

8-34. The supplying unit delivers supplies to the receiving unit.

THROUGHPUT

8-35. Shipments bypass one or more echelons in the supply chain to lessen handling and speed delivery forward. Throughput is more responsive to the needs of the user, is a more efficient use of transportation assets, and reduces exposure to pilferage and damage.

MATERIEL MANAGEMENT CENTERS

8-36. A division, corps, or theater materiel management center (MMC) supports each aviation brigade.

DIVISION MATERIEL MANAGEMENT CENTER

8-37. The division materiel management center (DMMC) is the division's logistics coordinating and control element. It provides materiel management for weapon systems and controls maintenance priorities. It also coordinates and controls supply functions to meet operational needs. FM 4-93.2 (FM 63-2) contains additional information on the DMMC.

CORPS SUPPORT COMMAND MATERIEL MANAGEMENT CENTER

8-38. The corps materiel management center (CMMC) is the heart of the corps-level supply and maintenance management system. It performs integrated supply and AVIM management for all classes of supply (except maps, medical, and COMSEC) for which the COSCOM has jurisdiction and responsibility.

THEATER SUPPORT COMMAND MATERIEL MANAGEMENT CENTER

8-39. The MMC serves as the control center for materiel activities in the TSC through daily monitoring of supply and maintenance actions. The MMC performs integrated supply and maintenance management in the TSC for all classes of supply except medical supplies. It also manages maintenance activities for which the TSC is responsible. The TSC aviation division manages aviation materiel.

8-40. The MMC coordinates materiel activities with movement control elements and the functional directorates of the TSC support operations section. It maintains links to the CONUS base as well as tactical level MMCs. FM 4-93.4 (FM 63-4) has additional details on the TSC and its MMC.

REQUISITION AND DISTRIBUTION OF SUPPLIES

8-41. A general overview of supply requisition and distribution is discussed below.

CLASS I (AND CLASS VI WHEN APPLICABLE)

8-42. The Class I supply system during the initial phase of an operation pushes rations. Personnel strength, unit location, type of operations, and feeding capabilities determine the quantities and types of rations pushed forward. As the battlefield stabilizes, the supply system converts to a pull system. Rations are throughput as far forward as possible.

8-43. The battalion S4 generates ration replenishment requests for basic loads, and monitors the operational ration requests. Requests are based on personnel strength. Class I ration requests are consolidated by the S4 section and forwarded to the aviation brigade S4, or the appropriate support area if operating independently. Extra rations usually are not available at distribution points; therefore, ration requests must accurately reflect personnel present for duty, including attached personnel. The battalion S4 sections draw rations from the distribution point and issue them to the companies and troops.

CLASSES II, III (PACKAGED), IV, AND VII.

8-44. These classes of supply are handled in a manner similar to Class I. Requisitions originate at the battalion and are consolidated at brigade unless the unit is operating under another headquarters. Normally, the MMC authorizes shipment to the supply point in the support area via unit distribution. The items are then distributed to the battalions using supply point distribution. In some cases, the items may be throughput from the theater, corps, or division to subordinate battalions.

Weapon System Replacement Operations

8-45. This special management system replaces critical pieces of equipment for Class VII major weapon systems. Weapon systems, including personnel and ancillary equipment, are selectively replaced consistent with available resources and priorities. The XO, as the weapon system manager, coordinates the efforts of the S1, the S4, and other CSS assets. The XO allocates weapon system resources to subordinate units. A SITREP provides information to the commander and staff on the status of weapon systems within the battalions. When losses occur, the appropriate requisition is placed into the system.

CLASS III BULK

8-46. The basic load of Class III bulk is the hauling capacity of the unit's fuel vehicles, including the fuel tanks of the unit's vehicles. Topping off aircraft, vehicles, and equipment when possible, regardless of the fuel level, is essential to continuous operations.

8-47. Units normally use fuel forecasts to determine bulk petroleum, oils, and lubricants (POL) requirements. Battalions estimate the amount of fuel required based on projected operations, usually for the period covering 72 hours beyond the next day. Battalion S4s forward requests through the brigade S4 to the appropriate MMC. Units draw bulk POL from the support area Class III supply point by unit distribution. Fuel trucks return to battalion areas either as a part of logistics packages or to refueling points in FARPs.

8-48. A key exception to this principle is *refuel-on-the-move* operations. Although these operations may use unit assets, typically they involve supporting fuel units' equipment. The purpose is to ensure the unit's vehicles and bulk fuel assets are topped before critical phases of an operation. FM 4-20.12 (FM 10–67-1) contains details.

8-49. Class III bulk for the division and corps aviation brigade is delivered by corps assets. The division can store a one-day supply of Class III bulk. This fuel is stored and distributed from collapsible bladders or 5,000-gallon tanker trailers. Class III bulk normally is delivered to the MSB, and routinely delivered by corps as far forward as the brigade support area (BSA). However, it may be delivered as far forward as combat trains FARP in certain situations.

CLASS V AND CLASS V (A) (CONVENTIONAL AMMUNITION)

8-50. Conventional ammunition is the standard ammunition associated with conventional weapons such as M60 machine-guns for the UH–60 and weapon systems mounted on the AH–64 and OH-58D. These classes include standard explosives such as hand grenades, claymores, C-4, and pyrotechnics (flares, star clusters, and smoke grenades). Special ammunition, which does not apply to the aviation brigade, includes nuclear ammunition, special missile warheads, and rocket motors.

8-51. Normally, the S4 requests ammunition from the appropriate MMC or designated ammunition transfer point (ATP) representatives. Ammunition managers use combat loads rather than days of supply. Combat loads measure the amount of Class V a unit can carry into combat on its weapons system. Once the request has been authenticated, the ammunition is issued by supply point distribution to the battalion or brigade Class III/V platoon, either at the ATP or at the corps ASP.

8-52. For ordering Air Volcano munitions, the S4 must coordinate with the division engineer planner to calculate Class IV/V supplies and ensure a request is submitted to the G4. The engineer and assistant aviation officer coordinate the location of the ATP where the UH-60 will be loaded and fueled.

Required Supply Rate

8-53. The required supply rate (RSR) is the estimated amount of ammunition needed to sustain the operations of a combat force without restrictions for a specific period. RSR is expressed in rounds per weapon per day. This RSR is used to state ammunition requirements. The S3 normally formulates the brigade RSR, but it is often adjusted by higher headquarters.

Controlled Supply Rate

8-54. The controlled supply rate (CSR) is the rate of ammunition consumption (expressed in rounds per day per unit, weapon system, or individual) that can be supported for a given period. It is based on ammunition availability, storage facilities, and transportation capabilities. A unit may not exceed its CSR for ammunition without authority from higher headquarters. The S4 compares the CSR against the RSR; then remedies shortages by requesting more ammunition, suballocating ammunition, cross-leveling, or prioritizing support to subordinate units. The commander establishes CSRs for subordinate units.

Basic Load

8-55. The basic load is the quantity of ammunition authorized by the theater commander for wartime purposes and is required to be carried into combat by a unit. The basic load provides the unit with enough ammunition to sustain itself in combat until the unit can be resupplied.

CLASS VI

8-56. Class VI supplies may be made available through local procurement, transfer from theater stocks, or requisitioning from the Army and Air Force Exchange Service (AAFES). Available shipping space dictates Class VI supply to the theater. Class VI items are personal care items, candy, and other items for individual consumption. Health and comfort items (formally referred to as ration supplement sundry packages) are class VI supply items managed by the Defense Personnel Supply Center. They are issued through the standard supply system (normally class I supply channels) without cost to soldiers in the early stages of a deployment. They contain items such as disposable razors, toothbrushes, toothpaste, and other personal care items. Defense Logistics Agency (DLA) Regulation 4145.36 contains additional information on these packages.

CLASS VII

8-57. Class VII supplies consist of major end items such as vehicles and aircraft. Because of their importance to combat readiness and high costs, Class VII items usually are controlled through command channels and managed by the supporting MMC. Each echelon manages the requisition, distribution, maintenance, and disposal of these items to ensure visibility and operational readiness. Units report losses of major items through both supply and command channels. Replacement requires coordination among materiel managers, Class VII supply units, transporters, maintenance elements, and personnel managers.

CLASS IX AND CLASS IX (A)

8-58. The MMC normally manages Class IX. Within the battalions, the AVUM units maintain PLL items. ASL items are maintained at the DS or AVIM level.

8-59. Class IX requisition begins with the unit filling requisitions from its PLL. If the item is not stocked on the PLL, or is at zero balance, the requisition is passed to the supply support activity (SSA). This unit fills the request from its ASL stocks or passes the requisition to the MMC. The ground maintenance sections of aviation units normally maintain the Class IX ASL for ground equipment. The AVUM maintains the Class IX (A) PLL.

SUPPORT BY HOST NATION

8-60. Logistics support and transportation may be provided by host nation organizations and facilities. Common classes of supply may be available and obtained from local civilian sources. Items may include barrier and construction materials, fuel for vehicles, and some food and medical supplies. Requisition and distribution are coordinated through logistics and liaison channels.

SECTION III – MAINTENANCE PRINCIPLES

8-61. Maintenance is a combat multiplier. When OPFOR have relative parity in numbers and quality of equipment, the force that combines skillful use of equipment with an effective maintenance system has a decisive advantage. It has an initial advantage in that it enters battle with equipment that is likely to remain operational longer. It has a subsequent advantage in that it can return damaged equipment to the battle faster.

8-62. Well-trained and equipped forward maintenance elements are critical to the success of the maintenance concept. They must have the proper personnel, equipment, tools, and immediate access to high usage replacement parts. Readiness-level maintenance units concentrate on the rapid turnaround of equipment to the battle, while sustainment-level maintenance units repair and return equipment to the supply system.

8-63. The maintenance system is organized around forward support. All damaged or malfunctioning equipment should be repaired on-site, or as close to the site as possible.

SECTION IV – VEHICLE AND GROUND EQUIPMENT MAINTENANCE AND RECOVERY

MAINTENANCE SUPPORT STRUCTURE

8-64. Battalions and HvyHC have organic ground maintenance elements. DS, GS, and depot units provide maintenance assistance.

UNIT MAINTENANCE

8-65. The operator or crew and organizational maintenance personnel perform unit maintenance that includes scheduled and unscheduled unit-level maintenance, repair, and PMCS. PMCS maintains the operational readiness of equipment through preventive maintenance and early diagnosis of problems.

DIRECT SUPPORT

8-66. DS maintenance units are tailored to the weapons systems of the supported unit. They provide extensive maintenance expertise, component repair capabilities, and repair parts supply. This level of maintenance is normally found in the maintenance company of the DASB, forward support battalion (FSB), MSB of the DISCOM, and COSCOM maintenance units.

GENERAL SUPPORT

8-67. GS maintenance is characterized by extensive component repair capability. It repairs damaged systems for issue through the supply system as Class II, VII, or IX items. This level of maintenance normally is found at theater Army level.

VEHICLE AND EQUIPMENT RECOVERY PROCEDURES

8-68. The recovery manager coordinates recovery operations with the overall repair effort to best support the commander's priorities and the tactical situation. The brigade HHC has vehicle recovery capability. FM 4-30.31 (FM 9-43-2) describes the technical aspects of vehicle recovery operations.

RECOVERY PRINCIPLES

8-69. The unit recovers its equipment. When it lacks the physical means to recover an item, the unit requests assistance from the supporting maintenance element. Management of recovery operations is centralized at the battalion whenever possible.

8-70. Maintenance personnel repair equipment as far forward as possible within the limits of the tactical situation, amount of damage, and available resources. Recovery vehicles return equipment no farther to the rear than necessary, usually to the maintenance collection point of the supporting maintenance unit.

8-71. Recovery missions that might interfere with combat operations, or compromise security, are coordinated with the tactical commander.

SECTION V – AVIATION MAINTENANCE OPERATIONS

8-72. Aviation maintenance is performed on a 24-hour basis. Again, the governing concept is to *replace forward, repair rearward* so units can rapidly return aircraft for operational needs. Emphasis is on component replacement rather than repair. Such replacement requires increased stockage of line replaceable units (LRUs) and quick change assemblies (QCA). Damaged or inoperable aircraft that require time-consuming repair actions are handled in more secure areas toward the rear. FM 3-04.500 (FM 1-500) provides more detail.

MANAGEMENT BALANCE

8-73. Balancing the flying-hour program, operational ready rates, and bank hours is critical to meeting operational needs. Commanders and MOs/technicians evaluate available resources using the T4-P4 concept (tools, time, technology, training, problem, plan, people, parts) and adjust them accordingly.

SCHEDULED MAINTENANCE

8-74. Commanders avoid situations that cause an excessive number of aircraft to require scheduled maintenance at the same time, or in which scheduled maintenance must be overflown. All imminent scheduled maintenance should be accomplished before deployment or initiation of surge operations.

UNSCHEDULED MAINTENANCE

8-75. Unscheduled maintenance is generated by premature or unexpected malfunction, improper operation, or battlefield damage. Units must be doctrinally and organizationally prepared to apply responsive corrective action on an as-needed basis.

OTHER MEASURES

8-76. The supporting AVIM company can provide personnel augmentation at the AVUM location during surge periods. TM 1–1500–328–23 addresses deferred maintenance.

SUPPORT SYSTEM STRUCTURE

8-77. The support system is a three-level structure—AVUM, AVIM, and depot. AVUM and AVIM organizations are on the battlefield. Depot is often in CONUS.

AVIATION UNIT MAINTENANCE

8-78. The AVUM company provides quick turnaround through repair. Crew chiefs perform daily servicing, daily inspection, and HF, remove-and-replace aircraft repairs. Scheduled maintenance (other than daily inspections) and more time-consuming, operator-type repairs normally are performed by a maintenance element of the AVUM company. During operations, most AVUM platoons or companies are in the forward portion of the support area. The maintenance capability of the AVUM is governed by the maintenance allocation chart (MAC) and limited by the amount and complexity of ground support equipment (GSE), facilities required, authorized manning strength, and critical skills available.

Aviation Unit Maintenance Considerations

8-79. Some major considerations for aircraft maintenance at the AVUM location are—

- Maintaining the highest degree of mobility. This includes preparing load plans and practicing convoys and deployment procedures.
- Completing imminent scheduled maintenance before deployment or initiation of surge operations. This reduces the potential of having to ground aircraft or overfly scheduled maintenance events during critical battlefield situations.
- Setting priorities for repairs. The AVUM commander and production control officer set priorities for repairs based on the type aircraft and mission requirements.
- Authorized spare modules/components. The range and quantity of of authorized spare modules/components must be consistent with the mobility requirements dictated by the air mobility concept and organic transportation.
- Combat operations. These can result in shortages of personnel, repair parts, and aircraft. Intensive maintenance management is mandatory. MSTs and battle damage assessment and repair (BDAR) teams must be predesignated and trained so minimal time and resources are expended during critical periods.
- Controlled exchange. This is a key element in maintaining maximum numbers of mission-capable aircraft, but it must be firmly controlled by SOP and be according to AR 750-1 and TM 1-1500-328-23.

Maintenance Support Teams

8-80. The AVUM company provides mobile, responsive support through MSTs. MSTs are used to repair aircraft on site or to prepare them for evacuation. The AVUM company commander and PC officer coordinate and schedule maintenance at the forward location of the AVUM unit. The members of the forward element must be able to diagnose aircraft damage or serviceability rapidly and accurately. MST operations follow the principles listed below.

- Teams may be used for aircraft, component, avionics, or armament repair.
- When the time and situation allow, teams repair on site rather than evacuating aircraft.
- Teams must be 100-percent mobile and transported by the fastest means available (normally by helicopter).
- Teams sent forward must be oriented and equipped for special tasks.

Aircraft Combat Maintenance and Battle Damage Repair

8-81. In some situations, normal maintenance procedures must be expedited to meet operational objectives. In such cases, the unit commander may authorize use of aircraft combat maintenance and battle damage repair (BDR) procedures. Aircraft combat maintenance and BDR is an AVUM responsibility with backup from supporting AVIM units. The concept uses specialized assessment criteria, repair kits, and trained personnel to return damaged aircraft to the battle as soon as possible. Often, these repairs are only temporary. Permanent repairs may be required when the tactical situation permits. This method is used to meet operational needs. It is not used when the situation allows application of standard methods.

AVIATION INTERMEDIATE MAINTENANCE

8-82. AVIM companies provide support-level maintenance for AVUM and operational units. The goal of AVIM units in combat is the same as that of AVUM units—to provide the commander with the maximum number of fully mission-capable aircraft. AVIM provides mobile, responsive, one-stop maintenance support. Maintenance functions that are not conducive to sustaining air mobility are assigned to nondivisional AVIMs or to depot maintenance.

Divisional Aviation Intermediate Maintenance Units

8-83. A divisional AVIM is assigned as a separate company, or as subordinate company in the DASB, organic to the DISCOM. This company is structured to support the specific aircraft assigned to the division. It supports the aviation brigade by providing AVIM and reinforcing AVUM-level support at its base location in the BSA, and forward team support in the operating unit areas.

8-84. The AVIM unit dispatches teams forward to assist operating units with AVUM overload situations, aircraft combat maintenance, BDR actions, and aircraft recoveries.

Nondivisional Aviation Intermediate Maintenance Units

8-85. The primary mission of the nondivisional AVIM companies is to provide the full scope of support services to corps nondivisional aviation units. A secondary mission is to reinforce divisional AVIM companies. This reinforcing support may include forward team maintenance and back-up recovery actions.

PHASE AND PROGRESSIVE PHASE MAINTENANCE

8-86. Ongoing operations, training exercises, and deployments can have a major impact on readiness (flying too many aircraft into scheduled maintenance at a critical time). To support the unit's flying hour program, OPTEMPO, deployments, training, and the availability of resources (tools, maintenance personnel, repair parts, special equipment) must be considered when planning phase maintenance (AH-64 and UH-60) and progressive phase maintenance (OH-58D) inspections.

8-87. To facilitate phases in fast-moving operations, phases normally are done at the AVIM or out of country. If out of country options are used, replacement aircraft may be provided.

SECTION VI – AIRCRAFT RECOVERY, EVACUATION, AND BATTLE DAMAGE ASSESSMENT AND REPAIR

BATTLEFIELD MANAGEMENT OF DAMAGED AIRCRAFT

8-88. BDAR/recovery operations are planned and coordinated in detail to minimize risk. Recovery operations are those that move an aircraft system or component from the battlefield to a maintenance facility. Recovery may require on-site repair for a one-time flight, or movement by another aircraft or surface vehicle. In extreme circumstances, only portions of inoperative aircraft may be recovered. An aircraft will be cannibalized at a field site only when the combat situation and aircraft condition are such that the aircraft would otherwise be lost to enemy forces. FMs 3-04.500 (FM 1-500) and 3-04.513 (FM 1-513) contain more detailed information on aircraft recovery.

RESPONSIBILITY

8-89. The owning unit is responsibility for aircraft recovery. The unit should use its AVUM assets within the limits of their capability. A successful recovery operation is a highly coordinated effort between the owning organization, its AVIM support, other supporting unit, and the ground element where the operation is to take place. If the recovery is beyond the AVUM team's capability, AVIM support is requested. Overall, control of the recovery rests with the aviation brigade TOC.

RECOVERY TEAMS

8-90. The AVUM organization prepares for aircraft recovery contingencies by designating a DART. The DART, as a minimum, includes a maintenance test pilot, maintenance personnel, aircraft assessor, and technical inspector. The technical inspector may also be the assessor. All members must be trained to prepare aircraft for recovery as preparing aircraft for recovery is a unit responsibility. The team chief ensures that rigging equipment and quick-fix BDR kits (tools, hardware, POL products, repair parts, and technical manuals) are kept ready for quick-notice recovery missions. The owning flight company may be required to provide a crew chief to the DART. FM 3-04.513 (FM 1-513) contains a sample aircraft recovery and evacuation SOP.

FACTORS AFFECTING RECOVERY OPERATIONS

8-91. Assessment of the following factors facilitates selection of the best COA:

- Location of downed aircraft.
- Types of special equipment packages installed on the aircraft.
- Amount of damage to aircraft.
- Tactical situation and proximity to enemy.
- Time available (planning time for AVUM preparation and rigging is 30 to 60 minutes, which may vary based on METT-TC).
- Weather.

- Assets available.

COURSES OF ACTION

8-92. The unit SOP provides guidance required to determine which of the following actions is appropriate for the situation:

- Make combat repairs, defer further maintenance, or return the aircraft to service.
- Make repairs for one-time flight, and fly the aircraft to an appropriate maintenance area.
- Rig the aircraft for recovery (surface or aerial) and arrange for transport.
- Selectively cannibalize, destroy, or abandon the aircraft according to TM 750-244-1-5 and unit SOP.

AERIAL RECOVERY

8-93. General procedures typically are covered in unit SOPs. FM 3-04.513 (FM 1-513) provides detailed procedures for preparing and performing aerial recovery operations for specific aircraft. FM 3-04.120 (FM 1-120) provides doctrinal guidance on the requirements, procedures, and C^2 tasks involved in planning, coordinating, and executing the airspace control function. Unless a battalion has attached or assigned UH-60s or CH-47s, it will have to request them to conduct an aerial recovery.

Planning

8-94. Recovery operations and, to a lesser degree, maintenance evacuations, can easily be detected and attacked by enemy forces. Plan command, control, and coordination for recovery operations in advance. Recovery and evacuation procedures must be included in unit SOPs, contingency plans, OPORDs, and air mission briefings.

Special Environments

8-95. NBC decontamination of aircraft, equipment, and personnel should be accomplished before delivery to the maintenance site, if possible. The increased risk associated with night recovery operations, must be weighed against the urgency to recover the aircraft, considering time, weather, the need for security, and the tactical situation.

AIRCRAFT COMMANDER AND CREW

8-96. When an aircraft is forced down, the crew should notify the unit or AVUM company via an aircraft or survival radio. Important information includes—

- Aircraft identification and type.
- Location of aircraft.
- Number of people on board.
- Assessment of site security.
- Adaptability of the site for the insertion of a DART or BDAR team.

- An evaluation of damage, to the extent possible, so that needed BDAR personnel, equipment, and parts requirements can be estimated.
- Information on crew and passenger capability to assist. For example, the aircraft commander may be able to fly the aircraft out, eliminating the need for an aviator as part of BDAR.

SECTION VII – AVIATION LIFE SUPPORT SYSTEM

GENERAL

8-97. Commanders ensure that mission-required ALSE is on hand in sufficient quantities, and that the equipment is in serviceable condition. To meet the Army's demanding transformation requirements, newer and more complex, integrated systems are being fielded. These systems demand better maintenance planning, higher maintenance skills, and dedicated facilities.

8-98. Commanders are required to establish an ALSS maintenance management and training program budget to meet resource requirements. Funding for equipment, supplies, and repair parts is imperative. When preparing the budget, review AR 95-1, CTAs 8-100, 50-900, 50-909, and applicable MTOEs and TDAs.

AVIATION LIFE SUPPORT SYSTEM MAINTENANCE MANAGEMENT AND TRAINING PROGRAM CONSIDERATIONS

8-99. The ALSS shop at battalion obtains and maintains all required ALSE. AR 95-1, DA Pam 738-751, and TM 1-1500-204-23-1 contain specific policies on use, maintenance, and responsibilities. Subordinate unit ALSS shops are under the direct supervision of the ALSO. Some major considerations for AVUM are—

- Maintain the highest degree of mobility. Prepare load plans and rehearse deployment procedures.
- Complete scheduled maintenance before deployment or surge operations.
- Set priorities for repairs based on mission requirements.
- Manage maintenance intensively. The ALSS maintenance program must be established and trained so minimal time and resources are expended during critical periods.

AVIATION LIFE SUPPORT SYSTEM FACILITY

8-100. The ALSS facility accommodates maintenance personnel, maintenance areas, and storage of ALSS and support equipment, test equipment, repair parts, supplies, materials, and tools. AR-95-1 specifies minimum requirements. Test equipment, tools, and pilfer able items are stored in secured containers. Administrative areas are established for charts, records, publications, and administrative supplies. When deployed, units require mobility augmentation for this facility.

AVIATION LIFE SUPPORT SYSTEM MAINTENANCE RESPONSIBILITIES

8-101. Battalion commanders are responsible for maintenance of ALSE. The commander—

- Appoints an ALSO on orders to assist, advise, and represent the commander in all matters pertaining to ALSS, according to AR 95-1.
- Obtains maintenance resources, such as technically qualified personnel, facilities, technical publications, repair parts, tools, test equipment, and supplies.
- Determines budgets and obtains funding for equipment, supplies, and repair parts to ensure a well-maintained and continuous ALSS maintenace and training programs.
- Ensures that only trained, qualified personnel perform maintenance on ALSE.
- Ensures that ALSE is maintained in a mission-ready condition, in sufficient quantities to support unit mission requirements.
- Ensures that inspection, maintenance, and repair of ALSE is performed consistent with the tactical situation, skill, time, repair parts, special tools, and test equipment available.
- Coordinates AVIM for those items of ALSE that are beyond the capabilities of the ALSS shop because of lack of skills, tools or test equipment.

SECTION VIII – STANDARD ARMY MANAGEMENT INFORMATION SYSTEMS ARCHITECTURE

8-102. STAMIS consist of computer hardware and software systems that automate diverse functions based on validated customer requirements. STAMIS facilitate the vertical and horizontal flow of logistics and maintenance status information to units Army wide. Figure 8-1 shows the STAMIS architecture.

STANDARD ARMY RETAIL SUPPLY SYSTEM-OBJECTIVE

8-103. The standard Army retail supply system-objective (SARSS-O) is a STAMIS for retail supply operations and management. It includes all units and installations (active, reserve, and NG). It provides supply-related data to the integrated logistics analysis program (ILAP) system. SARSS-O is comprised of four integrated systems:

- SARSS-1 at the SSA level.
- SARSS-2AD at the division, separate brigade or ACR, and the MMC level.
- SARSS-2AC/B at the corps and theater MMC levels.
- SARSS-Gateway, formerly known as the objective supply capability (OSC).

UNIT-LEVEL LOGISTICS SYSTEMS

8-104. Unit-level logistics systems (ULLS) consists of software and hardware that automates the logistics system for unit supply, maintenance, and materiel readiness management operations. It prepares unit supply documents, maintenance management records, readiness reports, and property records. ULLS consists of three applications—ULLS-Aviation (ULLS-A), ULLS-Ground (ULLS-G), and ULLS-S4.

UNIT-LEVEL LOGISTICS SYSTEMS-AVIATION

8-105. ULLS-A enables aviation production control officers to generate and manage AVUM level work orders and post status to the maintenance request register. It also provides quality control officers automated component, inventory, and inspection master files. Production control receives a master maintenance data file (MMDF) updated and supplied from logistics support activity (LOGSA).

8-106. The Army materiel status system (AMSS) reporting capability within ULLS-A replaces the manual readiness reporting requirements outlined in AR 700-138. AMSS is intended to become the commander's link to monitoring the supply and maintenance posture of the unit.

UNIT-LEVEL LOGISTICS SYSTEMS -GROUND

8-107. ULLS-G is located at units that have an organizational maintenance facility. It automates vehicle dispatching, PLL management, and the Army maintenance management system (TAMMS). The automotive information test (AIT) interrogator is connected directly to the ULLS-G. ULLS-G is linked to the wholesale supply system through SARSS-Gateway.

UNIT-LEVEL LOGISTICS SYSTEMS -S4

8-108. ULLS-S4 is located at unit-level supply rooms and at battalion and brigade S4 sections. ULLS-S4 automates the supply property requisitioning/document register process, hand/subhand receipts, component, budget, and logistics planning activities. It also receives and produces AMSS reports generated by ULLS-G/A systems or by another ULLS-S4 system. The AIT interrogator is connected directly to ULLS-S4. ULLS-S4 interfaces with the standard property book system-revised (SPBS-R), ULLS-G and ULLS-A (for budget and AMSS data transferring), standard Army ammunition system (SAAS), SARSS-O at the DS level, the standard Army intermediate level logistics system supply (SAILS), the SARSS-Gateway and the combat services support control system (CSSCS).

STANDARD ARMY MAINTENANCE SYSTEM

8-109. This system includes standard Army maintenance system (SAMS)-1 and SAMS-2.

STANDARD ARMY MAINTENANCE SYSTEM -1

8-110. SAMS-1 enables automated processing of DS/GS maintenance shop production functions, maintenance control work orders, and key supply functions. Requisitions are prepared automatically and automatic status is received from SARSS-1. SAMS-1 has interfaces with other systems such as ULLS and SARSS-O. It also provides completed work order data to the LOGSA for equipment performance and other analyses.

STANDARD ARMY MAINTENANCE SYSTEM -2

8-111. SAMS-2 is an automated maintenance management system used at the divisional MSB and FSB, the materiel office of functional maintenance battalions and support groups in the corps and EAC. It is also used at MMC and in the DISCOM, COSCOM, and the TSC.

8-112. SAMS-2 enables monitoring equipment nonmission capable status, and controlling and coordinating maintenance actions and repair parts usage to maximize equipment availability.

8-113. SAMS-2 receives and processes maintenance data to meet information requirements of the manager, and to fulfill reporting requirements to customers, higher SAMS-2 sites, and the wholesale maintenance level. Data can be accessed instantly to enable management control, coordination, reports, analysis, and review.

8-114. SAMS-2 provides maintenance and management information to each level of command from the user to the division or corps, wholesale and DA levels.

INTEGRATED LOGISTICS ANALYSIS PROGRAM

8-115. The ILAP family of existing and planned management information utilities provides logistics and resource managers with integrated views of cross-functional data. Data are taken from the STAMIS at local, regional, and national levels, and from the Defense Finance and Accounting Service (DFAS). These data are then integrated and displayed at levels of aggregation appropriate for each management level (Figure 8-1).

DEFENSE AUTOMATIC ADDRESSING SYSTEM

8-116. Logistics information processing system (LIPS), which is maintained by the defense automatic addressing system (DAAS), is DOD’s central repository for information on the status of requisitions. It also augments global transportation network (GTN) in monitoring the status of nonunit cargo shipments.

SECTION IX – SAFETY

8-117. An effective safety program for maintenance operations is a basic requirement in all units. Everyone must be alert to immediately recognize and correct potentially dangerous situations. Accidents can cause more losses than enemy action unless safety is embraced by the unit. Appendix A contains additional information on risk management.

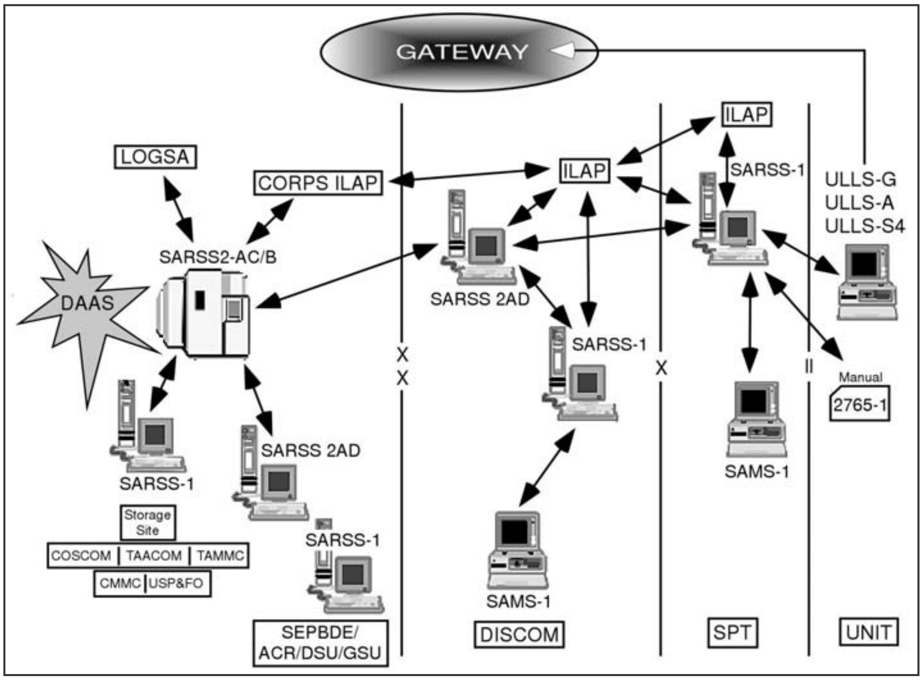


Figure 8-1. STAMIS Architecture

ACCIDENT CAUSES

8-118. An aviation accident is seldom caused by a single factor such as human error or materiel failure. Accidents are more likely to result from a series of contributing incidents. The following areas require constant command attention to prevent aviation accidents:

- Human factors.
- Training, education, and promotion.
- Equipment design, adequacy, and supply.
- Normal and emergency procedures.
- Maintenance.
- Facilities and services.
- Environment.

8-119. The more complex aircraft have higher maintenance-related mishap rates. Commanders and maintenance supervisors must ensure that their personnel learn from maintenance errors generated in their own units. *Flightfax* and other publications provide additional examples and information. All personnel must strictly adhere to published maintenance procedures and apply risk management at all levels of operations.

SAFETY REGULATIONS

8-120. AR 385-10 regulates overall safety. AR 385-95 regulates the Army aviation accident prevention program. DA Pam 385-40 covers accident investigation and reporting.

RESPONSIBILITIES

8-121. The quality assurance (QA) section has primary responsibility for safety for all maintenance work performed on aircraft or their components. However, everyone in the unit has responsibilities in the unit's maintenance safety and aviation accident prevention programs. General responsibilities for key personnel are outline below. Appendix A contains additional information.

UNIT COMMANDER

8-122. Commanders ensure that all unit activities are conducted according to established safety rules and regulations. These regulations include ARs 385-40 and 385-95, DA Pam 385-40, and local directives. Commanders also determine the cause of accidents and ensure that corrections are made to prevent recurrence. When deviation from an established safety rule is desired, commanders obtain permission from the appropriate higher commander.

SUPERVISORS

8-123. Effective supervision is the key to accident prevention. Supervisors must apply all established accident prevention measures in daily operations. They should frequently brief subordinates on safety procedures, get their suggestions for improving safety practices, and announce any new safety procedures. Recommended agenda items are listed below.

- The overall job and expected results.
- The how, why, and when of the job, and any ideas from the group on ways to improve methods and procedures.
- The part each person contributes.
- Existing and anticipated hazards, and the action needed to resolve these problems.
- The need for prompt, accurate reporting of all injuries, accidents, or near accidents.
- Basic first aid procedures, training, and readiness.
- The need to search constantly for, detect, and correct unsafe practices and conditions to prevent accidents and injuries.

INDIVIDUALS

8-124. All personnel must be aware of the safety rules established for their individual and collective protection. Each person must read and follow unit SOPs, instructions, checklists, and other safety-related information. They must report safety voids, hazards, and unsafe or incomplete procedures. Each soldier must follow through until the problem is corrected.

SAFETY

8-125. The U.S. Army Safety Center (USASC) publication, *Guide to Aviation Resources Management for Aircraft Mishap Prevention*, is one publication that outlines safety procedures. *Aviation Resource Management Surveys (ARMS) Commander's Guide* is available at the following worldwide web address: https://freddie.forscom.army.mil/. Copies of the guide may be obtained from the unit SO.

Appendix A

Risk Management

Risk management is the process of identifying and controlling hazards to protect the force. It is the Army's principal risk-reduction process. The intuitive management of risk in conducting military training and operations is old, but its systematic application, as part of Army doctrine, is relatively new. Therefore, this appendix presents a summary of how-to-do-it information based on FM 5-0 (FM 101-5) and FM 5-19 (FM 100-14).

Note: Key risk management terms are defined at the end of this appendix.

APPLICATION

A-1. Risk management is applied to reduce the risk of the full range of METT-TC hazards, including enemy action. It is integrated into the MDMP as indicated in Figure A-1.

Military Decision Making Process *	Risk Management Steps				
	Identify Hazards	Assess Hazards	Develop Controls & Make Risk Decisions	Implement Controls	Supervise & Evaluate
1. Receipt of mission	X				
2. Mission analysis	X	X			
3. COA development	X	X	X		
4. COA analysis (war game)	X	X	X		
5. COA comparison			X		
6. COA approval			X		
7. Orders production				X	
8. Rehearsal	X	X	X	X	X
9. Execution and assessment	X	X	X	X	X

* FM 101-5 31 May 1997

Figure A-1. Risk Management Integrated Into the MDMP

RESPONSIBILITIES

A-2. Leaders at every echelon are responsible for risk management.

RESPONSIBILITIES AT TASK FORCE AND HIGHER HEADQUARTERS

A-3. Every commander, leader, and staff officer must integrate risk management into the planning and execution of training and operational missions. Staff officers assist the commander in minimizing unnecessary risk by increasing certainty in all operations. They use the risk management process to assess their functional areas and make control-measure recommendations to reduce or eliminate risk to support the combat power dynamic of force protection. Examples include the following:

- Applying risk management during the MDMP to identify force-protection shortcomings in the BOS functions.
- Developing and implementing controls for the commanders that support the mission by avoiding unnecessary risk and loss of combat power.
- Providing support to operational requirements and establishing procedures and standards that are clear and practical for each specified and implied task.

Commander

A-4. The commander has overall responsibility. The commander—

- Provides risk guidance.
- Selects hazard-control options.
- Makes the risk decision for COA.
- Enforces and evaluates controls.

Executive Officer

A-5. The XO has staff coordination responsibility. The XO—

- Supervises risk management integration across the entire staff.
- Ensures that hazard identification and controls are integrated into plans and orders.
- Ensures that the staff monitors and enforces controls during execution.

Staff Officers

A-6. Staff officers have responsibility in their own functional areas. Staff officers—

- Identify hazards most likely to result in loss of combat power (that is, hazards that are not adequately controlled).
- Develop control options that address reasons for hazards.
- Integrate hazard identification and selected controls into functional area paragraphs, graphics, and annexes of the OPORD.

Safety Officer/Noncommissioned Officer

A-7. The SO/NCO has coordination responsibility. The SO/NCO—

- Assists the commander and staff with risk management integration during mission planning, execution, and assessment.
- Collects hazard information and controls identified by the staff and uses this information to prepare risk assessment and control measures for all operations.
- Coordinates staff risk management and makes recommendations to the S3.

RESPONSIBILITIES AT COMPANY AND LOWER HEADQUARTERS

A-8. The commander or leader performs or delegates execution of the risk management process for each step in troop-leading procedures (Figure A-2).

Troop Leading Steps	Identify Hazards	Assess Hazards	Develop Controls & Make Risk Decisions	Implement Controls	Supervise & Evaluate
1. Receive Mission	X				
-Perform initial METT-T-C analysis	X				
2. Issue a warning order	X				
3. Make a tentative plan	X	X			
a. Make an estimate of the situation	X	X			
b. Conduct a detailed mission analysis	X	X			
c. Develop situation and courses of action:	X	X			
-Enemy situation (enemy COA)	X	X			
-Terrain and weather (OCOKA)	X	X			
-Friendly situation (troops and time available)	X	X			
-Course of action (friendly)	X	X			
d. Analyze courses of action - war game	X	X			
e. Compare courses of action			X		
f. Make decisions			X		
g. Expand selected COAs into a tentative plan			X		
4. Initiate movement				X	
5. Reconnoiter				X	
6. Complete the plan				X	
7. Issue the order				X	
8. Supervise and refine the plan					X

Figure A-2. Risk Management Integrated Into Troop-Leading Procedures

RISK MANAGEMENT PROCEDURES

A-9. The commander and staff perform the actions listed below. The SO collects the information generated during these actions and enters it on the risk management worksheet (Figure A-3).

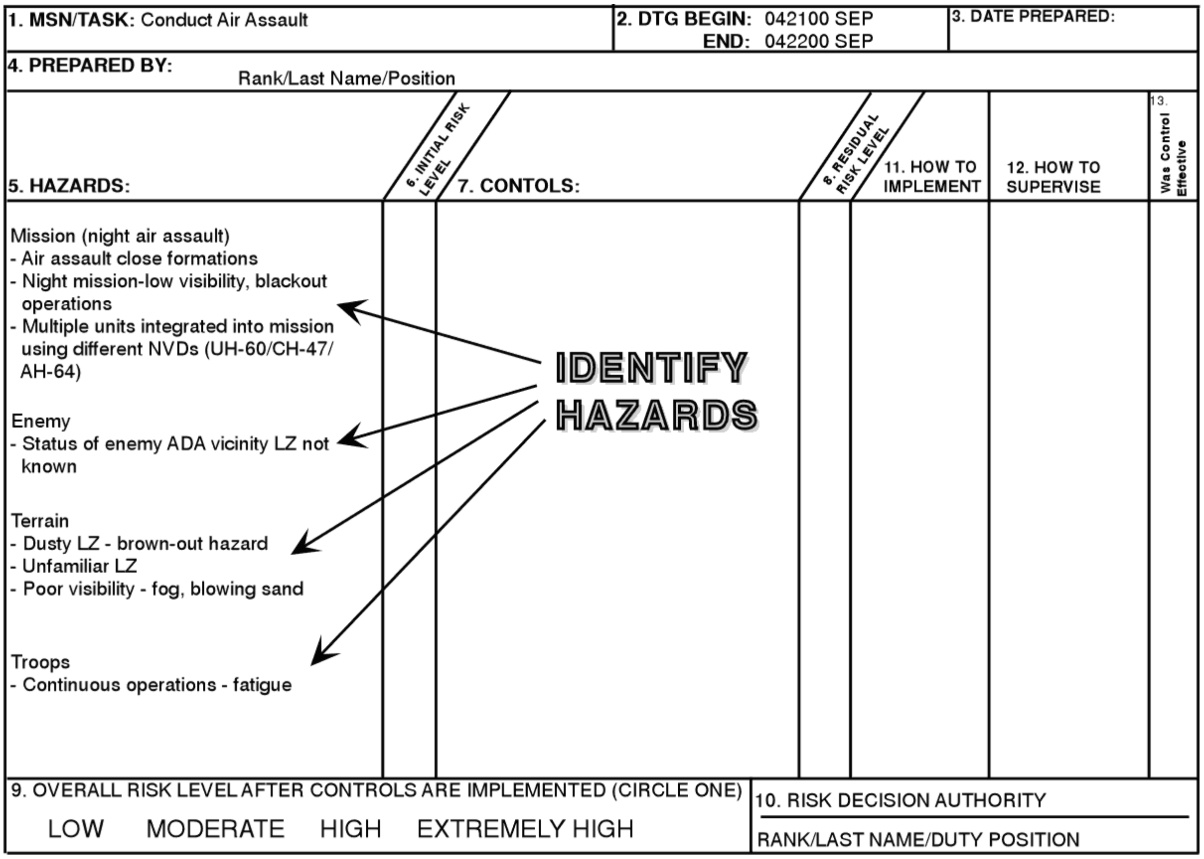


Figure A-3. Risk Management Worksheet—Identify Hazards

IDENTIFY HAZARDS

A-10. Collect METT-TC factors for each COA for the mission or task (See Figure A-4).

Sources

A-11. Sources include the following:

- Mission order/task instructions.
- CCIR.
- Mission planning systems.
- Tactical SOP.
- Unit accident history.
- Reconnaissance.
- Experience.

• MISSION:
- **AIR ASSAULT INFANTRY PERSONNEL**
- **INSERT NLT 042100 SEP, ROVER BEACH LZ**
- **PREPARE TO EXTRACT NLT 042200 SEP, SAME LZ**

• CONDITIONS
- **ONE COMPANY UH-60, 2 CH-47s, 2 AH-64s**
- **LOAD: 14 FULLY EQUIPPED SOLDIERS, 540 POUNDS SPECIAL EQUIPMENT**
- **BLACKOUT CONDITIONS**
- **LZ: 114 MILES FROM DEPARTURE POINT, 100 YARDS WIDE, SAND/ DIRT/GRASS**
- **WX: RESTRICTED VISIBILITY EN ROUTE AND AT LZ (ILLUMINATION, RAIN, FOG, LOOSE SAND)**

• SITUATION:
- **CREW: FULLY QUALIFIED, EXPERIENCED, SUPERB TEAMWORK**
- **MISSION BRIEF AT 041530 SEP (CREW AND PERSONNEL)**

Figure A-4. Example of Mission Factors

Review Factors

A-12. Review METT-TC factors to identify hazards most likely to cause loss of combat power. That is, identify those hazards that are not adequately controlled at this or the next lower echelon of command. To do this, answer the questions in the matrix below (Figure A-5) to determine if the hazard needs to be risk managed.

		Adequate	
		NO	YES
Support	- Is the type amount/capability/condition of support adequate to control hazards? - Personnel - Equipment and materials - Supplies - Services/facilities		
Standards	- Is guidance/procedure adequately clear practical/specific to control hazard?		
Training	- Is training adequately thorough and recent to control hazard?		
Leader	- Is leadership ready, willing, and able to enforce standards required to control hazards?		
Unit Self Discipline	- Is the unit performance and conduct self-disciplined to control hazard?		
If all are "Yes," no further action is required. If one or more are "No," risk manage the hazard. (Enter it on the risk management worksheet)			

Figure A-5. Does the Hazard Require Risk Management?

Record

A-13. Hazards determined to require risk management are identified to the SO/NCO, who enters them in Block 5 on the worksheet.

ASSESS HAZARDS

A-14. Once a hazard has been identified, it must be evaluated for control.

Risk Level

A-15. Determine the risk level of each hazard that is not adequately controlled. Use Figure A-6 and your best judgment to select the risk level.

Risk Level:
E - Extremely High
H - High
M - Moderate
L - Low

Severity		HAZARD PROBABILITY				
		Frequent	Likely	Occasional	Seldom	Unlikely
Severity	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L

Figure A-6. Risk Assessment—Assess Hazards

Record

A-16. Provide the risk level for each hazard to the SO/NCO. The SO/NCO enters this information in Block 6 of the risk management worksheet as the initial risk level for each hazard (Figure A-7).

DEVELOP CONTROLS

A-17. Develop one or more controls to eliminate each hazard or to reduce its level of risk. Controls should address the reasons that the hazard needs to be risk managed. Provide controls to the SO/NCO, who enters them in Block 7 of the risk management worksheet (Figure A-8).

DETERMINE RESIDUAL RISK

A-18. After controls are developed, a level of risk may remain.

Risk Assessment Matrix

A-19. For each hazard, use the risk assessment matrix (Figure A-9) and best judgment to determine the level of risk remaining, assuming that the controls are implemented.

Record

A-20. Provide the residual risk level for each hazard to the SO/NCO, who enters it in Block 8 of the risk management worksheet (Figure A-10).

1. MSN/TASK: Conduct Air Assault			2. DTG BEGIN: 042100 SEP END: 042200 SEP		3. DATE PREPARED:	
4. PREPARED BY: Rank/Last Name/Position						
5. HAZARDS:	6. INITIAL RISK LEVEL	7. CONTOLS:	8. RESIDUAL RISK LEVEL	11. HOW TO IMPLEMENT	12. HOW TO SUPERVISE	13. Was Control Effective
Mission (night air assault) - Air assault close formations - Night mission- low visibility, blackout operations - Multiple units integrated into mission using different NVDs (UH-60/CH-47/ AH-64)	EH	ASSESS HAZARDS				
Enemy - Status of enemy ADA vicinity LZ not known	EH					
Terrain - Dusty LZ - brown-out hazard - Unfamiliar LZ - Poor visibility - fog, blowing sand	H					
Troops - Continuous operations - fatigue	H					
9. OVERALL RISK LEVEL AFTER CONTROLS ARE IMPLEMENTED (CIRCLE ONE) LOW MODERATE HIGH EXTREMELY HIGH			10. RISK DECISION AUTHORITY RANK/LAST NAME/DUTY POSITION			

Figure A-7. Risk Management Worksheet—Assess Hazards

1. MSN/TASK: Conduct Air Assault	**2. DTG BEGIN:** 042100 SEP **END:** 042200 SEP	**3. DATE PREPARED:**
4. PREPARED BY: Rank/Last Name/Position		

5. HAZARDS:	**6. INITIAL RISK LEVEL**	**7. CONTOLS:**	**8. RESIDUAL RISK LEVEL**	**11. HOW TO IMPLEMENT**	**12. HOW TO SUPERVISE**	**13. Was Control Effective**
Mission (night air assault) - Air assault close formations - Night mission - low visibility, blackout operations - Multiple units integrated into mission using different NVDs (UH-60/CH-47/ AH-64)	EH	- Brief all participating crew on formation en route and at PZs and LZs. Conduct full rehearsal. - All crew members will have NVDs to to include all CEs. - Ensure that AH-64 crews have NVGs for CPGs. All participating PCs will attend mission briefing.				
Enemy - Status of enemy ADA vicinity LZ not known	EH	- Request UAV surveillance of LZ from Division.				
Terrain - Dusty LZ - brown-out hazard - Unfamiliar LZ - Poor visibility - fog, blowing sand	H	- All PCs will brief brown-out hazards to crews and rehearse procedure. - Provide photos/video of LZ for mission briefing. Ensure all have current hazard maps of PZ/LZ and route. - Support mission IFR - capable aircraft. Altitude no lower than 200 feet AGL en route. Ensure IMC breakup plan includes attached aircraft.				
Troops - Continuous operations - fatigue	H	- Monitor and enforce crew-rest plan				

DEVELOP CONTROLS

9. OVERALL RISK LEVEL AFTER CONTROLS ARE IMPLEMENTED (CIRCLE ONE) LOW MODERATE HIGH EXTREMELY HIGH	10. RISK DECISION AUTHORITY RANK/LAST NAME/DUTY POSITION

Figure A-8. Risk Management Worksheet—Develop Controls

Risk Level:
E - Extremely High
H - High
M - Moderate
L - Low

		HAZARD PROBABILITY				
		Frequent	**Likely**	**Occasional**	**Seldom**	**Unlikely**
Severity	**Catastrophic**	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
	Marginal	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**

Figure A-9. Risk Assessment Matrix—Determine Residual Risk

1. MSN/TASK: Conduct Air Assault			2. DTG BEGIN: 042100 SEP END: 042200 SEP		3. DATE PREPARED:	
4. PREPARED BY: Rank/Last Name/Position						
5. HAZARDS:	6. INITIAL RISK LEVEL	7. CONTOLS:	8. RESIDUAL RISK LEVEL	11. HOW TO IMPLEMENT	12. HOW TO SUPERVISE	13. Was Control Effective
Mission (night air assault) - Air assault close formations - Night mission - low visibility, blackout operations - Multiple units integrated into mission using different NVDs (UH-60/CH-47/ AH-64)	EH	- Brief all participating crew on formation en route and at PZs and LZs. Conduct full rehearsal. - All crew members will have NVDs to to include all CEs. - Ensure AH-64 crews have NVGs for CPGs. All participating PCs will attend mission briefing.	M			
Enemy - Status of enemy ADA vicinity LZ not known	EH	- Request UAV surveillance of LZ from Division.	M	RESIDUAL RISK		
Terrain - Dusty LZ - brown-out hazard - Unfamiliar LZ - Poor visibility - fog, blowing sand	H	- All PCs will brief brown-out hazards to crews and rehearse procedure. - Provide photos/video of LZ for mission briefing. Ensure all have current hazard maps of PZ/LZ and route. - Support mission IFR - capable aircraft. Altitude no lower than 200 feet AGL en route. Ensure IMC breakup plan includes attached aircraft.	L			
Troops - Continuous operations - fatigue	H	- Monitor and enforce crew-rest plan	L			
9. OVERALL RISK LEVEL AFTER CONTROLS ARE IMPLEMENTED (CIRCLE ONE) LOW MODERATE HIGH EXTREMELY HIGH			10. RISK DECISION AUTHORITY RANK/LAST NAME/DUTY POSITION			

Figure A-10. Risk Management Worksheet—Residual Risk

DETERMINE COURSE OF ACTION RISK

A-21. SOs/NCOs determine the overall risk level for each COA, assuming that the commander selects the controls and they are implemented.

Unit Standing Operating Procedure

A-22. SOs/NCOs use procedures in the unit's SOP when determining overall risk. If the unit has no such procedures, the COA's overall risk level is the same as the hazard with the highest residual risk. They circle the COA's risk level in Block 9 (See Figure A-10).

Residual Risk Criterion

A-23. SOs/NCOs analyze the feasibility and acceptability of each COA in terms of residual risk. They score the residual risk criterion for each COA using weights determined by the XO and provide these scores for entry on the decision matrix.

Report

A-24. SOs/NCOs present hazards, controls, and risks during commanders' decision briefings. Risk management worksheets may be used for this purpose.

MAKE RISK DECISION

A-25. Commanders make the decisions.

Decision Process

A-26. Commanders select the COA and decide whether to accept the COA's risk level. They decide what level of residual risk they will accept and approve control measures that will result in that level or a lower level of risk. They obtain the higher commander's approval to accept any level of residual risk that might imperil the higher commander's intent or is not consistent with risk guidance. In Block 10, SOs/NCOs enter the name, rank, and duty position of the commander accepting the COA's risk level (Figure A-11).

Issue Refined Risk Guidance

A-27. The S3 develops and issues a warning order that contains the commander's refined risk guidance.

IMPLEMENT CONTROLS

A-28. Based on the commander's decision and risk guidance, the staff determines how each control will be put into effect or communicated to the personnel who will make it happen; for example, FRAGO, OPORD, SOP, mission briefing, or rehearsals. SOs/NCOs enter this information in Block 11 of the risk management worksheet (Figure A-11). The staff coordinates controls, integrates them into the FRAGO and/or appropriate paragraphs and graphics of the OPORD, and confirms understanding by subordinate units during the rehearsal.

SUPERVISE

A-29. The staff determines how each control will be monitored or enforced to ensure that it is effectively implemented; for example, command presence, direct supervision, precombat inspection, precombat checks, SITREP, spot check, radio net monitoring, cross talk, and back brief. The staff provides control supervision methods to the SO/NCO, who enters them in Block 12 (Figure A-12).

RISK MANAGEMENT ASSESSMENT

A-30. Evaluation of risks and controls is an ongoing process.

Evaluate Controls

A-31. Staff members evaluate the effectiveness of each control in reducing the risk of the targeted hazard. They provide a "yes," if effective, or "no," if not, to the SO/NCO, who enters this information in Block 13.

1. MSN/TASK: Conduct Air Assault	**2. DTG BEGIN:** 042100 SEP **END:** 042200 SEP
3. DATE PREPARED:	
4. PREPARED BY: Rank/Last Name/Position	

5. HAZARDS:	6. INITIAL RISK LEVEL	**7. CONTOLS:**	8. RESIDUAL RISK LEVEL	**11. HOW TO IMPLEMENT**	**12. HOW TO SUPERVISE**	13. Was Control Effective
Mission (night air assault) - Air assault close formations - Night mission - low visibility, blackout operations - Multiple units integrated into mission using different NVDs (UH-60/CH-47/ AH-64)	EH	- Brief all participating crew on formation en route and at PZs and LZs. Conduct full rehearsal. - All crew members will have NVDs to to include all CEs. - Ensure AH-64 crews have NVGs for CPGs. All participating PCs will attend mission briefing.	M	Mission briefings Rehearsal - Mission - Crew	IMPLEMENT	
Enemy - Status of enemy ADA vicinity LZ not known	EH	- Request UAV surveillance of LZ from Division.	M	Coordinate w/ div G3 for UAV support		
Terrain - Dusty LZ - brown-out hazard - Unfamiliar LZ - Poor visibility - fog, blowing sand	H	- All PCs will brief brown-out hazards to crews and rehearse procedure. - Provide photos/video of LZ for mission briefing. Ensure all have current hazard maps of PZ/LZ and route. - Support mission IFR - capable aircraft. Altitude no lower than 200 feet AGL en route. Ensure IMC breakup plan includes attached aircraft.	L	Mission briefings Rehearsal - Mission - Crew		
Troops - Continuous operations - fatigue	H	- Monitor and enforce crew-rest plan.	L	Mission brief TACSOP		

9. OVERALL RISK LEVEL AFTER CONTROLS ARE IMPLEMENTED (CIRCLE ONE) LOW MODERATE HIGH EXTREMELY HIGH	10. RISK DECISION AUTHORITY RANK/LAST NAME/DUTY POSITION

Figure A-11. Risk Management Worksheet—Implement

1. MSN/TASK: Conduct Air Assault	2. DTG BEGIN: 042100 SEP END: 042200 SEP	3. DATE PREPARED:
4. PREPARED BY: Rank/Last Name/Position		

5. HAZARDS:	6. INITIAL RISK LEVEL	7. CONTOLS:	8. RESIDUAL RISK LEVEL	11. HOW TO IMPLEMENT	12. HOW TO SUPERVISE	13. Was Control Effective
Mission (night air assault) - Air assault close formations - Night mission - low visibility, blackout operations - Multiple units integrated into mission using different NVDs (UH-60/CH-47/AH-64)	EH	- Brief all participating crew on formation en route and at PZs and LZs. Conduct full rehearsal. - All crew members will have NVDs to to include all CEs. - Ensure that AH-64 crews have NVGs for CPGs. All participating PCs will attend mission briefing.	M	Mission briefings Rehearsal - Mission - Crew	Direct supervision brief backs	
Enemy - Status of enemy ADA vicinity LZ not known	EH	- Request UAV surveillance of LZ from Division.	M	Coordinate w/ div G3 for UAV support	Brief back from Bde S3	
Terrain - Dusty LZ - brown-out hazard - Unfamiliar LZ - Poor visibility - fog, blowing sand	H	- All PCs will brief brown-out hazards to crews and rehearse procedure. - Provide photos/video of LZ for mission briefing. Ensure all have current hazard maps of PZ/LZ and route. - Support mission IFR - capable aircraft. Altitude no lower than 200 feet AGL en route. Ensure IMC breakup plan includes attached aircraft.	L	Mission briefings Rehearsal - Mission - Crew SUPERVISE	Direct supervision	
Troops - Continuous operations - fatigue	H	- Monitor and enforce crew-rest plan.	L	Mission brief TACSOP	Direct supervision Brief backs	

9. OVERALL RISK LEVEL AFTER CONTROLS ARE IMPLEMENTED (CIRCLE ONE)	10. RISK DECISION AUTHORITY
LOW MODERATE HIGH EXTREMELY HIGH	RANK/LAST NAME/DUTY POSITION

Figure A-12. Risk Management Worksheet—Supervise

Ineffective Controls

A-32. For each control judged not effective, staff members determine why it was not effective and what to do the next time the hazard is identified; for example, change the control, develop a different control, or change the method of implementation or supervision. They provide this information to safety personnel, who report it during the AAR.

Report

A-33. The SO, with the safety NCO, evaluates the unit's risk management performance and reports during the AAR. The matrix below (Figure A-13) may be used for this report.

	GO	NO-GO
Identified the most important hazards.		
* Available facts for each METT-TC factor gathered and considered.		
* Hazard (enemy and accident) most likely to result in loss of combat power identified?		
Assessed risk level of each hazard.		
* Valid method/tool used to assess initial risk levels?		
Developed appropriate control options and determined residual risk.		
* Each control addressed hazard reason(s)?		
* Residual risk level realistic for each hazard?		
* Valid method/tool used to determine the residual risk level for each COA?		
* Residual risk level for each COA entered on decision matrix?		
Made risk decision for selected COA.		
* Valid procedure/guidance used for determining risk decision authority?		
Hazards and controls clearly communicated to responsible unit/leadership.		
* Controls integrated into appropriate paragraphs and graphics of the OPORD/FRAGO and rehearsals?		
Implemented and enforced controls.		
* Effective methods used to supervise/enforce controls?		

Figure A-13. Risk Management Task Standards and Performance Assessment

DEFINITIONS

A-34. The following terms are defined as they are used in the risk management process.

CONDITIONS

A-35. Conditions are the readiness status of personnel and equipment with respect to the operational environment during mission planning, preparation, and execution. Readiness that is below standard leads to human error, material failure, and inadequate precautions for environmental factors, which may cause accidents, fratricide, and mission degradation.

CONTROLS

A-36. Controls are actions are taken to eliminate hazards or reduce their risk.

HAZARD

A-37. A hazard is an actual or potential condition that can cause injury, illness, or death of personnel; damage to or loss of equipment or property; or mission degradation.

PROBABILITY

A-38. The levels of probability that an event will occur are the following:

- Frequent: Occurs often, continuously experienced.
- Likely: Occurs several times.
- Occasional: Occurs sporadically.
- Seldom: Unlikely, but could occur at some time.
- Unlikely: Can assume it will not occur.

RESIDUAL RISK

A-39. Residual risk is the level of risk remaining after controls have been selected for hazards. (Controls are identified and selected until residual risk is at an acceptable level or until it is impractical to reduce further.)

RISK

A-40. Risk level is the probability of exposure to injury or loss from a hazard expressed in terms of hazard probability and severity.

RISK ASSESSMENT

A-41. Risk assessment is the identification and assessment of hazards (the first two steps of the risk management process).

SEVERITY

A-42. The level of severity is the expected consequence of an event in terms of degree of injury, property damage, or other mission-impairing factors. These levels are the following:

- Catastrophic: Death or permanent total disability, system loss, major damage, significant property damage, or mission failure.
- Critical: Permanent partial disability, temporary total disability exceeding three months, major system damage, significant property damage, or significant mission degradation.
- Marginal: Minor injury, lost workday accident, minor system damage, minor property damage, or some mission degradation.
- Negligible: First aid or minor medical treatment, minor system impairment, or little or no impact on mission accomplishment.

Appendix B

Tactical Standing Operating Procedures Considerations

GENERAL

B-1. SOPs detail how forces execute specific techniques and procedures that commanders standardize to enhance effectiveness, timeliness, and flexibility. Commanders use SOPs to standardize routine or recurring actions that normally do not require their personal involvement. They develop SOPs from doctrinal sources, applicable portions of the higher headquarters SOPs, higher commander's guidance, and techniques and procedures developed through experience. The tactical SOP must be as complete as necessary but not so voluminous that new arrivals or newly attached units cannot quickly become familiar with the routine of their new controlling headquarters.

BENEFITS

B-2. The benefits of SOPs include the following:

- Simplified, concise combat orders.
- Enhanced understanding and teamwork among commanders, staffs, and units.
- Established, synchronized staff drills.
- Established, abbreviated, or accelerated decision-making techniques.

RESPONSIBILITY

B-3. The S3, with input from other staff sections, is responsible for preparing, coordinating, authenticating, publishing, and distributing the command's tactical SOP.

TACTICAL STANDING OPERATING PROCEDURE PRINCIPLES

B-4. Discussed below are some of the principles common to successful tactical SOPs.

SIMPLICITY

B-5. Simple, easy-to-read and easy-to-execute procedures are critical to tactical SOP application. Critical items of procedure should be presented in as few words and graphics as possible. Task organization changes can occur rapidly, but *effective* task organization requires each of the units attached or placed under OPCON to be able to operate with efficiency. A 200-page SOP is a daunting document to absorb when the unit is attached in the morning for an operation that afternoon.

DOCTRINE

B-6. A tactical SOP cannot deviate from doctrine. The more a tactical SOP parallels doctrine, the easier that it will be to learn and execute.

COMMONALITY

B-7. Standardization of tactical SOPs is essential within a division and should probably extend to all units within a corps. Attack, assault, air reconnaissance, GS, heavy helicopter, and even UAV units could have difficulty operating together unless each unit operates from a common SOP. That standardization effort should include reinforcing units and, especially, reserve component units. Just as aviation units today conduct worldwide and local standardization conferences for flight operations, units within a division and a corps should consider conducting tactical SOP conferences to ensure standardization of tactical procedures.

AVAILABILITY

B-8. With the growth of the Internet, SOP sharing and transmission of tactical SOPs are easy. Many good tactical SOPs are available to provide a base outline for units. The challenge is to develop and publish a standardized tactical SOP within the division and the corps.

TRAINING

B-9. No tactical SOP will produce the desired results unless it is constantly reviewed and tested. The tactical SOP should be a topic in every pilot's briefing. The tactical SOP should also be a point of discussion in every OPORD and plan—and during every tactical exercise after-action review. Standardized and internalized tactical SOPs make training easier to supervise and execute while making battles less costly to win.

Appendix C

Deployment

SECTION I – DEPLOYMENT FUNDAMENTALS

GENERAL

C-1. This appendix addresses deployment of ground vehicles, equipment, and aircraft. The capability to quickly deploy aviation assets from CONUS or forward-deployment sites to another theater is an important aspect of U.S. forces' rapid deployment. Units that plan, train, and validate their movement plans greatly increase their chances for success.

C-2. Units may be required to move from any location to railheads, seaports of embarkation (SPOE), or aerial ports of embarkation (APOE) from which they will be transported to the theater of operations. Movement to the SPOE or APOE may involve a combination of modes. Aircraft are generally flown to the port. Vehicles, depending on distance, may convoy or be shipped via rail.

C-3. Units also must be prepared to self-deploy aircraft, limited personnel, and selected equipment to almost anywhere in the world.

COMMANDER

C-4. The commander is responsible for unit movement. He directs preparation of SOPs, movement orders, and load plans. He validates SOPs and orders through periodic training exercises.

UNIT MOVEMENT PERSONNEL

C-5. Unit movement personnel develop SOPs and load plans. They train personnel and ensure that equipment is prepared for the move. They inspect equipment before and after the unit moves. They also request appropriate support.

SECTION II – PLANNING AND PREPARATION, SEA AND AIR TRANSPORT

C-6. Successful movement depends on detailed planning, SOPs for deployment by various methods, and the identification, training, and validation of deployment and load teams. Each team member has specific duties, from preparation at home station, to clearance of the port of debarkation (POD), to arrival at destination.

C-7. Upon receiving the warning order and time permitting, advance parties are sent to both the ports of embarkation (POEs) and PODs to prepare for embarkation and debarkation and to provide command, control, and intelligence (C^2I).

C-8. The following references discuss deployment actions and considerations:

- *Unit Movement Officer (UMO) Deployment Handbook Reference 97-1*, published by the U.S. Army Transportation School. Download from http://www.transchool.eustis.army.mil/.
- Appendix H, *Deployment,* FM 3-04.500 (FM 1-500). Download FMs from http:// www.adtdl.army.mil/atdls.htm.
- FM 4-01.011 (FM 55-65).

C-9. Military Traffic Management Command Transportation Engineering Agency (MTMCTEA) pamphlets provide specific guidance for preparation of equipment for movement. Download from http://www.tea.army.mil/dpe/field.htm:

- MTMCTEA Pamphlet 55-19 (Rail).
- MTMCTEA Pamphlet 55-20 (Truck).
- MTMCTEA Pamphlet 55-21 (Helicopter).
- MTMCTEA Pamphlet 55-22 (Lifting and Lashing).
- MTMCTEA Pamphlet 55-23 (Containerization).
- MTMCTEA Pamphlet 55-24 (Air).

C-10. Aircraft preparation, lifting, and tiedown must be according to appropriate preparation for shipment manuals and specific loading instructions manuals for military aircraft (fixed-wing air shipments only). Download from http://www.logsa.army.mil/ etms/online.htm:

- TM 1-1520-Apache/Longbow.
- TM 1-1520-237-S.
- TM 1-1520-238-S.
- TM 1-1520-248-S.
- TM 55-1520-241-S.
- TM 55-1520-242-S.

C-11. Not all contingencies for unit movement can be foreseen because of the wide range of missions and world events that may occur. Unit staffs should be aware of battle book plans and war game probable and possible scenarios. They should establish skeleton plans to cover contingencies.

C-12. Unit movement personnel should be familiar with the POEs available to their organization and mission requirements. Special needs and considerations should be addressed as early as possible for each POE. Unit movement personnel should—

- Establish and periodically update telephone lists, points of contact, and special requirements for likely POEs.
- Identify advance party personnel and define duties.
- Identify OPSEC requirements during movement and embarkation activities.
- Plan workspace for personnel during the embarkation phase (empty offices, borrowed tentage from nondeploying units, and rented or borrowed trailers).
- Identify communications requirements (commercial lines, wire, radio, and cellular phone).

- Determine transportation requirements at POE for movement teams and key personnel (borrowed vehicles and rental cars).
- Plan messing, billeting, medical treatment facilities, refueling/defueling points, and special requirements for weapons and ammunition.

SECTION III – SEA OR AIR TRANSPORT DEPLOYMENT

MOVEMENT

C-13. Upon receiving the order, units ferry their aircraft and move ground vehicles along preselected routes to the POE. Units that can perform depot-level maintenance normally operate at these embarkation points. As the units arrive, a dedicated depot support team assists in preparing the vehicles, equipment, and aircraft for deployment. Preparation includes required maintenance and installation of ferry equipment.

C-14. Air and sea deployment modes terminate at aerial and sea ports of debarkation (APOD/SPOD). Depot or AVIM facilities should be available there or elsewhere in the theater. Personnel at these facilities remove ferry equipment, install mission equipment, and perform required maintenance and inspections to prepare the equipment for the mission. They also coordinate the immediate backhaul of designated support teams and ferry equipment. On receipt of the deployment order, AVIM commanders dispatch preselected facility teams. Deployment headquarters staff members should locate command facilities at each termination site to facilitate the integration of aircraft, vehicles, and personnel into the theater force structure.

TASK ORGANIZATION

C-15. Arriving elements task organize and reconfigure vehicles and aircraft as appropriate for the mission. CSS efforts are prioritized to build combat-capable units and C^4I architecture.

FORCE PROTECTION

C-16. Aviation forces are particularly vulnerable during the buildup phase when the unit is not at full strength and aircraft and vehicles may not be fully assembled for combat. The security plan must be understood and executed from the moment that the first unit arrives. This plan should include passive and active measures to combat air and ground threats.

C-17. Aviation forces often are among the first units to arrive in theater. They may have to provide reconnaissance, security, and attack operations to secure a lodgment before more forces arrive in theater. This situation may require aviation units to conduct immediate and continuous operations from offshore or remote locations while the main body moves into the lodgment area.

C-18. To reduce the risk of fratricide, crew members must understand—

- The composition and location of friendly forces and the plan.
- Theater-specific IFF procedures.

TRAINING

C-19. Local area orientations, test flights, or other requirements that could not be executed in advance may be required. Commanders should attempt to phase the arrival of personnel—such as instructor pilots, test pilots, and key leaders—to begin before the entire unit arrives. If units are already present in country, these key personnel should deploy as early as possible to train with those units. The advance party should be briefed on these requirements and the plan for their execution so that they can identify and coordinate required external support.

C-20. Acclimation training may be required. Many units that move from one environmental extreme to another need a period of adjustment to the new climate. The unit commander or S3 should arrange training and conditioning to accelerate acclimation.

C-21. Most deployments will involve operating in a joint or multinational environment. Early-arriving units may be able to schedule training with other services. Liaison elements should be designated to ensure smooth coordination.

SECTION IV – PLANNING CONSIDERATIONS, SELF-DEPLOYMENT

GENERAL

C-22. Self-deployment is an alternative method to rapidly move aircraft. AH-64, UH-60, and CH-47D helicopters with auxiliary tanks can carry enough usable fuel to self-deploy to many locations.

C-23. Commanders should avoid self-deployment over large bodies of water except in an emergency when other methods are not available. This method is risky because aircrews face the challenge of a possible ditching at sea.

C-24. Units should not plan to deploy combat troops on self-deploying aircraft. Available space is typically used to accommodate those supplies, tools, parts, survival equipment, and limited support personnel necessary to make the flights self-sustaining during the deployment.

C-25. Configuring some aircraft to self-deploy long distances may require alternate transport of some weapons systems, equipment, and baggage. Maintenance and armament personnel must reconfigure these aircraft before the unit can commit them to combat.

C-26. The commander, with the S3 and SO, develops a preaccident contingency plan before self-deployment. The S1 identifies available medical treatment facilities along the route and advises the S3.

C-27. Unit staff members plan procedures for downed aircrew and aircraft recovery.

C-28. Staff members conduct risk analysis and consider alternatives. For extensive legs of flight over water, plans should include Naval assets along the flight route to provide intermediate fuel stops or SAR.

C-29. Ground support teams should be prepositioned at stopover points along self-deployment flight routes. Ground support teams include personnel, equipment, and repair parts to provide limited services. These services include POL products, supply, health service support, communications, weather forecasting, and flight planning.

PERSONNEL

C-30. Aircrews and passengers may require passports and visas for each country of intended landing. The mission may require crew members or other support personnel with specific foreign language proficiency for those countries in which refueling or extended stopovers are planned.

C-31. Extensive distances may require aircrews to fly many hours. The challenge is to ensure that crews are able to fight when they arrive in theater. Commanders should adjust work and rest schedules before and during deployment. Commanders must plan to rotate crews through pilot duties whenever possible. Deploying units could carry backup crews from nondeploying units on CH-47 and UH-60 aircraft.

INTELLIGENCE

C-32. S2s obtain threat intelligence information about those countries that are overflown and those where landings are planned. Terrorist threats, counterintelligence, and specific force protection concerns are important to aircrews for planned and potential stops.

TRAINING

C-33. Commanders should place emphasis on predeployment training including sea survival, fuel system management, high gross-weight operations, route flight checks, International Civil Aviation Organization (ICAO) flight planning, navigation equipment, communication requirements, shipboard operations, and rescue operations.

C-34. En route and destination environmental considerations—such as high altitude, mountainous and jungle terrain, and over-water flight—are considered. Crews must be trained for survival in the environment and the use of special equipment required for each environment.

C-35. Theater-specific ROE, status of forces agreements (SOFAs), local customs, language training, and OPSEC requirements that can be anticipated should be performed at home station, if possible.

LOGISTICS

C-36. Self-deploying and supporting units request and coordinate maintenance and crew-rest facilities, fuel, transportation, security, and messing for stopover-point teams and self-deploying aircrews. If U.S. ground support teams are not available, units coordinate with friendly nations to provide the required services. The S5 is the point of contact for staff officers who deal with host nations. If no S5 is assigned, the S3 performs this function.

C-37. When aviation units deploy to destinations lacking fixed-base facilities, prepositioned ground support teams perform those functions. S4s of self-deploying and supporting units are responsible for logistics requirements along the self-deployment route. Aviation maintenance officers organize a maintenance support operation to prepare aircraft for self-deployment and to meet maintenance requirements along the route.

C-38. Staff members verify availability and quantity of fuel at en route fuel stops, rather than depending solely on Department of Defense Flight Information Publications (DOD FLIP). An appropriate agency verifies fuel quality at each location before refueling.

C-39. Contracting officers or Class A agents, if required at stopover sites, should be in the advance party.

C-40. The unit should issue appropriate survival equipment and clothing for the climate that it expects to encounter.

C-41. To facilitate mission readiness, movement planners, logisticians, and maintenance personnel carefully war game the arrival of units and equipment into the theater.

SELF-DEPLOYMENT MISSION PLANNING

C-42. Air defense identification zone (ADIZ) procedures, as well as international interception signals, must be clearly understood by all aircrew members.

C-43. All aircrew members must obtain and understand approved international clearances before departure.

FLIGHT ORGANIZATION AND AIRCRAFT CONFIGURATION

C-44. Each departing flight of multiple aircraft should be self-sustaining in terms of food, water, limited maintenance capability, and force protection. Aircraft with limited cargo capacity—such as AH-64s or OH-58Ds—require task organization with UH-60s or CH-47s. USAF CSAR or Naval support is essential for downed aircrew recovery. Ideally, an escort SAR aircraft is assigned. Without escort, each flight should include at least two aircraft with rescue hoists.

C-45. Maintenance personnel and a maintenance test pilot are included in the flights themselves or are prepositioned at various planned stopover locations.

C-46. Depending on type of aircraft and space available, a maintenance support package might include an auxiliary fuel system, tow bars, packaged POL, limited spare parts, a mechanic's toolbox, and tug or tow vehicle.

COMMUNICATIONS

C-47. Units—

- Must coordinate frequencies for internal flight following throughout the trip.
- Must coordinate and verify compatibility of specific frequencies for supporting Naval vessels and SAR elements.
- Take SATCOM sets if available; SATCOM enables each flight to communicate its status to home station and the theater of operations.

EQUIPMENT

C-48. Survival vests, rafts, hot-cold-weather survival kits, rescue hoists, survival radios, food, and water are essential mission equipment.

C-49. Each flight should have multiple aircraft with extra survival equipment that can be dropped to downed crew members.

WEAPONS

C-50. Individual and crew-served weapons should normally remain out of sight during flight and ground operations.

C-51. The controlling headquarters issues ROE when deploying units carry weapons and ammunition.

SECTION V – SELF-DEPLOYMENT ROUTES

C-52. Aircraft equipped with ferry tanks can self-deploy over long distances. The following Atlantic routes (Figures C1 through C3) support general planning. Additional stopover points, land or sea based, may be required because of variables. Coordination of friendly ships with landing and refueling capability may allow less deviation. There are no published Pacific routes.

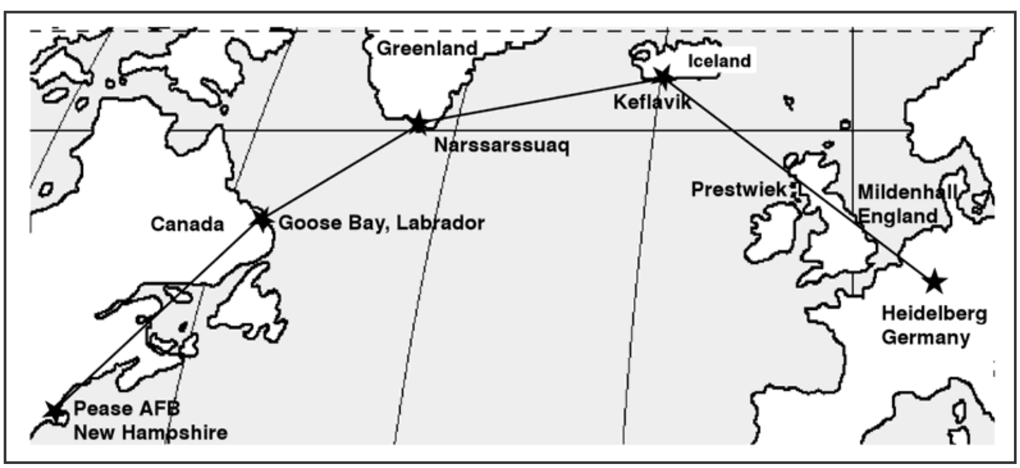


Figure C-1. European Route Northern

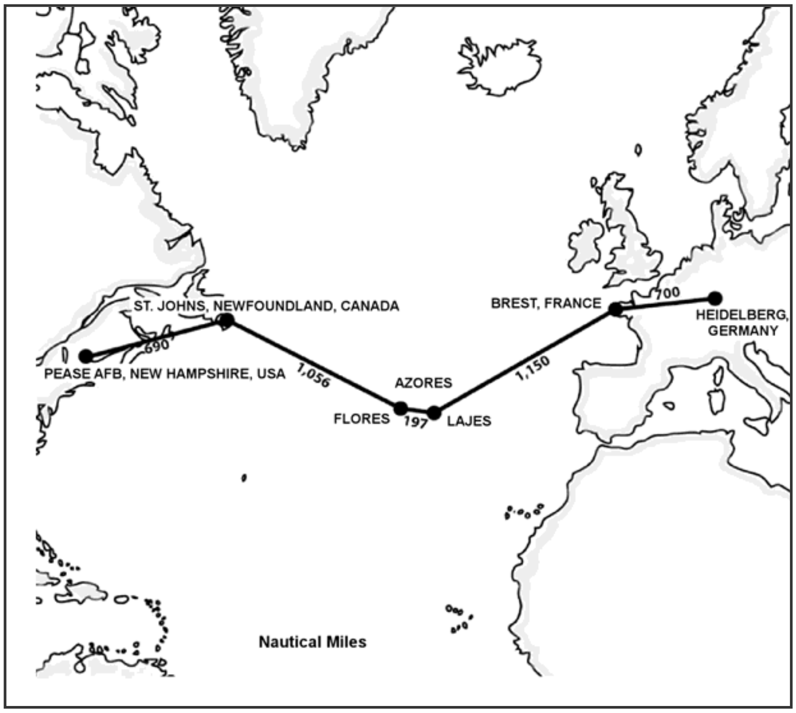


Figure C-2. European Route Central

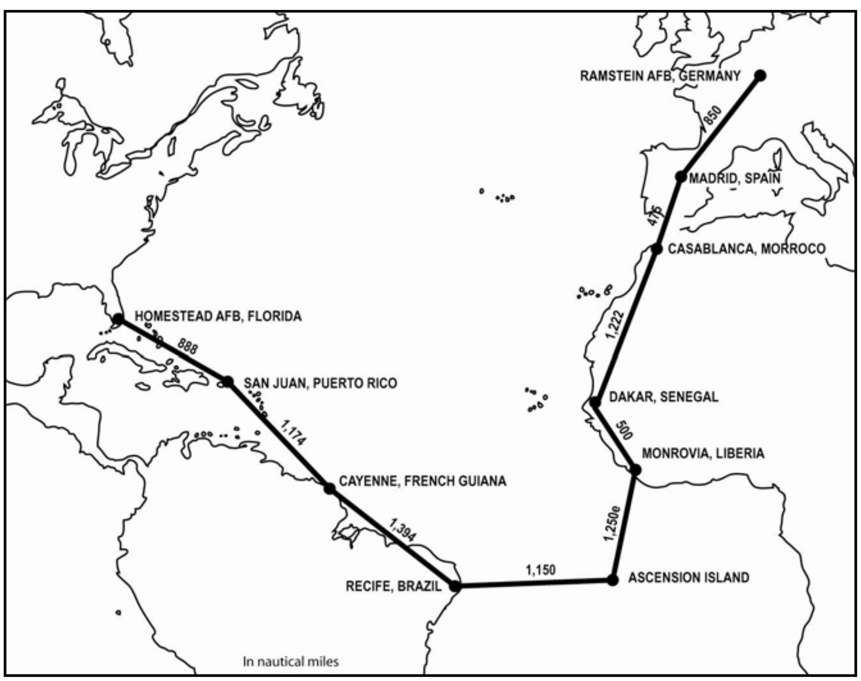


Figure C-3. European Route Southern

Appendix D

Assembly Area Operations/Road March

SECTION I – DESIGNATION OF ASSEMBLY AREAS

GENERAL

D-1. An AA is a location where units prepare for future operations, issue orders, perform maintenance, and accomplish resupply. Aviation unit AAs may vary from fixed-base airfields to remote field sites. Regardless of the type of AA that the unit occupies, the commander and staff adhere to certain principles to ensure unit survivability. AAs usually locate in the corps or division rear area or near the higher headquarters AA. Aviation AAs usually locate out of the range of enemy medium artillery and are large enough to adequately disperse subordinate units.

ASSEMBLY AREAS

D-2. The AA security and maintenance of OPTEMPO must be balanced. It is very difficult for aviation units to secure their own AAs and maintain high OPTEMPOs; therefore, additional security must be requested from higher headquarters. An AA must provide—

- Security through location, self-defense, and integration into defensive schemes of adjacent units.
- Concealment for aircraft.
- Cover and concealment for ground elements.
- Accessibility to adequate roads and MSR.
- Proximity to friendly units to assist communications, coordination, and logistics.
- Suitable ground and aircraft ingress/egress routes.
- Distance from projected enemy avenues of approach.

HEAVY ASSEMBLY AREAS

D-3. Aviation brigades may disperse battalion AAs based on mission and threat. They may also collocate battalion AAs around the brigade main CP to form a HAA. This action facilitates better C^3I and provides mutual defense when terrain offers little concealment and air or artillery attacks are unlikely. This action may also occur during SSC or SASO when an airfield or base camp is the primary source of supply.

FORWARD ASSEMBLY AREAS

D-4. Units occupy FAAs while awaiting orders to execute missions. FAAs locate near the controlling headquarters to improve C^3I interface and response times. Limited maintenance personnel, such as contact teams, may locate in the FAA. Considerations for selecting FAAs are the same as for selecting AAs. The FAA should locate out of range of enemy medium artillery.

SHARED ASSEMBLY AREAS (BASE CLUSTER DEFENSE)

D-5. Fundamentals that apply to AAs also apply to base cluster defense. The base cluster commander develops and integrates flexible defense plans to allow for differing degrees of preparation based on the probability of enemy activities.

ASSEMBLY AREA RESPONSIBILITIES

D-6. Commanders must designate who is responsible to select, occupy, and secure unit AAs. Listed below are typical staff responsibilities for the AA duties. The commander may decide to assign these responsibilities to others.

EXECUTIVE OFFICER

D-7. The XO performs the following AA duties:

- Establishes timelines for AA moves.
- Develops triggers, based upon a DST, that cue the need to displace the AA.
- Rehearses AA occupation and movement.

OPERATIONS OFFICER

D-8. The S3 performs the following AA duties:

- Selects future main CP sites.
- Selects site for the TOC within the main CP.
- Coordinates ISR plan development with the S2.
- Establishes a jump, or temporary, TOC, if necessary, until the TOC is established at the main CP site.
- Develops plans and orders for moving to the AA.
- Plans air routes and coordinates A^2C^2 for air routes to the new AA.
- Plans fires supporting the AA move.
- Develops plans to reconnoiter movement routes and new AA location.
- Plans and requests support, if necessary, for MEDEVAC assets to assist during the move.
- Coordinates with higher or adjacent units for land to establish the AA and integrates into their defensive plans.
- Requests engineer support to assist in AA improvement.
- Coordinates and requests AD support for the AA.

INTELLIGENCE OFFICER

D-9. The S2 performs the following AA duties:

- Develops an event template and the DST for the AA, resulting in DPs necessary to plan and execute AA displacement.
- Develops NAI near the AA.
- Develops the ISR plan, with the S3, for the AA.

- Tracks enemy movements in relation to the displacement DPs and informs the commander if the enemy reaches selected DPs.
- Assists the HHC commander and S3 in selecting new AAs by conducting a threat and terrain analysis of the proposed AA location.

LOGISTICS OFFICER

D-10. The S4 performs the following AA duties:

- Develops march tables for the vehicle convoy to the new AA.
- Selects the location for the ALOC.

COMMUNICATIONS-ELECTRONICS OFFICER

D-11. The S6 performs the following AA duties:

- Analyzes potential AA sites and determines their suitability in terms of providing communications for the task force.
- Establishes a retransmission site, if required, to assist during unit moves.
- Analyzes potential AAs for their proximity to MSE nodes.

COMMAND SERGEANT MAJOR

D-12. The CSM, or an NCO designated by the CSM, performs the following AA duties:

- Assists the S3 and S4 in developing movement orders.
- Supervises the breakdown of the old AA.
- Leads the quartering or advance party in coordination with the HHC commander and first sergeant.
- Supervises the establishment of the new AA.

HEADQUARTERS AND HEADQUARTERS COMMANDER

D-13. The HHC commander or 1SG performs the following AA duties:

- Organizes the march serials, designates serial commanders, and conducts convoy briefings.
- Leads the quartering or advance party.
- Selects locations, with the S3, for future AAs.
- Conducts a reconnaissance of proposed AA sites.
- Selects emergency displacement AAs.

ASSEMBLY AREA SELECTION

D-14. The AA is chosen to support projected battalion missions. Before selection, units conduct a map reconnaissance and a site survey of the proposed location. After selecting and coordinating an AA site, units occupy it on order. Units plan and rehearse occupation of the AA. Occupation of an AA is a four-phase operation:

- Reconnaissance.
- Quartering party and advance party operations.

- Main body arrival (air and ground).
- AA improvement.

ROUTE RECONNAISSANCE

D-15. Units conduct a route reconnaissance of convoy routes before the quartering party moves to the new AA location. Commanders may conduct separate reconnaissance using aircraft or vehicles or both or may reconnoiter concurrently just in front of the convoy. The purpose of this reconnaissance:

- Verifies the suitability of the convoy route.
- Locates areas along the route that could delay the convoy.
- Determines how much traffic is on the route.
- Looks for potential enemy ambush sites along the route or evidence of enemy activity.

