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TACTICS, TECHNIQUES, AND PROCEDURES FOR

FIRE SUPPORT FOR BRIGADE OPERATIONS (LIGHT)

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PREFACE

The purpose of this publication is to provide light forces fire support officers and enlisted personnel at maneuver company, battalion, and brigade with a how-to manual. It focuses on fire support officers (FSOs) in light infantry, airborne infantry, air assault infantry, and infantry at brigade and below.

This publication describes maneuver techniques and fire support considerations at maneuver brigade and below. It establishes responsibilities and duties of key personnel by focusing on how the fire support system can support the ground-gaining arms. This manual is not a substitute for doctrinal literature, Maneuver and fire support doctrine should be studied in depth to obtain a complete understanding of doctrine, tactics, and techniques. That basic understanding is a must in order to effectively apply the contents of this how-to manual.

The manual is fully compatible with the Army's AirLand Battle doctrine and is consistent with current joint and combined doctrine. It assumes that the user has a fundamental understanding of the fire support principles set forth in FM 6-20.

This publication has undergone several draft revisions during its development. Members of every light division artillery have provided input during the development cycle. Numerous individual Redlegs helped make it the authoritative fire support reference it is. Those units listed below provided representatives from the field to a unique exercise encompassing major input and comprehensive rewrite of the developed draft. The effort of these senior fire support officers resulted in the publication now before you. It reflects the consensus of the field on fire support tactics, techniques, and procedures for the brigades in light infantry divisions. The field representatives were from –

Ž 6th Infantry (Light) Division Artillery, Fort Richardson, Alaska

Ž 7th Infantry (Light) Division Artillery, Fort Oral, California

Ž 10th Mountain (Light) Infantry Division Artillery, Fort Drum, New York

Ž 25th Infantry (Light) Division Artillery Schofield Barracks, Hawaii

Ž 82d Airborne Division Artillery, Fort Bragg, North Carolina

• 101st Airborne (Air Assault) Division Artillery, Fort Campbell, Kentucky

• 29th Infantry (Light) Division Artillery, Fort Belvoir, Virginia

Ž 75th Ranger Regiment, Fort Benning, Georgia

Ž Joint Readiness Training Center, Little Rock, Arkansas

The US Army Field Artillery School (USAFAS) owes them, and many others, a great debt of gratitude for the professionalism displayed in true Redleg fashion.

The provisions of this publication are the subject of international agreements (NATO Standardization Agreements [STANAGs] and Quadripartite Standardization Agreements [QSTAGs]):

Ž 2014/506 Operation Orders, Annexes to Operation Orders, and Administ rat ive and Logistics Orders

• 2031/515 Proforma for Artillery Fire plan

• 2082 Relief of Combat Troops

Ž 2099/531 Fire Coordination in Support of Land Forces

Ž 2147/221 Target Nummbering System (Nonnuclear)

• 2887/217 Tactical Tasks and Responsibilities for Control of Artillery

The proponent of this publication is HQ TRADOC. Submit changes for improving this publication on DA Form 2028 (Recommended Changes to Publications and Blank Forms), and forward it directly to:

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Unless otherwise stated, whenever the masculine gender is used, both men and women are included.

CHAPTER 1

ORGANIZATION AND DUTIES

Section I. LIGHT FORCES ORGANIZATION

Mission

Light forces deploy worldwide to conduct combat operations in low- and mid-intensity conflicts and to accomplish other missions as the National Command Authority may direct. When properly augmented, light forces can operate for limited periods in high-intensity conflicts.

NOTE: The Iow-intensity conflict is discussed in detail In Appendix A.

Characteristics

Light forces are composed primarily of foot-mobile fighters. They are organized, equipped, and trained to capitalize on the capabilities of dismounted infantry. They can negotiate all types of terrain and operate in all geographic regions. They can adapt quickly to various modes of transportation; when necessary units are provided additional ground or airlift transportation to ensure tactical mobility. Brigades and battalions are fully prepared to engage independently in small-unit actions and to operate at considerable distances from their parent headquarters. Like other forces, light forces employ artillery, mortars, tactical air (TACAIR), Army aviation, naval gunfire, and reconnaissance assets in support of the tactical operations plan. Airborne, air assault, ranger, and amphibious units have unique capabilities beyond those normally associated with light forces. Some unique capabilities are addressed in Appendix B. For additional capabilities and associated fire support considerations, consult appropriate tactical manuals.

Significant Features

Significant features of light forces are as follows:

- Small organization of approximately 10,000 personnel per light infantry division.

Ž Entire organization and its equipment deployable by air in C-141 aircraft.

- Extremely high ratio of combat to combat service support (CSS).

- Combat support (CS) and CSS units not redundant; designed to provide minimum essential support.

Ž Commonality in organizational vehicles and equipment.

- Designed to rapidly receive and integrate augmentation forces and to support as dictated by mission, enemy, terrain and weather, and troops and time available (METT-T).

Section II. THE FIRE SUPPORT SYSTEM

Components

The fire support system supporting the light forces is the collective body of target acquisition and battlefield surveillance assets; attack svstems (both lethal and nonlethal) and munitions command and control systems and facilities; technical support (such as

meteorological [met] and survey); and the personne required to provide and manage fire support. Fire support assets are described in Appendix C.

Target Acquisition

Target acquisition assets are the target-producing eyes and ears of the system. They gather targeting information and targets by using all available means. These means include, but are not limited to, observers, radars, intelligence and electronic warfare (IEW) assets Army aviators, and frontline troops.

Attack Systems

The attack could be lethal or nonlethal, as in the case of electronic jamming. Each maneuver commander is provided or allocated an indirect fire system to influence his portion of the battlefield. The company commander has an organic 60-mm mortar section; the battalion commander has an organic 81-mm mortar platoon. When the maneuver brigade is committed to battle, the brigade commander generally will be allocated a direct support artillery battalion. Other assets that may be provided to the maneuver force include Army attack helicopters, TACAIR support, naval gunfire (NGF), and IEW. Air defense and engineer assets may also become important components of the fire support system.

Command and Control

These are the elements that make the system work. They translate the commander's concepts and desires into the technical and tactical actions needed to attack targets quickly and effectively.

Technical Support

Met and survey support is that technical part of the fire support system that ensures accurate unobserved fires, transfer of target data and effective massed fires.

Fire Support Planning and Coordination

Fire support planning is the continuous process of acquiring and analyzing targets, allocating fire support to targets, scheduling the attack of targets, and synchronizing all available fire support to achieve the commander's intent and to support the scheme of maneuver.

Fire support coordination is the process of executing the fire support plan. It too is continuous and runs concurrently with the planning process during combat operations.

PRINCIPLES OF FIRE SUPPORT PLANNING AND COORDINATION

Plan early and continuously.

Follow the commander's targeting guidance.

Exploit all available targeting assets.

Consider the use of all available fire support means, both lethal and nonlethal.

Use the lowest echelon capable of providing effective fire support.

Use the most effective means.

Furnish the type of support appropriate.

Avoid unnecessary duplication.

Consider airspace coordination.

Provide adequate fire support.

Provide rapid and effective coordination.

Remain flexible.

Provide for the safeguarding and survivability of friendly forces and/or installations.

Section III. FIRE SUPPORT ORGANIZATIONS, PERSONNEL, AND DUTIES

Role of the Direct Support Field Artillery Battalion Commander

The direct support (DS) field artillery (FA) battalion commander is the fire support coordinator (FSCOORD) for the supported brigade. As such, he is specifically responsible for fire support planning and coordination for the maneuver brigade. He brings, as his unique contribution to battle, his professional assessment of the current and near-term capabilities of his unit and of other fire support assets supporting the force. His duty location at any given time is where he can best execute the maneuver commander's intent for fire support. In addition to being personally in charge of fire support coordination for the brigade, the direct support FA battalion commander is responsible for –

- Training all personnel involved in fire support to perform successfully all stated and implied missions and tasks associated with providing fire support to a maneuver force.

- Continuously articulating his assessment of the current and future capabilities and the status of all fire support assets supporting the maneuver force. The FSCOORD may base his assessment on reports or on personal observation.

- Providing a knowledgeable, experienced officer as the brigade fire support officer. The FSCOORD also must establish a special mentor relationship with this officer, since the FSO, in the absence of the FSCOORD, personally represents him to the brigade commander. More than any other officer, the FSO must understand the FSCOORD's intent in supporting the maneuver plan. In addition, the FSCOORD must ensure that his brigade FSO is equally conversant on the FSCOORD's assessment of fire support assets supporting the maneuver force.

- Commanding his battalion. As the commander of the primary unit providing fire support to the force, the FSCOORD is responsible for the operational status of his unit, its morale and response to critical personnel shortages, and its current and future logistic capabilities to support the maneuver force.

NOTE: See FM 6-20-1 for additional discussion on the responsibilities of the direct support FA battalion commander.

Fire Support Team Organization

Fire support team (FIST) personnel for light forces are as shown below.

FIRE SUPPORT TEAM PERSONNEL

TITLE	RANK	NUMBER
FIST HQ		
Company FSO	LT	1
Fire Support Sergeant	SSG	1
Fire Support Specialist	SPC	1
Radiotelephone Operator (RATELO)[1]	PFC	1
Forward Observer (FO) Party (Three per FIST)		
Forward Observer	SGT	1
RATELO	PFC	1

[1]There is no RATELO at FIST HQ in the airborne and air assault divisions.

Company Fire Support Officer Duties

The company FSO is the maneuver company FSCOORD. He integrates all fires to support the company commander's scheme of maneuver. Although the FO is the primary shooter for the company, the FSO must be an expert at locating targets and adjusting fires. His duties are to-

Ž Plan, coordinate, and execute fire support.

• Advise the company commander on fire support matters.

• Keep key personnel informed of pertinent information (by spot reports and situation reports [SITREPs])

Ž Train the FIST and FOs in applicable fire support matters.

Ž Request, adjust, and direct all types of fire support.

• Ensure that the fire support plan and/or fire support execution matrix is prepared and disseminated to key personnel.

• Advise the company commander on positioning and use of company mortars.

• Allocate FOs and other observers to maintain surveillance of target and named areas of interest.

Ž Provide emergency control of close air support (CAS)-missions in the absence of qualified Air Force personnel (air liaison officer [ALO]. enlisted terminal attack controller [ETAC], and/or airborne forward air controller [AFAC]).

Company Fire Support Sergeant Duties

The company fire support sergeant is the senior enlisted assistant to the company FSO. The fire support sergeant acts as the company FSO in his absence. He is responsible for training all enlisted members assigned to the team. He supervises the maintenance of all equipment assigned to the section. The company fire support sergeant must be able to perform all duties of his FSO.

Company Fire Support Officer Working Relationships

The company FSO interacts and coordinates with other personnelmel as discussed below.

Maneuver Commander

The company FSO is the unit FSCOORD. He works with the company commander during combat operations to successfully accomplish all company-level fire support tasks. (Fire support tasks are summarized in Appendix D.) The maneuver commander is responsible for integrating fire support and maneuver. The company FSO gives recommendations and advice to the commander on all fire support matters; therefore, he is the maneuver unit fire support expert. Final decisions regarding company fire support are made by the company commander. The company FSO must work closely with the company commander and will go with him to receive plans and orders. The FSO must understand the scheme of maneuver as well as the company commander does. On the basis of the commander's guidance, the FSO devises his fire support plan, which must be presented to the commander for his approval, (See Appendix E.)

Battalion Fire Support Officer

The company FSO reports to the battalion FSO with regard to coordination of the company fire support plan and its integration into the battalion fire support plan. Also, he is responsible to the battalion FSO for the operations and readiness of organic FIST personnel and equipment. The company FSO provides updated friendly and enemy

battlefield information to the battalion FSO. This information includes forward line of own troops (FLOT) location, situation reports, spot reports, and other essential elements of friendly information (EEFI) and priority intelligence requirements (PIR). The battalion FSO is responsible for supervision and training of the company FSO.

Fire Support Team Headquarters

The company FSO is responsible for leading his team and supervising its training in all aspects of fire support. The primary trainer of the FIST personnel is the fire support sergeant. In addition, the company FSO ensures his team is fully equipped and that the equipment is fully operational. In light infantry organizations, most operations are conducted on foot (the force may be inserted by aircraft but will conduct operations on foot). Therefore, the company FSO can easily collocate with the company commander. In this case, the company FIST headquarters (HQ) becomes a part of the maneuver company headquarters. Most maneuver company HQ have an SOP delineating how the company HQ will locate, move, and provide security in tactical operations. It is very important that all members of the company FIST know and comply with the SOP.

Forward Observers

The FOs are the primary shooters for the company and are normally collocated with the maneuver platoon leaders. The company FSO is responsible for training the FOs to call for fire efficiently. He must give enough information to the FOs to ensure they understand how the fire support plan is to be integrated into the commander's scheme of maneuver. This information includes –

Ž Target numbers.

• Target lists. (See Appendix F.)

Ž Known points.

• Fire support coordinating measures. (See Appendix G.)

• Priority of fires.

• Degree of control.

Ž Commander's intent.

As the *eyes* and *ears* of the company, the FOs must report battlefield information to the company FSO. This information includes FLOT location, SITREPs, and spot reports.

Company Fire Support Officer and/or Fire Support Sergeant Required Actions

The actions the company FSO must take before any operation begins depend primarily on the current situation and the applicable SOP. The FIST will deploy with the maneuver company on all combat operations.

To prepare for operation, the company FSO must –

Ž Train the FOs.

Ž Train the company personnel to call for and adjust fires.

• Ensure all equipment is properly maintained.

Ž Ensure that the FIST personnel know the company tactical SOP (TSOP).

As the company FSCOORD, the FSO should –

• Obtain a mission briefing from the company commander, to include the following:

  o Scheme of maneuver and/or commander's intent.

- Locations of platoons, crew-served weapons, mortars, listening posts (LPs), and observation posts (OPs).
- Current enemy situation.
- Company strength (equipment and personnel).
- Status and location of obstacles.
- Location of final protective fires (FPFs) and other priority targets.
- Mission-oriented protective posture (MOPP) level and air defense status.

Ž Provide the company commander with the following information:

- Status of FIST personnel and equipment (include Classes I and V).
- Fire support assets available and ammunition status for each system (such as percentage of basic load or fire missions available for each system).
- Fire support plan for the operation.

Ž Obtain the following information from the battalion FSO:

- Status and location of fire support delivery systems available to the company.
- Existing targets, scheduled fires, known points, high-payoff targets, and priority of target attack.
- Current and planned fire support coordinating measures.
- Verified frequencies and call signs.
- Status of available combat observation/ lasing teams (COLTS).
- FA task organization.
- Army aviation available.
- Status of TACAIR missions and tactical air control party (TACP) CAS control personnel (ALO, ETAC, and/or AFAC).
- Naval gunfire available.

• Provide the FO parties with the following:

- Mission briefing (if they have not already received it).
- Existing targets, scheduled fires, registration points, high-payoff targets, and priority of target attack.
- Fire support coordinating measures in effect.
- Status and location of fire support delivery systems.
- Verified frequencies and call signs.
- Status of priority fires.

• Establish communications with the following (see Appendix H):

- Fire support assets (such as artillery and mortars).
- FOs, including COLTS, if any.
- Battalion FSO.

Battalion Fire Support Organization

The battalion FSO is the FSCOORD at maneuver battalion. He is in charge of the fire support element (FSE) and is the principal fire support advisor to the maneuver commander. The FSE is located with the operations element of the maneuver force.

BATTALION FIRE SUPPORT ELEMENT PERSONNEL

TITLE	RANK	NUMBER
Fire Support Officer	CPT	1
Fire Support Sergeant	SFC	1
Fire Support Specialist	SPC	2

When added to the FSE to perform their fire support functions, other representatives comprise a functional fire support cell (FS cell) to enhance and speed fire support coordination. These representatives may include the following:

Ž S3 air.

• Mortar platoon leader.

Ž Battalion chemical officer.

Ž Tactical air control party.

• Supporting arms liaison team (SALT).

• Other liaison officers (allied forces or Army aviation representatives).

Battalion Fire Support Officer Duties

The battalion FSO's primary duty is to plan, coordinate, and execute fires to support the commander's scheme of maneuver. His duties include –

• Advising the maneuver commander and his staff on fire support matters.

• Keeping key personnel (maneuver battalion commander, brigade FSO, DS battalion command post [CP], and so forth) informed of pertinent information (such as battlefield intelligence).

Ž Supervising all functions of the battalion FS cell.

Ž Training the company FSOs.

• Preparing and disseminating the fire plan and/or fire support execution matrix.

• Coordinating with the TACP on TACAIR missions and CAS control personnel (ALO, ETAC, and/or AFAC).

Battalion Fire Support Sergeant Duties

The battalion fire support sergeant is the senior enlisted assistant to the battalion FSO. The fire support sergeant acts as the FSO in his absence. He is responsible for the training of enlisted personnel of the battalion FSE and three maneuver FISTS. He advises the FSO on the FIST fire support sergeants' performance of NCO related duties. He supervises the maintenance of all equipment assigned to these sections. The battalion fire support sergeant must be able to perform all the duties of his FSO.

Battalion Fire Support Officer Working Relationships

The battalion FSO interacts and coordinates with personnel as discussed below.

Maneuver Commander

The battalion FSO is the commander's fire support expert. The maneuver commander –

• States his intentions through his concept of the operation as well as his commander's intent.

Ž Specifies priority of fires, including allocation of FPFs.

• Specifies fire support coordinating measures required.

Ž Specifies special munitions required (smoke, illumination, lethal chemical, riot control agents, family of scatterable mines [FASCAM]). (See Appendix I.)

Maneuver Battalion S3

The S3 integrates fire support into the scheme of maneurver in accordance with the commander's guidance. The S3-

- Develops the commander's intent into a scheme of maneuver or plan for the defense.
- Ž Establishes boundaries for subordinate units and other maneuver control measures (phase lines, passage points, checkpoints).
- Ž Answers questions and elaborates on commander's guidance concerning priority of fires, special munitions, use of TACAIR, employment of attached COLTS (see Appendix J), assignment of FPFs, employment of mortars, and/or any other areas involving fire support planning and coordination.

Brigade Fire Support Officer

The brigade FSO is responsible for planning and coordinating all fire support for maneuver operations. He –

- Disseminates fire support guidance as it applies to the battalion FSO (such as preplanned CAS missions, availability of immediate CAS, additional fire support assets, and target lists).
- Ž Disseminates the pulse repetition frequency (PRF) codes for laser designators.
- Recommends fire support coordinating measures.
- Ž Writes and disseminates the brigade fire support plan.
- Trains battalion FSOs.

Maneuver Battalion S3 Air

The battalion S3 air –

- Works closely with the FSO to prioritize CAS requests.
- Integrates TACAIR support into the commander's scheme of maneuver.
- Ž Forwards preplanned and immediate TACAIR requests to brigade.
- Ž Is the point of contact for Army aviation requests.

Maneuver Battalion S2

The battalion S2 constructs a reconnaissance and surveillance plan for the maneuver commander. He also conducts intelligence preparation of the battlefield (IPB).

Maneuver Battalion Signal Officer

The maneuver battalion signal officer (BSO) is a signal officer on the special staff. The BSO –

- Advises the commander and/or S3 on all communications and electronics matters including positioning command and control elements.
- Ž Is the FSO's point of contact for signal operation instructions (SOI) issue during operations and for communications troubleshooting.
- Is responsible for repair, turn-in, and exchange of communications equipment of attached fire support assets. Coordinates for batteries and communications supplies.
- Has a retransmission capability that permits radio communications on one net over a greater distance.

Task Force Engineer

The engineer coordinates the location and target numbering of all obstacles to support the scheme of maneuver. The FSO logs and reports all nominations for field artillery delivered FASCAM to the brigade FSO and DS battalion CP according to SOP and availability of augmenting artillery.

Direct Support Field Artillery Battalion Command Post

The field artillery battalion CP may coordinate with the battalion FSO during quick fire planning.

Maneuver Chemical Officer

When brigade has asked for nomination of chemical targets for friendly attack, the FSO coordinates with the chemical officer for the location of contaminated areas and NBC defense measures. The FSO also coordinates with the chemical officer for the use of riot control agents and obscurants.

Mortar Platoon Leader

The battalion FSO gets the following from the mortar platoon leader:

- Mortar positions and ammunition and tube status.
- Requests for survey and met support.

Tactical Air Control Party

The tactical air control party –

- Advises the maneuver commander and his staff on the capabilities, limitations, and use of TACAIR support.
- Helps process TACAIR requests.
- Controls CAS sorties supporting the battalion.
- Gives the battalion FSO TACAIR information and characteristics.

Supporting Arms Liaison Team

The supporting arms liaison team –

- Provides capabilities and employment considerations of naval gunfire and Navy and Marine air.
- Monitors firepower control team requests for fire support.

Company Fire Support Officers

The company FSOs work for the battalion FSO.

The battalion FSO provides guidance, battlefield intelligence, information on fire support assets, fire support coordinating measures, and technical advice to the company FSOs. Company FSOs send target lists, FLOT locations, SITREPSs spot reports, and other PIR to the battalion fire support element.

Requests for fires from the FISTS or observers may be sent directly to the field artillery over the FA fire direction (FD) net, or they may be sent through the battalion FSO. The method used depends on the fire support assets available, situation, equipment on hand, and so forth. Also, requests for mortars may be handled in the same manner.

Brigade Fire Support Organization

The brigade fire support element is organized with personnel as shown below.

BRIGADE FIRE SUPPORT ELEMENT PERSONNEL

TITLE	RANK	NUMBER
Fire Support Officer	MAJ	1
Plans/Targeting Officer	CPT	1
Fire Support Sergeant	SFC	1
Fire Support Specialist	SPC	2

When added to the FSE to perform their fire support functions, other representatives comprise a functional FS cell to enhance and speed fire support coordination. These representatives may include the following:

- ALO for matters concerning the coordination and employment of Air Force assets in support of the brigade.
- Naval gunfire liaison officer (NGLO) for matters concerning the coordination and employment of naval gunfire and naval air in sup-port of the brigade.
- Brigade chemical officer for matters concerning chemical agents, riot control agents, obscurants, aerosol agents, and employment of NBC defense.
- S3 air as a maneuver assistant S3 and to coordinate the employment of TACAIR and Army aviation with the FSO, ALO, and air defense platoon leader.
- Other representatives as required, such as liaison officers of allied forces supporting the operation or an Army aviation liaison officer when Army aviation is used as a fire support asset.

In addition to the staff officers discussed above and at battalion level, other staff members who may be in the brigade tactical CP are –

- The air defense (AD) platoon leader, who manages the air defense assets in support of the brigade. He should have valuable information on the location of enemy air defense targets, airspace coordination, and the enemy air situation.
- The engineer company commander, whose assets may be in direct support of the maneuver brigade. Coordinate with him on the coverage of obstacles, the use of FASCAM, and general battlefield mobility and countermobility.
- The IEW representative from the divisional combat electronic warfare intelligence (CEWI) assets. He controls and supervises the IEW assets that may be in support of the brigade. He can provide targets and information and is the tie-in for the offensive use of jamming. The FSO needs a working knowledge of the IEW assets available from this source to effectively coordinate their use in the attack of targets.