AREA RECONNAISSANCE

D-16. The unit accomplishes an area reconnaissance of the AA location and the surrounding terrain as soon as possible after selecting the AA site. The unit conducts this area reconnaissance by air or ground or both. If conducting the reconnaissance by air, aircrews should land and allow the reconnaissance party to physically walk and observe the layout of the terrain. Items to look for include suitability of the area's size and slope and vehicle accessibility from a ground stability and drainage standpoint. The commander considers an NBC survey and examines defensibility of the site to include available cover and concealment for ground elements, fields of fire, dead zones, and likely enemy infiltration and attack routes. Look for ground units operating nearby to ascertain whether ground tracked vehicles may transit through the area selected.

FORWARD ASSEMBLY AREA

D-17. The FAA is occupied only by the tactical CP, limited aircraft, and a minimum number of ground vehicles. Companies may also establish individual FAAs. Planning for the occupation of the FAA is not as detailed as that required for an AA. However, because the task force may remain in the FAA for more than several hours, the commander and the staff must consider security and camouflage. Occupation of the FAA is a three-phase operation:

- Area reconnaissance.
- Main body arrival.
- Security.

AREA RECONNAISSANCE

D-18. The reconnaissance element conducts an initial area reconnaissance (including NBC survey, if appropriate) of the FAA and the surrounding terrain. Upon completion, the reconnaissance element briefs the commander or S3 and keeps the new position under constant observation until the main body arrives.

MAIN BODY ARRIVAL

D-19. Each unit arrives separately at the FAA and lands in predetermined areas. Normally, arrivals are staggered by several minutes to avoid excessive traffic that could lead to accidents or enemy detection. The FAA should allow dispersion and observation of all the high-speed avenues of approach into the FAA.

SECURITY

D-20. Security of the FAA depends on the unit's capability to detect threats and move aircraft to another location before being attacked. After establishing FAA security, aircrews complete thorough aircraft preflight inspection and prepare for rapid departure by going through checklists leading up to engine start. The priority of tasks for each unit is to—

- Establish local security.
- Establish wire communications with the tactical CP.
- Prepare aircraft for immediate launch.
- Continue to plan missions.

QUARTERING PARTY AND ADVANCE PARTY OPERATIONS

D-21. The quartering party conducts the initial AA occupation, including an area reconnaissance for security and an NBC survey if the commander suspects contamination. It organizes and prepares the site for arrival of the main body. The quartering and advance parties may move together or at separate times. If they move together, the advance party will normally stop at a designated point outside the new AA and wait for the quartering party to finish operations before moving into the new AA. When time is short, units may combine and accomplish the functions of both at the same time.

NUCLEAR, BIOLOGICAL, AND CHEMICAL SURVEY

D-22. Units conduct an NBC survey if the commander suspects that NBC contamination is a possibility. Before movement, the quartering party leader consults the chemical officer and S2 to determine the likelihood of NBC contamination in the new AA.

SECURITY

D-23. Initially, security may consist of establishing OPs along likely avenues of approach in a position to maintain overwatch of the AA. Therefore, the size of the quartering party must support initial security requirements.

ADVANCE PARTY

D-24. The quartering party guides the advance party into its new locations. The advance party then—

- Enhances local security.
- Establishes additional OPs and a dismount point.
- Establishes communications with the TOC in the AA.
- Determines locations of the TOC, ALOC, unit elements, and FARP.

- Confirms suitability of the area.
- Clears safety hazards from the area.
- Establishes internal wire communications to the unit areas.
- Clears and marks aircraft parking positions.
- Emplaces chemical alarms.

MAIN BODY ARRIVAL (GROUND AND AIR)

D-25. The main body should arrive in two parts, beginning with ground vehicles and followed by aircraft.

GROUND ARRIVAL

D-26. Members of the advance party meet the ground vehicles as they arrive. The advance party guides ground vehicles along selected routes to each unit's position. The following are the priority of tasks upon main body closure.

Establish Security

D-27. The type and amount of security depend on the factors of METT-TC and may range from establishing OPs along most likely avenues of approach to full perimeter security.

Reestablish the Tactical Operations Center

D-28. TOC personnel establish full communications with higher headquarters as soon as possible after AA occupation. They maintain communications, even if limited, with higher headquarters throughout the breakdown and movement of the TOC.

Coordinate With Adjacent Units

D-29. TOC personnel establish security coordination and communications with adjacent units if both are within range of each other's direct fire weapons systems.

Develop Security Plan

D-30. The S2 develops NAIs for the AA, and the S3 develops a plan to keep the NAIs under observation. Companies submit sector sketches for incorporation into the brigade or battalion security plan. In addition, units should—

- Emplace camouflage.
- Establish individual fighting positions and survivability positions.
- Establish crew-served weapons fighting positions.
- Establish a dismount point.
- Establish a QRF.
- Conduct accountability checks of all personnel and weapons.

AIR ARRIVAL

D-31. Aircraft arrive after the ground segments of the battalion main body. During AA movement, the brigade maintains communications with subordinate battalions. The battalions retain communications with aircraft still located at previous AA sites. As aircraft arrive, ground guides position them in predetermined locations selected by the advance party. Aircraft locations should provide dispersal and the maximum concealment possible. Upon arrival, aircrews complete a postflight inspection, report any problems to the commander, and assist in establishing the AA.

ASSEMBLY AREA IMPROVEMENT

D-32. Units continue to improve the AA. Key areas include field sanitation, ground obstacles, camouflage, maintenance operations, and living conditions. Units conduct continuous camouflaging to reduce the radar, heat, noise, electronic, and visual signatures of the brigade.

ASSEMBLY AREA SECURITY

D-33. AA security is difficult for all aviation units. Battalions and subordinate companies must accomplish AA security basics and continue to mature the area as time allows. The following measures enhance AA security.

OBSTACLES

D-34. Units block with obstacles and cover with overlapping fields of fire any nonessential roads leading into the AA. Obstacles may be natural or man-made. Battalions coordinate with the brigade for engineer assistance in planning, preparing, executing, and completing tasks in defense of the AA. Engineer support can construct, repair, and maintain tactical obstacles, defensive positions, and logistics field sites. Units must exploit naturally protected positions for CPs, aircraft parking, FARPs, and maintenance facilities.

FIGHTING POSITIONS

D-35. The battalions and companies establish crew-served weapon fighting positions to cover most likely enemy avenues of approach. Personnel occupying these positions have a key role in securing the AA.

OBSERVATIONS POSTS

D-36. The battalions may establish OPs to provide early warning of anyone approaching the AA. Units place OPs along the most likely enemy avenues of approach and far enough away from the AA to provide adequate warning of impending attack. The OP must maintain communications with the TOC.

DISMOUNT POINT

D-37. The battalions establish dismount points to control the flow of traffic in the AA. The battalions block other roads into the AA with downed trees and parked vehicles or berms if engineer support is available. The dismount point controls traffic flow in and out of the AA and makes suspect any vehicle that approaches on other than established AA routes to the dismount point.

INDIRECT FIRE

D-38. The battalions plan indirect fires near the AA. Units plan final protective fires to protect the task force during displacements caused by enemy attack. OPs may also be responsible for FS targets within their area. When planning AA indirect fires, the commander develops an observer plan.

ASSEMBLY AREA INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE PLAN

D-39. The brigade and battalion S2 and S3 work together to establish an ISR plan. The S2 analyzes the area and develops NAIs. The S3 develops reconnaissance plans to cover NAIs. The reconnaissance plan may consist of organic aerial or ground reconnaissance or both.

EMERGENCY DISPLACEMENT PLAN

D-40. The commander establishes displacement criteria and unit displacement priority to a location developed by the S3 and S2. If the unit comes under artillery, air, or ground attack, it conducts an emergency displacement. The two displacement plan types are surprise and early warning displacements. Displacement plans for each company consist of the direction and route for leaving the AA, location of rally points, aircraft HAAs, and alternate AAs. Battalions coordinate, through the brigade, those areas to which they plan to displace. Units rehearse emergency displacement plans to ensure that all procedures are understood.

EARLY WARNING DISPLACEMENT

D-41. If the enemy reaches DPs established by the DST, the commander may direct an early warning displacement.

SURPRISE DISPLACEMENT

D-42. In case of surprise attack, units may conduct immediate displacement. Aircraft depart individually if the situation allows. For survivability, flight crews may remain in individual fighting or survivability positions until the immediate threat passes before executing the displacement. After departing the AA, aircrews fly to designated HAs or rally points, conduct a reconnaissance, establish security, establish communications with the TOC or command group, and transmit a situation report to the commander.

RALLY POINTS AND DISPLACEMENT ASSEMBLY AREAS

D-43. Battalions establish emergency displacement scatter plans to include rally points and displacement AAs for both vehicles and aircraft. These areas may not be the same place. After AA arrival, units select rally points. All task force aircrews and vehicle drivers must know rally point locations and routes to get to displacement AAs. Units prepare strip maps for each vehicle and aircraft and place a sketch of the emergency displacement plan in the TOC.

EMERGENCY DISPLACEMENT IN ADVERSE WEATHER CONDITIONS

D-44. Enemy ground forces may attack at night or in adverse weather conditions. Units rehearse night aircraft evacuation and plan reactions for heavy fog or other types of severe weather when flight is difficult. Aircraft may be able to evacuate in the fog by hovering along known roads. Aircraft gun systems can defend against the attack if hover in the AA is possible.

FRIENDLY AIR DEFENSE

D-45. Coordinate with friendly AD in the vicinity of the AA. These units may provide aviation units with area AD coverage of the AA. If not, the brigade can request AD assets from higher headquarters, depending on availability. In addition, the brigade coordinates with friendly AD units to ensure they are aware of the presence of friendly aircraft in the area. AD units can check IFF equipment by interrogating aircraft arriving and departing the AA.

DISPLACEMENT DECISION SUPPORT TEMPLATE

D-46. During initial AA setup, the S2 develops an event template and a DST for AA displacement. The DST results in DPs that those commanders can use to trigger AA displacement. After determining DPs, the S2 and S3 decide the best means to track enemy movement in relation to selected DPs.

READINESS CONDITION LEVELS

D-47. Based on DPs that the S2 establishes, the commander designates readiness condition (REDCON) levels for the unit. If the enemy reaches the initial DP, the unit upgrades its REDCON and conducts sequential displacement preparation. As enemy forces reach closer DPs, units increase movement preparations so that if the enemy reaches DPs that call for AA displacement, the task force is ready to move. Establishing REDCON levels ensures that units can preload equipment so that it is not left behind during displacement.

SECTION II – TACTICAL ROAD MARCH

D-48. Aviation units may need to move long distances to position for future operations. Both brigade and battalions plan this type of movement, called a road march. The main purpose of the road march is to relocate rapidly. Units conduct road marches at fixed speeds and timed intervals. This section examines tactical procedures and considerations for the road march.

ROAD MARCH TECHNIQUES

D-49. The following outlines three primary road-march techniques. The commander decides on the march formation based on the mission and threat level along the proposed route.

OPEN COLUMN

D-50. Units use the open column technique for daylight marches and at night with blackout lights or night-vision devices. Distance between vehicles varies, normally 50 to 200 meters, depending on light, dust, and weather conditions.

CLOSE COLUMN

D-51. Units use the close column technique for marches during limited visibility. Units base the distance between vehicles on the ability to see the vehicle ahead. This distance is normally less than 50 meters, requiring slower speeds.

INFILTRATION

D-52. The infiltration technique involves moving small groups of personnel and vehicles at irregular intervals along multiple routes. Units use this technique when available time and routes allow units to maximize security, deception, and dispersion. Of the three road-march techniques, infiltration provides the best possible passive defense against enemy observation and detection. It also increases likelihood of lost vehicles and slows closure at new AAs.

PLANNING CONSIDERATIONS

D-53. Standard tasks that the unit commander (and subordinate leaders, as necessary) may perform before a tactical road march include the following:

- Designate marshalling areas, as required, to organize the march column and conduct final inspection/briefing; well-trained units with good SOPs can move directly from AA positions into march formation.
- Conduct a METT-TC analysis to determine the enemy situation, including the probability of air or ground attack.
- Establish detailed security measures.
- Designate movement routes, including the start point, required checkpoints, and the RP; establish additional control measures to identify critical areas, possible ambush and choke points, and rest/maintenance stops.
- Organize, brief, and dispatch the quartering party.
- Specify march speed, movement formations, vehicle and serial intervals, catch-up speed, lighting, and times of critical events.
- Plan indirect FS and contingency actions, and rehearse actions on contact; contingency plans should cover vehicle breakdowns, lost vehicles, and accidents.
- Coordinate for CSS, including refueling, mess operations, vehicle recovery, local police assistance, and medical evacuation.

QUARTERING PARTY

D-54. The unit's quartering party precedes the unit into a new AA. Dispatched before the main body departs, the quartering party is responsible for reconnoitering the route of march. It conducts reconnaissance of the AA and the feeder route from the RP to the proposed AA. If either the route or AA proves unsatisfactory, the quartering party recommends changes to the commander.

D-55. Once the road march begins, quartering party members serve as guides along the feeder route and in the AA. The unit SOP outlines the party's size and composition, but specific tactical requirements may dictate changes.

CONTROL MEASURES

D-56. Commanders use road-march control measures to assist unit control.

GRAPHICS

D-57. Road-march graphics show the start point, RP, and route. Characteristics and other graphics may include the following:

- Marshalling areas are where the quartering party and main body can organize march columns and conduct final inspections/briefings.
- The start point represents the beginning of the road march route (easily recognizable man-made or terrain feature).
- The start point is far enough away from the unit's initial position to allow individual elements to organize into march formation at the appropriate speed and interval.
- The time required to move to the start point is in the movement order.
- The route is the path of travel connecting the start point and RP.
- The RP marks the end of the route of march (an easy-to-recognize man-made or terrain feature). Elements do not halt at the RP; they continue to their AA with assistance from guides, waypoints, or other graphic-control measures.

CRITICAL POINTS

D-58. Critical points are established where terrain or other factors may hinder movement or where timing is critical. The start point, RP, and checkpoints are critical points.

STRIP MAPS

D-59. Units use strip maps to assist navigation. Units—

- Include the start point, RP, checkpoints, marshalling areas, and refuel-on-the-move (ROM) sites and distances between these points.
- Use detailed sketches showing marshalling areas, scheduled halt locations, ROM sites, and other potentially confusing places.
- Include strip maps as an annex to the movement order; if possible, provide a copy to all vehicle drivers.

VISUAL SIGNALS

D-60. When observing radio listening silence during a road march, units employ hand-and-arm signals, flags, and lights as primary means of passing messages between vehicles and between moving units.

TRAFFIC CONTROL

D-61. The headquarters controlling the march may post road guides and traffic signs at designated traffic control points. At critical points, guides assist in creating a smooth flow of traffic along the march route. MP or organic personnel designated from the quartering party may serve as guides. They should have equipment or markers that allow march elements to identify them in the dark or other limited-visibility conditions.

RELEASE POINT

D-62. There is normally an RP for every echelon of command conducting the road march. For instance, there will be a battalion RP, followed by a company RP. Rehearse actions at the RP to reduce traffic problems.

ACTIONS DURING THE MARCH

D-63. The march leader designates the march order in the march brief or in march orders. Vehicles usually line up in march order before start point departure. Trained units may move directly into march order from their AA positions, if ground guides know the march order and the march leader can account for all vehicles. Units must arrive at the start point at times designated in the movement order. To avoid confusion during initial move-out, leaders may reconnoiter the route to the start point, issue clear movement instructions, and conduct thorough rehearsals to work out spacing, signals, and timing.

D-64. The march leader is responsible for maintaining the constant march speed specified in the march brief and orders, making adjustments for terrain and traffic. The march leader briefs actions in the event of scheduled and unscheduled halts based on the tactical situation. Administrative marches have a higher safety priority and tactical marches, a higher security priority. The march leader briefs actions to take if attacked en route by air or ground forces.

HALTS

D-65. While taking part in a road march, battalions prepare to conduct both scheduled and unscheduled halts.

Scheduled Halts

D-66. Units conduct scheduled halts to permit maintenance, refueling, and personal relief activities and to allow other traffic to pass. Units establish the time and duration of scheduled halts in the movement order. The unit SOP specifies actions to be taken during halts. Units make a 15-minute maintenance halt after the first hour of the march, with 10-minute halts every two hours thereafter.

D-67. In combat, the first halt priority is to establish and maintain local security. March leaders may plan scheduled halts to secure potential ambush sites if prior reconnaissance and known threat activity cause leaders to suspect that an ambush could occur at a particular location. This action may involve actual dismounting to secure overwatching terrain, alerting vehicle personnel to orient weapons on particular areas as the convoy passes, and sending vehicles through the area in smaller groups.

D-68. During peacetime administrative marches, the first halt priority is safety. Even combat marches must consider that accidents may cause more casualties than combat action during the march. March leaders plan halt locations that safeguard personnel and vehicles from traffic and threats.

Refueling Halts

D-69. During long marches, units may conduct ROM operations. The ROM site composition depends on both OPSEC considerations and refueling capability of ROM site assets. The OPORD must specify the amount of fuel or time at the pump for each vehicle. It also outlines instructions for OPSEC at the ROM site and at staging areas where vehicles move after refueling.

Unscheduled Halts

D-70. Units make unscheduled halts if they encounter unexpected obstacles, contaminated areas, or disabled vehicles blocking the route. As unscheduled halts occur in combat, units dismount and establish security and don NBC protective equipment if applicable. In administrative movements, safety is paramount. Units train drivers to pull off the road, if possible, and instruct all but designated personnel to remain in vehicles. Drivers instruct one messenger to carefully dismount and move to the front of the convoy away from any traffic. The messenger obtains or provides information on the reason for the halt and receives directions from the march leader. The march leader determines and eliminates the cause of the halt.

Disabled Vehicle

D-71. Units must not allow disabled vehicles to obstruct traffic for lengthy periods. Train drivers to move the vehicle off the road as problems develop. Trail elements take charge to assist disabled vehicles, report the problem, establish security, and post guides to direct traffic. If possible, they make repairs and rejoin the rear of the column later. Vehicles that drop out of the column return to their original positions only after the column halts. Until then, they move just ahead of the trail element, which usually comprises the maintenance team and some type of security. If the crew cannot repair the vehicle, the trail element wrecker recovers the vehicle.

HALT SECURITY

D-72. Halt security normally involves dispersing vehicles, establishing a close-in perimeter, and securing terrain that dominates the march halt.

ACTIONS AT THE RELEASE POINT

D-73. Units move through their RP without stopping. Unit guides pick up the unit there and guide it to the AA dismount point. Each platoon then picks up its own assigned guide and follows the guide's signals to its position in the AA. Depending on terrain and the equipment available, guides and marking materials may be posted at or near exact vehicle locations.

Appendix E

Communications

This appendix outlines the communication tools and generalized TTP to ensure effective C^2 of aviation ground and flight operations. Chapter 3 provides additional detail on C^2 issues.

SECTION I – AIRCRAFT COMMUNICATIONS

AIRCRAFT COMMUNICATIONS OVERVIEW

E-1. This section discusses the capabilities of the following aircraft radios and digital modems:

- Single Channel Ground-Airborne Radio System (SINCGARS) (FM).
- Have Quick II (UHF).
- High frequency (HF).
- VHF
- IDM.
- AN/PRC-112 survival radio.
- AN/APR-186 (VHF).

E-2. The section also discusses airborne facilitators—such as the UH-60 C^2 aircraft and joint systems—that can aid aviation units in relaying communications. It further discusses challenges to mission communications.

SINGLE CHANNEL GROUND-AIRBORNE RADIO SYSTEM

E-3. The SINCGARS is the common battlefield radio system employed by Army ground and aviation forces. It provides secure or plain voice communications over the VHF-FM frequency range of 30- to 87.975-megahertz at 25-kilohertz intervals. Its frequency-hopping mode of operation counters enemy jamming efforts. Earlier radio models require the KY-58 to provide secure communications. The SINCGARS-System Improvement Program (SIP) has embedded encryption, an automated GPS interface, and improved data capability for faster data communications. However, even the airborne SINCGARS-SIP requires KY-58 interface for cipher text communications. SINCGARS is a LOS system with limited range at terrain flight altitudes.

E-4. Army aviation's component of SINCGARS is the AN/ARC-201 compatible with other service SINCGARS radios to include the AN/ARC-210 and AN/ARC-222 radios used by other services and Army HH-60L air ambulances.

E-5. Aircraft SINCGARS are filled using the automated network control device (ANCD). The AMPS, when available, provides simplified setup of

SINCGARS and other radio systems. The combat training centers have noted common problems with time drift and the need to perform over-the-air rekeying as missions progress.

HAVE QUICK II

E-6. The AN/ARC-164 is a common UHF-AM radio employed by joint aircraft. It provides aviation brigade subordinate units with a means of communicating internally on company battle nets. It also allows interface with sister-service aircraft during JAAT and other joint flight operations. Its frequency-hopping mode of operation counters enemy jamming efforts. Like SINCGARS, it is a LOS system with limited range at terrain flight altitudes.

E-7. The AMPS, when available, provides simplified setup of Have Quick II time of day (TOD) and word of day (WOD) for AH-64D and OH-58D aircraft.

E-8. Units must use Have Quick II in the frequency-hopping mode during training to ensure effective communication during actual operations. WOD loading is not difficult, but TOD can be problematic if aircraft lack a Have Quick II/GPS interface. Aircraft without GPS interface can request and accept a GPS TOD from other unit aircraft. In addition, on long operations beyond four hours, the TOD begins to drift. A single aircraft, such as the UH-60 C^2 aircraft, are then designated as the base point for TOD updates as unit aircraft begin to drop out of the net because of drifting TOD.

HIGH FREQUENCY RADIO

E-9. The AN/ARC-220 HF radio system is an NOE, long-range radio system that provides voice and data communication beyond the range of SINCGARS and Have Quick II systems. It operates in the 2- to 29.999-megahertz frequency range in 100-hertz steps on 20 preselectable channels, for a total of 280,000 possible frequencies. Aircraft not equipped with a 1553 data bus have an additional control display unit for operation of the radio.

E-10. The system has an NLOS range of at least 300 kilometers. The 30- to 100-kilometer range often is the most challenging distance in which to maintain effective communications.

E-11. ALE reduces aircrew workload and improves connectivity. In this mode, the caller enters the desired radio address and presses the microphone key. The radio then sounds on the preprogrammed frequency set listening for the best signal. When found, both radios tune to that optimum frequency and a connection occurs. One shortcoming of ALE is that third parties do not hear message traffic. If passive listening is necessary and all parties on the net need the same information, the net control station (NCS) chooses the manual or electronic counter-countermeasure frequency-hopping mode. When stations do not rely on each other's reports to perform their mission, ALE is the preferred mode.

E-12. Aircrews can communicate using secure voice or secure data. In data mode, the system can create, edit, and store up to 10 formatted and free text messages of up to 500 characters each. It interfaces with the KY-100 to provide secure communications and with the AN/VRC-100 ground radio in aviation ground TOCs.

E-13. Secure voice is the primary method of operation for the HF radio in ALE, manual, and frequency-hopping modes. In poor conditions—such as low magnetic flux number, night operations when the ionosphere dissipates, and thunderstorms—aircrews should employ secure data at 300 bits per second. Data transmission increases aircrew workload during flight; the radio stores up to 10 messages in memory, allowing the crew to preload a set of anticipated messages before flight.

E-14. For identical messages with changing location, it often is easier to edit in the new location in an existing memory message than to initiate a whole new entry. In addition, a reduced workload results when commanders use the control display unit's feature permitting HF transmittal of current position with one button press.

E-15. If brigade units have not used HF radios habitually in training before operations, the brigade S3 should direct HF radio exercises before operations to ensure that units use HF to its best advantage.

VERY HIGH FREQUENCY RADIO

E-16. The AN/ARC-186 is an administrative VHF-AM radio primarily used to communicate with ATS. Normally, it operates in the 116- to 151.975-VHF-AM frequency range. In wired and configured aircraft, it can back up the SINCGARS radio in the same 30- to 89.975-megahertz frequency range. It generally lacks a KY-58 interface to provide secure FM communications, and it has no frequency-hopping mode compatible with SINCGARS. The AN/ARC-186 is a LOS radio system with limited range at terrain-flight altitudes but greater range at administrative altitudes normally associated with ATS communication.

IMPROVED DATA MODEM

E-17. The MD-1295/A is a digital transfer modem that allows equipped aviation forces to exchange complex battlefield information in short, coded bursts. Digital calls for fire are processed through the IDM. The IDM has a preplanned product improvement that will incorporate software for processing JVMF messages, allowing interoperability with ATCCS and FBCB2.

E-18. A number of joint systems incorporate IDM for data interoperability. The JSTARS common ground station (CGS), located in brigades and division CPs, also has IDM capability.

AN/PRC-112 SURVIVAL RADIO

E-19. This small radio, carried in aircrew survival vests, enables downed aircrews to be located by aircraft equipped with the AN/ARS-6 Pilot Locating System. It receives short, periodic bursts from the ARS-6 and responds with its own coded reply to allow secure location of aircrews. An AM voice mode allows unsecured communication on guard, on 282.2 megahertz, or on two additional UHF channels. The PRC-112A radio has upgraded voice communication security that scrambles voice communication for greater security. Both the PRC-112 and -112A permit voice contact with nearby aircrews if aircraft radios are damaged on impact.

UH-60 COMMAND AND CONTROL CONSOLE

E-20. UH-60 aircraft equipped with the AN/ASC-15B C^2 console provide users with in-flight SA and communications access. The modified console provides SINCGARS, Have Quick II, HF, VHF-AM, and satellite communication. Systems run off aircraft power and internal aircraft antennas. The aircraft has just one SINCGARS 201 radio but has three AN/ARC 210 multimode radios capable of operation on SINCGARS FM, UHF, or VHF frequencies. This permits the capability to simultaneously operate the command network and monitor the O&I or higher HQ command networks. It provides operators with a means of choosing between either active SINCGARS communication or retransmission. Retransmission of Have Quick II and VHF-AM is also possible with the system.

E-21. Forward in the aircraft, the console contains radio sets, console controls, and six internal communication system (ICS) boxes. In the rear, four additional ICS boxes and a map board allow up to 10 personnel to monitor the console's radio systems. The C^2 console's lights are compatible with NVG. It is the supported unit's responsibility to provide a trained console operator. The crew chief is not trained to perform this function.

E-22. The C^2 console can operate in the ground mode. In this configuration, the console can remain mounted on the aircraft or can be dismounted. In the ground mode, the C^2 console requires generator power and external antennas. It requires four trained personnel an hour to remove the console from the aircraft. Figure E-1 shows the aircraft configuration.

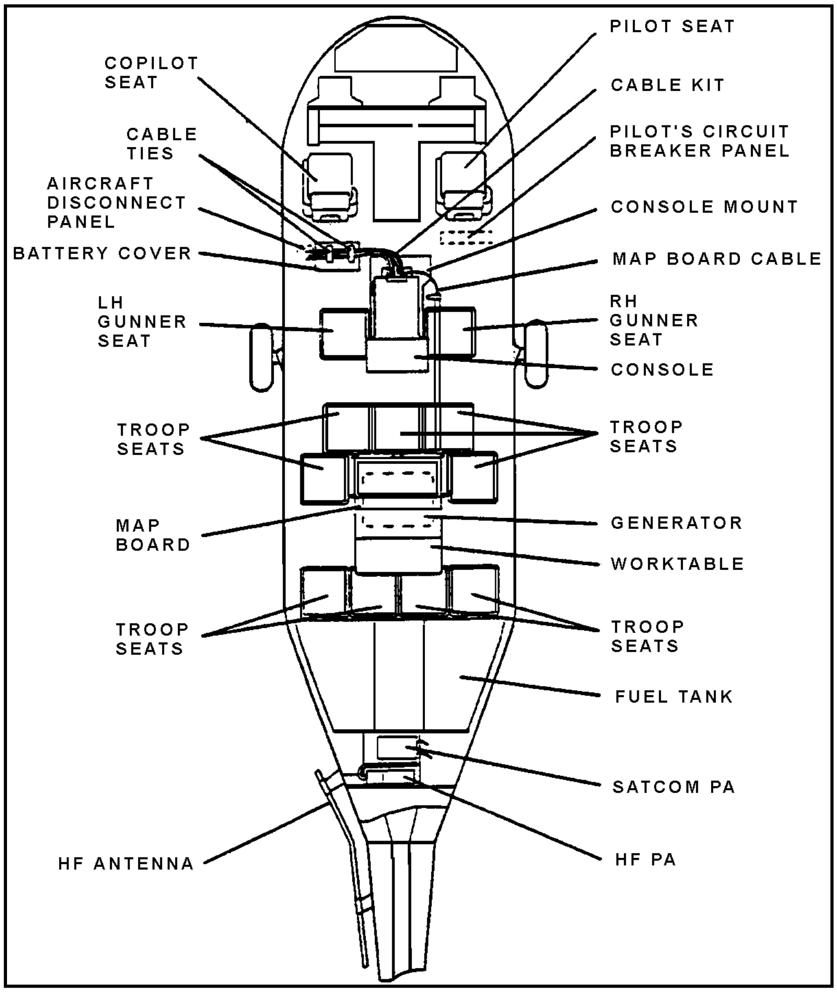


Figure E-1. UH-60 C^2 Aircraft Configuration

AIRBORNE RELAY

E-23. Some operations in deep areas have the priority to justify communications relay as a means of overcoming difficulty in communicating. If allocated, the C-12 may perform HF relay or even SINCGARS and Have Quick II relay if the threat permits flight within range of those radio systems. The AWACS, E-8 JSTARS, C-130 airborne battlefield C^2 center, EA-6, airborne forward air controllers, participating deep JAAT and air interdiction, or other joint aircraft may be available to relay HF, Have Quick II, and in some cases, SINCGARS communications. Enhanced Position Location Reporting System (EPLRS) capabilities on the A^2C^2S aircraft allow automated relay of data communications. In addition, future UAVs may have retransmit mission capabilities for FM command nets. Table E-1 illustrates the potential for relay with higher-flying aircraft if coordinated by staff members in advance.

Table E-1. Joint Aircraft Potentially Interoperable for Communications or Relay

COMMS/ RELAY CAPABLE	C-12	E-3 AWACS	E-8C JSTARS	C-130 ABCCC	EA-6B	FAC	AI/ JAAT	UAV
SINCGARS		X	X	X	X	X		X
Have Quick II	X	X	X	X	X	X	X	
High Frequency	X	X	X	X	X	X	X	
EPLRS		X	X	X			X F16 Block 30	
Improved Data Modem			X		X		X F16C F16D	

AIRCRAFT COMMUNICATIONS CHALLENGES

E-24. The primary challenge to aircraft communication is the combined effect of terrain-flight altitudes and operational distances between aircraft and their CPs. The HF radio is the primary materiel solution to the NOE communications requirement and the need to communicate over greater distances. However, for best connectivity, units must employ the HF radio's ALE mode that does not permit the normal monitoring of nets by all stations. In addition, unlike SINCGARS, only a single HF radio is available on most aircraft. These constraints relegate the role of HF to a secondary communications system available when other communications are impossible.

E-25. Army aircraft share common radio systems and have communications interoperability. One exception is the OH-58D that lacks HF capability because its small size limits HF antenna effectiveness. The AH-64A and CH-47D also have just a single SINCGARS radio. This situation prohibits commanders/staffs from simultaneously monitoring both the command and O&I nets. It also inhibits routine data communication. Table E-2 compares Army aircraft communications capabilities.

Table E-2. Aircraft Communications Interoperability

Tactical Aircraft Communications	AH-64D	AH-64A	OH-58D	UH-60A/L	CH-47D	HH-60L
AN/ARC-186 VHF-AM/FM	X	X (same antenna for VHF-AM and FM 2 commo	X	X	X	
AN/ARC-201 VHF-FM (SINCGARS)	X (2)	X (1)	X (1 or 2)	X (2)	X (1)	X (2)
AN/ARC-220 (High Frequency)				X	X	X
AN/ARC-164 (Have Quick)	X	X	X	X	X	X
AN/ARC-222 VHF-AM/FM						X
MD-1295/A (Improved Data Modem)	X		X			X

SECTION II – GROUND COMMUNICATIONS

OVERVIEW

E-26. This section discusses means of communicating from ground CPs.

WIRE

E-27. When feasible, wire communication should be the primary means of communicating within the TOC areas. Subordinate and attached battalion main CPs should run wire to the aviation brigade main CP. Wire should cross roads either overhead or through culverts and should be buried as soon as feasible to hinder enemy tapping.

GROUND SINGLE CHANNEL AIR-GROUND RADIO SYSTEM (AN/VRC-87, 88, 89, 90, 91, 92)

E-28. The ground SINCGARS is the primary C^2 network within the brigade and with corps/division. It is also used for O&I and A&L networks. Some systems require KY-57 for security. Newer SINCGARS-SIP has data rate adapters and encryption embedded. On vehicle-mounted SINCGARS, the user looks for "/A" after the SINCGARS numerical designation to identify systems with integrated communications security. The ANCD or AMPS allows loading of SINCGARS and IFF information.

GROUND HAVE QUICK II (AN/VRC-83 OR AN/GRC-240)

E-29. This ground radio allows communications with Have Quick II UHF-AM airborne radio systems. It includes a portable GPS for aligning TOD and a KY-57 for secure communications. It is backward compatible with first-generation Have Quick systems and with non-Have Quick UHF-AM radios. It is compatible with Air Force, Navy, and Marine Corps Have Quick II systems, but LOS constraints may hinder communication with joint systems from the ground.

MOBILE SUBSCRIBER EQUIPMENT

E-30. The MSE network architecture forms a node grid system capable of providing alternate communications paths between node centers throughout the corps AO. Alternate communications paths are provided to ensure a high degree of system survivability. The secure mobile antijam reliable tactical terminal (SMART-T), if available, provides satellite range extension for the MSE network. The aviation brigade ties in throughout the system to maintain connectivity with dispersed aviation units supporting corps and division elements.

E-31. Generally, MSE provides a connection between the main CP and the DMAIN CP, adjacent ground maneuver brigade CPs, the DASB for heavy divisions, and rear CP if employed. Small extension node and radio access unit (RAU) support ensure both telephone and mobile subscriber radio telephone (MSRT) radio coverage for the aviation brigade and battalion TOCs.

GROUND HIGH FREQUENCY (AN/VRC-100)

E-32. The AN/VRC-100, coupled to the KY-100, provides secure communications with airborne HF radios. The VRC-100 and aircraft ARC-220 have virtually identical components packaged differently.

E-33. Because HF radio waves bounce off the ionosphere, short-range HF is very difficult to direction find and jam. If jamming does occur in the ALE mode, ALE simply finds a better frequency. If jamming occurs in manual mode, the NCS may not be able to announce a mode switch to all stations. Aircrews that lose HF communications must exhaust other possibilities before assuming that jamming is the problem and switching to the electronic counter-countermeasures frequency-hopping mode without net notification.

E-34. Antenna selection and angle are critical to effective communication using the high-frequency radio. The following table illustrates different antenna configurations and their applications. Only the FANLITE near-vertical incident skywave antenna comes standard with the radio system; other antennas would need to be procured or rigged to create conditions shown in Table E-3.

Table E-3. Antenna Configuration Effect on Operational Range

Antenna Type	Radiation Pattern	Antenna Takeoff Angle	Value to Operations
32' whip, vertical	Omnidirectional	45 degrees with ground radials installed	Fair at medium range
16' whip, vertical	Omnidirectional	Vertical to 45 degrees	Poor, for mobile use only
Standard FANLITE sloping or horizontal	Near vertical	45 degrees to horizontal	Good at short range
Resonant di-pole, horizontal	Bidirectional	45 degrees to horizontal	Good at medium range
Log periodic	Unidirectional	Where pointed	Very good at long range when pointed on the horizon; very good at short range when vertical
Yagi	Unidirectional	Where pointed	Good at long range when pointed on the horizon; good at short range when vertical

E-35. Besides antenna considerations, frequency selection is another critical variable for effective HF communications. HF radio frequencies for effective short-range (30 to 100 kilometers) communications are usually below 8 megahertz. The FANLITE antenna works better and the ground wave is longer at lower HF frequencies. However, the corps or division signal office typically assigns frequencies without considering these parameters. The brigade signal officer must ensure that the higher headquarters signal office is aware of optimal aviation HF frequencies.

E-36. At night, the ionosphere begins to dissipate, resulting in less reflection of HF radio waves. When this situation occurs, relay over a longer path may prove effective. A more distant station may receive the HF signal better than a closer one. Ground HF operators should have a list of frequencies and call signs to contact other distant aviation brigades or other stations that can relay C^2 information.

E-37. In the ALE mode, if the radio channel is inactive for a period of time, the radio reverts to the scan mode and another ALE sequence must occur to reconnect. To prevent this situation, stations operating in the ALE mode should sound periodically to retain a good frequency for communication. This “sounding” will ensure that an ALE connection is already in place, thereby saving tens of seconds when a message must be sent. Radios can be set up to automatically sound at a periodic rate. The ground HF radio operator generally can perform this “sounding” to reduce aircrew workload.

AIR TRAFFIC SERVICES COMMUNICATIONS

E-38. Air traffic control radios are available for A^2C^2, limited flight following, and localized control of inbound and outbound aircraft. Radios also permit recovery of aircraft that experience inadvertent IMC. These systems may provide brigade commanders with a backup means of communicating with units, although this should not be their primary mission. Commanders must recognize that these radios emit unique signatures and locating these radios to the brigade TOC must be balanced with knowledge that some enemies can identify and target signature location. Another option available to brigade commanders is employment of better ATS antennas used with other tactical radios.

E-39. The tactical airspace integration system (TAIS) provides fully automated capability to support airspace management at echelons above corps, corps, and division level. TAIS is fully integrated with ABCS. When used with other ABCS, TAIS provides automated A^2C^2 planning and airspace deconfliction. The tactical terminal control system (TTCS), AN/TSQ-198, provides tactical ATS capabilities in more austere environments. It can also provide backup communications capabilities at aviation TOCs or in deep or rear areas.

GROUND SATELLITE COMMUNICATION

E-40. Different SATCOM and TACSAT ground systems may be available to aviation brigades. For effective use, TOC locations must permit LOS between the dish antenna and the geosynchronous satellites. For instance, a TOC location next to a mountain or among tall trees may obstruct SATCOM LOS. To prevent SATCOM bleed-over, at least a 10-megahertz frequency separation should exist between outgoing and incoming signals.

E-41. Common TACSAT systems include the PSC-5 Spitfire and the AN/PRC-117F. These systems include SINCGARS and Have Quick capability. The SMART-T is a larger SATCOM system that interfaces with military strategic and tactical relay (MILSTAR) satellites for data transfer at low and medium rates to extend the MSE network range.

E-42. Units should avoid overreliance on SATCOM for longer-range communications during large-scale conflict because channels can become oversubscribed. In addition, SATCOM may not be a viable solution in certain latitudes and areas of the world where geosynchronous satellite coverage is sparse.

AN/PRC-127 (WALKIE-TALKIE)

E-43. This nontactical walkie-talkie operates in the 138- to 160-megahertz FM range. The frequency is set from an integral keypad. Fourteen channels are available. This system provides personnel with a nonsecure low-power means of localized communication.

COMMERCIAL TELEPHONE LINES AND CELLULAR TELEPHONES

E-44. In many areas, commercial telephone lines and cellular phones can support nonsecure voice and data logistics communications or prompting between parties to attempt communications using secure means. If forced to withdraw and approved by higher headquarters, units should sever sections of commercial telephone lines and destroy cellular substations to hinder enemy use.

VISUAL AND SOUND COMMUNICATIONS

E-45. Visual card systems, landing lights, hand-and-arm signals, flags, pyrotechnics, and other visual cues can provide simplified communications when radio transmission may not be possible or tactically sound. Visual cues are especially valuable in FARP, sling-load, and ATS operations near AAs. Audio cues are another possibility, such as for alert of chemical attacks, but around operating vehicles and aircraft, audio signals may prove inaudible.

MESSENGER

E-46. Ground and air messengers may transport hard-copy messages and larger documents as part of a regularly scheduled shuttle between CPs, trains, and higher and lower headquarters. An alternative to dedicated messengers is delivery with ground and aerial delivery of supplies such as meals delivered to a tactical CP. Messengers may deliver combat plans and orders, written coordination and control measures, graphics, logistics requests and estimates, or other extensive documents that would consume excess time to send electronically.

SECTION III – COMMUNICATIONS NETWORKS AND COMMAND POST RELATIONSHIPS

GENERAL

E-47. Aviation units have more complex communications requirements than ground forces. Greater distances between brigade CPs and subordinate battalions and their widely dispersed aircraft require additional radio systems beyond the normal SINCGARS combat net radio. Communications systems must support the larger battle space of aviation brigades that may conduct simultaneous shaping operations, reconnaissance, and UH-60 A^2C^2S support in decisive operations and aerial resupply as part of sustaining operations.

NET CONTROL STATION

E-48. For most tactical nets, the NCS is the aviation brigade or battalion TOC. Paragraph five of the operations order designates frequencies, transmission security variables, cryptographic variables, and time to open the radio net. When the NCS makes the “all” call, stations respond in a prescribed sequence, usually alphanumeric by call sign or by unit sequence. The NCS acknowledges all stations entering the net, and stations remain in the net until receiving permission to leave the net. The NCS tracks which stations are on the net and maintains a call log. Before changing modes, the NCS makes a call in the present mode of operation announcing the change.

BATTALIONS

E-49. Battalions typically operate a C^2 network and O&I and A&L networks all using SINCGARS. Battalions also operate an internal air battle network using Have Quick II. The high-frequency radio is a secondary means of secure tactical communication to overcome SINCGARS and Have Quick II LOS constraints. The AN/ARC-186 VHF-AM radio is normally for administrative ATS but may function as a platoon internal net. The battalion TOC may also have access to MSE and SATCOM for communicating with higher headquarters.

AVIATION BRIGADES

E-50. MSE is the primary means of communications with higher headquarters, especially in large AOs. Brigades have SINCGARS C^2 and O&I and A&L networks and are Have Quick II-capable. HF radios provide a secondary means of communication. SATCOM may also be prevalent at brigade level.

TACTICAL RADIO NETWORKS

E-51. Units establish and monitor the following networks. In addition, lower echelon commanders and staffs monitor the networks of their next higher echelon. Battalions monitor brigade nets. Brigades monitor division nets. Retransmission stations may be needed to extend the range of any or all tactical radio nets.

COMMAND NETWORK

E-52. The brigade commander, XO, S3, and battalion commanders operate on the brigade command network. The battalion commander, XO, S3, and company commanders operate on the battalion command network. Because SINCGARS may lack the range necessary to control forward operations, a tactical CP may temporarily operate forward at brigade or battalion level. Ground retransmission stations may be set up to facilitate command net communication. The HF radio is a secondary means of command net communication. Relay of command information is a third option.

OPERATIONS AND INTELLIGENCE NET

E-53. The brigade and battalion S2s control their O&I networks. SINCGARS is the primary net communications medium. As the Army evolves and digitizes its force communications, these networks will become more automated in reaching back to higher echelons for pertinent information and in forwarding combat information gained by aviation forces.

ADMINISTRATION AND LOGISTICS NET

E-54. The brigade and battalion S1 and S4 control their A&L networks. Units transmit routine supply requests and personnel actions on this net, often employing SINCGARS and MSE data communications. FARPs operate on the A&L network and, if possible, monitor the command network. If the A&L network is inoperable, the O&I network may serve as an alternative.

COMMAND POST COMMUNICATIONS

E-55. The Army's standardized CP structure exists to facilitate communications. Commanders modify this structure to meet unique aviation mission needs, their personal command-and-control style, and the need for continuous operations. Personnel and communication systems availability constraints may not support traditional doctrinal CP structure. Force digitization and automation will further modify how units C^2 in the future.

COMMAND GROUP COMMUNICATIONS

E-56. The command group varies by unit but normally includes the commander, S3, S2 representative, and the FSO and ALO if available. When away from the TOC, the command group generally operates on the SINCGARS command net from a ground vehicle or aircraft but may also employ HF and SATCOM, as required, to communicate with subordinates and higher headquarters.

TACTICAL COMMAND POST COMMUNICATIONS

E-57. The tactical CP is a temporary CP established to enhance C^2 of current operations. The brigade tactical CP is often near the division tactical CP. Aviation battalion tactical CPs may be near supported brigade main CPs. The tactical CP is the responsibility of the S3 and includes personnel from the S2 and S3 sections and, often, the command group. If the displacing main CP includes an ALOC, then ALOC S1 and S4 representatives may also be in the tactical CP. The tactical CP primarily communicates on the command and O&I SINCGARS nets. HF and TACSAT are secondary means of communication, and MSE may support ground tactical CPs.

MAIN COMMAND POST COMMUNICATIONS

E-58. The brigade and battalion main CPs include the soldiers, equipment, and facilities necessary for C^2. It is the responsibility of the XO. At a minimum, the main CP consists of a TOC and necessary signal assets that satisfy communication requirements. The aviation brigade main CP may be close enough to the DMAIN CP to run a land line. If a rear CP is not employed, the main CP also includes the ALOC. The main CP includes tactical CP personnel when it is not deployed. The NCS for the command and O&I networks generally is in the TOC at the main CP. The ALOC is the NCS for the A&L network. The brigade main CP may require the S6 to establish ground retransmission capability to maintain SINCGARS command and O&I net communications with battalion tactical CPs. Generally, battalion main CPs are relatively near the brigade CP so that direct SINCGARS or ground-line communication is possible. The brigade main CP also employs TACSAT and HF communications as secondary and long-distance communications means. The MSE area common-user network is a primary communication means with adjacent and higher headquarters and the rear CP if employed.

REAR COMMAND POST COMMUNICATIONS

E-59. The brigade rear CP may locate within the EAC, corps, or DSA. For brigades in heavy divisions, the rear CP may be close to the DASB's main CP. For brigades in light divisions, the rear CP may be close to the AVIM, division airfield, and MSB main CP. Subordinate lift battalion CPs may also be nearby. The S1 or S4 is responsible for the rear CP. It is the NCS for the A&L SINCGARS network, but it also employs MSE and possibly HF to send data.

ALTERNATE COMMAND POST COMMUNICATIONS

E-60. The commander may designate an alternate CP to ensure operational continuity during displacements or in case serious damage occurs to the TOC. The alternate CP may be the tactical CP (including A^2C^2S when fielded), a subordinate unit, or the rear CP. Primary communications for an alternate CP are whatever is organic at that level to maintain a command and O&I net at a minimum.

SECTION IV – FLIGHT MISSION COMMUNICATIONS

GENERAL

E-61. This section addresses how aircrews communicate internally and externally with aircraft and ground communication systems.

E-62. SINCGARS is the primary combat net radio. Airborne commanders operate on the command net. Reports are sent on the O&I network. Logisticians and FARPs operate on the A&L net. Have Quick II supports internal communication between aircraft at the company level and provides a means of communicating with any joint air systems that may be participating in the mission. HF communications enhance terrain flight communications with distant CPs. If UH-60 C^2 system-equipped or A^2C^2S aircraft are available, SATCOM provides another long-distance communication option. Units minimize voice communications by employing brevity codes and digital data communications.

ATTACK HELICOPTER BATTALION

E-63. Longbow-equipped units have secure FM1 and FM2 SINCGARS capability to simultaneously operate on two nets. One radio can habitually operate for voice and the other for data using the

E-64. . Have Quick II voice mode or IDM data transfer facilitates company and platoon internal communication. Designated aircrews can make reports to battalion on the O&I SINCGARS net, while keeping the company commander aware on an internal Have Quick II O&I net. The HF radio is available as a secondary means of voice or data communication with the battalion. AH-64A units have neither dual secure FM radios nor an IDM capability. These units can employ HF secure data communication as an alternative to FM2 secure/IDM.

AIR CAVALRY SQUADRON

E-65. Kiowa Warrior aircraft have secure SINCGARS, Have Quick II, and VHF capability. The following is a preferred means of internal squadron communications:

- FM1 (secure) squadron command net (squadron commander, XO, S3, and troop commanders).
- FM1 (secure) platoon command net.
- FM2 (secure) digitized O&I network/supported unit/FS net.
- Have Quick II (secure) troop command net.
- VHF (nonsecure) coordination net for all elements.

E-66. The FM2 may be designated as a digital SA network for IDM-transmitted spot reports, situation/status reports, and battle damage assessment reports. These digitized reports are sent via FM2 directly to the squadron and troop FBCB2-equipped vehicles.

ASSAULT HELICOPTER BATTALION

E-67. Battalion UH-60 aircraft missions range from single ship air movement to major air assaults involving multiple aircraft. As with other units, the primary combat net radio is SINCGARS, employed for command, and O&I and A&L nets. For intraaircraft communication, units use Have Quick II. In the absence of a SINCGARS/IDM capability and given typical air assault distances, HF is a secondary and often crucial communications tool for maintaining contact with distant CPs. To minimize voice traffic on air assaults, air mission commanders employ HF ALE data transmission with preloaded short messages for anticipated reports to the rear. These could include—

- Staging phase: arrival passage points, crossing phase line, arrival PZ, executing bump plan, PZ unsecured, executing/arrival alternate PZ, request maintenance, enemy contact, and downed aircraft.
- Air movement phase: arrival start point/RP, reporting airspace control plan 1, executing bump plan, executing/arrival alternate LZ, request maintenance, unanticipated enemy contact, downed aircraft, and request for MEDEVAC.

E-68. Single ship air movements can occur at extended distances. Unit CPs can communicate changes in pickup and drop-off points and other en route changes using the HF ALE mode to assure contact.

COMMAND AVIATION BATTALION

E-69. The command aviation battalion has the UH-60 C^2-system-equipped aircraft and eventually will have the A^2C^2S. Ground brigade commanders and staffs employ the C^2 console or A^2C^2S, as required, without interference from aircrews. Aircrews may be asked to monitor certain SINCGARS nets on aircraft radios and to relay key messages to staff members in the rear. This requirement and distances involved may require aircrews to use HF communication to maintain contact with the command aviation battalion TOC or to relay messages for supported commanders if C^2 system HF radios are tied up or ineffective.

E-70. A secondary mission of C^2-system-equipped and A^2C^2S aircraft is C^2 of some aviation brigade missions such as operations in deep areas and air assaults. In these missions, the aviation brigade commander and selected staff may employ the C^2 aircraft as a tactical CP. Relative proximity to mission aircraft facilitates SINCGARS voice and IDM data transmission between the brigade and battalion commanders. The availability of HF and SATCOM ensures long-distance communications with the division or corps CP.

HEAVY HELICOPTER BATTALION

E-71. These missions are frequently single ship long-distance operations and require HF for communications with the battalion TOC. Some units employ multiple CH-47s for air assaults to move artillery, high mobility multipurpose wheeled vehicle (HMMWV), and other key mission equipment. These missions require the organic SINCGARS capability to communicate on assault battalion nets; however, only one SINCGARS is generally available. Have Quick II provides internal communication between CH-47s.

AVIATION BATTALION TASK FORCE

E-72. An aviation battalion TF forms and deploys for missions that do not require an entire aviation brigade but must support a broad spectrum of aviation missions. The AH-64D, OH-58D, and HH-60L have IDM capability for data communications; the AH-64A, UH-60A/L, and CH-47 aircraft do not. All aircraft share SINCGARS, HF, and Have Quick II interoperability with the exception of the OH-58D, which lacks HF capability.

E-73. For some missions requiring extensive digital communications, such as attack, only IDM-capable OH-58D and AH-64D aircraft may participate. On the other hand, OH-58D aircraft may be task-organized with non-IDM AH-64As. During reconnaissance and air assaults, all aircraft may participate. Task force commanders require cross-trained staff personnel and possibly A^2C^2S aircraft to C^2 the task force.

Appendix F

Arming and Refueling Operations

This appendix provides aviation commanders, staff elements, and Class III and V personnel with a comprehensive view of the purpose, organization, and operation of the FARP. It also describes planning considerations for FARP setup and transportation planning for Class III and V products.

SECTION I – INTRODUCTION

PROPONENCY AND APPLICABLE FIELD AND TECHNICAL MANUALS

F-1. The Combined Arms Support Command is the proponent for operations and military occupational specialties (MOSs) related to fueling and ammunition operations. This appendix specifies unique procedures that ammunition, arming, and refueling personnel perform in FARP and AA refuel operations.

F-2. This appendix covers information from the rescinded FM 1-104. However, units must refer to FM 10-67-1 for greater detail and applicable checklists. FM 4-20.12 (FM 10-67-1) consolidates and supersedes FMs 10-18, 10-20, 10-68, 10-69, 10-70-1, and 10-71. Units ensure that FARP personnel have the most current version of FM 4-20.12 (FM 10-67-1) available during FARP operations.

F-3. For ammunition operations, the user should refer to FM 4-30.13 (FM 9-13), including its Appendix J.

F-4. Other technical manuals are cited in this appendix, and these are available at www.logsa.army.mil/etms/find_etm.cfm.

DEFINITION

F-5. A FARP is a temporary arming and refueling facility organized, equipped, and deployed within the aviation unit's AO. FARPs are transitory and support specific mission objectives. Some FARPs do not have cavalry or attack arming points. However, they do have ammunition for all weapons carried by utility and heavy helicopters. FARPs are task-organized according to METT-TC.

PURPOSE

F-6. FARPs promote increased aircraft time on station by reducing turnaround time associated with refueling and rearming. Units employ FARPs when flight time to unit trains is excessive and mission demands require longer time on station. FARPs also support operations in deep areas or other operations when mission distances exceed normal aircraft range and when target size requires rearming. During exploitation and other rapid advances, FARPs support aviation forces when field trains are unable to keep pace.

F-7. The key to effective FARP support is simultaneous arming and refueling. Ideally, FARPs service each company as a unit, with each aircraft within that unit simultaneously receiving fuel and ammunition.

PERSONNEL

F-8. Personnel allocations for the FARP include MOSs 77F, 89B, 15J, 15X, and 15Y. Petroleum specialists, MOS 77F, transport Class III and fuels aircraft. Ammunition specialists, MOS 89B, transport, unpack, maintain, and account for ammunition. Aircraft armament repairers, MOSs 15J/X/Y, repair fire control systems and arm OH-58D, AH-64A, and AH-64D aircraft, respectively. As required, commanders augment the FARP with other medical, BDA/maintenance teams, and security forces. At division or major base camp rapid refueling point supporting SASO, the increased operational tempo or density of traffic may require ATS assets.

PLANNING FACTORS

GENERAL

F-9. The mission and operational tempo determine FARP supply priorities. Exploiting ATKHBs may expend Class V faster than Class III. Conversely, reconnoitering air cavalry squadrons expend more Class III than Class V.

DISTANCE

F-10. Units often establish FARPs if distances between the fight and the logistics trains exceed 30 kilometers. FARPs that are located too far forward are at risk of artillery engagement and increase turnaround time for slower supply vehicles. However, flight time to and from FARPs positioned too far in the rear reduces available time on station. The threat, availability of cover and concealment, road conditions, availability of higher echelon throughput of Class III/V, and distance to Class III/V distribution points affect how close FARPs can locate to the fight for sustained support.

THREAT

F-11. The threat can neutralize aviation force effectiveness by preventing aircraft from rearming and refueling. Therefore, the FARP may be a high-priority target for the enemy. Enemy forces may subject FARPs to NBC, ground, TACAIR, air assault, and artillery attacks. Local sympathizers and insurgents may harass FARP operations.

DISPLACEMENT

F-12. FARP survivability requires frequent displacement. Few FARP locations permit rearming and refueling more than three times. A good planning figure for FARP duration is three to six hours. Units employ more than one FARP for longer missions with displacing silent FARPs waiting to assume the mission at preplanned times. Careful site selection, effective camouflage, and minimum personnel and equipment lead to survivable, mission-capable FARPs.

SECTION II – COMMAND, CONTROL, AND COMMUNICATIONS

COMMAND AND CONTROL

F-13. One of the most difficult aspects of FARP operations is how to command, control, and communicate with other elements in the aviation unit without compromising the FARP.

COMMANDER

F-14. The commander is responsible for overall FARP success. Based on the factors of METT-TC, he decides how FARPs will support missions.

S3

F-15. The S3 formulates a FARP plan that supports the commander's tactical plan. The S3 consults with the S4 and the HHC commander to ensure that the plan is logistically supportable.

S4

F-16. The S4 calculates mission Class III/V requirements and plans supply distribution. He coordinates these needs with higher headquarters.

CLASS III/V PLATOON LEADER

F-17. The Class III/V platoon leader is responsible for accomplishing the FARP mission. He assists the S3 in formulating the FARP plan and coordinates fuel and ammunition needs with the S4.

AIRCRAFT CONTROL

F-18. Aircraft control within the FARP is critical to safety and efficiency. The FARP's proximity to the battlefield restricts use of electronic means for positive aircraft control. The most effective control mechanism is a thorough briefing based on a well-written and -rehearsed SOP that outlines FARP procedures for aircrews and FARP personnel. For rapid refueling points in rear areas, offset, low-output nondirectional radio beacons (NDBs) may be a low-risk means to identify refuel points. In addition, units may use various signaling methods to maintain procedural aircraft control.

AIR TRAFFIC SERVICES

F-19. ATS use in the FARP is METT-TC dependent. Under some circumstances, ATS units can provide aviation commanders with an extra measure of safety and synchronization.

Air Traffic Services Team

F-20. A tactical aviation control team can manage aircraft flow for faster, safer, and more efficient operations. A team has three soldiers equipped with an HMMWV-mounted TTCS and an AN/TRN-30(V)1 low-power nondirectional radio beacon. This equipment can be set up within 30 minutes. It provides a short-to-medium range NDB and secure-voice VHF and UHF. The tactical aviation control team deploys from a supporting ATS company, battalion, or group assigned to the division, corps, or theater.

VISUAL SIGNALS

F-21. Examples of visual signals include hand-and-arm signals, smoke, signal flags, flash cards, and light signals. Ground guides normally control aircraft movement within the FARP. Because ground guides may direct allied aircraft, they must use standard hand-and-arm signals (Section VIII).

Smoke

F-22. Smoke is not a preferred visual signal, but it has some advantages. It indicates wind direction. Different colors can indicate the current FARP situation and Class III/V availability. Smoke also has disadvantages; its use is day restricted, and it can compromise the FARP location.

Lights and Flags

F-23. Flashlights and light wands provide other types of visual signals. Use flashlights with color-coded disks to relay information. A separate colored disk, easily seen at night, can indicate the FARP situation or supply availability. During the day, signal flags of different colors can serve the same purpose. Sites should be concealed that limit enemy ability to detect FARP light sources. FARP personnel maintain light discipline until aircraft arrive. Personnel use light wands with hand-and-arm signals to mark departure, landing, and arming and refueling points.

F-24. Chemical lights come in several colors, including IR, which only NVDs can detect. Personnel use these in the same manner as flashlights and light wands. An effective technique for lighting the landing area is to dig shallow trenches in the shape of a "Y" and place both chemical and beanbag lights in the trenches. Landing aircrews will see the "Y" at a certain angle from the air, but it will not be visible to the enemy from the ground. Lights should be turned off when not needed.

SIGNALS

F-25. In peacetime, aircrews turn off the anticollision light to signal the ground crew to begin arming. As an alternate combat signal, aircrews may employ hand-and-arm signals during the day and cockpit navigation lights at night to signal the start of arming. Ground personnel can talk via intercom to the aircrew with the helmet assembly, rearming refueling personnel (HARRP) (CTA 50-900) with communications (HGU-24/P).

TRAFFIC LAYOUT

F-26. Standard marker panels on departure and arrival points improve the control of aircraft. FARP personnel use secured engineer tape, chemical lights, or beanbag lights at night to indicate desired aircraft movement or the location of ground guides. After servicing, the ground guide directs aircraft toward the departure end of the FARP.

CAUTION
If used, properly secure marker panels and engineer tape to avoid foreign object damage.

F-27. Figure F-1 shows an example of traffic layout. Figure F-2 shows an example of layout for simultaneous operations.

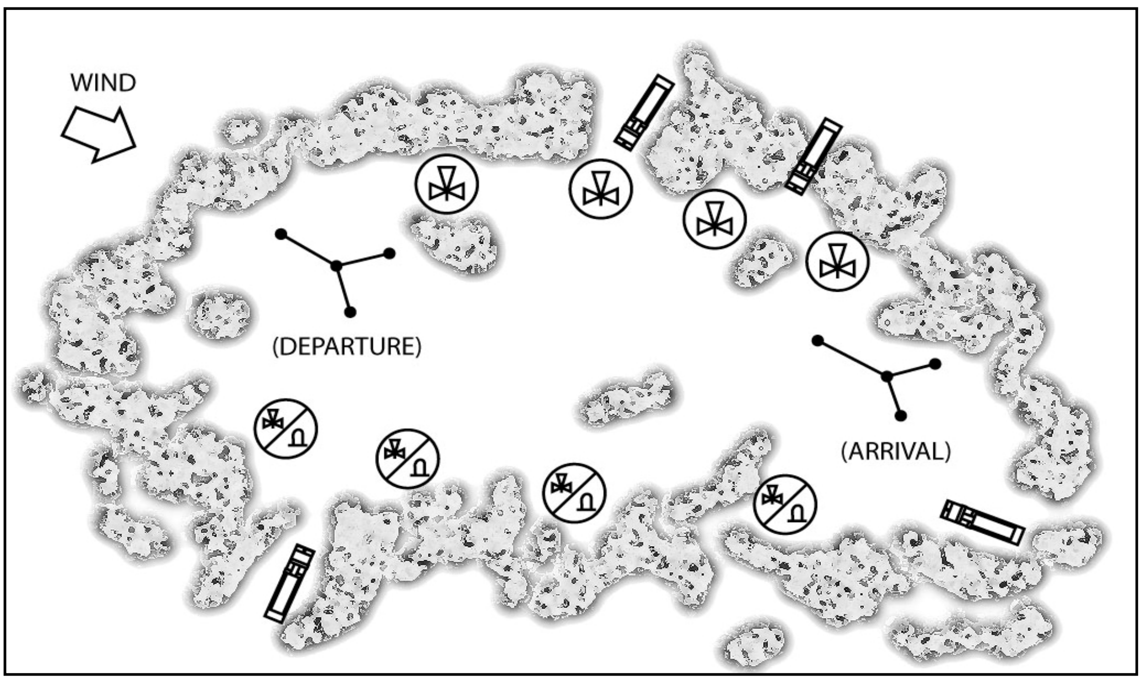


Figure F-1. Example of FARP Traffic Layout

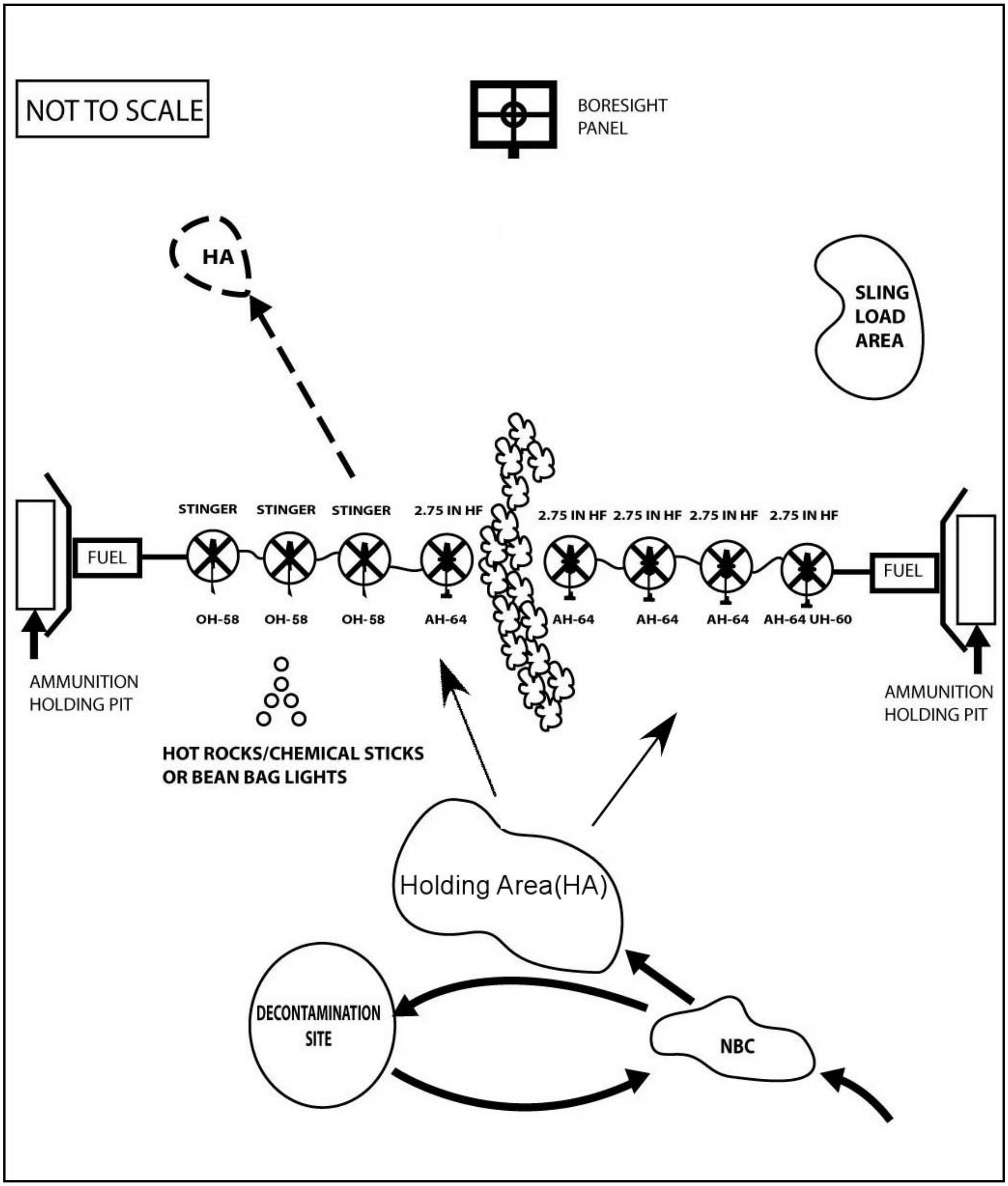


Figure F-2. Example of FARP Layout for Simultaneous Operations

F-28. Maintaining unit integrity during FARP operations improves aircraft control. Units select HAs, ingress routes, and egress routes to improve aircraft control. They involve the unit SO in planning routes in and out of the FARP and establishing checkpoints along the routes.

RADIO COMMUNICATIONS

F-29. FARP personnel avoid radio transmission to reduce enemy capability to detect and target electronic emissions. However, each FARP (active and silent) requires at least two FM radios for monitoring. This allows simultaneous monitoring of both the command and A&L nets. FARP personnel monitor the command net to determine when units are inbound and when the FARP needs to displace. FARPs communicate on A&L to inform the S4 of their own supply needs.

F-30. Because FM radios are limited by LOS and range, the distance or location of the FARP may prevent FARP personnel from monitoring or transmitting on the designated command frequency. Aircraft retransmission or relay is an option. Critical messages that may require airborne relay include when the FARP—

- Is under attack.
- Relocates or ceases operations.
- Is not operational at the scheduled time.
- Requires resupply.
- Has a change in status.

F-31. Aircrews use radios only after aircraft have left the FARP. This procedure helps prevent the enemy from electronically pinpointing the FARP's location. Aircrews can relay less time-sensitive FARP reports and other communications in person after mission completion.

SECTION III – EMPLOYMENT FACTORS

LOCATION

F-32. FARPs locate as close to the AO as the tactical situation permits. They may locate as far forward as 18 to 25 kilometers, dependent upon METT-TC; behind the FLOT; and within a committed brigade's AO. This distance increases aircraft time on station by reducing travel times associated with refueling. If possible, the FARP remains outside the threat of medium-range artillery. Figure F-3 shows typical ranges of threat medium-range artillery.

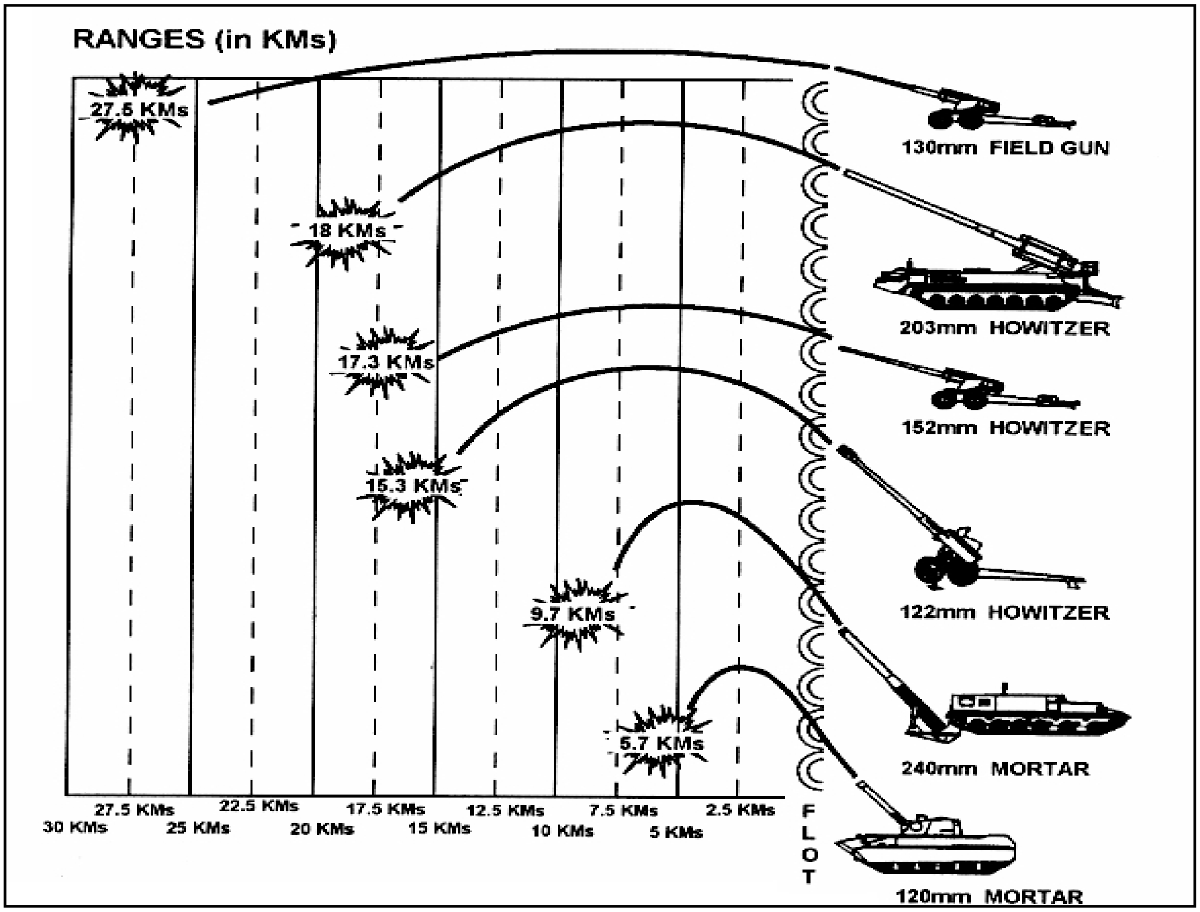


Figure F-3. Typical Ranges of Threat Medium Range Artillery

FORWARD ARMING AND REFUELING POINT MISSION SUMMARY

F-33. The tempo and distances of future linear and nonlinear operations will increase demand for FARPs that support simultaneous operations. Aviation's ability to operate in depth and breadth requires equally mobile, austere, transitory FARPs located near the AO to maintain support. In less-intense operations and SASO, FARPs may operate out of airheads or centralized base camps. Such facilities provide the security and hardening that allow FARPs to remain in place longer. In both linear and nonlinear operations, aircraft may have greater dependence on extended range fuel systems (ERFSs) that can rapidly deplete available FARP fuel.

MISSION

F-34. FARPs support deep, close, and rear areas (Chapter 2). In many circumstances, vehicle-emplaced FARPs within the close area can also support aircraft returning from deep areas and reaction elements assigned to counter Level III rear threats. Units also may employ air-emplaceable jump FARPs to support rear or deep areas or to reinforce FARPs supporting decisive and shaping operations. The following discussion explains how

FARPs support the three basic mission types in the context of decisive, shaping, and sustaining operations (Chapter 2).

Decisive Operations

F-35. Ground and air maneuver forces strike decisive blows. Ammunition palletized loading system (PLS) trucks with mission-configured loads push supplies down to the close area where FARP elements meet them at logistics RPs. When possible, the Class III/V platoon leader coordinates for direct delivery to the silent FARP to avoid transloading. Units travel to supply points for fuel or receive throughput from higher echelon 5,000-gallon tankers for transloading. Air-emplaced jump FARPs support limited resupply behind enemy lines and support mobile strikes involving major air assaults.

Shaping Operations

F-36. Cavalry, operations in deep areas, special operations, and air assaults characterize these operations. Corps AH-64 aircraft conduct operations in deep areas using extended-range fuel tanks so that only Class V FARP support may be necessary behind enemy lines. Special operations aircraft also may require Class V support. Air assault mission aircraft often employ extended-range fuel tanks but may need limited Class V support for armed aircraft providing assault security.

Sustaining Operations

F-37. Air-emplaced jump FARPs support corps and division reaction aviation forces as they attack Level III rear threats to sustainment. Airheads and base camps support SASO and initial deployment aviation needs at intermediate support bases. CH-47D and UH-60A/L aircraft conduct air movement to supplement ground-emplaced FARP activities and emplace jump FARPs supporting aerial resupply of ground forces in shaping operations in deep areas.

ENEMY

F-38. The S2 determines the threat that the FARP is likely to encounter. This determination includes the enemy's capabilities, posture, and weapon systems. For example, a FARP located in the close area may encounter an enemy reconnaissance element. A FARP in the rear area may be the target of enemy SOF. The S2 also determines the type of intelligence-gathering devices and sensors that the enemy has oriented on the proposed FARP location.

TERRAIN AND WEATHER

F-39. A good FARP location allows for the tactical dispersion of aircraft and vehicles. Tree lines, vegetation, shadows, and built-up areas can conceal FARP operations. FARP personnel employ terrain folds and reverse slopes to mask the FARP from enemy observation. They choose locations with masked MSR and ingress/egress routes for both ground and air.

TROOPS AND SUPPORT AVAILABLE

F-40. The Class III/V platoon leader must determine if enough troops are available to operate the desired size and number of FARPs. An implied task is the requirement to resupply and set up current and future FARPs. In addition, the proper personnel skills must be available in the proper numbers. For example, the 15J, 15X and 15Y personnel are school-trained to arm and repair weapon systems. Units must cross-train other personnel to fuel aircraft and load weapon systems but cannot cross-train them to perform specific repair functions. Depending on FARP location, security requirements will vary. In most cases, the FARP provides its own security.

TIME AVAILABLE

F-41. Mission duration is a critical planning factor. Longer missions require either multiple FARPs for different phases of the mission or a midmission FARP displacement combined with Class III/V throughput to a new FARP location. Planners must consider driving or flight time to proposed FARP sites. Planners—

- Allow sufficient time for FARP setup.
- Consider how far the FARP is from the supply points, and either plan supply throughput or arrange for a second silent FARP to go active to support the next phase of the mission.

F-42. The FARP supports rearming and refueling operations for a specific mission. When that mission is complete, the air assets make the transition to the rear AA to reconfigure ammunition loads, refuel, and perform required maintenance in preparation for other missions. Figures F-4 and F-5 show typical dispositions of the division aviation brigade and its support assets.

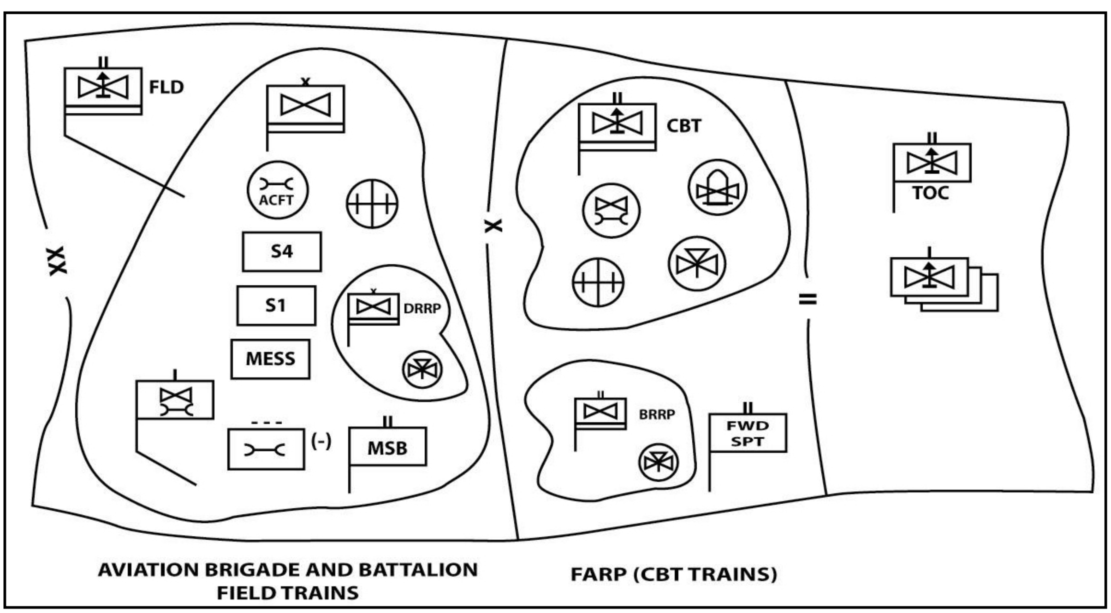


Figure F-4. Typical Battlefield FARP Layout

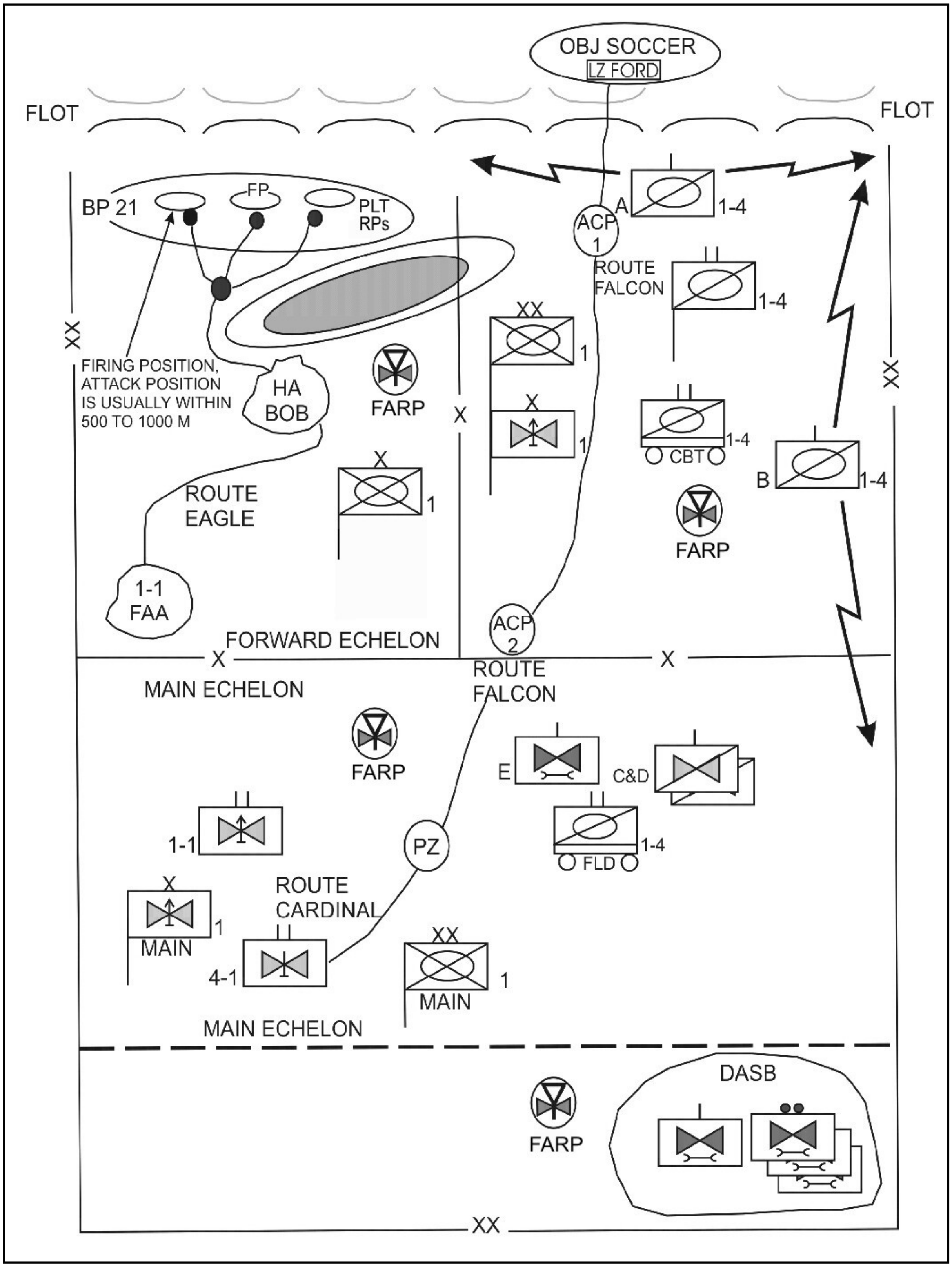


Figure F-5. Typical Disposition of the Division Aviation Brigade and Support Assets

Brigade Rapid Refueling Points

F-43. Brigades employ rapid refueling points to refuel other unit aircraft. The rapid refueling point services aircraft as quickly as possible, allowing CS missions to continue. Rearming operations are not conducted at this site unless a Level III threat requires it. This practice allows more arming assets forward.

Division Rapid Refueling Points

F-44. Stationary in nature, the division rapid refueling point locates in protected rear areas of the DSA. It is manned by the aviation support battalion (ASB) or is task-organized within the aviation brigade. It supports organic and transient aircraft. The length of rapid refueling point operations usually depends on the factors of METT-TC. As with the brigade, the division rapid refueling point does not rearm aircraft.

EMPLACEMENT

F-45. FARPs can be emplaced by ground or air. The means of emplacement depends on where and when the FARP is to be set up and how much Class III/V that the mission requires. The FARP should be designed so that a trained team can quickly place it into operation. This team should be able to load and move without leaving behind any debris, fuel, ammunition, or equipment; therefore, the FARP employs only those assets that it needs for the mission. Section VII covers FARP emplacement.

Ground Vehicle Emplacement

F-46. FARPs normally emplace using ground vehicles carrying bulk quantities of Class III/V. Ground vehicles also are the primary means of displacing and resupplying the FARP. However, ground-mobile FARPs have several disadvantages. Ground vehicles limit the rapid positioning of FARPs and are subject to road and traffic conditions. Vehicle accessibility limits where FARPs can locate. At mission completion, empty vehicles must return to distant supply points before they are available to emplace a new FARP. Vehicle malfunctions hamper overall mission capability.

Air Emplacement

F-47. Emplacing FARPs by air offers three major advantages. The first is that a FARP can move about the battlefield much faster by air than by ground. The second advantage is that nearly every open field becomes a potential FARP site. Third, it is generally more practical, from a threat perspective, to air emplace FARPs in support of shaping operations in deep areas.

F-48. Air-emplaced FARPs also have disadvantages. Aerial emplacement depends on availability of supporting aircraft. If the enemy is advancing and no utility or heavy helicopters are available for FARP displacement, the entire FARP can be lost.

F-49. Aerial resupply of the FARP requires multiple loads to move bulk quantities of Class III/V. This additional air traffic can compromise the FARP location, increasing likelihood of enemy attack. Aircraft that sling load equipment and supplies cannot fly NOE. They are more visible to enemy sensors and missiles. Although materiel handling equipment (MHE) is often essential in a FARP, it may be impractical to sling load rough-terrain forklifts. The absence of MHE can seriously degrade ammunition handling.

Combined Ground Vehicle and Air Emplacement

F-50. The most efficient use of assets combines ground and air capabilities. When time is critical, the FARE, limited Class III/V, and advance-party personnel can air emplace. Remaining Class III/V products, MHE, and support personnel can move to the site via ground transportation. Aerial resupply of most FARPs occurs only when expenditure rates exceed organic ground transport capability. Heavy or utility helicopters can temporarily augment ground vehicles until supply flow returns to normal.

MOVEMENT PLAN

F-51. FARP movement plans should cover advance parties, march tables, a route reconnaissance, and alternate site locations. Detailed movement planning improves the accuracy of the FARP's operational time. Planning should include load plans for individual vehicles and trailers. Standard load plans do not exist for current equipment because equipment varies in each unit's MTOE. In addition, varying Class V requirements for different missions greatly affect vehicle load plans.

F-52. An advance party/security team, equipped with NBC detection equipment, reconnoiters the planned route and proposed FARP site. If the site is unsuitable, the team explores alternate FARP locations. If the site is usable, the advance party identifies areas for placing equipment. When remaining FARP personnel and equipment arrive, the advance party guides each vehicle to its position.

SECURITY

F-53. FARPs need enough organic security to thwart anticipated threats. Excess security equipment hinders movement. Inadequate security risks valuable assets. The advance party may include Stinger assets, NBC teams, and crew-served weapons. The lead vehicle employs NBC attack monitoring and warning equipment. Monitoring equipment locates upwind of the FARP site. Light antitank weapons protect against enemy armored scout vehicles. If available, FARPs place electronic early warning systems along likely avenues of approach not covered by listening or OBs. Armed helicopters in or near the FARP may act as quick-reaction forces. Units also can employ nonflying soldiers as UH-60-transportable quick-reaction teams.

F-54. The FARP coordinates with the brigade responsible for the sector in which the FARP locates and integrates into the air and ground security plan of nearby friendly forces. If a FARP is designated a priority target, division AD assets may employ near the FARP. These AD assets may cover friendly ingress and egress routes. Units establish checkpoints that allow positive identification for friendly aircraft using the FARP.

F-55. In the event of substantial attack, personnel execute a scatter plan to include movement to rallying points. These points increase personnel survivability and allow personnel to regain control of the situation.

RELOCATION

F-56. Several guidelines determine the relocation of a FARP. By definition, the FARP should be temporary, not staying anywhere longer than three to six hours unless it is hardened and located in a secure area such as an airhead. When the battle lines are changing rapidly or when the rear area threat dictates, the FARP must move often. Where air parity or enemy air superiority exists, the FARP must move often.

F-57. A FARP may relocate for any of the following reasons:

- It comes under attack.
- It receives the order to relocate.
- A preplanned relocation time has been set.
- A specific event occurs; for example, when the FARP has serviced a specific unit or a specific number of aircraft.
- A decision or trigger point is reached.

F-58. The message to relocate a FARP is passed in FRAGO format and should contain, as a minimum—

- Eight-digit grid coordinates of the next site and alternate site.
- Time that the FARP is to be mission ready.
- Fuel and ammunition requirements.
- Passage-of-lines contacts, frequencies, call signs, and ingress and egress points.
- Enemy situation at the next site.
- March table or movement overlay.
- A logistics release point (LRP) to the FRAGO.

ADVANCE-PARTY ACTIONS

F-59. The advance party breaks down one section, consisting of one heavy expanded mobility tactical truck (HEMTT) or one FARE. Next, it rolls up and packs hoses and refuels the tanker if fuel is available. The advance party then transports, when possible, enough ammunition for two mission loads per aircraft, rolls up the camouflage nets, and sets up a convoy.

F-60. When the new site is deemed suitable, the advance party—

- Determines landing direction.
- Determines and marks refuel and rearm points, truck emplacements, and ammunition emplacements.
- Sets up equipment.

F-61. Remaining elements break down the FARP in the same way and sequence as described above. When personnel arrive at the new site, they move into new locations, as directed by the advance party, and set up arming and refueling points.