Brigade Fire Support Officer Duties

The DS artillery battalion commander (FSCOORD) cannot be at the brigade headquarters continually. The brigade FSO serves as a full-time liaison between the DS FA battalion and the maneuver brigade. He helps the maneuver brigade S3 integrate fire support into the maneuver commander's scheme of operation. Assisting the FSO are the other staff officers who make up the FS cell. The duties of the brigade FSO are as follows:

- Be responsible to the DS battalion commander to train subordinates in all facets of their duties.
- Keep the brigade commander informed of available fire support assets, their capabilities and limitations, and their tactical missions.
- Keep the brigade commander informed of enemy indirect fire capabilities and limitations.
- Help the brigade commander develop his estimate of the situation and war-game possible courses of action, resulting in the creation of the decision support template.
- Develop the brigade fire support plan and/or fire support execution matrix; brief the commander and get his approval of the plan and/or matrix; and disseminate the approved plan and/or matrix to the DS artillery battalion, the battalion FSOs, the division FSE, and the division artillery (div arty) CP.

- EnSure battalion FSOs plan fires in accordance with the commander's guidance.
- Consolidate target lists from the battalion FSOs, and resolve duplications.
- Coordinate requests for additional fire support from battalion FSOs when the fire support means available at company or battalion level are inadequate.

Ž Recommend fire support coordinating measures.

- Coordinate with the ALO in the brigade use of TACAIR assets.

Brigade Plans/Targeting Officer Duties

The plans/targeting officer acts as the FSO in the absence of the FSO. Also, he interfaces with the brigade S2 and helps him and the FSO by providing information regarding the vulnerabilities of targets. He advises the brigade S2 regarding specific requirements for accuracy of target location assurance and level of target description, and duration the target may be considered viable for attack by fire support systems. His duties are as follows:

- Help the brigade S2 write the target acquisition and surveillance plan.
- Help provide staff supervision of the target acquisition (TA) assets attached organic, and under operational control (OPCON) of the brigade.

Ž Develop, recommend to the commander, and disseminate the attack guidance matrix to the division FS cell, DS artillery battalion CP, and subordinate elements; recommend changes in attack guidance. (See Appendix K.)

- Determine, recommend, and process time-sensitive high-payoff targets to the fire support element.

Ž Coordinate with the maneuver brigade S2 for target acquisition coverage and processing of brigade high-payoff targets.

Ž With the brigade S2, produce target selection standards matrix for TA assets working for the brigade.

Brigade Fire Support Sergeant Duties

The brigade fire support sergeant is the senior enlisted assistant to the brigade FSO. He may act as shift leader in the FSE. He is responsible for the enlisted training of three maneuver battalion FSEs, nine maneuver FISTS, and assigned COLTS. He supervises the maintenance of all equipment assigned to these sections. The brigade fire support sergeant must be able to perform all the duties of his FSO.

Brigade Fire Support Officer Working Relationships

The brigade FSO interacts and coordinates with personnel as discussed below.

Maneuver Brigade Commander and/or S3

The maneuver commander is the person responsible for the operation. The maneuver S3 is detailed responsibility for the integration of fire support into the operation.

Direct Support Battalion Commander

The DS battalion commander is the brigade FSCOORD. He is accountable to the maneuver brigade commander for the quality of fire support provided the maneuver brigade. He helps the maneuver S3 integrate fire support into the combined arms operation. He is responsible for the training of all fire support personnel supporting the brigade.

Division Fire Support Cell

The division FS cell is the next higher link in the fire support chain. The division FS cell provides guidance to the brigade FS cell, and both FS cells exchange fire support planning and coordination information.

Battalion Fire Support Officers

The brigade FSO is responsible for the technical supervision of the battalion FSOs. He ensures that they properly develop and execute their fire support plan.

CHAPTER 2

THE "WHAT" OF FIRE SUPPORT PLANNING AND COORDINATION

Fire Support Planning

Fire support planning is the continuing process of analyzing, allocating, and scheduling fire support. It determines how fire support will be used, what types of targets will be attacked, when they will be attacked, and with what means. The goal is to effectively integrate fire support into battle plans to optimize combat power. To do this, fire support planning is concurrent with battle planning. Planning must be flexible to accommodate the unexpected in combat and to facilitate rapid change. It anticipates the massing of fire support assets, changes in the force mission, realistic movement times, resupply, target acquisition technical support to include survey and met requirements, and the replacement of entire units. In fire support planning, the FSO must consider three vital sets of information:

- Commander's intent and/or scheme of maneuver.
- Mission, enemy, terrain and weather, and troops and time available.
- Guidance from higher FA headquarters.

These three items cannot be considered separately. Each impacts on the others.

Commander's Intent

At each level, the FSO plans fires as the commander outlines his scheme of maneuver. The FSO must know **when** and **where** the commander wants fire support. He must fully understand **what** the commander wants in the way of effects, duration. and timing. To truly understand the commander's intent, the FSO must know **why** the commander wants support. He must also understand how the unit direct fire assets are to be used so he can supplement not interfere with, their employment. The FSO must seek and understand the commander's guidance and intent and be prepared to recommend the integration of available fire support. The FSO must inform the maneuver brigade commander and the S3 of the FA logistics cost for implementing the fire support battlefield operating system (BOS) for each course of action. This information must be presented during the war-gaming portion of the command estimate process. Also, the FSO informs the commander of all changes to the fire support plan he receives through fire support channels.

METT-T

All levels of command continuously analyze information while considering factors of METT-T.

CONSIDERATIONS OF METT-T

FACTOR	CONSIDERATIONS
Mission	What is the mission? What are the commander's concept of the operation and scheme of maneuver? What is the commander's intent? What is the objective of the operation? What route is the unit using? What are the intermediate objectives? What are the missions of the higher, lower, and adjacent units? Are there any contingency missions?

CONSIDERATIONS OF METT-T (CONTINUED)

FACTOR	CONSIDERATIONS
Enemy	What are the capabilities and limitations of enemy forces in the unit zone of action (for example, fire support assets, direct fire weapons, and vehicle mobility)? What are the likely courses of action? Where are known, suspected, and likely enemy locations? How does the enemy employ his forces (artillery, patrols, FOs, attack helicopters)?
Terrain and Weather	Consider observation, cover and concealment, obstacles, key terrain, and avenues of approach (OCOKA). (See Appendix B.) What is observation like in sector? Are cover and concealment available in sector? Where are the obstacles (man-made and natural) in sector? Where is the key terrain? Where are likely positions for ambushes, LPs, OPs, and killing zones? Where are the avenues of approach? What is the weather forecast, and how will it affect mobility and visibility? How does terrain affect mobility, both friendly and enemy? What munitions are best suited for the terrain and weather? Are appropriate fire support coordinating measures tied to terrain, when applicable? **NOTE:** Environmental and terrain considerations are discussed in Appendix L.
Troops Available	What is the status of FIST and/or FS cell training, experience, personnel, and equipment? What fire support assets are available, and what are their locations and/or capabilities? What is the status of the supported unit? What is the status of the observers in sector (forward observers, COLTs, scouts, and so forth)?
Time Available	How long before the operation begins? How much time is available to fire-plan? How long will it take to coordinate the fire plan? How long is the operation expected to last?

Guidance From Higher Headquarters

Higher headquarters will give the FSO information essential to the fire support plan. This information includes –

- The commander's intent at the level.
- Fire support assets available.
- Fire support coordinating measures.

- Target lists.
- Schedules of fires.
- Constraints on FA Class V consumption, stated in terms of a controlled supply rate (CSR).
- Technical advice on fire support matters.

Decision-Making Process

The decision-making process is as detailed, or as simple, as time permits. The commander plays the central role in this process, with the staff providing advice and information related to their respective areas. The process is primarily downward, beginning at higher echelons and progressing down to the company FSO. Its effectiveness requires continuous interaction and bottom-up feedback. The following paragraphs describe some fire support aspects of the decision-making process at company, battalion, and brigade levels.

When the maneuver commander receives his mission (step 1) and issues his initial planning guidance (step 2), the corresponding FS cell receives guidance from the higher FS cell. As a minimum this guidance should include the following:

- Fire support asset allocation and status.
- Commander's target attack guidance.
- Fires in the zone planned by higher headquarters.

The commander analyzes and restates the mission and issues his intent and planning guidance (step 3). This planning guidance may have several courses of action. Upon receipt, the staff take the following actions:

Ž The FSO makes his staff estimate (step 4). He interacts with the other staff members and war-games the courses of action to determine the suitability of fire support to support the courses of action.

Ž The S2 analyzes the area of operations (AO) and focuses the IPB process. He informs other staff members of the known enemy locations, capabilities and projected courses of action of the enemy force, and assets that are most important to the accomplishment of the enemy mission. He determines which organic and attached collection assets (maneuver, fire support, and military intelligence) can acquire those enemy assets. He also tasks and provides staff supervision of the collection assets. If time permits, the S2 and the targeting officer identify high-value targets within the brigade zone.

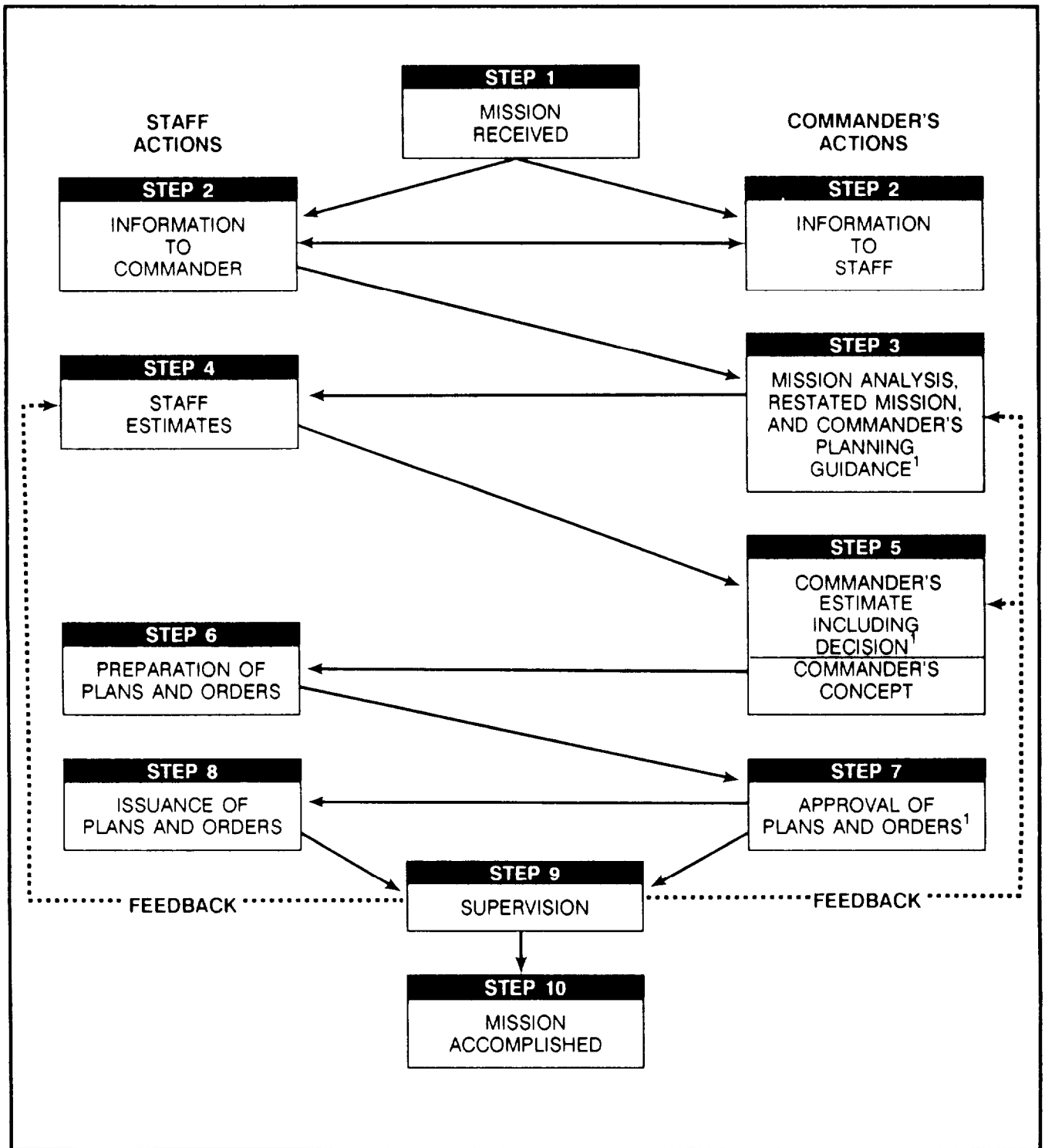
The staff members prepare and brief their estimates to the commander. The FSO must be able to brief the fire support requirements for each course of action and recommend the best one from a fire support perspective. The requirements he should be prepared to discuss include the following:

Ž Assets available to support the operation.

Ž Capabilities and limitations of fire support for each course of action (both friendly and enemy).

The commander gives his estimate and makes a decision, He issues his concept, stating how he visualizes the conduct of the battle (step 5). As he develops his battle plan for the employment of maneuver forces, he must also visualize and articulate how he will use his fire support resources, which subordinate echelon he will weight with fire support, and what targets to attack. Subordinate commanders and their FSOs may be present. The commander issues guidance to the staff regarding prioritization of targets, desired effects, and targets that require some sort of formal assessment after attack.

DECISION-MAKING PROCESS



[1]In time-critical situations, the commander may be forced to base his estimate on his personal knowledge of the situation and issue oral orders to his subordinate units.

Plans and orders are prepared (step 6). The FSO, assisted by the other fire support staff officers, writes the fire support plan. The brigade FSO plans fires in support of the brigade operation in accordance with the commander's concept, intent, and scheme of maneuver. Fires planned outside the brigade zone are coordinated with higher and adjacent units. Fires planned in the brigade rear are coordinated with the S3 and the controlling agency in the brigade support area (BSA), normally the S4. The fire plan, with target lists and schedules, is disseminated to higher and adjacent units and to the battalion FSOs. The targeting officer helps the S2 write the target acquisition and surveillance plans. As a minimum the fire support plan should include –

- Availability and status of fire support assets.
- Priority of fires and how that priority will be executed.
- Planned fire support within the zone.
- Fire support execution matrix.
- Target lists.
- Attack guidance matrix.
- Any requirements the higher FS cell will place on subordinate FS cells.
- Ž Retransmission requirements for communications, depending on terrain.

The commander approves the plan or order **(step 7).**

The written plan is disseminated to the subordinate units **(step 8).** The FSO at each level should accompany his maneuver commander when he receives briefings from higher headquarters on plans or orders.

Before execution, plans are refined as follows:

- Target lists are refined and duplications resolved; company FSOs are particularly valuable in this refinement.
- Schedules are updated and disseminated.
- Additional fire support assets are requested.
- The collection plan is reviewed to ensure it is compatible with the fire support plan.
- Information collected by sensors before and during execution is processed. The targeting officer monitors reports by collection assets, updates target lists, and submits to the FS cell time-sensitive targets not in the fire support system.
- The field artillery support plan is developed by the FA battalion S3. It is based on the information received from the FA battalion commander and the brigade FSO. This plan embodies the DS battalion commander's concept for executing the fire support plan supporting the brigade commander's intent. The DS battalion commander briefs the brigade commander on the FA support plan, which is the FA battalion operation order.

The fire support plan rehearsal (discussed below) is an important part of **step 9** of the decision-making process.

As the plan is executed, the FSO continues planning. As the battle progresses, the commander may issue new guidance to reflect changes in enemy equipment and tactics, changes in friendly capability, and changes in the unit mission.

Fire Support Plan Rehearsal

The FSO should gather all available members of the FS cell to actively participate in the maneuver commander's rehearsal. Rehearsals improve total comprehension of the plan. Participants who are unclear on specific portions of the plan find answers through the repetitiveness afforded by war-gaming the operation. The maneuver course of action and supporting fire plan should be analyzed in anticipation of enemy courses of action that might occur during actual execution of the plan.

In addition to war-gaming possible enemy courses of action, the rehearsal may address the use of primary and alternate communications nets: alternative attack systems to be used in the engagement of specified targets; and positioning of munitions, observers, and weapon systems. The rehearsal improves responsiveness of fires and the synchronization of all the maneuver commander's resources for the battle.

At **any** level, fire support participants in a maneuver commander's rehearsal should include all members of the FS cell and any subordinate FS cell members associated with participating subordinate maneuver headquarters. These members include the FSCOORD and/or FSO, ALO, NGLO and/or SALT officer, mortar platoon leader, chemical officer, and Army aviation liaison officer, as applicable. The FA battalion S3 will benefit from the maneuver commander's rehearsal by obtaining information for movement, schedules of fire submitted by the FSOs, munition requirements, and a more complete understanding of the operational time involved with the scheme of maneuver. Also, the S2, the intelligence and electronic warfare support element (IEWSE) team leader, and the engineer officer, in particular, should be present. They should participate in the war-gaming of significant events, such as target acquisition employment and obstacle emplacement.

If the maneuver commander does not conduct a rehearsal and rehearsal time is available, the FSCOORD and/or FSO should conduct a fire support rehearsal by using the existing maneuver operation plan (OPLAN), fire support plan, and fire support execution matrix. The fire support execution matrix is ideal for use in the rehearsal, since the rehearsal is normally conducted by performing and/or reciting –

- Actions to occur.
- Possible friendly initiatives.
- Possible reactions to enemy initiatives.

Ž Control measures.

- Significant events that are to occur in relation to time or phases of an operation.

The rehearsal conducted by only fire support personnel is limited in that the success of the rehearsal and benefits to be derived from it depend on how well the FSCOORD and/or FSO conducting the rehearsal know the maneuver commander's concept of the operation. Within the DS artillery battalion, the commander, S3, FSO, and S2 structure the fire support rehearsal in accordance with the enemy's most likely course of action and the friendly scheme of maneuver. At the appropriate time, each participant carries out his part of the plan. The FSOs execute their assigned targets, place fire support coordinating measures into effect, and make the reports the battalion depends on for its combat information. The FOs do the same. They ensure that their assigned missions, especially high-priority ones like FPFs, are loaded in the buffers of their digital message devices (DMDs) and ready for transmission. The ALOs monitor airspace coordination procedures, clear aircraft to depart from the initial point (IP), call for target marking, and request fires for suppression of enemy air defenses (SEAD). The DS battalion CP monitors all of this. The battalion operations and intelligence (O&I) section pays particular attention to displacements. The battalion fire direction center (FDC) issues fire orders and passes messages to observers. If there is a mutual support unit, the two FDCs exercise transfer of control. Attached radars work situational cues with the cueing agents. Each fire unit FDC computes fire commands, acknowledges fire support coordinating measures, and ensures that it can fire its assigned mission. Where alternative friendly courses of action hinge on enemy actions and when time permits, the alternatives may be rehearsed.

Note the important features of the rehearsal. It presupposes a complete plan – a plan complete enough to be executed. It is designed to show whether everyone knows his responsibilities (for example, for firing a target, moving a battery, switching frequencies, observing a named area of interest) and the cues for his action. It allows a check on whether the plan will work. For example, observers confirm that they can see their targets and FDCs confirm that they have ballistic solutions to their targets. Finally, the rehearsal as a whole is clearly under **someone's** direction.

There are many ways to conduct rehearsals. When time is limited, you will not have a chance to rehearse everything. You must streamline your plan and focus your rehearsal on critical events. Some rehearsal methods are discussed below.

Suitable or Actual Terrain

The use of a suitable maneuver area or the actual area in which the operation is to be conducted is the best method for conducting a rehearsal because of its increased realism. Communications lines of sight, clutter on specific communications nets, trigger points or target reference points (TRPs), and actual operational times required to move from position to position may be visually simulated. This method requires a large area and an increased amount of preparation and planning time. Its use may depend on operational or signal security considerations.

Model Rehearsal

Models may be constructed showing buildings, compounds, or built-up areas. This type of rehearsal requires good intelligence information on the area of operation and more time to construct the model itself. This type of rehearsal is normally used for special operations.

Map RehearsaI

This rehearsal may be conducted on any map with the appropriate overlays. This method may be used when time and rehearsal space are limited. Using this method limits the number of participants to those who can gather around a single map unless individual maps are used. Actions to be taken are recited by the participants.

Sand Table

The sand table method expands the area in which rehearsal participants may gather around a single graphical representation of the operation. Maneuver graphics may be depicted by using engineer tape, string, or spray paint or simply by cawing out lines in the ground. Key terrain, topography, and objectives may be depicted by the use of rocks, items of equipment, or piles of earth. Preparing for this rehearsal method requires more time; however, it generally permits more participants and is a better visual aid.

Radio Rehearsal and Communications Exercise

This exercise is conducted on FS nets by using the brigade or battalion fire support plans or execution matrixes when the time available and the situation do not allow assembly of key personnel.

Fire Planning

Plan the minimum targets necessary to support the scheme of maneuver. The targeting process, a critical component of the fire planning process, is based on the friendly scheme of maneuver. It requires close interaction among the commander, S2, targeting officer, S3, FS cell, and various combat support agencies. It includes an assessment of the terrain and enemy and an identification of those enemy formations, equipment, facilities, and terrain which must

be attacked to ensure success. It also involves anticipating the requirement for SEAD fires in support of CAS assets.

Process

Fire planning begins with the commander's guidance and intent. It continues through the development of a prioritized list specifying what targets are to be attacked and when *(decide)*, the acquisition of those high-payoff targets *(detect)*, and the determination of attack options to be used (fire support, maneuver, electronic warfare [EW], or a combination) to defeat the target *(deliver)*. It concludes with the assessment of the effects of the attack.

Offensive Fire Planning

For fire planning, offensive operations may be divided into four phases: short of the line of departure (LD) or line of contact (LC), from the LD or LC to the objective, on the objective, and beyond the objective.

Defensive Fire Planning

In the defense, the FSO should consider planning fires in front of, on, and behind the position.

Analysis

After the FSO has collected the targets available to him, he must analyze them to determine which ones will be included in the fire plan. Having too many targets is as bad as having too few targets to support the scheme of maneuver, It is imperative that FS cells be able to reference targets quickly. The target list will be reduced by –

- Resolving duplication of targets.
- Removing targets that do not fit the commander's intent or support the scheme of maneuver.