SITE PREPARATION

F-62. FARP personnel—

- Police the FARP site before operational use.
- Prevent rotor wash from injuring personnel or damaging equipment, remove sticks, stones, and other potential flying objects.
- Clear scrub brush, small trees, and vegetation from landing and takeoff areas.
- Predesignate landing, takeoff, and hover areas to minimize accidents and injuries.
- Clear the areas around the rearming and refueling points and the pump assemblies, removing dried grass and leaves to avoid fires.

F-63. Aircraft may sink in wet, snow-covered, thawing, or muddy ground. Reinforce unstable ground with staked, pierced steel planking or other suitable material.

MULTIPLE FORWARD ARMING AND REFUELING POINT OPERATIONS

F-64. The degree of air superiority and the factors of METT-TC determine the number of FARPs and the number of points at each FARP. Multiple FARP operations may be necessary. When feasible, units arrange assets into two or three independent and mobile FARP operations. The ideal situation would include an active FARP, a silent or relocating FARP preparing to go active, and a rapid-reaction air-emplaced jump FARP on standby.

F-65. The active FARP conducts refueling and rearming operations. The silent FARP has all equipment and personnel at the future site, but it is not yet operational. The jump FARP deploys for special, short-notice missions such as rear operations or reinforcement of other FARPs. It is composed of a FARE, 500-gallon collapsible fuel drums, and/or ammunition (as the mission dictates). The jump FARP is transported and emplaced by ground or air and employed when dictated by time or geographical constraints. It allows uninterrupted support during FARP emergencies.

F-66. When employing multiple FARPs, it is important to coordinate resupply. If Class III/V throughput occurs at a designated time, active FARPs stop receiving supplies and silent FARPs start receiving them. If properly timed, the active FARP expends all of its supplies just as a silent FARP becomes active. If time permits, FARP personnel transport unused Class III/V to the new site. Otherwise, they camouflage supplies and pick them up later. FARP personnel destroy supplies only as a last resort. TM 750-244-3 provides guidance on asset destruction.

F-67. A typical ground-emplaced mobile FARP can rearm and refuel eight aircraft simultaneously. It consists of eight rearm/refuel points. The silent FARP is identically configured and prepared to assume operations.

DAMAGED OR DESTROYED ASSETS

F-68. If attacked, FARP personnel vacate the FARP site. The nature of the compromise determines what can be salvaged. The refueling equipment is most critical. Without HEMTT tankers or FARE systems, refueling aircraft will be difficult. Higher echelon, less-mobile 5,000-gallon semitrailers may need to replace destroyed HEMTT tankers.

F-69. FARP personnel replace damaged or destroyed equipment quickly to avoid mission disruption. Report personnel injuries to the HHC commander, and report damage to vehicles, equipment, and supplies to the S4. If assets are unavailable in the unit, emergency support may be available from other brigade sources. This support could range from borrowing equipment to using another battalion's FARP. Units inform aviation elements of any changes in the status of the FARP sites, to include alternate arming and refueling instructions.

F-70. Planners prioritize essential equipment or products before the mission starts. Inform all FARP personnel of the priorities. For example, keeping Hellfire missiles from the enemy would be a high priority because the missiles are expensive and in short supply.

SECTION IV – REFUELING OPERATIONS

F-71. This section discusses the FARE, the Advanced Aviation Forward Area Refueling System (AAFARS), site layout, support equipment, personnel refueling requirements, and refueling methods.

FORWARD AREA REFUELING EQUIPMENT

F-72. The FARE system (NSN 4930-00-133-3041) consists of a pump assembly, a filter/separator, hoses, nozzles, grounding equipment, and valves. Other support equipment includes fire extinguishers, grounding rods, waste cans, 5-gallon water cans, absorbent material, fuel source, and the fuel sampling kit. The pump has two hose connections and is rated at 100 gallons per minute (GPM). When two hoses are used, the actual flow rate may be under 50 GPM. The fuel source is usually 500-gallon collapsible drums. Other fuel sources include 600-gallon pods; 1,200-gallon tank and pump unit (TPU); 3,000- or 10,000-gallon collapsible tanks; 2,500-gallon HEMTT tanker; 5,000-gallon semitrailer; railroad tank cars; and USAF cargo-plane fuel tanks.

ADVANCED AVIATION FORWARD AREA REFUELING SYSTEM

F-73. AAFARS will replace the FARE system. The AAFARS is a four-point refuel system providing a minimum of 55 GPM at each refuel point. A distance of 100 feet separates each refueling point. The primary fuel source is the 500-gallon collapsible drum although, like the FARE, the system is compatible with other fuel sources. The key AAFARS function is to simultaneously refuel four helicopters in tactical locations using center point refueling (D-1), closed-circuit refueling (CCR), or open-port nozzles. The system interfaces with existing U.S. Army, Air Force, Navy, and Marine Corps aircraft and is interoperable with NATO and other allied-nation refuel equipment.

FORWARD AREA REFUELING EQUIPMENT SITE LAYOUT

F-74. Skilled, experienced personnel can set up a FARE within 15 minutes of site arrival. Figure F-6 shows a typical site layout.

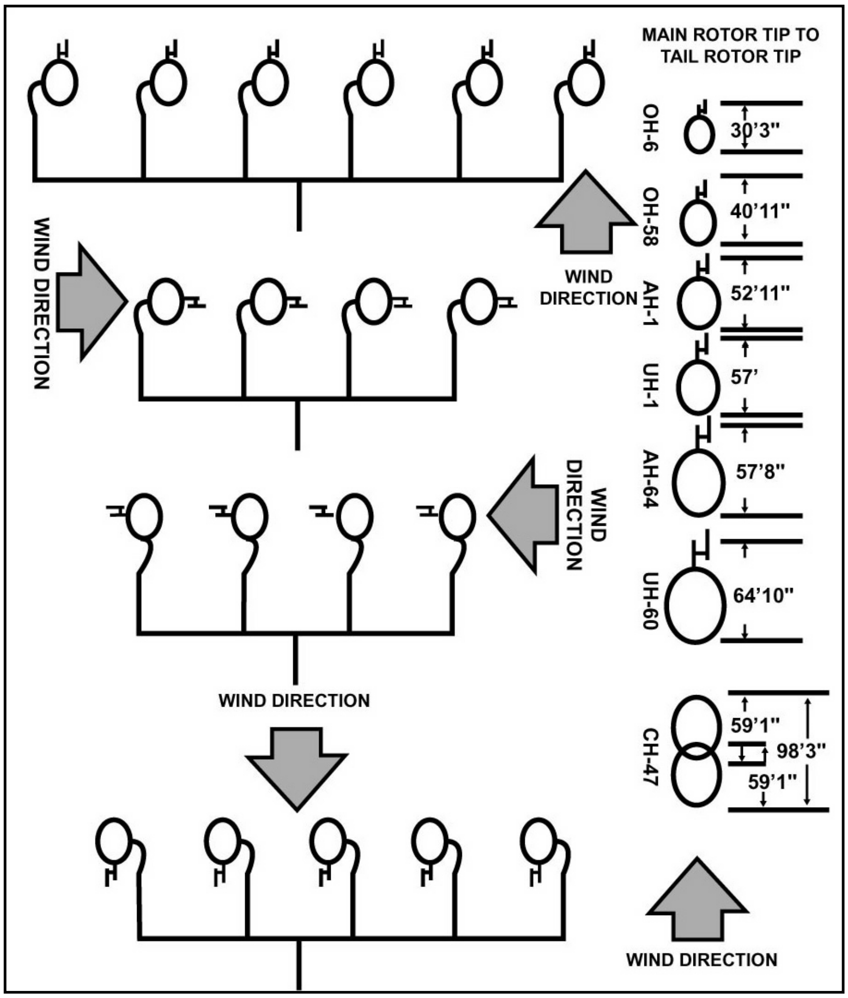


Figure F-6. Typical FARE Setup

F-75. FARE system setup should exploit terrain features, achieve maximum dispersion, avoid obstacles, and accommodate the aircraft type that the FARP will service. When planning the layout, personnel must consider the minimum spacing required between aircraft during refueling. The spacing depends on the type of aircraft and rotor sizes. Proper spacing reduces the possibility of collision and damage caused by rotor wash. The minimum rotor hub-to-rotor-hub spacing for the CH-47 is 180 feet. Spacing for other helicopters is 100 feet.

F-76. If the area has a prevailing wind pattern, FARP personnel orient the refueling system so that helicopters land, refuel, and take off into the wind. Figure F-6 shows a FARE setup under various wind conditions. Refueling points should be laid out on the higher portions of sloped sites, not in hollows or valleys. Fuel vapors are heavier than air and flow downhill. In addition, fuel sources should be downwind of the aircraft's exhaust to reduce explosion hazard. These considerations apply to any FARP setup with the FARE, 5,000-gallon tanker, or HEMTT.

F-77. The FARP layout in desert, dust, and snow environments should not require hovering where wind and rotor wash may cause brownout or whiteout. Special considerations are necessary when aircrews operate with night vision devices (NVD).

SUPPORT EQUIPMENT

F-78. FARE or FARP personnel perform the following procedures:

- Locate a fire extinguisher at each refueling nozzle and at the pump and filter assembly.
- Place a water can at each refueling point; the water enables operators to wash fuel from skin and clothes and dirt from fuel nozzles.
- Place a waste fuel pan next to each nozzle to contain fuel spillage.

PERSONNEL REFUELING REQUIREMENTS

F-79. During refueling, one person stays next to the main emergency fuel shut-off valve and monitors refueling. At each refuel point, one person refuels the aircraft while another remains outside the aircraft's main rotor disk and monitors with a suitable fire extinguisher where he can see both the pilot at the controls and the refueler with the nozzle. Each rearming/refueling point has one supervisor, one refueler, and two rearming personnel. Additional personnel may be supplemented from existing assets, depending on METT-TC.

REFUELING METHODS

F-80. Units conduct *hot* or rapid refueling while aircraft engines are running and rotors are turning. *Cold* refueling occurs when aircraft engines have been shut down. In a field environment, units normally use the *hot* refueling method. There are two types of *hot* refueling: open-port and CCR.

Open-Port

F-81. Units open-port refuel with an automotive type of nozzle, inserted into a fill port of larger diameter. It is not as fast or as safe as CCR. The larger port allows fuel vapors to escape. In addition, dust, dirt, rain, snow, and ice can enter the fill port during refueling, risking fuel contamination. Spills from overflowing tanks also are more likely. Units should use the open-port rapid refueling method only during combat or vital training. In these cases, the unit commander makes the final decision. Units conduct simultaneous arming and open-port refueling activities only when the combat situation and benefits of reduced ground time outweigh the risks.

WARNING

As aircraft move through the air, they build up static electricity. Static electricity also builds up on refueling equipment as fuel passes through the hoses. The refueler must ground the aircraft, fuel nozzle, and pump assembly to prevent sparks and explosions. Static electricity buildup is greater in cool, dry air than in warm, moist air.

Closed-Circuit

F-82. CCR is accomplished with a nozzle that mates with and locks into the fuel tank. This connection prevents fuel spills and vapors from escaping at the aircraft fill port and reduces the chances of fuel contamination.

SECTION V – AMMUNITION AND ARMING OPERATIONS AND TRAINING

AMMUNITION OPERATIONS

F-83. This section discusses ammunition and arming operations, aircraft flow and mix, and training.

AMMUNITION STORAGE

F-84. The ready ammunition storage area (RASA) contains the ammunition to support aircraft arming. Ready ammunition is that quantity required to support the mission beyond one load. The RASA requires separate areas for the assembly and disassembly of rockets, aircraft flares, and malfunctioned ammunition. AR 385-64 and TM 9-1300-206 contain more information.

F-85. The basic load storage area (BLSA) contains the specific quantity of ammunition required and authorized to be on hand at the unit to support three days of combat. A basic load includes a variety of ammunition such as small arms, grenades, and mines, in addition to aircraft-specific ammunition.

AMMUNITION SAFETY PROCEDURES

F-86. All personnel must observe required safety procedures to prevent the accidental firing of ammunition or propellants. Improper handling or stray electricity may cause ammunition to explode and result in loss of life, serious injury to personnel, or serious damage to equipment.

F-87. Fin protector springs effectively short-circuit igniter leads, preventing accidental ignition. Armament personnel—

- Install shorting wire clips and fin protectors on all rockets immediately after unloading aircraft launchers or when rockets are not in a launcher.
- Ensure a sufficient quantity of clips and protectors are at each rearm pad; keep them after arming aircraft.

- Secure these clips and wire protectors to prevent foreign object damage.

F-88. Armament personnel must assemble rockets according to the instructions in TM 9-1340-222-20. They retorque unfired rockets remaining in aircraft launchers after a mission. Dropped complete rockets, rocket motors, or fuze-warhead combinations may cause the fuze or warhead to function prematurely. They return dropped crated or uncrated rockets to supporting ammunition supply points.

F-89. In base camp or semipermanent training facilities, units should build barricades around the RASA, BLSA, and rearm pads. Barricades should be at least three-feet thick to effectively reduce hazards from a fire or an explosion. Rocket motors may go off, so point rockets away from aircraft, personnel, and built-up areas and towards berms, barricades, and open spaces.

F-90. Armament personnel cover ammunition to protect it from the weather. In high temperatures, covers must not create excessive ammunition heating. Dark covers placed directly on ammunition pallets can create temperatures up to 180 degrees Fahrenheit.. These high temperatures can damage missile systems. Select light-colored covers to shade ammunition and allow air circulation.

F-91. Armament personnel should follow these procedures:

- Do not stack rockets; the weight will damage bottom layers. If unpacked, store rockets on racks built at the site.
- Do not place rockets directly on the ground; place rockets on a drop cloth or wooden pallet that allows air to circulate.
- Secure rockets to keep them from rolling downhill.

F-92. For maximum safety, armament personnel—

- Minimize the amount of ammunition stored at the RASA and the rearm pads.
- Limit the RASA to 2,000 pounds of net explosive weight (NEW) per cubicle.
- Do not exceed the following limits:
  - Limit each rearm pad to the ammunition required to fully arm one aircraft plus the rocket quantities for a second load; this practice facilitates exchanging the missile and rocket launchers if the mission dictates.
  - Store ammunition for a second aircraft off the pad, properly covered—and pointed away from aircraft, personnel, and other ammunition.

F-93. Table F-1 shows common items used during helicopter rearm operations. Table F-2 shows minimum safe distances between rearm points, RASAs, and activities not ammunition-related.

Table F-1. Common Items, Helicopter Rearm Operations

ITEM	NET EXPLOSIVE WEIGHT
Hellfire missile	34.4 pounds
Rocket, 2.75 in, HE (H489 or H490)	10.0 pounds
Rocket, 2.75 in, HE (H488 or H534)	11.0 pounds
Cartridge, 30-mm, HE (B130 or B131)	.058 ounces
Small arms ammunition	None

Table F-2. Minimum Safe Distances (in Feet)

FROM	TO	BARRICADED	UNBARRICADED
Rearm Point	Rearm point	100-180*	100-180*
	Inhabited buildings and unarmed aircraft	400	800
	Public highways	240	480
	POL storage or refuel facilities	450	800
Ready Ammunition Storage Area	Rearm point	75	140
	Inhabited buildings and unarmed aircraft	50	1,010
	Public highways	305	610
	POL storage or refuel facilities	505	1,010
* Distance is based on rotor clearance.			

ARMING OPERATIONS

ARMAMENT PAD SETUP

F-94. Armament pad setup affects overall aircraft turnaround times. During combat missions, before aircraft arrive, armament personnel place enough ammunition on armament pads for at least one arming sequence. They lay out ammunition in loading order. Armament personnel lay out a full ammunition load in case aircraft expend the entire initial load. Figure F-7 shows two typical layouts for major gunnery training facilities or well-prepared base camp helicopter rearm points. In combat, such preparation is impossible. Figure F-8 shows three-dimensional views.

PERSONNEL REQUIREMENTS

F-95. The weight of the ammunition containers and Hellfire missiles requires that at least two people load each aircraft. Two personnel arm the turret system to ensure link removal and less jamming during uploads. Rocket ammunition requires multiple personnel and tools just to remove and prepare it before loading.

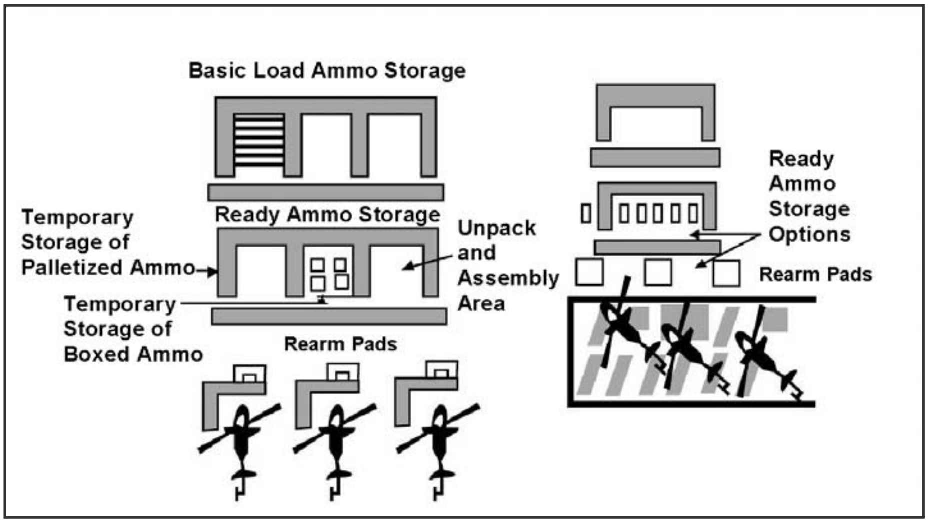


Figure F-7. Typical Layouts for Rearm Points

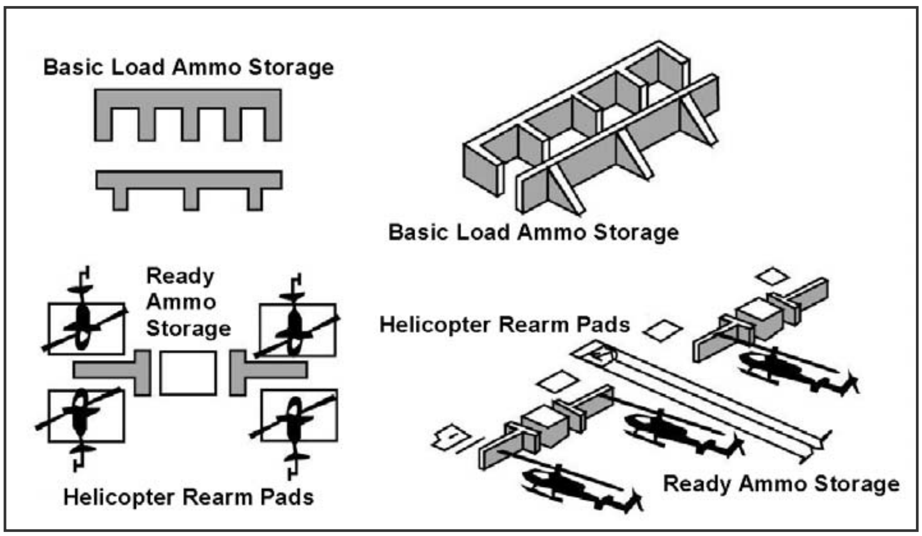


Figure F-8. Three-Dimensional View of a Rearm Point Plan

AIRCRAFT FLOW AND MIX

LIMITATIONS

F-96. Several factors can degrade efficiency and increase turnaround times. These factors include crew size, night operations, NBC environment, weapons and ordnance mix, attrition, and maintenance problems.

Personnel

F-97. For rapid turnaround times, FARPs need sufficient personnel to service aircraft. Each point should be staffed by one supervisor, one refueler, and two armament personnel. Each Class III HEMTT requires one person to man the emergency shutoff valve. Dividing available personnel and equipment into multiple FARPs requires careful planning, or none will be mission capable. Personnel shortages may require aircraft crew members to assist arming and refueling. Turret and Hellfire ammunition requires at least two loaders. During the day, under ideal conditions, a well-trained crew of two can fully arm an AH-64 in 40 minutes. A crew of four reduces time by 3 to 6 minutes.

Night Operations

F-98. When arming turret weapons at night, personnel need NVD or supplemental lighting such as flashlights. In addition, arming times will be three to eight minutes longer at night, especially under low-light conditions.

Nuclear, Biological, And Chemical Conditions

F-99. If chemical protective clothing is worn, refueling times increase by two to four minutes and rearming times by two to six minutes. Fatigue increases the longer a soldier remains under MOPP conditions. Personnel must drink more water when in MOPP to reduce the possibility of heat injuries.

Weapons and Ordnance Mix

F-100. Weapons and ordnance mix can be a limiting factor. For example, an AH-64 may have a weapons load of two Hellfire missile launchers and two 19-tube rocket launchers. A mission change may require that AH-64s be set up for Hellfire heavy (four Hellfire missile launchers). This change requires removal of two 19-tube rocket launchers and replacement with Hellfire missile launchers. While weapons changes and boresighting are better accomplished in the AA, mission timelines may not permit return to the AA; therefore, equipment and tools to accomplish this boresighting must be at the FARP. In addition, the launchers may need boresighting, which requires special equipment. Such a time-consuming changeover must be in the commander's mission-support decision matrix.

Armament Maintenance

F-101. Aircraft with armament maintenance problems may interrupt the flow of FARP operations. These aircraft should be positioned away from the arming and refueling area to keep the flow of aircraft constant.

SIMULTANEOUS ARMING AND REFUELING

F-102. Minimizing aircraft ground time in the FARP is important for two reasons. First, longer aircraft service times mean less time on the battlefield. Second, aircraft are extremely vulnerable on the ground. Simultaneous arming and refueling minimizes ground time; however, they carry their own risk.

F-103. Typically, ATKHBs rotate companies through the FARP to support the battalion's continuous or phased attack. Tests show that well-trained crews require up to 40 minutes to fully arm an AH-64. This means it is critical to maintain company integrity at the FARP. Otherwise, platoons and teams waiting for open armament/refuel points may not be able to rejoin already serviced aircraft in the battle for another 40 minutes. Meanwhile, other companies begin to arrive at the FARP creating additional backlog and less time on station. When possible, all company aircraft must arm and refuel at the same time.

F-104. Depending on task organization and the number of mission-capable aircraft, FARPs require eight armament/refuel points. This quantity supports simultaneous servicing of most company-sized organizations. Each HEMTT tanker and upcoming AAFARS can service up to four refuel points. Extra refuel hose capacity allows units to cross-level fuel from HEMTT tankers to 500-gallon drums without interrupting aircraft refueling. With sufficient drums in place, as fuel gets low, units can transfer tanker fuel to drums, allowing tankers to go for top off. This practice is a good strategy as the FARP prepares to displace and needs fuel resupply at the next location. An alternate strategy is to initially locate all filled drums at the silent FARP, thereby allowing tankers from the initial location to resupply without a lull in the next FARP's mission.

Terrain

F-105. A four-point FARP requires an area larger than a football field. Finding a single cleared, concealed, level area for eight service points may prove difficult. If terrain dictates, consider splitting away part of the FARP to a nearby area.

F-106. FARPs may be divided into two sections, up to one kilometer apart, supporting two to four points each. This layout imposes C^2 and security challenges and prevents personnel who finish servicing their aircraft from assisting others a kilometer away. However, it supports company integrity and dispersion, making it harder to target the FARP with artillery. Figure F-9 depicts a FARP split into two areas for dispersion. Figure F-10 depicts a FARP concealed in urban terrain.

Personnel

F-107. A FARP with eight service points theoretically requires at least 10 refuelers: 8 to refuel aircraft and 2 manning the emergency shut-off valves. It also requires 12 arming personnel (2 per service point). This requirement can overextend the III/V platoon because there is a need for a second silent or resupplying FARP.

F-108. One solution is cross training personnel to assist in multiple FARP functions. Units can train 89Bs, 77Fs, and copilots to assist in arming functions. At a 50-gallon-per-minute rate, a 77F can finish refueling in as little as six minutes and then assist in arming.

F-109. If in the FARP up to 40 minutes, pilots and copilots may stretch by alternately leaving the aircraft. They can assist some arming functions such as lifting Hellfire missiles and loading rockets. Units also can arrange UH-60 transport of FARP personnel, minus drivers, to newly opening FARPs.

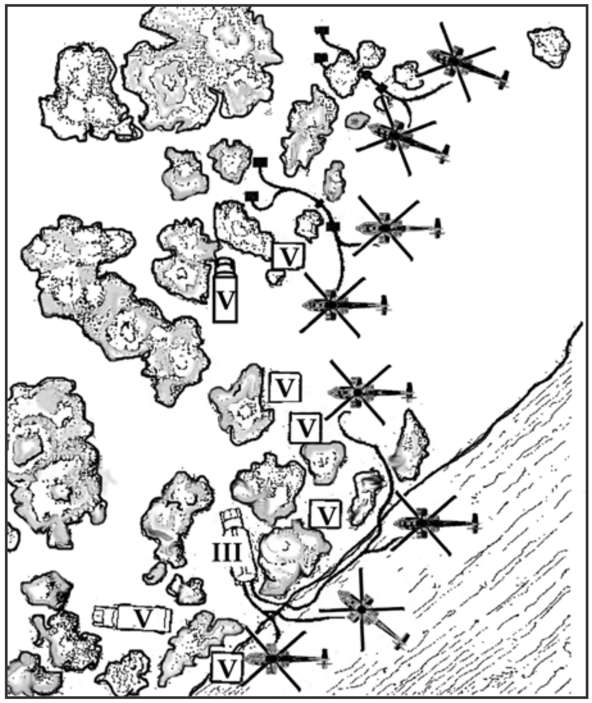


Figure F-9. Example of a Tactical FARP Layout

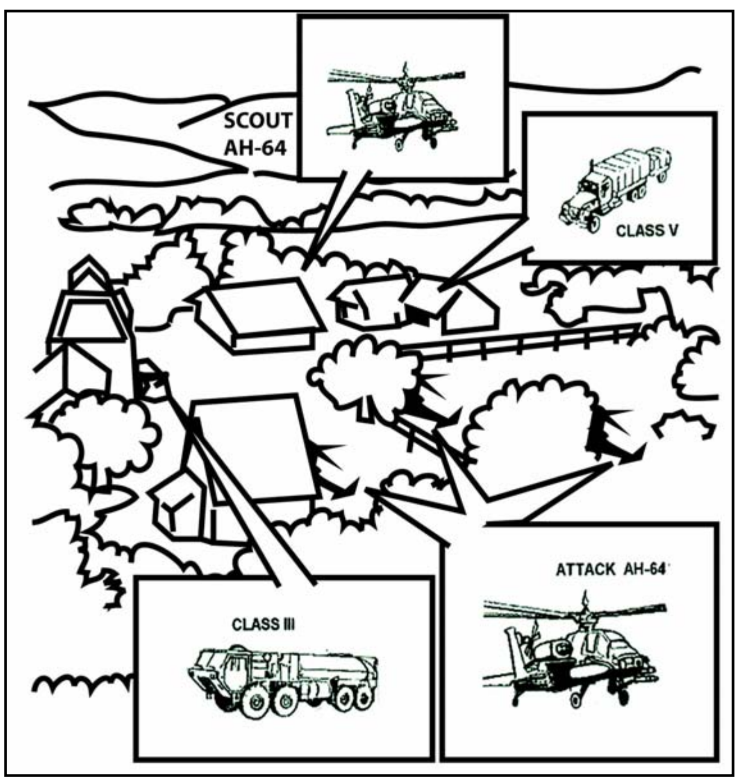


Figure F-10. FARP Operations Concealed in Urban Terrain

Equipment

F-110. At least one HEMTT tanker and two FAREs or one AAFARS must support each four-point FARP. More typical would be two HEMTT tankers, given a less-than-routine availability of UH-60 aircraft to transport 500-gallon drums. Even greater numbers of HEMTTs and heavy expanded mobility ammunition trailers (HEMATs) must support each FARP. Again, as with personnel constraints, it is difficult to operate more than one FARP with available equipment. In addition, there is the time-consuming challenge of resupplying HEMTT tankers and HEMATs to support ongoing and future FARP operations.

F-111. A solution may be coordinated throughput of mission-configured loads using PLS trucks from supporting ammunition units. These PLSs reduce MHE needs by hydraulically placing entire pallets onto the ground for manual access to ammunition. The S4 and III/V platoon leader can coordinate palletized ammunition throughput directly to silent FARP locations and near projected future armament pads.

AIRCRAFT MIX

F-112. If a Longbow unit splits into two platoons or three teams, the FCR aircraft usually is the scout and may have more gun and rocket ammunition. FARP personnel identify the FCR aircraft and direct it to supply points that specialize in loading more of that kind of Class V.

F-113. Scout aircraft may expend little ammunition and may primarily need refueling, which is not as time intensive. They may overwatch until another aircraft completes servicing and can assume the overwatch role.

ATTACK HELICOPTER BATTALION TECHNIQUES

F-114. ATKHBs have three primary techniques for attacking the enemy: continuous attack, phased attack, and maximum destruction. FM 3-04.112 (FM 1-112) covers these in detail.

Continuous Attack

F-115. This is a primary driver for maintaining company integrity in the FARP. In this technique, battalions rotate companies through the FARP. Units cannot afford to have a backlog waiting on companies before them.

Phased Attack

F-116. To give the commander more time operating with two companies in the attack, he can operate two FARPs simultaneously. The normal silent FARP can go active to allow servicing of two companies at the same time.

Maximum Destruction

F-117. Units often employ this technique in a target-rich environment. Aircraft may employ extended-range tanks to reach the objective area and return on one fuel load. If the target is large and one ammunition load is insufficient, given one pylon's loss to an extended range fuel tank, units may air emplace a jump FARP with limited Class V only.

F-118. UH-60 aircraft can internally carry at least 15 Hellfire containers in the cargo compartment doorway area, while externally transporting another 9 palletized Hellfire missiles for a total weight of about 4,800 pounds. This capability allows each UH-60 to resupply three AH-64Ds with eight missiles each. Units also can externally transport three Hellfire pallets (1,800 pounds each) in three separate 10,000-pound slings if UH-60s employ extended-range fuel tanks that would make internal loading/unloading more difficult.

TRAINING

F-119. A successful FARP operation is the final product of a series of progressive, skill-building programs to include the cross training of assigned and attached personnel. Coordinated operations are achieved by integrating team training with programs that emphasize personal skill development. Training progresses as individuals integrate into operational teams.

INDIVIDUAL AND COLLECTIVE TRAINING

F-120. Successful FARP operations result when personnel train to operate as a team. The unit does not limit individual and collective training to just arming and refueling activities. The unit trains FARP personnel in firefighting and rescue procedures according to FM 4-20.12 (FM 10-67-1). Commanders train FARP personnel to prepare Class III/V sling loads (FM 4-20.197 [FM 10-450-3]).

F-121. Every team member should be proficient in day and night land navigation. Because night relocation of the FARP is common, units should emphasize night land navigation skills.

F-122. Team members should have extensive driver training to include operator maintenance procedures. Delivering products to the FARP is as critical as operating the FARP. Team members must also be able to check fuel quality using the visual sample, Aqua Glo, and American Petroleum Institute gravity-testing methods.

F-123. Commanders train team members in NBC detection and decontamination. This training must emphasize FARP vulnerability to direct NBC attack and cross contamination from aircraft. It stresses the need for FARP operations in MOPP gear to survive and continue the mission.

F-124. Personnel must be able to recognize any aircraft that may use the FARP. They should be able to identify all Army, Navy, Air Force, Marine, and allied aircraft and know arming and refueling procedures for each aircraft.

SECTION VI – COMBAT SERVICE SUPPORT

FORWARD ARMING AND REFUELING POINTS SUPPORT MISSION CONSIDERATIONS

F-125. CSS for FARP missions depends on the echelon of support and its corresponding tanker/truck/trailer/MHE capacity. The type of corps and its heavy, light, air assault, or airborne divisions determine how CSS units support aviation mission needs for Class III/V. The type of aviation unit within the corps or division aviation brigade and its relative location on the battlefield also determine support.

F-126. Some CSS elements employ supply point distribution. FARP tankers and trucks must drive to separate Class III and V supply points for transload. Other CSS units employ supply throughput using PLS trucks with mission-configured combat Class V loads and Class III fuel semitrailers that link up with FARP elements at more forward logistics RPs. CSS units support around-the-clock operational capability.

F-127. As missions change, FARP CSS resupply needs change. Transport and MHE requirements may exceed III/V platoon equipment and personnel capabilities, especially when units operate multiple FARPs. Transport vehicles may exceed their cargo-carrying capacity (cube out) before exceeding their weight limitations. Table F-3 shows cargo capacities for various vehicle types.

Table F-3. Cargo Capacity Comparison in Rounds

Munition	HEMTT	HEMAT	5-ton short bed	5-ton long bed	1-½-ton trailer
Hellfire	36	36	27	45	9
Stinger	54	72	36	54	9
Hydra 2.75”	240	240	180	300	60
30-mm	10,368	10,368	10,560	10,560	2,640

F-128. Available MHE unloads ammunition. This MHE may be the TOE-authorized forklift or the HEMTT-mounted crane. Transporting the variable reach forklift may require a flatbed trailer, an item not readily available to the unit. Without the forklift or crane, ammunition pallets must be manually broken down while on the bed of the transport vehicle, which can be a laborious and time-consuming operation.

RESUPPLY

F-129. Resupply operations must match the pace of battle. The same vehicles that support active FARPs must periodically return to Class III and V supply points. Units overcome this lull in FARP capability by operating multiple FARPs and coordinating throughput to the next projected FARP location.

F-130. The Class III/V platoon leader processes periodic bulk POL status reports through the S4 to the MMC to forecast user needs. The corps delivers Class III supplies, using throughput distribution, as far forward as the BSA. However, delivery may occur to the battalion AA or FARP, in specific situations. The aviation unit uses its vehicles to transport the fuel from the transfer point to the FARP. Aviation units in the corps rear area receive Class III from the corps support area (CSA) transfer point.

F-131. If demand exceeds unit resupply capability, limited aerial resupply may be available from other division or corps heavy or utility helicopters. Figure F-11 shows the flow of Class III supplies.

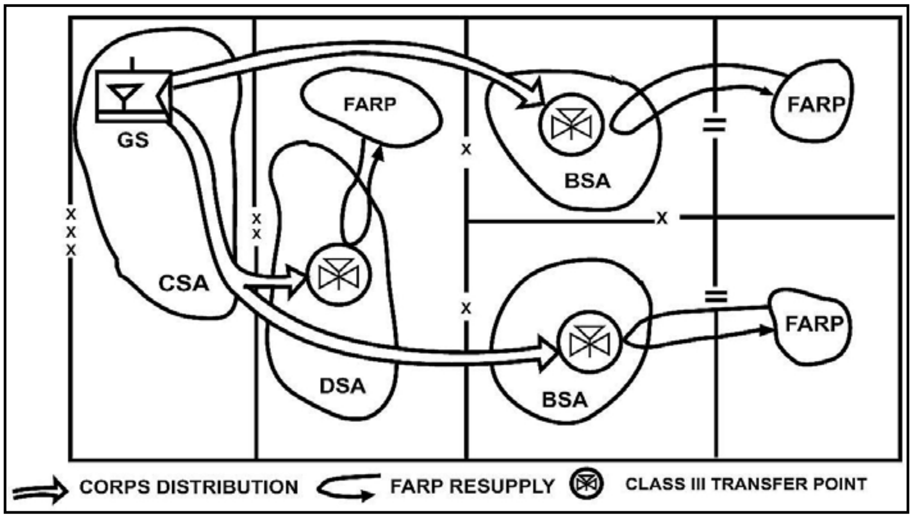


Figure F-11. Flow of Class III Supplies

F-132. The battalion S4 forwards ammunition requests to the appropriate MMC or designated ATP representative. After authenticating requests to ensure that they are consistent with the controlled supply rate, the supplying unit issues ammunition to aviation unit trucks via supply point distribution at either the ATP or the corps ASP.

F-133. Within the division, each forward support battalion can operate one ATP. The corps direct support ammunition company provides an additional ATP in the DSA. The ATPs normally are located in the BSA. They contain high-tonnage, high-usage ammunition to support all of the division units operating in the brigade area. The ammunition is transported to the ATP via throughput distribution from the corps. It is then transferred to the battalion trucks or off loaded for future transfer. All other ammunition is kept in the ASP in the CSA; this area normally is located directly behind the rear of the division area. Figure F-12 shows the flow of Class V supplies.

CLASS III REQUIREMENTS

F-134. Two factors determine FARP fuel requirements. The first is the total number and type of aircraft requiring support. For planning purposes, units assume 100-percent availability. This assumption provides fuel for unplanned aircraft that may need support. The second factor is projected mission duration. Operator's manuals and SB 710-1-1 contain more information about fuel-consumption rates.

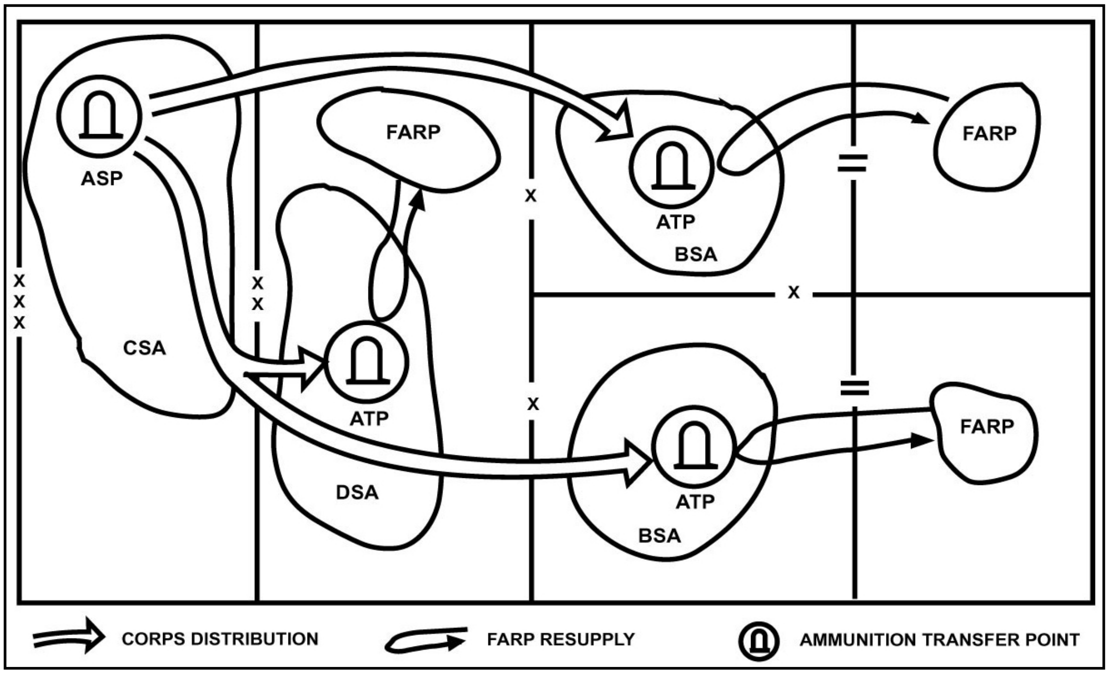


Figure F-12. Flow of Class V Supplies

CLASS V REQUIREMENTS

F-135. The battalion S4 is responsible for calculating the amount of ammunition needed for the mission. He bases his figures on the S3's plan. Table F-4 shows an example of the total Class V requirements needed by an ATKHB for one day. Generally, one armament HEMTT with HEMAT is required for every four OH-58D or three AH-64 aircraft.

Table F-4. Example of Munitions Requirements for One Day

AH-64D ATKHB	
Weapon	**Rounds**
Hellfire missiles	**576**
2.75" rockets	**1,512**
30mm chain gun	**36,000**

F-136. A potential solution to Class V transportation shortfalls is PLS ammunition throughput. Corps and division ammunition units employ PLS trucks and hydraulically off-loading flat racks. Units can coordinate throughput to battalion AAs or future FARP locations. An ideal situation would be to place eight flat racks near the eight armament pads in a silent FARP location. This act would simplify silent FARP setup with available personnel.

SECTION VII – EMPLACEMENT METHODS

F-137. This section discusses ways to accomplish the emplacement of the FARP by ground vehicles, helicopters, and M/arine and Air Force assets.

GROUND VEHICLES

F-138. Small, maneuverable, easy-to-conceal ground vehicles, such as the HMMWV, can emplace the FARE platform. The disadvantage is that HMMWVs may not be available or may be needed for other FARP missions.

F-139. The 3/4-ton trailer is an option for FARE transport. Planners should consider bolting the FARE system (pump and filter/separator) to the trailer frame. The trailer is light enough to transport by HMMWV or sling load by UH-60. To complete the FARP package, units can air or ground emplace fuel and ammunition.

F-140. Another HMMWV or 3/4-ton trailer capability is transport of ammunition from the cargo truck to the armament pad. It can also move the 500-gallon collapsible fuel drums around the FARP if the collapsible fuel-drum tow assembly is available.

F-141. The M977 HEMTT and M978 HEMTT tanker are the primary movers of Class III/V supplies to the FARP (Figure F-13). The M977 can carry 22,000 pounds of cargo. Its onboard crane has a 2,500-pound lift capability. The crane enables the HEMTT to load and offload ammunition without other materiel-handling equipment.

F-142. The M978 tanker holds 2,500 gallons of fuel and provides two refueling points. When paired with the Hot Tactical Aircraft Refueling System (HTARS), the M978 can simultaneously refuel four aircraft.

F-143. The M977 or M978 are prime movers for the HEMAT (M989). It carries up to 22,000 pounds of ammunition, four 500-gallon collapsible drums, or two 600-gallon fuel pods. Generally, one armament HEMTT with HEMAT can support up to four OH-58D or three AH-64 aircraft.

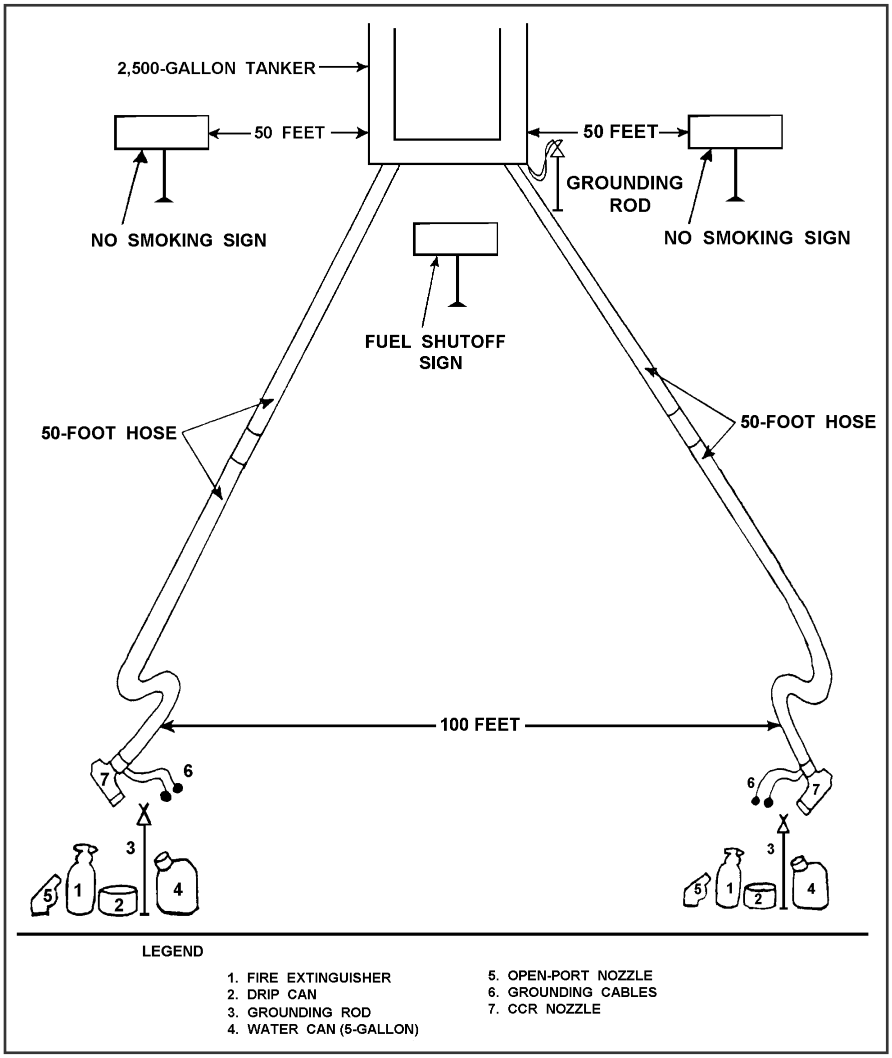


Figure F-13. HEMTT FARP Layout

F-144. The five-ton truck transports either ammunition or fuel. As a fuel transport, it carries a TPU consisting of two 600-gallon fuel pods and refuel equipment for two fuel points. The five-ton truck can tow one 1/2-ton trailer for ammunition, a 600-gallon fuel pod, or a 500-gallon fuel drum.

HELICOPTERS

JUMP FORWARD ARMING AND REFUELING POINT

F-145. Two UH-60Ls can deliver an austere jump FARP to its new location. One UH-60L can carry up to two 500-gallon collapsible fuel drums and part of the FARP crew. The other UH-60 internally transports up to 15 Hellfire missiles and can sling load the FARE or the AAFARS, which may mount to a 3/4-ton trailer. If the FARE or AAFARS is trailer mounted, additional Class V transport is feasible if trailer sides are built up with wood to include a cover. In a second lift, the UH-60s can transport two more fuel drums and additional mission ammunition. Aircraft can sling load three Hellfire pallets at once for 27 total missiles.

ADVANCED AVIATION FORWARD AREA REFUELING SYSTEM

F-146. The AAFARS is a two-person portable system. Its components include a 200-GPM diesel-engine pump, a standard element separator, lightweight suction/discharge hoses, and dry break couplings. It can support up to four refuel points. The AAFARS and CH-47 ERFS are shown in Figures F-14 and F-15.

FAT COW

F-147. The CH-47's ERFS, commonly known as *Fat Cow*, is a modular, interconnectable system, composed of up to four 600-gallon noncrashworthy tanks, four electrically operated fuel pumps, and a vent system. It mounts on the left side of the aircraft cargo area; exact placement depends on aircraft center-of-gravity limits. This system provides up to 2,320 gallons to refuel other aircraft.

F-148. With the ERFS, space for cargo and passengers is extremely limited. The aircraft can seat four people on each side. Figure F-16 shows the proper placement for remaining required equipment to include the FARE. With a MACOM waiver, units can transport additional FARP or security personnel, as in Task Force Hawk, in which 18 infantrymen provided security.

F-149. After the aircraft lands, FARP personnel can set up two refueling points quickly. Figure F-17 shows how the refueling points may be set up. The actual setup depends on the equipment available.

F-150. Advantages of the ERFS are the following:

- The system is ready for refueling within minutes after landing; this makes Fat Cow especially useful for operations in deep areas.
- The system displaces quickly; after refueling and packing equipment, the CH-47 takes off, clearing the site within minutes.
- The ERFS may be pressure refueled (a maximum of 35 per square inch and 150 GPM for faster turnaround missions.

F-151. Disadvantages of the ERFS are the following:

- The ERFS is airworthy when installed, operated, and maintained as described in TM 55-1560-307-13&P; however, fuel can leak into the cabin, potentially causing a catastrophic incident during a hard landing or accident.
- Aircraft can carry only essential personnel; these personnel must be seated, wearing a lap belt, unless a MACOM waiver is granted.
- CH-47 door guns provide limited protection; planning should consider escort reconnaissance or attack elements.
- Additional hazards exist if CH-47 rotors turn during refueling.
- Depending on FARP location, the CH-47 may require ERFS fuel.
- CH-47 signature makes operations vulnerable to detection and attack.

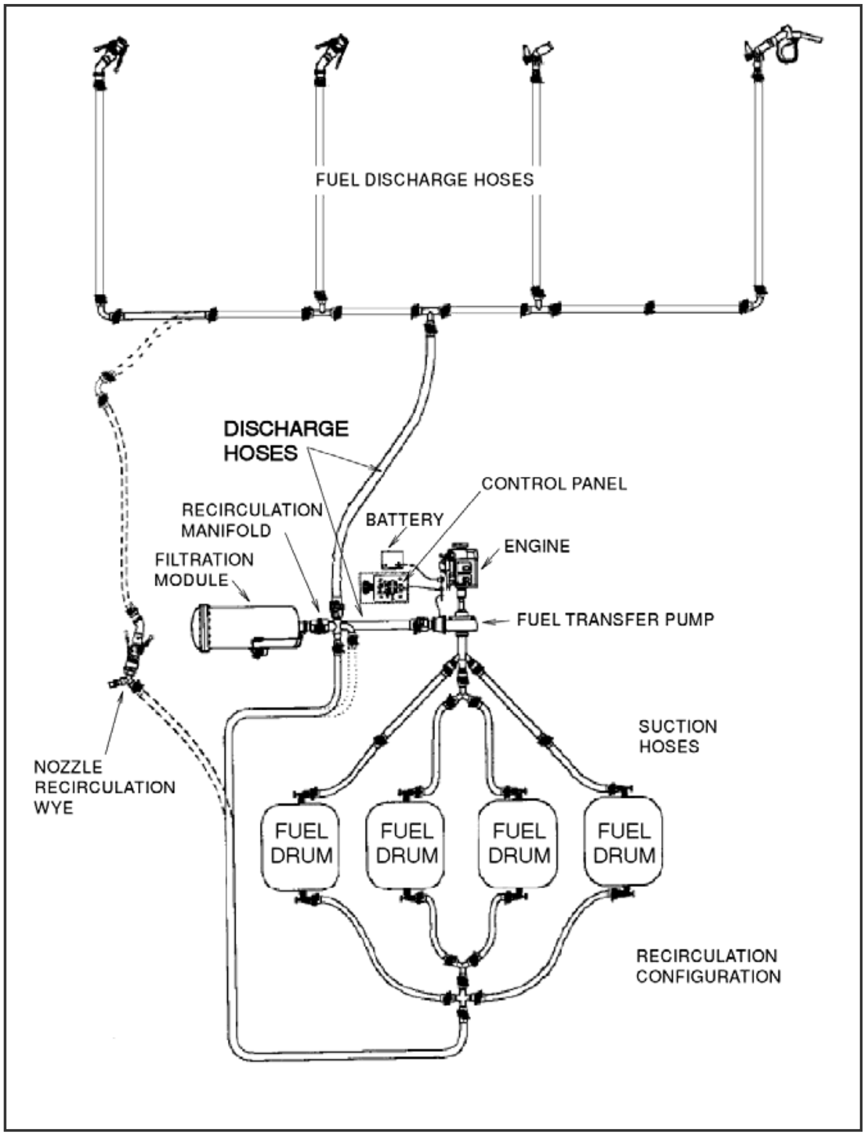


Figure F-14. AAFARS Layout Configuration

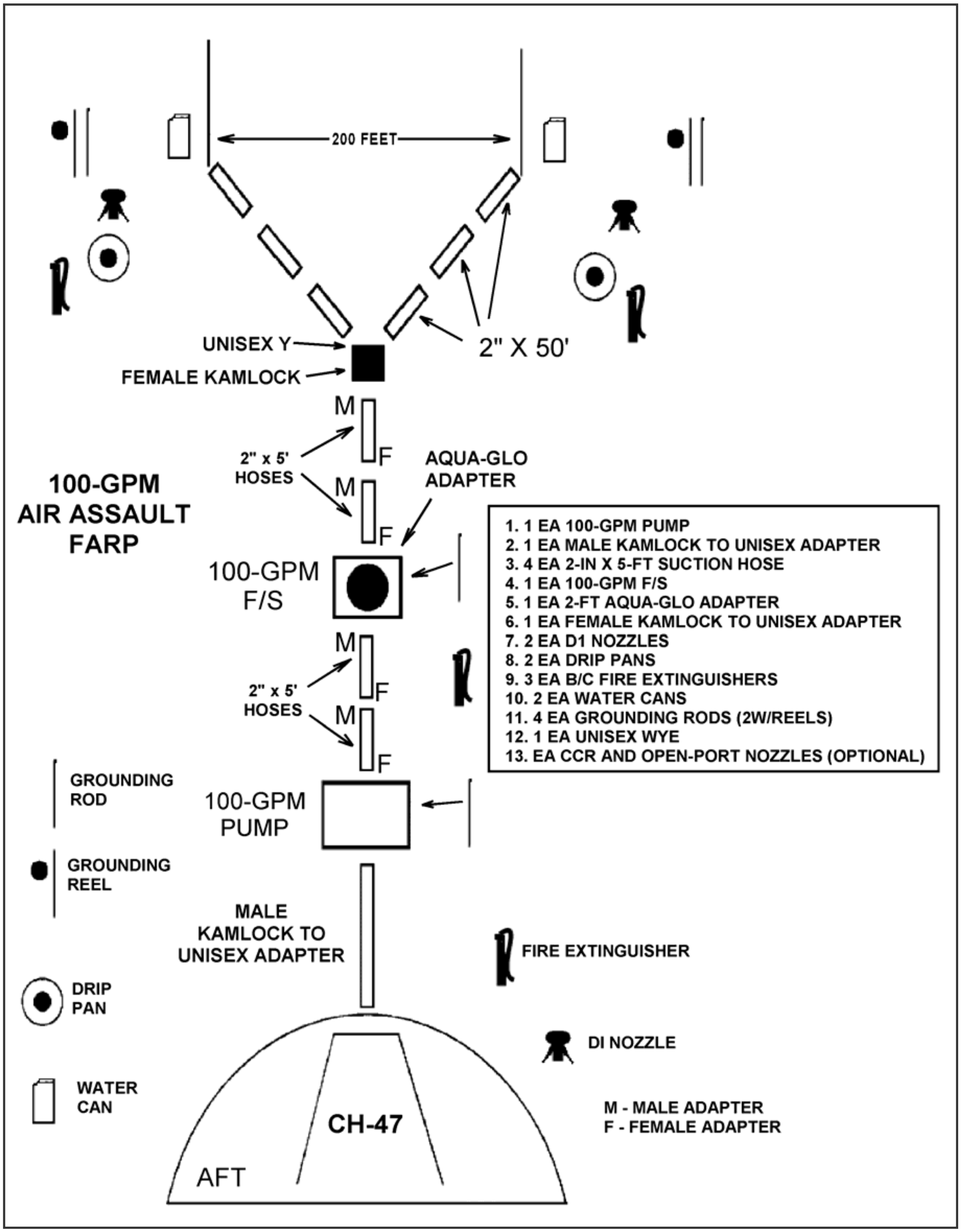


Figure F-15 ERFS Layout Configuration

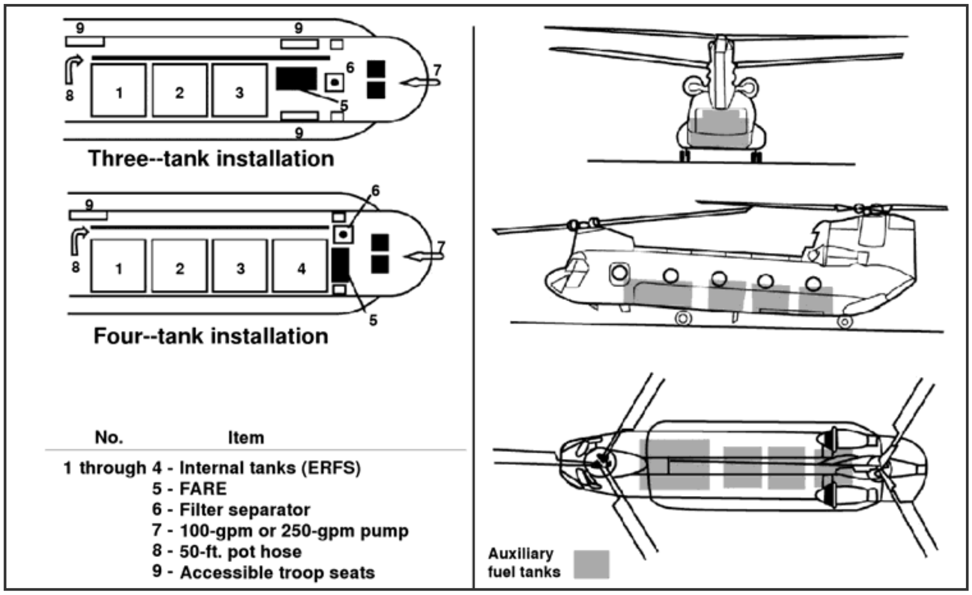


Figure F-16. CH-47 ERFS Equipment and Tank Installation

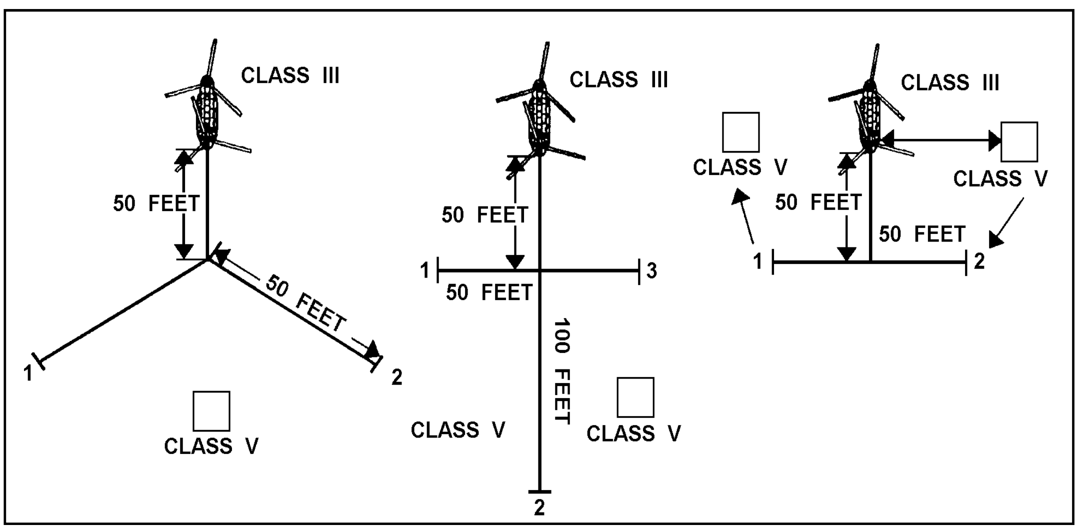


Figure F-17. Refueling Point Setups

UH-60 WET HAWK/FAT HAWK

F-152. UH-60 aircraft may be more readily available and more survivable for many operations in deep areas. Units can internally transport FARE systems and FARP personnel and externally transport 500-gallon fuel drums. (TM 55-1560-307-13&P contains additional information.)

F-153. A *Wet Hawk* is a UH-60 that provides fuel to another aircraft from its own internal or external fuel tanks via a micro-FARE system. A *Fat Hawk* is a UH-60 that provides both fuel and ammunition. A Fat Hawk crew can refuel and rearm four OH-58D aircraft in less than 15 minutes without sling loading fuel or ammunition. The absence of an external load increases UH-60 survivability, reduces emplacement time, and limits enemy capability to target the FARP. Normal operations consists of two External Stores Support System (ESSS)-equipped UH-60 aircraft with full crew, three to four POL personnel, a combat lifesaver/medic, security personnel, armament personnel, and armament and refuel equipment to support the mission.

JOINT AIRCRAFT ASSETS AVAILABLE FOR REFUEL/RESUPPLY

F-154. If the brigade or battalion AA is located at an airfield base camp or forward operating base or if an austere airfield is available, units may be able to request joint fixed-wing refuel/resupply support.

F-155. Marine Corps CH-53s have a unique refueling capability that can support supply points, operations in deep areas, and other specialized mission applications.

MARINE CH-53 TACTICAL BULK FUEL DELIVERY SYSTEM

F-156. Marine Corps CH-53 units are equipped with the tactical bulk fuel delivery system (TBFDS) that includes one to three 800-gallon internal fuel tanks and a 120-GPM refueling system, allowing transport of 800, 1,600, or 2,400 gallons of fuel. However, the fuel system is tied into the aircraft's main fuel tanks, allowing delivery of additional fuel. Because the CH-53 can air refuel, it can quickly join with a KC-130 at altitudes as low as 500 feet AGL to replenish TBFDS tanks and rejoin the ground FARP or fuel supply location to replenish additional aircraft (Figure F-18).

MARINE KC-130

F-157. The Marine Corps KC-130F/R/T/J models are equipped for airborne refueling but also rapid ground refueling of Marine or, in this case, Army helicopters and ground vehicles. Aircraft refuel from wing fuel and pods mounted under the wings. They also can carry a 3,600-gallon stainless steel tank inside the cargo compartment for additional fuel delivery. Older model KC-130s require this cargo compartment tank for refueling and can only transport 5,588 gallons in wing and wing-pod fuel tanks. The new KC-130J can deliver up to 8,455 gallons from wing pods and wing fuel and an additional 3,600 gallons from the cargo compartment tank. It can also refuel without the cargo compartment tank, allowing palletized ammunition and other supplies to be transported. It has its own pumps and hoses that can dispense up to 300 GPM from each pod (Figure F-19).

AIR FORCE C-17

F-158. The Air Force C-17 also can function as a tanker providing fuel to ground receivers using HTARS. The receivers can be Army aircraft, trucks, bladders, or other equipment. The C-17 can deliver fuel through either one or both of its single-point receptacles. The C-17 booster pumps defuel the aircraft using the HTARS and additional Army components. Aircraft can defuel at a rate of 520 GPM, depending on the number of booster pumps (Figure F-20).

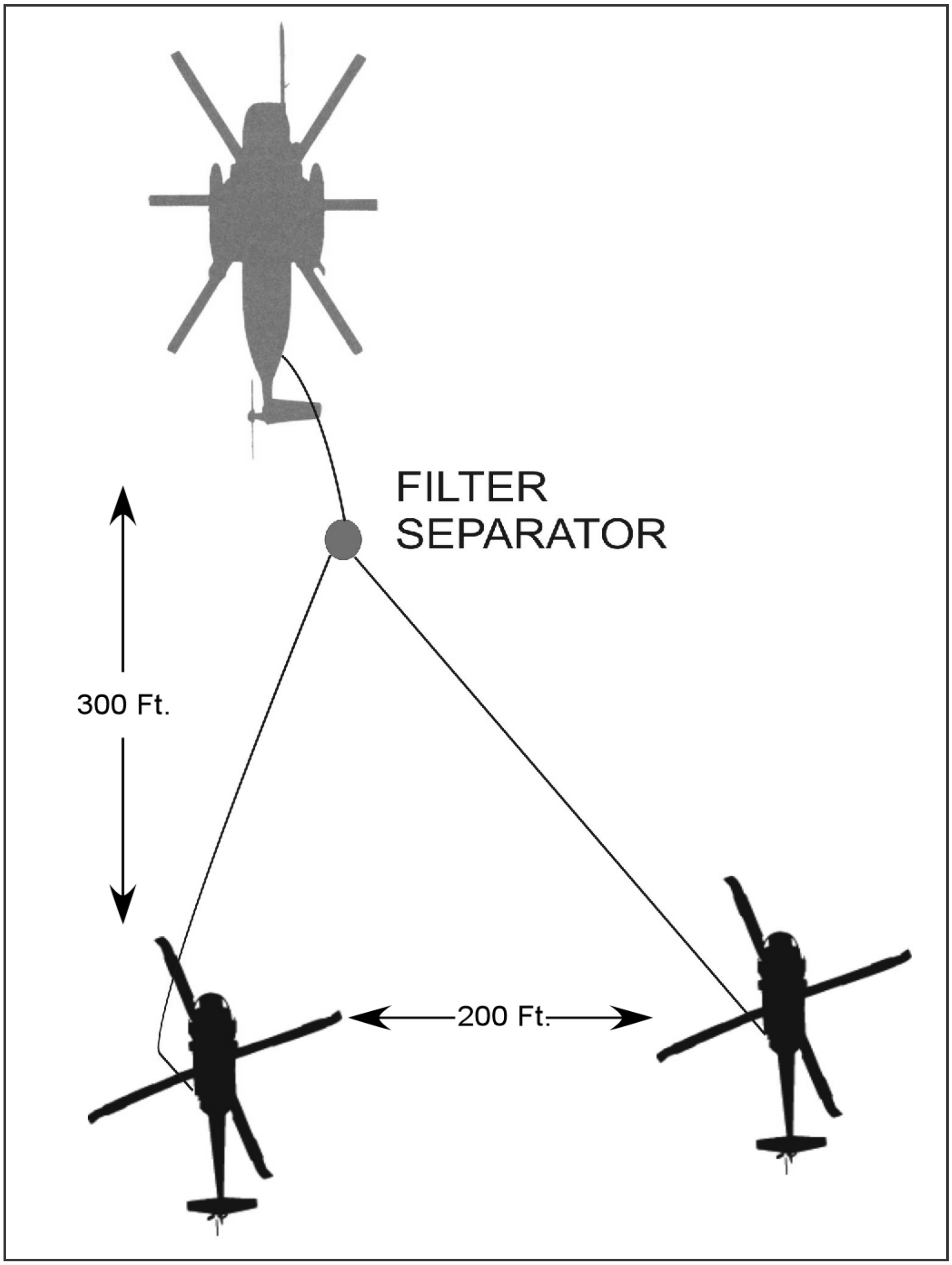


Figure F-18. HTARS Configuration and Additional Components for CH-53 FARP

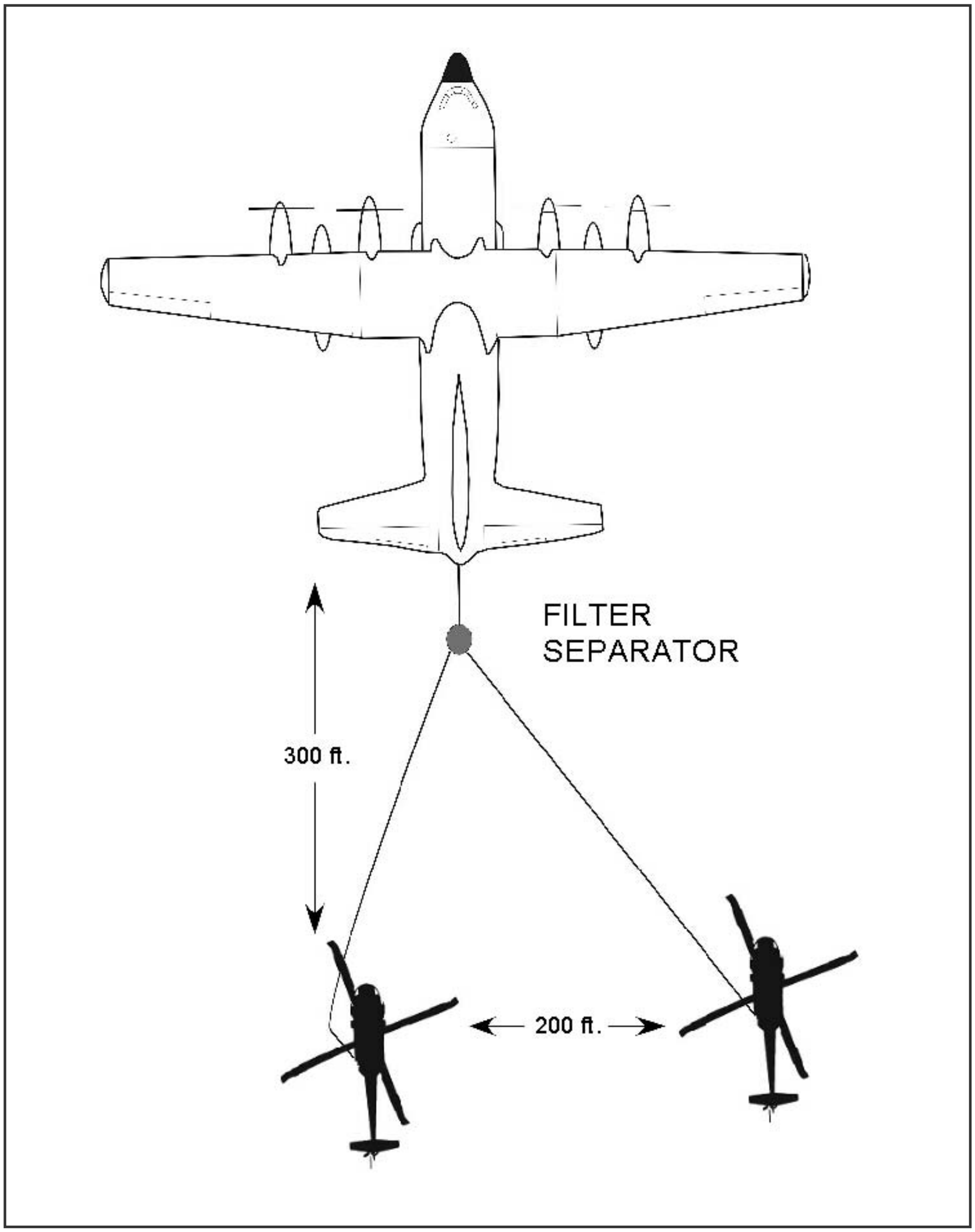


Figure F-19. HTARS Configuration and Additional Components for C-130 FARP

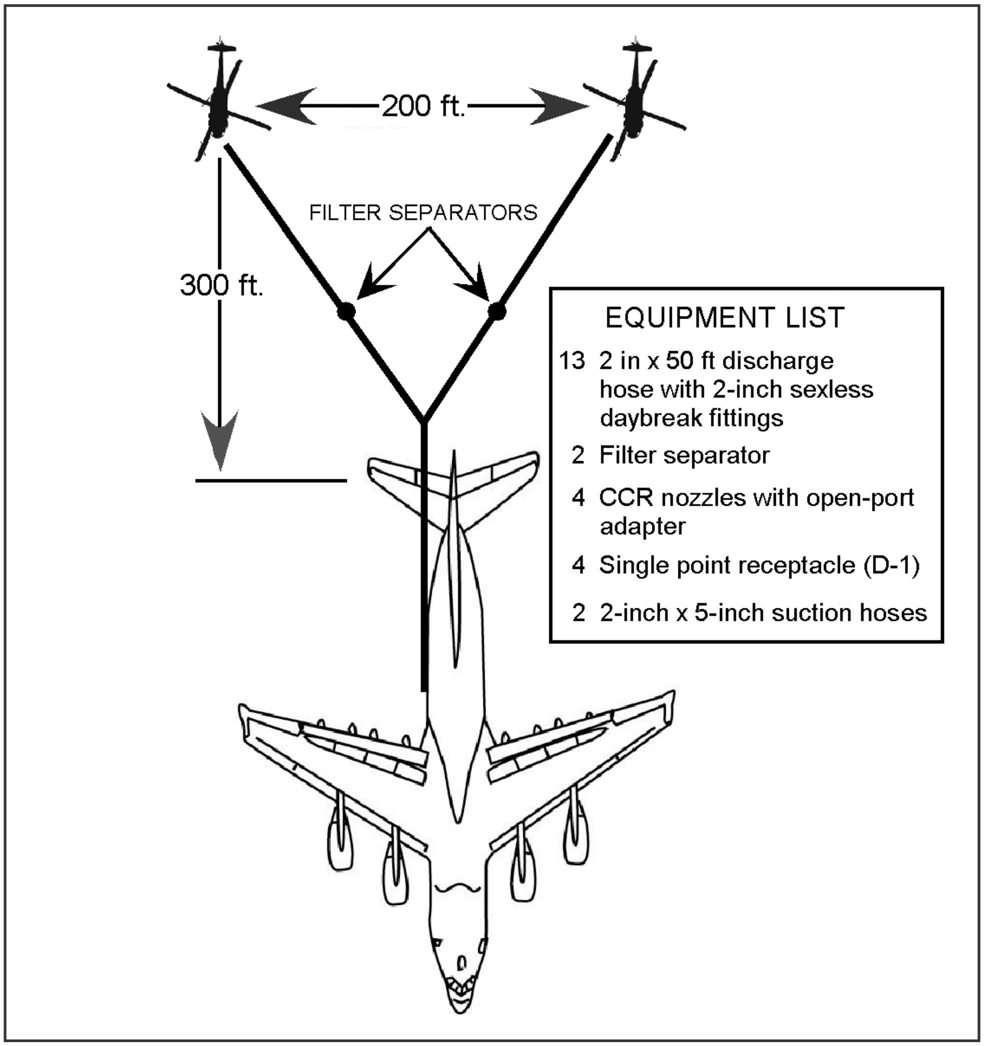


Figure F-20. HTARS Configuration and Additional Components for C-17 FARP

SITE CONSIDERATIONS

F-159. The KC-130 or C-17 can operate from small airfields with limited supporting infrastructure. The airfield runway must be 3,000- to 5,000-feet long and 90-feet wide.

F-160. The KC-130 and C-17 do not require paved runways. Graded and compacted gravel or clay will suffice. However, if KC-130 or C-17 resupply becomes a primary means of resupply for a forward operating base or base camp airfield—such as occurred in Afghanistan—runway repair requirements will increase, dictating engineer augmentation.

F-161. The CH-53 TBFDS does not require a runway but a large relatively flat area similar in size to that required for CH-47 Fat Cow refueling.

EQUIPMENT LAYOUT

F-162. The CH-53 TBFDS has enough hoses to refuel two aircraft or refuel vehicles located 200 feet away. Hoses run out of the cargo compartment in the form of a “V” in the same manner as a CH-47 Fat Cow. The TBFDS uses the standard D-1 nozzle compatible with Army and other joint aircraft. Army aircraft must approach Marine Corps refueling points hovering at a 45-degree angle with the aircraft fuel port facing the nozzle.

F-163. Marine KC-130s have organic refuel equipment and compatible D-1 nozzles as they perform the same ground mission for Marine helicopters and fixed-wing aircraft. Fuel in the wing-mounted external fuel tanks and internal 3,600-gallon stainless steel tank (if installed) can be dispensed for rapid ground refueling. The aircraft external fuel pods use ram-air turbine-driven fuel boost pumps in each pod.

F-164. For the C-17, required equipment includes the HTARS, two 100-GPM filter separators, five fire extinguishers, four water cans, and spill containers. Postoperation evacuation of fuel lines requires a 100-GPM pump. FARP or FARE personnel configure the HTARS and additional components as Figure F-20 shows. They lay out the system to achieve minimum safe distance between aircraft.

CONNECTION OF SYSTEM COMPONENTS FOR THE C-17

F-165. Starting at the supply aircraft, FARP or FARE personnel—

- Connect using a single-point nozzle (D-1 type) and perform a locked nozzle check.
- Connect a 2-inch by 50-foot discharge hose to the nozzle, using the sexless dry break fitting.
- Install a T-fitting to the end of the discharge hose.
- Connect a 2-inch by 50-foot discharge hose to both remaining ends of the T-fitting.
- Connect a 100-GPM filter/separator, after these lengths of hose.

F-166. Lay out the remainder of the HTARS into a modified configuration, resulting in two refueling points, separated by at least 200 feet between points and 300 feet from the C-17. At each refueling point, FARP or FARE personnel—

- Connect the applicable CCR or D-1 nozzle.
- Ensure that the sexless fitting valves are in the open position.
- Attempt to manually disconnect the dry break connection after opening each valve. Properly assembled hardware will not disconnect; if it does disconnect, replace the faulty connection.

GROUNDING AND OTHER EQUIPMENT FOR THE C-17, KC-130, OR CH-53

F-167. FARP or FARE personnel—

- Drive a grounding rod into the ground 10 feet from the end of each dispensing hose.
- Loop the dispensing hose back to the ground rod, and hang the nozzle on the ground-rod hanger.

- Connect the clip of the nozzle grounding wire to the ground rod at each point.
- Place a fire extinguisher, a spill container, and a five-gallon can of water at each point.
- Place a grounding rod at the filter/separator, and connect using the filter/separator grounding wire.
- Place a fire extinguisher at the filter/separators.

OPERATION

F-168. One critical aspect of refueling operation with other service aircraft is that their rules and regulations differ from and supersede the Army's. For instance, Marine doctrine prohibits simultaneous arming and refueling and requires a separation distance of at least 300 feet from separate arming and refueling activities. In addition, while hot refueling is permissible, hot refueling with explosive ordnance on board is not authorized unless approved by Headquarters, U.S. Marine Corps, and Naval Air Systems Command.

F-169. In wartime, attack units may be authorized to refuel while armed. In peace and lesser contingencies, units must dearm, then refuel, then rearm. This restriction effectively requires aircraft to shut down after refueling to preserve onboard fuel. Marine Corps aircraft use JP5 fuel. The Air Force and Army use JP8. This disparity poses no problem for Army aircraft.

F-170. Unless Marine Corps or Air Force regulations supersede the Army's, operate the system in compliance with safety procedures and follow these steps:

- The refuelers guide aircraft into position using coordinated signals; they check with the pilot to ensure that all armaments are on safe.
- Aircrew members, except the pilot, should assist with refueling or as fire guards.
- The refuelers place fire extinguishers near the aircraft and within reach of fuel fill points.
- The refuelers ground the aircraft.
- The refuelers bond the nozzle to the aircraft; they insert the bonding plug into the aircraft plug receiver or attach the nozzle bonding cable clip to bare metal on the aircraft.
- After bonding the nozzle, the refuelers remove the nozzle dust cap and open the fill port.
- The refuelers verify that all valves are open.
- Refuelers signal the refueling supervisor that the point is ready to fuel and open the nozzle and refuel; they do not leave the nozzle at any time during the refueling; they stop the flow of fuel if there is any emergency at the refueling point.
- After the receiving aircraft is full, refuelers shut off the nozzle; disconnect the nozzle from the aircraft; and replace the fuel fill port cover and the nozzle dust cap.
- Refuelers unplug the nozzle-bonding plug and return the nozzle to the nozzle hanger.

F-171. For C-17 refueling, refuelers use a FARE pump to evacuate fuel lines and recover components as follows:

- Close the D-1 nozzle.
- Install the FARE pump 10 feet away from the SPR panel.
- Reverse the flow direction of each filter/separator.
- Start the pump, and run at idle.
- Recover hoses, starting at the refueling point.
- Stop the pump, and disconnect from the tanker aircraft.

ADVANTAGES/DISADVANTAGES

Advantages

F-172. The advantages of the CH-53 TBFDS, KC-130, or C-17 FARP include—

- Ability to deliver bulk fuel to remote areas using small airfields with unimproved runways (no runway for CH-53) and little supporting infrastructure.
- Ability to provide substantial fuel and be set up and operational quickly.
- Useful for selected operations in deep areas using intermediate staging bases or forward operating bases.
- Ability of the CH-53 TBFDS to aerial refuel and rapidly return with additional fuel.
- Ability of joint fixed-wing aircraft can also transport ammunition in the cargo compartment for substantial resupply capability.

Disadvantages

F-173. The disadvantages of the CH-53 TBFDS, KC-130, or C-17 FARP include—

- It requires diversion of these aircraft from other valuable missions.
- Because of other priorities and the ACO/ATO process, it may require substantial time to request and get approval for such missions.
- The KC-130 or C-17 requires a 3,000-foot by 90-foot minimum runway for landing; engineer requirements can be extensive if the runway is dirt or clay and the unit anticipates repeated use.
- The aviation unit operating the FARP must transport personnel and equipment to the FARP site; Marine CH-53s or KC-130s may wish to provide their own refuelers/operators.
- Marine Corps' aircraft refueling regulations prohibit simultaneous arming and refueling activities.

SECTION VIII – VOLCANO ARMING OPERATIONS

F-174. UH-60 aircraft equipped with the Volcano system require arming in a manner similar to attack helicopters. However, assault battalions and their

Volcano-owning AVUMs lack the arming personnel organic to attack and cavalry HHCs. Therefore, units must use crew chiefs, combat engineers, or other trained personnel to load and arm Volcano canisters. This level of training is essential for safe arming operations. If the unit forecasts operations, it should request additional engineer personnel for the duration of the operation.

ARMING LOCATION AND SITE LAYOUT

F-175. Loading and arming can occur in the unit AA or near the rapid refuel point. FM 3-34.32 (FM 20-32) specifies that, because of more than 1,200 pounds of explosives in 160 mine canisters on fully loaded Volcano aircraft, loading aircraft should position at least 1,000 meters from CPs, major routes, and nonessential personnel. If positioning proves impractical in combat, units should exercise feasible caution and avoid potential sources of secondary explosions such as fuel storage areas.

F-176. The total weight of the armed air Volcano system is 2,886 kilograms (more than 6,350 pounds). Because fully loaded Volcano aircraft approach maximum gross weight, ground conditions should be firm or steel/wood planking landing pad should be provided. Armed aircraft should avoid refueling near (within 375 meters) other aircraft. Simultaneous arming and refueling is not necessary or recommended. Obstacles should not hinder takeoff at high gross weight.

F-177. Figure F-21 shows an example of a site layout for Volcano arming. As with normal FARP operations, fire extinguishers and grounding rods must be available at the arming point. Arming personnel dig a dud pit where they place damaged or misfired canisters. Personnel store live canisters to the front left and right of the aircraft and spent canisters, to the rear left and right, taking care to avoid the tail rotor. Personnel and vehicles must avoid areas directly adjacent to the M139 dispensers; accidental discharge could strike personnel, and mine arming would occur within 2.5 minutes. If such discharge occurs, the aircraft and loading personnel should reposition at least 640 meters away and loading personnel should notify EOD personnel. That distance extends to 1,000 meters if a fire occurs near the live canisters and personnel are unable to extinguish it in a reasonable time.

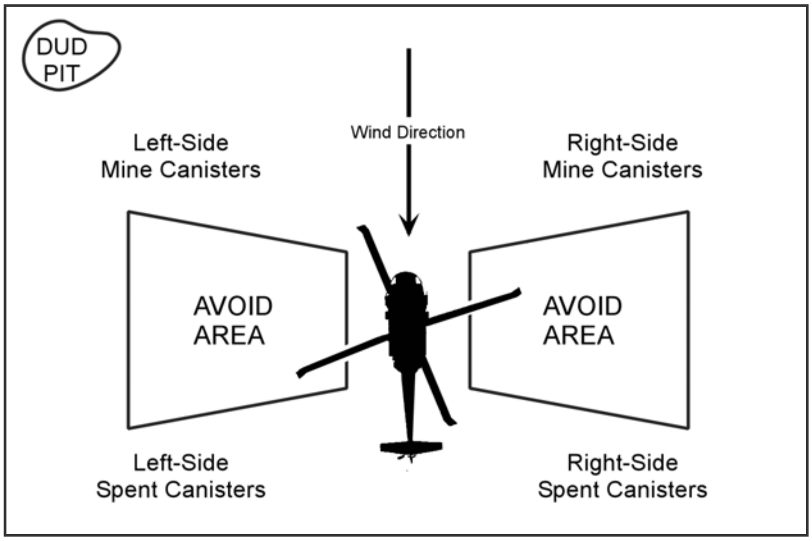


Figure F-21. Example of a Site Layout for a Volcano Arming Point

ARMING AND DISARMING OPERATIONS

ARMING

F-178. Each launcher rack functions as a carrier and launcher platform for a 40-mine canister. Aircraft can mount up to four M139 dispenser racks, two on each side of the UH-60. Loaders insert canisters into the 40 keyholes, rows 1 through 4 from bottom to top and columns 1 through 10 from left to right. This loading sequence can be important if the rack carries less than a full load of mines. As loaders insert the mine canisters, a green latch latches the canister to the rack and a red latch arms the canister. The rack has two electric receptacles—one for the power connector and one for the launcher rack cable running to the dispensing control unit.

DISARMING

F-179. After mission completion, aircraft return to the arming point to dearm. The users—

- Discard spent canisters at least 30 meters to the left or right rear of the aircraft at the 4- and 8-o'clock positions.
- Return live canisters to ASPs for future use or repackaging.
- Place misfired canisters in the dud pit and contact EOD.

SECTION IX – FORWARD ARMING AND REFUELING POINT OPERATIONS

F-180. The FARP provides forward support for tactical operations. Its organization includes the POL and ammunition section and a maintenance contact team.

EQUIPMENT

HEAVY EXPANDED MOBILITY TACTICAL TRUCK FORWARD ARMING AND REFUELING POINT

F-181. The FARP personnel place two HEMTT tankers on-line and retain one in reserve.

FORWARD AREA REFUELING EQUIPMENT/ADVANCED AVIATION FORWARD AREA REFUELING SYSTEM FORWARD ARMING AND REFUELING POINT

F-182. The FARP personnel configure the FARE or AAFARS FARP similar to the HEMTT FARP. They use at least eight points or as needed to support simultaneous refueling of an attack helicopter company or ACT.

FORWARD ARMING AND REFUELING POINT LAYOUT

F-183. The FARP layout for simultaneous rearming and refueling operations will depend on the terrain.

SITE SELECTION

F-184. FARP personnel use tree lines, vegetation, terrain folds, and reverse slopes to mask the FARP. Do not collocate the FARP with the TOC or unit trains. The site must accommodate the number and type of aircraft that need service. Units maintain the minimum spacing prescribed by FM 4-20.12 (FM 10-67-1). This manual requires 100 feet between refueling points for all aircraft except the CH-47, which requires 180 feet for aircraft parked side by side. Sites must allow adequate obstacle clearance for safe takeoff and landing. Units designate HAs for waiting aircraft in view of the FARP but not within it.

WORK PRIORITIES

SECURITY

F-185. FARP personnel—

- Establish a perimeter and prepare fighting positions and range cards.
- Set up crew-served and air defense weapons to protect the site.
- Sweep the site for NBC contamination and set up NBC equipment.
- Reconnoiter the site for appropriate refuel and rearm points.

COMMUNICATIONS

F-186. Upon arrival, the FARP NCOIC establishes communications with the TOC, giving the closing report and anticipated time of operation. If possible, he communicates on secure FM from a location other than the FARP. FARP personnel use the FARP radio only under the following circumstances:

- Requesting resupply.
- Reporting that the site is under attack.
- Reporting that the FARP is not operational.

- Reporting a serious FARP incident such as a fire or an aircraft accident.

F-187. Outbound aircraft can relay critical messages from the FARP to the TOC. This reduces the chances of enemy detection by radio transmission.

SETUP

F-188. FARP personnel—

- Determine the refuel and rearm point's positions.
- Break down ammunition into the first standard loads and another load in the RASA.
- Reposition vehicles into final parking location.
- Perform PMCS on vehicles, radios, NBC equipment, weapons, and platoon equipment.
- Camouflage vehicles and equipment.

RESUPPLY

F-189. FARP personnel resupply ammunition and fuel as necessary. After ammunition trucks offload, depending on the FARP's expected duration of operation, vehicles may need to depart for resupply of Class V. HEMTT tankers may transload into other tankers as they become empty or can fill empty 500-gallon drums. This practice allows these vehicles to go for additional Class III at distribution points or logistics RPs. In all cases, personnel diverted to resupply vehicles are not available to assist in arming and refueling. With a silent FARP prepared to assume the mission, the initial FARP vehicles can resupply without disrupting the mission.

AIRCRAFT PROCEDURES

F-190. Unit SOP and orders specify procedures. The following provides recommendations and describes standard signals.

LANDING

F-191. The AMC calls in the blind when 5 kilometers from the FARP. An example call is "T14 (FARP), this is T56 with five on blue." The AMC is telling the FARP that five aircraft are inbound on the Blue route. This alerts the FARP and other aircraft of his intentions. The FARP does not reply unless the area is not safe or secure. Personnel do not use terms that violate OPSEC such as *aircraft, inbound, outbound,* and *FARP*.

F-192. Aircraft fly NOE within 3 kilometers of the FARP. Approaching aircraft maintain visual contact with departing aircraft.

POSITIONING

F-193. FARP personnel use standard hand-and-arm signals to assist pilots in positioning aircraft into refueling and rearming points.