OFFENSIVE FIRE PLANNING

PHASE	ACTIONS TO BE TAKEN
Short of the LD or LC	Consider planning fires – • To support the unit movement to the LD or LC. • To support the unit if the attack fails and the enemy counterattacks. • To impede enemy patrols and early warning systems.
LD or LD to the Objective	Provide priority of fires to lead elements. Consider planning – • Fires to suppress enemy direct fire weapons. • Smoke to restrict enemy observation of friendly maneuver elements. • Smoke to screen friendly obstacle breaching operations. • Fires on exposed flanks. Consider placing an observer with overwatch elements. Consider recommending a preparation fire if the advantages outweigh the disadvantages: • Will the enemy be forewarned of an attack if a preparation is fired? • Will the loss of surprise significantly affect the chance for success? • Are there enough significant targets to justify the preparation? • Is there enough fire support ammunition to fire an effective preparation? • Can the enemy recover before the effects can be exploited? Determine when and how you will shift fires. Use one of the following methods: • Time – at a predetermined time, fires will shift. • Location – fires shift when the maneuver unit reaches a certain location, such as a phase line. • On call – the maneuver commander directs when the fires shift. • Event – a predetermined event signals shifting of fires. **NOTE:** Whatever method is used, the commander, the platoon leaders, the FOs, and the FDC must all know what method is being used.
On the Objective	Consider planning – • Fires to block enemy reinforcement and resupply by ground or air. • Fires to suppress enemy direct fire weapons. • Obscurants to screen friendly forces or obscure hostile ground observation when consolidating on the objective. • A signal for lifting and/or shifting fires. • Fires as for the defense when consolidating on the objective.
Beyond the Objective	Consider planning fires – • To impede enemy reinforcements. • To block avenues of approach for counterattacking enemy forces. • To slow or block enemy retreat.

DEFENSIVE FIRE PLANNING

FOCUS	ACTIONS TO BE TAKEN
In Front of the Position	On avenues of approach – • Target enemy avenues of approach. • Integrate fire support with direct fire weapons. • Plan trigger points for possible moving targets. On key terrain – • Place an observer on terrain where he can provide early warning, target location, and laser designation and/or overwatch of the battle. • Plan to obscure enemy observation of friendly movements. On obstacles – • Coordinate coverage of obstacles with the engineers. • Consider the use of smoke or riot control agents to hinder breaching operations. • If available and in conjunction with the engineer, plan FASCAM to reseed minefields that the enemy has breached. • Plan fires to close gaps and lanes in barrier or obstacle plans. • Plan fires to help canalize the enemy. • Integrate fire support with obstacles to complement direct fire weapons. • Accurately locate obstacles and preplanned targets.
On the Position	Consider – • Using groups or series to assist in withdrawal. • Using smoke to facilitate disengagement. • Planning fires on top of your battle position to help in the disengagement, to deny the enemy access to the position, and to support a counterattack. Plan FPFs (a prearranged barrier of fire designed to protect friendly troops). Use the following sequence in planning FPFs; but remember, the maneuver commander selects FPF locations. • Select the fire support asset to fire the FPF. This selection is based on allocations. • Adjust fire onto the FPF to determine actual firing data to be used in firing the FPF. (The tactical situation, time, or ammunition supply may not allow the FPF to be adjusted.) • Determine the FPF time of flight. • Select the FPF trigger point (a permanent, visible point on terrain to the front which is used to determine when the FPF will be fired). Consider time of flight and the estimated enemy rate of movement. • Integrate the FPF into the final protective lines of the company direct fire weapons. • Determine how the FPF call for fire will be initiated. **NOTE:** The length of an FPF is the number of elements (tubes) multiplied by the projectile bursting diameter. The sizes of the FPFs for various systems are as shown below. **System** / **Elements** / **Size of FPF** 60-mm mortar / 2 tubes / 70 by 35 meters 81-mm mortar / 4 tubes / 140 by 35 meters 81-mm mortar (improved) / 4 tubes / 140 by 35 meters 107-mm mortar / 3 tubes / 120 by 40 meters 105-mm howitzer / 3 guns / 105 by 35 meters 105-mm howitzer / 6 guns / 210 by 35 meters 155-mm howitzer / 4 guns / 200 by 50 meters 155-mm howitzer / 6 guns / 300 by 50 meters 155-mm howitzer / 8 guns / 400 by 50 meters 203-mm howitzer / 4 guns / 320 by 80 meters 203-mm howitzer / 8 guns / 640 by 80 meters

DEFENSIVE FIRE PLANNING (CONTINUED)

FOCUS	ACTIONS TO BE TAKEN
Behind the Position	Consider planning fires – • To support alternate battle positions. • To support a counterattack. • To delay the enemy as the company withdraws. • To prevent reinforcement by the enemy. • To obscure enemy observation of friendly movements.

Target Acquisition Assets in a Brigade

The FSO has at his disposal not only the targeting assets of FA target acquisition systems but also maneuver and military intelligence (MI) assets.

Field Artillery Systems

The direct support FA battalion in light divisions has an organic AN/TPQ-36 radar.

The direct support FA battalion S2 has access to information normally limited to Threat field artillery assets.

Div arty may have aerial observers available.

Div arty may have COLTS available.

Forward observers are available.

Fire Support Cell Systems

At division level, the FS cell has access to targeting information from the division G2 and the all-source production section (ASPS).

One COLT is organic to each direct support FA battalion and three are organic to headquarters and headquarters battery (HHB), division artillery. They may be allocated to the brigade FSO to provide target acquisition critical to the operation and beyond the capabilities of the FIST. The maneuver brigade commander, in coordination with the direct support FA battalion commander, will retain positioning approval.

The battalion FSOs should provide targeting and intelligence information from the maneuver battalion S2 and TA assets not only to the brigade FSO but also to the FIST and the FA battalion.

Maneuver Systems

The brigade S2 can provide intelligence information gained through maneuver and MI channels.

Military Intelligence Systems

The division MI battalion (CEWI) commander task-organizes his assets to provide intelligence and EW support to committed maneuver brigades.

The CEWI battalion commander may form an IEW company team to control the diverse MI assets, including assets not directly supporting the brigade, deployed in the brigade area of operations. There is no standard structure for the company, and it is assigned standard tactical missions. Elements of the IEW company team may include those discussed below.

Counterintelligence Team(s). This team identifies hostile collection and rear battle threat; determines the EEFI; nominates enemy TA systems for suppression, neutralization, or destruction; and maintains intelligence, operations security (OPSEC), and deception bases.

Ground Surveillance Radar and Remotely Employed Sensor Teams. These teams give the brigade a highly mobile, near-all-weather, 24-hour capability for battlefield surveillance. They may be employed on patrols and at observation posts. Normally, most of the teams provided to the brigade are attached to subordinate battalions and may be deployed to company level. A ground surveillance radar is a better targeting asset when it is surveyed in.

Electronic Warfare Platoon. This platoon provides voice communications intercept. It can interface with the MI battalion tactical operations center (TOC) and the IEWSE and can scan and summarize voice interceptions.

Target List Work Sheet

The FSO records targets on DA Form 4655-R (Target List Work Sheet). An example of this work sheet and instructions for its completion are in Appendix F. A reproducible copy of this form is in Appendix M. The essential data recorded on this form are the target number, target description, target location, and specific guidance on the attack of the target. Specific information in the remarks column may include the following:

- Shell-fuze combinations (if other than high explosive [HE]-point detonating [PD]).
- Fire support system to engage the targets (if other than FA).
- Effects required by the commander.
- Duration of fires.
- Schedule into which the target is to be included, such as a group or series.

Deliberate Fire Planning

Deliberate fire planning is conducted through a formal top-down process, with bottom-up refinement as time permits. However, deliberate fire planning at all levels also begins immediately upon receipt of the mission. Company and battalion FSOs should not wait for a target list from higher echelons before beginning their own planning. For the maneuver brigade, the process begins with the receipt of targeting information from the division. The division G2, in conjunction with the targeting officer of the division main FSE, performs a detailed IPB and target value analysis (TVA) for the entire division area of operation. Named areas of interest (NAIs) and target areas of interest (TAIs) are included in the IPB for the brigade S2. High-payoff targets for the division and specific targets of interest and schedules of fire come from the top down to the brigade FSE or targeting officer. The brigade S2 and FSO must refine this division guidance for the brigade area and concept of operation.

Brigade is normally the lowest level at which formal fire planning is done. The brigade FSO receives from the division targets that are in his zone and in the brigade area of interest and that have been developed from the division IPB and/or acquired by division TA assets. The brigade FSO works with the targeting team at brigade to develop targets within his zone. The targeting team includes the commander, S3, S2, IEWSE, targeting officer, and engineer officer. The brigade FSO adds division and brigade targets to his target list work sheet, posts the targets on his overlay, and passes those targets to subordinate maneuver battalions and the DS artillery battalion. He then receives target list modifications from the battalion FSOs. Using the target list work sheet and overlay, he resolves duplications, prioritizes the list, and sends it to the DS battalion and appropriate agencies available to the maneuver brigade commander for that operation. It is important that the brigade FSO allow enough planning time for subordinate headquarters and that he establish a cutoff time for their submission of modifications so that the plan can be disseminated with adequate time for execution.

The battalion FSO, in conjunction with the commander, operations officer, and primary and special staffs, is responsible for identifying the fire support requirements of the battalion. He receives targets from the brigade FSO, modifies them as necessary, and adds targets of concern to the battalion commander. Using the target list work sheet and overlay as tools, he forwards his list of targets to subordinate company FSOs.

The company FSO and company commander plan targets to support the company scheme of maneuver. From the battalion, the company FSO receives targets that are within the company area of interest. He modifies them as necessary and adds any other targets according to the maneuver commander's priorities. Modifications and additions are submitted through the battalion to the brigade FSO for inclusion in the final brigade target list and fire plan.

At the lowest level, the company FSO nominates targets in his sector, records this target information on the target list work sheet, and forwards it to the battalion FSO. The battalion FSO considers the target information he receives from each of the company FSOs, consolidates it (for example, eliminates duplications), adds targets needed by the battalion, and forwards a copy of the target list work sheet to the brigade FSO. The brigade FSO receives target lists from the battalion FSOs. Using a target overlay, he resolves duplications, adds targets developed by the brigade TA assets, prioritizes the list, and sends it to the DS battalion. He informs the battalion FSOs of any subsequent changes to the plans. Once targets are received by battalion and/or brigade FSOs, they prepare their fire plans and schedules to support the maneuver and allocate targets to the appropriate fire support agency or asset.

Quick Fire Planning

The purpose of quick fire planning is to quickly prepare and execute fire support in anticipation of an impending operation. The FSO must ensure the DS battalion S3, FDC, and battalion FS cells understand his quick fire plan and how it is used. Quick fire planning techniques constitute an informal fire plan. Quick fire planning differs from deliberate fire planning in that bottom-up, rather than top-down, fire planning is conducted. In the quick fire plan, the FSO is responsible for –

- Identifying targets to be engaged in the target list.
- Allocating all fire support assets available to engage the targets in the plan.
- Preparing the schedule of fires.
- Disseminating the schedule to all appropriate fire support agencies for execution.

The following paragraphs delineate the quick fire planning sequence.

Receive the operation order (OPORD). (Understand what the commander wants!) Get the following decisions from the commander:

- Targets to be engaged.
- Desired effects on targets.
- Order and timing of target engagement.
- Duration of fires.
- H-hour.
- Priority of fires.
- Priority for targeting.
- Priority for execution.
- Time check from commander.
- Estimated rate of movement.
- Need for target adjustment.
- Concept of the operation to include --
  - Objective and defensive positions.
  - Maneuver control measures.
  - Obstacles.

Find out what assets are available for the operation. Concurrently, send a warning order to all attack agencies. These include the FA battalion S3, mortar platoon leader, ALO, NGLO or SALT, and aviation liaison officer (if any are applicable). An example warning order is given below. Information to be obtained is as follows:

Ž From the direct support FA battalion – the firing units that will be designated to fire in the quick fire plan schedule.

Ž From the maneuver commander–the availability of the mortar platoon (company FSO to battalion FSO for the 81-mm mortars if a company operation) for inclusion as a firing unit in the schedule of fires.

Ž From the FS cell -TACAIR mission information. Coordinate CAS requirements (for example, aircraft type, ordnance, time on station, laser codes, and control procedures) with the ALO.

Ž From the firepower control team (FCT), SALT, or NGLO – the availability of naval aircraft and/or naval gunfire.

Plan targets in accordance with (IAW) the scheme of maneuver, commander's guidance, and allocated assets. Include –

- Asset to be used.
- Munitions mix.

Ž Shell-fuze combinations.

- Duration of fire for each target.
- Time to fire.

EXAMPLE QUICK FIRE PLAN

First transmission (warning order):

J3B THIS IS D7T, QUICK FIRE PLAN, OVER.
A2Y TO CONDUCT A HASTY ATTACK, OVER.
FIRE PLAN NICKNAME MARK.
TIMINGS FROM H MINUS 6 TO H PLUS 7.
H-HOUR 0525, OVER.

(If shell-fuze combination other than standard is needed, report as part of target list; for example,
30 ROUNDS HE VT, OVER.)

Second transmission (target information):

J3B THIS IS D7T, TARGET LIST FOLLOWS:

(Read target information from appropriate lines in the quick fire plan.)

SAMPLE QUICK FIRE PLAN

QUICK FIRE PLAN

For use of this form, see FM 6-20-40 or FM 6-20-60; the proponent agency is TRADOC.

FIRE PLAN	SUPPORTING	ORIGINATOR	MODIFICATIONS BY
MARK	A2Y	J3B	D7T

H HOUR	SHEET	OF	DATE TIME GROUP
0525	1	1	260415Z

TARGET INFORMATION

LINE	TARGET NUMBER	DESCRIPTION	LOCATION	ALTITUDE	REMARKS
1	301	PLT w/PT76	225 490	280	
2	302	POL SITE	234 567	252	50% WP
3	303	ROAD JUNCTION	292 866	306	O/C

LEGEND:

O/C = on call
POL = petroleum, oil and lubricants
plt = platoon
WP = white phosphorus

After receiving the commander's approval, disseminate the fire plan to attack systems, higher headquarter FS cells, and those who will implement the plan (FOS and subordinate FS cells). Whenever possible, send DA Form 5368-R (Quick Fire Plan) to the FA battalion CP and the mortar platoon leader. A reproducible copy of this form is in Appendix M.

Ensure that the subordinate FSOs and/or FISTS understand the fire plan. As a minimum cover –

- Positions or locations of FSOs and/or observers during the conduct of the operation.
- Who is to initiate the fire plan or initiate the fire request on specific on-call targets within the fire plan. Include the agency to be contacted when the target is to be initiated, and the communications net to be used.
- Which unit has priority of fires or priority targets, if applicable.
- The use of methods of control in modifying the plan should it become necessary during the execution of the plan.
- The agencies available when additional targets of opportunity arise during the execution of the plan.

NOTE: If time allows, a rehearsal should be conducted to ensure comprehension of the plan.

Inform the commander when the fire support plan is ready.

Review the fire support plan, and modify it as necessary.

Fire Support Execution Matrix

The fire support execution matrix is a concise, easy planning and execution tool which shows the many factors of a complicated fire support plan. This matrix may help the FSO and the commander understand how the fire plan supports the scheme of maneuver. It is a valuable planning tool for both the offense and the defense. It explains the aspects of the fire support plan for which each FSO or FO is responsible and the phase during the battle at which these aspects apply. When approved, the matrix becomes the primary execution tool. The matrix is set up with the maneuver elements shown along the left side and different phases (phase lines, events, or times) of the mission along the top. Phases used should correspond to phases established on maneuver execution matrixes.

Company-Level Matrix

At company level, information to go in each box includes the following:

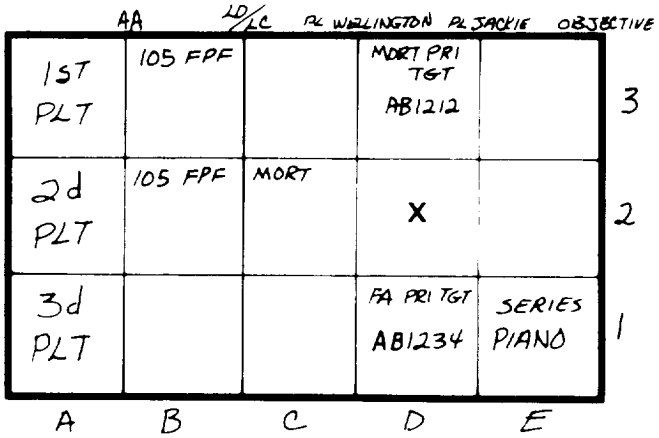
- Priorities of indirect fire support to a platoon indicated by an abbreviation of that fire support asset will appear in the upper left corner of the appropriate matrix box.
- The acronym *FPF*, preceded by the type of indirect fire means responsible for firing that FPF, will appear in the center of the box.
- Priority targets allocated to a platoon will appear in the box as PRI TGT, preceded by the means of fire support responsible for engaging the target and followed by the target number.
- If FIST elements are responsible for the initiation of specific fires, the target number, group, or series designation will be listed in the box for that FIST element. Specific guidelines concerning fires not included on the target list work sheet will be included in that box.
- Each fire support coordinating measure to be placed in effect, followed by a word designated for that measure, will be shown in the box. For airspace coordination areas (ACAs), the time the planned CAS or attack helicopter are due in place is listed.
- Other factors that apply to a certain platoon during a specific time frame maybe included in the appropriate box. General guidance is issued in the written portion of the OPORD.

EXAMPLE COMPANY FIRE SUPPORT EXECUTION MATRIX

The illustration below shows an example of a completed fire support execution matrix for a company deliberate attack. In the assembly area (AA), a field artillery FPF is allocated for 1st and 2d Platoons. 2d Platoon has priority of mortar (mort) fires from the LD/LC to Phase Line (PL) WELLINGTON. From PL WELLINGTON to PL JACKIE, 1st Platoon has been allocated a mortar priority target designated AB1212. 3d Platoon has been allocated an artillery priority target, AB1234. On the objective, Series PIANO is to be fired by the artillery for 3d Platoon.

The illustration shows a way to label the fire support execution matrix for easy reference. Columns are identified by letter, and lines are identified by number. For example, the X is placed in block D2. This matrix reference system allows the FSO to easily disseminate the original or updated matrix data by radio or wire to all appropriate agencies.

SAMPLE COMPANY FIRE SUPPORT EXECUTION MATRIX



Battalion-Level Matrix

At battalion level. the matrix is used as follows:

- If priority of any indirect fire support asset is allocated to a team, it is indicated by an abbreviation of that asset in the upper left corner of the appropriate matrix box.
- If an FPF has been allocated, the acronym *FPF*, preceded by the type of indirect fire means responsible for firing that FPF, will appear in the center of the box.
- If a priority target is allocated to a team, it will appear in the box as PRI TGT, preceded by the means of fire support responsible for firing the target. Once a target is determined as the priority target the corresponding target number is placed in the box.
- If a certain company FSO is responsible for initiating specific fires, the target number, group, or series will be listed in the box for that FSO. Specific guidelines concerning the fires not included on the target list work sheet will be included in the box.
- If an ACA is to be put in effect by a particular FSO, the acronym ACA, followed by the code word designated for that ACA, will be shown in the box. Also, the time the planned CAS or attack helicopters are due in the area (time on target [TOT]) is listed.
- Other factors that apply to a certain team during a specific time frame may also be included in the appropriate box. General guidance is issued in the written portion of the OPORD.

EXAMPLE BATTALION FIRE SUPPORT EXECUTION MATRIX

Shown below is an example of a completed fire support execution matrix for a deliberate attack. In the assembly area, field artillery FPFs are allocated to Companies A and C, while Company B is allocated an 81-mm mortar FPF. Priorities of fire (POFs) are broken down with Company B having priority of fires from Section B mortars; Company A, from Section A mortars; and Company C, out in front of the battalion (bn), from the field artillery.

As the units depart the assembly area toward the LD/LC, priority of FA fires is picked up by the battalion. Group A4C and Series JOE are initiated by the battalion FSO in accordance with the guidance of the battalion commander. If communication with the FSO is lost, unit SOP specifies that the lead company has the option to initiate these fires as it sees fit. The allocation of priorities of fire from the mortar sections remains the same as in the assembly area. Company C, which is the lead team at this point, has been allocated an FA priority target, designated AC3002. Companies A and B have mortar priority targets from their respective sectors and have designated these targets as shown in the matrix.

As the battalion crosses the LD/LC, Company C (still in the lead) assumes priority of FA fires and is responsible for firing priority target AC3003. Company A still has priority of Section A mortars with a priority target, which has been chosen to support the advance. Close air support, under battalion control, is due in the area at 0800. The battalion FSO will place ACA ORANGE in effect before the aircraft assault on the target.

When the lead element crosses PL RED, Company A assumes priority of fires from mortar sections, with each mortar section responsible for a priority target. Company B assumes priority of fires from the FA and is responsible for firing Group A6C.

As the battalion crosses PL BLUE and begins its final assault on the objective, Company A, with priority of mortar fires, initiates Series FINISH. The battalion FSO, with priority of FA control, fires Groups A7C and A8C, designed to suppress the objective.

Phase Line GREEN is the limit of advance; however, at PL GREEN, priority of fires, FPFs, and the responsibility to initiate certain fires have been allocated (as shown on the matrix) to disrupt the enemy as he withdraws and to protect the battalion in case of a counterattack.

SAMPLE BATTALION FIRE SUPPORT EXECUTION MATRIX

	AA		LD/LC	PL RED	PL BLUE	PL GREEN	
CO A	MORT A POF 105 FPF	MORT A POF MORT PRI TGT AC 3010	MORT A POF	MORT POF MORT PRI TGT AC 3125 MORT PRI TGT AC 3205	MORT POF SERIES FINISH	MORT POF 81 FPF	4
CO B	MORT B POF 81 FPF	MORT B POF MORT PRI TGT AC 3008	MORT B POF	FA POF A6C			3
CO C	105 FPF	FA PRI TGT AC 3002	FA POF FA PRI TGT AC 3003			FA POF 105 FPF	2
BN CONTROL	FA POF	FA POF A4C SERIES JOE	ACA ORANGE CAS TOT 0800		FA POF A7C A8C		1
	A	B	C	D	E	F	G

Fire Support Coordination

Fire support coordination is the continuous process of implementing fire support planning and managing the fire support assets that are available to a maneuver force. The greatest fire support plan in the world is worthless unless it is properly coordinated with the appropriate personnel and/or agencies. In short, coordination makes the plan happen. Key personnel with whom coordination must be effected are as follows:

- Higher FSE.
- Lower FSE.
- Chemical officer.
- Direct support FA battalion TOC (usually done at the brigade FS cell).
- Adjacent unit FS cells.
- Mortar platoon leader (battalion or company).
- Engineer platoon leader.
- Air liaison officer.
- Naval gunfire liaison officer.
- Army aviation liaison officer.
- Maneuver battalion S3 and S3 air.
- Air defense representative.
- Military intelligence representative.
- Military police (MP) platoon leader.

Maneuver Commander Responsibilities

The maneuver commander sets the priorities for positioning of units within his sector. Normally, the FA battalion S3 and the brigade S3 coordinate positioning of an FA unit, However, the FSO may become involved by helping the FA battalion S3, Coordination should include –

- Locations of delivery units, radars, CPs, and trains.
- Movement routes and times.
- Supply routes.

Priorities of positioning are as follows:

- Direct support FA battalion.
- Reinforcing battalions.
- Divisional general support reinforcing (GSR) and general support (GS) units.
- Corps units (GSR before GS).