STANDARD HAND AND ARM SIGNALS

F-194. In Figure F-22, the ground guide—

- (Left): Stands in direct view of the pilot.
- (Right): Points to the next guide with one arm, and sweeps the other arm in the direction in which the pilot is to proceed.

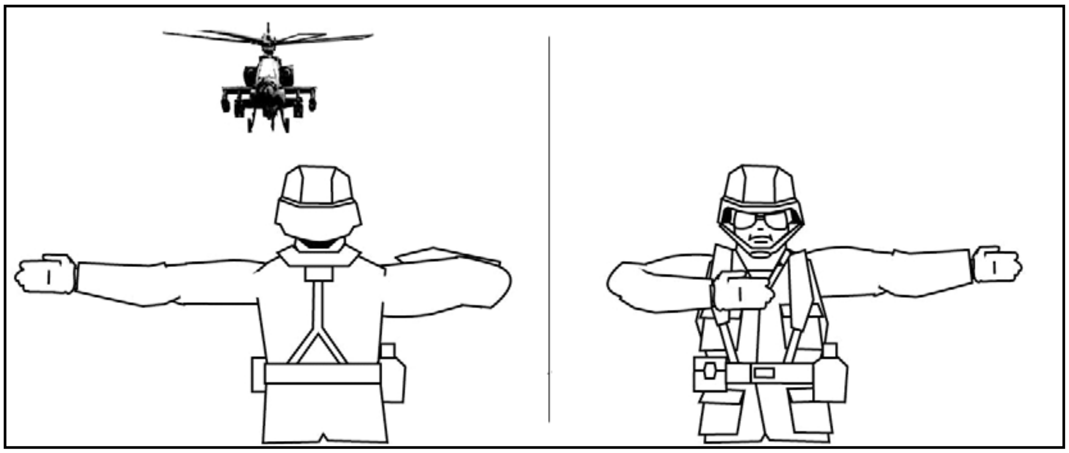


Figure F-22. (Left) Ground Guide Position Relative to Aircraft; (Right) Proceed To Next Ground Guide

F-195. In Figure F-23, the ground guide—

- (Left): Places arms above head in vertical position with palms facing inward.
- (Right): Places arms out at shoulder height, palms up, repeatedly motioning upward and backward; and indicates the aircraft speed desired by rapidity of motions.

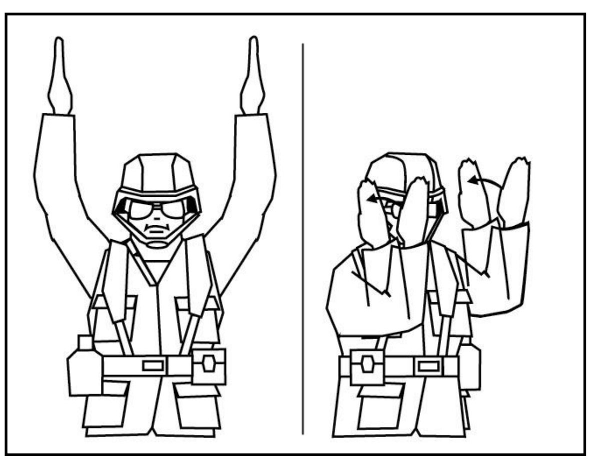


Figure F-23. (Left) This Way; (Right) Move Ahead

F-196. In Figure F-24, the ground guide—

- (Left): Positions right arm down, and points to left wheel or skid; lifts left arm repeatedly from horizontal position toward head (desired direction of turn); and indicates rate of turn by rapidity of motions.
- (Center): Positions left arm down, and points to right wheel or skid; lifts right arm repeatedly from horizontal position toward head (desired direction of turn); and indicates rate of turn by rapidity of motions.
- (Right): Stands with arms raised vertically above head and facing toward the point where the aircraft is to land; lowers arms repeatedly from a vertical to a horizontal position, stopping finally in the horizontal position.

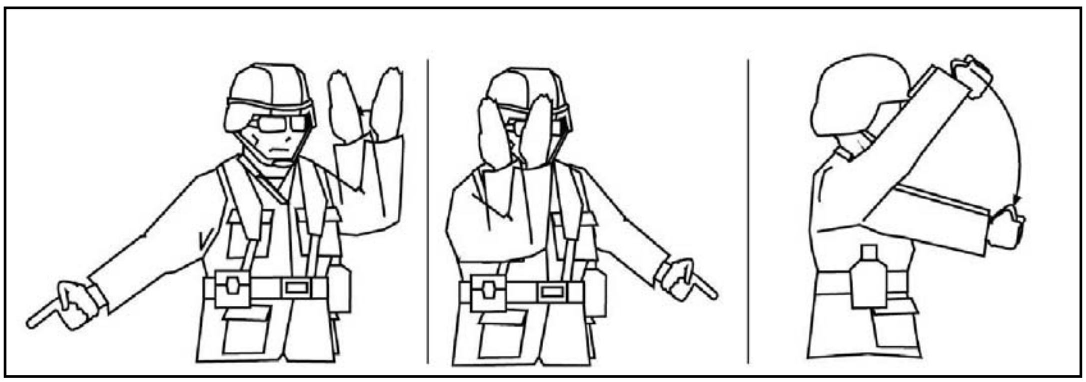


Figure F-24. (Left) Turn to Port; (Center) Turn to Starboard; (Right) Landing Direction

F-197. In Figure F-25, the ground guide—

- (Left): Extends arms horizontally to the side, palms up; repeatedly raises arms overhead; and indicates rate of ascent by speed of motion.
- (Right): Extend arms horizontally sideways with palms down; holds position to signal hover.

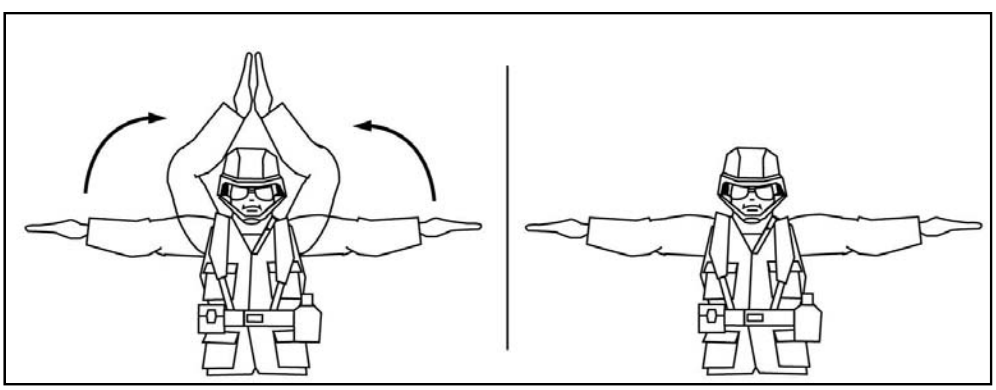


Figure F-25. (Left) Move Upward; (Right) Hover

F-198. In Figure F-26 the ground guide—

- (Left): Extends arms horizontally to the side, palms down; sweeps arms downward; and indicates rate of descent by rapidity of motion.
- (Right): Extends left arm horizontally to the side in direction of movement; repeatedly swings right arm over the head in same direction.

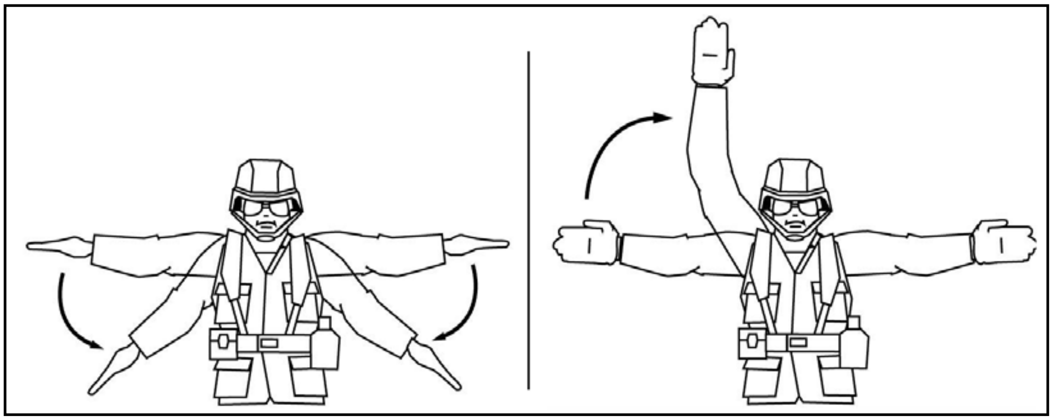


Figure F-26. (Left) Move Downward; (Right) Move to Right

F-199. In Figure F-27, the ground guide—

- (Left): Extends right arm horizontally to the side in the direction of movement; repeatedly swings left arm over the head in same direction.
- (Right): Holds arms down, palms toward the ground; arms move up and down repeatedly.

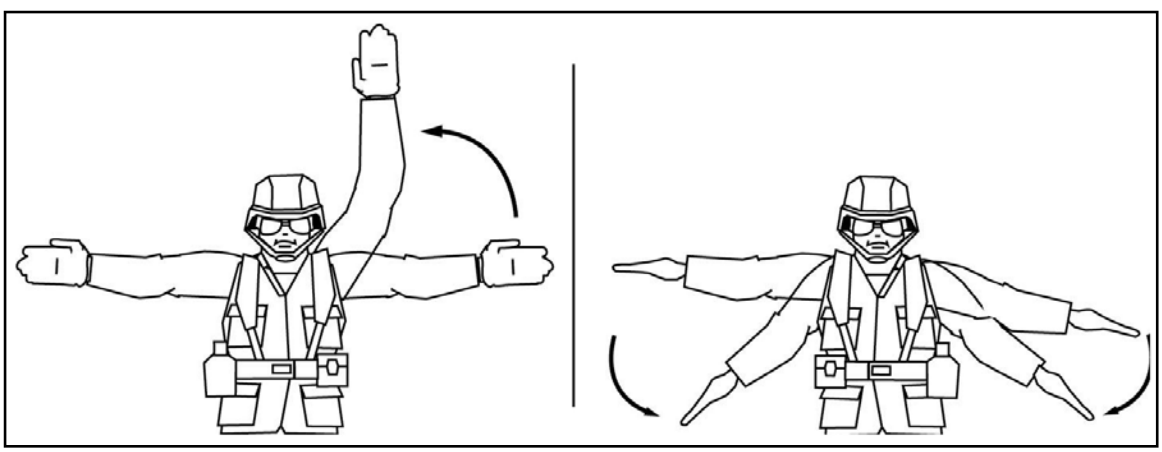


Figure F-27. (Left) Move to Left; (Right) Slow Down

F-200. In Figure F-28, the ground guide—

- (Left): Crosses arms above head, palms forward.
- (Center): *Apply Brakes, Day Operations*: Holds arms above head, fingers extended, and palms toward aircraft; closes fists. *Apply Brakes, Night Operations*: Holds arms above head, wands crossed. *Release Brakes, Day Operations:* Holds arms above head, fists closed; extends fingers, palms toward aircraft. *Release Brakes, Night Operations:* Holds arms above head, with wands crossed; uncrosses wands.
- (Right): Makes rapid horizontal figure-eight motion at waist level with one arm; points at fire with the other arm.

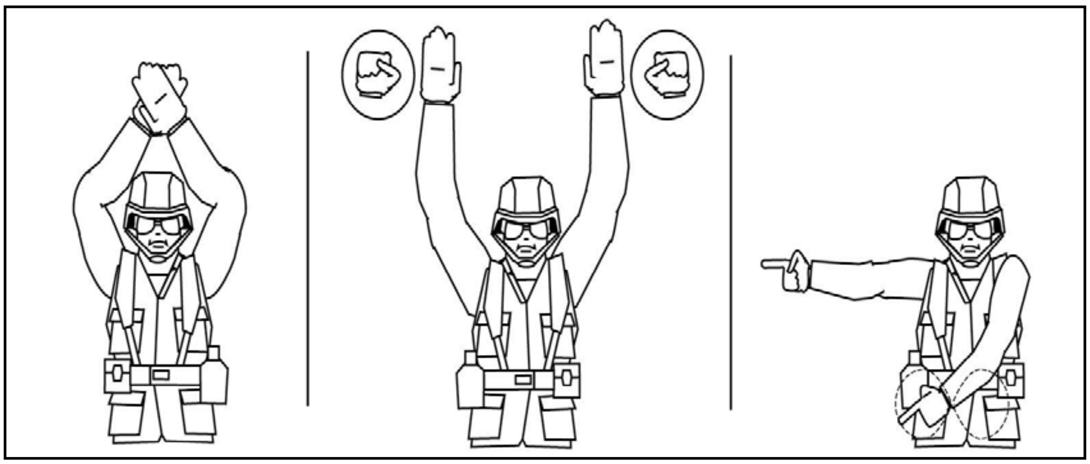


Figure F-28. (Left) Stop; (Center) Brakes; (Right) Fire

F-201. In Figure F-29, the ground guide—

- (Left): Makes circular motion in horizontal plane with right hand above head.
- (Center): *Day Operations:* Holds left hand to the side, extending the number of fingers that indicate which engine to start; makes a circular motion with right hand at head level. *Night Operations:* Performs movement similar to day signal except for flashing the ground guide wand in the left hand the number of times that indicate which engine to start.
- (Right): Repeatedly crosses and uncrosses arms over the head.

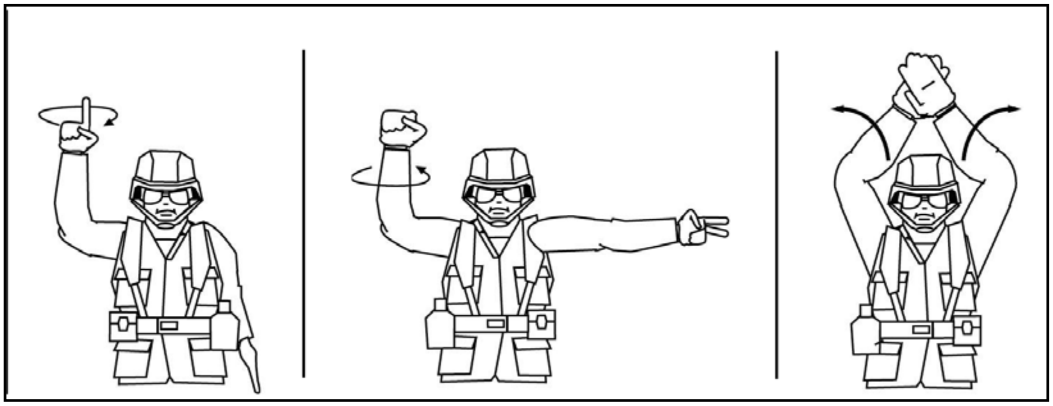


Figure F-29. (Left) Engage Rotor(s); (Center) Start Engine(s); (Right) Wave Off

F-202. In Figure F-30, the ground guide—

- (Left): Holds hand raised with thumb up.
- (Center): Holds arm out, hand below the waist level, thumb down.
- (Right): Holds hands down by side, palms forward; with elbows straight, repeatedly moves arms forward and upward to shoulder height.

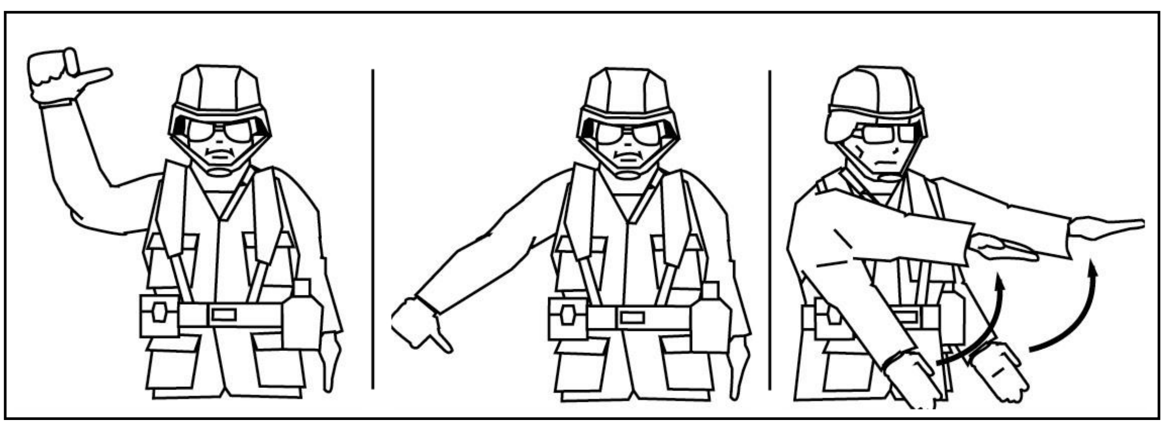


Figure F-30. (Left) Affirmative or All Clear; (Center) Negative or Not Clear; (Right) Move Back

F-203. In Figure F-31, the ground guide—

- (Left): Crosses hands and extends arms downward in front of the body.
- (Center): Points left arm down, and repeatedly moves right arm from overhead vertical position to horizontal forward position.
- (Right): Points right arm down, and moves left arm from overhead vertical position to horizontal forward position; repeats left arm movement.

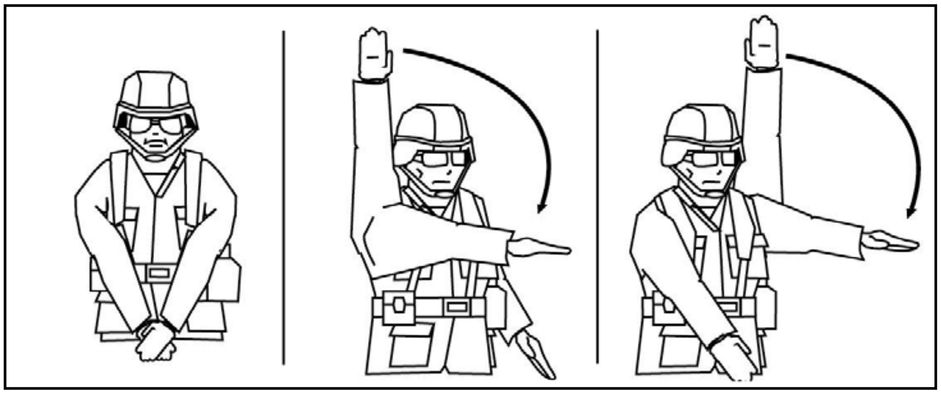


Figure F-31. (Left) Land; (Center) Tail to the Right; (Right) Tail to the Left

F-204. In Figure F-32, the pilot—

- (Left): Makes a beckoning motion with right hand at eye level.
- (Right): Raises left hand overhead, palm toward aircraft with the right hand indicating the persons concerned; and gestures toward aircraft.

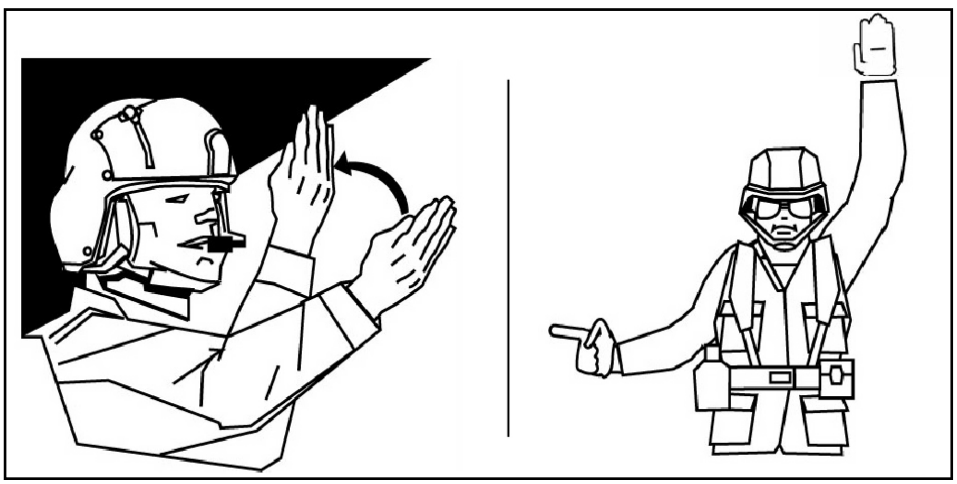


Figure F-32. (Left) Clearance to Approach Aircraft; (Right) Personnel Approach Aircraft

F-205. In Figure F-33, the ground guide—

- (Left): Holds right fist, thumb extended upward, raised suddenly to meet horizontal palm of left hand.
- (Center): Holds right fist, thumb extended downward, lowered suddenly to meet horizontal palm of left hand.
- (Right): Holds arms down, palms toward ground; waves right or left arm up and down to indicate that left- or right-side engines, respectively, should be slowed down.

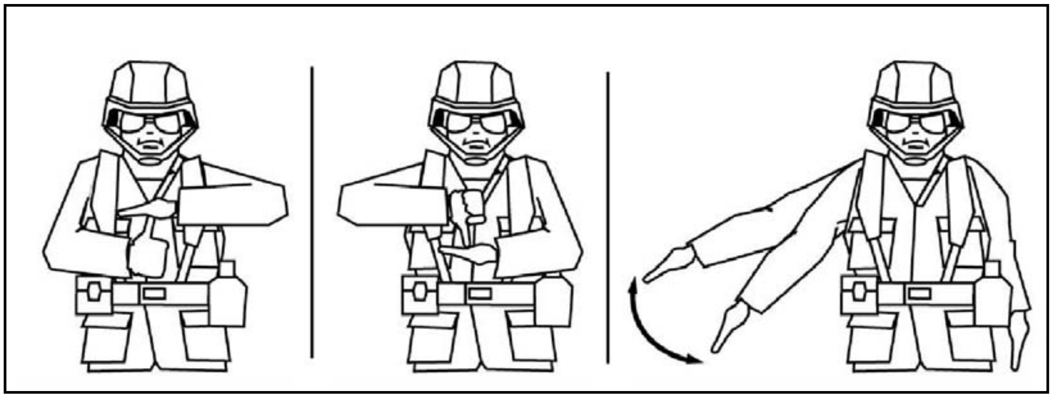


Figure F-33. (Left) Tail Hook Up; (Center) Tail Hook Down; (Right) Slow Engine(s) on Indicated Side

F-206. In Figure F-34, the ground guide—

- (Left): Holds either arm and hand at shoulder level, palm down; draws the extended hand across neck in a "throat-cutting" motion.
- (Center): *Day Operations:* Extends hands overhead; pushes first two fingers of right hand into fist of left hand. *Night Operations:* Makes same movement with the left-hand wand vertically and the right-hand wand horizontally.
- (Right): *Day Operations:* Extends hands overhead; pulls first two fingers of right hand away from left fist. *Night Operations:* Makes same movement except that left-hand wand is vertical and right-hand wand is horizontal.

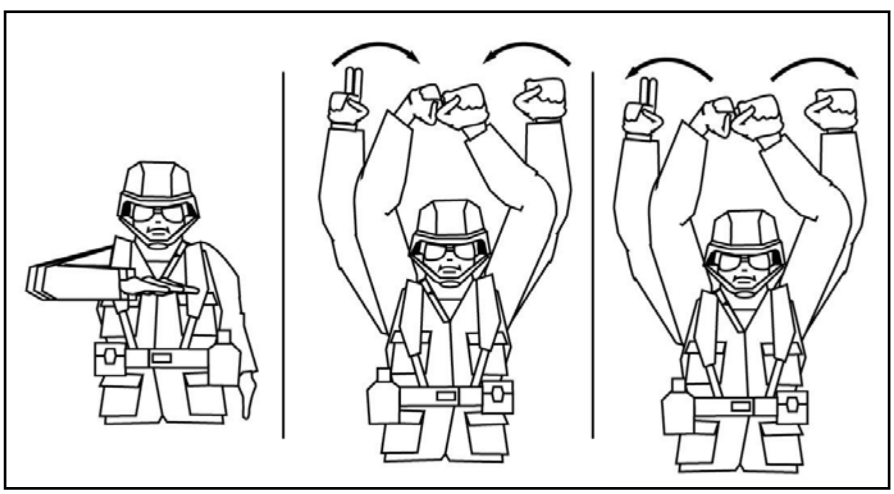


Figure F-34. (Left) Cut Engine(s) or Stop Rotor(s; (Center) Connect APU; (Right) Disconnect APU

F-207. In Figure F-35, the ground guide—

- (Left): Holds arms down, fists closed, thumbs extended inward; swings arms from extended position inward.

- (Right): Holds arms down, fists closed, thumbs extended outward; swings arms outward.

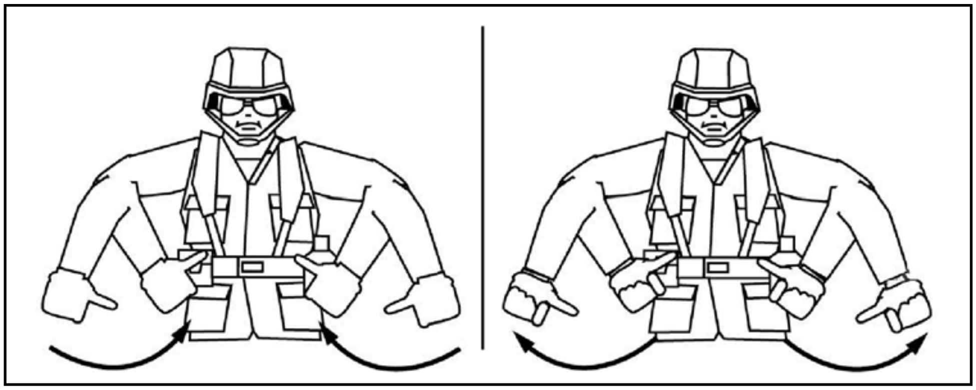


Figure F-35. (Left) Insert Chocks; (Right) Remove Chocks

F-208. In Figure 36, the ground guide—

- (Left): Makes rope-climbing motion with hands.
- (Center): Holds left arm forward horizontally with fists clenched; extended right hand makes horizontal slicing motion below left arm, palm down.
- (Right): Bends left arm horizontally across chest with fist clenched, palm down; opens right hand pointed up vertically to center of left fist.

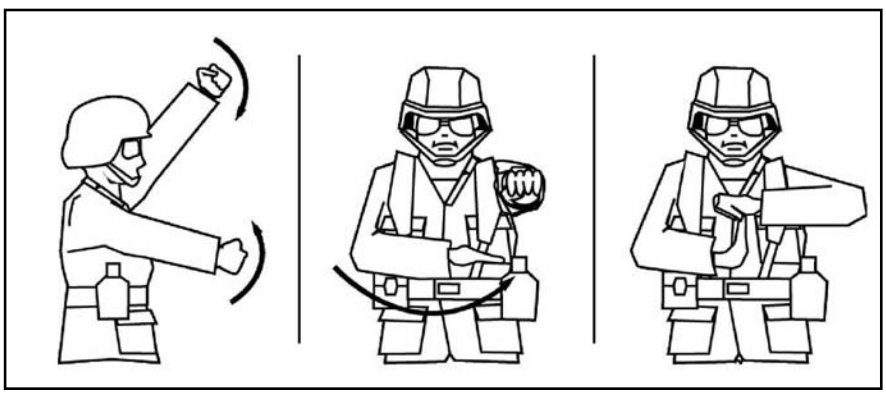


Figure F-36. (Left) Hook Up Load; (Center) Release Load; (Right) Load Has Not Been Released

F-209. In Figure F-37, the ground guide—

- (Left): Makes a signal similar to "release load" except that the left hand has the palm down and not clenched; rapid repetition of right-hand movement indicates urgency.
- (Center): Extends left arm horizontally in front of body with fist clenched; extends right arm forward, palms up; makes an upward motion.

- (Right): Extends left arm horizontally in front of body with fist clenched; extends right arm forward, palm down, and makes a downward motion.

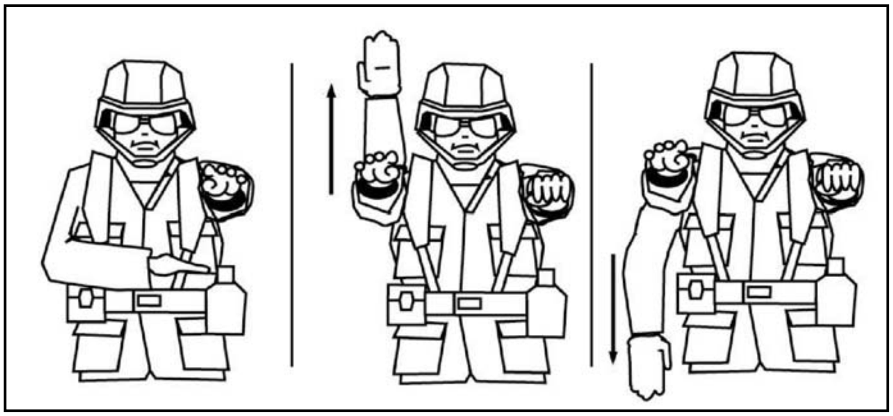


Figure F-37. (Left) Cut Cable; (Center) Winch Up; (Right) Winch Down

F-210. In Figure F-38, the ground guide—

- (Left): Hits right elbow with palm of left hand.
- (Center): *Day Operations:* With arms above head, clasps left forearm with right hand and clenches the left fist. *Night Operations:* Similar to the day signal except the right wand is placed against the left forearm; holds wand in the left hand vertically.
- (Right): *Day Operations:* With arms and hands in "install-downlocks" position, the right hand unclasps the left forearm. *Night Operations:* Similar to the day signal except the right wand is placed against the left forearm.

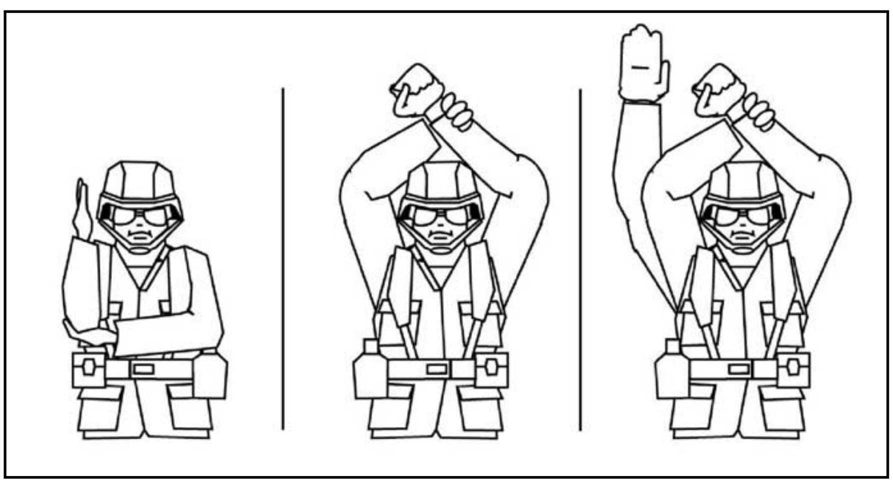


Figure F-38. (Left) Lock Wings/Rotor Blades; (Center) Install Downlocks; (Right) Remove Downlocks

F-211. In Figure F-39, the ground guide—

- (Left): Holds left hand overhead, right hand pointing to specific boots for removal.
- (Center): When the rotor starts to slow, stands with both hands raised above head, fists closed, and thumbs pointing out.
- (Right): When droop stops go in, turns thumbs inward.

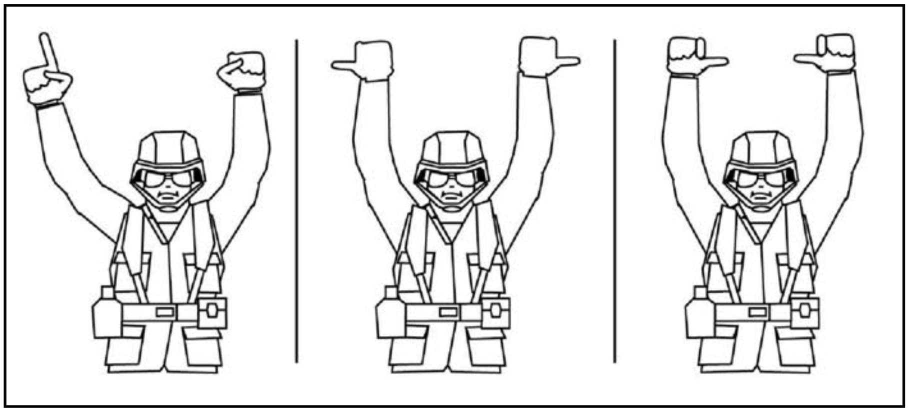


Figure F-39. (Left) Remove Blade Tie-Downs; (Center) Droop Stops Out; (Right) Droop Stops In

REFUELING AND REARMING PROCEDURES

WARNING

Exercise the following precautionary measures if wearing the Extended Cold Weather Clothing System (ECWCS) while performing aircraft arming and refueling operations:

a. Fuel handlers wearing ECWCS should ground/bond themselves to the aircraft, truck, or refueling component for several seconds before fuel/defuel operations.

b. Do not remove ECWCS within 50 feet of fueling operations or near flammable vapor-air mixture.

c. Rinse fuel-soaked ECWCS with water before removal.

F-212. The standard refueling and rearming line consists of eight points and a maintenance point. The unit locates the maintenance point where it will not interfere with normal operations.

REFUELING

F-213. FARP personnel inspect fuel and equipment according to regulations and the unit accident prevention program.

F-214. For hot refueling, FARP personnel—

- Ensure that a 100-foot separation exists between refueling points.
- Ground CCR nozzles to grounding rods, and bond to the aircraft.
- Secure fuel caps and disconnect grounding cables before aircraft takeoff.

F-215. Aircrews ensure that armament systems are on *Safe* or *Off.* They stabilize the aircraft at flat pitch and deplane passengers before conducting refueling operations. Although no transmissions are permitted except during an emergency, they monitor all communications. Aircrews turn strobe lights off before refueling and back on before takeoff (day only).

F-216. FARP personnel and crew chiefs wear protective equipment, including eye and hearing protection and gloves, while conducting refueling operations. FARP personnel or crew members man fire extinguishers.

REARMING

Maintenance Point

F-217. Units locate the maintenance point where it will not interfere with normal operations. This point should be equipped with the following items:

- One fire extinguisher and a ground rod with cable.
- One standard toolbox.
- Two pallets for downloading rockets and 30-millimeter ammunition.
- Special tools as determined by the maintenance officer in charge.
- Spare parts.

Rearm Points

F-218. These points should be equipped with the following items:

- One standard toolbox.
- One metric toolbox (AH-64).
- One fire extinguisher and grounding rod with cable.
- One uploader/downloader (AH-64).
- One wing mike cord.
- Two pallets for rockets.

Personnel Requirements

F-219. Each FARP should include the following personnel:

- One noncommissioned officer.
- One line SO.
- One officer in charge.
- Three armament personnel (preferred); two armament personnel (minimum) for each rearm pad.

- A contact team (maintenance point only).

Procedures

F-220. FARP personnel arm/dearm aircraft according to the appropriate aircraft operator's manual.

F-221. After turning off all armament switches, the pilot turns off the anticollision light. The pilot makes no radio transmissions during loading/downloading operations.

F-222. Once the anticollision light is off, armament personnel ground the airframe, install the wing-store jettison pins, and chock the wheels, as applicable. They plug in their headsets and establish communication with the aircrew. The aircrew assists and monitors armament personnel during loading/downloading operations.

F-223. Ground crews load subsystems inboard to outboard, remaining clear of the front of the systems and back-blast areas. When loading is complete, the ground crew removes all safety pins and moves away from the aircraft.

AIRCRAFT CONTROL AND SAFETY

F-224. Any incident involving a fire or suspected fuel contamination will close the FARP until the SO investigates the incident and authorizes further operations.

FORWARD ARMING AND REFUELING POINT PERSONNEL

F-225. FARP personnel mark refuel nozzles with a red/an orange light source attached to the grounding rod. They mark the landing area with either beanbag lights or chemical lights. Units may also use heated rocks in cans for easier FLIR detection.

F-226. Ground guides guide aircraft into and out of refueling points using white wands or chemical lights other than green. Ground guides do not stand in front of the aircraft weapon system at any time.

AIRCREWS

F-227. Aircrews make no radio transmissions within 100 feet of refueling or arming points. While in the FARP, aircrews place aircraft position lights on steady bright or dim. They turn off lights if required by the tactical situation or if using NVD.

F-228. Aircrews flash aircraft position lights to alert the ground guide when ready to refuel or depart. The pilot signals the refueler to stop refueling the aircraft. Before takeoff, pilots ensure that personnel remove grounding clips and stand clear.

EXTENDED RANGE FUEL SYSTEM (FAT COW) OPERATIONS

STORAGE

F-229. FARP personnel—

- Secure and statically ground all 600-gallon tanks on an asphalt or concrete hardstand that is away from aircraft and ground vehicle operation.
- Empty the tanks before storage (except residual fuel).
- Store ERFS equipment—such as the pump board, fuel lines, and tie-down straps—in the ERFS storage cases provided by the shipping facility.
- Ensure that the storage area is enclosed and well ventilated.
- Drain all fuel supply lines of excess fuel before storage.

INSTALLATION AND OPERATION

F-230. TMs 55-1520-240-10 and 55-1560-307-13&P cover installation, operation, and PMCS of ERFS. Crew chiefs defuel aircraft according to TM 55-1560-307-13&P and the unit SOP. When the ERFS is installed on the aircraft, they enter the following statement on the DA Form 2408-13-1 (Aircraft Inspection and Maintenance Record): "Aircraft allowed operating with ERFS installed according to TM 55-1560-307-13&P."

F-231. Crew chiefs record all system faults on DA Form 2408-13-3 (Aircraft Technical Inspection Worksheet). After removing the ERFS, they reenter all faults on the existing or new DA Form 2404.

MISSION EQUIPMENT

F-232. Equipment requirements are divided between two sections. The unit assigned the mission supplies the aircraft, the ERFS with FARE attachments, one 50-foot suction hose (pot hose), one grounding rod with cable, ground covers, tie-down ropes, and ALSE. The POL section supplies all of the items shown in Figure F-16, one extra 100-GPM pump, one of each type of refueling nozzle, and one 50-foot refueling hose.

F-233. The mission unit personnel install the required number of tanks according to TM 55-1560-307-13&P and Figure F-16. If conducting extended-range missions, they install the ERFS fuel management control panel:

- Hoses and Fittings. When possible, personnel use unisex fittings to reduce assembly/disassembly fuel spillage and self-ground connections.
- Pump System. If using the 250-GPM self-contained pump system, exclude the filter separator from the equipment list and place the pump in the 100-GPM mode; the pump's size precludes loading a spare pump.
- Nozzles. Mission unit personnel use the D-1 single-point nozzle on CH-47Ds and CCR nozzles with attachments on other aircraft, unless the D-1 is specified.

SITE SELECTION

F-234. The LZ must be large enough to accommodate FARP aircraft with no less than 150 feet between refueling points. Allow at least 300 feet between each CH-47 conducting ERFS refueling. This layout allows 150-foot separation between supported aircraft refueling points.

SITE LAYOUT

F-235. For daytime operations, FARP personnel designate landing points and mark them with standard visual signals and markers. For night operations, they designate landing points and mark them with chemical lights or tactical Y. FARP personnel—

- Set up refueling points and equipment as Figure F-14 shows.
- Place the extra 100-GPM pump beside the operating pump; for ease of replacement, they place all spares so that they are readily accessible.
- Ground each FARP aircraft to its own grounding point; ground pumps and filter separator.
- Place emergency equipment, such as a 5-gallon water can and fire extinguisher, at the pump station and refueling points.

FIRE EXTINGUISHERS

F-236. Fire extinguishers must have current inspection tags and seals. Authorized fire extinguishers include the following:

- Twenty-pound Halon 1211.
- Twenty-pound ($KH\ CO^{3}$) Purple K.
- Fifteen-pound CO^{2}.

BLADE ROPES AND TAIL CONE COVERS

Blade Ropes

F-237. Crew chiefs install and secure at least one blade rope per rotor system on ERFS aircraft.

Tail Cone Covers

F-238. Crew chiefs install engine tail-cone covers to prevent engine foreign-object damage and keep rotors from turning.

CREW DUTIES

Pilot in Command

F-239. The PC of the supporting aircraft is in charge of FARP operations. He directs all operations and monitors safety. He ensures that personnel conduct operations according to the SOP.

F-240. The PC's station is at the fuel pump. This position enables him to monitor all phases of the operation and turn off the fuel supply in case of a mishap or an emergency.

Copilot

F-241. Copilots assist in marshalling, fire guard, and other duties that the PC assigns.

Flight Engineer

F-242. The flight engineer is responsible for safely loading the aircraft before the mission and unloading it after the aircraft is shut down. He controls the fuel flow from inside the aircraft. In addition, he is responsible for cutting off the fuel supply from inside the aircraft in case of a mishap or an emergency.

Crew Chief

F-243. The crew chief assists with marshalling and fire-guard duties.

Petroleum, Oils, and Lubricants Refuelers

F-244. Refuelers set up the FARP and conduct refueling operations.

STANDARD FLIGHT EQUIPMENT

F-245. Crew members use standard flight equipment. POL refuelers use safety equipment and clothing as prescribed in the SOP and regulations.

FORWARD ARMING AND REFUELING POINT OPERATIONS

Aircraft Position

F-246. A marshaller positions arriving aircraft in chalk order at each refuel point. Aircraft remain in position until all refuel, then reposition together.

Fuel Transfer

F-247. Aircrews transfer fuel from the internal tanks in the same manner as when aircraft self-deploy. To maintain aircraft center-of-gravity, complete fuel transfer in the following sequence:

- Four tanks: 4, 1, 3, and 2.
- Three tanks: 3, 1, and 2.

Auxiliary Power Unit

F-248. Aircrews do not operate the aircraft auxiliary power unit during refueling operations.

EXTENDED-RANGE FUEL SYSTEM OPERATIONAL CHECKLIST

PREFLIGHT INSPECTION

F-249. Before applying electrical power for system operation, aircrews perform the checks and services listed in the PMCS, Table 2-6, TM 55-1560-307-13&P.

EXTENDED-RANGE FUEL SYSTEM FUEL TRANSFER CHECKLIST

F-250. Aircrews refer to TM 55-1560-307-13&P for the ERFS fuel transfer checklist. See www.logsa.army.mil/etms/find_etm.cfm, and enter the TM number in the applicable place.

AIR ASSAULT FORWARD ARMING AND REFUELING POINT REFERENCE CHECKLIST

UPON ARRIVAL AT THE SITE

F-251. The FARP personnel follow these procedures:

- Position the CH-47 so that refueling aircraft can land into the wind.
- Start unloading and setting up equipment.
- Check the FARP system under pressure for leaks.
- Take a fuel sample using Aqua-Glo test procedures.
- Record the fuel-sample reading.
- Commence refueling operations.

F-252. The aircrew members may assist with the FARP layout unless the PC needs them during the shutdown phase. Aircrews—

- Shut down engines.
- Ensure that the PC observes and directs the FARP site layout.
- Use the PC to conduct a safety and equipment installation inspection of the FARP site.

AQUA-GLO TEST PREPARATION, FUEL SAMPLING, AND FUEL TEST PROCEDURES

F-253. FARP personnel follow the guidance in the most current FM 4-20.12 (FM 10-67-1) for inspecting and testing the fuel and equipment. Do not use FM 10-68, which has been rescinded.

F-254. Both documents are accessible on line. See www.logsa.army.mil/etms/find_etm.cfm, and enter the TM number in the applicable place.

SECTION X – MULTIPLE FORWARD ARMING AND REFUELING POINT OPERATIONS

F-255. The best way to provide 24-hour support is to employ a two-FARP sequence. A schedule that rotates two or more FARPs ensures that one FARP is always active, reduces personnel fatigue, and facilitates efficient resupply.

MISSION

F-256. In this example, the mission is to deploy two FARPs to support continuous attack, making the transition to phased attack of a different target. The S3 designates two primary sites and alternates. The scheduled operational times for FARP 1 are 0800 and 1930. The operational times for FARP 2 are 1400 and 2000. In this example, the transition to phased attack requires one of the FARP teams to further split to allow drivers to travel to supply points and/or throughput LRP.

SUGGESTED SCHEDULE

F-257. Table F-5 illustrates a suggested FARP schedule. It assumes that when one FARP is active, a second silent FARP is inactive. This example also illustrates how a mission change to phased attack would require both FARPs to operate simultaneously.

Table F-5. Suggested FARP Schedule

	Team 1 (Platoon Sgt leads) FARP	Team 2 (Platoon Leader leads) FARP
0800	FARP 1 ACTIVE, Spts A Co	Shuts down old FARP 2; drives to resupply point
0900	FARP 1 ACTIVE, Spts B Co	Drives to resupply point/LRP
1000	FARP 1 ACTIVE, Spts C Co	Arrives at resupply point/LRP; loads/transloads
1100	FARP 1 ACTIVE, Spts A Co	Drives to FARP 2 location
1200	FARP 1 ACTIVE, Spts B Co	Drives to & arrives at FARP 2 location; sets up
1300	FARP 1 ACTIVE, Spts C Co	Continues setup, priority-of-work tasks
1400	Shuts down FARP; drives to resupply points/LRPs	FARP 2 ACTIVE. Supports A Co.; offloads Class V trucks; prepares to go to supply point
1500	Drives to resupply points/LRPs	FARP 2 ACTIVE. Supports B Co; plt ldr prepares to split his team; transloads fuel into empty tankers/drums
1600	Arrives at resupply points/LRPs, loads/transloads	Team 2A: Supports C Co. in FARP 2; Team 2B: takes offloaded trucks/tankers and drives to LRPs
1700	Drives to new FARP 1 location	Team 2A: Supports A Co. in old FARP 2; Team 2B:arrives at LRPs, loads/transloads
1800	Arrives at new FARP 1 location; off-loads/sets up	Team 2A: Supports B Co. in old FARP 2, Team 2B: loaded trucks return to new FARP site
1900	Continues setup, priority of work FARP 1 ACTIVE	Tm 2A: Services C Co. in old FARP 2; tears down, moves to new FARP/LRP; Tm 2B: loaded trucks arrive/set up new FARP
2000	FARP 1 ACTIVE, Spts A Co	FARP 2 ACTIVE. Supports B Co. (phased attack)
2100	FARP 1 ACTIVE, Spts C Co	FARP 2 ACTIVE. Continues offload of Class V
2200	FARP 1 ACTIVE, Spts A Co	FARP 2 ACTIVE. Spts B Co. (phased attack)

SECTION XI – EMERGENCY PROCEDURES IN THE FORWARD ARMING AND REFUELING POINT

EMERGENCY PROCEDURES IN TACTICAL SITUATIONS

F-258. In case of fire, aircrews not directly involved fly to their respective HAs. FARP personnel take the following actions:

- Shut down the pump immediately.
- Remove nozzle from the aircraft.
- Attempt to put out small fires with fire extinguishers.
- Move the tanker from the scene, if the situation permits.
- Close all FARE butterfly valves and elbow couplers linked to 500-gallon collapsible drums, if time permits.
- Move to a safe area.
- Notify the TOC at the first opportunity.

F-259. If the FARP site is under attack or under a threat of being overrun, FARP personnel—

- Stop refueling.
- Evacuate aircraft.
- Disconnect FARP aircraft from the system by disconnecting the 50-foot pot hose from inside the aircraft and evacuate the aircraft.
- Defend the FARP area or abandon the system and evacuate as directed.

EMERGENCY PROCEDURES DURING NONTACTICAL SITUATIONS

FIRE IN THE REFUELING AREA

F-260. FARP personnel stop refueling at all points, then—

- Turn off all pumps.
- Close all valves.
- Evacuate aircraft and unnecessary personnel from the area.
- Attempt to fight the fire.
- Notify the higher command.

AIRCRAFT FIRE

F-261. FARP personnel stop refueling at all points, then—

- Turn off all pumps.
- Close all valves.
- Evacuate personnel from the aircraft.
- Attempt to shut down the aircraft.
- Evacuate all other aircraft from the area.
- Fight the fire.
- Notify the higher command.

FUEL LEAKS

F-262. FARP personnel stop refueling at the affected point, then—

- Turn off all pumps.
- Turn off the valves to the leak.
- Repair or replace the affected pieces.
- Open valves and start the pumps.
- Check for additional leaks.
- Proceed with refueling operations.

SECTION XII – LOAD PLANS

F-263. Three primary ground vehicles support FARP operations: the M978 HEMTT tanker, M977 HEMTT cargo vehicle, and the M989A1 HEMAT.

HEAVY EXPANDED MOBILITY TACTICAL TRUCK TANKER

F-264. The HEMTT tanker can carry 2,500 gallons, of which 2,250 gallons are usable. When paired with the HTARS, a HEMTT tanker can simultaneously refuel four aircraft.

HEAVY EXPANDED MOBILITY TACTICAL TRUCK CARGO VEHICLE

F-265. The HEMTT cargo vehicle is equipped with a materiel-handling crane with a 2,500-pound load capacity at a 19-foot boom radius. The 18-foot cargo body can carry 22,000 pounds. When carrying ammunition, this truck will cube out before it weighs out.

HEAVY EXPANDED MOBILITY AMMUNITION TRAILER

F-266. The HEMTT is the prime mover for the HEMAT. The HEMAT can carry 22,000 pounds.

SAMPLE LOAD PLANS

F-267. Figure F-40 is the essential load plan key for Figures F-41 through F-43.

Load Plan 1

Item	Quantity	Approximated Weight (lbs)
30mm Pallet	2	7,472
RF Hellfire Pallet	4	7,200
	Total Weight	14,672

Load Plan 2

Item	Quantity	Approximated Weight (lbs)
2.75” Rocket Pallet	2	5,032
RF Hellfire Pallet	3	5,400
	Total Weight	10,432

Load Plan 3

Item	Quantity	Approximated Weight (lbs)
RF Hellfire Pallet	2	3,600
30mm Pallet	2	7,472
2.75” Rocket Pallet	2	5,032
	Total Weight	16,104

Figure F-40. Load Plan Key

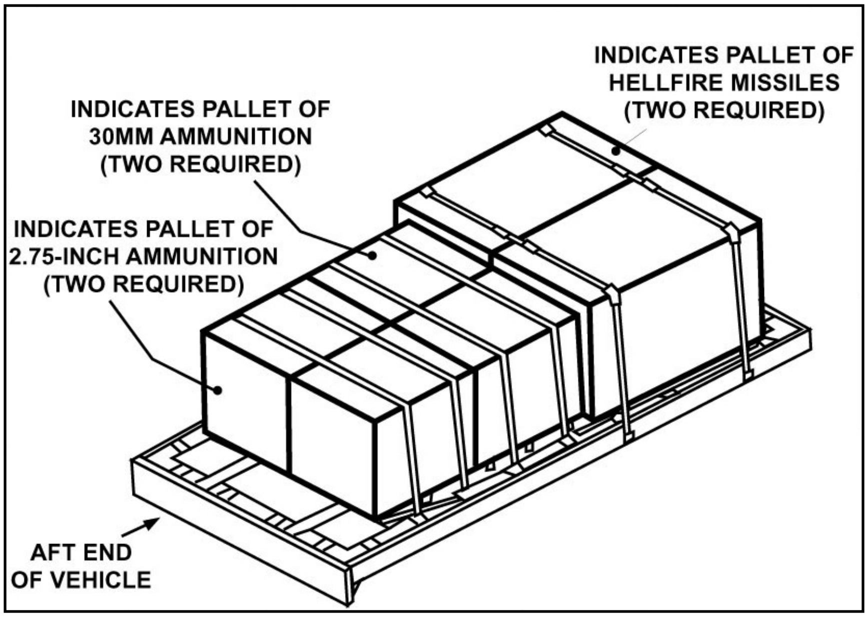


Figure F-41. Load Plan 1

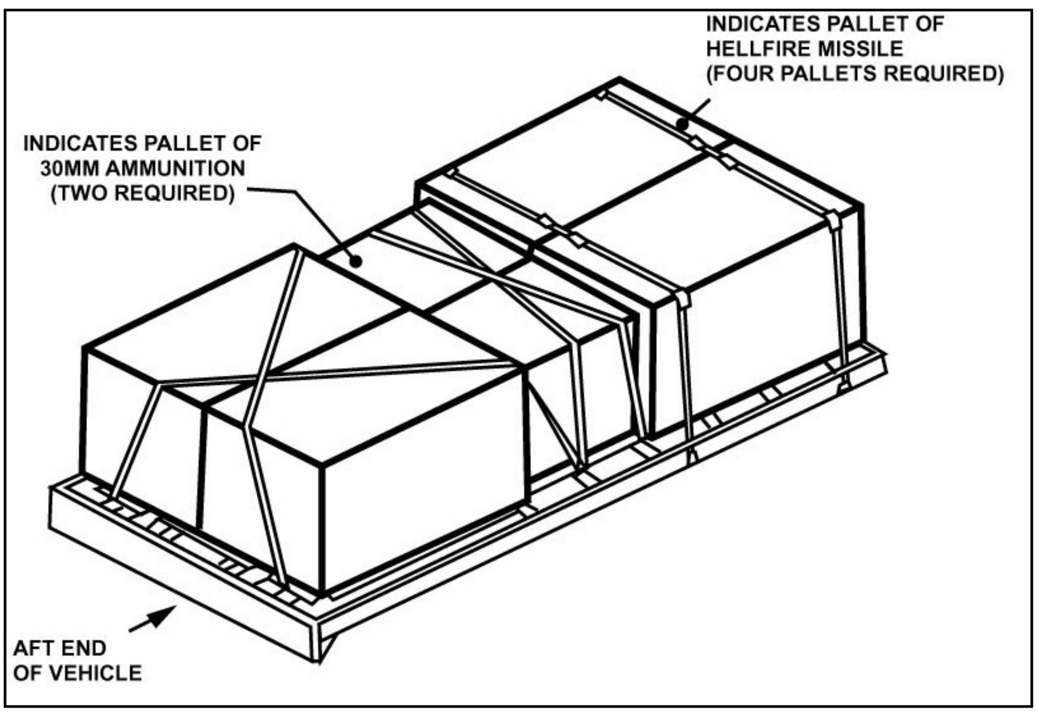


Figure F-42. Load Plan 2

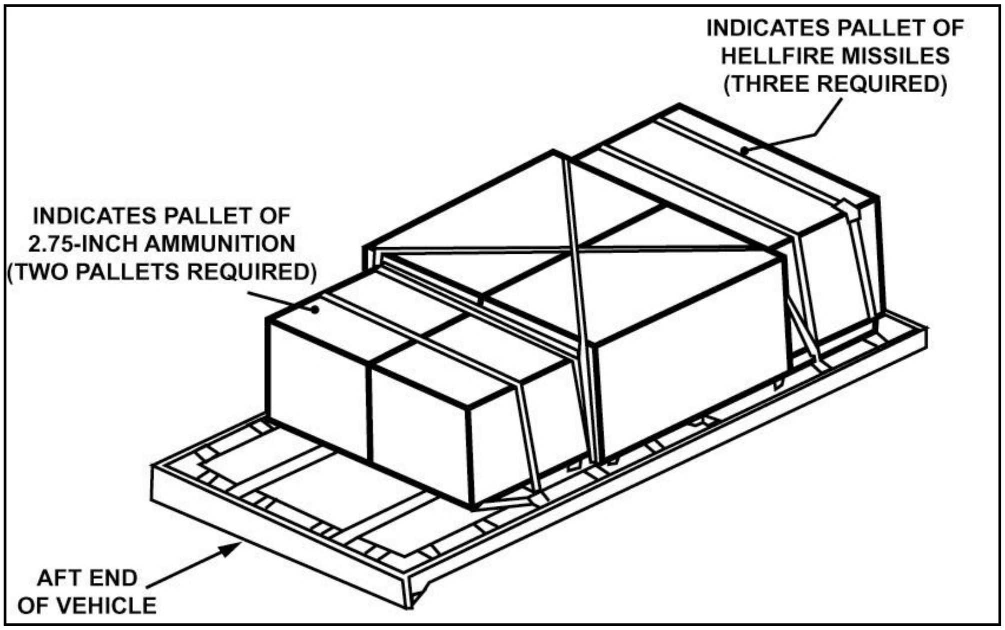


Figure F-43. Load Plan 3

SECTION XIII – NIGHT AND SEASONAL OPERATIONS

F-268. This section discusses considerations for night, hot-weather, and winter FARP operations. FARP operations under varied environmental conditions require planning and training. Different environments require different considerations.

NIGHT OPERATIONS

F-269. The establishment of a FARP at night requires special considerations. Movement must be planned in detail and executed in an orderly manner. Delays will occur because of low-light levels. Light discipline is extremely important.

AIRCRAFT INBOUND CALLS

F-270. As with day operations, the AMC contacts the FARP about 5 kilometers out. An example call is "T14 (FARP), this is T56 (AMC) with five on blue." The FARP should remain blacked out until aircraft arrive. Aircrews use a prearranged signal to identify themselves to FARP personnel. Once in the area, the aircraft could transmit a simple, short message. For example, using a single word, such as "Bravo," is sufficient. "Bravo" would alert FARP personnel that friendly aircraft are nearby and that they can turn on the site-location markers.

FORWARD ARMING AND REFUELING POINT MARKING

F-271. The FARP can be marked in several ways. If aircrews are equipped with NVDs, FARP personnel may use a low-level IR light source. Alternate marking techniques include a flashlight with colored lens, chemical lights, or colored beanbag lights. If the existing light level is high, such as during a full moon, engineer tape or other high-contrast materials that are staked to the ground may suffice.

F-272. During arming and refueling operations, FARP personnel may have to use artificial lights because of the low natural light level. Color-coded, low-intensity light sources may be used to indicate direction, takeoff and landing areas, and pad sites.

NIGHT VISION

F-273. Artificial lights may pose several problems. The FARP will probably be in total darkness until aircraft arrive. When personnel start working with lights, their night visual acuity may be impaired. Personnel will be constantly adjusting from a no-light to a low-light working environment. Each time that the light level changes, personnel may need time for their night vision to readapt.

F-274. The glow from a nearby chemical light can disturb a worker's vision. Objects may be blurred when looked at closely. Artificial light sources are a problem because they cannot be placed to adequately illuminate the work and leave both hands free.

F-275. NVDs may be the best choice for night FARP operations. However, their use requires extensive training or aircraft turnaround times may increase.

Advantages of Night Vision Devices

F-276. The advantages of NVDs for night FARP operations are the following:

- Passive lighting greatly reduces the enemy's ability to detect the FARP.
- Aircrews and FARP personnel will be using systems that are compatible, and FARP lighting will not interfere with aircraft night sight systems.
- The same signals, such as hand-and-arm signals and flags, can be used during the day and at night.

Disadvantages

F-277. The disadvantages of NVDs for night FARP operations are the following:

- Objects closer than 10 inches will appear blurred.
- Close workspace around weapon systems may impair the individual's efficiency.
- NVDs may not be compatible with current NBC equipment.
- The unit may not have enough NVDs to support both aircrew and FARP personnel.

DESERT OPERATIONS

F-278. The desert environment poses many problems for FARP operations. Adequate water supplies should be available. Aircrews and ground personnel will perspire profusely. To prevent heat casualties or extensive dehydration, each individual must drink plenty of water—up to 5 gallons every 24 hours. Other factors include terrain, mobility, communications, flying techniques, high-density altitude, and FARE systems.

TERRAIN

F-279. Deserts may consist of many different types of sand. Sand may be as fine as talcum powder or as coarse as gravel. The type of sand affects off-road vehicle mobility. In many areas, a crust may form on the surface. If the crust is dark-colored, the sand is very coarse. In such situations, the light sand has been blown away, leaving a surface crust that may be hard enough for a helicopter to land with almost no dust signature.

F-280. The flat terrain and poor relief of the desert create serious navigational problems. Therefore, FARPs must be established in easily recognizable positions. The use of offset, low-output NDBs assists in locating FARP positions. Navigation equipment, such as Doppler, also helps.

F-281. The enemy can observe desert activities from as far away as 10 kilometers. From a vantage point of high ground, the enemy can observe activity from as far away as 20 kilometers. The FARP will be a target of opportunity for any enemy pilot who can see it. Without cover and concealment, the FARP must have AD protection.

MOBILITY

F-282. The best ground vehicles for the desert are the 1-1/4-ton truck, 2-1/2-ton truck, 5-ton truck, and HEMTT. Most vehicle trailers are unsuitable for off-road travel except for the HEMAT.

F-283. The easiest and fastest way to establish a FARP in the desert is to sling load it into position. Two FARE systems oriented into the prevailing wind and set up in a T-formation (Figure F-44) allow adequate separation from the turning rotors. This system can support four refueling points. The FARP should be positioned to facilitate ground vehicle support. This positioning eases the strain of trying to aerially support the FARP.

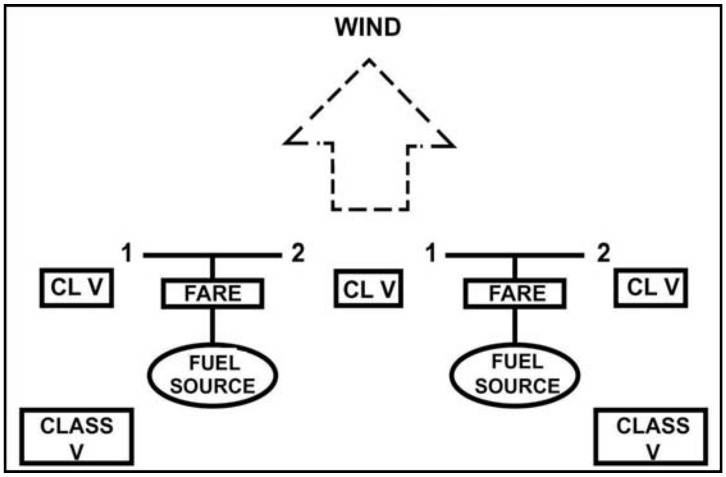


Figure F-44. T-Formation FARE Setup

COMMUNICATIONS

F-284. Electronic communication capabilities will vary from day to day. Communicating with an element more than 25 kilometers away may require a relay station.

FLYING TECHNIQUES

F-285. Aircraft dust signatures are reduced if airspeed is kept above 40 knots. Aircrews should not attempt in-ground-effect hovering. Aircrews should plan and execute approaches to the ground. Correct desert flying techniques help the aircrew to maintain visual contact with the ground.

HIGH-DENSITY ALTITUDE

F-286. High-density altitudes that can degrade aircraft performance will affect most desert operations. In the early morning, when density altitude is lowest, the UH-60 may be able to carry two full 500-gallon collapsible fuel drums. By noon, it may be able to carry only one. An attack helicopter may have to carry less than a full load of ammunition or fuel. Aircrews will require more frequent trips to the FARP. The FARP must be logistically prepared for them.

FORWARD AREA REFUELING EQUIPMENT SYSTEMS

F-287. FARE systems must be dug in or sandbagged. For optimum performance, the fuel source (500-gallon collapsible drum) should be at a level equal to or higher than the pump. All small engine-driven equipment must be protected from blowing sand to prevent mechanical problems. The procedures listed below will help ensure the continued operation of the FARE system. FARE personnel must—

- Replace filter separator elements when they fail or when the pressure differential indicator shows that they must be changed.
- Change or clean oil filters at least every six hours.

- Clean small-engine air filters daily with compressed air and replace weekly.
- Run generators continuously for no more than three to six hours before they replace it.

ADDITIONAL CONDITIONS AND CHARACTERISTICS

F-288. Other conditions and characteristics peculiar to the desert that all personnel should be aware of are listed below:

- All personnel are susceptible to visual illusions (mirages).
- Dust storms restrict the ability to see and breathe.
- Personnel should perform PMCS twice a day.
- Continued exposure to bright sunlight can cause severe eyestrain or sun blindness unless personnel take preventive measures.
- Light can be seen for great distances over flat terrain; a pink filter can be seen more than 5 miles away by someone using an NVD.
- Ground vehicles are easy to identify; silhouettes and shadows are easily detected because they contrast with the lighter natural background.
- In sandy areas, turret weapon systems need frequent cleaning and light lubrication; use of lubricants without proper cleaning causes a buildup of sand in the gear mechanism. This causes weapons to jam; optical sights should be protected from blowing sand that could scar the glass window of the telescopic sight unit.

WINTER OPERATIONS

F-289. The winter battlefield is characterized by low temperatures, fog, freezing rain, snow, ice, frozen ground, and at times, muddy ground. FARP operations are difficult under these conditions. Detailed planning and training are required to overcome them.

DISPLACEMENT

F-290. Snow, ice, and mud reduce vehicle mobility, complicating ground displacement. Commanders should plan for aerial displacement when possible. If ground displacement is necessary, leaders should allow more time for movement. Breakdown and setup of the FARP take more time on the winter battlefield than in other environments.

PERSONNEL

F-291. Low temperatures make it difficult for personnel to keep warm and function. Wind chill caused by rotor wash can result in cold injuries even when air temperatures are not very cold. Fuel spilled on bare skin or soaked into clothing has a cooling effect as it evaporates, increasing the probability of cold injury. Personnel handling cold ammunition need mittens or other protection and a lighter pair of gloves when manual dexterity is needed to perform delicate operations. Commanders should ensure that personnel are equipped and trained to function in a cold environment.

FORWARD ARMING AND REFUELING POINT MARKING

F-292. Marking the FARP for aircraft control requires special consideration. Engineer tape is not effective on snow. Marker panels can quickly become obscured by falling snow. Hand-and-arm signals, flashlights, or smoke may be used, depending on weather conditions. Maneuvering aircraft on loose snow surfaces may cause clouds of blowing snow, which can obscure ground guides or other control measures. Blowing snow could cause aircrews to become disoriented and lose aircraft control. Packing the snow or spraying the snow surface with water to form a crust of ice can reduce these problems.

CAMOUFLAGE

F-293. Camouflage can be difficult, particularly where there is complete snow cover. The use of white covers and snow as camouflage is a possible solution. The best solution, however, is to avoid open snowfields when selecting FARP locations. Instead, the FARP should be located near partially wooded or urban areas. FM 3-58.1 (FM 20-3) describes camouflage procedures in detail.

ELECTRICAL GROUNDING

F-294. Electrically grounding equipment and aircraft is another problem. Frozen ground makes the emplacement of grounding rods difficult and reduces effectiveness of the electrical ground. To emplace a grounding rod, a hole must be dug, drilled, blasted, or melted and the rod placed in the hole. To ensure the proper flow of electricity, paper or other absorbent material is filled in around the rod and then soaked with salt water.

MAINTENANCE

F-295. Maintenance requirements for aircraft and equipment increase on the winter battlefield. When aircraft icing occurs, FARP personnel may have to deice the aircraft. In cases of extremely thick ice, a Herman Nelson heater or aviation ground power unit may be the only effective deicing equipment available. At times, ammunition can freeze. Deice caps for the Hellfire missiles are available. They are fitted over the seeker to prevent it from freezing. Rocket-pod covers also are available. These covers fit snugly over the rockets, and the rockets can be fired through them. FARP equipment must be “winterized” with additional antifreeze or low-temperature lubricants.

SECTION XIV – PETROLEUM SPILLS

SPILL DEFINITIONS

F-296. Broadly defined, a spill is the release of any kind of a petroleum product or hazardous substance into the environment. Three spill types are small priming spills, small spills, and large spills:

- A small priming spill covers less than 18 inches in all directions.
- A small spill extends less than 10 feet in any direction, covers less than 50 square feet, and is not continuous.

- A large spill extends farther than 10 feet in any direction, covers an area in excess of 50 feet, or is continuous (for example a leaking tank).

F-297. For purposes of reporting to federal, state, and local authorities, an oil spill is defined as any spill that reaches a stream, creek, river, or any other body of water in harmful quantities. In addition, units report any spill that could come into contact with the aqua line of the local water table. Harmful quantities violate applicable water-quality standards or cause a film or sheen upon, or discoloration of, the surface of the water or adjoining shorelines. Harmful quantities also cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.

F-298. The information relative to spill size and reportable spills discussed in this section applies only to oil spills, not to hazardous substances. The commander or on-site coordinator is the only person authorized to report spills. He reports all spills of any kind that he deems significant, including any spill that results in fire or explosion.

SPILL DISCOVERY

F-299. The initial component in the spill-response plan is discovery. The primary responsibility of a discoverer is to notify proper authorities, who are trained and equipped to deal with an environmental incident. Upon discovery, the discoverers—

- Stop the source of the spill if properly trained to do so and it can be done safely.
- Begin the notification process.

ASSESSMENT

F-300. During every step of the spill-response process, each responding individual continually assesses the situation. He makes decisions on the next appropriate action to be taken. Upon initial discovery, he reports—

- Time and type of incident.
- Name and quantity of spilled material and rate of release.
- Direction of the spill, vapor, or smoke release.
- Fire or explosion possibility.
- Coverage area of spill and the intensity of any fire or explosion.
- Extent of injuries, if any.
- Status of cleanup.
- Whether spill team is on-site or en route.
- Whether spill team is adequate.
- Estimated time to completion.
- Name of on-scene commander and how to contact him.

F-301. The commander or on-site coordinator determines the appropriate response based on potential risks associated with the spill. He determines whether an imminent or actual threat exists to human health or the environment. He notifies appropriate authorities. For example, the on-scene commander may determine that the spill cleanup is beyond the capability of the functional area activity that created the spill. He then mobilizes the response team to control, contain, and clean up any spilled material if—

- The spill could result in the release of flammable or combustible liquids or vapors, thus causing a fire or gas-explosion hazard.
- The spill could cause the release of toxic liquid or fumes.
- The spill is containable on site but the potential exists for ground contamination.
- The spill cannot be contained on site, resulting in off-site soil or water contamination.

RESPONSE PHASES FOR OIL SPILLS

F-302. Defensive actions begin as soon as possible. Actions are taken to prevent or minimize damage to public health and welfare or to the environment. Some general actions include—

- Eliminating sources of sparks or flames.
- Controlling the source of the discharge.
- Emplacing physical barriers, such as berms or dikes, to deter the spread of the oil.
- Preventing contaminated water discharge into storm drains or the sewer system.
- Recovering the oil or minimizing its effects.
- Placing recovered oil and contaminated absorbents, such as rags, in Department of Transportation (DOT)-approved containers for disposal as hazardous waste (HW).

OIL SPILL CLEANUP

F-303. The responsible unit takes the following actions for each type of oil spill.

TYPE OF SPILL

Small Priming Spill

F-304. The responsible unit posts a fireguard at the spill until vapors dissipate.

Small Spill

F-305. For small spills, the responsible unit—

- Stops operations in the area and posts a fireguard.
- Uses an absorbent cleaning agent; if the fuel spills on concrete or a similar hard surface, after cleaning, place the absorbent material in a closed metal container for later burning.
- Does not use rags to absorb the spill—if aircraft fuel spills. Fuel may spill on the ground or on a hard surface away from operational areas; if so, rope off the spill area until the fuel evaporates and vapors disperse.

- Ceases operations; does not allow personnel in the area until the fuel is vapor-free.

Large Spill

F-306. For large spills the responsible unit—

- Calls the fire department immediately.
- Stops the flow of fuel; after taking all safety precautions, personnel may consider removing aircraft, refueling vehicles, and personnel from the spill area.
- Shuts engines off.
- Blankets large fuel spills with foam.

F-307. The fire chief directs subsequent recovery of fuels. He does not use the area for operations until it is declared free of fuel and fuel vapors.

ADDITIONAL ACTIONS

F-308. If berms or grated trenches did not contain the spill, the responsible unit establishes an area of isolation. The area size depends on the spill's size and the waste removed.

F-309. If the spill produces a toxic vapor cloud, evacuate the area. If large quantities of volatile (toxic or combustible) materials spill, the responsible unit evacuates a downwind area at least 500 feet wide and 1,000 feet long. Contact the Air Weather Service (AWS) for ambient wind speeds and directions. The AWS will assist the fire chief and commander or on-site coordinator by providing toxic corridor computations. The responsible unit should—

- Use pumps or tank trucks to collect as much of the material as possible.
- Use hay or other absorbent material to absorb oil not collected by pumping.
- Dispose of contaminated earth and absorbent material as directed by the environmental officer, commander, or on-site coordinator.

RESPONSIBILITIES AND DUTIES OF ON-SITE COORDINATOR

F-310. The on-site coordinator coordinates plans with the response team, state, and local representatives. He—

- Determines when the area is clean enough for normal service to return.
- Briefs and dispatches a response force to the accident scene and determines the need for additional support teams.
- Locates or relocates the mobile CP, if necessary.
- Receives a briefing from the fire chief or other personnel on actions taken.
- Evacuates and establishes a disaster cordon around the area and establishes an entry control point, allowing only essential personnel in the area.

- Secures the accident scene after the area is declared safe and declares "all clear" following withdrawal, as the situation dictates.
- Coordinates appropriate actions with local civil authorities at the accident scene.
- Coordinates logistical support, as necessary.
- Informs higher headquarters of the situation and actions taken and notifies appropriate agencies if unit personnel cannot sufficiently contain and clean the spill.

RESPONSE TEAM ORGANIZATION AND TRAINING

ORGANIZATION

F-311. Units establish procedures and response teams to manage environmental emergencies. The installation or major subordinate command governs organization and provides training.

TRAINING

F-312. Training includes classroom and emergency-response exercises. Classroom instruction trains response teams in exposure hazards of substances that they may encounter during a spill response. Training exercises focus on actual spill-control and cleanup activities. Team members receive proper hazardous substance response training to—

- Familiarize them with facility layouts and typical oil and hazardous substances.
- Use and maintain breathing apparatuses and other equipment.
- Classify hazardous substances and their characteristics.
- Retain spills and recover spilled substances.
- Dispose of contaminated soil, absorbent material, and recovered pollutants.
- Restore the contaminated area to its former condition.

F-313. Individuals who store, transfer, or employ oil or hazardous substances require some level of hazard training; recommended training includes—

- Spill procedures and safety concerns.
- Reaction and avoidance of exposure to hazardous substance spills.
- Specific safety requirements and procedures of the work assignment.

Appendix G

Army Airspace Command and Control

The term *Army airspace* does not signify ownership of any airspace contiguous to the battlefield or any other geographical dimension. Airspace is a joint medium for all friendly combatants. Each joint force component may operate aerial vehicles and weapons systems within the airspace with maximum freedom consistent with priorities, the degree of operationally acceptable risk, and the joint force commander's intent.

SECTION I – AIRSPACE INTERFACE

G-1. The A^2C^2 system is the airspace management component of the Army Air Ground System (AAGS). It outlines the Army's integration of airspace usage and C^2 within the framework of the TAGS. These systems, in whole or in part, are placed in each echelon from maneuver battalion to numbered army. This appendix summarizes these systems and the communication mediums used to accelerate the airspace control authority's objectives. AAGS is the control system for synchronizing, coordinating, and integrating air operations. It provides the means to initiate, receive, process, and execute requests for air support and to disseminate information and intelligence produced by aerial assets.

G-2. AAGS interfaces with elements from other services to function as a single entity in planning, coordinating, deconflicting, and integrating air support operations with ground operations. The Army elements of the AAGS consist of CPs, FSEs, air defense elements, A^2C^2, and coordination/liaison elements (Figure G-1).

SIMULTANEOUS USE

G-3. A^2C^2 maximizes the simultaneous use of airspace. At decisive moments, commanders are able to exploit all available combat power—synchronized in time, space, and purpose. Potential users of the aerial dimension of the battlefield include not only Army aviation but also AD, MI, FS, and joint and combined air and ground forces.

FRATRICIDE AVOIDANCE

G-4. Effective airspace management and control minimize the risk of fratricide and increase overall force effectiveness. The A^2C^2 system provides an effective conduit for timely bidirectional communication between the airspace control authority (ACA) and all friendly airspace users. The air ATO), published daily by the ACA, directs tactical IFF use and assignments in each theater, as well as projecting ground combat movements.

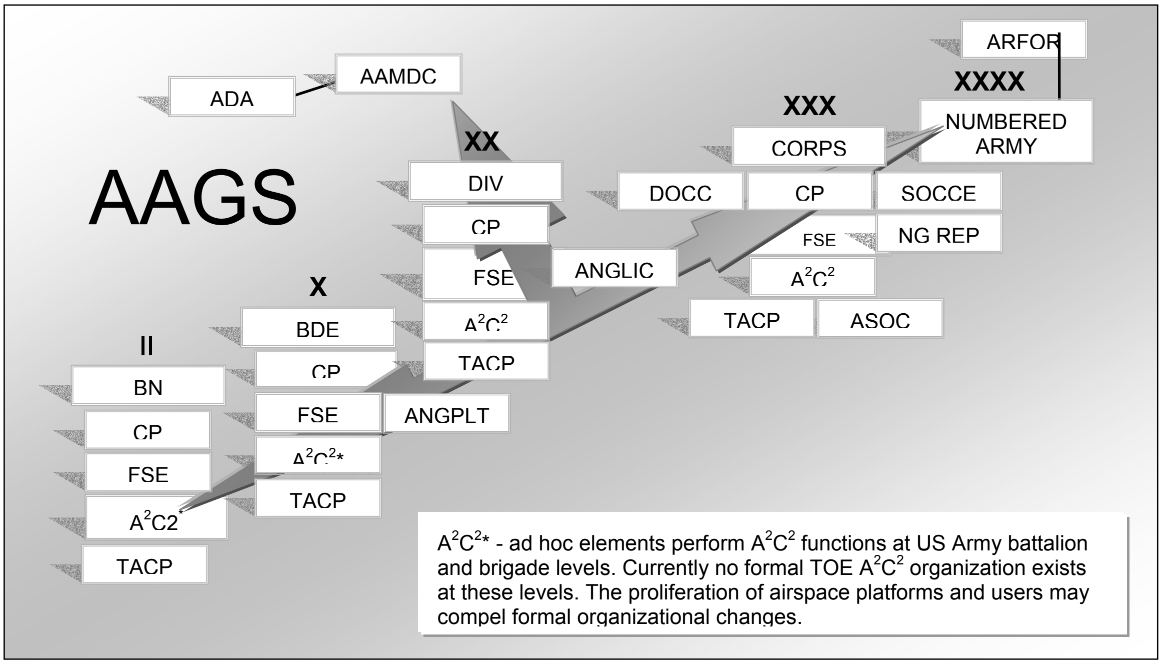


Figure G-1. Army Air Ground System

ARMY AIRSPACE USERS

G-5. A^2C^2, AD, and FS coordination functions are interwoven. These functions involve detailed coordination and integration of CAS, indirect fire, organic and augmenting AD, and tactical fire and maneuver operations (to include Army aviation). Brigade, battalion, and company commanders; FS coordinators; ALOs; and FACs directly involved in localized combat operations perform A^2C^2 functions established by higher echelons such as the division A^2C^2 element.

AIR DEFENSE

G-6. AD protects the force and selected geopolitical assets from aerial attack, missile attack, and surveillance. Air defense forces use both positive and procedural means of fire control. Integration and airspace control are imperative to ensure safe, unencumbered passage of friendly aircraft while denying access to enemy aircraft and missiles. AD units require automated transfer of airspace information via the airspace control order (ACO) and ATO. AD units provide near-real-time airspace SA using organic and integrated joint sensors at all echelons.

AVIATION

G-7. Army aviation combat, CS, and CSS operations are generally conducted in the terrain-flight dimension of the battlefield, which is fundamentally linked to it at all echelons. A^2C^2 planning should allow complete flexibility for Army aviation units operating below the coordination altitude.

FIELD ARTILLERY

G-8. FA uses airspace to deliver indirect fires through airspace from extremely low to very high altitudes. Personnel in the FSEs, from company through corps, have the principal means for deconflicting FS with other airspace users.

FIRE SUPPORT ELEMENT

G-9. The FSE coordinates planned fires and acts as the focal point for airspace requests to support immediate fires. It forwards airspace requests, through higher headquarters, to the corps A^2C^2 cell for ACO and ATO inclusion. It also passes immediate airspace requests to the battlefield coordination detachment (BCD) in the AOC.

MILITARY INTELLIGENCE

G-10. MI aircraft and UAVs conduct intelligence collection and target acquisition missions. These platforms may use low-altitude airspace normally allotted to the land component commander (LCC). However, they normally conduct missions in upper-altitude airspace procedurally allotted to the air component commander. The ATO and ACO include these upper-altitude missions. However, commanders often direct these flexible, highly responsive assets to perform immediate missions not in the ATO or ACO. The A^2C^2 system must provide a real-time conduit to acquire airspace for immediate missions. The system must also be capable of displaying real-time, three-dimensional locations of MI airborne platforms.

AEROMEDICAL SUPPORT

G-11. Aeromedical evacuation units provide 24-hour support within the AO. To ensure rapid response to evacuation requests, aeromedical units provide a coordinating element as part of the A^2C^2 system. This coordinating element provides the interface necessary to complete time-sensitive airspace requests with limited aeromedical assets. The A^2C^2 system provides the communications means to coordinate with aircraft conducting the mission because airspace clearance may occur in flight.

SPECIAL OPERATIONS

G-12. By design, SOFs deploy quickly in small, low-profile units to specific regions or theaters of operations. The presence and number of other U.S. forces in theater usually dictate the method of airspace deconfliction. Special operations ground forces often operate beyond normal friendly troop concentrations. Missions deep within enemy territory demand A^2C^2 systems capable of restrictive battle space control measures to avoid fratricide.

AIRBORNE OPERATIONS

G-13. Airborne units require many of the same A^2C^2 considerations as aviation and SOFs. They require airspace control measures to provide entry and exit routes and ROAs to deconflict airspace from aircraft not directly involved in the operation. The ground phase requires substantial deconfliction of battle space. Once employed, these forces are often in areas beyond the normal concentration of forces—near free-fire areas for FA, other fires, and effects of those fires.

INFANTRY OPERATIONS

G-14. As with FA indirect fires, infantry mortars require battle space deconfliction.

MOUNTED GROUND OPERATIONS

G-15. Armor and mechanized units often spearhead ground elements in the close battle. These forces can outpace airspace control measure updates designed to protect those elements from fratricide. Simultaneous tactical operations by attack helicopters and mechanized units require continuous airspace deconfliction.

SECTION II – ARMY AIRSPACE COMMAND AND CONTROL STAFF RESPONSIBILITIES

G-16. A^2C^2 requires a coordinated staff effort to accomplish the functional activity of airspace control. This process—coupled with the near-real-time collection and dissemination of information—increases combat effectiveness by promoting the safe, efficient, and flexible use of airspace.

ARMY AIRSPACE COMMAND AND CONTROL RESPONSIBILITIES

G-17. Commanders and staffs must ensure that their assets, systems, and personnel provide timely, relevant, and accurate information. Current airspace utilization, gleaned from the ATO, helps C^2 elements better understand the overall intensity and flow of the battle. This information enhances the A^2C^2 element's efforts in coordinating use of airspace and avoiding undue restrictions.

G-18. The G3/S3 Air has supervisory responsibility for airspace control. ATS personnel within the A^2C^2 elements perform the integration function for all airspace users. A^2C^2 elements provide the necessary communications to interface with airspace control functions at each echelon. The A^2C^2 cell displays both planned and ongoing use of airspace.

G-19. The A^2C^2 staff must have backup plans and alternate A^2C^2 cells to assume A^2C^2 functions in case the primary cell is damaged or destroyed.

CORPS AND DIVISION ARMY AIRSPACE COMMAND AND CONTROL ELEMENTS

G-20. Corps airspace control elements orient on synchronizing combined arms team airspace users with supporting sister services (See Figure G-2).

G-21. The division A^2C^2 focuses primarily on the close battle. It must move airspace planning data to and from the corps A^2C^2 element and disseminate the ATO, ACO, and A^2C^2 information to subordinate units.

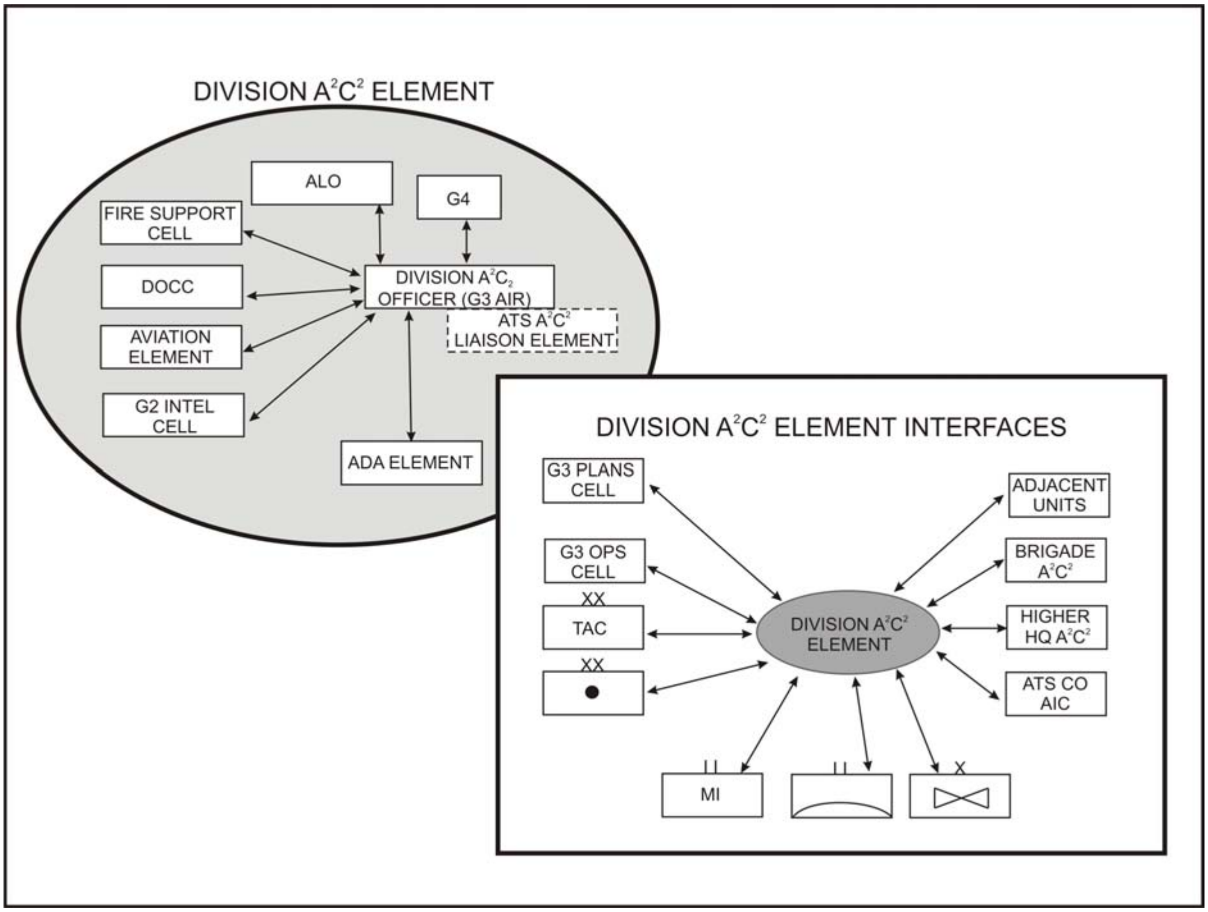


Figure G-2. Example of Division A^2C^2 Element

G-22. A^2C^2 staff representatives include the following:

- G3 operations section (G3 Air).
- AD element.
- Aviation element.
- ATS liaison element.
- Fire support element.
- G2 section (as required).
- G4 section (as required).
- UAV unit commander and LNO/NCO (as required).
- Air Force TACP.
- air and naval gunfire liaison company (ANGLICO).

BRIGADE AND BATTALION A^2C^2 REQUIREMENTS

G-23. The brigade A^2C^2 element implements and disseminates the ACOs and ATOs to the lowest levels. It also submits air-space control means requests to the division A^2C^2 element for processing. When deployed as a separate task force, the brigade may receive TACPs and theater airlift liaison officers (TALOs) to assist in mission planning.

G-24. Brigades and battalions do not have direct A^2C^2 support. Therefore, existing staff personnel, LNOs, and FS representatives must perform the A^2C^2 function supervised by the S3 Air.

G-25. The battalion S3 Air submits airspace control means requests to the brigade A^2C^2 element for processing and forwarding. ADA, FA, MI, and aviation battalions must receive and implement ACOs and ATOs.

SECTION III – COMMUNICATIONS CONNECTIVITY

TACTICAL AIRSPACE INTEGRATION SYSTEM

G-26. TAIS is a digitized, integrated airspace management and decision support system. It automates A^2C^2 planning and operations and air traffic services. It also helps planners build Army input for the joint ACO to distribute the approved A^2C^2 overlay. TAIS takes input from multiple sources and combines it into a single picture. Combined with the electronic ground picture, it helps users visualize both the air and ground battle space. Each system comes with extensive communications packages that allow operators to communicate directly with the various airspace users. The system is designed to automatically notify operators of potential conflicts in airspace use. TAIS also has interoperability with both the Navy and Air Force airspace management systems. Appendix K contains additional information.

THEATER BATTLE MANAGEMENT CORE SYSTEM

G-27. The Air Force uses the Theater Battle Management Core System (TBMCS) to construct, disseminate, and execute the ATO and ACO. The TBMCS interfaces with Advanced Field Artillery Tactical Data System (AFATDS), AMDWS, and TAIS to support the production of the ATO, ACO, and airspace control measures request.

SECTION IV – AIRSPACE CONTROL ORDER, AIR TASKING ORDER, AND SPECIAL INSTRUCTIONS

G-28. The airspace control plan, ACO, and ATO are the foundations of airspace operations in the joint environment. Airspace control must effectively allow combat operations without adding undue restrictions or adversely affecting the capabilities of any service or functional component.

AIRSPACE CONTROL PLAN

G-29. The airspace control plan is developed by the ACA and approved by the joint force commander (JFC). It provides specific planning guidance and procedures for the airspace control system and defines the joint force airspace control organization. This plan outlines the airspace control process and may be published either as an annex to the basic OPLAN or OPORD, or as a separate document. Because the airspace control plan delineates the airspace control area, planners must address coordination procedures for all airspace users. Implementation of the airspace control plan is through the ACO, which all components must comply with.

AIRSPACE CONTROL ORDER

G-30. The ACO and the airspace control plan are the two most critical documents pertaining to all airspace control measures within a joint operations area. The ACO is a jointly approved message implementing the airspace control plan. It provides specific, detailed information on airspace control and airspace control measures to all theater airspace users. The ACO is published on a cyclical basis (normally daily), depending on the theater. It may be part of the ATO or a stand-alone document. While the airspace control plan provides general guidance on airspace control, the ACO institutes airspace control procedures for specified periods. It also contains modifications to the airspace control plan guidance and procedures, and it activates or deactivates procedural control measures.

G-31. The ACO notifies appropriate air-ground systems nodes and the controlling agencies of the effective times, altitudes, and distances for all airspace control measures. The ACO may also include other pertinent airspace information—such as FS and air defense control measures—that deems necessary by the ACA.

G-32. The ACO consolidates input from all organizations involved in the conflict and presents the final airspace control plan. While coordination and integration of airspace requirements should be accomplished at the lowest possible level, much is actually accomplished by senior C^2 elements because most ACMs are approved by the ACA. Regulation of the airspace control function is decentralized to the maximum extent possible; however, centralized direction by the ACA does not imply OPCON or TACON over any air assets.

AIR TASKING ORDER

G-33. The ATO is a highly detailed, daily order that describes and directs the overall air operation. This order contains mandatory, optional, and conditional entries used to task and disseminate to components, subordinate units, and C^2 agencies' projected sorties, capabilities, and forces to targets. Each order provides specific instructions to include IFF modes and codes, mission timing, routes of flight, targets, weapons loads, air refueling data, and call signs, as well as general and SPINS. Overall, the ATO is divided into three sections: (I) mission, (II) execution, and (III) SPINS. Essentially, the ATO provides units with all of the guidance and direction that they need to fly assigned missions.

G-34. Planning and executing of the joint ATO are a continuous process of accommodating changing tactical situations and JFC guidance as well as requests for support from component commanders. The joint ATO matches specific targets, compiled by the joint force air component commander (JFACC)/JFC staff, with the capabilities/forces made available to the JFACC for the given joint ATO day. The full joint air tasking order cycle—from JFC guidance to the start of ATO execution—depends on the JFC's procedures, but each ATO period usually covers a 24-hour period. The ATO that is being built today will refer to past ATOs and project into the future. Any plans or subplans that were built yesterday will be used as a starting point or reference point for the plan that is being built for tomorrow. For example, to build the next airspace control plan, planners will refer to the current airspace control plan (Figure G-3).

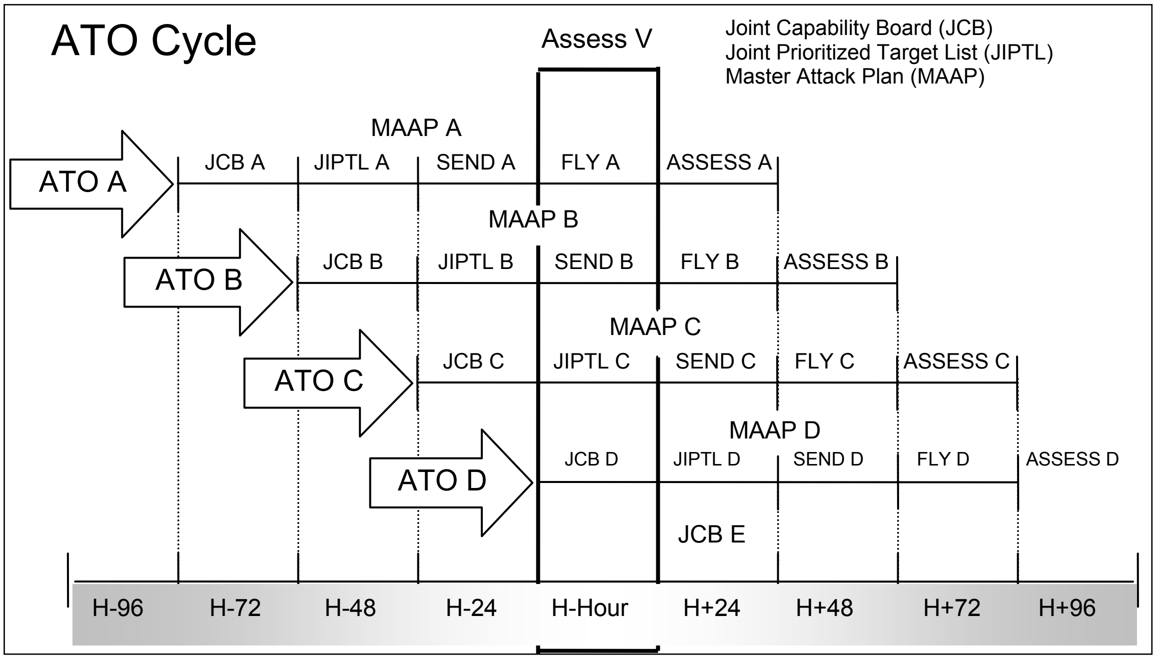


Figure G-3. ATO Cycle

SPECIAL INSTRUCTIONS

G-35. Special instructions are normally included as part of the "combined/general unit remarks" in a free text format that highlights, modifies or supplements mission data contained in other portions of the ATO. SPINS, includes eclectic supplemental information that will not fit into other mission formats. As a general rule, SPINS are valid until they are rescinded or superseded. In some theaters, SPINS are published as a separate message because of their length.

G-36. ATO and SPINS are formatted using basic United States Message Test Format (USMTF) procedures and organized using alphanumeric section designators. Although SPINS are formatted using standardized procedures, their appearance varies according to the theater requirements and command directives. Special instructions cover a variety of mission planning considerations, to include the following:

- Airspace.
- Range times.
- Frequencies.
- Control agencies.
- IFF/selective identification feature (SIF).

- Mission event numbers.
- CSAR.

AIR TASKING ORDER DEVELOPMENT

G-37. Joint ATO development is a complex, repetitive process in which JFC and JFACC guidance, target worksheets, and master air attack plan (MAAP) and component requirements are used to finalize the ATO, SPINS, and ACO.

G-38. The objective of the joint targeting process is to ensure an effective and efficient joint attack against the enemy with all available assets maximized to achieve the overall objective. This process provides for the planning, coordination, allocation, and tasking of joint air missions/sorties to accommodate changing tactical situations and matching the appropriate response to them. The six steps of the joint targeting process, depicted in Figure G-4, have been overlaid with the U.S. Army and USMC's D3A targeting methodology.

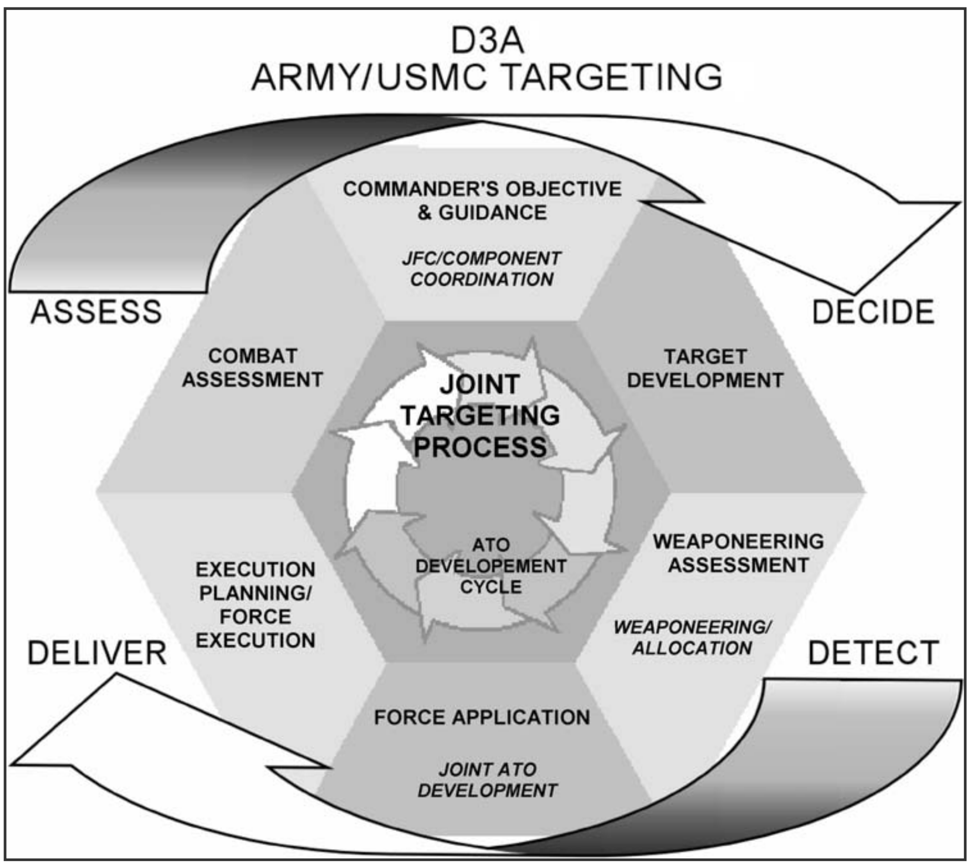


Figure G-4. D3A/Joint Targeting Process

G-39. Although referred to as a "cycle," the joint targeting process is really a continuous process of overlapping functions, independent of a particular sequence.

G-40. Figure G-5 is replicative of an ATO SPINS. FM 3-52.2 (FM 100-103-2), Appendix B, contains additional information.

SPINS INDEX:
1. RANGE TIMES/MODE 3.
2. PACKAGE COMMANDERS.
3. LIVE ORDNANCE.
4. IFF/SIF.
5. COMMUNICATIONS PLAN.
6. GENERAL.
7. OPERATIONAL RESTRICTIONS.
8. AIRSPACE CONTROL ORDER.

1. RANGE TIMES/MODE 3:
RANGE RESTRICTIONS: ALL TIMES ARE ZULU MODE 3:
CHARACTERS THREE AND FOUR (XX) ARE YOUR CALL SIGN NUMBER.
A. CAL: 1445-1800
B. RANGE 71 OPEN: 1500-1800
C. RANGE 76 OPEN: 1510-1800
ETC...

2. MISSION COMMANDERS:

MISSION	MSN UNIT	ROOM	PHONE
A29131	INT 31FW	56	22104
A29242	CAS 354FW	51	22103
A29151	OCA 33FW	45	27094

3. LIVE ORDNANCE/AIRLIFT SCHEDULE:

MSN	A/C	TARGET	TOT	ORD	BACKUP TOT
A29391	C-130	POKER DZ	1645-1730	T-BUNDLES	TBD
A29341	A-10	75-8	1642-1647	L8817	TBD

4. IFF/SIF: ALL AIRCRAFT WILL SQUAWK ROTATING MODE 1 FOR FRIENDLY ID CODES WILL BE CHANGED EVERY TWO HOURS PLUS/MINUS ONE MINUTE. ALL AIRCRAFT WILL SQUAWK THE SAME MODE 2 AS THE ASSIGNED MODE 3 IF CAPABLE.
1500 32
1700

5. COMMUNICATION PLAN:
REFER TO AIRCREW AID: DAY 03
BLACKJACK: 377.8
SHOWTIME: 312.8
AAR RENDEZVOUS: 276.4
GCI SAFETY: 308.6
JRCC: 288.0

Figure G-5. ATO SPINS

G-41. The ACO and ATO cycles interrelate. Whatever publication and distribution means are used, it is critical to mission success that the airspace users receive pertinent airspace information as early in the planning cycle as possible.

SECTION V – UNITED STATES MESSAGE TEXT FORMAT

G-42. USMTF is the joint standard for message-based information exchange. The efficient and effective employment of U.S. forces in joint and combined operations is contingent on efficient and effective communication. USMTF facilitates communications efficiency by standardizing message formats, data elements, and information exchange procedures.

G-43. Presently, two instructional USMTF courses are offered to user organizations. Instruction is provided on the currently implemented USMTF Standard using the defense information infrastructure communication message processor (CMP). Certified by the Joint Interoperability Test Center (JITC), CMP replaces all past versions of MTF message editors and supports both legacy and Defense Message System (DMS) organizational message requirements. Attendance at both courses is unit-funded. The FORSCOM e-mail is USMTF@forscom.army.mil.

- USMTF Automated Course (JT-105) (8 Hours) trains administrative support personnel and staff officers/NCOs who compose USMTF reports/messages using microcomputers. This course is procedures oriented and includes practical applications and hands-on software training.
- USMTF Managers Course (JT-205) (24 hours/3 days) is designed for personnel at joint commands who have been designated to implement a new USMTF program or direct a program already underway. The goal of the manager's course is to develop a cadre of trained personnel at the activity who will be responsible for providing MTF training for the command. This course is a "train-the-trainer" program.

Appendix H

Unmanned Aerial Vehicle Considerations

SECTION I – PURPOSE

INTRODUCTION

H-1. UAVs operate anywhere on the battlefield to include forward of the FLOT. They can operate at night and in limited adverse weather conditions when equipped with the proper sensors. UAVs are an excellent intelligence asset that provides the commander with near-real-time reconnaissance and battlefield surveillance without major risk to personnel. They also give commanders a dedicated, rapidly taskable asset that can look wide as well as deep. During a mission, new targets may arise and the commander can redirect a UAV to a different mission or area in real time. Some models also can conduct operations other than reconnaissance such as laser designation and attack.

TACTICAL LOCATION OF ARMY UNMANNED AERIAL VEHICLES

H-2. UAV platoons can launch UAVs from either improved or unimproved airstrips. Locating the platoon with the aviation brigade generally improves coordination because the UAV section has immediate access to AD status, threat graphics, and weather data. UAV elements can operate in single or split-site configurations.

SINGLE-SITE OPERATIONS

H-3. Single-site operations facilitate command, control, communications (C^3), and logistics support. However, adding the UAV element to a brigade TOC creates a greater electronic and physical signature.

SPLIT-SITE OPERATIONS

H-4. In split-site operations, the UAV element is split into two distinct sites: the mission planning and control site (MPCS) and the launch and recovery (L/R) site.

Mission Planning and Control Site

H-5. The MPCS consists of a ground control station (GCS) along with associated personnel and supporting equipment. It is normally located with the supported unit. The MPCS receives the mission, plans and controls the airborne UAV, and reports information.

Launch and Recovery Site

H-6. The L/R site consists of the UAVs, maintenance equipment, and GSE and associated personnel. The L/R site receives the mission plan from the MPCS. It prepares, launches, and recovers the UAVs. When selecting the site for the L/R, the following must be considered (Figure H-1):

- Required LOS between the ground terminals and UAVs.
- Avoidance of high-population areas with power lines.
- Proximity of L/R site to forward element to effectively coordinate, hand off, and receive control of the UAV.

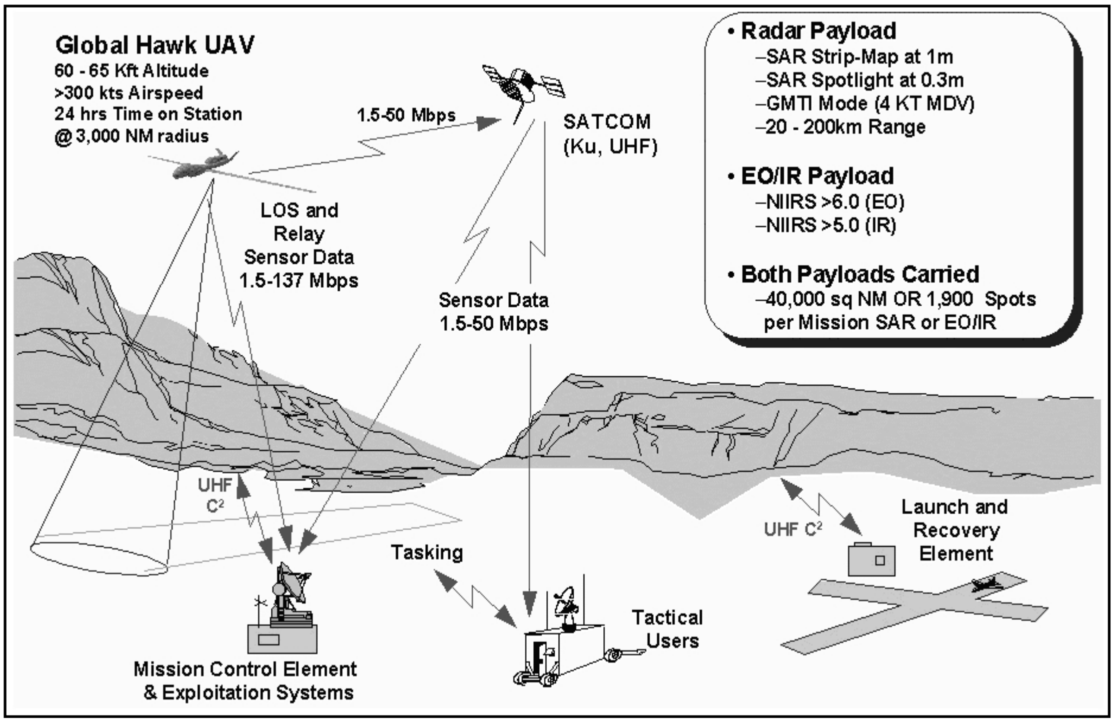


Figure H-1. Split-Site Concept

EMPLOYMENT

H-7. The UAV provides near-real-time reconnaissance, surveillance, and target acquisition (RSTA). It may be employed forward of the FLOT, on the flanks, or in rear areas. When employed together, UAVs and aeroscouts provide excellent reconnaissance resolution. The commander also may use UAVs to determine the best locations to employ air reconnaissance assets or to observe selected areas, thus freeing aeroscouts to focus efforts where contact is most likely. UAVs can be fitted with laser designators that can mark targets. They can also be armed. The commander can also employ UAVs to—

- Support in a separate economy-of-force mode or in teamed arrangements with manned aircraft.
- Support target acquisition efforts and lethal attacks on enemy reconnaissance and advance forces.

- Assist in route, area, and zone reconnaissance.
- Locate and help determine enemy force composition, disposition, and activity.
- Maintain contact with enemy forces from initial contact through battle damage assessment.
- Provide target coordinates with enough accuracy to enable immediate target handover, as well as first-round fire-for-effect engagements at artillery's maximum effective range.
- Transfer combat information by relaying voice and data transmissions from aircraft and ground vehicles to the brigade and division TOCs.

CAPABILITIES

H-8. UAVs equipped with day television or IR sensor packages can reconnoiter air routes, LZs, and objectives before and during all types of tactical operations. UAVs may precede any element, to include vehicle or aircraft security elements, to provide early warning, reaction time, or target servicing. Current capabilities allow the UAV to distinguish between different types of vehicles at about 6,000 feet above ground level (AGL) and to detect vehicles at altitudes as high as 32,000 feet AGL.

RISK REDUCTION

H-9. The UAV provides an airborne targeting and surveillance asset that does not expose personnel to risk. UAVs of other services provide additional support. Those UAVs will sometimes have greater range, altitude, and endurance capabilities.

SYSTEM INTEGRATION

H-10. The Tactical Control System (TCS) (software, hardware, and extra ground support hardware) is the data link through which UAVs interface with the JSTARS and other joint and combined systems.

DETECTION

H-11. Currently, tactical UAVs are extremely difficult for enemy AD systems to detect and engage. Enemy radars are designed to detect much faster moving aircraft and tend to skip over these slow-flying platforms. If detected, the composite airframes provide very small radar cross sections. IR-guided surface-to-air missile (SAM) systems have difficulty getting a positive lock on the small power plants and, in most cases, cannot engage them. The low visual and acoustic signatures of UAVs make them an attractive platform for stealth reconnaissance. Tactical UAVs have less than a 10-percent chance of detection by the unaided human eye when operating as low as 3,000 feet AGL.

SPECIAL CONSIDERATIONS

H-12. Even UAVs with degraded mission packages can disrupt enemy operations. Enemy concerns about UAV activity cause frequent movement and tend to lead to increased radio traffic from which intelligence data can be generated. Frequent movement disrupts the enemy force's ability to conduct coordinated operations, strains its logistical system, and degrades its physical and mental endurance.

LIMITATIONS

H-13. The UAV is less effective in locating enemy forces that are well covered or concealed. Tactical UAVs are not well suited for wide area searches; rather, their capabilities are enhanced when they are employed as part of an overall collection plan. Like manned aircraft, they are vulnerable to enemy AD systems and they have weather restrictions.

OPERATIONS

H-14. The UAV provides an airborne targeting, surveillance, and retransmission asset that does not expose personnel to risk. UAV employment may include teaming with aviation combat platforms.

INTELLIGENCE, SURVEILLANCE AND RECONNAISSANCE

H-15. The capabilities of the UAV expand the planning horizon for the S2 and S3. Conversely, there is the potential for overreliance on the UAV at the expense of other collection assets. This overreliance can result in an ISR plan that is neither comprehensive nor integrated. Traditional intelligence-gathering assets require as much attention as high-technology equipment. Both should be focused on the CCIR.

INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE EXECUTION

H-16. UAVs contribute to the overall ISR effort. The range and endurance of UAVs provide commanders with a bird's-eye perspective where and when they need it, without risking manned aircraft. UAVs can fly deep into the AO and are flexible enough to be quickly retasked to provide timely information on other areas. While RSTA is a primary mission, UAVs also provide substantial support to intelligence collection in support of the IPB effort and BDA.

NONLINEAR BATTLEFIELD

H-17. A nonlinear, expanded battlefield may routinely create gaps between friendly units. Reconnaissance of these gaps is an excellent mission for the UAV.

COORDINATED UNMANNED AERIAL VEHICLE/AVIATION RECONNAISSANCE OPERATIONS

H-18. When employed together, UAVs and air cavalry units provide excellent reconnaissance resolution. The commander also may use UAV data to determine the best locations to employ air reconnaissance assets. In either case, UAV support greatly reduces the mission load of the aeroscouts. Without UAV support, extended operations may require commanders to rotate aircraft or plan rest and resupply operations to maintain a continuous, limited reconnaissance effort. Frequent aviation training with UAVs maximizes the capabilities of this reconnaissance team and assists the commander in selecting the best method of employment for different tactical situations.

H-19. Reconnaissance forces performing security operations generally straddle the lines between decisive and shaping operations. The RSTA capabilities of UAVs make them ideal to support reconnaissance and security missions. Locating enemy air defense systems is a critical mission for UAVs. They can warn of both the presence and location of HPTs. They can jam acquisition and tracking emissions but otherwise remain in the passive mode. UAVs can cue forces during screen, guard, and cover missions. Likewise, during economy of force missions, the UAV's communications relay capabilities can alert dispersed forces to mass their effects on a particular enemy force. UAVs can perform all of the basic tasks of the screen except clearing an area, thus freeing the helicopters for higher priority actions within the covering force mission.

SECTION II – UNMANNED AERIAL VEHICLE DESCRIPTIONS

GENERAL

H-20. This section provides general characteristics and capabilities of currently fielded and developmental models. UAVs generally are categorized as *tactical* or *endurance*, based on capable range.

TACTICAL UNMANNED AERIAL VEHICLE

H-21. Tactical UAVs have an operational capability out to 200 kilometers.

SHADOW 200 UNMANNED AERIAL VEHICLE (UNDER DEVELOPMENT)

H-22. The Shadow 200 UAV is an Army system that provides commanders at the brigade level with near-real-time RSTA capabilities. The electro-optical/IR (EO/IR) payload will be a multimode, forward looking infrared television (FLIR/TV) sensor with enough resolution to detect and recognize an APC-sized target from operational altitudes (greater than 8,000 feet AGL during the day and greater than 6,000 feet AGL at night) and at survivable standoff ranges (3 to 5 kilometers). Imagery will be preprocessed on board and passed to the GCS. The payload will be capable of autonomous preplanned operation and instantaneous retasking throughout a mission. The EO/IR payload will provide continuous zoom capabilities in EO mode and multiple fields of view (FOVs) in the IR mode. The Army is also considering use of the Shadow for EW missions such as electronic target location, communications intercept, and jamming. The system contains the following subsystems:

- Three air vehicles (wing-12.75 feet, length-11.17 feet, height-3.3 feet, takeoff weight-328 pounds).
- Two GCSs.
- One portable control station.
- Launch and recovery equipment (hydraulic launcher, arresting gear, and automatic landing system).
- Ground and logistics support equipment.

H-23. Key operational factors are the following:

- Has an EO and IR sensor.
- Deploys via two C-130 sorties.
- Attains a maximum altitude of 15,000 feet.
- Has an operational radius of 50 or more kilometers.
- Maintains a cruise/loiter speed of 60 to 85 knots true airspeed (KTAS), maximum 225 KTAS.
- Requires rail launch (100 meters area) with arrested recovery (100 meters).
- Has operation endurance of more than five hours.

PIONEER UNMANNED AERIAL VEHICLE

H-24. The Pioneer UAV is a Navy system that provides imagery intelligence (IMINT) for tactical commanders. It is employed as a system and requires rocket-assisted takeoff (RATO) and an 800-meter runway with arresting gear for takeoff and landing. This system contains the following subsystems:

- Five air vehicles (wing-17 feet, length-14 feet, height-3.3 feet, takeoff weight-452 pounds).
- Nine payloads (five day cameras, four IR).
- One ground control shelter.
- One portable control shelter.
- Four remote receiving systems.
- GSE.

H-25. Key operational factors are the following:

- Has an EO and IR sensor.
- Deploys via two C-141s or five C-130 sorties.
- Attains a maximum altitude of 15,000 feet.
- Has an operational radius of 185 kilometers.
- Maintains a cruise and loiter speed of 65 KTAS, 95 KTAS maximum.
- Has operation endurance of five hours.

HUNTER UNMANNED AERIAL VEHICLE

H-26. The Hunter UAV is the only UAV currently in the Army inventory. It provides near-real-time IMINT within a 200-kilometer radius, expandable to 300 kilometers by using another Hunter as an airborne relay. The Hunter UAV supports ground tactical forces commanders from a 200-meter unimproved runway and is employed as a system. This system contains the following subsystems:

- Eight air vehicles (wing-29.2 feet, length-23 feet, height-5.4 feet, takeoff weight-1,600 pounds).
- Four remote video terminals.
- Three ground control/mission planning stations.
- Two ground data terminals.
- One launch recovery system.

- One mobile maintenance facility.

H-27. Key operational factors are the following:

- Has an EO and IR sensor.
- Can be equipped with a laser designator.
- Deploys via 16 C-130 sorties.
- Has a maximum altitude of 15,000 feet.
- Has an operational radius of 267 kilometers.
- Cruises at up to 90 KTAS and loiters at 60 to 75 KTAS, 110 KTAS maximum.
- Has operation endurance of 12 hours.

ENDURANCE UNMANNED AERIAL VEHICLES

H-28. Endurance UAVs are defined as any vehicle that can operate beyond 200 kilometers.

PREDATOR UNMANNED AERIAL VEHICLE (MEDIUM ALTITUDE)

H-29. The Predator UAV is an Air Force system that provides long-range, time on station, and near-real-time IMINT to Joint Task Force (JTF) and theater commanders. The Predator is unique in its ability to collect full-rate video imagery and transmit information via SATCOM or LOS. The Predator's key roles include observing known targets, escorting convoys, monitoring enemy movements, and providing BDA information. The Predator is most effective when observing known targets, rather than searching over extended areas. Its low airspeed makes it ideal for loitering and is lower than most enemy radars are programmed to detect. It can operate in adverse weather conditions. The Predator requires an 800-meter runway for takeoff. This system contains the following:

- Four air vehicles (wing-48.7 feet, length-26.7 feet, height-7.3 feet, takeoff weight-2,300 pounds).
- One GCS.
- One Trojan Spirit II Dissemination System.
- GSE.

H-30. The Predator can be fitted with a Hellfire missile under each wing. Other key operational factors are the following:

- Has a synthetic aperture radar and an EO and IR sensor.
- Can be equipped as a laser designator.
- Deploys via five C-130 or two C-141 sorties.
- Attains a maximum altitude of 25,000 feet.
- Has an operational radius of 925 kilometers.
- Maintains a cruise speed of 65 KTAS, 110 KTAS maximum.
- Has operation endurance greater than 20 hours.

GLOBAL HAWK UNMANNED AERIAL VEHICLE (HIGH ALTITUDE)

H-31. The Global Hawk UAV is an Air Force system. It provides long-range, time on station, and wide area surveillance for theater commanders. The system will be able to survey, in one day, an area equivalent to the State of Illinois (40,000 square miles), while providing imagery with a three-foot resolution. The large radius gives the commanders much flexibility in choosing an operating location, to include out-of-theater operations. This UAV can perform persistent tracking of critical targets, loitering over the target area for more than 24 hours and providing high-quality images in all weather conditions. It is employed in low-to-moderate risk areas to look into high-threat areas. The Global Hawk has a conventional aircraft design that is easily visible on radar screens; therefore, survivability is derived from its very high operating altitude and self-defense measures. It is equipped with a threat warning receiver and a threat deception system, which includes onboard radar jammers and expendable decoys. Differential GPS and advanced control technology will allow the UAV to be virtually autonomous, handling take-offs on its own. It communicates through SATCOM and LOS. It requires a 5,000-foot runway for takeoff. The dimensions of this UAV are the following:

- Wing-116.2 feet.
- Length-44.4 feet.
- Height-15.2 feet.
- Takeoff weight-25,600 pounds.

H-32. Key operational factors are the following:

- Has a SAR and an EO and IR sensor.
- Is self-deployable.
- Requires multiple C-141, C-17, or C-5 sorties for GSE.
- Attains a maximum altitude of 65,000 feet.
- Has an operational radius of 5,500 kilometers.
- Maintains a cruise speed of 350 knots.
- Has operation endurance greater than 40 hours.

Appendix I

Aircraft Characteristics

This appendix provides an overview of the basic characteristics and capabilities of aircraft organic to the various aviation brigades—or that may be available in an aviation task force organization.

SECTION I – OH-58D KIOWA WARRIOR

I-1. The primary missions of this aircraft are armed reconnaissance and light attack. The OH-58D discussed herein is the version addressed with affectivity code "R" in TM 1-1520-248-10.

DESCRIPTION

I-2. The OH-58D is a single-engine, dual-seat, armed observation aircraft. It has an improved master controller processing unit (IMCPU) system that provides highly integrated communication, navigation, aircraft, and mission equipment subsystems. The VIXL can store compressed images in memory and enables transmission of video images between aircraft. The mast-mounted sight contains a suite of sensors that include a high-resolution television camera, IR thermal imaging, a laser rangefinder, and a laser designator. It is also equipped with a videotape recorder.

SPECIFICATIONS

I-3. Table I-1 outlines OH-58D aircraft specifications.

Table I-1. OH-58D Specifications

Length	41'2.4"
Height	12'10.6"
Fuselage width (with weapons pylons)	9'2"
Main rotor diameter	35'
Maximum gross weight	5,500 pounds (5,200 pounds by Interim Statement of Airworthiness Qualification (ISAQ).
Cruise airspeed	100 knots (varies with environmental/mission conditions)
Combat radius	120 kilometers (varies with environmental/mission conditions)

CAPABILITIES

I-4. The OH-58D provides the following:

- Day, night, battlefield obscurant, and limited adverse-weather fighting capabilities.

- Data transfer system that permits upload from AMPS data transfer cartridge and download of selected postmission data.
- Countermeasure suite of IR jammers, radar warning receivers, and laser warning detectors.
- Moving map display.
- Video recording and cockpit playback of television and thermal imagery from the mission.
- Advanced navigation and mission planning equipment; transportable in the C-130, C-141, C-5, and C-17.

ARMAMENT SYSTEMS

I-5. The OH-58D armament capabilities consist of a .50-caliber machine gun, 2.75-inch rockets, Hellfire missiles, and air-to-air missiles. These systems are mounted on two universal weapons pylons. The aircraft has a laser rangefinder/designator used to designate for the weapons system as well as provide range-to-target information for onboard weapons systems.

.50-CALIBER MACHINE GUN

I-6. This electronically controlled weapon can be mounted in a fixed position on the left weapons pylon. It is a point system with a maximum effective range of 2,000 meters. It may be fired in the continuous mode (up to 150 rounds with a one-minute cooling period) or in one-second bursts of 12 to 14 rounds. Ammunition capacity is 500 rounds.

2.75-INCH ROCKET SYSTEM

I-7. The OH-58D can carry two seven-shot rocket pods for a maximum load of 14 rockets for use against enemy personnel, light armored vehicles, and other soft-skinned targets. This area system can launch multiple rockets with various warhead mixes to include high explosive, high-explosive multipurpose submunitions, white phosphorous, illumination, and flechette. The maximum range is 9,000 meters, with the most effective range being 3,000 to 5,000 meters.

HELLFIRE MISSILE

I-8. The SAL Hellfire is used primarily for the destruction of tanks, armored vehicles, and other hard-material targets. The OH-58D can carry two two-missile launchers for a maximum of four missiles. However, weight restrictions usually restrict the aircraft to just one launcher. The minimum engagement range is 500 meters; the maximum range is 8,000 meters. Laser designation may be autonomous or remote.

AIR-TO-AIR STINGER MISSILE SYSTEM

I-9. The ATAS is an IR, heat-seeking, fire-and-forget missile, capable of engaging airborne targets day or night. The OH-58D can carry two Stinger missiles per pylon for a maximum of four missiles. The maximum range is more than 4,000 meters.

ARMAMENT CONFIGURATIONS

I-10. Figure I-1 illustrates an example of mission load configurations. Only one system at a time may be mounted per side.

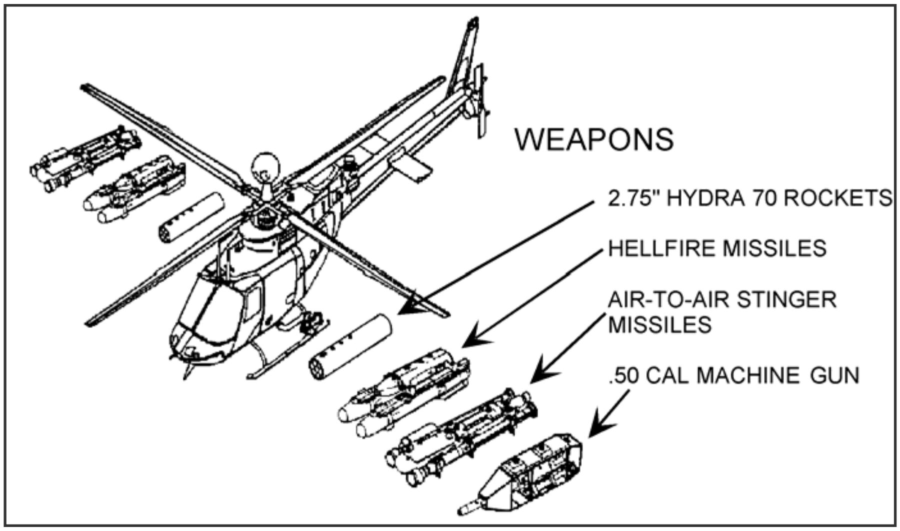


Figure I-1. OH-58D Weapons Loading

COMMUNICATIONS

I-11. The OH-58D has the following communications systems:

- Up to three AN/ARC-186 provide VHF-FM 1 (30- to 87.975-megahertz) and FM 2 (if installed) and VHF-AM (116- to 151.975-megahertz) secure communication when employed with KY-58.
- The AN/ARC-164 Have Quick II provides antijam frequency-hopping UHF-AM communications in the 225- to 399.975-megahertz range in 25-kilohertz intervals.
- The OH-58D may have the AN/ARC-201 SINCGARS, which requires KY-58 interface for secure communications, or 201D SINCGARS with embedded encryption and data capability; both operate in the 30- to 87.975-megahertz frequency range and have antijam, frequency-hopping capability.
- The IDM transfers digital messages.
- The KY-58 provides secure communications for SINCGARS, Have Quick II, and VHF-AM/FM radios.

NAVIGATION SYSTEM

I-12. The Embedded Global Positioning System Inertial Navigation System (EGI) is a self-contained, all-attitude navigation system that works with the radar altimeter and laser rangefinder/designator. Its embedded GPS receiver (EGR) supports the pure GPS and blended GPS/Inertial Navigation System (INS) solutions. The system is capable of storing waypoint and target information for making flight plan routes and changing these routes as a mission may change. EGI also provides target location in longitude and latitude or military grid reference system (MGRS) coordinates and altitude in meters or feet above mean sea level (MSL) when range, bearing, and declination to the target are provided to the navigation subsystem for the mast mounted sight.

AIRCRAFT SURVIVABILITY EQUIPMENT

I-13. Appendix J addresses the OH-58D ASE.

LIMITATIONS

I-14. The following are limitations of the OH-58D:

- **IR Crossover.** The thermal imaging sensor operates by determining temperature differentials; when targets and their surroundings reach the same temperature, target detection degrades.
- **Obscurants.** Some obscurants (such as dust, rain, haze, or smoke) can keep laser energy from reaching the target and can hide the target from the incoming munitions seeker.
- **Low Cloud Ceilings.** Consideration must be given to cloud ceilings to determine maximum employment range of the SAL Hellfire. Depending on the distance to target, trajectory mode selected, and lasing techniques, the missile may climb into low cloud ceilings, causing the seeker to break track from the laser spot or preventing the seeker from acquiring the laser spot.
- **Hellfire Remote Designation Constraints.** The designating crew may offset a maximum of 60 degrees from the gun-to-target line and must not position its aircraft within a +30-degree safety fan from the firing aircraft.
- **IMC.** The Kiowa Warrior is not certified for instrument flight rules (IFR) operations.

SECTION II – AH-64A APACHE

I-15. The AH-64A is a highly stable aerial weapons-delivery platform. Its primary mission is to destroy HVTs. It can fight close and deep to destroy, attrite, disrupt, or delay enemy forces. Armed reconnaissance and security are secondary missions.

DESCRIPTION

I-16. The AH-64A is a twin-engine, tandem-seat, aerial weapons platform. It is equipped with a target acquisition designation sight (TADS), laser range finder/designator (LRF/D), and a pilot night vision sensor (PNVS) that allow the two-man crew to navigate and attack at night and in adverse weather conditions at extended standoff ranges. The Apache has a full range of aircraft survivability equipment and can withstand hits from rounds as large 23 millimeters in critical areas.

SPECIFICATIONS

I-17. Section III contains aircraft specifications and comparison to AH-64D specifications.

CAPABILITIES

I-18. The AH-64A provides the following:

- Precision attacks during the day, at night, or in adverse weather or when the battlefield is obscured.
- Wide array of firepower options.
- Robust suite of electronic warfare systems.
- Lethal suppression of enemy air defenses.
- Data transfer system to upload from the AMPS data transfer cartridge and download postmission data.

AH-64A ARMAMENT SYSTEMS

I-19. The AH-64A Apache can carry up to 16 Hellfire laser-designated missiles. Hellfire is used primarily to destroy tanks, armored vehicles, and other hard targets. The Apache can also deliver 76 2.75-inch folding fin aerial rockets for use against enemy personnel, light armor vehicles and other soft-skinned targets. The 1,200 rounds of ammunition for its area weapons system 30-millimeter automatic gun round out the Apache's arsenal.

30-MILLIMETER CHAIN GUN

I-20. The M230E1 is a chain-driven area weapons system mounted to a hydraulically driven turret, under the helicopter forward fuselage. It fires the U.S. M789 NATO standard ammunition high explosive dual-purpose (HEDP) round. Each shell contains 21.5 grams of explosive charge sealed in a shaped-charge liner. It is capable of penetrating more than 2 inches of armor at 2,500 meters and produces antipersonnel effects within a 4-meter radius. At typical engagement ranges, HEDP ammunition will defeat BMP-type targets. The AH-64A can carry 1,200 rounds of 30-millimeter ammunition. It has a rate of fire of 600 to 650 rounds per minute, with a maximum effective range of about 1,500 meters against point targets and 3,000 meters against area targets.

2.75-INCH ROCKET SYSTEM

I-21. The family of 2.75-inch unguided rockets includes M260/M261 light weight launchers (LWL), MK66 rocket motor, and several warhead and fuze combinations. Warheads can be categorized into two areas. Unitary warheads are fitted with impact-detonating warheads. Cargo warheads, with airburst range settable or fixed standoff fuses, use the wall-in-space concept. This concept provides a large increase in effectiveness and virtually eliminates range-to-target errors caused by variations in launcher/helicopter pitch angles during launch. The Apache can carry a maximum of 76 aerial rockets for use against enemy personnel, light armored vehicles, and other soft-skinned targets. The system is capable of launching multiple rockets with various warhead mixes to include high explosive; high-explosive, multipurpose submunitions; white phosphorous; illumination; and flechette. The maximum fire control computer (FCC) computed range solution is 7,500 meters.

HELLFIRE MISSILE

I-22. The Hellfire is used primarily to destroy tanks, armored vehicles, and other hard-material targets. The AH-64A is capable of firing only the SAL Hellfire missile. SAL missiles can defeat any known armor. The minimum engagement range is 500 meters, and the maximum range is 8,000 meters. The maximum aircraft load is 16 missiles. Laser target designation may be autonomous or remote.

MISSION CONFIGURATIONS

I-23. Table I-2 shows AH-64A mission profiles and typical ammunition loads.

Table I-2. AH-64A Mission Profiles/Typical Loads

Mission	Hellfire	30mm	Hydra 2.75
Attack	16	1,200	
Movement to Contact	8	1,200	38
Screen	8	1,200	19

COMMUNICATIONS

I-24. The AH-64A has the following communications systems:

- Radio set AN/ARC-186(V) is a VHF-FM/AM transceiver that provides clear and secure voice communication capability at frequencies in the VHF-AM and -FM bands.
- The AN/ARC-164 Have Quick II system is a UHF-AM radio transmitter-receiver set that provides an antijam, frequency-hopping capability.
- The AN/ARC-201D is an airborne VHF-FM transceiver and part of the SINCGARS family of radios; it has an antijam, frequency-hopping mode of operation. The radio set provides secure or plain voice communications over the frequency range of 30- to 87.975-megahertz at 25-kilohertz intervals. When used with the TSEC/KY-58 voice security system, the radio set can transmit and receive clear voice or cipher-mode communications.
- The AN/ARC-220 HF radio provides NOE long-range communications in the 2- to 29.999-megahertz range and secure mode when employed with the KY-100.
- The TSEC/KY-100 provides secure communications for the AN/ARC-220 HF radio.
- The TSEC/KY-58 interfaces with the AN/ARC-186 and AN/ARC-201 radios to provide secure voice for these radios.

NAVIGATION SYSTEMS

I-25. The navigation systems of the AH-64A are divided into two major groupings: stand-alone radio NAVAIDs—a nonintegrated navigation system—and an integrated navigation system. The stand-alone aids consist of the AN/ARN-89 or the AN/ARN-149(V)3 automatic direction finder (ADF) sets. The integrated navigation system consists of the EGI unit, the air data sensor subsystem (ADSS), the heading and attitude reference system (HARS), the AN/ASN-137 DNS, the IP-1552G computer display unit (CDU), and the navigation software module in the FCC.

AIRCRAFT SURVIVABILITY EQUIPMENT

I-26. Appendix J addresses the AH-64A ASE.

LIMITATIONS

I-27. The following are limitations of the AH-64A:

- **Threat Identification.** Threat identification through the FLIR system is extremely difficult; although the crew can easily find the heat signature of a vehicle, it may not be able to determine whether it is friend or foe.
- **IR Crossover.** The thermal imaging sensor and PNVS operate by determining temperature differentials. When targets and their surroundings reach the same temperature (normally twice a day), target detection is degraded; these conditions also make flight while using the FLIR sensor difficult.
- **Obscurants.** Some obscurants (such as dust, rain, haze, or smoke) can prevent laser energy from reaching the target and can hide the target from the incoming munitions seeker for SAL Hellfire and prevent effective use of FLIR systems.
- **Low Cloud Ceilings.** Consideration must be given to cloud ceilings to determine maximum employment range of the SAL Hellfire. Depending on the range to target, trajectory mode selected, and lasing techniques, the missile may climb into low cloud ceilings, causing the seeker to break track from the laser spot or preventing the seeker from acquiring the laser spot.
- **SAL Hellfire Remote Designation Constraints.** The designating crew may offset a maximum of 60 degrees from the gun-to-target line and must not position its aircraft within a +30-degree safety fan from the firing aircraft.

SECTION III – AH-64D APACHE LONGBOW

I-28. The AH-64D is a highly stable aerial weapons-delivery platform. Its primary mission is attack. It can fight close and deep to destroy, attrite, disrupt, or delay enemy forces. Armed reconnaissance and security are secondary missions.

DESCRIPTION

I-29. The AH-64D is a remanufactured AH-64A (Section II of this appendix). Its improved navigation system integrates dual INS/GPS and Doppler radar for acceleration cueing. Some D models are equipped with a millimeter wave FCR that allows the helicopter to identify, classify, prioritize, and track targets out to the maximum range of the Hellfire weapon system. (See Table I-3 below.)

WITH RADAR

I-30. Apaches equipped with the Longbow system are denoted as either AH-64D with radar, AH-64D Longbow, or LBA. The LBA helicopter is equipped with FCR, radar frequency interferometer (RFI), and upgraded 701C engines to compensate for the additional weight of the Longbow system. The Longbow system is integrated with the TADS to allow simultaneous and autonomous operation of the TADS and the FCR.

WITHOUT RADAR

I-31. The AH-64D without radar includes all of the above LBA aircraft upgrades except the FCR and the RFI system and their associated black boxes. The aircraft may not have the improved 701C engine installed. The AH-64D without radar can be converted to an AH-64D with radar, with the installation of the Longbow system and 701C engines. The AH-64D without radar can fire the RF Hellfire missile autonomously (with LOS to the target) or by using FCR targeting data handed over from an AH-64D with radar.

SPECIFICATIONS

I-32. Table I-3 compares AH-64A/D specifications.

Table I-3. Comparison of Apache Specifications

Model	AH-64A	AH-64D w/o Radar	AH-64D Longbow
Length (feet)	57.67	57.67	57.67
Height (feet)	15.25	13.33	16.08
Width (feet)	17.17	15.50	15.05
Main Rotor Span (feet)	48	48	48
Max Gross Weight (pounds)	21,000	23,000	23,000
Cruise Speed (knots)	120*	130*	30*
Combat Radius (km)	200*	200	200
Combat Radius With One 230-Gallon Aux Fuel Tank (km)	350*	350*	350*
Self-Deployability	Yes	Yes	Yes
* Varies with a multitude of factors such as temperature, wind, gross weight, and mission-specific time requirements.			

CAPABILITIES

I-33. The AH-64D provides the following:

- Precision attacks during day or night, in adverse weather, or when the battlefield is obscured (Longbow).
- Wide array of firepower options.
- Detection, classification, and prioritization of stationary and moving ground and airborne targets (Longbow).
- Robust suite of electronic warfare systems.
- Lethal destruction of enemy air defenses (DEAD).
- Real-time SA and intelligence of the battlefield to the digitized aviation/ground commander; data transfer system to upload from the AMPS data-transfer cartridge and download postmission data.
- High-frequency radio for NOE long-distance NLOS communications.

ARMAMENT SYSTEMS

I-34. The Longbow system enhances the rapid employment of all available weapons including Hellfire missiles, air-to-air missiles (future capability), aerial rocket system, and the 30-millimeter cannon. Once the FCR detects, classifies, and prioritizes targets, the gunner selects the desired weapon for the attack and the data is automatically transferred to the weapon and displayed on the selected weapon sight.

30-MILLIMETER CHAIN GUN

I-35. The M230E1 is a chain-driven area weapons system mounted to a hydraulically driven turret, under the helicopter forward fuselage. It fires the U.S. M789 NATO standard ammunition HEDP round. Each shell contains 21.5 grams of explosive charge sealed in a shaped-charge liner. It can penetrate more than 2 inches of armor at 2,500 meters and produces antipersonnel effects within a 4-meter radius. At typical engagement ranges, HEDP ammunition will defeat BMP-type targets. The AH-64D can carry 1,200 rounds of 30-millimeter ammunition. It has a rate of fire of 600 to 650 rounds per minute, with a maximum effective range of about 1,500 meters against point targets and 3,000 meters against area targets. The gunner selects the desired weapon for the attack, and the data is automatically transferred to the weapon and displayed on the selected weapon sight.

2.75-INCH ROCKET SYSTEM

I-36. The AH-64D can carry a maximum of 76 folding-fin aerial rockets for use against enemy personnel, light armored vehicles, and other soft-skinned targets. The system can launch multiple rockets with various warhead mixes to include high explosive; high-explosive, multipurpose submunitions; white phosphorous; illumination; and flechette. Aircrews can select the quantity and type to be fired. The maximum range is 9,000 meters, with the most effective range being 3,000 to 5,000 meters.

HELLFIRE MISSILE

I-37. The Hellfire is used primarily for the destruction of tanks, armored vehicles, and other hard material targets. The AH-64D retains the capability to fire SAL Hellfire. Hellfire missiles (SAL and RF) can defeat any known armor. The minimum engagement range is 500 meters, and the maximum range is 8,000 meters. The maximum aircraft load is 16 missiles.

SEMIACTIVE LASER HELLFIRE

I-38. Laser target designation may be autonomous or remote.

LONGBOW RADAR FREQUENCY HELLFIRE

I-39. This millimeter wave guided missile is a true fire-and-forget weapon. The millimeter wave radar and missile can engage targets through weather and battlefield obscurants. The RF missile receives targeting information—to include north, east, and down data—from the acquisition source: TADS, FCR, or another aircraft. Targeting data can be transferred from a Longbow to an AH-64D without radar as a radar frequency handover (RFHO).

MISSION CONFIGURATIONS

I-40. Table I-4 is a matrix of AH-64D mission profiles and typical ammunition loads (weight limits may require a reduction in mission loads).

Table I-4. AH-64D Mission Profiles/Typical Loads

Mission	Hellfire RF/SAL	30mm	Hydra 2.75-inch Rockets	Aux Tank
Attack	12/4	300		No
	12/4	300		Internal
	8/4	300		External
Movement to Contact	4/4	300	38	No
	4/4	300	38	Internal
	4/4	300	19	External
Screen	8/4	300	19	No
	8/4	300	19	Internal
	4/4	300	19	External

FIRE-CONTROL RADAR

I-41. The Longbow system consists of an integrated millimeter wave FCR, along with an RFI. The FCR enables LBA helicopters to detect, classify, prioritize, and engage targets with RF Hellfire missiles without visually acquiring the target. LBA crews may also employ the RF Hellfire missile during poor visibility when laser, optical, and FLIR sensors are degraded. The RFI can detect and identify radar systems and display targeting information on the same screen as the information from the FCR. The FCR will not identify friend or foe, other than AD weapons, which are identifiable by their distinctive radar signatures detected by the RFI system.

COMMUNICATIONS

I-42. The AH-64D has the following communication systems:

- The AN/ARC-186 (V) provides VHF-AM/FM communications in the frequency ranges of 30 to 87.975 megahertz and 116 to 151.975 megahertz; the radio is primarily for administrative communications with ATS but can function as an FM 3.
- The ARC-164 Have Quick II provides UHF communications and includes antijam, frequency-hopping capability; it is normally employed for internal air-to-air and air-to-TOC communications and for communicating with the air components of other services. When used with the KY-58, the radio provides secure communications.
- Two AN/ARC-201D radios provide VHF-FM secure communications in the 30- to 87.975-megahertz frequency range for communications internally and with ground units.
- The AN/ARC-220 HF provides high-frequency, NOE long-range communication with the AN/ARC-100 in the TOC and with other HF receivers.
- The IDM transfers digital messages.

NAVIGATION SYSTEMS

I-43. The navigation subsystem consists of the following major components:

- EGI (primary and backup).
- Doppler radar velocity sensor.
- Radar altimeter.
- ADF.
- High integrated air data computer.
- Flight management computer.

AIRCRAFT SURVIVABILITY EQUIPMENT

I-44. Appendix J addresses the AH-64D ASE.

LIMITATIONS

I-45. The following are limitations of the AH-64D:

- **Threat Identification.** Threat identification through the FLIR system is extremely difficult; although the crew can easily find the heat signature of a vehicle, it may not be able to determine whether it is friend or foe. In addition, the FCR will not identify friend or foe, other than radar air defense weapons, which are identifiable by their distinctive signatures detected by the RFI system.
- **IR Crossover.** The thermal imaging sensor and PNVS operate by determining temperature differentials; when targets and their surroundings reach the same temperature (normally twice a day), target detection is degraded. These conditions also make flight while using the FLIR sensor difficult.

- **Obscurants.** Some obscurants (such as dust, rain, haze, or smoke) can prevent laser energy from reaching the target and can hide the target from the incoming munitions seeker for SAL Hellfire and prevent effective use of FLIR systems; FCR and RF Hellfire see and shoot through obscurants.
- **Low Cloud Ceilings.** Consideration must be given to cloud ceilings to determine maximum employment range of the SAL Hellfire; depending on the range to target, trajectory mode selected and lasing techniques, the missile may climb into low cloud ceilings, causing the seeker to break track from the laser spot or preventing the seeker from acquiring the laser spot.
- **SAL Hellfire Remote Designation Constraints.** These constraints are identical to those of the AH-64A.
- **Instrument Flight Rules.** The AH-64D is not currently certified for IFR operations.

SECTION IV – UH-60A/L BLACK HAWK

I-46. The primary missions of this aircraft are air assault, air movement, C^2, casualty evacuation, and aerial delivery of mines. Other roles include CSAR, aircraft recovery, parachute operations, disaster relief, and fire fighting.

UH-60A/L DESCRIPTION

I-47. The UH-60A/L is a twin-engine, dual-seat, utility helicopter. The minimum required crew is a pilot and copilot. It is designed to carry 11 combat-loaded air assault troops (seats installed). It can move a 105-millimeter howitzer and 30 rounds of ammunition. The UH-60A/L is equipped with a full instrument package and is certified for instrument meteorological conditions as well as day and NVG operations. In addition to its basic configuration, the UH-60A/L includes kit installations that provide the capability for rescue hoist, extended-range fuel, and casualty evacuation operations. The UH-60L is powered by upgraded engines and has an improved durability gearbox.

SPECIFICATIONS

I-48. Table I-5 gives UH-60A/L aircraft specifications.

Table I-5. UH-60A/L Aircraft Specifications

Length	64'10" rotors turning, 41'4" rotors/pylons folded
Height	12'4" center hub, 16"10" tail rotor
Width	9'8.6" main landing gear, 14'4" stabilator
Width with ESSS installed	21'
Main rotor and tail rotor diameter	53'8" main rotor, 11' tail rotor at 20-degree angle
Cabin floor dimensions	Floor: 73" wide x 151" long
Cabin door dimensions	69" wide x 54.5" high
Maximum gross weight, UH-60A	20,250 pounds
Maximum gross weight, UH-60L	22,000 pounds
Maximum cargo hook load, UH-60A	8,000 pounds
Maximum cargo hook load, UH-60L	9,000 pounds
Cruise airspeed	130 knots (varies with environmental/mission conditions)
Combat radius	225 kilometers (varies with environmental/mission conditions)

CAPABILITIES

I-49. The UH-60A/L provides the following:

- Countermeasure suite of IR jammers, radar warning receivers, and laser-warning detectors.
- Data-transfer system to upload from the AMPS data-transfer cartridge and download postmission data.
- Internal transport of 11 combat-loaded troops with seats installed and 16 combat-loaded troops with seats removed.
- MEDEVAC of six litter patients.
- Self-deployable range of 558 NM with the ERFS, with 30-minute reserve.
- Transportable in the C-5 and C-17 aircraft.
- Shipboard compatibility for joint and combined operations.

ARMAMENT SUBSYSTEMS

I-50. The Black Hawk has provisions for door mounting of two M60D 7.62-millimeter machine guns. The subsystem is pintle-mounted in each gunner's window at the forward end of the cabin section. The two M60D 7.62-millimeter machine guns are free pointing but limited in traverse, elevation, and depression.

AIR VOLCANO

I-51. The air Volcano is a helicopter-mounted, automated, scatterable mine-delivery system that can deliver mines day or night. The system can dispense mines during day/night. The system can rapidly emplace a 278-meter, 557-meter, or 1,115- by 140-meter field at up to 960 mines (800 antitank and 160 antipersonnel) per sortie. The antitank density yields an 80 percent chance of encounter. Mines can be set to self destruct after 4 hours, 48 hours, or 15 days. FM 3-34.32 (FM 20-32) addresses Volcano operations.

LIMITATIONS

I-52. The air Volcano system has limitations:

- The UH-60 with air Volcano mounted, a full crew, and one system operator will be at high gross weight, which reduces range and maneuverability.
- Minefield emplacement is conducted at low airspeeds (80 knots or less), making the aircraft more vulnerable to detection and engagement.
- The crew cannot operate the M60D machine gun with the air Volcano installed.
- System installation requires about four hours.
- These systems require two five-ton cargo trucks for transport; it is an engineer responsibility to provide transportation assets to move these systems.

TYPES OF MINEFIELDS

I-53. Four types of minefields can by emplaced using Volcano—disrupt, fix, turn, and block. Figure I-2 illustrates emplacement techniques.

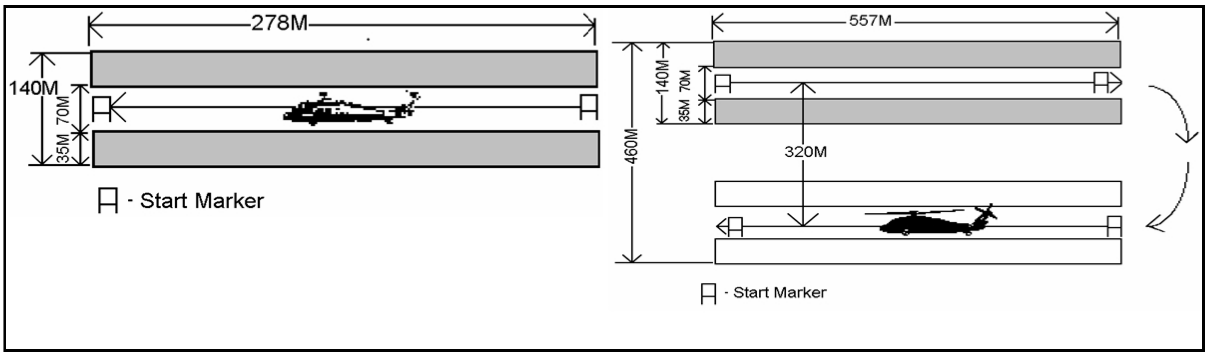


Figure I-2. Disrupt and Fix (Left), Turn and Block (Right)

COMMUNICATIONS

I-54. The UH-60D has the following communications systems:

- The AN/ARC-186 provides two-way voice communications in both the VHF-AM-FM ranges. It provides VHS-AM ATS communications, but it can function as an FM 2.
- The AN/ARC-164 (V) Have Quick II provides two-way voice communications in the UHF-AM frequency range of 225 to 399.975 megahertz; the sets provide an antijam frequency-hopping capability.
- The AN/ARC-201 (SINCGARS) is a VHS-FM antijam frequency-hopping radio, providing communications in the 30- to 87.975-megahertz frequency range at 25-kilohertz intervals.
- The AN/ARC-220 HF radio provides NOE, long-range communication with the AN/ARC-100 in the TOC and with other HF receivers.
- The TSEC/KY-58 interfaces with the ARC-186 (V), Have Quick, and SINCGARS radios to provide secure communications.

NAVIGATION SYSTEMS

I-55. The UH-60A/L has the following navigation systems:

- The ASN-128B Doppler/GPS navigation set provides present position or destination navigation information in latitude and longitude or MGRS coordinates.
- The AN/ARN-89 or AN/ARN-149 (V) provides automatic direction-finding capability for instrument navigation and approach.
- The AN/ARN-123 (V) or AN/ARN-147 (V) VOR/LOC/GS/MB receiving sets provide instrument navigation and approach.

HEADS-UP DISPLAY AN/AVS-7

I-56. The heads-up display (HUD) system serves as an aid to pilots using the AN/AVS-6 NVG by providing operational symbology information directly into the NVG. It always displays airspeed, altitude from MSL, attitude, and engine torque and can display up to 29 symbols.

AIRCRAFT SURVIVABILITY EQUIPMENT

I-57. Appendix J addresses the UH-60A/L ASE.

LIMITATIONS

I-58. The following are limitations of the UH-60A/L aircraft:

- UH-60A/L aircrews employ AN/AVS-6 NVG that lack the same night capabilities as FLIR systems in AH-64 aircraft.
- UH-60A/L aircraft are instrument-certified but cannot operate in all environmental conditions, depending on threat and navigational aid availability.
- Aircraft equipped with extended-range fuel tanks may not offer the same accessibility to the aircraft cabin for loading; self-defense machine guns have a limited range of motion when ERFS kits are installed.

SECTION V – HH-60L BLACK HAWK

I-59. The HH-60L Black Hawk's primary mission is aerial MEDEVAC. Secondary missions include transport of medical teams, delivery of medical supplies, and support for CSAR missions.

I-60. Air ambulance companies that operate the HH-60L are not organic to the aviation brigade but are frequently task-organized with it for maintenance, A^2C^2, SPINS, ATO, ACO, weather-forecasting, intelligence, and gunship-escort support. The area support MEDEVAC section leader and the forward support MEDEVAC are responsible for coordinating with the corps or division aviation brigade S3 to facilitate support operations. FM 4-02.26 (FM 8-10-26) contains detailed information on air ambulance company employment and operations.

DESCRIPTION

I-61. The HH-60L is a twin-engine, dual-seat, utility helicopter. The minimum required crew is a pilot and copilot. For aerial MEDEVAC missions, the crew includes up to three medical attendants. The HH-60L is equipped with a full instrument package and can conduct operations in day/night/NVG and instrument meteorological conditions. In addition to the basic configuration, the HH-60L includes a nose-mounted FLIR and kit installations that allow for rescue hoist, extended range fuel, and MEDEVAC operations.

SPECIFICATIONS

I-62. Table I-6 outlines HH-60L aircraft specifications.

Table I-6. HH-60L Specifications

Length	64'10" rotors turning, 41'4" rotors/pylon folded
Height	12'4" center hub, 16'10" tail rotor
Width	9'8.6" main landing gear, 14'4" stabilator
Main rotor and tail rotor diameter	53'8" main rotor, 11' tail rotor at 20-degree angle
Cabin floor and door dimensions	73" wide x 151" long, 69" wide x 54.5" high
Maximum gross weight	22,000 pounds.
Rescue hoist/cargo hook max weights	600 pounds rescue hoist; 8,000 pounds, cargo hook
Maximum range with ERFS	630 NM w/400 pound reserve
Patient capacity	6 litter or 6 seated
Crew capacity	2 pilots, 1 crew chief, 3 medical attendants
Fuel capacity	360 gallons and additional 460 gallons. w/ERFS

CAPABILITIES

I-63. The HH-60L provides the following:

- Transport of six litter patients and two medical attendants.
- Transport of six seated patients and two medical attendants.
- Transport of internally and externally loaded medical supplies.
- Transport of medical teams.

ARMAMENT

I-64. The HH-60L is an unarmed aircraft.

COMMUNICATIONS

I-65. The HH-60L has the following communication systems:

- The AN/ARC-201 (SINCGARS) provides VHF-FM communications in the 30- to 87.975-megahertz frequency range and has antijam, frequency-hopping capability.
- The AN/ARC-222 provides VHF-AM/FM communications and a maritime capability.

- The ARC-164 (V) provides UHF-AM communications in the 225- to 399.975-megahertz frequency range and has antijam, frequency-hopping capability.
- The AN/ARC-220 HF radio provides NOE long-range communications in the 2- to 29.999-megahertz frequency range.
- The KY-58 provides secure communications for the SINCGARS, Have Quick II, and AN/ARC-222 radios.
- The KY-100 provides secure communications for the AN/ARC-220 high-frequency radio.

NAVIGATION SYSTEMS

I-66. The HH-60L has the following navigation systems:

- AN/ARN-149 ADF.
- AN-ARN-147 VOR/LOC/GS/MB receiving set.
- AN/ASN 128B Doppler/GPS navigation set.
- AN/ASN 153 (V) TACAN.

AN/ARS-6(V) PILOT HEADS-UP DISPLAY AN/AVS-7

I-67. The HUD system serves as an aid to pilots using the AN/AVS-6 NVG by providing operational symbology information directly into the NVG. It always displays airspeed, altitude (MSL), attitude, and engine torque and can display up to 29 symbols.

AIRCRAFT SURVIVABILITY EQUIPMENT

I-68. Appendix J covers the HH-60L ASE.

LIMITATIONS

I-69. The following are limitations of the HH-60L aircraft:

- HH-60L aircrews employ AN/AVS-6 NVG that lack the same night capabilities as FLIR systems in AH-64 aircraft; the HH-60L FLIR is for mission detection of soldiers to be evacuated. It is not compatible for flying the aircraft.
- HH-60L aircraft are instrument certified but cannot operate in all environmental conditions, depending on threat and navigational aid availability.
- Aircraft equipped with extended-range fuel tanks may not offer the same accessibility to the aircraft cabin for loading.

SECTION VI – CH-47D CHINOOK

I-70. The primary missions of this aircraft are air assault, artillery raids, and air movement of troops, cargo, and weapons. Other roles include CSAR, casualty evacuation, aircraft recovery, parachute operations, disaster relief, fire fighting, and heavy construction.

DESCRIPTION

I-71. The CH-47D is a twin-turbine engine, tandem-rotor helicopter. The minimum crew required to fly it is a pilot, copilot, and flight engineer. Additional crew members, as required, may be added at the discretion of the commander. Tactical missions normally require the addition of one or two crew chiefs.

SPECIFICATIONS

I-72. Table I-7 outlines CH-47D specifications.

Table I-7. CH-47D Specifications

Length	98.9’
Height	18.9’
Fuselage width	12.4’
Main rotor span	60’
Cargo space	1,500 cu ft
Floor space	225 sq ft
Maximum gross weight	50,000 pounds
Max load for forward and aft hooks	17,000 pounds
Max tandem load for forward and aft hooks	25,000 pounds
Max load for center hook	26,000 pounds
Cruise airspeed	130* knots
Max continuous airspeed	170* knots
Combat radius (16,000 lb cargo)	50* NM (90 km)
Combat radius (31 troops)	100* NM (180 km)
* Varies with a multitude of factors such as temperature, wind, gross weight, internal versus external load, and time in PZ/LZ.	

CAPABILITIES

I-73. The CH-47D provides the following:

- Countermeasure suite of IR jammers, radar-warning receivers, and laser-warning detectors.
- Data-reduction transfer system to upload from the AMPS data-transfer cartridge and download postmission data.
- Internal transport of two HMMWVs or a HMMWV with a 105-millimeter howitzer and gun crew.
- MEDEVACs of 24 litter patients and 2 medics.
- Self-deployable range of 1,056 NM with the ERFS, with 30-minute reserve; transportable in the C-5 aircraft.
- Shipboard compatibility for joint and combined operations.

ARMAMENT SUBSYSTEMS

I-74. The armament subsystems are the M24 and M41 machine-gun systems installed in the cabin door, cabin escape hatch, and on the ramp. Both subsystems use the M60D 7.62-millimeter machine gun. The two flexible 7.62-millimeter machine guns are free pointing but limited in traverse, elevation, and depression.

COMMUNICATIONS

I-75. The CH-47D has the following communications systems:

- The AN/ARC-164 Have Quick II radios provide UHF-AM two-way communications in the 225- to 399.975-megahertz range in 25-kilohertz-intervals; they can operate in normal or antijam, frequency-hopping mode.
- The AN/ARC-201 SINCGARS provides two-way communications in the VHF-FM range of 30 to 87.975 megahertz in 25-kilohertz intervals; it employs antijam, frequency-hopping capability, and, when used with the KY-58, provides secure voice and cipher-mode communications. Later SINCGARS has embedded encryption and does not require KY-58 interface.
- One or two AN/ARC-186 VHF-AM-FM radio sets are installed, providing broad VHF communications on either the number 1 or 3 position on the function control selector of the Controls and Function, Interphone Control.
- The AN/ARC-220 HF radio supports NOE long-distance communications from 2 to 29.999 megahertz in 100-hertz steps on 20 preselectable channels, for a total of 280,000 possible frequencies; as one of the radios available to the commander, it is accessible in the number 4 position on the function control selector.
- The KY-58 interfaces with the AN/ARC-186 VHF-AM-FM radio in the FM range to provide secure communications.
- The KY-100 provides secure communications for the AN/ARC-220 high-frequency radio.

NAVIGATION SYSTEMS

I-76. The CH-47 has the following navigation systems:

- The AN/ASN-128B Doppler/GPS navigation set provides present position or destination navigation information in latitude and longitude or the MGRS coordinates. In the primary combined mode, the GPS updates Doppler position at a 1-megahertz rate; other CH-47 aircraft have the AN/ASN-128 Doppler navigation without GPS.
- The AN/ARN-89 ADF provides automatic direction finding for instrument navigation and approach.
- The AN/ARN-123 (V) VOR/LOC/GS/MB provides instrument navigation and approach.

HEADS-UP DISPLAY AN/AVS-7

I-77. The HUD system serves as an aid to pilots using the AN/AVS-6 NVG by providing operational symbology information directly into the NVG. It always displays airspeed, altitude (MSL), attitude, and engine torque and can display up to 29 symbols.

AIRCRAFT SURVIVABILITY EQUIPMENT

I-78. Appendix J addresses the CH-47D ASE.

LIMITATIONS

I-79. The following are limitations of the CH-47D aircraft:

- CH-47D aircrews employ AN/AVS-6 NVG that lack the same night capabilities as FLIR systems in AH-64 aircraft.
- CH-47D aircraft are instrument certified but cannot operate in all environmental conditions depending on threat and navigational aid availability.
- CH-47D aircraft generate a powerful downwash that may dislodge tents or other unsecured items in proximity to landing or hover. In desert and snow conditions, this downwash can disclose friendly positions; LZs must be chosen that accommodate the aircraft's size and signature.

SECTION VII – C-12 (C, D, T1, AND T2 MODELS)

I-80. The C-12 provides higher speed intratheater transport for key personnel.

DESCRIPTION

I-81. The C-12 is a twin-engine, turboprop, fixed-wing aircraft. Many different C-12 models are fielded. The C-12C and D1 have PT6A-41 engines; the C-12D2, T1, and T2 have PT6A-42 engines. Aircraft can normally carry eight passengers and a crew of two. All models have an aft passenger door, and all, except the C-12C, have a separate cargo door.

SPECIFICATIONS

I-82. Table I-8 outlines C-12 specifications.

Table I-8. C-12 Specifications

Length	43'10”
Height	15'5”
Wingspan	C-12C: 54'6”, C-12D: 55'6.5”, C-12T1/T2: 55'6.5”
Max gross weight at takeoff	13,500 lb. (C and D1 models), 14,000 lb.(D2, T1, and T2 models)
Cargo door dimensions	C-12C not installed C-12D and C-12T1/T2 52” x 52”
Cruise airspeed	Max 260 knots indicated airspeed, varies with conditions
Ceiling	Max 31,000 MSL, varies with conditions
Range	Varies; for example, 386-gallon main fuel yields 960 NM and 4.5 hours endurance (standard day, zero wind, cruise PA 26,000', 1,700 RPM): same conditions with 544-gallon full main and auxiliary fuel yield more than 1,600 NM and 7 hours endurance
Crew	2 pilots

CAPABILITIES

I-83. The C-12 provides the following:

- Transport of up to eight personnel.
- Communication equipment capable of supporting key passengers.
- Light cargo transport capability.

ARMAMENT SYSTEMS

I-84. The C-12 is unarmed.

COMMUNICATIONS

I-85. The C-12 has the following communication systems, depending on the model:

- The AN/ARC-164 (C, D1, and D2) provides two-way voice communications in the 225- to 399.975-megahertz range for a normal range of 50 miles.
- The UHF-20B (C and D1) provides VHF-AM communications in the 116- to 151.975-megahertz frequency range for a normal range of 50 miles.
- The 718U HF command set (C and D1) provides high-frequency communications in the frequency range of 2 to 29.999 megahertz.
- The AN/ARC-186 (C and D1) provides VHF-AM/FM communications.
- The AN/ARC-210 (V) (T1 and T2) provides multifrequency communications in the 30 to 88 FM band, 108 to 136 AM band, 136 to 156 FM band, 156 to 174 FM maritime band, and 225 to 400 AM/FM Have Quick and SATCOM bands.
- The VHF-22C (D2, T1, and T2) provides VHF communications.
- The KHF 950 (D2, T1, and T2) provides high-frequency, long-range communications.

NAVIGATION SYSTEMS

I-86. The C-12 has the following navigation systems:

- The KLN-90B GPS provides global positioning system navigation.
- Two VIR-30 VOR receivers are installed, one without marker beacon capability for instrument navigation.
- The KR 87 ADF provides automatic direction finding capability with AM transmitters.
- The DME-40 provides distance-measuring equipment capability.
- The AP-106 autopilot system works with other navigation equipment to fly the aircraft en route.

AIRCRAFT SURVIVABILITY EQUIPMENT

I-87. The C-12 has no aircraft survivability equipment because of the nature of its mission profiles.

LIMITATIONS

I-88. The C-12 has no self-defense protection system and limited capability to survive against airborne threats. It is not normally flown at terrain-flight altitudes.

SECTION VIII – C-23 (B AND B+)

I-89. The C-23B or B+ supports theater aviation needs for cargo transport, airdrop, and aeromedical evacuation.

DESCRIPTION

I-90. The C-23B Super Sherpa is a twin turboprop, fixed-wing aircraft. Its rectangular-shaped cabin readily accommodates palletized cargo; up to 500 pounds of additional baggage can be stored in a nose compartment. The C-23B has a crew of three.

SPECIFICATIONS

I-91. Table I-9 outlines C-23B specifications.

Table I-9. C-23B/B+ Specifications

Length	58'½"
Wingspan	74'8"
Height	16'3"
Cabin dimensions	29' long x 5'6" wide x 6'6" high
Maximum payload	7,100 pounds
Maximum gross weight	25,500 pounds
Maximum airspeed	190 knots
Range	More than 1,000 miles (varies with environmental/ mission conditions)
Typical mission range	770 miles with 5,000-pound payload

CAPABILITIES

I-92. The C-23 provides the following:

- Transport of up to 30 seated passengers.
- Transport of 27 paratroopers.
- Transport of 18 litters and 2 medical attendants.
- Transport of palletized cargo.

ARMAMENT SYSTEMS

I-93. The C-23B is an unarmed aircraft.

COMMUNICATIONS

I-94. The C-23B and B+ lack SINCGARS, Have Quick, and HF capability. The two organic AN/ARC-182(V) radios operate in the 30- to 399.975-megahertz frequency ranges.

NAVIGATION SYSTEMS

I-95. The C-23B has the following navigation systems:

- Two VIR-32A VHF navigation receivers with DME 42 and ILS/GS.
- Two RMI-36 radio magnetic indicators.
- One ADF-60A ADF.
- Two EHSI-74 electronic horizontal situation indicators.
- One TDR-90 transponder.
- One AN/APX-100(V) transponder.

AIRCRAFT SURVIVABILITY EQUIPMENT

I-96. Appendix J covers X-23 ASE.

C-23B LIMITATIONS

I-97. The following are limitations of the C-23B:

- The C-23B is not pressurized; therefore, aircrew members require oxygen for sustained flights above 10,000 feet. Passengers would also require oxygen above that altitude, which would generally be impractical; resultant flights with passengers at lower altitude will adversely affect range and endurance.
- The narrow cabin will not permit internal loading of Army vehicles such as the HMMWV.

Appendix J

Aircraft Survivability

SECTION I – FUNDAMENTALS

THREAT

J-1. Aircraft survivability is a primary concern throughout planning and execution of all missions. Army aircrews operate in an extremely hazardous environment of highly lethal air defense threats. The array of enemy air defense systems includes radar, IR, EO, and directed-energy weapons. Proper use of ASE, combined with careful route planning and movement techniques, greatly reduces the enemy's ability to effectively engage Army helicopters. Section III contains further threat information.

AIRCRAFT SURVIVABILITY TENETS

J-2. Aircrews deny or degrade the enemy's ability to detect, acquire, engage, and damage friendly aircraft by reducing aircraft radar, IR, visual, and acoustic signatures. This reduction is accomplished through the tenets of—

- Tactics.
- ASE.
- Aircraft hardening.

TACTICS

J-3. Appropriate tactics are the most effective means of enhancing aircraft survivability. Mission planning begins with a detailed analysis of the enemy air defense threat. Planners then determine how to best avoid or degrade that threat. Flight planning incorporates a detailed flight route analysis, seeking to avoid known or suspected enemy air defense sites and reduce the chances of detection or engagement by the enemy. Flight modes (low-level, contour, and NOE) and techniques (traveling, traveling overwatch, and bounding overwatch) are selected. Effective terrain flight not only limits LOS exposure times but also places the aircraft's radar, IR, and visual signature in a cluttered environment. Chapter 4 addresses flight modes and movement techniques.

AIRCRAFT SURVIVABILITY EQUIPMENT

J-4. ASE systems can be categorized in three general areas: signature reduction (design passive), SA (electronic passive), and jamming and decoying (electronic active) countermeasures. ASE is used *in combination* with sound tactics to enhance survivability. ASE cannot compensate for dangers introduced by poor tactics.

Signature Reduction (Design Passive)

J-5. These measures are incorporated during manufacture or modification of aircraft. Examples include flat canopies, exhaust suppressors, and IR reflective paint. Aviators, in choosing how much signature to expose to the threat, also influence signature control. The IR and radar signatures are least when viewed from the front, while the maximum IR signature is from the rear quadrants. The maximum visual and radar signatures are from the sides. Aircrews reduce the signature by using terrain and changing the aircraft's physical orientation to the threat, based on the type of enemy system anticipated or encountered.

Situational Awareness (Electronic Passive)

J-6. Electronic passive ASE systems provide early warning to aircrews, allowing them reaction time. These systems include radar detecting sets, laser detecting sets (LDSs), and IR missile warning systems. Aircrews use cues from these systems to change modes of flight or increase vigilance (actively seek masking terrain features).

Jamming and Decoying (Electronic Active)

J-7. If detected, aircrews use electronic active countermeasures (jammers, chaff, and flares) to provide some protection while they maneuver to masking terrain or outside threat range. Radar threats can be decoyed by chaff. Other sets can jam radar and IR threats. Flares can decoy IR missiles.

AIRCRAFT HARDENING (VULNERABILITY REDUCTION)

J-8. Hardening provides ballistic tolerance, redundant critical flight systems, and crashworthy features in an attempt to minimize the damage to an aircraft that has been hit.

SECTION II – AIRCRAFT SURVIVABILITY EQUIPMENT

J-9. This section includes a brief description of each ASE system with available configurations to optimize the ASE system.

AN/APR-39(V)1

J-10. The AN/APR-39(V)1 is a passive, omnidirectional radar signal detecting set (RSDS). The system detects friendly and threat radar systems in the high (E, F, G, H, I, and J) bands, as well as missile guidance radars in the low (C and D) bands. Some enemy systems may operate outside these bands. Therefore, crews must be aware if these systems are in the AO.

AN/APR-39A(V)1

J-11. The AN/APR-39A(V)1 RSDS is an upgraded version of the AN/APR-39(V)1. It uses a digital processor, alphanumeric symbology display, and synthetic voice warning to alert the aircrew of radar-directed air defense threat systems. It provides coverage for C, D, and E through M band pulsed wave radar. The theater-specific mission data set software is reprogrammable. Although the band coverage is extended, some enemy systems cannot be detected. Because of the limited memory and reprogramming of the system, aircrews should check with the unit EWO or ASE officer to understand which enemy systems are actually being displayed.

AN/APR-44(V)1/3

J-12. The AN/APR-44(V)1/3 RSDS is a passive system used to detect continuous wave (CW) radar signals aimed at the aircraft. A light indicates the detection, a tone is heard in the headset, and a logic signal is produced for external use. The AN/APR-44(V)1 is connected to the AN/APR-39A(V)1 and warns the pilot through the AN/APR 39A(V)1 or a warning display on the multifunctional display. The AN/APR-44(V)3 is a stand-alone system and warns the pilot with a light and a tone in the headset. The AN/APR-44(V)3 has additional components that enable an aircraft to detect airborne interceptors.

AN/APR-48A

J-13. The AN/APR-48A RFI detects emitting radar targets and computes accurate target azimuth and target identification for AH-64D LBAs equipped with FCR. Mounted on the mast above the rotors, the RFI provides continuous 360-degree emitter detection and threat identification, including early warning, ground targeting, counterbattery, and aircraft radars. For fine direction-finding measurements, a four-element interferometer array with a 90-degree FOV provides the DF accuracy and tolerance to multipath induced errors found from radar reflectance.

AN/AVR-2/2A

J-14. The AN/AVR-2/2A LDS is a passive laser warning system that provides input to the AN/APR-39A(V)1 to detect laser energy. The 2A version is also used as sensors for MILES/AGES. The system has reprogrammable emitter identification (EID).

AN/ALQ-136(V)5

J-15. AN/ALQ-136(V)5 countermeasures set (CMS) is an airborne, automatic electronic radar jammer designed to defeat/degrade the tracking capability of a limited number of hostile threat pulse radars. When threat signals are identified and verified, jamming automatically begins and continues until the threat radar signal is no longer detected. The CMS then ceases jamming but continues to receive and analyze radar signals.

AN/ALQ-144A(V)1/3

J-16. The AN/ALQ-144A(V)1/3 CMS is an active, continuous operating omnidirectional IR jammer system designed to confuse or decoy threat IR missile systems. The AN/ALQ-144A(V)1 CMS provides jamming of all known threat IR missile systems when operated on an aircraft that has been equipped with low-reflective paint and engine exhaust suppressors. The system has specific jam-program number settings that must be set before flight.

AN/ALQ156(V)1

J-17. The AN/ALQ156(V)1 missile approach detector is an airborne radar system that provides IR homing protection to the aircraft by detecting the approach of antiaircraft missiles. Upon detection of an incoming missile, the missile detector automatically initiates a signal, which triggers the M-130 general purpose dispenser system. The dispenser system then releases a flare to decoy IR missiles away from the aircraft.

M-130

J-18. The M-130 general purpose dispenser has a dual countermeasure capability of chaff and flares. The system is operated either manually with AN/APR-39 RSDS warning or automatically through interface with the AN/ALQ-156. The dispenser system can dispense flares only (30 each) or chaff only (30 each). By adding a second M130 dispenser assembly and payload module, the aircraft may dispense flares or chaff, independently. Chaff and flare cartridges cannot be mixed in any payload module. The chaff protects against radar-directed antiaircraft weapon systems, while the flares protect against IR-directed missile systems. When the M-130 is set to dispense chaff, the electronic control module must be set with the program setting for the aircraft before flight. Currently, only the CH-47D has an approved airworthiness release to fire flares from the M-130.

J-19. Table J-1 depicts the systems that are in each aircraft. Note that aircraft carry only one AN/APR-39 system at a time. In addition, very few aircraft use the AN/APR-44 system.

Table J-1. Aircraft ASE Matrix

ASE	AH-64A	AH-64D	OH-58D	UH-60A/L	CH-47D	HH-60L	RC-23B
AN/APR-39(V)1	X			X	X		
AN/APR-39(V)2							X
AN/APR-39A(V)1	X	X	X	X	X	X	
AN/APR-44(V)1/3	X		X	X			X
AN/APR-48A		X					
AN/ALQ-136(V)2							X
AN/ALQ-136(V)5	X	X					
AN/ALQ-144A(V)1			X	X		X	
AN/ALQ-144A(V)3	X	X					
AN/ALQ-156(V)1/2					X		X
AN/ALQ-162(V)3							X
AN/AVR-2A	X	X	X				
M-130 (CHAFF)	X	X		X		X	X
M-130 (FLARE)					X	X	X

SECTION III – THREAT CONSIDERATIONS

J-20. This section provides general information about the capabilities and characteristics of threat systems. It may be applied to specific threats on a case-by-case basis.

THREAT ENGAGEMENT SEQUENCE

J-21. All weapon systems must complete an engagement sequence to actually have an effect on the target aircraft. A step in the engagement sequence that is missed forces the threat to start over again. Weapon systems sensors must—

- Detect.
- Acquire.
- Track.
- Launch and guide or fire a ballistics solution.
- Assess damage.

EXAMPLE OF A THREAT SYSTEM

J-22. Five elements required to compute an AD fire control solution are range, azimuth, elevation, velocity, and time of flight (TOF). If one of the fire elements is incorrect, the AD system will not hit the target.

TIME AND SPACE

J-23. The threat must detect, acquire, track (establish a fire-control solution), and fire at the aircraft. The TOF of the projectile must be determined. The threat must predict where the aircraft target will be (within a few meters) when its ordnance travels to a point in space and time.

ACQUISITION VERSUS TRACKING

J-24. The difference between detection and acquisition, compared to tracking, is very important. In detection and acquisition, the threat weapon system does not have refined data to fire. The threat weapon system must track the aircraft long enough to determine range, azimuth, elevation, and velocity to predict when and where to fire to hit its target. Indications of search or acquisition activity may alert the aircrew in time to increase its vigilance (for example, change mode of flight, actively searching for masking terrain features). Tracking indications alert the aircrew to an immediate action requirement (masking or, when terrain is not readily available, ASE decoys and evasive maneuvers).

ENGAGEMENT ENVELOPE

J-25. Threat systems have a minimum and maximum effective altitude and range. These numbers are computed against a cooperative engagement (nonmaneuvering aircraft, blue-sky background, flat terrain, and steady velocity). The typical effective envelope for a threat system is based upon a 50 percentile; that is, at the maximum (or minimum) effective range (or altitude), the weapon system is able to hit the target one out of two times. As the target gets further into the threat's envelope, the probability of a first-shot kill increases. As the target gets further outside the threat envelope, the probability decreases until the target is outside the threat's maximum range (or altitude), where it is physically impossible to hit.