Fire Support Officer Responsibilities

Specific FSO responsibilities for coordination are as follows:

- Establish and maintain communications with key personnel, to include adjacent units.
- Prepare and disseminate fire support documents, records, and reports.
- Execute the fire support plan.
- Supervise the target acquisition effort of the FS cell, and ensure that the S2 is aware of the intelligence needs of the FS cell.
- Keep higher and lower FS cells informed of supported forces situation.
- Exchange battlefield information with the field artillery and the supported force.
- Task the most effective fire support means to attack targets.
- Coordinate all fire support in the commander's zone or sector.
- Ensure the safeguarding of friendly elements.
- Ensure continued flow of targeting information.
- Anticipate changes dictated by the developing battle, and recommend revision of the fire support plan.
- Direct the fire support attack of targets in the priority establish by the commander.
- Generate fire support missions against targets of interest.
- Override requests for fire, or direct that another system provide the requested fire support as necessary.
- Coordinate with the ALO on use of TACAIR assets.

Clearance of Fires

The FSO at each echelon is vitally concerned that all fire requests are quickly processed and that all fires into his maneuver commander's zone are properly cleared.

Requests for Fire. Within brigades, requests for fire are approved by the FSO at each echelon. Usually, requests for FA fire are approved by the task force (battalion) FSO. To expedite these requests, silence by the monitoring FSO is considered consent. This consent essentially validates the use of the requested asset to engage the particular target. For fires within the zone of the requestor, no clearance or other coordination is necessary.

Clearance. The maneuver commander has the final authority to approve (clear) fires and their effects within his zone. This is not the same as approval of requests for fire support assets as discussed above. Normally, a maneuver commander delegates authority to coordinate and clear fires within his zone (normally delineated by boundaries) to his FSO. When fires or their effects will fall outside the zone of the requesting FSO, every effort must be made to coordinate and clear those fires with the commander and/or FSO who owns the zone. This should be done by the most expeditious means available. This coordination may be between two adjacent company FSOs, or it may be done by the battalion FSO. The spirit of this coordination is to ensure that all fires out of zone or across boundaries are properly cleared. However, if no permissive coordinating measure exists, the inability to effect coordination should not prevent attack. This is especially true when friendly forces are under fire or when a high-value target is of fleeting nature.

Fire Support Officer Considerations. The FSO must consider the following key points with regard to coordination:

- In whose zone the target is located.
- Whether the effects of chemical munitions, riot control agents, illumination, and obscurants fired in his zone will affect adjacent zones or airspace.
- Whether coordination is re uired Whether coordination beyond that o the requesting agency coordinating with the maneuver commander or S3 is necessary.
- That the battalion FSE coordinates all fires within the company or battalion sectors and initiates all coordination for fires outside the battalion sector.
- Which FSE is responsible for the maneuver zone in which the target lies.
- How he may contact them. What communications networks and agencies are available between the FSO initiating the coordination and the FSO in whose zone the target lies.

Required Actions. Upon receipt of the fire request, the following actions take place:

- The DS artillery battalion FDC immediately begins the tactical processing during coordination. The battery FDC begins technical processing at the same time.
- All FSEs monitor the fire request and plot the target on the situation map.
- Depending on the location of the tar et in relation to the overall situation, the affected FSEs coordinate with the other members of the FS cell as appropriate.
- If the target lies outside the requestor's zone of action or if it appears the fire mission may affect the brigade operation, the battalion FSE coordinates the request with the brigade FSE.
- The brigade FSO coordinates with the appropriate adjacent FSO if the target lies across a brigade boundary.
- The brigade FSE coordinates with the division FS cell if the target lies beyond a division boundary.
- The approving authority in all situations is the maneuver commander in whose zone the target lies; authority is often delegated to the FSO.
- Battalion FSEs on or near brigade or division boundaries should exchange frequencies and call signs to expedite fire support coordination across the boundary.

EXAMPLES OF FIRE SUPPORT COORDINATION

Example 1. Request for fire by B/1-40 Infantry (Inf) on Target AC0006 (monitored by 1-40 Inf FSO).

- **In whose zone is the target?** A/1-40 Inf.
- **Is coordination necessary?** Yes; through the battalion FSO.
- **Which FSE is responsible for the zone in which the target lies?** 1-40 Inf FSE.

Example 2. Request for fire by B/1-40 Inf on Target AC0001 (monitored by 1-40 Inf FSO).

- **In whose zone is the target?** 1st Brigade (Bde).
- **Is coordination necessary?** Yes, because it is outside the zone of the requesting agency (B/1-40 Inf FIST).
- **Which FSE is responsible for the zone in which the target lies?** 1st Bde FSE.
- **How may the 1-40 Inf FSO contact the brigade FSE?** Options are as follows:
  - 1-40 Inf FSO calls 1st Bde FSO on the brigade fire support net.
  - 1-40 Inf FSO calls 1st Bde FSO on the direct support FA battalion fire net.

Example 3. Request for fire by B/1-40 Inf on Target AC0002 (monitored by 1-40 Inf FSO).

- **In whose zone is the target?** 2d Bde.
- **Is coordination necessary?** Yes, because it is outside the zone of the requesting agency (B/1-40 Inf).
- **Which FSE is responsible for the zone in which the target lies?** 2d Bde FSE.
- **How may the 1-40 Inf FSO contact the brigade FSE?** Options are as follows:
  - 1-40 Inf FSO calls the 2d Bde FSO direct on the 2d Bde fire support net (if he has the frequencies and call signs) (preferred method).
  - 1-40 Inf FSO calls the 1st Bde FSO on the 1st Bde fire support net. The 1st Bde FSO contacts the 2d Bde FSO by–
    - Calling the 1st Bde FSE on the 2d Inf Div fire support net.
    - Calling the 2d Inf Div tactical FSE, who in turn contacts the 2d Bde FSE.
  - 1-40 Inf FSO calls 2d Bde FSO by going through the direct support FA battalion fire net, through 2d Inf Div Arty to the 2d Bde direct support FA battalion, who contacts the 2d Bde FSO.

Example 4. Request for fire by B/1-40 Inf on Target AC0003 (monitored by 1-40 Inf FSO).

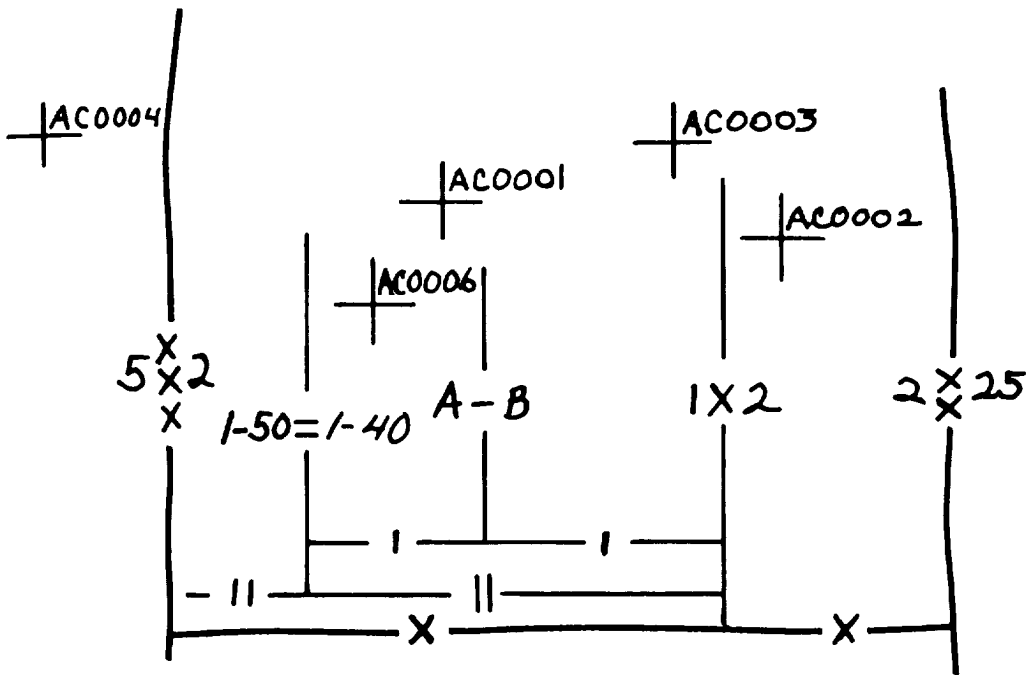
- **In whose zone is the target?** 2d Inf Div.
- **Is coordination necessary?** Yes, because it is outside the zone of the requesting agency (B/1-40 Inf).
- **Which FSE is responsible for the zone in which the target lies?** 2d Inf Div tactical FSE.
- **How may the 1-40 Inf FSO contact the 2d Inf Div tactical FSE?** Options are a follows:
  - 1-40 Inf FSO calls the 2d Inf Div tactical FSE (preferred method).
  - 1-40 Inf FSO calls the 1st Bde FSO on the 1st Bde fire support net. The 1st Bde FSO contacts the 2d Inf Div tactical FSE by–
    - Calling the 2d Inf Div tactical FSE direct on the 2d Inf Div fire support net (if the FSO has the frequencies and call signs).
    - Calling the adjacent FSO in the 2d Inf Div zone, who calls the 2d Inf Div tactical FSE (if the FSO has the frequencies and call signs).

EXAMPLES OF FIRE SUPPORT COORDINATION (CONTINUED)

Example 5. Request for fire by B/1-40 Inf on Target AC0004 (monitored by 1-40 Inf FSO).

- **In whose zone is the target?** 5th Corps.
- **Is coordination necessary?** Yes, because it is outside the zone of the requesting agency (B/1-40 Inf FIST).
- **Which FSE is responsible for the zone in which the target lies?** 5th Corps FSE.
- **How may the 1-40 Inf FSO contact the 5th Corps tactical FSE?** Options are as follows:
  - 1-40 Inf FSO calls the 5th Corps tactical FSE direct (preferred method).
  - 1-40 Inf FSO calls the 1st Bde FSO on the 1st Bde fire support net. The 1st Bde FSO contacts the 2d Inf Div tactical FSE by–
    - Calling the 2d Inf Div tactical FSE direct on the 2d Inf Div fire support net (if the FSO has the frequencies and call signs).
    - Calling the adjacent FSO in the 2d Inf Div zone, who calls the 2d Inf Div tactical FSE (if the FSO has the frequencies and call signs).

SAMPLE SITUATION



Brigade Fire Support Coordination Checklist

The brigade FSO must coordinate with the personnel as indicated in the table below. Also, during the operation, the FSO must –

- Implement on-order fire support coordinating measures.
- Monitor the status of the maneuver battalions. Be prepared to shift priorities of fire and/or to request additional support from division.
- Ensure a timely flow of targeting and battlefield information to battalion FS cells and the DS battalion.
- Prepare for contingency operations.