J-26. The aircrew, even if exposed, can make the engagement more difficult for the threat. A stationary target, for example, allows the threat to adjust each shot off the last until it hits the aircraft. A more difficult engagement is a moving, constant-velocity shot. A prediction can be made, and if a miss occurs, an adjustment can be made based off the last shot. The most difficult engagement is against a moving target that varies range, altitude, attitude, and velocity. Prediction is impossible because all four factors are changing at differing rates.

THREAT WEAPON SENSORS

J-27. There are four major types of threat weapon sensors: radar, IR, directed energy, and optical. For in-depth information concerning particular threat systems, aircrews should contact the unit EWO, ASE officer, or tactical operations officer.

RADAR

J-28. Direct threat radar weapons require LOS to hit the target. They are either fire-controlled antiaircraft artillery (AAA) or, for missile systems, command, semiactive radar homing (SARH), or active radar homing (ARH). Radar weapons must detect, acquire, track, launch and guide (or fire a ballistic solution), and assess damage. Radar systems are hampered by ground clutter. To pick out targets from ground clutter, radar systems can detect movement though the use of a MTI, Doppler (continuous-wave radar), or pulse Doppler. Some modern radar systems track not only the movement of the aircraft itself but also the movement of rotor blades. Radar systems can be detected, avoided, decoyed, jammed, and destroyed by direct and indirect fires (self-artillery and antiradiation missiles).

INFRARED

J-29. IR direct threat weapons require LOS before launch. The in-flight missile must maintain LOS with the target until impact or detonation of the proximity fuse. IR missiles require the operator to visually detect the target and energize the seeker before the sensor acquires the target. The operator must track the target with the seeker caged to the LOS until it is determined that the seeker is tracking the target and not background objects (natural or man-made objects such as vehicles, the sun, or reflected energy of the sun off clouds). The IR sensor is also susceptible to atmospheric conditions (such as haze or humidity), the signature of the aircraft and its background, flares, decoys, and jamming. Generally, the portability of IR systems makes it difficult to predict where they may be located. Their passive sensors make them difficult to detect before launch. Aircrews have little time to respond to a launch because of the missile's short TOF.

DIRECTED-ENERGY WEAPONS

J-30. Laser-guided or -aided weapons use lasers to perform ranging, tracking, or guiding functions for conventional explosives. Pure directed-energy weapons (DEW)s use laser and other forms of DEWs to inflict damage to the aircraft or its sensors. DEWs are of short duration, hard to detect, extremely hard to decoy or jam, and hard to kill. They rely upon LOS and atmospheric conditions and are somewhat short ranged at present.

OPTICAL/ELECTRO-OPTICAL

J-31. Optical/EO sensors are used as either the primary or the secondary sensor for all weapon systems. They are, with very few exceptions, completely passive. They are limited by human eyes, atmospheric conditions, distance, jitter, and in many cases, by darkness. The optical/EO sensors are most difficult to detect, seldom can be decoyed, and can be jammed in the sense of obscurant, but, when located, can be killed.

SECTION IV – OPERATIONAL EMPLOYMENT CONSIDERATIONS

J-32. For ASE to provide effective protection, configuration settings must be optimized for known and suspected threats. The ASE/EWO and tactical operations officer ensure that optimum ASE configuration settings are prepared for each flight.

MISSION PLANNING

J-33. ASE and EW must be considered in all phases of mission planning and execution. Figure J-1 illustrates the roles and responsibilities of ASE planning.

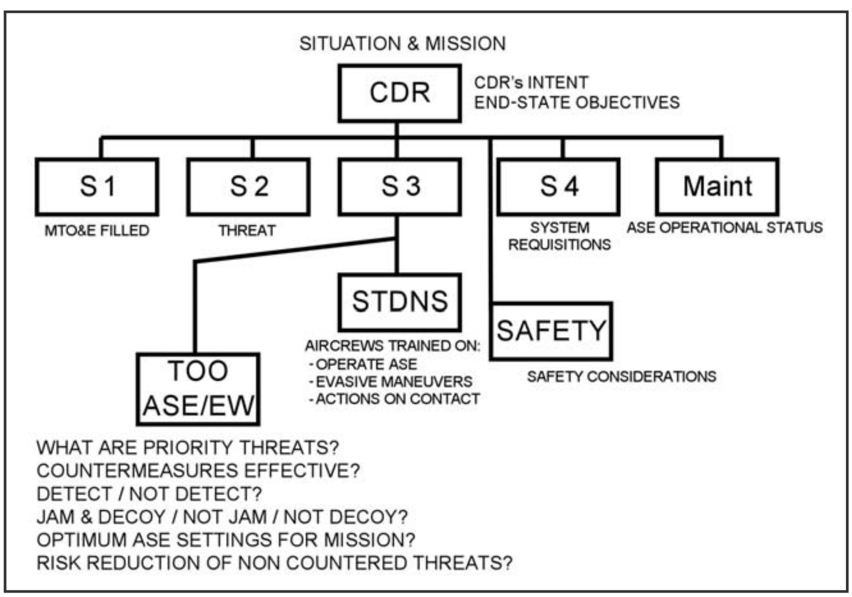


Figure J-1. Roles and Functions

OPERATION ORDER SUPPORT

J-34. The EW annex is created to support the OPORD. The enemy and friendly situations are further defined with the emphasis on the EW capabilities that each have to find, fix, jam, deceive, disrupt, or destroy each other. Figure J-2 illustrates the support to OPORD development.

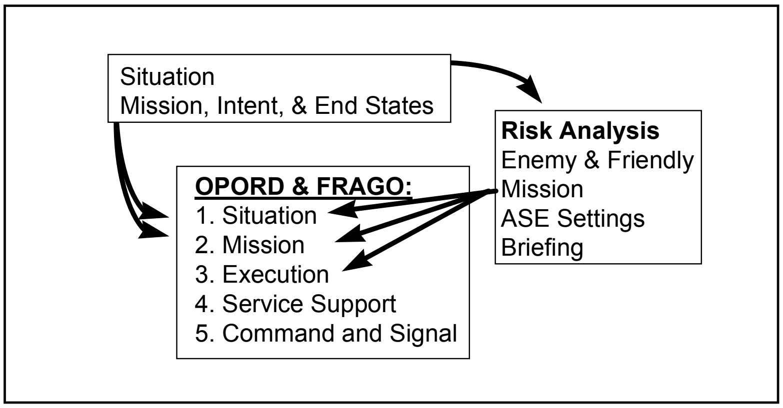


Figure J-2. OPORD and FRAGO

J-35. A supplement to the overall mission briefing is the ASE briefing (Figure J-3).

AS/EW Briefing Format			
OVERALL RISK	Low	Medium	High
CAUSED BY:	Mission Profile	ASE Suite	Threat
ASE and IFF configuration settings:			
ASE can detect			
ASE cannot detect:			
ASE can jam:			
ASE cannot jam:			
PRIMARY THREATS:	IR	E/O	Laser/DEW
Risk Reduction Measures:			
Changes to Standard TTP:			
Questions:			

Figure J-3. ASE Mission Brief Format

SECTION V – MISSION EXECUTION

J-36. Aircrews must be familiar with ASE SA displays and their threat indications. Some actions must be performed immediately. After receiving visual indications of enemy gun or missile firing or ASE indications of radar track or launch, the aircrew has but seconds to react. The aircrew should immediately—

- Deploy to cover.
- Perform evasive maneuver if masking terrain is not readily available.
- Determine whether to continue or abort the mission.

CREW COORDINATION

J-37. Crew coordination must be rehearsed to perform evasive maneuvers. Standardized terminology, such as "Missile 3 o'clock, break right" and "Breaking right," should be used to avoid confusion.

MULTISHIP CONSIDERATIONS

J-38. Formations and spacing intervals should be selected to provide all aircraft maneuver space to evade hostile fire. Standardized terminology, such as "Chalk three, tracers 3 o'clock, breaking left," should be used to alert the flight. Briefings should include evasive formation break-up procedures and how to reestablish the formation after breaking the engagement. Terrain, narrow radar beam, altitude, maintenance problems, or other factors may prevent all aircraft in the formation from receiving signals; therefore, it is important to communicate ASE alerts or indications immediately.

Appendix K

Digitization

This appendix summarizes key information that leaders require to exercise C^2 using the ABCS. It includes information on the components of ABCS and its supporting systems and how to use ABCS within a CP to support battle planning, preparation, execution, and sustainment.

SECTION I – INTRODUCTION

GENERAL

K-1. For military operations in the twenty-first century, force projection, split-base operations, information warfare, and joint or combined operations will be the rule. Crucial to these capabilities is the effective flow of information to support warfighting throughout all phases of an operation (see Figure K-1). ABCS provides rapid and reliable information nets to enable the Army to project the force, protect the force, gain information superiority, determine the battle space, conduct decisive operations, and sustain the force. It provides real-time and near-real-time information that enables sound decision making inside the enemy's decision cycle.

K-2. ABCS is a collection of information management systems that assists the commander in exercising C^2. It assists him in gaining SU of the battlefield. ABCS permits him to apply his judgment more productively, to use his command presence more efficiently, to develop and disseminate his vision effectively, and to understand better the dynamics of war (in general) and the specific operation (in particular).

K-3. ABCS provides a visual means to see friendly and enemy forces and the ability to arrange and maneuver forces to accomplish missions. The ABCS components assist in answering the following questions:

- Where am I?
- What is my status?
- Where are the other friendly units?
- What is their status?
- Where is the enemy?
- What is the enemy's status?

K-4. Digitization capability is an evolutionary process that will occur over many years. This appendix describes envisioned objective operations. When capability is incomplete, the challenge is to devise ways to mix traditional, manual methods with the automated systems that permit more rapid planning and synchronized execution. As always, these guidelines should be applied to a degree that complements the existing level of automation.

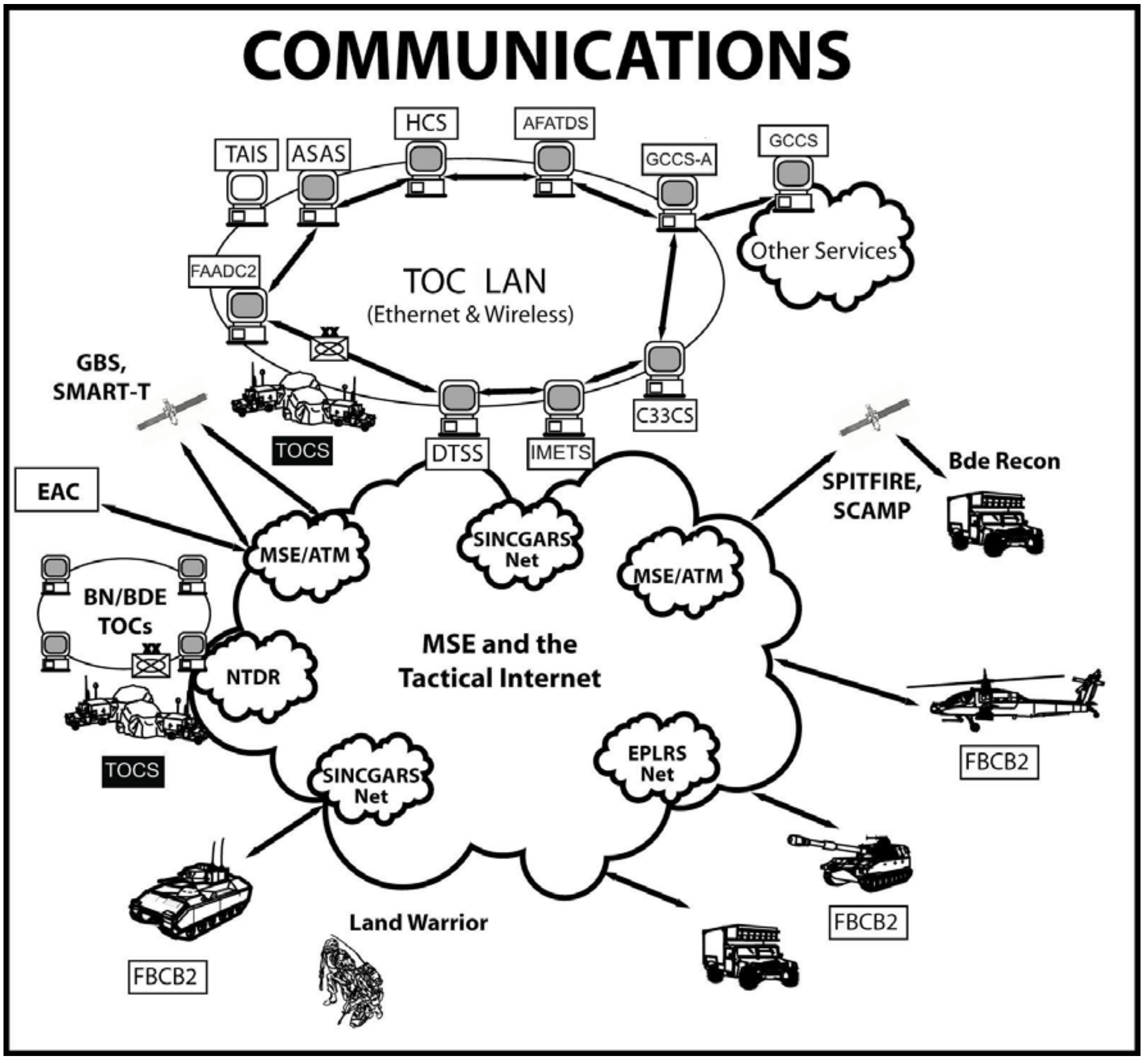


Figure K-1. Digitized Communications

COMMON PICTURES

K-5. Definitions of common pictures follow. In practice, the terms common operational picture (COP) and common tactical picture (CTP) are often used interchangeably.

- **Common Operational Picture.** The COP is an operational picture tailored to the user's requirements, based on common data and information shared by more than one command; the COP facilitates collaborative planning and assists all echelons in achieving SU, which helps to synchronize execution.
- **Common Tactical Picture.** The CTP is an application available on ABCS computers and supporting systems; the application uses a common mapping background, is accessed through a common user

interface, and displays information shared from the Joint Common Database (JCDB). The CTP is dynamically updated as data change in the JCDB.

K-6. Examples of COP overlays are the force disposition, enhanced by overlaying the operational overlay; FS overlays; and the A^2C^2 overlay. Additional information is available at the description of each system.

K-7. ABCS assists in answering these questions by providing a COP of the battle space through timely presentation of information in various types of formats including voice, data, imagery, graphics, and video. The operational picture also provides—

- Access to planning documents.
- Status reports.
- Timely, automatic warnings of air, missile, and NBC attacks.

K-8. Although each battlefield automated system (BAS) of ABCS makes contributions that support its own BOS-oriented tasks, the key contribution of ABCS is as an interoperable "system of systems." The synergistic capabilities of ABCS allow commanders to reach across the BOS to request, select, and evaluate data from diverse resources to create relevant information. The COP begins with a common map background against which a commander can display a variety of information such as—

- Friendly locations and graphic-control measures.
- Enemy units and equipment.
- Fire support control measures, range fans, and targets.
- Air tracks and tactical ballistic missile tracks.
- Logistics status and joint information.

K-9. The COP includes Army units; joint, allied or coalition forces; and enemy, neutral, or unknown forces. Each user can tailor his COP to show as little or as much information as he requires. ABCS' essential contribution to C^2 is that it provides identical, shared data. ABCS enhances warfighting in the following ways:

- Accelerates the MDMP, preparation of estimates, COA development, wargaming, and orders production and dissemination.
- Assists in gathering and displaying relevant information while filtering out unnecessary data.
- Allows for dissemination of information in near-real time and minimizes latency of information exchanges.
- Facilitates the synchronization of CSS by increasing the opportunities for real-time coordination.
- Exploits digital map data and terrain-analysis products.
- Facilitates rehearsal and training through compatibility with current and future simulation and simulation systems.
- Enhances interoperability through commonality of task procedures.
- Provides data access to the commander in austere environments through reach-back capability.

COMMON SERVICES

K-10. ABCS provides several information management applications.

COLLABORATION TOOLS

K-11. Collaboration tools include—

- VTC, whiteboard, and shared applications.
- Messaging.
- File transfers.
- Calendar creation/scheduling.
- Task management.
- Internet browser.
- Database query tools.

TRAINING APPLICATIONS

K-12. These provide training and simulation capabilities for individual and collective training events.

APPLICATIONS

K-13. Common applications include word processor, spreadsheet, and presentation/graphics programs. Document interchange services support document exchanges between heterogeneous computer systems using common file formats.

K-14. The operational picture application creates a shared picture of the battle space.

K-15. The planning application automates aspects of the MDMP and enables parallel and collaborative planning.

ARMY BATTLE COMMAND SYSTEM COMMUNICATIONS NET

K-16. Connectivity is provided by tactical communications systems: MSE, near term digital radio (NTDR), SINCGARS, and EPLRS. The ABCSs within the brigade, division, and corps CPs are supported by a wide area network (WAN) and LAN switch/router architecture(Figure K-2.).

OTHER DIGITAL SYSTEMS

K-17. Additional systems interfacing with ABCS may include the A^2C^2S, the Digital Topographic Support System/Quick Response Multicolor Printer (DTSS/QRMP), and CGS.

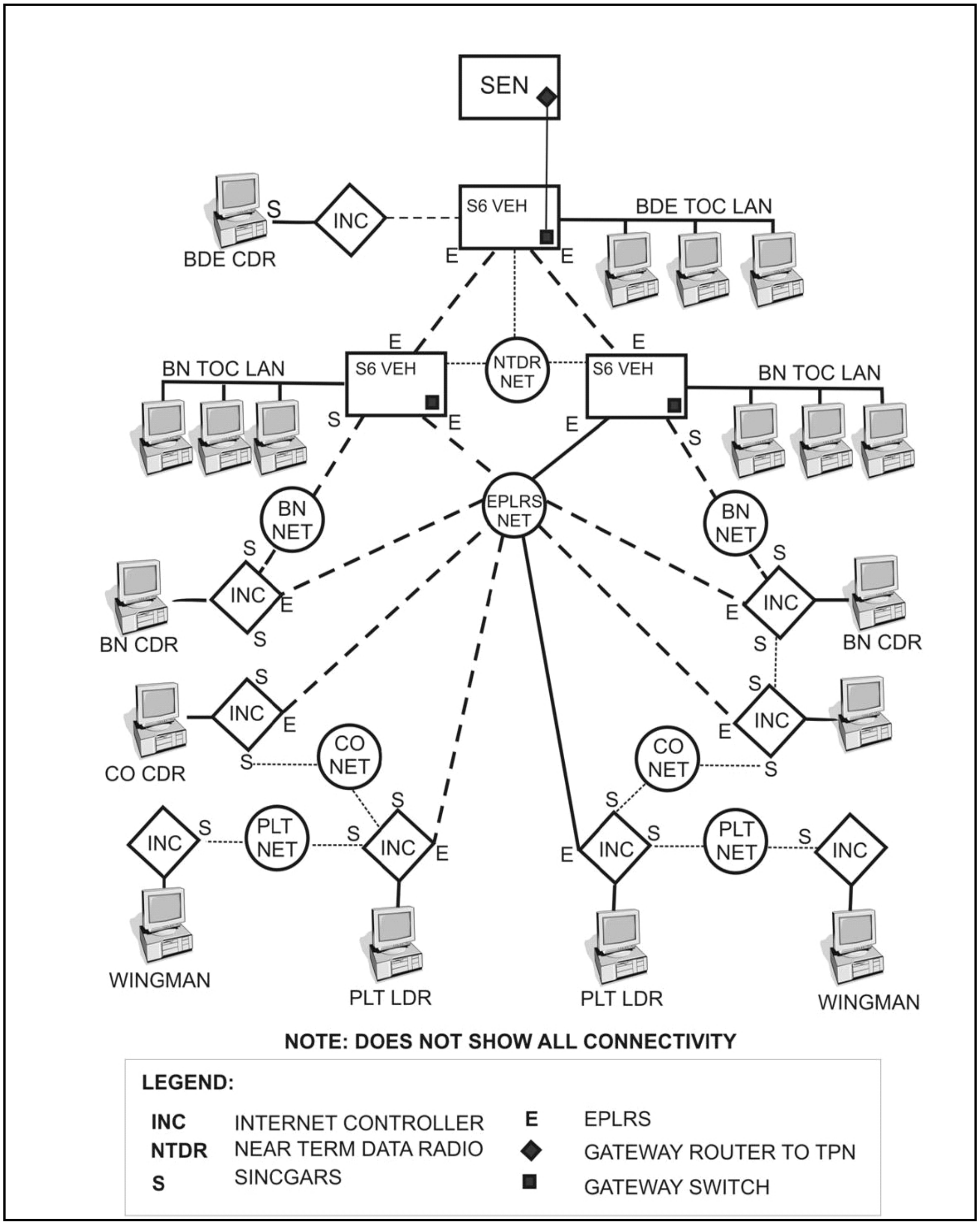


Figure K-2. Example of an ABCS Communications Net

SECTION II – SYSTEMS DESCRIPTIONS

K-18. ABCS is a system of systems that consists of information technology applications, nets, and communications that enable data exchange throughout the force. It is composed of subsystems for each BOS. Each subsystem supports and provides information to other systems to improve battlefield SU. By integrating the ABCS components to a JCDB, the COP can be viewed at any workstation according to the commander's specific requirements. In addition, ABCS subsystems provide an array of specialized capabilities and applications for units at all levels.

ARMY BATTLE COMMAND SYSTEM COMPONENTS

K-19. ABCS consists of the following subsystems:

- GCCS-A.
- FBCB2.
- TAIS.
- DTSS.
- Integrated Meteorological System (IMETS).
- ATCCS.

GLOBAL COMMAND AND CONTROL SYSTEM—ARMY

K-20. GCCS-A is the Army hardware and software that directly support Army implementation of the joint GCCS. It supports monitoring, planning, and execution of joint, combined, and Army operations for EAC. GCCS-A ensures Army access to key information within the joint realm such as force tracking, host-nation and civil affairs support, theater air defense, targeting, PSYOP, C^2, logistics, and medical and personnel status. In turn, this information supports corps-level planning, execution, and monitoring of mobilization, deployment, sustainment, and redeployment.

LOCATION

K-21. There is a GCCS-A system at the corps main and tactical CPs.

KEY CAPABILITIES

K-22. The commander's force analyzer provides current, time phased force deployment data (TPFDD). This information is key for planning the movement of forces and monitoring unit status and availability.

K-23. The logistics analyzer allows planners to forecast resources needed in various combat situations.

K-24. GCCS-A shares the client-server architecture common operating environment (COE) with the joint GCCS for the general functions of teleconferencing, messaging, file transfers, office automation, utilities, and system administration.

FORCE XXI BATTLE COMMAND BRIGADE AND BELOW

K-25. FBCB2 provides C^2 and SU to the lowest tactical echelons. It supports OPCON chiefly through the transmission and receipt of orders, reports, and data via combat messages. FBCB2 employs position navigation and reporting capability to depict and transmit the unit's own location. FBCB2 can also access other friendly units' locations, as well as intelligence, to show the friendly and enemy picture in near-real time, even while on the move.

LOCATION

K-26. FBCB2 is found on platforms from the commander to the soldier level.

KEY CAPABILITIES

K-27. FBCB2 assists SU by telling the user his location and the locations of other friendly forces, observed enemy forces, and reported battlefield obstacles. The user can adjust his picture of the battlefield by selecting which overlays, graphics, and icons are shown. Unit displays can be altered by grouping icons according to unit type or echelon.

K-28. FBCB2 automates frequently used urgent messages for reporting the enemy, requesting MEDEVAC, NBC attack, call for fire, cease fire, and unit situation reporting. Enemy information can be rapidly formatted via an automated report. This information is forwarded to all other FBCB2 users and the all source analysis system (ASAS) supporting the user, usually the task force or brigade S2.

K-29. FBCB2 supports the call-for-fire process via a message in JVMF sent directly to AFATDS. The integration of the laser ranger finder with FBCB2's Ground Positioning System greatly improves the speed and accuracy of both calls for fire and enemy spot reports. It provides key information to the CSSCS on unit logistical status.

TACTICAL AIRSPACE INTERGRATION SYSTEM

K-30. TAIS is a digitized, integrated airspace management and decision support system to assist the ground commander's role in the air battle. It supports automated A^2C^2 planning and operations and air traffic services. It also helps planners build Army input for the joint ACO to distribute the approved A^2C^2 overlay. TAIS can display ACMs in two or three dimensions while monitoring the real-time airspace situation. TAIS provides SU of the third dimension by providing real-time airspace information that displays the location and movement of aircraft transiting the battle space overlaid against current ACMs.

LOCATION

K-31. A TAIS is found at the DMAIN. A second TAIS is located at the division tactical CP or aviation brigade where it can optimally provide flight-following functionality. At corps level, one TAIS is at the main CP while a second is placed consistent with the tactical situation. TAIS is also at EAC.

KEY CAPABILITIES

K-32. TAIS deconflicts (mathematically and graphically), in real time, airspace usage in the third and fourth dimensions (altitude and time). For example, the operator can graphically rotate a three-dimensional representation of the airspace to see ACMs from different angles, enabling him to see how they intersect and overlap.

K-33. The air traffic services display includes information from the ACO and ATO. TAIS operators can use this display to track the flight of aircraft. If an aircraft leaves the safe transition corridor, TAIS can alert the operator. TAIS will be able to communicate (voice and data) with current and future military aircraft (joint/combined), civilian aircraft and air traffic control systems, and other U.S. and allied forces airspace users.

DIGITAL TOPOGRAPHICAL SUPPORT SYSTEM

K-34. DTSS enables topographic support personnel to receive, format/reformat, store, retrieve, create, update, and manipulate digital topographic data. It gives digital terrain analysis, terrain databases, updated terrain products, and hard-copy reproduction of topographic products to include maps. Its tactical decision aids support COA analysis and the MDMP. These aids include mobility analysis, intervisibility (LOS) analysis, environmental and climatology analysis, terrain elevation, and other special products. Using the Global Broadcast Service (GBS), DTSS receives and distributes digital terrain data from the NIMA. DTSS can update existing digital maps from satellite imagery and produce full-size, color paper maps from any DTSS product.

LOCATION

K-35. DTSS is found at the corps main CP, DMAIN, and tactical and brigade CPs.

KEY CAPABILITIES

K-36. DTSS produces sophisticated mobility analysis products. For example, it provides a detailed analysis comparing off-road mobility of the HMMWV and M1 tank.

K-37. DTSS performs intervisibility analysis, which is overlaid on a terrain map backdrop. For example, from any point on the map, it can depict every other point within LOS of the first point.

K-38. DTSS depicts a three-dimensional view such as a *fly-through* area. Colored areas show threat and friendly air defense domes superimposed on satellite imagery. The DTSS database contains detailed terrain information but not weapon characteristics and locations; these must be obtained from the intelligence staff.

INTERGRATED METEOROLOGICAL SYSTEM

K-39. IMETS is the meteorological component of ABCS. It provides an automated, high-resolution weather system to receive, process, and disseminate current weather observations, forecasts, and weather and environmental effects decision aids.

LOCATION

K-40. IMETS workstations, manned by staff weather teams, are at the aviation brigade, division, and corps main CPs.

KEY CAPABILITIES

K-41. IMETS receives and integrates weather information from polar-orbiting civilian and military meteorological satellites, the Air Force Global Weather Center, artillery meteorological teams, remote sensors, and civilian forecast centers.

K-42. IMETS processes and collates forecasts, observations, and climatological data to produce timely and accurate weather products tailored to the warfighter's specific needs. Additional weather information is available via the IMETS web pages. Severe weather warnings are disseminated to units via USMTF message.

K-43. The integrated weather effects decision aid (IWEDA) displays weather effects on weapon systems or missions. For example, it can show the various weather effects—whether favorable, marginal, or unfavorable—on various weapons over the next 24 hours.

ARMY TACTICAL COMMAND AND CONTROL SYSTEM

K-44. ATCSS is a family of automated C^2 tools. ATCCS consists of these systems:

- MCS.
- Maneuver Control System-Light (MCS-L).
- ASAS.
- All Source Analysis System-Light (ASAS-L).
- AFATDS.
- AMDWS.
- CSSCS.

MANEUVER CONTROL SYSTEM

K-45. MCS is the S3's tool. It displays the current battle and enables planning for the future battle. It provides the ability to collect, coordinate, and act on near-real time battlefield information. MCS integrates information horizontally and vertically to provide the COP of friendly, enemy, and noncombatant locations.

Location

K-46. MCS is found at echelons from battalion through corps.

Key Capabilities

K-47. A message processor is available on all MCS workstations. It is used to create, edit, transmit, print, and store messages in both USMTF and JVMF.

K-48. With word-processing templates and web-browser technology, MCS can rapidly produce and distribute OPLANs, OPORDs, FRAGOs, and WARNOs. Task organizations are created, edited, and displayed using the unit task organization (UTO) tool.

K-49. MCS collaborative planning tools enable multinode collaborative planning sessions within or between CPs. These tools include data conferencing, chat, and whiteboard. The whiteboard is a powerful capability for war-gaming, orders briefs, and back-briefs. The chat feature is similar to current chat programs available on personal computers. Multiple users can communicate simultaneously by posting text messages that can be read simultaneously by all chat participants.

MANEUVER CONTROL SYSTEM -LIGHT

K-50. MCS-L operates as a client of MCS. It is able to obtain data directly from the JCDB and to update the JCDB with friendly locations and battlefield geometry. The main difference between MCS-L and MCS is the ability of the latter system to perform various net server functions and to interface with FBCB2.

Location

K-51. MCS-L is found at battalion, brigade, and certain separate companies.

Key Capabilities

K-52. The MCS-L can be used to—

- Produce orders, plans, and annexes; used to develop task organizations, overlays, and synchronization matrices.
- Develop and assess courses of action; the MCS-L includes a distance/rate tool.
- Create messages and generate reports; used to maintain the staff journal.
- Record and depict NAIs, TAIs, and CCIR including HVTs and HPTs.
- Function as file transfer protocol (FTP) client/server; the MCS-L possesses Adobe Acrobat™, a file zip utility, Microsoft Office™, and a web browser.

ALL SOURCE ANALYSIS SYSTEM

K-53. ASAS is the intelligence fusion system. It receives and processes intelligence and information from sensors, processors, and communications systems at national, theater, and tactical echelons and spot reports from FBCB2. It provides a timely, accurate picture of the enemy situation. The S2 uses his ASAS remote workstation (RWS) for automated situation development, COAs, targeting, tactical warning, and BDA.

Location

K-54. ASAS is at echelons from battalion to corps. An ASAS RWS can function as a stand-alone system or as an adjunct to an analysis and control element (ACE) at corps and division level and the analysis and control team at brigade.

Key Capabilities

K-55. Intelligence personnel can use the analysis tools in the ASAS RWS for their IPB. For example, it is able to depict tracked vehicle GO and NO-GO areas overlaid on a terrain map. The ASAS RWS assists the warfighter's COA analysis with information on enemy units, equipment, locations, and movements.

K-56. Using reports and sensor inputs, the RWS can alert the operator to enemy targets and can automatically nominate them for friendly supporting fires. Commanders and staff can even focus ASAS on the specific types of targets that will best support the mission.

K-57. ASAS also monitors the current enemy situation. Using the latest combat information and intelligence, it maintains and displays timely, detailed data on enemy units.

ALL SOURCE ANALYSIS SYSTEM-LIGHT

K-58. ASAS-L has vertical and horizontal interoperability with MCS, AFATDS, FBCB2, and other ASAS terminals. It is intended primarily for those who use preprocessed intelligence information and graphic IPB products from the analysis and control team, ACE, and the S2's ASAS RWS (the chief ASAS platform at corps, division, and maneuver brigade echelons). ASAS-L receives and processes initial INTREP and information received via FBCB2. It will forward these reports to the analysis and control team and ACE where the information will undergo intelligence processing and integration before returning to the brigade S2 as fully correlated intelligence information.

Location

K-59. ASAS-L is at battalion.

Key Capabilities

K-60. The ASAS-L provides ISR management and analytic support to the battalion S2 for SU, tactical warning, force protection, and targeting. It provides an analyzed enemy picture to the operational picture.

ADVANCED FIELD ARTILLERY TACTICAL DATA SYSTEM

K-61. AFATDS is the artillery management system employed by FS personnel. It provides for fully automated FS planning, coordination, and control of close support; counterfire; interdiction; suppression of enemy air defenses; and operations in deep areas. AFATDS matches FS weapons with targets based on target type, the commander's guidance, unit availability, weapon status, and ammunition availability. It encompasses FS platforms across the services—including mortars, field artillery cannons, rockets, missiles, CAS, attack helicopters, and NSFS. AFATDS is a multiservice system.

Location

K-62. AFATDS is at the firing platoon through EAC. Remote terminals allow commanders, LNOs, and other FS personnel to monitor FS operations and issue guidance.

Key Capabilities

K-63. AFATDS analyzes a potential target and then identifies which available FS systems would be most effective. This information is shown to the operator through a visual display.

K-64. Based on the commander's guidance, AFATDS prioritizes targets and supported units, specifying the method of engagement and the volume of fire for each type of target. These priorities can vary according to varying guidance for each phase of an operation to best support the commander's intent and scheme of maneuver.

K-65. AFATDS processes fire missions through combat messages in dialogue with MCS, CSSCS, AMDWS, and FBCB2 and reports mission results to ASAS.

K-66. In addition to managing the FS of current operations, AFATDS assists FS planning for future operations. Its planning mode offers decision aids and analytical tools to determine which FS plan best supports a course of action.

AIR AND MISSILE DEFENSE WORK STATION

K-67. AMDWS is the air defense system that enables monitoring of the current air operation while planning for future events. It also provides SU of the third dimension. The force operations capability of AMDWS supports the planning, coordination, and preparation for and sustainment of the air defense mission. It integrates air defense fire units, sensors, and C^2 centers into a coherent system for defeating the aerial threat. Defense planning and analysis functions support the development of AD missions and the distribution and merging of missions between echelons. AMDWS also supports air battle management by displays that show ACOs, current fire unit status, alert posture, missile expenditure, and personnel ready for duty.

Location

K-68. AMDWS is located at the AD battery CP with the maneuver brigade main CP, division CPs, corps CPs, and EAC.

Key Capabilities

K-69. The air defense unit status screen shows the location, alert status, on-hand munitions, vehicles, and personnel for AD units from section through battalion echelon.

K-70. Its weapon and sensor visibility feature supports placement of AD weapons and sensors. By analyzing platform capabilities and digitized terrain elevation data, AMDWS can determine the area coverage of weapons and sensors at different locations.

K-71. The AMDWS mission planner shows zones of sensor coverage, weapons coverage, friendly and hostile air tracks, air avenues of approach, and airfields. The commander can use this display to synchronize air-defense coverage with the planned scheme of maneuver. Operators can set parameters to depict aircraft at various altitudes based on the surrounding terrain.

COMBAT SERVICE SUPPORT CONTROL SYSTEM

K-72. CSSCS is the automated system for planning and controlling the CSS of combat operations. Warfighters can logistically assess future COAs using current or planned task organizations and approved planning factors. CSSCS tracks the maneuver sustainment posture throughout the task organization down to company level.

Location

K-73. CSSCS terminals are found from the battalion through theater.

Key Capabilities

K-74. Logistics reports depict unit and resource status with a color code of green, amber, red, or black by using corresponding percentages set by the user. Reports can be displayed as web-based custom reports or as standard, preformatted reports. The standard report shows the logistical readiness of a unit and its subordinate units. The user can focus on parts of the report to isolate specific units and materiel items. This capability helps identify how an individual status affects the overall readiness rating of the unit. In the custom report, the user can track the status of specific units and resources:

- The capability report shows a unit's logistical ability to conduct sustained combat operations; this report provides unit resource status in relation to combat posture and intensity for the current day and next four days.
- The supply class report shows resource status with items grouped by class of supply.
- The personnel daily summary depicts unit personnel status and is available for all company-size units and separate battalions.

ARMY BATTLE COMMAND SYSTEM AND THE COMMON TACTICAL PICTURE

K-75. Figure K-3 shows the ABCS's input that forms the CTP.

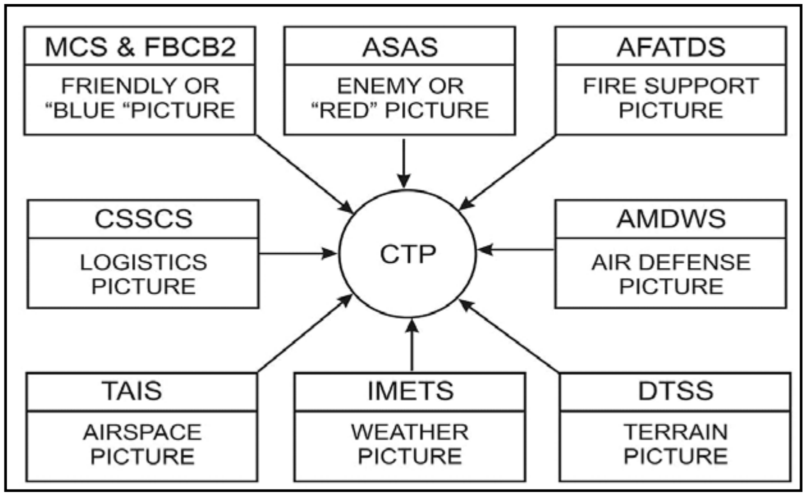


Figure K-3. Common Tactical Picture

SECTION III – NETWORK ARCHITECTURE AND TACTICAL INTERNET

OVERVIEW

K-76. The Army's network architecture is the Warfighter Information Network-Tactical (WIN-T). It is an evolving tactical telecommunications system consisting of infrastructure and network components from the maneuver battalion to the theater rear. It comprises multiple systems and pathways designed to facilitate information distribution and access to information services.

K-77. The TI is one element of WIN-T. The TI consists of tactical communications radios, linked by routers, using commercial standards for addressing and information protocols. It allows digital systems to send and receive SA and C^2 messaging.

K-78. Both SA and C^2 pass simultaneously over the TI. The TI's design provides capabilities that are mobile, secure, survivable, seamless, and capable of supporting multimedia tactical information systems. These capabilities continue despite masking terrain, distance, enemy EW, loss of key signal elements or CPs, or replacement of individual platforms. The TI consists of two segments:

- A lower TI that connects echelons brigade and below.
- An upper TI that provides interbrigade and division connections and above.

LOWER TACTICAL INTERNET COMMUNICATIONS

K-79. Digital communications connectivity for FBCB2 SA and other lower TI C^2 data for brigade and below has three primary components:

- EPLRS—data-only communication (platform position and network coordination).
- SINCGARS—voice and data communications.
- Internet controller (INC)—routing and interface capability.

K-80. Not all FBCB2 ground or aviation platforms will be EPLRS equipped. The non-EPLRS platforms pass FBCB2 data, via the INC, to servers with SINCGARS and EPLRS. Every platform is associated with an EPLRS server through which all SA and C^2 data are routed. Platforms consistently evaluate server quality and jump to an alternate server if the primary server output degrades. Vehicles and aircraft without FBCB2 require verbal reporting and manual tracking. Vehicles and aircraft with EPLRS and FBCB2 will have displays showing the COP, tailorable to the needs of that platform (Figure K-4).

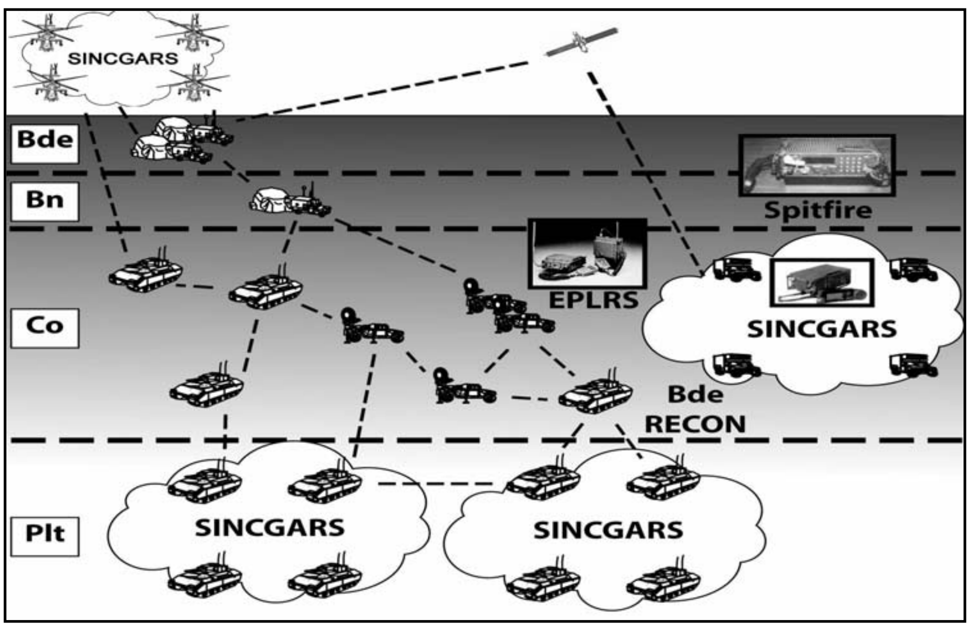


Figure K-4. Lower TI Communications

UPPER TACTICAL INTERNET (WIN-T) COMMUNICATIONS

K-81. MSE and NTDR provide upper TI access/interface to the TOCs of the battalion and brigade CPs. Upward dissemination of the FBCB2 COP SA and C^2 data occurs over the upper TI between the battalion and brigade TOC and to higher echelons. The upper TI also permits access to the intelligence SA of the Army Battle C^2 System of higher and adjacent headquarters. The NTDR handles the bulk of data between the battalion and brigade TOCs with dissemination to and from higher headquarters via MSE (Figure K-5).

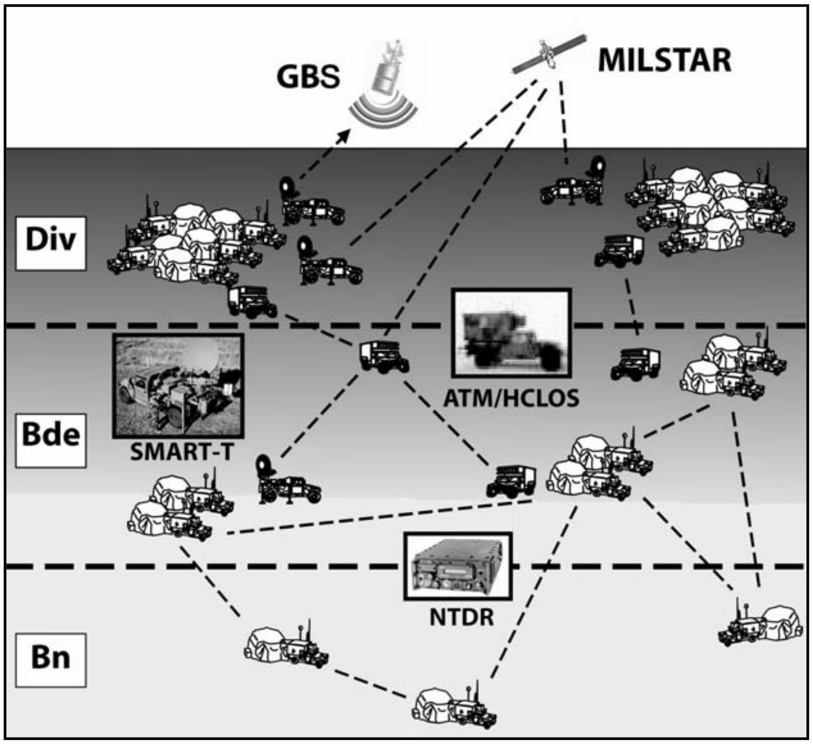


Figure K-5. Upper TI Communications

K-82. At the battalion CP, the TOC INC routes the SA and C^2 data over the TOC LAN and NTDR. At the brigade CP, the TOC INC routes the SA and C^2 data to other brigades and the division over the TOC LAN, NTDR, and MSE.

K-83. The upper TI is that part of the WIN-T that connects tactical echelons to distant headquarters and information sources via the GBS, military SATCOM terminals and satellites, high-capacity LOS transmission, and high-altitude unmanned aircraft relay.

SEAMLESS TACTICAL INTERNET AND NETWORK ARCHITECTURE CONNECTIVITY

K-84. Both the upper and lower TI permit seamless exchange of SA and C^2 data (Figure K-6). Brigade is the echelon where such transfer occurs between the upper and lower TI. Four elements are essential to sharing SA and C^2 messaging all the way down to a vehicle or aircraft platform:

- Appropriate radio waveform (SINCGARS, EPLRS, NTDR, and eventually JTRS).
- Application software (FBCB2 and ABCS).
- Network architecture (TI and WIN-T elements).
- Platform processing and display (SA software and display).

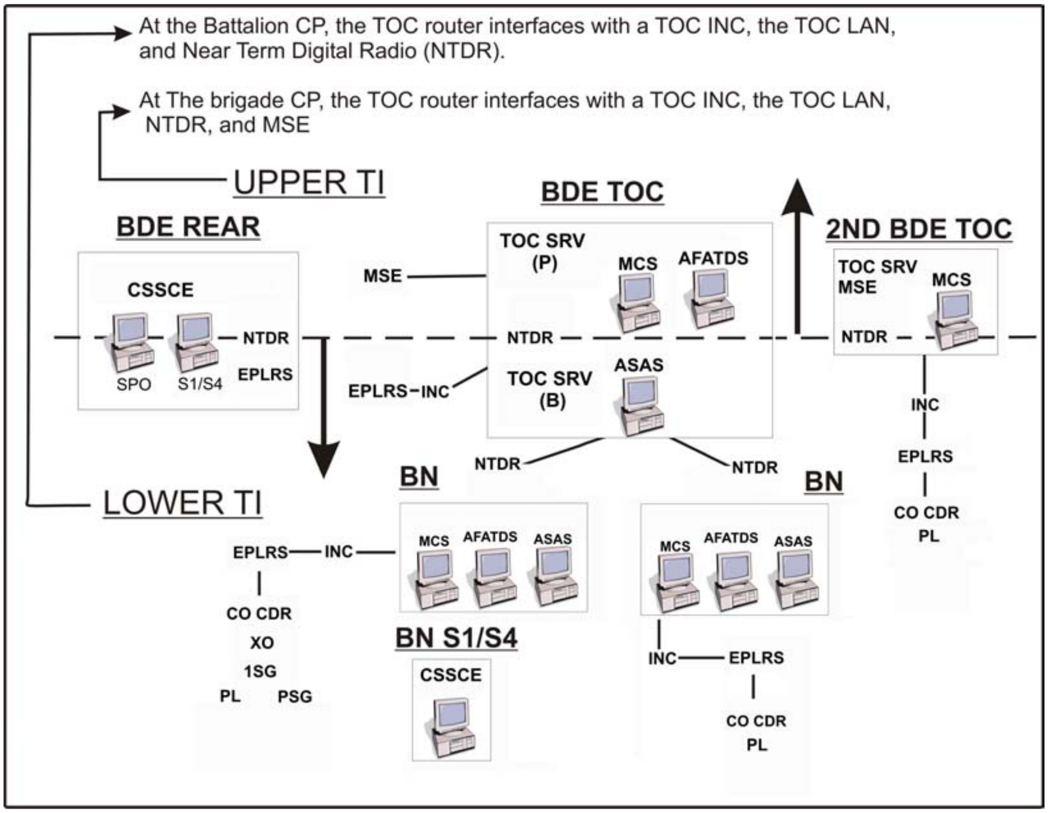


Figure K-6. Upper and Lower TI Interface

SECTION IV – DIGITAL COMMAND POST OPERATIONS

INTRODUCTION

K-85. The Army is making rapid and drastic changes in CP design, taking full advantage of the newest computer technology. The CPs for digitized units will be mobile, deployable, and equipped to access, process, and distribute the information and orders for their echelon. This section outlines the internal operations of a digital CP. FM 3-91 (FM 71-100), 71-100-2, FM 71-100-3, and FM 5-0 (FM 101-5) contain detailed discussion.

DATA EXCHANGE

K-86. Central to digital CP operations is the manner in which they exchange data. ABCSs share information either directly with one another or through the JCDB. The JCDB resides on all of the ABCS computers in a CP and provides the data for the common applications that generate the COP. Battlefield information dynamically flows back and forth between ABCSs and the JCDB. When data is entered through a BAS, this change is forwarded to all ABCS subscribers on the CP's tactical LAN (TACLAN) and posted to the COP (Figure K-7).

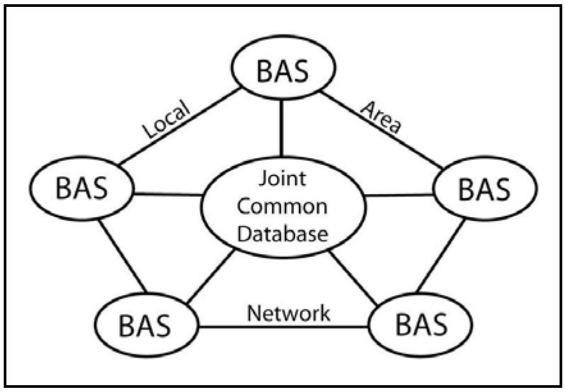


Figure K-7. Data Exchange Within a CP LAN

K-87. Data are also exchanged between CPs. This exchange allows the same data to be maintained in the JCDBs in different CPs. Data generated by each BAS flows to its counterpart BAS at adjacent echelons. Each BAS then transfers this information to the JCDB at that echelon via the TI. Friendly picture position information flows from FBCB2 upward through the server located at each echelon. This information is then deposited into that echelon's JCDB. This data exchange ensures that all TOCs have JCDBs resembling one another. This is key to creating the COP. Figure K-8 shows this data flow between an example battalion and brigade with their MCS operating as servers. Note the flow of friendly position information (depicted by dashed arrows) moving between these echelons and into their JCDBs. Each BAS can, in turn, access this friendly picture from the JCDB at its echelon. The flow of data from a BAS to other BASs and the JCDB is shown by solid arrows.

DIGITAL COMMAND POST LAYOUT

K-88. The standardized integrated command post system (SICPS) is the new generation of CP facility systems to support digitized units. SICPS is a C^2 enabler, providing the platform from which to conduct digital CP activities. Its primary purpose is to support C^2 of digitized units by housing their ABCSs. SICPS is designed to facilitate CP operations by providing the flexibility, commonality, and operational capabilities needed to enhance unit mobility and integrate ABCS and associated communication and networking equipment. It supports the integration of these C^4ISR assets into platforms that can serve as a stand-alone CP or as an integrated element in a larger digitized CP.

K-89. The SICPS has seven CP variants to include track- and wheeled-vehicle-mounted vans, tents, and hard shelters. The digital CP will collocate staff sections and supporting communications systems to facilitate both face-to-face interaction and digital data exchange.

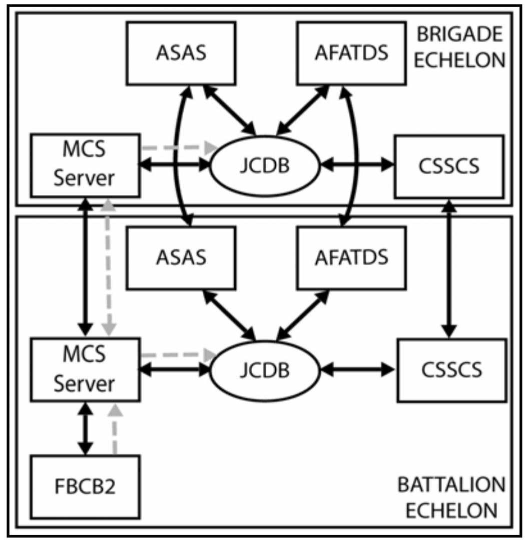


Figure K-8. Example of a Data Exchange Between CPs

K-90. Figure K-9 shows one configuration for the aviation brigade digital CP. Specific unit SOPs may differ from this example. As with the analog CP, the digital CP's physical setup must facilitate communication and analysis of information as well as accommodating computer hardware requirements. Within the digital CP, information is processed at two locations: individual workstations and the combat information center (CIC).

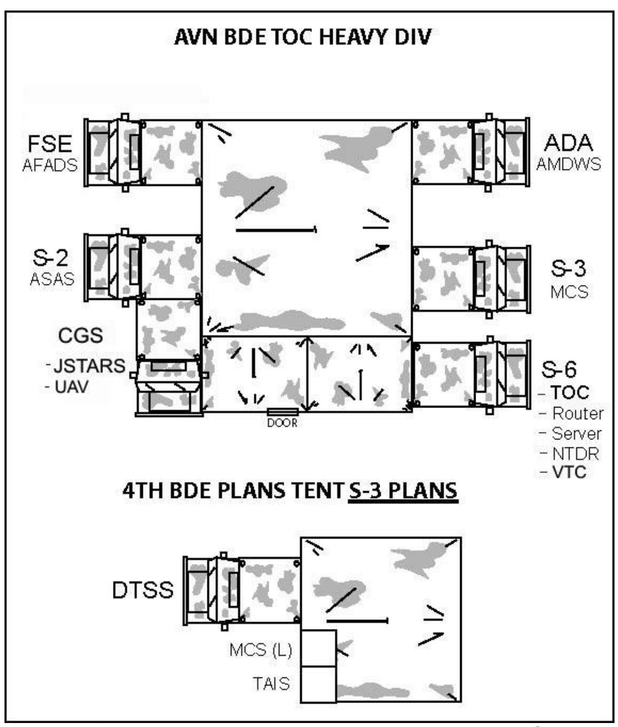


Figure K-9. Typical Aviation Brigade Digital CP Layout

INDIVIDUAL WORKSTATIONS

K-91. The focus of the individual workstation is the individual BAS and the specific BOS that it supports. At his workstation, the staff member inputs and monitors data within his sphere of responsibility. He also accesses data posted to web pages and shared files by other staff sections in the LAN and WAN to carry out his BOS functions and duties.

COMBAT INFORMATION CENTER

K-92. The focus of the CIC is integrated battle monitoring and decision making. It is a special location within the CP for the display of information. The CIC is the central area for viewing information for the commander and his staff to maintain SA.

LARGE SCREEN DISPLAY

K-93. The large screen display (LSD) is the only area in the CP where all key BAS data can be viewed simultaneously. It is, therefore, the place where battlefield vision is best supported. The commander uses the CIC to illustrate his guidance and, with his staff's assistance, to develop and maintain the COP. CICs will vary by MTOE. However, the typical CIC has two LSDs, each capable of displaying nine subscreens. Each subscreen can display the COP and can be configured in various ways to best support the commander's information display preferences. The more subscreens used, the lower the resolution of the image. It is, therefore, recommended that each LSD screen use no more than four subscreens. Two LSDs allow the display of eight subscreens, which should ordinarily be enough. The addition of the engineer battalion LSD will increase this display capability.

DATA DISPLAY MANAGEMENT

K-94. IO play a key role in a commander and staff's ability to maintain an accurate picture of the battlefield in the CIC. With feeds from each ABCS, the LSD enables them to see more of the battlefield and to receive greater amounts of real-time battlefield information by BOS than is available with analog systems.

K-95. More information is not necessarily beneficial to mission planning and accomplishment. Data must be filtered, fused, and focused to create meaningful informational displays relevant to the mission. These displays or tactical pictures must, therefore, be presented in a logical manner on the LSD to support SU. CP digitization has replaced analog maps, acetate, and wing-boards with digital overlays and electronic files. Because electronically stored information is readily available through a minimum number of computer keystrokes, there is also less need to print paper copies of the information. However, information saved electronically has a tendency to be "out of sight, out of mind." Leaders and staff must, therefore, know what data is available to them to make decisions about what will be displayed.

K-96. Although the LSD can display any BAS electronic data, the narrative and static aspects of some information still lend themselves to paper-copy posting within the CP. This is especially true for information that is less likely to change during a mission such as CCIR and the synchronization matrix. In turn, this optimizes the use of LSD subscreens by freeing them to depict dynamic ABCS digital content. The commander, XO, S3, and battle captain must be able to orchestrate BOS coordination through the display of key information on the LSD. Each staff section must, therefore, maintain information relating to its BOS using visual graphics that support the COP. Staff sections and their supporting systems should be arranged around the LSD to facilitate information control, interaction, coordination, and information analysis.

K-97. The COP is displayed on the LSD through one ABCS, typically the S3's MCS or MCS-L. COP control and manipulation and CP LAN administration are aided by centrally collocating the CP server and the BAS that projects the COP. The ability to view the LSD through the BAS controlling the COP also facilitates communication and navigation through data. During discussions in the CIC, personnel can focus staff on key portions of the COP. Data will be displayed on the LSD via the COP using the ABCS COP application or through overlays provided by individual BASs. To portray the COP graphically requires METT-TC analysis of information. The COP displays enemy (shown as red feed and graphics), friendly (shown as blue feed and graphics), terrain (shown as characteristics and impact), and civilian considerations (shown as gray feed and graphics).

K-98. Friendly analysis occurs in the CIC by all BOS sections and systems. Each BAS provides BOS overlays for subsequent data manipulation and consolidated viewing in the form of operational pictures that form the COP. Enemy analysis is especially time-sensitive information.

K-99. The MCS whiteboard or electronic whiteboard equips leaders and staffs to conduct collaborative sessions. Participants at distributed locations view the same enemy and friendly COP on an MCS display and are linked with audio. The *telestration* feature of whiteboard allows each participant to use a mouse with a crayon drawing capability to visually depict locations, graphics, and other coordination measures that can be seen on the participants' screens.

DIGITAL STAFF ESTIMATES

K-100. Not all key information can be graphically depicted on the LSD. Such information must be captured in a readily available, continuous update format for quick dissemination and assimilation. FM 5-0 (FM 101-5) emphasizes that each staff section should maintain a staff estimate (in narrative form, at division and higher and, in graphical form, at brigade and battalion). In the analog CP, these graphical staff estimates correspond to the "wing board" and map data.

K-101. Digitization has eliminated the need to post information to wing boards but has created the need to organize digital data. Units must capitalize on the TACLAN web pages maintained by each staff section for organizing and posting critical mission data. By placing digital staff estimates on a web page, each staff section supports the commander's and staff's need to quickly review, update, and use information for battle monitoring and planning.

K-102. Establishing a standard staff estimate format facilitates navigation through the estimate and cross-referencing between estimates. Staff estimates should also list available BOS overlays by name to better focus graphical review within the ABCS COP application and to focus all echelons and staff on the same, most current data. Through digitally equipped LNOs, analog units should access these digital estimates to obtain current operational data and to help synchronize their operations with digital units.

INFORMATION MANAGEMENT

K-103. The staff must be organized to support the information management process of filter-fuse-focus. This process will be guided by doctrine, TTP, and unit SOPs. The staff must operate according to established procedures that specify access to common databases, common displays, and report formats. The staff must be organized to allow the vertical and horizontal flow of information. This organization should provide links between teams within staff sections, between staff sections within a CP, and between CPs at the same, higher, and lower echelons.

K-104. Digitization enables commanders and staff members to focus more on the execution of combat operations and much less on planning, coordination, and the processing of information. Commanders and staff will have much more data upon which to base their decisions. Their challenge, therefore, will be to manage the flow of vast amounts of data so that the right information gets to the right person at the right time. These specific challenges are—

- **Relevancy:** Determine the relevant information from among the vast amount of data available.
- **Responsibility:** Ensure that each product is the assigned responsibility of a specific staff section.
- **Accuracy and Currency:** Ensure that the data are correct and up-to-date.
- **Dissemination:** Ensure that information generated by the staff gets to the right personnel.
- **Evaluation:** Ensure that information is appropriately assessed.

RELEVANCY

K-105. Because of the large quantity of data available, the commander needs to establish information priorities to focus the staff during their data collection. These priorities must address the relevant information to the specific operation. The commander provides this focus via CCIR that are—

- Specified by the commander and applicable only to him.
- Situation dependent and linked to present and future operations.
- Based on events or activities that are predictable.
- Time sensitive (answers to CCIR must be reported to the commander by the most rapid and effective means).

K-106. Table K-1 summarizes the CCIR responsibilities.

Table K-1. CCIR Responsibilities

Duty Position	Sample Briefing Items
Commander	Establish CCIR Establish priorities for information collection and distribution Assign assets to collection information Determine display of information throughout his command during an operation
Chief of Staff/ Executive Officer	Manage CCIR Establish TTP for tracking when and how CCIR are answered Assign responsibilities to personnel within the staff sections and CPs to manage information Supervise commander's guidance for collecting, processing, and circulating information
Staff Leaders	Manage information within BOS Recommend CCIR based on analyses Record, evaluate, analyze, and report collected information to answer CCIR
Staff Section Operators	Monitor ABCS traffic Know what to file, what data to display, what to name/rename files, and where to store them Know what graphics to display Be alert to CCIR and know how to act on CCIR for these requirements

RESPONSIBILITY

K-107. The diverse products produced using ABCS must each be the responsibility of specific staff sections. This responsibility will usually be obvious, being based on doctrine. Unit SOPs/TTP must confirm these doctrinal responsibilities while ensuring that all other products are the assigned responsibilities of specific staff sections.

ACCURACY AND CURRENCY

K-108. Because ABCS is automated, it allows information to flow much more quickly and accurately. However, while ABCS is automated, most of its information does not flow automatically. Only friendly position data (which supports the friendly or "blue" picture) flows automatically via FBCB2 and the TI. For all other data to enter and flow throughout ABCS, each BAS must be properly initialized and its data maintained. Staff sections will have ready and routine access to the many products of other staffs and units at varied echelons. This outside access may take place without a staff section knowing about it. Staffs must ensure that they continuously post their most up-to-date products and maintain them on staff web pages or shared folders. CP internal procedures must specify routines and suspenses for producing and revising ABCS products and specify where they will be maintained.

DISSEMINATION

K-109. Because of bandwidth limitations, it might not be possible to routinely send out products through e-mail. On the other hand, it is not enough to merely post information to a web site or shared folder and expect others to use it. With the exception of routine, scheduled postings and updates, the staff must proactively notify users when such changes are made. When a product is posted or revised, staff sections must notify other staff sections and units at the same, lower, and higher echelons. This notification must include instructions on precisely where to find the product and its file name. Units must establish SOPs that specify file-naming conventions and file-management procedures. Whether forwarding products or providing notification of product postings in shared files/web pages, the right personnel must receive the right information. Correct address information using the ABCS address books and message handling tables (MHTs) must be established to ensure that data will be sent to the correct BASs. Addressees must be the users employing the individual ABCS rather than generic role names in the address book. If this is not done correctly, information on one BAS will not flow to other BASs even in the same TOC. During initialization, operators must also create and distribute databases, which can be done via messages in ABCS. These databases will ensure that BASs can share the right kind of information.

EVALUATION

K-110. Computer data tends to be accepted at face value because it is computer-based and, therefore, is assumed to always be correct. Users of digital systems must resist this tendency. Error can be introduced through failures in BASs, databases, and communications systems; human error in inputting data; and failing to update information in a timely manner. Data must therefore be evaluated within the context provided by SU to verify that they are accurate and current. Users must follow up on discrepancies to ensure that they have the right information.

SECTION V – DIGITAL DUTIES AND RESPONSIBILITIES

K-111. Staff functions as described in FM 5-0 (FM 101-5) will not fundamentally change in the digital CP. However, these functions will be carried out differently using the digital tools that ABCS provides. Digitization will also require personnel to perform new functions as listed below. These digital CP tasks should be conducted in addition to and as a part of standard staff responsibilities.

COMMANDER

K-112. The commander has the following digital duties and responsibilities:

- Provides command guidance for employing ABCS.
- Provides C^2 of automation resources.
- Establishes automation support priorities.
- Specifies the unit's COP.
- Establishes the CCIR and ensures that these requirements are depicted in ABCS.
- Ensures that subordinate leaders are trained in the employment, operation, and sustainment of automation.
- Trains subordinate leaders and staff to create, maintain, distribute, and use the COP.

EXECUTIVE OFFICER

K-113. The XO has the following digital duties and responsibilities:

- Coordinates the staff to ensure ABCS integration across BAS.
- Ensures that the staff integrates and coordinates its ABCS activities internally, vertically (with higher headquarters and subordinate units), and horizontally (with adjacent units).
- Manages the CCIR; ensures satisfaction of the CCIR.
- Directs the creation and distribution of the COP to include procedures for updating enemy and friendly SU.
- Monitors the information filters, collection plans, and networks that distribute the COP.
- Provides guidance for automation support.
- Coordinates the staff to ensure automation support.
- Coordinates procedures for inter-CP VTCs and whiteboard sessions.
- Monitors liaison teams with analog (nondigitized) units and joint/allied forces for their contribution to the COP.

S1

K-114. The S1 has the following digital duties and responsibilities:

- Is responsible for personnel functions of CSSCS.
- Employs CSSCS to monitor and report on personnel-related portions of the commander's tracked item list (CTIL).
- Manages Standard Installation/Division Personnel System (SIDPERS) interface with CSSCS.

S2

K-115. The S2 has the following digital duties and responsibilities:

- Acts as staff proponent for ASAS and IMETS.
- Supervises ASAS and IMETS operations and support.
- Provides guidance on employment and support of ASAS and IMETS.
- Supervises the information security program; evaluates security vulnerabilities.
- Assists the G6/S6 in implementing and enforcing LAN security policies.
- Provides software application expertise on proponent systems.

S3

K-116. The S3 has the following digital duties and responsibilities:

- Acts as staff proponent for MCS, AFATDS, AMDWS, FBCB2, and AMPS.
- Plans, integrates, and employs ABCS.
- Develops the ABCS annex for plans and orders.
- Develops ABCS annexes to the garrison and tactical SOPs.

- Oversees offensive IO and defensive IO.
- Provides operational and support guidance regarding network employment to subordinate units.
- Integrates AMPS and distributed planning data.
- Creates, maintains, and displays the COP; maintains SU of all units.
- Coordinates with G6/S6 for communications connectivity in support of ABCS.
- Plans and monitors operator digital sustainment training.
- Provides software application expertise on proponent systems.
- Assigns LNOs and coordinates their digital support.
- Collects and distributes postmission results/BDA.

S4

K-117. The S4 has the following digital duties and responsibilities:

- Acts as staff proponent for CSSCS.
- Supervises CSSCS operations and support.
- Provides guidance on employment and support of CSSCS.
- Monitors and reports on the status of all automation equipment.
- Provides software application expertise on proponent systems.

S6

K-118. The S6 has the following digital duties and responsibilities:

- Serves as signal subject matter expert to the commander; advises the commander and staff on all signal support matters.
- Monitors WAN performance; integrates the CP LAN.
- Is responsible for all automation information systems, automation and network management, and information security.
- Ensures consistency and compatibility of automation systems.
- Manages the TI; is responsible for network employment, network configuration, and network status monitoring and reporting.
- Receives planning worksheets with LAN/WAN requirements.
- Ensures unit information network connectivity between unit and higher/lower echelons.
- Plans, coordinates, and manages network terminals.
- Develops, modifies, and manages network need lines, UTO, and base configuration files.
- Plans, coordinates, and manages communications links to include reach-back communications.
- Coordinates with higher echelon signal officers for additional communications support.
- Develops and coordinates the signal digital support plan.
- Determines system and retransmission requirements for the tactical situation.

- Coordinates with higher, adjacent, and subordinate units in development of the signal digital support plan.
- Manages the release of ABCS software within the unit.
- Provides a focal point for automation support (help desk).
- Implements and enforces LAN security policies.
- Establishes COMSEC accountability, distribution, destruction, and security procedures within the unit.

MISSION APPLICATION ADMINISTRATOR

K-119. The mission application administrator has the following digital duties and responsibilities:

- Helps the S6 manage the network.
- Plans and coordinates the linking of BAS to the unit CP.
- Supervises and performs unit-level maintenance and installs and performs maintenance on multifunctional/multiuser information processing systems, peripheral equipment, and associated devices in mobile and fixed facilities.
- Performs analyst functions; constructs, edits, and tests computer system programs.
- Performs preliminary tasks necessary for CP LAN initialization.
- Assists in troubleshooting digital systems.
- Conducts data system studies and prepares documentation and specifications for proposals.
- Maintains master copies of software.
- Backs up data for user-owned and -operated automation information systems.
- Assists in recovery of digital data at the user level.
- Operates and performs PMCS on assigned vehicles and power generators.
- Monitors BAS PMCS program.
- Coordinates repairs with the S6 section.

BATTLE CAPTAIN/BATTLE STAFF NONCOMMISSIONED OFFICER

K-120. The battle captain/battle staff NCO has the following digital duties and responsibilities:

- Oversees operations of assigned BAS.
- Controls/directs the initialization of the BAS within the CP LAN (battle staff NCO).
- Ensures that information flow and coordination take place between and within each staff section and with higher, adjacent, and lower headquarters.
- Accesses and employs information through ABCS in support of operations and planning.
- Ensures that key BAS products are available and current in support of the mission.

BATTLEFIELD AUTOMATED SYSTEM OPERATORS

K-121. The battlefield automated system operator has the following digital duties and responsibilities:

- Installs and operates assigned digital hardware and software.
- Establishes connectivity of assigned BAS within LAN/WAN; ensures that the system interfaces with correct tactical communications.
- Inputs operational data.
- Produces automated reports required by commanders and staff leaders.
- Performs PMCS on assigned BAS.
- Isolates, identifies, and tracks digital system problems.
- Maintains continuity of digital operations.
- Maintains portions of the COP, as assigned.
- Ensures unit-level information security.

SECTION VI – MANAGEMENT OF DIGITAL COMMAND POST PERSONNEL

BATTLE ROSTERS

K-122. Each section within the CP must maintain a digital battle roster listing the section operators assigned to each BAS. At a minimum, sections should plan for three operators per system: two soldiers to man a 12-hour shift each plus one soldier to serve as a backup and to provide periodic relief. The roster should list the following:

- Personnel name and rank.
- Assigned BAS.
- Assigned shift.
- Date of most recent training on system.
- Software version of most recent training.
- Estimated date of departure from unit.

K-123. Operators should be managed in a manner similar to unit vehicle drivers according to the following principles:

- Depth: Have more trained operators than needed to ensure BAS coverage even when unanticipated losses occur.
- Anticipate: Know when personnel are scheduled to depart the unit, and train their replacements well in advance.
- Leaders: Section leaders should be prepared to function as operators; in addition to providing additional coverage, this ability enables section leaders to better supervise and employ the BASs that they oversee.
- Currency: Operators must be trained on the most current software carried on their BAS.

SHIFT MANAGEMENT

K-124. Shift changes are usually scheduled at 12-hour intervals. Commanders should consider offsetting shift changes at midshift for key personnel. Staggering personnel in this manner will maintain a constant interface of new and old shift personnel. This practice will ensure that at least one individual knows what happened during the previous shift. Figure K-10 provides an example.

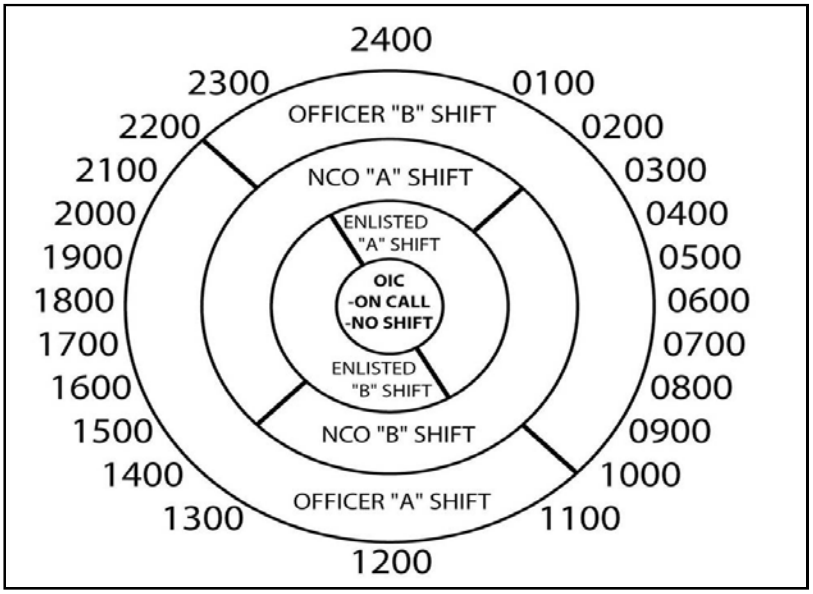


Figure K-10. Example of Staggered Shift Changes

K-125. Soldiers must conduct a one-on-one exchange of information with the person who they are relieving. This exchange must be followed by sectionwide debriefs to ensure continuity in information flow and handoff of ongoing staff actions.

K-126. Following the individual brief, section-level products and actions should be reviewed. Each staff section should accomplish the following actions:

- Review the digital journal for the past 12 hours.
- Review and update any CCIR.
- Review the current approved overlays.
- Review the current COP products.
- Check files to ensure that standard naming conventions are used.
- Review the UTO.
- Check section web products for updating and to ensure that they are posted properly.

K-127. A collective information exchange, in the form of a shift change brief, must be conducted so that the incoming shift receives a positive change of control. Personnel from different staff sections will have access to the key information produced by other sections and CPs. Handover briefings focus much less on the rote exchange of information. Rather, these briefing sessions can function to focus personnel on available information, evaluation of information, the status of the current operations, and tasks to support future operations.

K-128. Critical digital considerations should be briefed collectively within the CP. Table K-2 provides an example of what this brief may look like. There is presently no doctrinal guidance on this process. Units should develop SOPs to address this requirement.

Table K-2. Example of a CP Shift Change Brief

Staff Position	Sample Briefing Items
S3 Battle Captain	Current higher and brigade changes to task organization Disposition/status of units Current and future missions Current operations LNO updates Combat power status Projected operations over next 12 hours Current timelines
S2/ Weather	PIR/CCIR Current SU and location/status of all ISR assets (national to division/brigade) RFI/RFA to higher (ARFOR or national) Weather – next 12 hours impact/effects on friendly and enemy systems HVT/HPT Battle damage assessment Significant activities during past 12 hours
FSE	Organization for combat Unit locations and status Priority of fires HPT/attack guidance matrix Fire support control measures Significant activities
ALO	Preplanned request status Immediate request status In-flight reports
AD	Organization for combat Current AD warning status Aircraft engagements Location and status of AD units
Engineer	Operations since last update Status of equipment and Class IV/V Future engineer operations Recommendations for the commander
Chemical	NBC condition Current and recommended MOPP Enemy NBC activity Chemical unit locations and status
S1/S4/ Surgeon	Equipment status Class VIII status Priority of support Personnel status/health service status

BATTLE RHYTHM

K-129. Battle rhythm is a nondoctrinal term that describes a process essential to effective and efficient battle staff operations. The cycle of recurring events within a CP focuses staff members to meet information and action requirements. These recurring events include—

- Shift changes.
- Targeting meetings.
- Reports.
- Battle updates without the commander.
- Battle update briefings.
- Commanders' collaborative sessions.
- Battle captain collaborative sessions.

K-130. The staff must achieve a battle rhythm for updating and viewing information and understand how to use it to affect operations. A well-established battle rhythm will aid the commander and staff with CP organization, information management and display, decision making, and fighting the battle from the CIC and via satellite C^2 systems. Battle rhythm demands careful planning and design. The many competing demands must be deconflicted. Even subordinate units affect a higher echelon's battle rhythm based on their needs and unit procedures. Two key things to consider when establishing SOPs for battle rhythm are scheduled updates (both with higher and subordinate units) and bandwidth. ABCS competes for bandwidth with the commander's digital updates or VTCs especially if the data passes over communications links between CPs. The MDMP can have one of the most dramatic effects on battle rhythm. The process is lengthy and detailed and must be closely coordinated with other ongoing actions.

BATTLE UPDATE BRIEFING

K-131. The battle update briefing provides the commander with analyzed information essential to decision making and to synchronize the staff's actions. Use of the COP expedites the battle update and makes it more current. The more information used from the COP, the more time that the staff has to analyze and evaluate the information. The battle update briefing itself will center on the COP displayed in the CIC. The staff must be selective as to what other information is presented given the wealth of data and the fact that it is already available at each BAS. Unit SOPs, command guidance, and operational requirements will guide what information is briefed. Facts and capabilities may be presented in digital staff estimates for the commander to review before the briefing. This allows the battle update briefing to focus on by-exception information and on specific commander issues. Methods to update the commander depend on his location, connectivity, and the information that he requires. Table K-3 compares delivery methods.

Table K-3. Update Delivery Comparison

Commander in an Aviation CP	Commander in Another CP
Verbal	Voice (radio, phone)
Over the shoulder of an operator	FBCB2
Commander's update page and pull-up information	MCS or access to another BAS at his location
Links to staff section pages and pull-up information	Collaboration session
Collaboration session	
Large Screen Display	

K-132. Traditionally, these updates were a recounting of significant events since the last update. To build the update, the CP would establish an information cut-off time. The focus was on maintaining SU. ABCS has altered this briefing from a staff brief to a constantly available information package focusing on the commander's needs. Table K-4 shows how the briefing has evolved from its traditional analog form to its digital form.

Table K-4. Traditional Versus Digital

Traditional	Digital
Significant events since last update	Commander accesses his own critical information needs
Current as of cut-off time	Updated continuously
Periodic event	Available anytime
Current SU	Enhances SU
Staff presentations and their preparation were significant event	Staff routinely maintains information files, which continues with normal operations

K-133. Battle update briefs should maximize the use of information from BASs to aid in understanding the COP. Cutting and pasting information to non-ABCS briefing slides focus on fact finding and less on analysis. The traditional form also consumes considerable time: more than one hour to build/transmit slides, one hour to present (at brigade level), and one additional hour to present (at the division level). By the time that slides are briefed, their information is outdated and inconsistent with the more current COP.

ANALOG UNIT INTERACTION

K-134. Digitized units must be prepared to operate with nondigital units that do not have the technology to access the digital COP. Liaison parties will almost always be necessary to ensure full exchange of information between digitized and nondigitized units. The primary tasks of digital LNO teams are—

- Receipt and transmission of orders, graphics, and intelligence data via BAS.
- Provision of friendly and enemy SU to the analog unit using its BAS.

- Manual creation of the analog unit friendly and enemy SU and its transmission back to the parent organization.
- Fire support and coordination.

PLANNING

K-135. A digitized unit must exchange liaison teams with nondigitized units early and consistently throughout the planning process. Nondigitized units must strive to conduct parallel planning but will be at a disadvantage without digital staff tools. Parallel planning requires rapid exchange of information with analog units during the planning process. Involving higher, adjacent, and lower staff elements early in the planning process allows the entire staff to see both current and future operations and to identify known or potential problem areas.

LIAISON TEAMS

K-136. Digital liaison teams may be sent to the analog unit's CP. Liaison provides at least some digital capability to analog units. These teams will support SU for both the digital and nondigital unit, the issue of orders, and informal information exchange. The number of liaison teams is limited, and these alone cannot solve the C^2 challenges of analog units that are without digitally based SU. Liaison teams may be needed to escort elements of the analog unit, even down to single vehicles if necessary. This latter option will provide SU for these analog elements but is only practical if the digital unit forms additional liaison elements.

EQUIPMENT REQUIREMENTS

K-137. The equipment and skills required of the liaison teams are a function of the type of operation being conducted and the force with which the team is coordinating. There are three basic forms of liaison that affect the task organization of liaison teams:

- **Digital unit to digital unit:** This requires the least equipment and personnel because information is easily shared in near-real time; critical SU is maintained in each unit's knowledge base.
- **Digital unit to analog unit:** This may occur when conducting operations with some active component units, most reserve component units, and coalition forces; these teams require a full suite of digital systems to maintain the parent unit's COP and to provide SU of the nondigitized force back to the digital headquarters. Representation from each staff section may be required on the team.
- **Digital unit to nonmilitary forces/agencies:** This is the same as for analog units but augmented with additional specialties such as the S5/G5.

Appendix L

Army Airborne Command and Control System

SECTION I – INTRODUCTION

L-1. The A^2C^2S is a UH-60 Black Hawk-based C^2 system that serves as an airborne tactical CP. Through its onboard MCS, ASAS, AFATDS, AMDWS, CSSCS, and FBCB2, A^2C^2S provides continuous battlefield SA. It also is the source of digital information for nondigitized aircraft supporting the operation (Figure L-1).

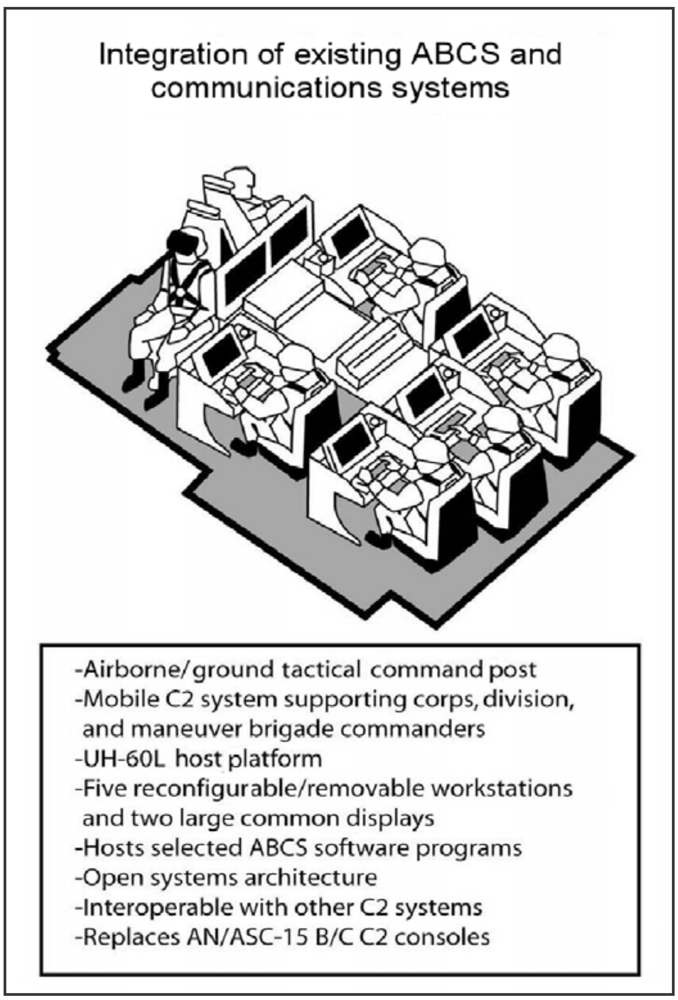


Figure L-1. A^2C^2S Configuration

MISSION

L-2. A^2C^2S provides maneuver commanders—from ATKHB to echelons above corps—with on-the-move C^2. The system supports three major operational functions: mission planning, mission execution, and mission support. Its primary function is to monitor the execution of current operations while the main CP focuses primarily on planning future operations.

ARMY AIRBORNE COMMAND AND CONTROL SYSTEM CAPABILITIES

L-3. A^2C^2S enables the commander and his staff to traverse the battle space to critical places at critical times. The commander and staff can perform all battle command and coordination functions from A^2C^2S. It has simultaneous multiband voice and data channels and dynamic visual battlefield SA and C^2 via C^4I connectivity. A^2C^2S provides access to the TI to manipulate, store, manage, and analyze SA information, intelligence data, mission plans, and mission progress data to support the C^2 decision-making process. The system has triservice interoperability and is compatible with NATO, civil aviation, maritime, and law-enforcement communications.

FEATURES AND PERFORMANCE

L-4. A^2C^2S provides—

- Robust LOS and NLOS communications through SINCGARS Advanced System Improvement Program (ASIP), SATCOM demand assigned multiple access (DAMA), Have Quick II, EPLRS (friendly positions), NTDR (SA), and HF.
- GPS for present position and standard NIMA maps with overlays for a complete picture of the battlefield.
- Automated display of SA and C^2.
- Five automated, reconfigurable, and removable workstations and a command database and two large common displays; each workstation incorporates a keyboard, monitor, and audio communications unit.
- Real-time battle-space control and monitoring.
- Common displays.
- Enhanced control of battle.
- Digital connectivity with all ABCSs.
- Standard communications and information security.
- Airborne and ground operational modes.

ARMY AIRBORNE COMMAND AND CONTROL SYSTEM INTERFACES

L-5. A^2C^2S interfaces with—

- JSTARS.
- TACSAT.
- Maneuver TOCs.
- RAH-66 Comanche (when fielded).
- CH-47F Chinook (when fielded).
- AH-64D Longbow.

- OH-58D.
- M1 main battle tank.
- M2/M3 cavalry fighting vehicle.
- MLRS.

OPERATION AS A GROUND CP

L-6. The preferred power source for ground operations is commercial power. If commercial power is not available, a generator is the next preferred power source. If external power is not available, aircraft power is required. Extended ground times may require a ground power unit, which could be brought in via sling load, or by a tactical ground vehicle, such as a HMMWV with a generator kit.

COMMAND AND CONTROL MISSION PLANNING CONSIDERATIONS

L-7. C^2 planning considerations unique to A^2C^2S are discussed below.

SYSTEM INITIALIZATION

L-8. Initialization is an important step in preparing A^2C^2S automated systems. If A^2C^2S begins a mission without proper initialization, it is difficult to transfer the necessary volume of initial information while en route (in a timely manner) to exploit the capabilities of the automated workstations and data communications. A^2C^2S initialization is a three-step process:

- Initializing radios.
- Initializing the IDM (+)/INC.
- Loading of MCS data.

SYSTEM OPERATOR

L-9. A master operator manages the software/hardware while the commander and staff control the battle. The operator must be trained to initialize the system, use each of the component systems, and troubleshoot the system and provide immediate work-around solutions in case of malfunctions. The aviation unit may not have personnel available to operate the system. The supported unit commander must be prepared to provide a systems operator.

ARMY AIRBORNE COMMAND AND CONTROL SYSTEM OPERATOR MANUALS

L-10. This appendix is written to provide an overview of A^2C^2S. Operator manuals take precedence over any procedure in this appendix.

SECTION II – EMPLOYMENT

L-11. The information management capabilities of A^2C^2S are focused on controlling the execution of an operation. Planning capability is limited. Mission data are transferred to A^2C^2S from the digital TOC to bring it up to the same (current) operational status at the start of a mission.

INFORMATION FLOW

L-12. The ATCCSs are primarily top-down planning tools. Once the execution phase begins, the primary flow of information is bottom-up via FBCB2. A^2C^2S draws real-time data from broadcast sources to determine changes to the enemy situation during the execution phase of a mission. The intelligence information that the ASAS provides is an analyzed and formal product. Intelligence information that A^2C^2S receives from tactical related applications (TRAP), Tactical Data Information Exchange-Broadcast (TADIX-B), and Tactical Information Broadcast Service (TIBS) broadcast sources is raw data (Figure L-2).

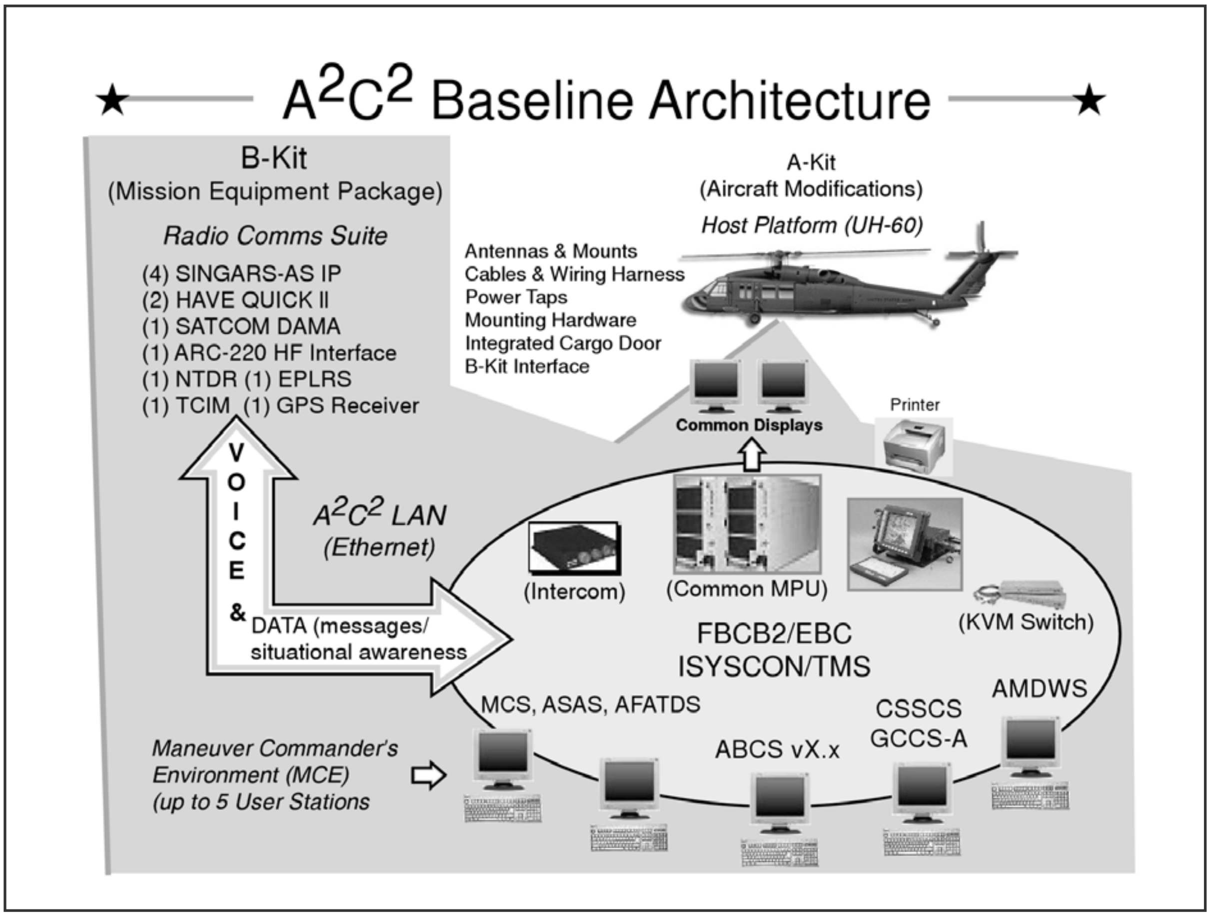


Figure L-2. A^2C^2S Information Flow

BATTLEFIELD EMPLOYMENT

L-13. A^2C^2S expands the battlefield by providing the means to exercise C^2 and gather tactical information in support of a mission while on the move. From A^2C^2S, the commander and staff influence the battle via direct exchange of voice and digital information with units conducting the mission. They simultaneously develop the situation beyond the range of their unit's sensors and shooters by accessing broadcast intelligence sources.

COVERING FORCE AND DEEP AREAS

L-14. A^2C^2S enhances lethality during covering-force missions and shaping operations in deep areas by moving its command forward so that it can maintain contact with the maneuver forces. From A^2C^2S, the commander and staff can synchronize deliberate and hasty artillery fires. A^2C^2S can have a direct link to artillery, including the ATACMS. However, direct linkage is not necessary for direct FS or priority of fires.

CLOSE AREAS

L-15. Integral activities during operations in close areas include maneuver, close combat (including TACAIR), indirect FS, CS and CSS of committed forces, and C^3I. Aviation organizations may be employed as a security or reserve force in the security or main battle area. A^2C^2S gives the commander a clear picture of the close battle and allows him to coordinate and synchronize maneuver and fires. Linked with other automated systems, A^2C^2S can pull information on demand. This allows the commander to operate at his own tempo, without the information delays characteristic of traditional reporting methods.

REAR AREAS

L-16. The aviation brigade gives the division commander a highly mobile and lethal combat force to counter a Level III incursion in the rear area. As a maneuver headquarters, the brigade can be tasked as a tactical combat force to respond to a significant threat. A^2C^2S provides a flexible and highly mobile tactical CP to control operations.

STABILITY AND SUPPORT OPERATIONS

L-17. During SASO, the system provides connectivity to special operations C^2, embassy, law enforcement, maritime, civil, and/or other humanitarian information and communication networks. A^2C^2S can improve the ability of local, state, and federal agencies to communicate and coordinate in a crisis environment such as a hurricane or forest fire.

Appendix M

Media Considerations

SECTION I – MEDIA SUPPORT

GENERAL

M-1. This section addresses how forces support media information needs while protecting operational security.

MEDIA PRESENCE ASSESSMENT

M-2. The commander needs to know how many media representatives are in the theater before force deployment and the anticipated level of media presence once deployment begins. He requires analysis of the media type (print or broadcast), media visibility (local, national, international, American, or foreign), and media style (news, information, or entertainment) covering the operation. The media presence assessment should address the authority under which media representatives are operating in the theater and their degree of access to the theater of operations. With this information, units prepare for the media environment that they are about to enter.

MEDIA CAPABILITIES

M-3. Commanders examine the media's technological capabilities and their logistics support including their transportation and resupply assets. Units may have to transport and logistically support media members.

HOME-STATION INFORMATION NEEDS

M-4. Units must know what information that they are to provide and to whom. Public affairs planners determine the information needs of soldiers and family members (internal audiences) and of the American public (external audience). A thorough audience analysis is essential to determine how different audiences will perceive information made available to the media. Information products provided to internal and external audiences will vary. Units exercise caution in providing information about Army capabilities, the force's size and structure, unit activities, deployments, and other operational information.

DEPLOYED UNIT NEEDS

M-5. For deployed soldiers, the public affairs office (PAO) includes products (print, broadcast, and electronic) that provide news and information about the home station, the local community, and national and international events.

PROTECTING INFORMATION

M-6. Commanders balance the need to inform the public with the understanding that units must practice OPSEC. The threat has access to the same media resources as the friendly force and public. Both sides can benefit from and be hurt by information that the media gains and disseminates. Pieces of the right information in the wrong hands can adversely affect the outcome of operations. Soldiers must protect vital information by practicing security at the source, following established OPSEC measures. In addition to protecting both raw and completed information products, units protect information networks.

MEDIA FACILITATION

M-7. The commercial news media are major players in the global information environment. News media will cover future military operations and, in many cases, will be on the ground before American forces arrive. They will transmit images to the world of events as they happen, from both sides of the conflict. It is the commander's task, through the staff, to develop a responsive infrastructure to facilitate media interaction.

PREPARING FOR THE MEDIA

M-8. Commanders must understand the role of news organizations and journalists. They must understand media capabilities to gather and broadcast information from the battlefield or AO in near-real time. Commanders must provide media access to the force, keeping in mind the effect that media technology can have on operational security. Commanders must also provide support and resources to assist the media in their mission.

UNIT MEDIA FACILITATION REQUIREMENTS

M-9. The objective of media facilitation is to support reporters in their efforts to cover the force and the operation, while minimizing the possibility that media activities will interfere with the operation, endanger mission accomplishment, or compromise soldier safety or privacy. Units should prepare to support the following requirements to facilitate visits by the media:

- Assisting media entry into the area.
- Registering media representatives.
- Orienting them on ground rules for coverage.
- Ensuring that they understand security policies.
- Arranging interviews and briefings.
- Coordinating unit visits and escorts.
- Providing transportation to media representatives.
- Providing thorough and timely responses to media queries.
- Embedding media in operational units, if required.

ASSESSING THE MEDIA INTEREST LEVEL

M-10. Commanders should assess the level of news media interest in their operation to anticipate and provide those assets necessary for the media.

Commanders and staff must also assess the intensity of news media interest and anticipate the personnel, communications, transportation, and deployment requirements for communicating through the news media during all stages of the operation.

EMBEDDING THE MEDIA

M-11. The PAO may seek out media members who are willing to spend extended periods with soldiers during an operation and embed them into units. Embedding is the act of assigning reporters to units as members of those units. They eat, sleep, and move with units. They are authorized open access to all sections of units and are not escorted by public affairs personnel. Rather, units are the reporters' escorts. Reporters file their stories from unit locations. The unit commander establishes OPSEC guidelines on what and when the reporter can report.

GROUND RULES

M-12. Sustained contacts between military forces and the news media can result in the most complete and accurate stories about their units. They seek to convince reporters that acceptance of reasonable military ground rules in the integration of journalists into operational units is in the best interest of both institutions. Some reporters will choose not to cooperate. Commanders have no responsibility for such individuals and should focus their attention on the reporters who desire to abide by the procedures outlined for the operation.

MEDIA SECURITY

M-13. Some members of the media may claim that their security is of no concern to the military and that DOD policy calls for working with journalists without regard for their safety. The captures of journalists by U.S. adversaries in Panama during Operation Just Cause, in Iraq during Operation Desert Storm, and in Afghanistan have proven that no one can guarantee the security of all reporters. However, those who accept the protection afforded them by military units are in the best position to cover the story and avoid harm.

PUBLIC AFFAIRS OFFICE ESCORTS, INTERVIEWS, AND BRIEFINGS

M-14. Public affairs and operational personnel should be available to furnish context to transmitted images or reports. Without command assistance, there is a chance of misperceptions and misunderstandings; however, it is unrealistic to expect that trained public affairs professionals will accompany all journalists. Often, PAOs are not the most qualified personnel to act as escorts because they lack specialized expertise to explain detailed activities of different units involved in an operation. Units should be prepared to provide their own escorts for visiting media representatives.

MEDIA TRANSPORT

M-15. The PAO normally arranges for the press to visit a unit. He assists in transport to the unit and relies on designated subject matter experts (such as an XO, first sergeant, or platoon leader) to assist the media while with that unit. Transportation arrangements need not place special requirements on the unit. Reporters can move with supply columns or any other transport that shuttles within the organization.

COMMAND INTEREST

M-16. Commanders at every level should stay abreast of what reporters are saying about their efforts. Tactical-level commanders will often learn from the reporters integrated with their units, from news summaries, or other reports published or broadcast after the fact. They need not like or agree with news reports, but they do need to understand the report's effect. Media reports help shape public perception and opinion of the command's effectiveness. With an effective media facilitation program, the command is aware of differences between its version of events and what the news media may report. Relying on technology, assessments, and media facilitation plans, commanders and PA staffs continuously work to narrow that inevitable gap.

M-17. Information should be fully and readily available, consistent with statutory requirements, unless current and valid security classifications preclude its release. Units adhere to the following guidelines:

- Support provisions of the Freedom of Information Act (FOIA) in both letter and spirit.
- Allow members of the Armed Forces and their family members to freely exchange general and military information with media members, without censorship or propaganda.
- Do not classify or withhold information to protect the government from criticism or embarrassment.
- Withhold information only when disclosure would adversely affect national security, compromise the mission, or otherwise threaten the safety or privacy of soldiers.
- Plan and coordinate public affairs details within DOD and with other government agencies to meet DOD obligations to provide information to the public.
- Do not employ propaganda in DOD public affairs programs.

PREPARING FOR MEDIA INTERVIEWS

M-18. Figure M-1 is a checklist to aid in preparation for media interviews. It includes typical questions that reporters may ask. An interview with the media is never a casual conversation. The military representative should never go into a media interview without preparing, rehearsing (if practical), and remembering that he represents the unit and the U.S. Army.

THINGS YOU SHOULD THINK ABOUT AND BE AWARE OF:

a. When human safety or other serious concerns are involved, deal with those considerations first.
b. Communicate only information that is approved for external distribution. Always tell the truth.
c. Know to whom you are speaking. Get the person's name and telephone number if necessary.
d. Do not be intimidated. You may tell a reporter that you need to clarify an important matter before you can answer questions.
e. Talk from the public's viewpoint. Avoid jargon. Speak within the audience's frame of reference.
f. If the questions do not lie within the framework of approved statements or within your area of expertise, find the appropriate technical advisor or spokesperson.
g. State the most important fact at the beginning. Place your own headline on the answer.
h. Attack problems in your answers, not people.
i. Do not repeat offensive or negative language. Do not let other people put words in your mouth.
j. Direct questions deserve equally direct and forthright answers.
k. Do not exaggerate the facts. Listen to how your answer sounds when spoken.
l. Ignore cameras and microphones. Talk to the reporter.
m. During videotaped interviews, it is acceptable to stop your statement and start over.
n. Do not say "no comment", explain why you do not have an immediate answer.
o. Keep your composure, even if a news reporter gets snappy.
p. Be prepared to provide sufficient evidence for statements that you make.
q. Be especially alert about photos. You have little control over photos taken off military reservation property, but you have every right to control photos taken on the military reservation. Be aware of your surroundings, and follow local OPSEC rules when determining the interview location.

WHAT WILL BE ASKED?

a. What happened and where? When did this occur?
b. Are there injuries or deaths as a result? How many? Who are the injured and dead?
c. What actions is the unit taking to control the situation?
d. Have chemicals or other hazardous substances been released into the environment? What kinds? How much?
e. What types of hazards are presented to a person offsite?
f. Have offsite emergency response personnel been notified? Which ones?
g. Are unit operations shut down?
h. Has the site or facility been evacuated?
i. How many people are employed at this site?
j. What do you do at this site?
k. How old is the facility? Does it meet current regulations?
l. Why did this situation occur? (Do not speculate.)
m. Are there safety rules covering the situation? Were they violated?
n. Has a site emergency response plan been activated? What does that involve?
o. Tell me about your organization.
p. Will this situation have nationwide ramifications, or will its effect likely be limited to a single site or region?
q. How much money is this going to cost the taxpayers?
r. Is there insurance coverage for the loss or damage? How much?

Figure M-1. Media Interview Guidelines

SECTION II – GUIDELINES

M-19. This section explains DOD media guidelines for reporters and the units that support them.

DEPARTMENT OF DEFENSE MEDIA GUIDELINES

M-20. DOD Directive 5122.5 provides the following guidelines for covering combat operations:

- Open and independent reporting will be the principal means covering of U.S. military operations.
- Pools are not to serve as the standard means of covering U.S. military operations; however, pools may sometimes provide the only feasible means of early access to a military operation. Pools should be as large as possible and disbanded at the earliest opportunity, within 24 to 36 hours when possible. The arrival of early access pools will not cancel the principle of independent coverage for journalists already in the area.
- Even under conditions of open coverage, pools may be appropriate for specific events such as those at extremely remote locations or where space is limited.
- Journalists in a combat zone receive credentials from the U.S. military and will be required to abide by a clear set of military security ground rules that protect U.S. forces and their operations; violation of the ground rules can result in suspension of credentials and expulsion from the combat zone for the journalists involved. News organizations will make their best efforts to assign experienced journalists to combat operations and then make them familiar with U.S. military operations.
- Journalists will be provided access to all major military units; special operations restrictions may limit access in some cases.
- Military public affairs officers should act as liaisons but should not interfere with reporting.
- Under conditions of open coverage, field commanders will permit journalists to ride in military vehicles and aircraft whenever feasible; the military will be responsible for the transportation of pools.

M-21. Figure M-2 is a sample of media ground rules.

OPERATION DESERT STORM GROUND RULES

The following information should not be reported because its publication or broadcast could jeopardize operations and endanger lives:

(1) For U.S. or coalition units, specific numerical information on troop strength, aircraft, weapons systems, on-hand equipment or supplies—such as artillery, tanks, radars, missiles, trucks, and water—including amounts of ammunition or fuel moved by support units or on hand in combat units. Unit size may be described in general terms such as "company-size, multibattalion, multidivision, naval task force, and carrier battle group."Number and amount of equipment and supplies may be described in general terms such as "large, small, or many."

(2) Any information that reveals details of future plans, operations, or strikes, including postponed or cancelled operations.

(3) Information, photography, and imagery that would reveal the specific location of military forces or show the level of security at military installations or encampments. Locations may be described as follows: all Navy embark stories can identify the ship upon which embarked as a dateline and will state that this report is coming "from the Persian Gulf, Red Sea, or North Arabian Sea." Stories written in Saudi Arabia may be datelined "Eastern Saudi Arabia, near the Kuwaiti border." For specific countries outside Saudi Arabia, stories will state that the report is coming from the Persian Gulf region unless that country has acknowledged its participation.

(4) ROE details.

(5) Information on intelligence collection activities, including targets, methods and results.

(6) During an operation, specific information on friendly force troop movements, tactical deployments, and dispositions that would jeopardize operational security and lives. This would include unit designations, names or operations, and size of friendly forces involved until released by [Central Command] CENTCOM.

(7) Identification of mission aircraft points of origin, other than as land or carrier based.

(8) Information on the effectiveness or ineffectiveness of enemy camouflage, cover, deception, targeting, direct and indirect fire, intelligence collection, or security measures.

(9) Specific identifying information on missing or downed aircraft or ships while search-and-rescue operations are planned or underway.

(10) SOF methods, unique equipment, or tactics.

(11) Specific operating methods and tactics—such as air [operations] angles of attack or speeds, naval tactics, and evasive maneuvers. General terms, such as "low" or "fast," may be used.

(12) Information on operational or support vulnerabilities that could be used against U.S. forces—such as details of major battle damage or major personnel losses of specific U.S. or coalition units—until that information no longer provides tactical advantage to the enemy and is, therefore, released by CENTCOM. Damage and casualties may be described as "light," "moderate," or "heavy."

Figure M-2. Sample Media Ground Rules

SECTION III – MEDIA IN STABILITY AND SUPPORT OPERATIONS

M-22. SASO present unique challenges and may require greater diplomacy in dealing with the media. The Army may also coordinate media coverage with other nonmilitary agencies in the AO.

MEDIA FOCUS

M-23. Media attention should be viewed as an asset rather than a hindrance. The public often considers media reports more credible than official pronouncements. News reports are a primary conduit for communicating Army goals, capabilities, and accomplishments. They contribute to perceptions of legitimacy, requiring the presentation of consistent, clear information about the operation.

SOLDIER PREPARATION

M-24. SASO usually receives intense international media attention; therefore, soldiers must understand that their decisions and actions can have immediate strategic and political implications. They should understand the nature of the operation and know its goals. Internal information programs build soldier knowledge of the history and cultural factors that shape the operation and its context. These also enhance knowledge of coalition partners, thereby contributing to mutual trust and respect.

MULTINATIONAL OPERATIONS

M-25. Political considerations and media involvement may be the most important factors in a multinational operation. Combined operations help to solidify international acceptance of the SASO; however, the accompanying international media coverage presents unique challenges.

OPERATIONAL CONSIDERATIONS

M-26. To reinforce unity of purpose, spokespersons from all nations should speak with one voice. Multinational partnerships consist of alliances and coalitions. Alliances are long-standing relationships of nations with formal, standardized agreements and operating procedures oriented on long-term objectives. Coalitions are more short term in duration and goal. Cultural, psychological, economic, technological, and political factors influence these alliances and coalitions.

COALITIONS

M-27. The United States enters coalitions for a single purpose of finite duration. Coalition members may be diverse in culture, politics, and philosophy. Their relationships may be tenuous and fragile. Each nation enters an alliance or a coalition for its own reasons; therefore, mutually agreed upon end states must be clearly defined. Coalition nation reporters may show interest in U.S. Army units. Exercise particular caution because reports may strengthen or weaken coalition nation public opinion about the SASO.

PEACE OPERATIONS

M-28. Peace operations are nearly always multinational, subject to intense media scrutiny, and designed to allow the political process to resolve conflicts. It is vital for peacekeepers to be seen as impartial to belligerents while firmly united within their coalitions. Political and cultural complexities of past and present alliances and coalitions can make impartiality difficult. Media recognition that the operation is an impartial, team effort enhances mutual confidence and respect and solidifies the partnership. On the other hand, media perception that the U.S. Army lacks confidence in and respect for coalition partners can doom an operation.

CROSS-CULTURAL INTERACTION

M-29. Spokespersons must show great sensitivity to cultural differences when addressing issues involving other coalition members. Even an appearance of cultural insensitivity can undermine popular and political support for a member-nation's participation, thus threatening coalition unity. Army units addressing media members must clearly define common objectives in a multinational environment.

INFORMATION RELEASE AUTHORITY

M-30. Not all nations share a common belief in the U.S. policy of maximum disclosure with minimum delay. Media procedures should be worked out with coalition members to avoid disparities and delays. Standard procedures can eliminate conflicts and confusion created when one nation addresses an incident that another will not acknowledge. Operations and public affairs planners must—

- Designate a primary spokesperson for the multinational force and operation.
- Ensure that coalition members speak with one voice.
- Develop a clear definition of operation objectives and measures of success.
- Understand that not all nations are equally candid about success and failure.
- Be aware of cultural differences and sensitivities of coalition partners.

OTHER AGENCY INTERACTION

M-31. The country team coordinates activities to achieve a unified program for the U.S. national interests and the host nation. Working under the ambassador's direction, the country team pools the skills and resources of the participating agencies. This combined effort helps eliminate problems and realize U.S. national objectives and goals.

UNITED STATES AMBASSADOR

M-32. The ambassador presides over the country team. He or she determines the composition, which normally includes but is not limited to the—

- Deputy Chief of mission.
- Director, U.S. Agency for International Development.
- Director, U.S. Information Agency (USIA).
- FBI liaison.
- Central Intelligence Agency (CIA) station chief.
- Press secretary.
- Department attaché.
- Economic officer.
- Political officer.

- Chief of the security assistance office.
- Embassy staff personnel, as appropriate.
- Defense attaché.

UNITED STATES GOVERNMENT AGENCIES

M-33. Effective media support may sometimes require close contact with the U.S. military services, the Department of State (DOS), and other U.S. Government agencies. Normally, an executive order defines agency responsibilities, functions, and interagency relationships. This order assigns overall responsibility for U.S. and media interaction in the area to either the senior DOS representative or the U.S. commander.

DEPARTMENT OF STATE

M-34. Because the DOS formulates and implements foreign policy, it has a stake in media activities. In this area, the DOS has primary or joint responsibility with DOD for policy concerning—

- The extent to which U.S. forces will aid a host government.
- Any matters affecting U.S. relations with other nations, particularly allies or neutrals.
- How U.S. operations will influence or maintain the country's economy.
- Matters involving media access or other measures that may influence populace attitude.

UNITED STATES INFORMATION AGENCY

M-35. The USIA is an independent U.S. Government agency helping to achieve U.S. foreign policy objectives by influencing public attitudes in foreign areas. It advises the President and the various U.S. departments and agencies of the possible effect of policy, programs, and official statements on foreign opinion. The USIA has interests in media operations in the host country or theater of operations.

NONGOVERNMENTAL ORGANIZATIONS

M-36. Nongovernmental organizations (NGOs) and humanitarian groups often locate in the AO before, during, and after any military operation. If present before the media arrive, they often are the initial sources of information for journalists and may serve as major sources during an operation. These organizations may conduct operations that are humanitarian (short term) or developmental (long term) in scope. The sponsoring groups or agencies may be private corporations, foundations, professional associations, or religious groups. Units on the ground should contact these organizations to develop an understanding of their concerns, goals, and potential needs. Representatives of these organizations are credible spokespersons on the local situation and may provide invaluable background information on the operational situation.

M-37. The G5 maintains a list of NGOs. The S5 should coordinate efforts with the G5.

Appendix N

Rules of Engagement

GENERAL

N-1. ROE are directives issued by competent military authority that delineate the circumstances and limitations under which United States forces will initiate/continue combat engagement with other forces. In a general war between two uniformed, similarly-equipped opponents, the complexity of ROE is normally low. The soldier in contact with the enemy is usually instructed on the priority of target classes to engage, with restricted targets delineated by the laws of war. In the same conflict, however, soldiers performing support missions may find their ROE are more complex, reflecting the ROE more often associated with SASO, rather than the ROE associated with direct combat.

N-2. ROE must be clear. Soldiers operating with confusing or uncertain guidance can compromise the mission.

N-3. Despite similarities that may exist between operations, each operation has its own ROE. These rules are generally delineated in the OPLAN ROE annex (Figure N-1); however, based on changing circumstances, they may be further refined in the OPORD. For continuing operations, any further changes are specified in follow-on FRAGOs. The overall commander approves these rules with advice from the SJA, the CMO, the political advisor (POLAD), and others as required.

FORCE-PROTECTION LEVELS

N-4. DOD Directive 2000.12 sets out the DOD Antiterrorism/Force Protection Program responsibilities. DOD Directive 0-2000.12H establishes guidance for force-protection levels. DOD Instruction 2000.16, sets out the responsibilities of establishing force-protection levels. Full references can be downloaded from http://www.dtic.mil/whs/directives/.

N-5. The graduated series of force-protection conditions range from force-protection conditions normal to force protection conditions delta (Table N-1). The four-force protection conditions above normal are—

- Force-Protection Conditions ALPHA: These conditions apply when there is a general threat of possible terrorist activity against personnel and facilities, the nature and extent of which are unpredictable, and circumstances do not justify full implementation of force protection conditions BRAVO measures. The measures in these force protection conditions must be capable of being maintained indefinitely.

Copy ____ of _____ copies
HQs, TF 1-19
Camp Deployed, Any Country
DateTime Group

ANNEX E (ROE) to 1-19 TF OPORD 01-01

References: No change.

1. Rules of Engagement.

a. ROE will be briefed in detail to all soldiers upon issuance of each 1-19 TF OPLAN/OPORD/FRAGO. The commander will resolve conflicts between ROE and the 1-19 TF OPLAN/OPORD/FRAGO.

b. Nothing in these rules limits the rights of individual soldiers to defend themselves or the rights and responsibilities to leaders to defend their units.

c. ROE follow:

1) SOLDIERS CARD: You will carry this card at all times.

2) MISSION: Your mission is to assist in the implementation of and to help ensure compliance with this peacekeeping operation.

3) SELF DEFENSE:

a) You have the right to use necessary and proportional force in self-defense.

b) You will use only the minimum force necessary to defend yourself.

4) GENERAL RULES:

a) You will use only the minimum force necessary to accomplish your mission.

b) You will not harm hostile force/belligerents who want to surrender. Disarm them and turn them over to your superiors.

c) You will treat everyone, including civilians and detained hostile forces/belligerents, humanely.

d) You will collect and care for the wounded, whether friend or foe.

e) You will respect private property. Do not steal. Do not take war trophies.

f) You will prevent or report to your superiors all suspected violations of the Law of Armed Conflict.

5) CHALLENGING AND WARNING SHOTS:

a) If the situation permits, issue a challenge:
English: U.S. Forces! STOP or I WILL FIRE
Local Language #1: U.S. Forces! STOP or I WILL FIRE!
Local Language #2: U.S. Forces! STOP or I WILL FIRE!

b) If the person fails to halt, you may be authorized by the on-scene commander or by standing orders to fire a warning shot.

6) OPENING FIRE: You may open fire only if you, friendly forces, or persons or property under your protection is threatened with deadly force. This means that:

a) You may open fire against an individual who fires or aims a weapon at, or otherwise demonstrates intent to imminently attack you, friendly forces, or persons or property designated as under your protection.

b) You may open fire against an individual who plants, throws, or prepares to throw an explosive or incendiary device at, or otherwise demonstrates intent to imminently attack you, friendly forces, or persons or property designated as under your protection.

c) You may open fire against an individual deliberately driving a vehicle at you, friendly forces, or persons or property designated as under your protection.

d) You may fire against an individual who attempts to take possession of friendly force weapons, ammunition, or property designated as under your protection if there is no other way to prevent this act.

e) You may use minimum force, including opening fire, against an individual who unlawfully commits or is about to commit an act which endangers life, in circumstances if there is no other way to prevent the act.

7) MINIMUM FORCE: If you have to open fire, you must:

a) Fire only aimed shots.

b) Fire no more rounds than necessary.

c) Take all reasonable efforts to avoid unnecessary destruction of property.

d) Stop firing as soon as the situation is resolved.

e) Refrain from intentional attack on civilians, or property that is exclusively civilian or religious in character unless the property is being used for military purposes or engagement is authorized by your commander.

Figure N-1. Example ROE OPLAN/OPORD/FRAGO Annex

- **Force-Protection Conditions BRAVO**: These conditions apply when an increased and more predictable threat of terrorist activity exists. The measures in these force-protection conditions must be capable of being maintained for weeks without causing undue hardship, affecting operational capability, and aggravating relations with local authorities.
- **Force-Protection Conditions CHARLIE**: These conditions apply when an incident occurs or intelligence is received indicating that some form of terrorist action against personnel and facilities is imminent. Implementation of measures in these force-protection conditions for more than a short period probably will create hardship and affect the peacetime activities of the unit and its personnel.
- **Force-Protection Conditions DELTA**: These conditions apply in the immediate area where a terrorist attack has occurred or when intelligence has been received that terrorist action against a specific location or person is likely. Normally, these force-protection conditions are declared as a localized condition.

Table N-1. Force-Protection Levels

FORCE PROTECTION LEVELS			
PERSONNEL FORCE PROTECTION MEASURE	**VEHICLE** FORCE PROTECTION MEASURE	**WEAPON** FORCE PROTECTION MEASURE	**BASE CAMP** FORCE PROTECTION MEASURE
O	**H**	**W**	**A**
I	**I**	**X**	**B**
II	**J**	**Y**	**C**
III	**K**	**Z**	**D**
O - Soft cap **I** - Kevlar, LBE, weapon **II** - Kevlar, LBE, weapon, body armor **III** - Kevlar, LBE, weapon, body armor, mask	**H** - 2 veh, 2 pax/veh **I** - 3 veh, 2 pax/veh, M16+ per veh, commo check every hour **J** - 4 veh, 2 pax/veh, M16+ per veh, crew-served wpn, commo check every 30 min **K** - 4 veh, 2 pax/veh, M16+ per veh, crew-served wpn, continuous commo, MP escort, LTC permission	**W** - Wpn and ammo in arms room **X** - Wpn carried, magazine in pouch **Y** - Wpn carried, magazine in wpn, no rounds chambered **Z** - Wpn carried, magazine in wpn, rounds chambered, wpn on safe	**A** - One roving patrol, towers & fighting positions unmanned, QRF on 2-hour recall **B** - 2 pax in towers, 1 roving patrol, QRF 1-hour recall, commo check every hour **C** - 2 pax in towers, 2 roving patrols, QRF 30-min recall, commo check every 30 minutes **D** - 2 pax in towers, 2 roving patrols, all fighting positions manned; pull in OPs, CPs, & remote sites, QRF at REDCON 1, continuous commo

RULES OF ENGAGEMENT REHEARSALS

N-6. ROE cards are excellent reminders, but to ensure that ROE are understood, situational training exercises are essential. For example, an ROE may be "fire only in self-defense." But when does a soldier know that he is really being fired upon? Is it possible that the shooter is just some inebriated person in the crowd shooting into the air? If an aircrew sees tracers going by, does it mean that the search on the ground saw the aircraft and are firing at it or is it just celebratory fire?

N-7. This manual will not debate the correct answer to the above; it only points out that soldiers need clear examples of situations to ensure that they fully understand the ROE. An exercise to demonstrate the above would require role players, the training unit, observer-controllers, and a range safety plan.

N-8. ROE situations should be rehearsed in detail before deploying or executing a mission. No situation should occur in which personnel are unsure whether they should use force and what types of force—to include deadly force—are warranted.

Appendix O

Environmental Considerations

This appendix provides guidance on how to attain balance between mission accomplishment and protection of the natural and physical environment. ARs 200-1 and 200-2 provide information on Army environmental programs. FM 4-04.4 (FM 3-100.4[20-400]) lists items of interest in the preparation for daily operations, training, and combat operations while respecting the natural and physical environment.

SECTION I – ENVIRONMENTAL RESPONSIBILITIES

COMMANDER

O-1. Commanders must instill an environmental ethic in their subordinate leaders, staffs, and soldiers. They train and counsel subordinate leaders to monitor potential environmental hazards to the environment and enforce compliance with laws and regulations.

O-2. AVUM and AVIM commanders have unique environmental concerns and responsibilities. HHC commanders who supervise ground maintenance activities and NBC and Class III operations have similar responsibilities. Table O-1 shows points of contact available to assist commanders in environmental matters.

STAFF

O-3. Primary staff officers and NCOs integrate environmental considerations into the MDMP in operations and training. At battalion and above level, the commander appoints an assistant staff officer to serve as the environmental compliance officer (ECO) for the unit. Nevertheless, all staff officers must integrate environmental considerations into their activities. The S3 and S4 have the major responsibilities.

FLIGHT SURGEON

O-4. The flight surgeon monitors potential environmental hazards that could affect the health of soldiers in the command. When deployed, monitoring could include regional health matters such as water quality, air pollution, and environmental, endemic, and epidemic diseases. He monitors environmental considerations—such as smoke, chemical, and biological weapons—that the enemy could impose on the friendly force. He monitors field sanitation to ensure elimination of unnecessary environmental disruption and danger to soldiers from unsanitary conditions.

Table O-1. Environmental Assistance

TOPIC	POINT OF CONTACT
Air Pollution	Environmental Management Office
Audits/environmental compliance assessment system (ECAS)	Environmental Management Office
Archaeological & Historic Sites	Environmental Management Office and Range Control (DPTM)
Clean and Safe Water	Environmental Management Office
Command Environmental Issues	Chain-of-Command/ Environmental Quality Control Committee/Environmental Compliance Review Board
Environmental Training	G3/S3, Environmental Management Office
Hazardous Communications (HAZCOM) (Gas) Training	G3/S3, Safety Office, Fire Department
Hazardous Materials (HM)	G4/S4, Directorate of Logistics, Safety Office, Fire Department
HW	G4/S4, Environmental Management Office, Defense Reutilization and Marketing Office
Laws and Regulations	G1/S1, Environmental Management Office, JAG/Legal Office
Noise Pollution	Environmental Management Office, Range Control (DPTM)
Range Clearances/Restrictions	Range Control (DPTM)
Recycling Program	G4/S4, Environmental Management Office (EMO)
Standard Operating Procedures	G3/S3 and G4/S4, EMO
Spill Reporting	G3/S3, and G4/S4, EMO, Fire Department
Threatened/Endangered Species	EMO (Fish and Wildlife)
Water Pollution	EMO, G3/S3, and G4/S4
Wetland Protection	EMO, Range Control (DPTM)
Wildlife Management	EMO (Fish and Wildlife), Range Control, Provost Marshal Office

CHEMICAL OFFICER/NONCOMMISSIONED OFFICER

O-5. The chemical officer/NCO recommends the use of and requirements for chemical protection assets, decontamination and NBC defense, and smoke operations. With the flight surgeon, the chemical officer advises the commander on possible NBC hazards such as low-level radiation and toxic industrial material.

AVIATION MAINTENANCE OFFICER/NONCOMMISSIONED OFFICER

O-6. Aviation maintenance officers/NCOs plan and supervise maintenance and repair activities within the flight company, AVUM, or AVIM. These activities routinely use HM and generate HW. The maintenance officer/NCO ensures safe use, storage, and disposal of these materials. Activities may involve operating temporary storage areas for used oils, contaminated fuels, paint residues, spill cleanup residues, and solvents. Because maintenance personnel work with hazardous chemicals, the maintenance officer/NCO must ensure that all personnel comply with safety requirements.

GROUND MAINTENANCE OFFICER/NONCOMMISSIONED OFFICER

O-7. Ground maintenance officers/NCOs plan and supervise repair activities within the HHC of the aviation battalion and brigade. Flight companies may appoint a ground maintenance officer/NCO as an additional duty. These leaders must enforce proper use of HM and disposal of HW, while ensuring safe temporary storage of the same. Proper disposal and recycling of oil, coupled with the use of drip pans, ensure compliance with applicable regulations.

CLASS III/V PLATOON LEADER/SERGEANT

O-8. FARP activities can generate substantial HW unless the III/V platoon leader/NCO enforces the use of tarps under fuel drums, drip pans near nozzles, and sand bags under hose joints. The refueling activity itself has many potential environmental, safety, and health hazards requiring grounding, proper protective clothing, gloves, eyewear, and helmets. Proper fuel-truck operations and manned emergency shut-off valves help prevent major fuel spills. Waste fuel and other POL must be stored and disposed of properly. Fuel testing occurs daily to ensure that fuel has not been contaminated with water. Leaders ensure that safeguards exist to prevent fuel spills during fuel recirculation to filter out water/impurities.

ENVIRONMENTAL COMPLIANCE OFFICER

O-9. Each unit, down to company level, appoints an ECO. AR 200-1 directs all unit commanders to "appoint and train ECOs at appropriate levels to ensure compliance actions take place." In company-sized units, this generally translates into an extra duty. The appointed person advises the commander on environmental compliance matters and coordinates with the battalion ECO to clarify requirements or obtain assistance. The battalion ECO, in turn, coordinates with the supporting installation environmental staff.

O-10. The ECO accomplishes environmental compliance requirements on behalf of the commander. The ECO does the following:

- Advises the unit on environmental compliance during training, operations, and logistics functions.
- Serves as the commander's environmental eyes and ears.
- Coordinates between the environmental staffs of the unit and higher/installation headquarters.
- Manages information concerning the unit's environmental training and certification requirements.
- Performs unit environmental self-assessment inspections.
- Performs environmental risk assessments.

SUBORDINATE LEADERS

O-11. The role of leaders in environmental stewardship centers on building an environmental ethic in their soldiers by training, operating, and maintaining/sustaining in an environmentally responsible manner. Leaders counsel subordinates, lead by example, and enforce compliance by holding soldiers accountable. Leaders do the following:

- Communicate the Army environmental-friendly ethic while training soldiers to operate properly.

- Develop and sustain a positive and proactive commitment to environmental protection.
- Identify environmental risks associated with individual, collective, and METL task performance.
- Plan and conduct actions and training that sustain and protect the environment and integrate environmental considerations into daily unit activities.
- Analyze the influence of environmental factors on mission accomplishment.
- Train peers and subordinates to identify the effects of plans, actions, and missions on the environment.
- Counsel soldiers on the importance of protecting the environment and possible consequences of noncompliance with environmental laws and regulations.
- Ensure that soldiers are familiar with the unit's SOP, and supervise their compliance with laws and regulations.
- Incorporate environmental considerations into after-action reviews (AARs).
- Understand the linkage between environmental considerations and their associated effect on safety, force protection, and force health protection.

SOLDIERS

O-12. Soldiers have the inherent professional and personal responsibility to understand and support the Army's environmental program. They must do the following:

- Comply with environmental requirements in unit and installation SOPs.
- Maintain environmental awareness throughout daily activities.
- Provide recommendations to the chain of command on techniques that ensure compliance with environmental regulatory requirements.
- Identify the environmental risks associated with individual and team tasks.
- Support recycling programs.
- Report HM and HW spills immediately.
- Make sound environmental decisions based on guidance from the chain of command, training, and personal concepts of right and wrong.

SECTION II – PLANNING—INTEGRATING ENVIRONMENTAL CONSIDERATIONS

O-13. Commanders and staffs integrate environmental considerations into the MDMP and training plan process.

MILITARY DECISION-MAKING PROCESS

O-14. The commander and staff should include environmental considerations in the MDMP. The commander and staff refer to the environmental appendix of the higher HQ order and gather maps, SOPs, FMs, host-nation agreements, and existing staff estimates, lessons learned, and AARs to assess potential environmental impact. Staff planners make a generic list of environmental factors that pertain to their staff area and integrate these considerations into the seven-step process during—

- Receipt of Mission: Gather resources to help restate the mission and include environmental information resources.
- Mission Analysis: During the 17-step mission-analysis process, the staff considers environmental impact as a factor.
- Course-of-Action Development: In SASO, environmental factors have more effect than in combat; weigh environmental risk against mission requirements.
- Course-of-Action Analysis: Will a FARP location, dropped external fuel tanks, or fuel drums pollute fresh-water sources for friendly forces and civilians?
- Course-of-Action Comparison: When comparing most likely enemy and best friendly COAs, consider the likelihood that the enemy may pollute as a means of obscuring the battlefield or preventing friendly use of abandoned resources; this, in turn, may affect flight visibility, friendly and enemy force identification, and laser designation and range-finding.
- Course-of-Action Approval: When choosing the most likely friendly COAs, consider whether slight plan modification would reduce environmental impact without affecting the mission.
- Orders Production: Include environmental impacts and precautions in coordinating instructions of the execution paragraph or Annex F (Engineer), Appendix 2 (Environmental Considerations).

TRAINING PLAN DEVELOPMENT

O-15. During development of long-range, short-range, and near-term plans, the planning staff should consider the effect of training on the natural and physical environment and include environmental-specific training in the plan.

ASSESSMENT

O-16. The training process begins with an assessment of unit strengths and weaknesses and a plan to sustain strengths while improving areas of weakness. This process applies equally to the unit's environmental awareness and compliance. Commanders identify and assess known environmental risks during training planning.

LONG-RANGE PLAN

O-17. During long-range planning, units create the long-range training calendar based on major training area availability, training ammunition and fuel allocated, flight hours available, and deployments and mission timeframes already identified.

O-18. The environmental focus during this phase includes—

- Conducting reconnaissance of the training site.
- Assessing potential environmental risks and corresponding cleanup/restoration skills training required.
- Coordinating with installation environmental and wildlife staffs.
- Reviewing plans and SOPs.
- Obtaining clearance and land-use permits.
- Requesting special equipment or support resources.
- Coordinating with preventive medicine personnel.

SHORT-RANGE PLAN

O-19. Short-range planning refines and defines the broad guidance of the long-range calendar. It is often a quarterly plan. During short-range planning, units prepare for upcoming training by reviewing existing environmental procedures and guidance; updating as required, the unit SOP and risk assessment matrices; and training soldiers on any new procedures. Activities with an environmental focus during this phase include—

- Briefing the commander and staff.
- Reconnoitering the training site.
- Obtaining maps or overlays indicating environmentally sensitive areas.
- Coordinating with the environmental management office to identify recent changes in environmental conditions.
- Planning for HM/HW storage and transport.
- Reviewing spill-prevention measures.
- Modifying plans as necessary.

NEAR-TERM PLAN

O-20. Near-term planning defines specific actions for executing the short-range plan. It is the final phase of planning before training execution. During this phase, leaders exercise an environmental focus by—

- Briefing soldiers on environmental constraints and issues and modifying plans as necessary.
- Rehearsing the training to include the environmental awareness preventive measures built in and cleanup contingencies planned.
- Checking equipment for oil and fuel leaks and identifying HW disposal locations at the training site.
- Planning for HM/HW storage and spill containment.
- Ensuring that subordinate unit SOPs meet the requirements for the specific training site.

TRAINING EXECUTION

O-21. Precombat checks help ensure adequate preparation for training to standard. Leaders execute precombat checks by—

- Briefing environmental considerations as part of the OPORD.
- Including environmental considerations in the safety checks and crew briefings.
- Verifying completion of PMCS on vehicles, refueling equipment, weapons, communications, and NBC equipment to include checks for leaks and serviceability.
- Checking and confirming that vehicle load plans ensure security of HM and equipment to contain spills.

O-22. During training execution, leaders continue to monitor potential risks to the natural and physical environment by—

- Conducting environmental awareness training.
- Supervising high-risk operations.
- Conducting periodic environmental assessments.
- Correcting problems on the spot.
- Avoiding off-limits areas.
- Preventing and containing spills.
- Reporting damage accurately and in a timely manner.
- Removing HM/HW in a timely and appropriate manner.

EVALUATION

O-23. Evaluation is continuous and integral to training. Leaders at every level evaluate training. In the process, they discuss both the environmentally correct and incorrect actions that may occur. The AAR process should include environmental performance and should cover—

- Ensuring environmental accountability by identifying the problems encountered during training and how the unit corrected them as they arose.
- Ensuring HM/HW accountability by identifying how the unit accounted for the HM/HW and any difficulties that it may have had removing contaminated soil and restoring sites to near-original condition.
- Identifying potential consequences of environmental damage that make the damage a serious concern.
- Developing environmental lessons learned and suggested SOP changes.

SECTION III – OPERATIONS: INTEGRATING ENVIRONMENTAL CONSIDERATIONS

ENVIRONMENTAL PROTECTION DURING MILITARY OPERATIONS

O-24. Protecting the physical and natural environment while conducting operations against a hostile force is seldom feasible. The spectrum of conflict or nature of the SASO determines the viable environmental control measures. Units establish protective actions that minimize environmental impact while accomplishing the mission.

O-25. Rescue and NEOs, humanitarian assistance, firefighting, and overseas flight and logistical operations may impose unique environmental requirements and hazards. CALL Newsletter 99-9, *Integrating Military Environmental Protection,* provides insights on the emerging doctrine for base-camp operations that may include airfields. Operations, when possible, should avoid unnecessary effects on the environment of the host nation and should minimize collateral damage.

UNNECESSARY ENVIRONMENTAL IMPACTS

O-26. Unnecessary impacts include environmental damage that military necessity cannot justify. These acts are either wanton intentional acts or negligent unintentional acts. Examples of a wanton act could include dumping JP8 into a river or dropping 500-gallon fuel drum external loads or 230-gallon extended-range fuel tanks onto a farmer's field without adequate emergency rationale. An example of a negligent act might include spilling changed oil from a drip pan onto the ground, because of hurried attempts to dispose of the oil properly.

ENVIRONMENTAL COLLATERAL DAMAGE

O-27. Environmental collateral damage results from military actions during armed conflict that unintentionally cause other environmental consequences. Damaging enemy targets—such as ammunition stockpiles or wastewater treatment plants—can release hazardous substances that cause unintended casualties long after the battlefield/AO is secured. This may result in health and logistical (water) problems that could jeopardize the health of noncombatants—including occupational peace enforcement and peacekeeping allied forces left behind. Such collateral damage increases rebuilding efforts and may leave noncombatants with negative feelings toward the United States and its allies.

O-28. Articles 54 and 55 of the Geneva Convention protect objects indispensable for the survival of the civilian population and natural environment, respectively. There are similar issues regarding destruction of ancient monuments, churches, and similar cultural sites.

RISK MANAGEMENT

O-29. Preparation is key to successful environmental awareness and protection in daily operations and training. Commanders (company and above) must designate an environmental compliance officer to be responsible for environmental education, SOP updates, environmental risk assessments, and incident reporting. Commanders and ECOs also must assess areas where unit activities are most likely to violate environmental compliance.

O-30. The commander or ECO can coordinate most matters by contacting the EMO, Chief of Range Division, and the military fire department. In most cases, the EMO also includes the fish and wildlife officers and foresters, all located under the Directorate of Public Works (DPW). In cases where training is conducted overseas without corresponding U.S. organizations, units must coordinate with the host nation's equivalent of the above listed POCs. If there is no host-nation equivalent, training is conducted according to U.S. policies and regulations.

ARMY ENVIRONMENTAL COMPLIANCE ASSESSMENT PROGRAM

O-31. Units are periodically inspected by appropriate offices to ensure compliance with Environmental Compliance Assessment Program (ECAP) protocol. Units should obtain ECAP protocols from the EMO/DPW or, if unable, by calling the Army environmental hotline at 1-800-USA-3845 or DSN 584-1699.

UNIT-LEVEL ENVIRONMENTAL PROGRAMS

O-32. FM 4-04.4 (FM 3-100.4[20-400]) outlines unit-level programs. It specifies that unit leaders should—

- Ensure that all unit personnel have had (or are scheduled to receive) environmental awareness training; Chapter 3 of FM 4-04.4 (FM 3-100.4[20-400])identifies environmental training sources, and Chapter 5 identifies sources of assistance at the installation/garrison/base level.
- Designate, in writing, an ECO who is properly trained and qualified; this individual interfaces with appropriate environmental personnel and ensures that the unit complies with environmental laws and regulations.
- Meet with key higher unit staff (battalion S3 and S4 for company commanders) and installation personnel who deal with environmental issues and find out what their requirements are concerning environmental training, qualifications, and certification of unit personnel; ECAS inspections that may affect the unit, and common environmental problem areas and how to avoid them.
- Ensure that the unit SOP addresses environmental issues and procedures that apply to the unit (coordinate SOP environmental requirements with appropriate installation/chain-of-command personnel); Appendix C of FM 4-04.4 (FM 3-100.4[20-400]) has an example of an environmental SOP with items of concern that the commander can integrate into normal unit SOPs.

O-33. Table O-2 shows typical environmental program areas and their goal/impact.

Table O-2. Typical Environmental Program Areas

ENVIRONMENTAL PROGRAMS		
Program Area	**Goal**	**Military Impact**
Air	Control emissions	POL storage, energy production, waste disposal, smoke operations, fugitive dust
Asbestos management	Minimize release of and exposure to asbestos	Building acquisition, site demolition, vehicle repair parts
Cultural resource management	Protect historic and cultural heritage	Training area restrictions, additional cost for bldg. renovations
Environmental noise management	Protect health and reduce community annoyance	Timing and location of training events, flight paths, firing points
HM management	Prevent pollution and comply with HM regulations	Procurement, installation storage and inventory management, turn-in programs for HM
HW and solid waste management	Minimize generation of wastes	Training in segregation, recycling, and substitution to minimize HM and medical waste
Natural resource management	Protect natural environment	Integrated Natural Resource Management Plan (INRMP), ITAM, training area protection and maintenance
Pollution prevention	Reduce pollution and waste generation	Turn-in procedures for reusable items, energy efficiency programs, recycling
Spill prevention/response	Prevent and respond to spills	Installation and unit spill plans
Water resources management	Conserve and protect water	Erosion control, storm-water control, vehicle drip pans, wash racks

TYPES OF UNIT PROGRAMS

O-34. FM 4-04.4 (FM 3-100.4[20-400]) gives specific guidance on the following unit or installation environmental protection programs:

- HM management.
- HW management.
- HAZCOM programs.
- Pollution prevention and hazardous waste minimization (HAZMIN) recycling programs.
- Spill-prevention and response-plan programs.

SUMMARY

O-35. Unit leaders use environmental risk assessments to estimate the potential effect of unit activities on the natural and physical environment. This process applies to routine activities, training, mobilization, or deployment. The environmental risk assessment allows leaders and their staffs to identify potential environmental problems. The process also allows unit leaders to identify and manage residual risk.

Appendix P

Joint Air Attack Team Operations

SECTION I – PURPOSE

GENERAL

P-1. JAAT is an engagement technique used to increase the effectiveness of offensive or defensive operations by combining the firepower of fixed-wing aircraft with that of armed rotary-wing aircraft. Artillery or NSFS fires—along with direct fires from ground forces—should be employed, whenever possible, to increase the synergistic effect. The attack may be against a single enemy element or several enemy elements within a specified area. Air cavalry and attack helicopter assets are often called upon to employ an immediate or spontaneous JAAT while conducting their assigned missions. This combination gives both the Army aviation team and CAS team greater survivability while increasing the effectiveness of their firepower and complicating the enemy's movements.

PROCEDURES

P-2. The JAAT works best when helicopter and fixed-wing pilots communicate directly. Detailed attack synchronization is sometimes necessary; however, the most valuable attribute of a JAAT is the ability to respond rapidly to an opportunity and overwhelm the enemy by applying enormous amounts of firepower within a short time. All coordination measures and communications should be directed toward achieving this effort, while minimizing the potential for fratricide and maximizing the survivability of the participants. Supporting units should address JAAT in their SOPs and training programs.

NIGHT SYSTEMS

P-3. Modern systems enable JAAT operations anytime, day or night, at any place on the battlefield. AH-64 systems include NVG and FLIR and, in the AH-64D, millimeter wave radar. OH-58D systems include NVG and a TIS. Air Force ground-attack aircraft are equipped with NVG as well as IR pointers and may carry IR and white-light flares. Some F-16s are equipped with low altitude navigation target infrared night (LANTIRN) pods and NVG. Marine and Navy F/A-18 and AV-8 aircraft may be equipped with a FLIR or a targeting pod, and their pilots usually are equipped with NVG. The night capabilities that these systems provide make night JAAT operations particularly effective but require close coordination and frequent training with Air Force, Navy, and Marine air units.

SECTION II – PLANNING

PLANNING TEAM

P-4. Ground and aviation commanders use their S3s, FSOs, and the TACP to plan the JAAT mission. Air commanders may use the FAC, TACP, air support operations center (ASOC), air operations center (AOC), wing ground LNO, or squadron commanders.

COMMANDER

P-5. The ground-maneuver force commander is responsible for the ground and airspace below the coordinating altitude within the JAAT AO. The supported commander synchronizes the JAAT into the battle and brings these combined fires into play at the decisive moment.

AIR RECONNAISSANCE AND ATTACK HELICOPTERS

P-6. The attack helicopter portion of the JAAT may be performed by the OH-58D or AH-64 or a combination. Except for the additional planning and coordination necessary for a joint operation, the unit conducts the JAAT operation as it would a normal attack mission. The AMC plans the operation, coordinates attacks in the EA, and coordinates JSEAD systems for attacking CAS and helicopters. The air cavalry squadron or ATKHB provides suppressive fires against enemy AD, while the primary armor killers are CAS. The size of the JAAT depends on the aviation commander's analysis of the factors of METT-TC and the number of CAS sorties allocated.

TACTICAL AIRCRAFT

P-7. CAS assets that normally perform CAS are the Air Force A/OA-10 and F-16, Navy F/A-18, and Marine AV-8 and F/A-18; but other aircraft may be employed. The Air Force A/OA-10 provides the most flexible support to JAATs and has several advantages over other aircraft. A/OA-10s were specifically designed for and dedicated to the CAS mission. Their night-attack capabilities have increased with the fielding of NVG and associated equipment. The A/OA-10 has extensive loiter and multipass capabilities and can react quickly to a changing attack plan. Other CAS assets do not possess the extended loiter capability of the A/OA-10 but are capable because of their LANTIRN or targeting pods, FLIRs, or NVG. The availability of aerial refueling assets can greatly increase both loiter time and payloads carried by attack aircraft.

FORWARD AIR CONTROLLER

P-8. The FAC hands off fixed-wing aircraft to the JAAT AMC who controls the JAAT from the initial point inbound. The CAS flight leads control employment of the flight. The FAC can help locate targets and threats before or during the mission.

JOINT AIR ATTACK TEAM FIRE SUPPORT

P-9. Indirect fires can greatly increase survivability of friendly aircraft and destruction of the enemy. Fire support is normally used to begin the attack, suppress or destroy enemy AD, force armored vehicles to deploy, and create confusion within the C^2 of the element under fire. The FSO coordinates with the Air Force TACP located at a ground-maneuver brigade, aviation brigade, division, or corps headquarters so that FS fits smoothly into the plan. Once the JAAT mission begins, the AMC works directly with the FSO to coordinate FS.

MISSION PLANNING

P-10. Constant coordination is required between the commander, AMC, CAS flight lead/ALO/FAC, and FSO. As elements of the mission change, all members must be informed so that they can adjust their plans accordingly. Success of the JAAT depends on the proper synchronization of assets and how well each member of the JAAT understands the operation. JAAT operations may be preplanned, immediate, or spontaneous.

PREPLANNED

P-11. A preplanned JAAT operation is used when time is available to request CAS in the normal planning cycle (usually 36 hours). The preplanned request is drafted by the FSO in coordination with the TACP and processed through Army channels to the AOC. The AOC processes the request according to priorities established by the joint force commander. Approved preplanned JAATs will appear on the ATO with the number of sorties, times, and ordnance.

IMMEDIATE

P-12. An immediate request for CAS is used when time is not available to process the request within the normal planning cycle. An immediate CAS request should be submitted as soon as the need is recognized.

SPONTANEOUS

P-13. A spontaneous JAAT operation occurs when all members of the team are available but no time is available to plan and coordinate. Spontaneous JAAT operations depend on unit SOPs, training, and communications. A successful JAAT operation is possible anytime that pilots are able to coordinate actions by talking with each other. A common JAAT radio frequency that can be used by the team members is a critical portion of a spontaneous operation and should be included in SOI and Air Force ATOs. A common frequency allows the AMC to communicate and coordinate his attacks with the CAS aircraft in a minimal amount of time.

SEQUENCING

P-14. A well-orchestrated operation normally requires a number of radio calls. To minimize radio traffic, commanders often use a preplanned method of coordinating JAAT activities.

JOINT AIR ATTACK TEAM CLOCK

P-15. The JAAT clock (Figure P-1) is the best-known and most widely used method to control operations. It is a method of sequencing the engagement based on time. To initiate the JAAT, the aviation AMC updates the target information and issues the CAS a time hack (three minutes is the most common) that starts the JAAT clock. The time hack serves as the TOT for the CAS. CAS has ordnance impact or is over the target when the JAAT clock runs out. The AMC can employ fires throughout the JAAT clock, except during a safety buffer (normally 30 seconds) before the TOT. This safety buffer ensures that residual ordnance effects of the impacting rounds do not endanger CAS. The aviation AMC employs additional fires, as required, suppressing the enemy during the CAS egress. A reattack can be either immediate or based on an abbreviated JAAT clock. An example of a typical engagement follows:

- AMC coordinates the attack, then calls "three-minute hack—ready, ready, hack."
- CAS lead responds with "good hack."
- AMC engages the target with indirect fires, as required, to suppress the enemy.
- CAS departs the initial point as required, to meet the three-minute TOT.
- AMC ensures "check fire" on all indirect fires at the required time; this time is calculated by subtracting the required safety buffer (30 seconds) and the artillery time-of-flight (generally 10 to 30 seconds) from the TOT. The AMC may continue to suppress with direct fire weapons using visual separation.
- CAS engages the target at the three-minute mark.
- AMC issues CAS "reattack" or "return to initial point" and suppresses with direct fire to cover the CAS egress.

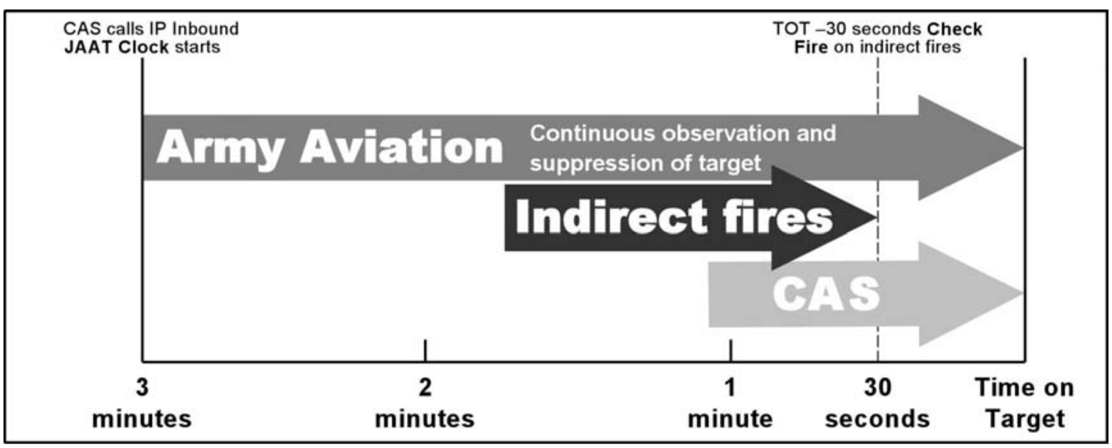


Figure P-1. Joint Air Attack Team Clock

P-16. Figure P-2 shows an alternative JAAT clock.

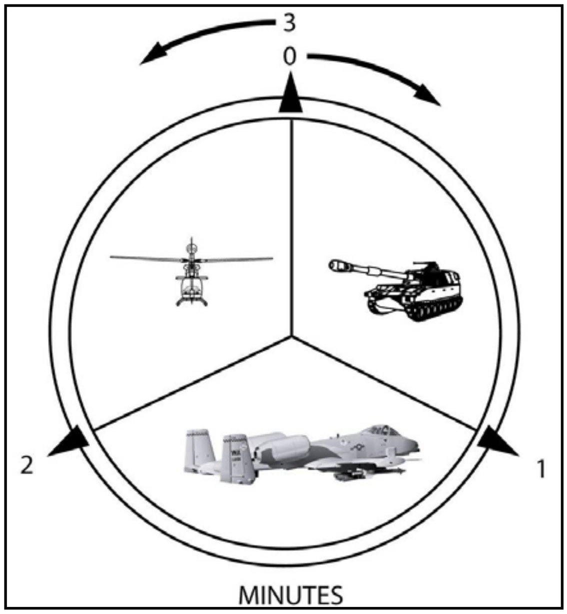


Figure P-2. Alternative JAAT Clock

JOINT AIR ATTACK TEAM SEQUENCE CARD

P-17. The JAAT sequence card (Figure P-3) lists a number of different attack sequence options. All of those likely to be involved in a JAAT operation use the card. The option to be used for any specific attack is broadcast by the AMC—giving the letter code, a number, and an H-hour. The letter code refers to the type of attack and the number to the length of time of the artillery bombardment. For example, if the AMC orders "KILO 3 at 1232 hours," the attack begins at 1232 hours, with an artillery bombardment for three minutes, followed at 1235 (1232 plus three minutes) by armed helicopters, and then the CAS at 1237. The artillery then engages (rounds on target) at 1240, until given check fire by the artillery observer. From the single call, all JAAT players can work out their involvement and plan accordingly. The format of the card varies and can be constructed or amended to meet different situations.

EMPLOYMENT

P-18. Employment of the JAAT depends on the factors of METT-TC. The commander selects the method of employment as early as possible so that attacking assets can be coordinated. The two basic employment methods are sector attacks and combined attacks. Sector attacks allow each element of the JAAT to attack within a specified sector. Combined attacks occur when JAAT elements mass their fires by attacking in the same sector.

H Hour	Min	2 min	3 min		"Check Fire"
K	Arty	Avn	CAS	Arty	
I	Arty	CAS		Arty	
J	Arty	Avn		CAS	Arty
N	Arty	Avn	Arty		
M	Arty	CAS	Arty		
R	Avn	CAS			
T	CAS	Avn			

Figure P-3. Joint Air Attack Team Sequence Card

SECTOR ATTACKS

P-19. The three types of sector attacks are sector-simultaneous, sector-sequential, and sector-random. Sectors work best when easily recognizable terrain features—such as roads, rivers, ridgelines, or tree lines—are used. Sectoring the target (Figure P-4) reduces targeting conflicts and provides each weapon with system flexibility in prioritizing the targets within the designated sector.

SECTOR-SIMULTANEOUS

P-20. During sector-simultaneous attacks, each element maneuvers to attack within its assigned sector to engage targets simultaneously with other JAAT elements. All aircraft must coordinate ordnance fans to reduce the potential for fratricide.

SECTOR-SEQUENTIAL

P-21. During sector-sequential attacks, each element maneuvers to attack within its assigned sector in a predetermined sequence. This sequence may range from several seconds to several minutes. This option reduces the ordnance fan coordination problem and facilitates covering fire for each preceding element.

SECTOR-RANDOM

P-22. During sector-random attacks, each element maneuvers to attack within its assigned sector and engages targets at will. All elements must coordinate ordnance fans to reduce the potential for fratricide.

COMBINED ATTACKS

P-23. The three types of combined attacks are combined-simultaneous, combined-sequential, and combined-random. Combined attacks usually involve armed helicopters and CAS using about the same avenue of approach to the target. Combined attacks typically provide good mutual support between the different elements but require more coordination and are more predictable to the enemy after the initial attack.

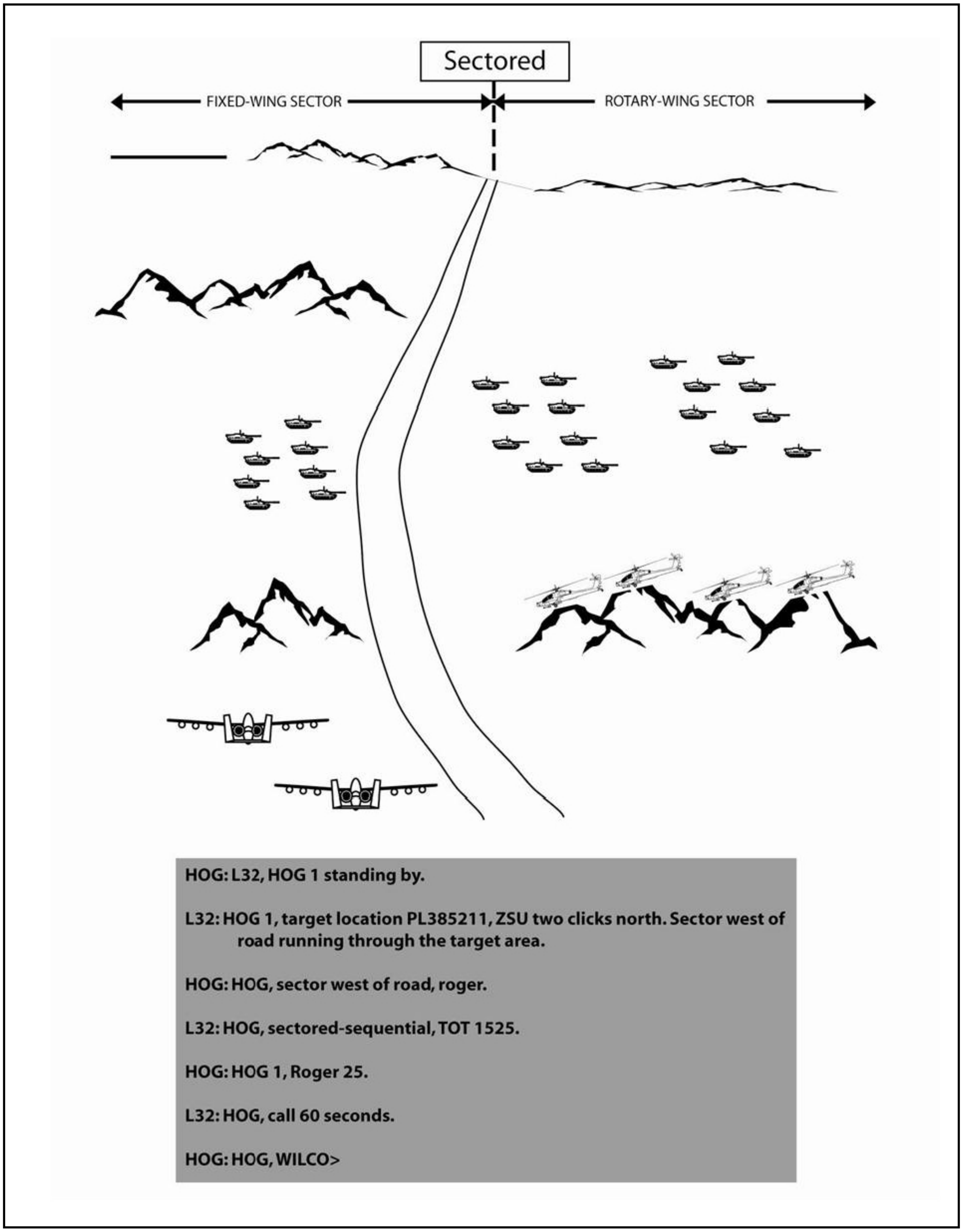


Figure P-4. Example of a Sector Attack

COMBINED-SIMULTANEOUS

P-24. During combined-simultaneous attacks, all elements engage targets in the same sector and attack simultaneously. All elements must coordinate ordnance fans to reduce the potential for fratricide. Combined-simultaneous attacks maximize destruction of the enemy and are the simplest to control. This method is an excellent control method when FA fires are not available or when elements can use maximum ordnance elevation for deconfliction of airspace.

COMBINED-SEQUENTIAL

P-25. During combined-sequential attacks, all elements engage targets in the same sector and attack in a predetermined sequence. This sequence may range from several seconds to several minutes. This option reduces the ordnance fan coordination problem and facilitates covering fire for each preceding element. Use of the JAAT clock method is an example of a combined sequential.

COMBINED-RANDOM

P-26. During combined-random attacks (Figure P-5), all elements engage targets in the same sector and attack at will. Once again, all elements must coordinate ordnance fans to reduce the potential for fratricide because attacks may inadvertently be simultaneous.

SECTION III – OPERATIONS

CONDUCT OF OPERATIONS

P-27. After receiving the mission, the task force conducts mission analysis in as much detail as time allows. Units conduct planning, coordination, analysis, and rehearsals to ensure success.

HOLDING AREA TO BATTLE POSITION

P-28. Upon departing the HA, air cavalry or attack teams move forward to reconnoiter the target area. They verify BPs, avenues of approach, obstacles, and potential EAs that have not been already identified. If the enemy has already entered the EAs, the teams maintain contact and attempt to locate the enemy's AD systems.

FIRE SUPPORT

P-29. During reconnaissance, the AMC establishes contact with the unit providing indirect FS. This contact should continue throughout the mission, with the AMC serving as the FS element on the battlefield. He should consider using artillery before direct fire engagements. Planners must keep in mind that obscurants generated by the impacting rounds may interfere with laser range finders and designators, degrading the effectiveness of precision-guided munitions.

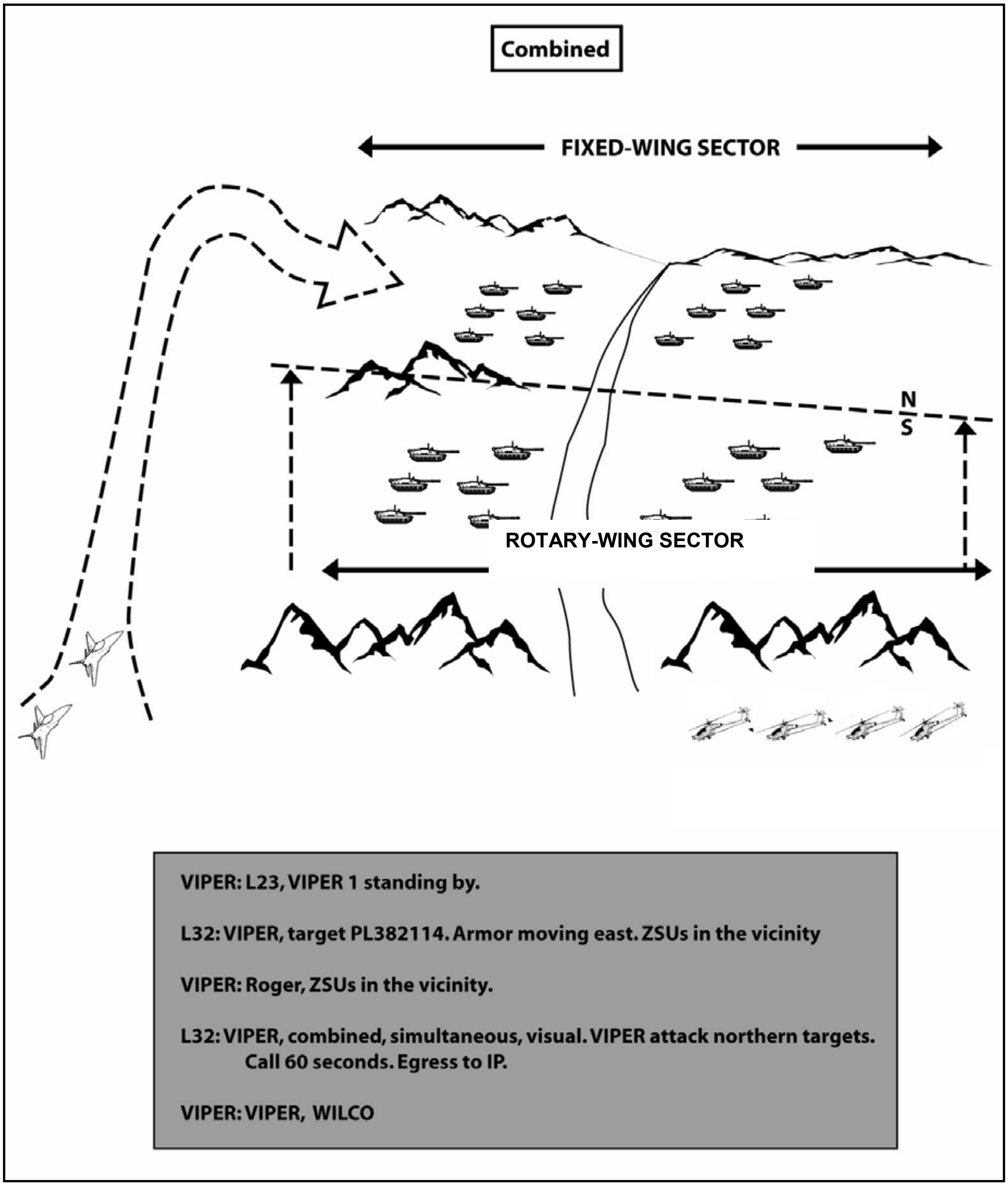


Figure P-5. Example of a Combined Attack

AT THE BATTLE POSITION

P-30. The AMC must attempt to flow all assets into the battle in various combinations without piecemealing the force. In preplanned JAAT operations, the arrival of the armed helicopters in the BP should coincide with the arrival of the CAS at the initial point. As the armed helicopters arrive, the teams take up their positions and begin their attack according to the scheme of maneuver. The attack should begin by engaging AD targets identified during the reconnaissance. The remainder of the teams attack enemy forces according to the priorities provided in orders.

CLOSE AIR SUPPORT ARRIVAL AT INITIAL POINT

P-31. CAS usually enters the target area in a flight of two; contacts the ALO or FAC with call sign, mission number, available ordnance, and loiter time; receives target information; and then takes a short time to process the information. If no ALO or FAC is available, the AMC accomplishes ALO or FAC tasks.

CLOSE AIR SUPPORT DEPARTS INITIAL POINT

P-32. The CAS flight departs the initial point, usually at low-altitude; contacts the ALO or FAC for an update on friendly and enemy activities; and gives an inbound call. This call is expressed in units of time; for example, 30 seconds. The AMC uses this call as a signal to lift or shift fires and coordinate the battle.

CLOSE AIR SUPPORT ATTACK

P-33. The AMC observes CAS attacks and adjusts subsequent attacks, as required, by using cardinal headings and distances from the last impacts. The AMC normally uses lasers to designate targets, the center mass of the target array, or sector boundaries. The use of lasers increases the speed and security of the attack and reduces the amount of communications needed between the AMC and the CAS flight.

COMMUNICATIONS

P-34. The communications link between members of the JAAT is critical. The aviation S3 or S6 must procure and disseminate the needed frequencies before the CAS arrives at the initial point.

ATTACK HELICOPTER CAPABILITIES

COMMUNICATIONS

P-35. Communications are the key to effective JAAT operations. The Have Quick radio system on the AH-64, OH-58D, and CAS aircraft allows jam-resistant, nonsecure, frequency-hopping communications with ALO or FAC and CAS elements. The armed helicopters and the TACP must coordinate the frequencies to be used before the CAS arrives at the initial point. Aircrews use the CAS check-in briefing below (Figure P-6) to coordinate the voice frequencies, digital data frequencies, and laser codes between the CAS and armed helicopters.

(Aircraft Transmit to Controller)
Aircraft ___________________, this is ___________________________
(Controller Call Sign) (Aircraft Call Sign)
1. Identification/Mission Number: _______________________________
Note: Authentication and appropriate response suggested here. The brief may be abbreviated for brevity or security ("as fragged" or "with exception").
2. Number and type of aircraft: _________________________________
3. Position and Altitude: ______________________________________
4. Ordnance: ____
5. Playtime: ____
6. Abort Code: ____

Figure P-6. Sample Format of a Tactical Aircraft Check-in Briefing

LASER DESIGNATION

P-36. The AH-64 and OH-58D laser designators can mark sectors, targets, and enemy positions for CAS equipped with proper sensing devices. The FAC is responsible for coordinating the laser code used.

CLOSE AIR SUPPORT CAPABILITIES

COMMUNICATIONS

P-37. CAS and FAC aircraft are equipped with jam-resistant, nonsecure, frequency-hopping communications via the Have Quick II radio. They are also equipped with other communications systems (VHF-AM and VHF-FM, additional UHF radio, and data link) depending on the participating aircraft.

PRECISION MUNITIONS

P-38. Precision munitions offer improved effects on the targeted enemy force. Laser-guided munitions can destroy bridges and other priority targets while allowing CAS greater survivability. The IR and optically guided versions of the Maverick missile provide precision hard- and moving-target kill capability.

FORWARD AIR CONTROLLER

P-39. If the FAC is available to brief the CAS aircraft, the AMC should use the following attack brief:

- Distance/direction reference.
- Specific target identification.
- Specific threat identification.
- Specific friendly identification.
- Specific attack restrictions.
- FAC position.
- Final clearance.

BRIEFING

P-40. In the absence of the FAC, the AMC briefs the JAAT. AMCs must be familiar with responsibilities detailed in FM 3-09.33 (FM 90-21).

Appendix Q

Air-Ground Integration

SECTION I – GENERAL

Q-1. Operations must be integrated so that air and ground forces can simultaneously work in the battlespace to achieve a common objective. Integration maximizes combat power through synergy of both forces. The synchronization of aviation operations into the ground commander's scheme of maneuver may require the integration of other services or coalition partners. It may also require integration of air cavalry, attack, assault, and cargo helicopters.

PLANNING AND TRAINING

Q-2. Integration starts at home station with—

- Development of common SOPs among aviation and ground maneuver units.
- Habitual combined training, including battle drills, to help all team elements maintain awareness of the locations and needs of other elements.

Q-3. Training, procedural standardization, and familiarity of team members greatly accelerate planning and coordination, especially in unfamiliar environments. A team built in this manner establishes battle efficiency sooner and maintains a higher tempo of combat operations. Familiarity and compliance with joint procedures are essential to allow seamless integration with other services' ground and air units.

Q-4. Commanders must insist on a high degree of combined arms training with habitually supporting units in the way that they are expected to fight—the whole intention of integration. Air and ground units regularly train and execute battle drills together to make coordination and reaction in combat instinctive.

Q-5. Aviation and ground units should be so accustomed to working together that separate training is considered a deviation from the standard. Lessons learned at the CTCs reveal that many units had to invent ways to coordinate because they had not prepared. This situation must not happen in war. Tested methods of coordination, practiced in training, reduce the difficulty of unfamiliar situations in new terrain and conditions.

WORKING WITH OTHER TEAMS

Q-6. When units have not been able to create the desired habitual relationship, the planning and coordination processes will be longer and more detailed. Rehearsals are essential for success. In-country training exercises should also be accomplished whenever possible. The probability of mistakes is increased unless coordination, planning, rehearsals, and training are conducted. Commanders must apply risk-management procedures throughout planning and execution.

SITUATIONAL AWARENESS

Q-7. Attack and air cavalry units often engage targets near friendly forces and noncombatants. This situation may occur during various types of operations—shaping, decisive, and sustaining. Aircrews must have knowledge of friendly force and noncombatant locations. Procedures for positive identification of enemy forces are required.

SYNCHRONIZATION OF WEAPONS

Q-8. The main reason for using several weapons systems at once is to overwhelm the enemy with more than it can counter. When possible, units sequence the employment of CAS, indirect fires, direct fires, and armed helicopters so closely as to seem simultaneous in fire effects. Fires are lifted or shifted at the most advantageous time for ground elements to overwhelm the objective before the enemy can offer effective opposition.

Q-9. Army aviators may be the key in controlling the employment of multiple weapons systems because of their vantage point on the battlefield and their ability to quickly relocate. Aviation units must routinely train with ground units so that they can effectively employ other Army and joint weapons systems.

SECTION II – EXAMPLES OF INTEGRATED OPERATIONS

GENERAL

Q-10. True integration occurs when the commander effectively uses every available asset to its fullest extent. The following are some available assets and capabilities:

- Satellites provide information concerning enemy location and movements, weather, terrain, and obstacles.
- JSTARS aircraft provide real-time information on enemy formations, direct TACAIR strikes, and furnish targeting data for other weapons systems.
- UAVs operate from immediately in front of the ground forces to deep into the enemy rear; they provide information and targeting data and, if armed, may attack enemy formations and installations.
- EW systems provide interception, disruption, deception, and targeting information.
- CAS elements destroy enemy formations and installations.
- Air and ground cavalry units search in front of the ground force, confirm enemy strengths and weaknesses, protect flanks, and allow the commander to orient on threats or exploit opportunities.

- Tank, mechanized infantry, light infantry, and air assault units—accompanied by air defense and engineer elements, as appropriate—forcibly take and occupy key terrain or deny terrain to the enemy.
- Attack helicopters maneuver to attack enemy forces and deny terrain for limited periods.
- UH-60 helicopters move troops, light vehicles, light artillery, and supplies; they also can emplace minefields and augment C^2.
- CH-47 helicopters move troops, medium vehicles, medium artillery, and supplies.
- Artillery provides indirect fires to disrupt and destroy enemy formations; aviation and ground forces also employ artillery for immediate suppression of enemy elements until they can maneuver and eliminate the threat.

OFFENSE

Q-11. Reports from aviation units, UAVs, JSTARS, and satellites provide valuable tactical information. These systems' higher vantage points and long-range sensor devices assist in directing ground vehicles against enemy elements that ground elements cannot detect. Enemy forces can be identified, engaged and destroyed, blocked or bypassed, as desired, by the maneuver commander. Air cavalry and attack helicopters are positioned ahead, behind, or to the flanks of the ground formation. Ground units in movement to contact, exploitation, or pursuit can markedly increase movement rates when preceded by air cavalry or attack helicopters.

DEFENSE

Q-12. A defensive example of integrated operations is a counterpenetration mission (Chapter 4). In this type of mission, the aviation brigade may be tasked to coordinate directly with the defending ground brigade to develop EAs to destroy penetrating enemy forces before they can get to the ground-BSA. This complex operation requires full understanding by both the ground and air elements. All ground and air units must know the EAs to reduce the potential for fratricide. Aviators must positively identify targets to avoid engaging friendly troops who may not have cleared the area or may have mistakenly entered. Buffer zones and fire-control measures must be established.

COMBAT SUPPORT AND COMBAT SERVICE SUPPORT

Q-13. UH-60 and CH-47 aircraft must be integrated into the ground commander's scheme of maneuver. Examples include the following:

- Air assault.
- Team insertions.
- CASEVAC.
- Volcano employment.
- Resupply.

SECTION III – MISSION PLANNING

GENERAL

Q-14. Mission planning encompasses mission training, mission rehearsal, and mission execution. During planning, the commander and staff visualize how the battlefield will look at various stages. They war-game the scheme of maneuver and anticipate enemy COAs at critical points. They plan friendly integrated aviation-ground COAs necessary to maintain the initiative. They also determine branches and sequels for the commander to exploit enemy actions, reactions, and weaknesses.

Q-15. Training exercises validate planning, training, and rehearsal. The outcome of the training exercise tells the commander where to place emphasis for future training and where to focus sustainment training (Figure Q-1).

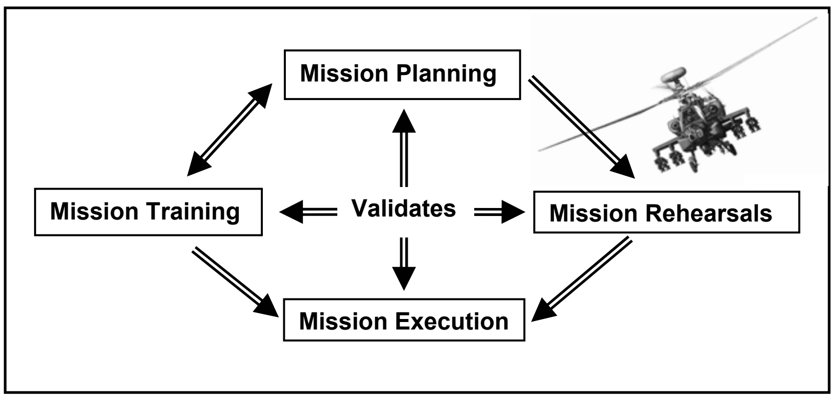


Figure Q-1. Mission Planning Through Execution Cycle

Q-16. Rehearsal validates planning and training for the mission. Minor planning adjustments may be made as a result of the validation provided during mission rehearsal. Optimal rehearsal includes integration of all mission participants. In combat, this integration allows the organization to operate as a whole, forming the combined arms or joint teams that will culminate in a synergistic air-ground effect.

Q-17. All efforts of planning and preparation affect mission execution. Future training and planning may be altered by lessons learned during the execution of current missions.

Q-18. Mission recovery ensures readiness for following missions. Recovery includes munitions reconfiguration, refueling, maintenance, CP movement, and crew changes.

Q-19. Although integrated missions are conducted with or under the control of a ground maneuver commander, they usually require direct coordination between aircrews and ground platoons or squads. Therefore, the aviation commander, his staff, and subordinate commanders and staffs typically directly coordinate with the supported unit throughout the planning process.

MINIMUM BRIGADE PLANNING REQUIREMENTS

Q-20. Figure Q-2 shows the minimum information required by the Army aviation team to ensure accurate and timely support. Digital transmission of information, such as coordinates, is faster and more accurate, if that method is available. Voice communications are necessary to verify information and to clarify needs and intentions.

- Situation including friendly forces' location, enemy situation highlighting known ADA threat in the AO, mission request, and tentative EA coordinates.
- Brigade- and battalion-level graphics update via MCS or AMPS or via radio communications, updating critical items—such as LOA, fire-control measures, and maneuver graphics—to better integrate into the friendly scheme of maneuver.
- Fire support coordination information: location of DS artillery and organic mortars, and call signs and frequencies.
- Ingress/egress routes into the AO; this includes passage points into sector or zone and air routes to the HA or LZ.
- Call signs and frequencies of the battalion in contact, down to the company in contact; air-ground coordination must be done on command frequencies to provide SA for all elements involved.
- GPS and SINCGARS time coordination; care must be taken to ensure that all units are operating on the same time.

Figure Q-2. Minimum Brigade Planning Requirements

LIAISON WITH THE GROUND MANEUVER FORCE

Q-21. In addition to the personal involvement of the aviation commander and staff, the aviation commander provides an LNO or a liaison team to the ground commander. The LNO interacts with the ground unit staff and other units' LNOs to ensure cross coordination at all levels. LNOs, at a minimum, should be captain's career course graduates and current or former PCs. They should possess a strong knowledge of the capabilities of all aircraft and units in the brigade. The aviation commander should also ask for a ground LNO from the maneuver brigade. The aviation battalion commander must implement an LNO certification program at home station to ensure that LNOs are proficient in the the full spectrum of operations.

Q-22. LNOs are vital for the coordination and deconfliction of the various elements that affect the scheme of maneuver. LNOs provide immediate access for each commander to an officer who has more intimate knowledge of the corresponding commander and his unit.

Q-23. Home-station training is not possible for all contingencies. Future alliances and coalition with foreign forces may require coordination without the opportunity for LNOs to become familiar with those units. As soon as possible upon deployment notification, the unit must prepare to operate with nontraditional partners. Units should send advance party personnel to begin coordination and training with forces in the theater. If U.S. units are already there, coordination with and lessons learned from them can be invaluable.

DECONFLICTION

Q-24. Deconfliction is a continual process for ground, aviation, and other supporting units. During planning and execution, aviation units must deconflict their operations with friendly units:

- Indirect fires, including mortars.
- CAS.
- UAVs.
- Air defenses.
- Smoke operations.
- Other internal aviation operations.
- Nonorganic aviation operations.
- Other services' delivery systems such as supply drops.
- Maneuver/movements for combat, CS, and CSS units.

SECTION IV – MISSION EXECUTION

ACTIONS EN ROUTE TO THE OBJECTIVE

Q-25. The ground maneuver headquarters informs its units in contact when aircraft are inbound. En route to the HA, the AMC contacts the ground maneuver element on its FM command network for a SITREP on the enemy and friendly forces.

Q-26. A battalion close fight SITREP consists of the following:

- Type and center of mass of enemy vehicles and equipment position and direction of movement; if dispersed, provide front line trace. Ground elements may not have a clear picture of the ADA threat.
- Location of friendly elements in contact, mission assigned to them, method of marking their position, and location of flanking units.
- Call sign/frequency verification and method of contact.

AVIATION TEAM CHECK-IN

Q-27. It is essential to positively identify locations of friendly units and supporting aircraft. Aircrews confirm with each other or wingmen their positive location. Ground elements must be extremely careful to verify any position information.

Q-28. The aviation team usually checks in on the command net of the unit that has the element in contact or as directed in the mission briefing. Upon initial radio contact, the aviation team leader executes a check-in as depicted in Figures Q-3 and Q-4. The team's location may be expressed by grid coordinates or position with respect to a known point or common graphics.

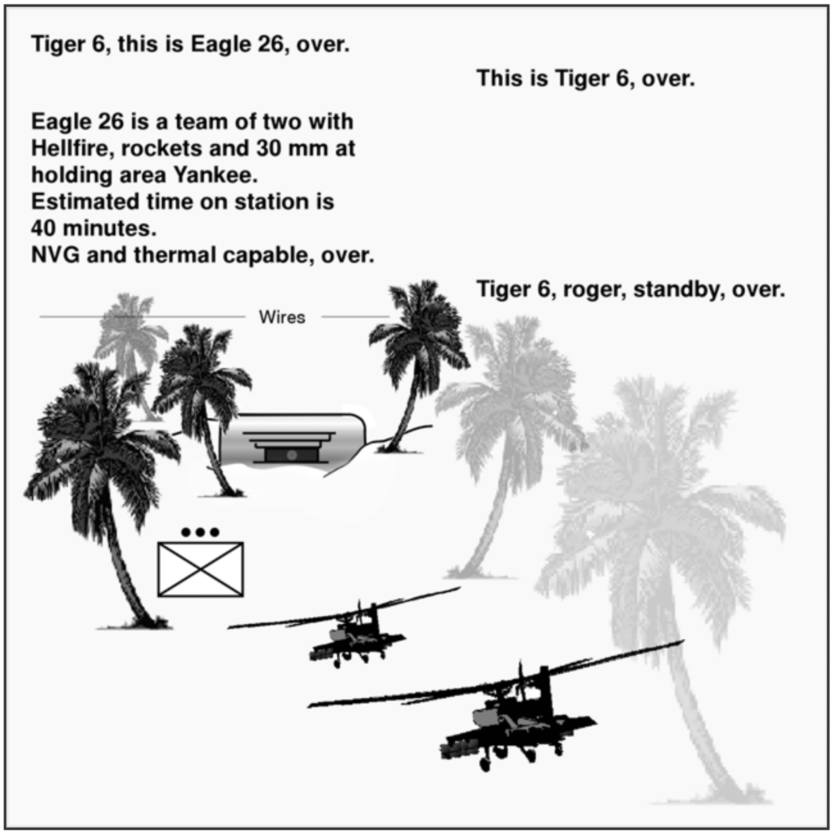


Figure Q-3. Aviation Team Check-In

Aviation Team Check-In

1. Initial contact.
2. Team composition, altitude, and location.
3. Munitions available.
4. Station time.
5. Night vision capabilities and type: image intensification, thermal, or both.

Figure Q-4. Example of Aviation Team Check-In

Q-29. The aviation team, if required, selects and occupies a holding or orbit area within FM communications range until required coordination is complete. High altitudes and high-density altitudes may preclude hovering by a fully loaded aircraft. The aviation team may need to establish a racetrack orbit oriented behind the LZ, BP, ABF, or SBF position. The AMC informs the ground unit leader of the orbiting pattern or the series of positions that his team will occupy.

Q-30. The BP, ABF, or SBF is normally offset from the flank of the friendly ground position but close enough to facilitate efficient target handoffs. This ensures that rotor wash, backblast, ammunition casing expenditure, and the general signature of aircraft do not interfere with operations on the ground or reveal ground unit positions. The offset position also allows aircraft to engage the enemy on its flanks, rather than its front, and lessens the risk of fratricide along the helicopter gun-target line. The scout platoon or other friendly forces must clear any positions over which helicopters may hover or orbit to preclude engagement by hidden enemy forces.

Q-31. The AMC provides the ground maneuver unit leader with his concept for the operation. This briefing may be as simple as relaying the direction of aircraft approach or attack route and time required to move to the recommended BP. On completion of coordination with the lowest unit in contact, the flight departs the holding or orbit area.

WEAPONS SELECTION

Q-32. Anything that kills the enemy for the ground force should be used. Hellfire is the preferred system for armor or hardened targets; however, Hellfire may be appropriate for use against a machine-gun position, bunker, or even an individual if that is what is required to assist the ground unit. Area fire weapons, such as gun systems and 2.75-inch rockets, are preferred for engaging troops in the open and other soft targets such as trucks and trenchworks. A Hellfire will usually not destroy the bunker unless it detonates ammunition or explosives stored in the bunker. It is important to note that the machine-gun crew may have been killed although the bunker appears undamaged.

SECTION V – POSITIVE LOCATION/TARGET IDENTIFICATION

COMMAND AND CONTROL TECHNIQUES

Q-33. Figures Q-5 through Q-8 show some C^2 techniques that can be effective during air-ground operations with Army aircraft:

- Bull's-eye technique—uses a known point or an easily recognizable terrain feature.
- Grid technique—uses grid coordinates to define the point.
- Sector/terrain technique—uses terrain and graphics available to both air and ground units.
- Phase line technique—uses graphics available to both air and ground units.

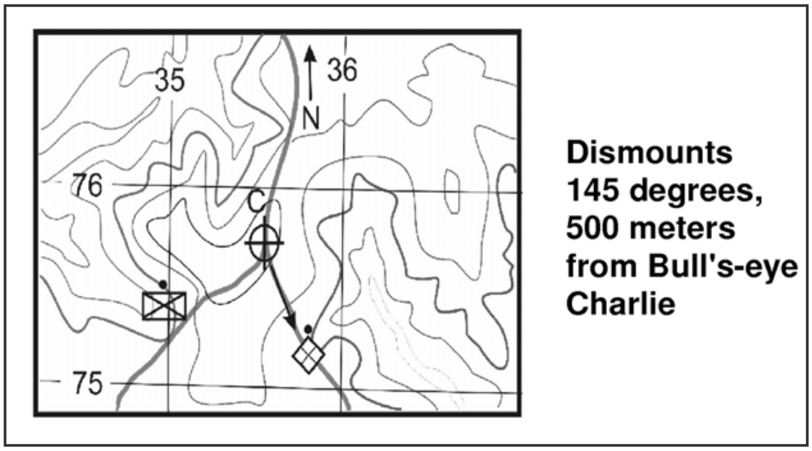


Figure Q-5. Bull's-Eye Technique

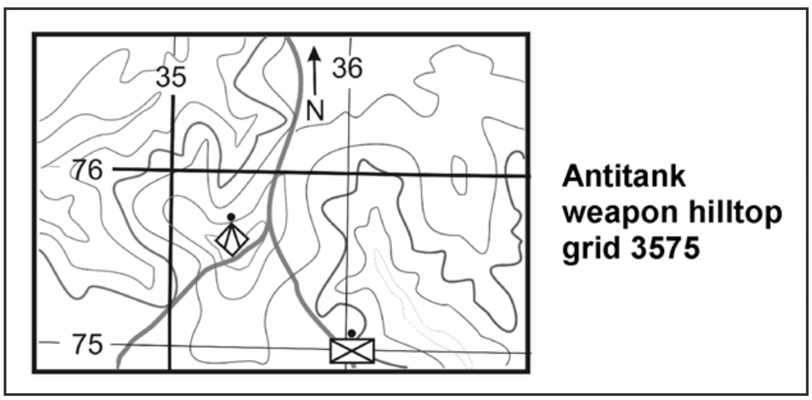


Figure Q-6. Grid Technique

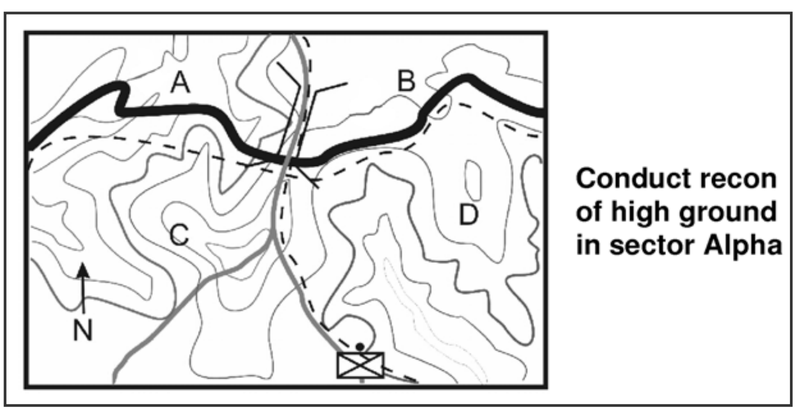


Figure Q-7. Sector/Terrain Technique

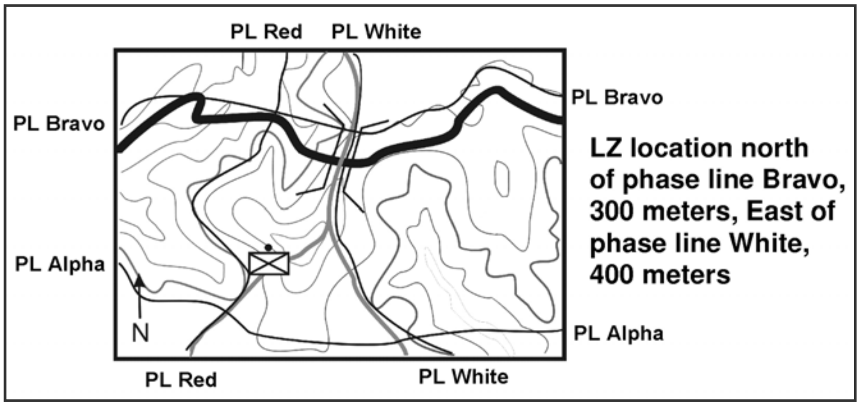


Figure Q-8. Phase Line Technique

MARKING

Q-34. There are various ways to mark a location or target. The effectiveness of vision systems on helicopters compares to those found on ground vehicles. During the day, the vision systems of the AH-64 and the OH-58D allow accurate identification of targets. During periods of reduced visibility, resolution is greatly degraded, requiring additional methods of verification. This situation requires extra efforts from both the ground unit and aviation element.

Q-35. Some U.S. weapons can kill targets beyond the ranges that thermal, optical, and radar acquisition devices can provide positive identification. Both aviation and ground forces may become overloaded with tasks in the heat of battle. Simple, positive identification procedures must be established and known to all.

MARKING FRIENDLY POSITIONS

Q-36. A method of target identification is direction and distance from friendly forces. Friendly forces can mark their own positions with IR strobes, IR tape, NVG lights, smoke, signal panels, body position, MRE heaters, chemical lights, and mirrors. Marking friendly positions is the least desirable method of target location information and should be used with extreme caution. Marking friendly positions can be a more time-consuming process than directly marking a target and can reveal friendly positions to the enemy.

MARKING ENEMY POSITIONS

Q-37. Target marking aids aircrews in locating the target that the unit in contact desires them to attack. Ground commanders should provide the target mark whenever possible. To be effective, the mark must be timely, accurate, and easily identifiable. Target marks may be confused with other fires on the battlefield, suppression rounds, detonations, and marks on other targets. Although a mark is not mandatory, it assists in aircrew accuracy, enhances SA, and reduces the risk of fratricide.

Marking by Direct Fire

Q-38. Direct-fire weapons can deliver a mark. Although this method may be more accurate and timely than an indirect fire mark, its use may be limited by range and the visibility of the weapon's burst effect. Aircraft may be used to deliver a mark. The preferred method is for the aircraft to mark with phosphorous, high-explosive rockets, illumination, or lasers. A burst of cannon fire or a single rocket fired to the left or right of the target as a marking round may be an option. This method may alert the enemy but is a good way to verify the target with reduced risk of friendly casualties. Ground units may also mark targets with direct fire using tracers or M203 smoke rounds.

Infrared Marking

Q-39. IR pointers and other IR devices can be used to mark targets at night for aircrews who are using NVGs; however, aircrews using other NVDs—such as FLIR or TIS—may not be able to see the mark. Unlike laser designators, these IR devices cannot be used to guide or improve the accuracy of aircraft ordnance. IR pointers may expose friendly units to an enemy with night-vision capability and should be used with caution. Ground units should initiate IR marks requested by the aircrew and continue until the aircrew transmits "TERMINATE" or the weapon hits the target.

Marking by Indirect Fire

Q-40. Artillery or mortar fires are effective means of assisting aircrews in visually acquiring targets. Before choosing to mark by artillery or mortars, observers should consider the danger of exposing these supporting arms to enemy indirect-fire acquisition systems and the additional coordination required. Marking rounds should be delivered as close to the target as possible, with smoke being the last round. Marking rounds are most effective when delivered within 100 meters of the target, but those within 300 meters are generally effective enough to direct armed aircraft. If the situation requires a precise mark, observers or spotters can adjust marking rounds early to ensure that an accurate mark is delivered. This action may, however, alert the enemy to an imminent attack.

Backup Marks

Q-41. Whenever a mark is provided, a plan for a backup mark should be considered. For example, direct fire may be tasked to deliver the primary mark, while a mortar may be assigned responsibility for the backup mark.

SUMMARY

Q-42. Table Q-1 suggests methods for identifying friendly forces and enemy targets.

Table Q-1. Methods of Marking Friendly and Enemy Positions

METHOD	DAY	NIGHT	NVG	NVS	FRIENDLY MARKS	TARGET MARKS	REMARKS
Smoke	Go	No Go	Marginal	No Go	Good	Good	Easy ID. May compromise friendly position, obscure target, or warn of FS employment. Placement may be difficult because of terrain, trees, or structures.
Smoke (IR)	Go	Go	Go	No Go	Good	Good	Easy ID. May compromise friendly position, obscure target, or warn of FS employment. Placement may be difficult because of terrain, trees, or structures. Night marking is greatly enhanced by the use of IR reflective smoke.
Illumination, Ground Burst	Go	Go	Go	No Go	NA	Good	Easy ID. May wash out NVDs.
Signal Mirror	Go	No Go	No Go	No Go	Good	NA	Avoids compromise of friendly location. Depends on weather and available light. May be lost in reflections from other reflective surfaces such as windshields, windows, or water.
Spot Light	No Go	Go	Go	No Go	Good	Marginal	Highly visible to all. Compromises friendly position and warns of FS employment. Effectiveness depends on the degree of ambient lighting.
IR Spot Light	No Go	No Go	Go	No Go	Good	Marginal	Visible to all NVGs. Effectiveness depends on the degree of ambient lighting.
IR Laser Pointer (below .4 watts)	No Go	No Go	Go	No Go	Good	Marginal	Effectiveness depends on the degree of ambient lighting.
IR Laser Pointer (above .4 watts)	No Go	No Go	Go	No Go	Good	Good	Less affected by ambient light and weather conditions. Highly effective under all but the most highly lit or worst weather conditions. IZLID-2 is the current example.
Visual Laser	No Go	Go	Go	No Go	Good	Marginal	Highly visible to all. High risk of compromise. Effective, depending upon degree of ambient light.
Laser Designator	Go	Go	No Go	Go	NA	Good	Highly effective with precision-guided munitions. Very restrictive laser-acquisition cone and requires LOS to target. May require precoordination of laser codes. Requires PGM or LST equipped.

Table Q-1 Methods of Marking Friendly and Enemy Positions (Concluded)

METHOD	DAY	NIGHT	NVG	NVS	FRIENDLY MARKS	TARGET MARKS	REMARKS
Tracers	Go	Go	Go	No Go	No Go	Marginal	May compromise position. May be difficult to distinguish mark from other gunfire. During daytime use, may be more effective to kick up dust surrounding target.
VS-17 Panel	Go	No Go	No Go	No Go	Good	NA	Easy to see when visibility is good. Must be shielded from the enemy.
IR Paper	No Go	No Go	No Go	Go	Good	NA	Must be shielded from the enemy. Affected by ambient temperature.
AN/PAQ-4C IR Aiming Light	No Go	No Go	Go	No Go	NA	Good	Effective to about 600 meters.
AN/PEQ-2A IR Aiming Light, Pointer, Illuminator	No Go	No Go	Go	No Go	NA	Good	Effective to about 1,300 meters. Can illuminate the target.
Chem Light	No Go	Go	Go	No Go	Good	NA	Must be shielded from enemy observation. Affected by ambient light. Spin to give unique signature.
IR Chem Light	No Go	No Go	Go	No Go	Good	NA	Must be shielded from enemy observation. Affected by ambient light. Spin to give unique signature.
Strobe	No Go	Go	Go	No Go	Excellent	NA	Visible to all. Affected by ambient light.
IR Strobe	No Go	No Go	Go	No Go	Excellent	NA	Effectiveness depends on ambient light. Coded strobes aid acquisition. Visible to all with NVGs.
Flare	Go	Go	Go	Marginal	Excellent	NA	Visible to all. Easily seen by aircrew.
IR Flare	No Go	No Go	Go	No Go	Excellent	NA	Easily seen by aircrews with NVGs.
Glint/IR Panel	No Go	No Go	No Go	Go	Good	NA	Not readily detected by enemy. Effective except in high ambient light.
Combat ID Panel	Go	No Go	No Go	No Go	Good	NA	Provides temperature contrast on vehicles or building.
Chemical Heat Sources, MRE Heater	No Go	No Go	No Go	Go	Poor	NA	Can be lost in thermal clutter. Difficult to acquire. Best to contrast a cold background.
Briefing Pointer	No Go	Go	Go	No Go	Fair	Poor	Short range.
Electronic Beacon	NA	NA	NA	NA	Excellent	Good	Ideal friendly marking for AC-130 and some USAF CAS. Not compatible with Navy/Marines. Can be used as a TRP. Coordination with aircrew essential.
Hydra 70 Illumination	Go	Go	Go	Go	NA	Good	Assists with direct fire and adjustment of indirect fire.

TARGET MARKING BREVITY LIST

Q-43. Table Q-2 lists standard brevity terms.

Table Q-2. Brevity List

TERM	MEANING
Rope	Observer is circling an IR pointer around an aircraft to help the aircraft identify the friendly ground position.
Visual	Observer is sighting a friendly aircraft or ground position. Opposite of BLIND.
Blind	Observer has no visual contact with friendly aircraft or ground position. Opposite of VISUAL.
Contact	Observer— 1. Has sensor contact at the stated position. 2. Acknowledges sighting of a specified reference point.
Snake	Aircrew calls to oscillate an IR pointer about a target.
Sparkle	Observer acknowledges— 1. Air-to-surface target marking by IR pointer. 2. Air-to-surface target marking by gunship/FAC-A using incendiary rounds.
Tally	Observer acknowledges sighting of a target, nonfriendly aircraft, landmark, or enemy position. Opposite of NO JOY.
Steady	Aircrew calls to stop oscillation of IR pointer.
Stop	Aircrew calls to stop IR illumination of a target.
No Joy	Aircrew does not have visual contact with the target/bandit/landmark. Opposite of TALLY.

SECTION VI – SPECIAL OPERATIONS

Q-44. Training at the home station with SOF may not be practical or available. Commanders and staffs must be aware that SOF are probably in theater, but their activities may not be published. Establishment of a communications link with special operations units is essential to coordinate operations.

Q-45. SOF are usually very well trained in the use of all assets. Their expertise should make the flow of coordination with them simple, but in some instances, the aviation force leader may have to use emergency coordination measures.

SECTION VII – OPERATIONS WITH NONTRADITIONAL FORCES

Q-46. Commanders must train their staffs and soldiers to be flexible and prepared to conduct liaison with and support elements that are not traditionally included in home-station training. These organizations may include the CIA, DOS, DEA, domestic and foreign police agencies, and indigenous forces. General checklists may be developed to address concerns. Often, these other agencies may not be aware of aviation capabilities. LNOs must be ready to advise and assist the supported element.

SECTION VIII – CLOSE COMBAT

Q-47. Close combat is inherent in maneuver and has one purpose—to decide the outcome of battles and engagements. It is carried out with direct-fire weapons and supported by indirect fire, CAS, and nonlethal engagement means. Close combat defeats or destroys enemy forces or seizes and retains ground. The range between combatants may vary from several thousand meters to hand-to-hand combat. During close combat, attack and cavalry aircraft may engage targets that are near friendly forces, thereby requiring detailed integration of fire and maneuver of ground and aviation forces. To achieve the desired effects and reduce the risk of fratricide, air-ground integration must take place down to company, platoon, and team levels. Close-combat engagements also require a higher training standard for aerial weapons delivery accuracy.

CLOSE COMBAT ATTACK

Q-48. *For aviation units, close combat attack (CCA) is defined as* a hasty or deliberate attack in support of units engaged in close combat. During CCA, armed helicopters engage enemy units with direct fires that impact near friendly forces. Targets may range from a few hundred meters to a few thousand meters. CCA is coordinated and directed by a team, platoon, or company-level ground unit using standardized CCA procedures in unit SOPs.

Q-49. Effective planning, coordination, and training between ground units and armed aircraft maximize the capabilities of the combined arms team, while minimizing the risk of fratricide. The key to success for enhancing air-ground coordination and the subsequent execution of the tasks involved begins with standardizing techniques and procedures. The end state is a detailed SOP between air and ground maneuver units that addresses the CCA situation. This procedure is best suited for units that maintain a habitual combined arms relationship during training and war.

Q-50. To prepare for close combat, basic tasks—such as how to find a ground unit's position at night—must be solved during home-station training. Operations in unfamiliar terrain must not be hampered by the question of how to find the unit. It is found by one of the various methods already practiced in training.

DIRECT FIRES CALLED BY THE GROUND COMMANDER IN CLOSE COMBAT

Q-51. The AMC and ground unit key leaders must consider the risk to friendly forces before weapon selection and engagement. If friendly forces may be in the lethality zone, the ground leader must be precise in describing the target that he wants aircraft to engage and should warn aircrews of the proximity of those forces. The aviation leader must be aware of his aircrews' skills in delivering fires near friendly forces.

CLOSE COMBAT ATTACK BRIEFING

Q-52. The CCA briefing (Figure Q-9) follows the joint standard nine-line format with minor modifications for Army helicopters. The briefing provides clear and concise information in a logical sequence that enables aircrews to employ their weapons systems. It also provides appropriate control to reduce the risk of fratricide. Figure Q-10 depicts an example of a briefing.

Q-53. Danger close ranges for armed helicopter weapons are in Table Q-3. FM 3-09.32 (FM 90-20) has additional information. Engagment at ranges danger close or short of danger close require extreme close coordination and positive identification. Crews must take special precautions when delivering direct fires on targets within these ranges but are not prohibited from delivering at ranges short of danger close. Accurate delivery of munitions is essential when engaging at danger close ranges and requires higher crew training standards.

Table Q-3. Danger Close Ranges for Attack Helicopter Engagement

WEAPON	DESCRIPTION	DANGER CLOSE IN METERS
2.75" rockets	Rocket with various warheads. Area weapon.	200
Hellfire	Precision-guided. Point weapon.	75
20 mm 25 mm 30 mm	Guns. Area weapons.	150

Q-54. Time is a primary constraining factor for coordinating direct fires in close combat. METT-TC dictates how coordination between the commander in contact and the AMC is accomplished. Face-to-face coordination is preferred but is rarely possible in CCA situations.

Q-55. In the hasty CCA—to take advantage of targets of opportunity or assist ground units under pressure—coordination is usually accomplished by radio.

ENGAGEMENT

Q-56. A potential target may seem lucrative because of its apparent location and activity, but visual acquisition and activity do not mean positive identification. If there is no immediate threat from a specific target and it is not positively identified, aircrews do not shoot until all possible measures to identify are taken. Before the armed helicopter team engages, the target must be confirmed by the aircrew and friendly unit in contact.

Q-57. During engagement, open communication and continuous coordination with friendly ground elements are required to ensure the desired effect. Coordination of the direct and indirect fires from all participants produces the most efficient results in the least amount of time, with the least risk to all. This coordination includes CAS and any nonlethal methods that may be employed.

CLOSE COMBAT ATTACK BRIEFING

(Omit data not required. Do not transmit line numbers. Units of measure are standard unless otherwise specified. *Denotes minimum essential in limited communications environment. BOLD denotes readback items when requested.)

Terminal controller: ____________ This is ____________
(Aircraft call sign) (Terminal controller)

***1. IP/BP/ABF or friendly location:** ____________
(Grid, known point or terrain feature)

*2. Heading to target: ____________(magnetic)
(Specify from IP/BP/ABF or friendly location)

*3. Distance to target: ____________(meters)
(Specify from IP/BP/ABF or friendly location)

4. Target elevation: ____________(feet mean sea level)

*5. Target description: ____________

____

***6. Target location:** ____________
(Grid, known point or terrain feature)

7. Type of target mark: ____________ Code:____________(day/night)
(WP, laser, IR, beacon) (Actual code)

Laser to Target Line:____________degrees

***8. Location of friendlies:** ____________
(Omit if previously given--grid, known point, or terrain feature)

Position Marked By: ____________

9. Egress direction: ____________
(Cardinal direction not over threats)

Remarks (as appropriate): ____________

____
(Threats, restrictions, danger close, attack clearance, SEAD, abort codes, hazards)

Time on target (TOT): ____________

or time to target (TTT): Standby____________ plus ____________ hack.

Note: When identifying position coordinates for joint operations, include the map datum data. DESERT STORM operations have shown that simple conversion to latitude/longitude is not sufficient. The location may be referenced on several different databases; for example, land-based versus sea-based data.

Figure Q-9. Close Combat Attack Checklist

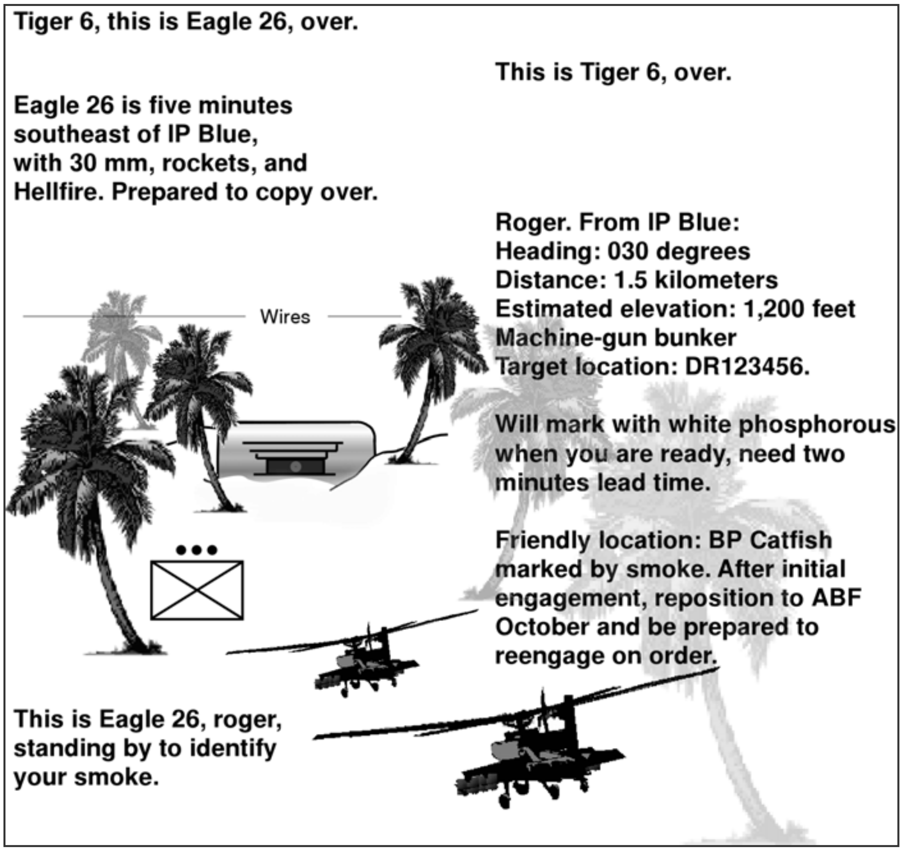


Figure Q-10. Example of a Close Combat Attack Brief

BATTLE DAMAGE ASSESSMENT/REATTACK

Q-58. The AMC provides a BDA to the ground commander who determines if a reattack is required to achieve his desired end state. Support continues until the desired effect is achieved.

EMERGENCY COORDINATION MEASURES

Q-59. Aviators may be required to assist ground personnel who are not fully familiar with aviation assets. Key personnel who habitually handle coordination for aviation support may become casualties or simply not be available. These situations require close attention, careful communications, and initiative on the part of the aviator to place fire on targets or deliver other support as necessary. An assault pilot may be required to coordinate for an attack mission or call for indirect FS. An attack pilot may have to assist in extracting personnel.

Q-60. Pilots must ask appropriate questions of the requestor, with emphasis on positive identification of location. Possibilities include the following questions:

- Where is ground unit's position? What are the GPS coordinates? Are those coordinates verified with another GPS?

- Can the ground unit mark its position with smoke, tracers, or other methods? (If smoke is used, aircrew verifies color after deployment.)
- What assistance does the ground unit need (FS, extraction, or resupply)?
- Where is the target? What are the grid coordinates or the relationship of the target to a readily identifiable natural or man-made feature?
- How far is the target from the ground unit and in what direction is it? If the observer is not familiar with meters, aircrews ask the observer to try football or soccer field lengths to estimate distances.
- What is the target? Is the target personnel, vehicles, equipment, or buildings? What is the size of the enemy force, and what is it doing?

Q-61. Aviators may have to fly helicopters near friendly troops to deliver ordnance onto the target. Factors that can reduce the potential for fratricide include the following:

- Precision-guided munitions.
- Fire support coordination measures.
- Planned or hasty coordination and control measures (Figures Q-5 through Q-8).
- Knowledge of the ground tactical plan.
- Knowledge of the exact location of friendly troops.
- Knowledge of the exact location of aircraft.
- Positive identification of targets.
- Familiarity between the supported unit and the aviation unit.

Appendix R

Urban Operations

Like so many urban battles, the battle of Hue was filled with ambiguity and uncertainty. The North Vietnamese Army (NVA) and Viet Cong attacked as part of the surprise Tet Offensive in 1968. Two NVA regiments overran the city, systematically executing thousands of inhabitants. The U.S. and South Vietnamese response was awkward and piecemeal. The Americans rapidly shifted three Marine Corps battalions from ongoing combat missions, and eventually, 13 South Vietnamese battalions were committed. The Americans followed with the commitment of the 3rd Brigade, 1st Cavalry, and a battalion task force of the 101st Airborne as blocking forces to attempt to stop enemy reinforcement and destroy its C^2 and logistical links. There was no clear unity of command over the various South Vietnamese and American forces, and the city was never fully isolated by either side. The battle raged for 22 days before the United States and its South Vietnamese allies achieved victory. Casualties were high, as is often the case in urban combat: 1,004 United States, 2,184 ARVN, and more than 5,000 NVA. Throughout the battle, aviation played a critical role in observation, troop movement, gun support, and MEDEVAC.

SECTION I – GENERAL

R-1. Operations in urban terrain follow the same basic planning and execution methodology as in other terrain; however, special planning and consideration of the characteristics unique to urban terrain are essential. See Chapter 6. FM 3-06.1 (FM 1-130) and FM 3-06.11 (FM 90-10-1) contain detailed information.

R-2. Whenever possible, aircrews avoid a fight in urban terrain. The optimum choice is to surround, isolate, and bypass a city, ensuring that any troops and resources in that city are rendered ineffective and unavailable to support other enemy operations.

AVIATION'S ROLE DURING URBAN OPERATIONS

R-3. Aviation enhances urban operations by providing—

- Reconnaissance.
- Speed of resupply.
- Rapid troop movement.
- Evacuation of personnel and equipment.
- Cooperative maneuver.

- Precision fires in support of ground forces.
- The combined arms team's ability to quickly and efficiently make the transition to new missions.

AH-64 UNITS

R-4. AH-64 units attack targets with direct fire to destroy enemy troops and equipment. They also assist with ISR and communications, using their advanced suite of sensors and radios.

OH-58D UNITS

R-5. OH-58D units perform the same functions as AH-64 units. They also perform reconnaissance and security missions in and around urban areas.

UTILITY AND HEAVY HELICOPTER UNITS

R-6. UH-60 and CH-47 units conduct air assaults and transport personnel, equipment, and supplies. They are configured with machine guns to aid in the suppression of enemy forces.

ALL HELICOPTERS

R-7. Aircraft can also assist in radio relay and perform as aerial OPs and C^2 platforms.

STAGES OF URBAN OPERATIONS

R-8. The four stages of urban operations are *assess*, *shape*, *dominate*, and *transition*. They may occur in succession or simultaneously.

ASSESS

R-9. In the *assess* stage (Figure R-1), the unit identifies the portions of the urban area essential to mission success.

AVIATION ASSESS MISSIONS

Lift (Utility/Cargo) Helicopter Units

- Provide CASEVAC.
- Conduct air movement of troops and supplies.
- Support C^2 operations.
- Support EW operations.
- Support NEO.

Attack/Cavalry Helicopter Units

- Perform reconnaissance of urban peripheral area to establish enemy strength and disposition.
- Conduct route and area reconnaissance for forces.
- Establish initial security of flanks and rear until relieved by ground forces.
- Perform air security.
- Provide suppressive fires in support of ground reconnaissance and security elements.

Figure R-1. Missions During the Assess Phase

SHAPE

R-10. In the *shape* phase, units isolate those areas essential to mission success in the offense or avoid isolation in the defense. In the offense, aviation forces attack to isolate the objective, move troops and supplies, enhance C^2, conduct reconnaissance, and augment ground forces. In the defense, aviation forces help set the conditions for the main battle and prevent isolation of friendly units (Figure R-2).

AVIATION SHAPE MISSIONS

Lift (Utility/Cargo) Helicopter Units

- Conduct air assaults to the flanks and rear to deny LOCs from the enemy.
- Provide CASEVAC.
- Perform personnel and equipment recovery.
- Conduct air movement of troops and supplies.
- Emplace logistical resupply points and FARPs.
- Support C^2 operations.
- Conduct EW operations.
- Support NEO.
- Conduct countermobility operations/emplace Volcano mines.

Attack/Cavalry Helicopter Units

- Perform reconnaissance of peripheral areas to establish enemy strength and disposition.
- Conduct route and area reconnaissance.
- Establish initial security of flanks and rear until relieved by ground forces.
- Augment ground forces for isolation of urban area.
- Employ indirect fires and CAS.
- Conduct JAAT.
- Perform air assault security.
- Provide suppressive fires in support of ground maneuver and security elements.
- Employ direct fires to destroy key targets and enemy elements attempting to escape or resupply or reinforce the urban area.

Figure R-2. Missions During the Shape Phase

DOMINATE

R-11. In the *dominate* phase, units precisely mass the effects of combat power to rapidly dominate the area (Figure R-3).

AVIATION DOMINATE MISSIONS

Lift (Utility/Cargo) Helicopter Units

In addition to the missions listed under assess and shape, utility and cargo aircraft may—

- Perform air assault.
- Support CA/PSYOP.

Attack/Cavalry Helicopter Units

In addition to the missions listed under assess and shape, attack and cavalry aircraft may—

- Provide security to flanks of advancing ground forces.
- Provide suppressive fires in support of attacking ground forces.
- Engage HPTs influencing point of penetration with precision direct fires.

Figure R-3. Missions During the Dominate Phase

TRANSITION

R-12. In the *transition* phase, units transfer control of the urban area to other agencies and prepare for follow-on operations. Aviation forces facilitate the transition (Figure R-4).

AVIATION TRANSITION MISSIONS

Lift (Utility/Cargo) Helicopter Units

- Provide CASEVAC.
- Perform personnel and equipment recovery.
- Conduct air movement of troops and supplies.
- Emplace logistical resupply points and FARPs.
- Support C^2 operations.

Attack/Cavalry Helicopter Units

- Provide screen or area security.
- Conduct route and area reconnaissance for forces.
- Serve as reserve.
- Conduct operations to set conditions for follow-on missions.

Figure R-4. Missions During the Transition Phase

SHAPE/DOMINATE

R-13. The lines between *shape* and *dominate* phases are rarely crisp. Aviation capabilities allow the commander to more quickly shape the battlefield and move into the dominate phase. There are always sectors of the battlefield that will be in different phases than in other sectors, demanding the application of various techniques by the commander.

R-14. During the operation illustrated in Figure R-5, aviation provides—

- Security by screening the flanks of the operation.
- Reconnaissance of NAIs.
- Direct fire on the enemy from numerous positions.
- Air assault and air movement.

R-15. These actions are conducted in concert with—

- Ground attacks.
- Observation by satellites, UAVs, and other aerial platforms.
- Indirect fires.
- Sister-service CAS.
- Ground elements tasked to control underground avenues of approach such as sewers and subway tunnels.
- MP and other ground elements tasked to control critical points and to screen those people departing and entering the sector for combatants.

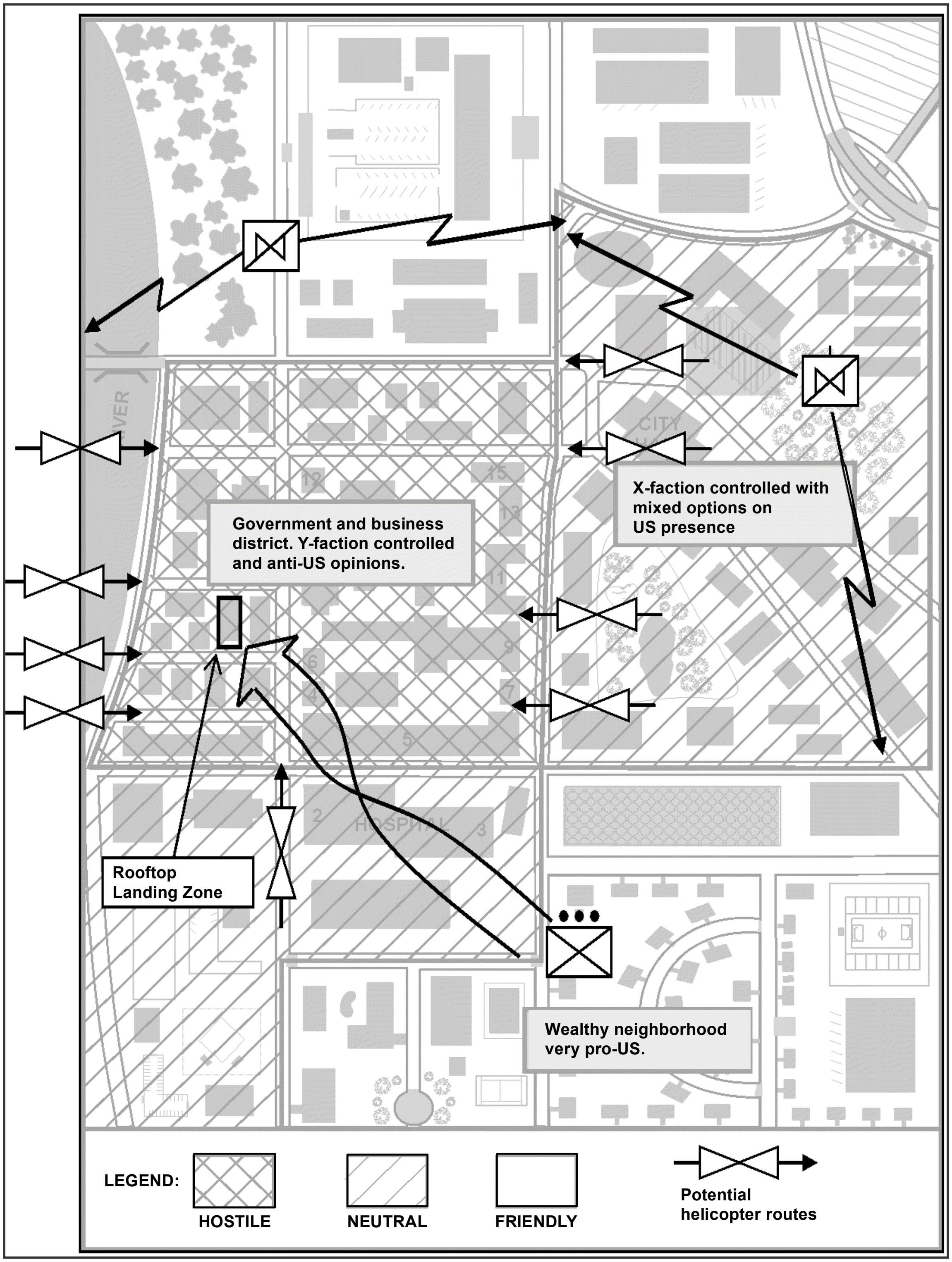


Figure R-5. Example of a Typical Shape/Dominate Mission

SECTION II – SPECIAL CONSIDERATIONS

AVIATION WEAPONS EMPLOYMENT IN URBAN TERRAIN

R-16. When fighting in urban terrain, most targets are fleeting and near the identifying soldier. Few personnel targets will be visible beyond 50 meters, and engagements usually occur at 35 meters or less. Armed helicopter engagements in support of troops that are in such proximity require careful coordination and execution.

R-17. To reduce the risk of fratricide, aircrews must be familiar with minimum arming distances and risk-estimate distances. Falling debris from urban structures can be as deadly as shrapnel. FM 3-09.32 (FM 90-20) and Chapter 3 of this manual contain additional information regarding danger close ranges.

R-18. The precision of the Hellfire missile may minimize collateral damage. Because of its accuracy, the use of a Hellfire missile may be appropriate to eliminate such targets as a sniper or machine-gun nest. Selection of the correct type of Hellfire warhead is also critical.

R-19. Though considered an area fire weapon, the 30-millimeter cannon is very accurate and may be employed against a single person or groups. It can penetrate the walls of most conventional structures.

R-20. The 50-caliber and 7.62-millimeter machine gun are both area fire weapons. They penetrate less well than the 30-millimeter, with the 50-caliber having greater effect than the 7.62-millimeter. Both are good for suppressive fires and against troops and other soft targets. Door guns on utility and cargo aircraft provide direct fires to protect the aircraft and crews.

R-21. The 2.75-inch rockets suppress and destroy targets. As currently configured, these are area fire weapons, the accuracy of which is tied directly to crew proficiency. Running or diving fire often yields the best results. Rockets are effective against troops and equipment in open streets and plazas when enough standoff and maneuver room is available. Flechette rounds are effective to clear rooftops. Smoke rounds are available.

HELICOPTER WEAPONS ENGAGEMENT

R-22. Armed helicopters are most effective when the standoff advantage of their weapons systems is employed and vulnerability to ground fires is reduced. Because of target masking in urban terrain, aircrews may have to maneuver close to a target to see and hit it. Continuous movement minimizes exposure time and enhances survivability. If the enemy has established a stronghold in the urban area, the risk to aviation assets dramatically increases. The close infantry battle will become increasingly difficult to support with helicopters.

R-23. As enemy elements seize key features (particularly taller structures), the air defense threat escalates. Helicopter movement must be swift and unpredictable. Low slow orbiting or hovering fire is extremely risky in urban terrain.

R-24. Urban terrain is canalized and often provides severely limited fields of fire. Structures tend to limit target views to a narrow corridor along the street or from high angles over the buildings. Enemy forces may occupy buildings or "hug" the near sides of buildings, putting them out of view of armed helicopters. Engagements of rooftop targets can come from all angles. Expect targets to move rapidly from cover to cover and require quick engagement.

R-25. The threat to aircraft is lessened when firing from friendly-controlled areas. Positions should be planned to provide flexibility for aircraft maneuver to maximize cover and multiple firing positions and angles. When forced to fight and fly over areas where the enemy has not been cleared, aviation forces face extremely high risk. Aircrews can expect engagement from the ground and upper floors of buildings. When these conditions exist, it is better to keep the aircraft moving rapidly, making it harder to engage. Aircrews normally conduct running fire engagements from an initial point, engaging the target and returning to a safe area to regroup for another attack. The lead-wingman concept is used for this type of attack. The wingman suppresses the target during and after lead's engagement and "covers his break." Ground units provide suppressive fires to protect the aircraft during their attack.

R-26. Aircrews plan for both hovering fire (Figure R-6) and running fire (Figure R-7). Running fire generally offers better aircraft survivability. If aircrews use hovering fire, they can unmask laterally or vertically from cover.

GRAPHIC AIDS AND ROUTE PLANNING

R-27. Aircrews have different visual cues and perspectives than do ground forces, thus potentially causing confusion. Common graphics and sketches help alleviate these differences.

NAVIGATION

R-28. Navigation over urban terrain can be more difficult than over natural terrain because most maps do not show the vertical development of urban terrain. Cities are compartmented, causing small navigational errors to have significant effect. High density of structures, variety of geographical references, and similarity of structures can cause confusion. If electrical power is still available, high ambient light levels can create problems with NVD.

NAVIGATION TECHNIQUES

R-29. Effective navigation over large towns and cities requires a variety of navigational systems and techniques. GPS eases the problems associated with navigation and orientation but does not eliminate the need for other navigational methods. Navigation systems may be degraded because of interference induced by buildings and by GPS jammers. Aircrews must closely monitor and cross-check their positions by all available means.

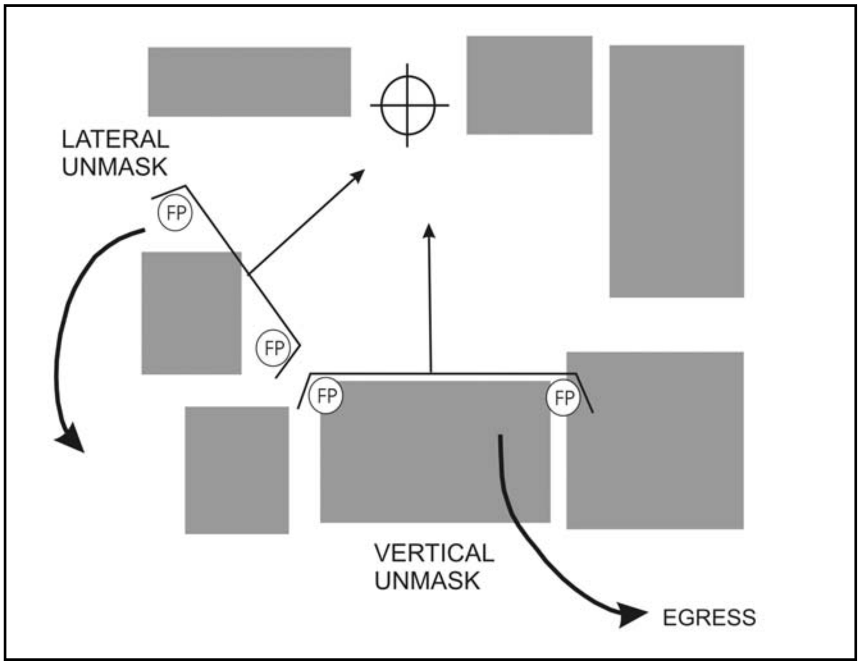


Figure R-6. Example of a Hovering Fire Engagement

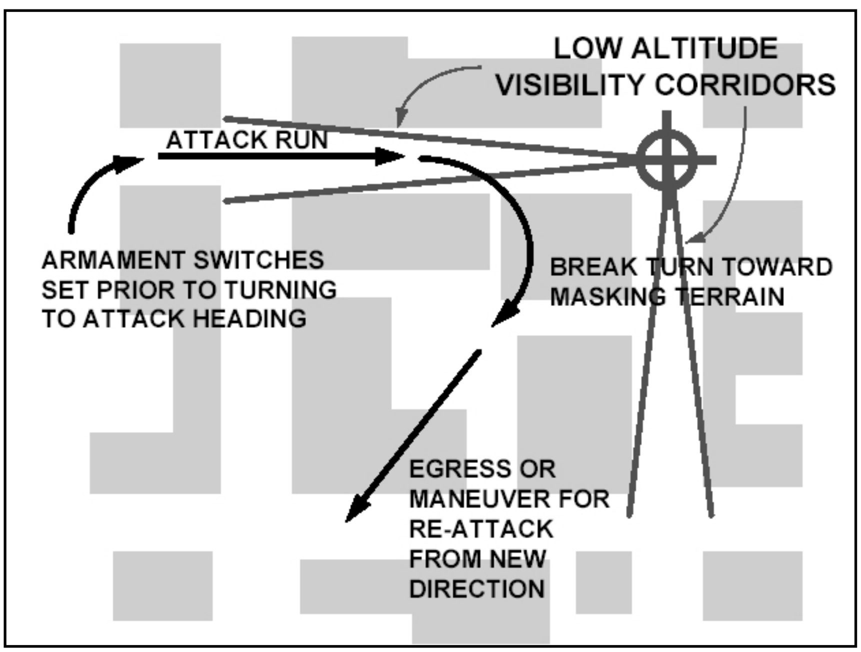


Figure R-7. Example of a Running Fire Engagement

R-30. Natural terrain features—such as rivers, lakes, and hills—are preferable landmarks because they are less likely to change, but they may not be useable during various flight profiles. Man-made features may provide the majority of available navigation aids. Units choose easily recognizable features such as cemeteries, stadiums, cathedrals, and major roads.

Highways, rivers, railways, canals, and coastlines provide easily recognizable boundaries and references to assist in maintaining orientation. Prominent rail and highway interchanges are useful as en route checkpoints.

R-31. Selection of key features within an urban area facilitates general orientation and backup navigation. The most prominent vertical structures, such as radio towers and distinctive skyscrapers, are visible from almost all directions in a major city. Use of these features as heading references is an effective method of navigation. However, prominent man-made objects can be destroyed and unavailable for reference. Varied flight routes and times increase survivability by preventing predictability.

R-32. An area sketch (Figure R-8) offers both the ground commander and the aircrew a means of identifying friendly and enemy locations. The sketch is an excellent tool for planning and unit coordination. It is best used for smaller towns and villages but can be applied to an EA or other specific area of a larger city. The area sketch captures natural and man-made features and key terrain in that area and designates a letter or numeral code to each. Buildings and their corners are coded. This gives aircrews an accurate way to target specific buildings and identify friendly locations. Units must ensure that they are using the same area sketch to effect coordination.

R-33. Units may use a network route structure (Figure R-9) of ACPs and air routes (preferably surveyed) to facilitate route planning, navigation, and C^2.

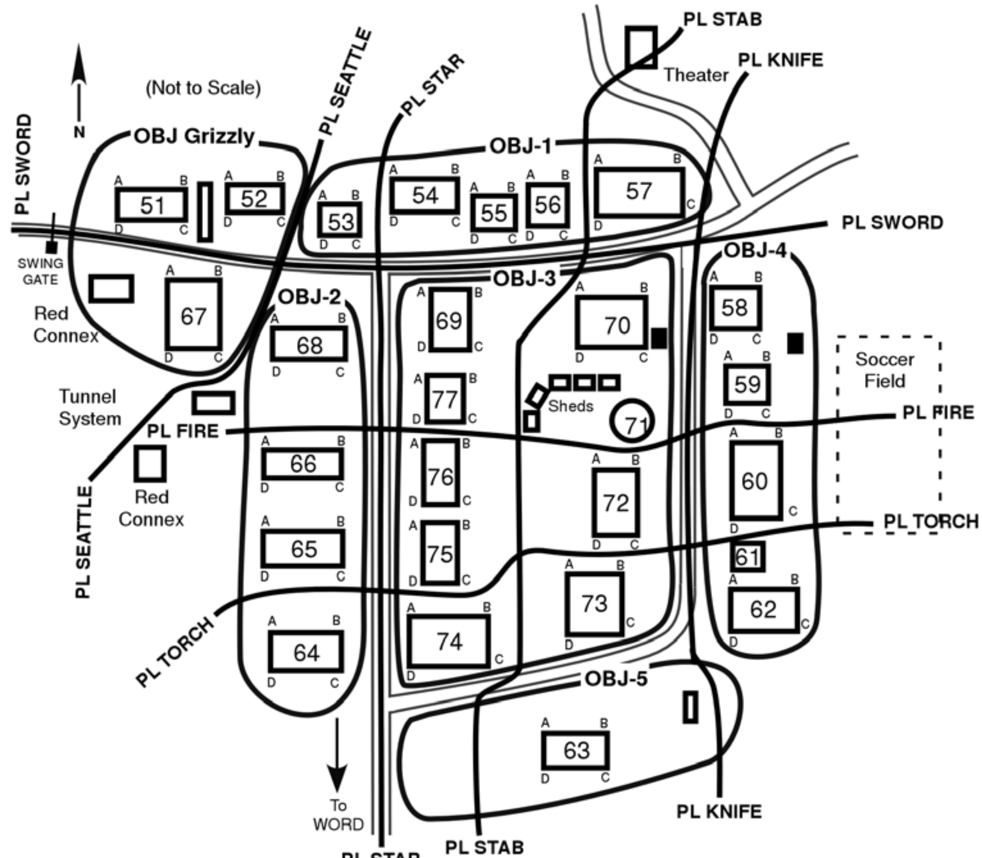
R-34. Maneuver graphics, FS coordinating measures, and airspace control measures further allow aircrews and ground elements to better visualize the urban battle space. It is the responsibility of both the aviation and ground unit to ensure that they use the same area sketch for accurate coordination.

SELECTION AND PREPARATION OF MAPS AND CHARTS

R-35. Units consider all available government and commercial products—ranging from paper maps and charts to digital mapping databases. Commercial maps of a city may be more current and provide better detail than tactical maps. Larger scale maps provide additional detail for accurate planning. Photo imagery supports more accurate assessment of key features. HUMINT sources can provide useful data for map preparation, including confirmation of locations and conditions of structures.

R-36. Shortcomings of tactical maps are that the urban area data are often out of date and the scales are too small to show enough urban detail. Maps with a larger scale than 1:50,000 provide greater detail for mission planning and execution. Maps should be updated with current terrain and structure information. This effort may involve drawing new features by hand. Overhead imagery can be used to update information:

- Some 1:25,000 tactical maps are available.
- Some 1:24,000 and 1:25,000 National Geodetic Survey maps are available for some countries.
- NIMA produces 1:12,500 maps for specific urban areas, as specified by the customer.



LEGEND

51 Factory	65 Bank		Generator/Box
52 Warehouse	66 Vet Clinic	- - - -	Fence
53 Private Home	67 Office Building		
54 Town House	68 Gas Station		
55 Private Home	69 Post Office		
56 Church	70 City Hall		
57 Municipal Building	71 Water Tower		
58 Power Station	72 Heath Clinic		
59 Private Home	73 Private Home		
60 Town House	74 Hotel		
61 Radio Station	75 Store		
62 School	76 Fire Station		
63 Private Home	77 Police Station		
64 Private Home			

Figure R-8. Example of an Area Sketch Flight Planning Aid

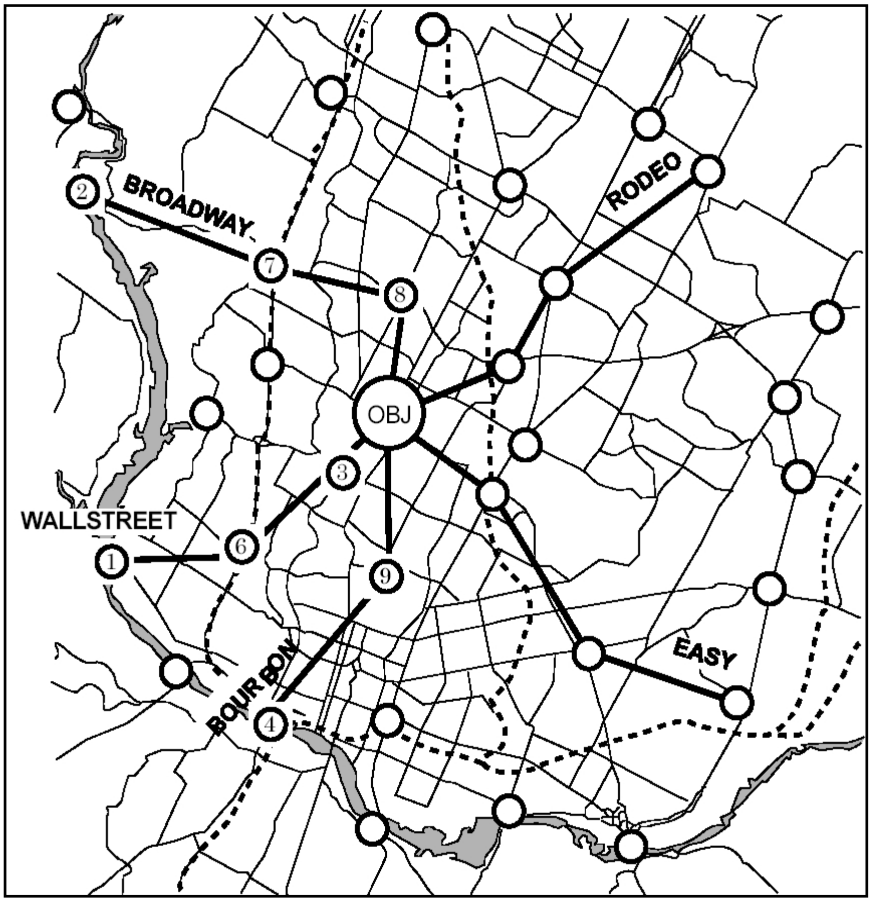


Figure R-9. Example of a Network Route Structure

R-37. Tourist maps are often large scale, depicting the shape of significant buildings and cultural features. A reference grid is usually overlaid on the map. Streets and landmarks may be listed in the margin, with reference to the location within the grid pattern. If military grid coordinates are required for navigation or targeting, the civilian map must be overlaid with the MGRS in the proper datum.

R-38. NEO Intelligence Support Handbooks (NISH) is also available for every American Embassy (classified secret). The NISH augments planning for NEO or hostage-recovery operations. It contains information such as presurveyed LZ listings. Planners must consider currency of terrain information.

TARGETING GRIDS AND REFERENCE TECHNIQUES

R-39. Ground elements generally use a terrain-based reference system during urban operations. MGRS coordinates have little meaning at street level. Aviation and ground forces must use common control methods. Possible techniques include urban grid (Figure R-10), checkpoint targeting (Figure R-11), objective area reference grid (Figure R-12), and target reference points (Figure R-13). These techniques are based on the street and structure pattern, without regard to the MGRS. Using common techniques allows aircrews to make the transition to the system in use by the ground element upon arrival in the objective area. For example, references to the objective or target may include local landmarks such as "The third floor of the Hotel Caviar, southeast corner." This transition should be facilitated by using a "big-to-small" acquisition technique.

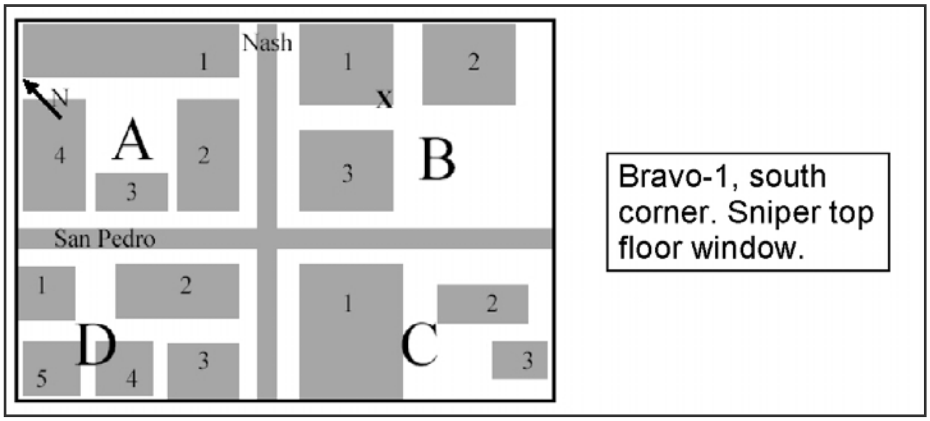


Figure R-10. Example of the Urban Grid Technique

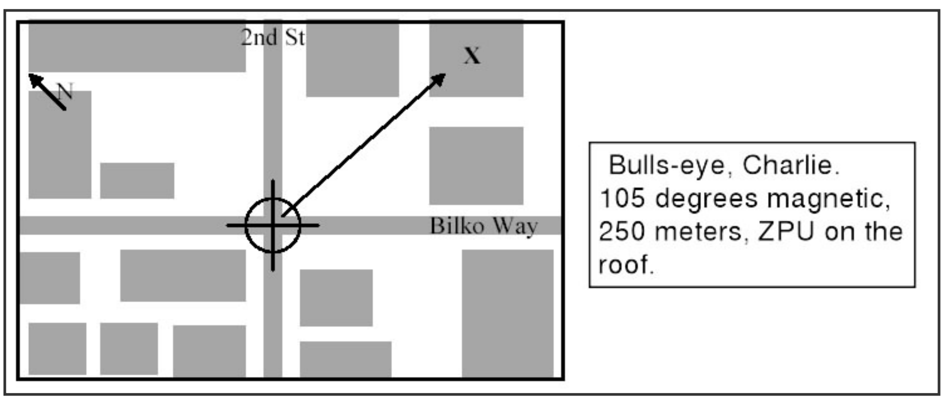


Figure R-11. Example of the Checkpoint (Bull's-Eye) Technique

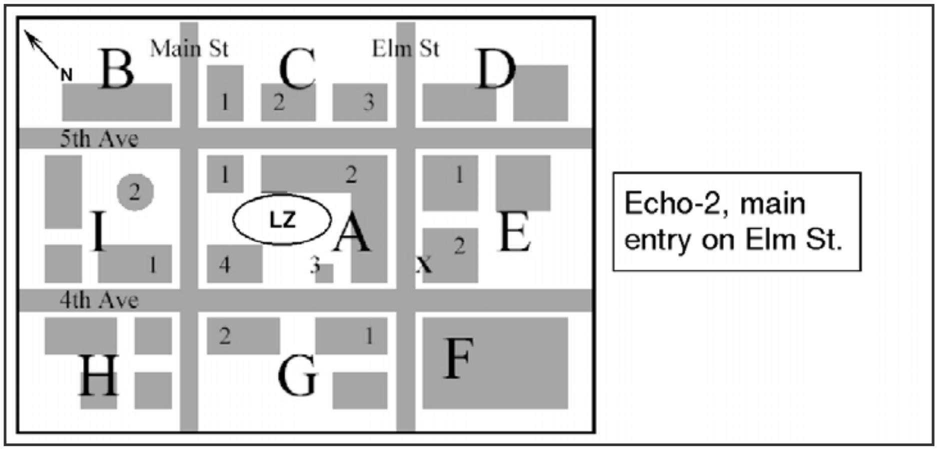


Figure R-12. Example of the Objective Area Reference Grid Technique

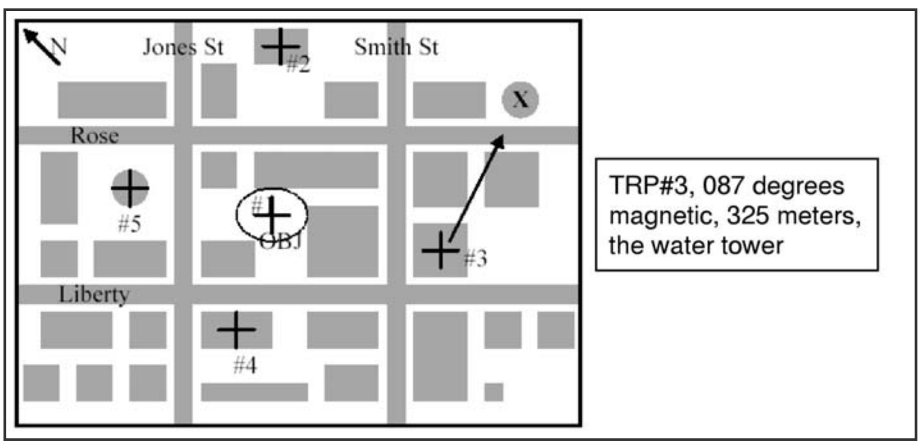


Figure R-13. Example of a Target Reference Point Technique

CONSIDERATIONS FOR HELICOPTER EMPLOYMENT

R-40. Commanders must identify and assess unique characteristics associated with aviation urban operations. Appendix A covers risk management in detail. Some other considerations follow.

FIRES

R-41. Some special considerations for fires in urban operations include the following:

- Minimum arming range and minimum slant ranges within urban areas limit the use of some weapons.
- Heavy concentration of precision weapon systems along a narrow front may cause coordination problems.
- Even precision weapons can cause fratricide if planning is not precise.

- Multiple flat, polished surfaces in an urban area may degrade laser use.
- Heavily developed urban centers can limit close air support.
- Direct and indirect suppressive ground fire should augment the escort suppressive fires as air-assaulting forces approach intended LZs.
- Operations could be in areas with a high potential for significant civilian injury and collateral damage of property; specific knowledge of weapons effects is critical.
- Wingmen protect firing aircraft while engaged pilots concentrate on targets.

THREAT

R-42. Some special considerations for the threat in urban operations include the following:

- Enemy forces may infiltrate urban terrain and ambush helicopters from positions inside buildings.
- Cover and concealment of urban terrain enable enemy force concentration, increasing the risk of effective small-arms fire.
- RPGs provide significant threat, especially to slow-moving helicopters.
- Portable surface-to-air missile systems are difficult to detect in and among buildings.
- Air defense ambush zones should be emplaced around or near likely aerial routes, landing sites, or objectives.
- Because LZs may be scarce and, therefore, predictable, air-assault operations in mass may be vulnerable to enemy fires.

WEATHER

R-43. Some special considerations for weather in urban operations include the following:

- Smoke and fire in the built-up area cause obscuration.
- Urban areas directly affect weather, especially wind patterns resulting in gusts and thermals.
- High concentration of man-made materials increases the risk of exposure to toxic industrial materials.

TERRAIN

R-44. Some special considerations for terrain in urban operations include the following:

- Obstacles—such as power lines, towers, and guidelines—may be more numerous and dangerous than in any other environment.
- Buildings limit maneuverability, and engagement ranges are typically shorter, affecting the ability of attack helicopters to employ weapons at desired standoff ranges.
- Buildings may be used to mask friendly helicopter operations.
- Urban terrain masks intelligence and electronic warfare acquisition capabilities.

- Landing and PZs may be severely limited; operations from unstable rooftops may be required. The S2 coordinates with the engineer officer to obtain available architectural plans and blueprints to determine the weight-bearing capabilities of rooftops for use as LZs.
- Vertical development blocking LOS radio communication can severely affect air-ground and low-level air-to-air communication.

Glossary

AADC	area air defense commander
1SG	first sergeant
A&L	administrative and logistics
A^2C^2	army airspace command and control
A^2C^2S	army airborne command and control system
AA	assembly area
AAA	antiaircraft artillery
ABCS	army battle command system
AAFARS	advanced aviation forward area refueling system
AAFES	Army and Air Force Exchange Service
AAGS	Army air-ground system
AAMDC	Army Air and Missile Defense Command
AAO	assistant aviation officer
AAR	after-action review
AATFC	air assault task force and air mission commander
ABCCC	airborne battlefield command and control center
ABF	attack by fire
A/C	aircraft
ADA	air defense artillery
ABCS	Army Battle Command System
AC	active component
ACA	airspace coordination area
ACE	analysis and control element
ACM	airspace control measures
ACO	air coordination order
ACP	air control point
ACT	air cavalry troop
AD	air defense
ADF	automatic direction finder
ADIZ	air defense identification zone

ADSI	air defense system integrator
ADSS	air data sensor subsystem
AFATDS	advanced field artillery tactical data system
AGES	air-ground engagement system
AGL	above ground level
AH	attack helicopter
AHB	assault helicopter battalion
AHC	assault helicopter company
AI	air interdiction
AIC	airspace information center
AIT	automotive information test
ALE	automatic link establishment
ALO	air liaison officer
ALOC	administrative and logistics center
ALSE	aviation life support equipment
ALSO	aviation life support officer
ALSS	aviation life support system
alt	altitude
AM	amplitude modulated
AMC	air mission commander
AMDWS	air and missile defense work station
ammo	ammunition
AMO	aviation maintenance officer
AMPS	aviation mission planning system
AMSS	Army materiel status system
ANCD	automated network control device
ANGLICO	air and naval gunfire liaison company
ANGPLT	air-naval gunfire platoon
AO	area of operations
AOC	air operations center
APC	armored personnel carrier
APOD	aerial port of debarkation
APOE	aerial port of embarkation
APU	auxiliary power unit

AR	Army regulation
ARFOR	Army forces
ARH	active radar homing
ARSOA	Army special operations aviation
arty	artillery
ARVN	Army of the Republic of Vietnam
ASAS	all source analysis system
ASAS-L	all source analysis system-light
ASB	aviation support battalion
ASE	aircraft survivability equipment
ASET	aviation survivability equipment trainer
ASIP	advanced system improvement program
ASL	authorized stockage list
ASOC	air support operations center
ASP	ammunition supply point
ATACMS	Army tactical missile system
ATAS	air-to-air stinger
ATCCS	Army tactical command and control system
ATKHB	attack helicopter battalion
ATKHC	attack helicopter company
ATM	aircrew training manual
ATO	air tasking order
ATP	ammunition transfer point
ATS	air traffic services
ATSO	air traffic services officer
aux	auxiliary
AVIM	aviation intermediate maintenance
avn	aviation
AVUM	aviation unit maintenance
AWACS	airborne warning and control system
AWS	air weather service
BAS	battlefield automated system
BCC	battlefield circulation control
BCD	battlefield coordination detachment

BDA	battle damage assessment
BDAR	battle damage assessment and repair
bde	brigade
BDR	battle damage repair
BHL	battle handover line
BHO	battle handover
blk	block
BLSA	basic load storage area
BMNT	begin morning nautical twilight
BMP	Soviet tracked armored personnel carrier
bn	battalion
BOS	battlefield operating system
BP	battle position
BRRP	brigade/battalion rapid refueling point
BSA	brigade support area
CATS	combined arms training strategy
C33CS	C33 telecommunications network
C^2	command and control
C^2I	command, control, and intelligence
C^3	command, control, and communications
C^3I	command, control, communications, and intelligence
C^4I	command, control, communications, computers, and intelligence
C^4ISR	command, control, communications, computers, intelligence, surveillance, and reconnaissance
CA	civil affairs
CAB	command aviation battalion
CAC	command aviation company
CADRG	compressed arc digitized raster graphic
CALL	Center for Army Lessons Learned
cal	caliber
CAS	close air support
CASEVAC	casualty evacuation (by nonmedical personnel, air or ground vehicle)
CBT	combat
CCA	close combat attack

CCIR	commander's critical information requirements
CCR	closed-circuit refueling
CD-ROM	Compact Disc-Read Only Memory
CD-RW	Compact Disc-ReWritable
cdr	commander
CDU	computer display unit
CE	communication-electronic
CENTCOM	central command
CFL	coordinated fire line
CFV	cavalry fighting vehicle
CH	cargo helicopter
chem	chemical
CGS	common ground station
CI	counter-intelligence
CIA	central intelligence agency
CIC	combat information center
cl	class
CMMC	Corps Materiel Management Center
CMO	civil-military operations
CMOC	civil-military operations center
CMP	communication message processor
CMS	countermeasures set
co	company
CO_2	carbon dioxide
COA	course of action
COE	common operating environment
commo	communication
COMSEC	communications security
CONUS	continental united states
COP	common operational picture
COSCOM	corps support command
CP	command post
CPG	copilot-gunner
CS	combat support

CSA	corps support area
CSAB	combat support aviation battalion
CSAR	combat search and rescue
CSM	command sergeant major
CSR	controlled supply rate
CSS	combat service support
CSSCS	combat service support control system
CTA	Common Table of Allowances
CTC	combat training center
CTIL	commander's tracked items list
CTP	common tactical picture
CW	continuous wave
DA	Department of the Army
D^3A	"decide, detect, deliver, assess"
DAMA	demand assigned multiple access
DAP	defensive armed penetrator (MH-60L helicopter)
DART	downed aircraft recovery team
DAAS	defense automatic addressing system
DASB	division aviation support battalion
DCSA Bde	division combat support aviation brigade
DEA	drug enforcement administration
DEAD	destruction of enemy air defense
DEW	directed energy weapon
DFAS	Defense Finance and Accounting System
DLA	Defense Logistics Agency
DMS	defense message system
DISCOM	division support command
div	division
DIVARTY	division artillery
DMAIN	division main
DMMC	division materiel management center
DOCC	deep operations coordination cell
DOD	Department of Defense
DODD	Department of Defense Directive

DOD FLIP	Department of Defense Flight Information Publication
DODI	Department of Defense Instructions
DOS	Department of State
DOT	Department of Transportation
DP	decision point
DPTM	Director for Plans, Training, and Mobilization
DPW	Directorate of Public Works
DRRP	division rapid refueling point
DS	direct support
DSA	division support area
DST	decision support template
DTC	data transfer cartridge
DTED	digital terrain elevation data
DTM	data transfer module
DTSS	digital topographical support system
DZ	drop zone
EA	engagement area
EAC	echelons above corps
ECAP	environmental compliance assessment program
ECAS	environmental compliance assessment system
ECO	environmental compliance officer
ECWCS	extended cold weather clothing system
ED	environmental division
EEFI	essential elements of friendly information
EGI	embedded GPS inertial navigation system
EGR	embedded GPS receiver
EHSI	electronic horizontal situation indicator
EID	emitter identification
EMO	Environmental Management Office
EMP	electromagnetic pulse
EMS	electromagnetic spectrum
EO	electro-optical
EO/IR	electro-optical infrared
EOD	explosive ordnance disposal

EP	electronic protections
EPA	evasion plan of action
EPLRS	enhanced position location reporting system
EPW	enemy prisoners of war
EQCC	environmental quality control committee
ERFS	extended range fuel system
ES	electronic support
ESM	electronic support measures
ESSS	external stores support system
EW	electronic warfare
EWO	electronic warfare officer
f	female
FA	field artillery
FAA	forward assembly area
FAC-A	forward area controller-airborne
FAC	forward area controller
FADDL	forward air defense data link
FARE	forward area refueling equipment
FARP	forward arming and refueling point
FBCB2	force xxi battle command brigade and below
FBI	Federal Bureau of Investigation
FCC	fire control computer
FCR	fire control radar
FEBA	forward edge of the battle area
FEZ	fighter engagement zone
FFA	free fire area
FFIR	friendly force information requirements
FID	foreign internal defense
FLD	field
FLIR	forward looking infrared
FLIR/TV	forward looking infrared/television
FLOT	forward line of own troops
FM	field manual; frequency modulation
FOIA	freedom of information act

FORSCOM	Forces Command
FOV	field of view
FP	firing position
FRAGO	fragmentary order
FRIES	fast rope insertion/extraction system
F/S	filter separator
FS	fire support
FSB	forward support battalion
FSCL	fire support coordination line
FSCM	fire support coordinating measure
FSE	fire support element
FSNCO	fire support noncommissioned officer
FSO	fire support officer
ft	foot or feet
FTP	file transfer protocol
FW	fighter wing
FWD	forward
G2	Assistant Chief of Staff (G2) Intelligence
G3	Assistant Chief of Staff (G3) Operations and Plans
GBS	global broadcast service
GCCS	global command and control system
GCCS-A	global command and control system—Army
GCI	ground control intercept
GCS	ground control station
GMTI	ground moving target indicator
GPM	gallons per minute
GPS	global positioning system
GS	general support
GSAB	general support aviation battalion
GSE	ground support equipment
GTN	Global Transportation Network
HA	holding area
HAA	heavy assembly areas
HARRP	helmet assembly, rearming refueling personnel

HARS	heading and attitude reference system
HATS	high altitude training site
HAZCOM	hazardous communications
HAZMIN	hazardous waste minimization
HCLOS	high capacity line of sight (radio)
HCS	Han, Chen and Son Computer System
HEDP	high explosive dual-purpose
HE	high explosive
HEED	helicopter emergency egress device
Hellfire	Hellfire laser air defense suppression and fire-and-forget guided missile
HEMAT	heavy expanded mobility ammunition trailer
HEMTT	heavy expanded mobility tactical truck
HF	high frequency
HH	Hughes helicopter
HHAs	heavy assembly areas
HHC	headquarters and headquarters company
HHT	headquarters and headquarters troop
HIDACZ	high density airspace control zone
HIMEZ	high altitude missile engagement zone
HM	hazardous material
HMMWV	high mobility multi-purpose wheeled vehicle
HPT	a high-payoff target
HPTL	high-payoff target list
HQ	headquarters
HSS	health service support
HTARS	hot tactical aircraft refueling system
HUD	heads-up display
HUMINT	human intelligence
HVT	high-value targets
HvyHB	heavy helicopter battalion
HvyHC	heavy helicopter company
HW	hazardous waste
ICAO	international civil aviation organization

ICS	internal communication system
ID	identification
IDM	improved data modem
IFF	identification friend or foe
IFR	instrument flight rules
ILAP	integrated logistics analysis program
ILS/GS	instrument landing system/glide slope
IMC	instrument meteorological conditions
IMCPU	improved master controller processing unit
IMETS	integrated meteorological system
IMINT	imagery intelligence
in	inch
INC	internet controller
INPIN	implementing instruction
INRMP	integrated natural resource management plan
INS	inertial navigation system
int	interdiction
INTREP	intelligence report
INTSUM	intelligence summary
IO	information operations
IP	instructor pilot
IPB	intelligence preparation of the battlefield
IR	infrared
ISAQ	interim statement of airworthiness qualification
ISOPREP	isolated personnel report
ISR	intelligence, surveillance, and reconnaissance
ITAM	integrated training area management
IWEDA	integrated weather effect decision aid
IZLID	infrared zoom laser illuminator designator
JAAT	joint air attack team
JCB	joint capability board
JCDB	joint common database
JEZ	joint engagement zone
JFACC	joint force air component commander

JFC	joint force commander
JITC	Joint Interoperability Test Center
JP	joint publication
JPTL	joint prioritized target list
JRCC	Joint Rescue Coordination Center
JSEAD	joint suppression of enemy air defense
JSHIP	joint shipboard helicopter integration process
JSRC	joint search and rescue center
JSTARS	joint surveillance, target attack radar system
JTF	joint task force
JVMF	joint variable message format
KH CO3	carbonate hardness carbonate ions
km	kilometer
KTAS	knots true airspeed
kts	knots
KVM	keyboard, video, mouse switch
L/R	launch and recovery
LAN	local area network
LANTIRN	low altitude navigation target infrared night
lb	pound
LBA	longbow apache
LBE	load-bearing equipment
LCC	land component commander
LD	line of departure
ldr	leader
LDS	laser detecting set
LH	left hand
LIPS	logistics information processing system
LLTR	low-level transit route
LNO	liaison officer
LOA	letter of authorization
LOC	lines of communication
LOGSA	Logistics Support Activity
LOMEZ	low altitude missile engagement zone

LOS	line of sight
LP	listening post
LPI	low probability of interception
LRF/D	laser range finder/designator
L/R	launch and recovery
LRP	logistics release point
LRU	line replaceable unit
LSD	large screen display
LST	laser spot tracker
LTC	line traffic coordinator
LWL	light weight launchers
LZ	landing zone
M	meter
MAAP	master air attack plan
MAC	maintenance allocation chart
MACCS	marine air command and control system
MACOM	Major Command
maint	maintenance
max	maximum
MB	marker beacon
Mbps	megabytes per second
MCE	maneuver commander's environment
MCS	maneuver control system
MCS-L	maneuver control system-light
MDMP	military decision-making process
MEDEVAC	medical evacuation (by medical personnel, air or ground vehicle)
MDV	MANPRINT domain verification
METL	mission essential task list
METT-TC	mission, enemy, terrain and weather, troops and support available, time available, and civil considerations
MGRS	military grid reference system
MHE	materiel handling equipment
MHT	message handling tables
MI	military intelligence

MILES	multiple integrated laser engagement system
MILSTAR	military strategic and tactical relay
min	minute
MK	mark
MLRS	multiple launcher rocket system
mm	millimeter
MMC	materiel management center
MO	maintenance officer
MMDF	missile management data file
MOOTW	military operations other than war
MOPP	mission oriented protective posture
MOS	military occupational specialties
MOUT	military operations on urbanized terrain
MP	military police
MPCS	mission planning and control site
MPU	micro processing unit
MRR	minimum risk route
MSB	main support battalion
MSE	mobile subscriber equipment
MSL	mean sea level
msn	mission
MSR	main supply routes
MSRT	mobile subscriber radio telephone
MST	maintenance support teams
MTI	moving target indicator
MTF	message text format
MTMCTEA	Military Traffic Management Command Transportation Engineering Agency
MTO&E	modification table of organization and equipment
MTP	mission training plan
MTW	major theater war
MWR	morale, welfare, and recreation
NAI	named areas of interest
NATO	North Atlantic Treaty Organization

NAVAID	navigational aid
NBC	nuclear, biological, and chemical
NCA	national command authority
NCO	noncommissioned officer
NCOIC	noncommissioned officer in charge
NCS	net control station
NDB	nondirectional radio beacon
NEO	noncombatant evacuation operations
NEPA	national environmental policy act
NEW	net explosive weight
NFA	no-fire area
NG	National Guard
NGO	nongovernmental organization
NIIRS	national imagery interpretation rating scales
NIMA	national imagery and mapping agency
NISH	noncombatant evacuation operation intelligence support handbooks
NLOS	non-line of sight
nm	nautical mile
NMCM	not mission capable-maintenance
NMCS	not mission capable-supply
NOE	nap-of-the-earth
NRB	natural resources branch
NSFS	naval surface fire support
NSN	national stock number
NTACS	navy tactical air control system
NTDR	near term digital radio
NVA	North Vietnamese Army
NVD	night vision devices
NVG	night vision goggles
NVS	night vision system
O&I	operations and intelligence
obj	objective
OC	observer controllers

OCA	oceanic control area
OCC	operational control console
OCOKA	observation and fields of fire, cover and concealment, obstacles to movement, key terrain, avenues of approach
OH	observation helicopter
OIC	officer in charge
OP	observation post
OPCON	operational control
OPFOR	opposing forces
OPLAN	operational plan
OPORD	operation orders
OPSEC	operations security
OPTEMPO	operating tempo
ORD	ordnance
OSC	objective supply capability
PA	power amplifier
Pam	pamphlet
PAO	public affairs office
pax	passenger (personnel)
PC	pilot-in-command
PEO	peace enforcement operations
PGM	precision guided munitions
PIR	priority information requirement
PKO	peacekeeping operations
PL	platoon leader
PLL	prescribed load lists
PLS	palletized loading system
plt	platoon
PMCM	partially mission capable-maintenance
PMCS	preventive maintenance checks and services
PP	passage point
PNVS	pilot night vision sensor
PO	peace operations
POC	point of contact

POD	port of debarkation
POE	port of embarkation
POL	petroleum, oils, and lubricants
POLAD	political advisor
PPM	parts per million
PSG	platoon sergeant
PSYOP	psychological operations
PZ	pickup zone
QA	quality assurance
QCA	quick change assembly
QRF	quick reaction force
QRMP	quick response multicolor printer
RAA	rear assembly areas
RASA	ready ammunition storage area
RATO	rocket assisted take off
RAU	radio access unit
RC	reserve component
RCC	rescue coordination center
recon	reconnaissance
REDCON	readiness condition
RETRANS	retransmission
RF	radar frequency
RFA	restrictive fire area
RFHO	radar frequency handover
RFI	radar frequency interferometer
RH	right hand
RI	relevant information
RMI	radio magnetic indicator
ROA	restricted operations area
ROE	rules of engagement
ROI	rules of interaction
ROM	refuel-on-the-move
ROZ	restricted operations zone
RP	release point

RPG	rocket propelled grenade
RSDS	radar signal detecting set
RSR	required supply rate
RSTA	reconnaissance, surveillance, and target acquisition
RTO	radio telephone operators
RWS	remote work station
S1	Adjutant
S2	Intelligence Officer
S3	Operations Officer
S4	Logistics Officer
S5	Civil-Military Operations Officer
S6	Communications-Electronics Officer
SA	situational awareness
SAAFR	standard-use Army aircraft flight route
SAAS	standard Army ammunition system
SAC	support aviation companies
SAFE	selected area for evasion
SAID	safe area intelligence description
SAILS	standard Army intermediate level supply system
SAL	semiactive laser
SAM	surface-to-air missile
SAMS	standard Army maintenance system
SAR	search and rescue
SARH	semiactive radar homing
SARSAT	search and rescue satellite
SARSS-O	standard Army retail supply system-objective
SASO	stability and support operations
SATCOM	satellite communications
SB	supply bulletin
SBF	support by fire
SCC	system control center
SEAD	suppression of enemy air defense
SEN	small extension node (switch)
SHORADMEZ	short range air defense engagement zone

SICPS	standardized integrated command post system
SIDPERS	standard installation/division personnel system
SIF	selective identification feature
SIMO	Systems Integration and Maintenance Office
SINCGARS	single channel air-ground radio system
SIP	system improvement program
SITREPS	situation reports
SJA	staff judge advocate
SMART-T	secure mobile antijam reliable tactical-terminal
SO	safety officer
SOATC	Special Operations Aviation Training Company
SOCCE	special operations command and control element
SOF	special operations forces
SOFA	status of forces agreements
SOI	signal operation instructions
SOP	standing operating procedures
SP	standardization instructor pilot
SPBS-R	standard property book system-revised
SPIES	special patrol insertion/extraction system
SPINS	special instructions
SPO	security, plans, operations
SPOD	seaport of debarkation
SPOE	seaport of embarkation
SPR	single-point refueling
spt	support
sq	square
SRP	safe recovery point
SRV	server
SSA	supply support activity
SSB	single-side band
SSC	small scale contingency
st	street
STAMIS	Standard Army Management Information Systems
STANAG	standardization agreement

stdns	standards
STP	soldier training publication
SU	situational understanding
TAB	Theater Aviation Brigade
tac	tactical
TAC	Theater Aviation Company
TACCP	tactical command post
TACAIR	tactical air
TACLAN	tactical local area network
TACAN	tactical air navigation
TACON	tactical control
TACP	tactical air control party
TACS	theater air control system
TACSAT	tactical satellite
TACSOP	tactical standing operating procedure
TDA	table of distribution and allowances
TADIX-B	tactical data information exchange-broadcast
TADS	target acquisition designation sight
TAGS	theater air-ground system
TAI	target areas of interest
TAIS	tactical airspace integration system
TALO	theater airlift liaison officer
TAMMS	The Army Maintenance Management System
TBD	to be determined
TBFDS	tactical bulk fuel delivery system
TBMCS	theater battle management core system
TCIM	tactical communication interface module
TCS	tactical control system
TDR	transmittal data relay
TESS	tactical engagement simulator system
TF	task force
TI	tactical internet
TIBS	tactical information broadcast service
TIS	thermal imaging system

TM	technical manual
TMD	theater missile defense
TOC	tactical operations center
TOD	time of day
TOE	table of organization and equipment
TOF	time of flight
TOO	tactical operations officer
TPFDD	time phased force deployment data
TPL	target priority lists
TPU	tank and pump unit
TRAP	tactical related applications
TRP	target reference point
TSC	theater support command
TSEC	telecommunications security
TSS	target selection standards
TTCS	tactical terminal control system
TTP	tactics, techniques, and procedures
TTT	time to target
TV	television
UAV	unmanned aerial vehicle
UH	utility helicopter
UHF	ultra high frequency
ULLS	Unit Level Logistics System
ULLS-A	Unit Level Logistics System-Aviation
ULLS-G	Unit Level Logistics System-Ground
ULLS-S4	Unit Level Logistics System-S4
UMO	unit movement officer
UMT	unit ministry team
U.S.	United States
USA	United States Army
USAAVNC	United States Army Aviation Center
USAF	United States Air Force
USMC	United States Marine Corp
USASC	United States Army Safety Center

USIA	United States Information Agency
USMTF	United States Message Text Format
UTO	unit task organization
veh	vehicle
vet	veterinary
VHF	very high frequency
VIR	VOR ILS receiver
VIXL	video image crosslink
VMC	visual meteorological conditions
VOR	very high frequency omnidirectional range
VTC	video teleconference
WAN	wide area network
WARNORD	warning order
WEZ	weapons engagement zone
WFZ	weapons free zone
WILCO	will comply
WIN-T	warfighter information network-tactical
w/o	without
WOD	word of day
wpn	weapon
XO	executive officer
ZSU	Soviet antiaircraft vehicle

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