COORDINATION REQUIRED BY THE BRIGADE FIRE SUPPORT OFFICER

POINT OF CORDINATION	ACTION TAKEN
Brigade Commander and S3	Determine– • Mission. • Scheme of maneuver. • Commander's intent. • Zone of action. • Future plans. • Which organizations have priorities of fire and when. • Established maneuver control measures. • Availability of fire support assets. Recommend– • Capabilities and limitations of fire support for the operation (can support versus cannot support the course of action). • Fire support required beyond that currently available to the brigade. • Placement of observers forward in the area considered to be most active, on key terrain, and on avenues of approach. Consider employing observers with scouts and reconnaissance elements. • Preparation fires. Are they necessary or desired for the operation? Will series and groups do the job? • Fire support coordinating measures.
Brigade S2 and Targeting Officer	Determine the following from the IPB: • Enemy order of battle. • Known and suspected enemy locations. • Size, type, and strength of enemy force expected to be encountered. • Terrain analysis of mobility corridors. • Friendly reconnaissance and patrol activity. • All target acquisition and surveillance plans (organic and attached). Provide– • Status of observers, COLTs, AN/TPQ-36 radars, and attached TA assets. • List of priority targets.
Division FS Cell	Determine– • FA assets available and tactical missions. • CAS allocations. • Division-level fire support coordinating measures likely to be in effect. Request additional assets as necessary to support the operation. Provide brigade-level fire support coordinating measures likely to be in effect.
Direct Support Battalion S3	Determine– • Locations of units. • Proposed locations. • Ammunition status. • FA commander's intent for support of the plan. • Unit weapons status. Provide a thorough briefing on the operation to allow adequate planning.
Battalion FSOs	Determine– • Final protective fires. Request additional support as necessary. • Fire support coordinating measures to recommend. • Alternate radio nets to be used in case of jamming. • Fires requiring positive control. Normally, these include illumination, smoke, FPFs, CAS, and priority targets. Know who has control, the conditions under which the fires are employed, and how they are to be controlled. Provide the target list, fire support execution matrix, and schedules that support the operation.

Split Command Post Operations

Brigade and battalion commanders each will establish a tactical (tac) command post during critical and fluid periods of combat operations to facilitate command and control of subordinate units, The organization and equipment may vary according to the commander's analysis. Usually, the tactical CP consists of the commander, S3, S2, FSO, and ALO. Other members of the staff or FS cell may be included according to the criticality of their areas; for example, the engineer should be present if obstacles are a critical part of the current operation. The DS battalion commander (FSCOORD) may be present at the brigade tactical CP for limited periods. He advises the commander, anticipates required movement of supporting artillery units, and directs execution of other fire support tasks. The tactical CP should include only the minimum number of personnel and amount of equipment necessary to control the battle, The FSO is responsible for keeping other fire support representatives informed of planned operations.

Planning Considerations

Each type of tactical CP at brigade and battalion is discussed separately with regard to personnel, equipment, and command, control, and communications (C3). The techniques described serve as examples and as a basis for establishing internal procedures. At times, the commander may have to make allowances to facilitate coordination of fires. He must be kept informed of the FSO's capability to influence the delivery and coordination of supporting fires. The timely employment of fire support will often determine the outcome of maneuver engagements and will often be controlled from the tactical CP by the FSCOORD and/or FSO.

Command, Control, and Communications

Communications must be maintained with subordinate and higher FSOs (includes the division FS cell for the brigade FSO) and supporting artillery units to provide adequate support to the maneuver operation. A stationary tactical CP should be positioned to enhance communications between higher and lower units. This facilitates command and control (C2) of maneuver and combat support systems. The requirements for adequate fire support communications must always be a consideration for establishing a ground-based tactical CP. The FSO must ensure that his communications package is adequate. He must be aggressive in establishing and maintaining fire support communications for the tactical CP operations.

Main Command Post Fire Support Cell Operations

The responsibilities of the FS cell during split CP operations are very similar at brigade and battalion. The FS cell helps the FSO maintain control and coordination of the maneuver unit fire support. It relays, takes messages, performs retransmission (retrans), does limited planning and coordination for current and future operations, and does any other assigned and implied tasks. In the absence of communications with the FSO, the FS cell is responsible for all FSO functions.

Brigade Tactical Command Post Operations

Brigade Aerial Tactical Command Post. Usually, this CP operates from an OH-58 helicopter and consists of the maneuver commander and other staff members as directed. The FSCOORD or FSO should be included in the aerial tactical CP. Use of this type of CT is most likely when two or more battalions are conducting air assault operations.

The brigade FSO must ensure enough radios are available for his use, whether they are installed in the aircraft or man-portable. Consider placing the ground-based ALO, subordinate FSOs, and other delivery system representatives on one centralized net, usually the brigade FS net. Some aircraft (UH-60 equipped for C3) may be

equipped with high frequency (HF) radios for control of Air Force and naval assets. Consider using the brigade FSE as a relay-retrans to the division FS cell.

The aerial tactical CP enhances C3 of maneuver and fire support. The use of aerial tactical CPS will normally be of limited duration. It involves higher risks, depending on the status of the Threat air defenses. The brigade FSO should expect the commander to direct attack of specific targets, and he must be prepared to coordinate those requests.

Stationary and/or Mobile Brigade Tactical Command Post. Usually, this CP is configured according to SOP and the commander's guidance. It should always include at least the FSCOORD or FSO during critical engagements when the brigade commander is actively engaged in the command and control of more than one battalion.

The brigade FSO must be prepared to improvise and make use of all available radios. A man-portable radio configured for backpack mode should always be carried for use as a primary or an alternate means of communication. Additional FM radios available to the FSO could include the radios of the commander or S3. The ALO's FM radio may be available. Availability of digital communications equipment may require minor installation modification to one of the brigade tactical CP vehicles. Use of radio remote devices, long-range antennas, and HF radios in the voice mode should be considered as appropriate. Use of the HF radios at the TACP and radio teletypewriter (RATT) or mobile subscriber equipment (MSE) nodes throughout the division gives the brigade FSO a long-range, unsecured communications capability.

Security must be a concern and planned for accordingly. Fire plans for local security should be planned briefed, and disseminated as with any other maneuver position. Long-range antennas and high-power radio settings should be used only when needed.

Foot-Mobile Brigade Tactical Command Post. This type of CP is not likely except during brigade-level air assault, lodgment, and amphibious operations. See the battalion tactical CP operations for considerations.

Battalion Tactical Command Post Operations

Battalion Aerial Tactical Command Post. This CP usually operates from an OH-58 helicopter and consists of the maneuver commander and other staff members as directed. Normally, it will be available when two or more companies are conducting air assault operations.

The battalion FSO must ensure enough radios are available for his use, whether installed in aircraft or man-portable. Consider placing the ground-based ALO, subordinate FSOs, and other delivery system representatives on one centralized net. Some aircraft (UH-60 equipped for C3) may be equipped with HF radios for control of Air Force and naval assets. Consider using the battalion FS cell as a relay-retrans to the brigade FSO.

Other considerations are similar to those in employing an aerial tactical CP at brigade level.

Stationary and/or Mobile Battalion Tactical Command Post. This CP usually is configured according to SOP and the commander's guidance. It should always include the battalion FSO. The other staff personnel present will be identified by the battalion commander. The battalion tactical CP may have two or three vehicles.

Considerations for communications are similar to those of the brigade FSO. The FM radios available to the battalion FSO, other than his man-portable radio, may include the ALO's FM radio. Availability of digital communications equipment may require minor installation modification to one of the tactical CP vehicles. Use of radio-remote devices, long-range antennas, and HF radios in the voice mode should be considered as appropriate. Use of the HF radios with the battalion ALO should also be considered for possible long-range, unsecured

communications capability. In defensive operations, the tactical CP should be dug in with overhead cover when possible. This will require remoting and digging in the wire.

The battalion CP will be much lighter than the brigade tactical CP and will be a greater security risk because of nearness to the FLOT.

Foot-Mobile Battalion Tactical Command Post. This CP is usually configured with the same personnel as the stationary tactical CP. It is used extensively during movements to contact, infiltrations, and landing zone (LZ) operations. It is the most difficult configuration for conducting fire support operations.

The primary means of communication will be a man-portable FM radio. The ALO should have a man-portable AM radio, which has a greater range than FM radios in most circumstances. The FS cell and the brigade FSO will have a much greater role under walking CP conditions because of the battalion FSO's limited radio range. The battalion FSO must be prepared to clear fire tasks with assistance from the FS cell. The FSO's communications requirements should be considered when selecting the route of movement during dismounted operations. Use of retrans during offensive operations will probably be required to enable the FIST or FO to effectively adjust artillery and mortar fires.

The security risks for dismounted battalion tactical CP operations are more situation-dependent than for other operations. Constant movement reduces the chance of being located, but it increases the chance of walking into an ambush or a prepared enemy position.

CHAPTER 3

THE "HOW" OF FIRE SUPPORT PLANNING

Section I. INTRODUCTION

General

The goal of fire support planning is to know the maneuver commander's guidance, intent, and scheme of maneuver and to coordinate fire support assets to support the operation. This chapter offers considerations to use during the planning of offensive and defensive operations. It does not address commander's intent or METT-T. Therefore, each FSO, company through brigade, must add those two items to the considerations to adequately plan and coordinate fire support for an operation. The product of fire support planning is the fire support plan, a key component of the commander's operation plan. The plan must be simple, flexible, and descriptive; it must complement the scheme of maneuver. Light infantry tactics are considerably different from mechanized tactics, and unique terms are used. Therefore, it is imperative that the FSO read, know, and understand all of FM 71-101 and FM 7-72.

Maneuver Tactics and Fire Support

The effectiveness of the total fire support system depends on the successful performance of the four basic tasks of fire support:

- Support forces in contact.
- Support the battle plan.
- Synchronize the fire support system.
- Sustain the fire support system.

NOTE: For an expanded discussion of these tasks, see FM 6-20, Chapter 3.

Section II. FIRE SUPPORT PLANNING FOR THE OFFENSE

Purpose of Offensive Operations

The primary purpose of an offensive operation is to destroy the enemy. This is done by breaking through his defensive system and driving rapidly and violently into his rear to destroy artillery, air defenses, command posts, logistical support, and his command and control system. FMs 7-20, 7-30, 71-101 and 100-5 describe in detail the purposes, fundamentals, and types of offensive operations. Other purposes of the offense are as follows:

- Secure key terrain.
- Gain information on enemy strength.
- Deceive and divert the enemy.
- Deprive the enemy of resources.
- Hold the enemy in position to keep him from concentrating.

Types of Offensive Operations

There are five basic types of offensive operations to be provided fire support:

- Movement to contact.
- Hasty attack.

Ž Deliberate attack (to include the forward passage of lines).

Ž Exploitation.

Ž Pursuit.

The support for each of these types is discussed in detail later in this chapter.

The following fire support tasks are performed in support of all types of offensive operations:

• Locate targets.

• Help integrate all available fire support assets.

Ž Provide conventional, chemical, and nuclear fires at the desired times and places. (The brigade FSO will inform the FS cell of the current FLOT and radiation exposure state [RES] category to expedite the employment of a division nuclear subpackage to support brigade operations.)

Ž Destroy, suppress, and/or neutralize enemy direct and indirect fire weapons.

• Provide illumination and smoke or obscurants.

Ž Provide fires in support of joint air attack team (JAAT) operations.

• Suppress or destroy enemy air defenses, command and control, and logistics facilities.

Ž Deliver scatterable mines.

• Prepare for support of future operations.

Movement to Contact

Description

The movement to contact is conducted by maneuver forces to gain or reestablish contact with the enemy. It may be used in any combat situation where the initiative is not clearly in the grasp of either opponent or where the enemy has broken contact.

A movement to contact is characterized by rapid movement decentralized control, and the hasty deployment of combined arms formations from the march – to attack or to defend. The movement should result in a meeting engagement. Target acquisition and intelligence means strive to discover the enemy's formations and facilities well before the lead elements of the friendly force reach him.

One of the primary tasks for a FSCOORD is to predict likely enemy locations and to plan on-call fires accordingly. Fire support units must be prepared to react quickly when needed.

Supported forces move aggressively toward the enemy but are not sure exactly **where** or **when** they will fight. A friendly force moves with the smallest practicable element forward. A reinforced battalion-size force might lead a division; whereas, a company or troop could lead a brigade. Forward elements advance along concealed routes covered by an overwatch element positioned to support by fire. The supported commander decentralizes control to leaders to the front and to the flanks. He retains the bulk of his combat power to permit flexible response once contact is made. The most pressing demand on fire support is responsive fires when called for.

FSCOORD Activities

FSCOORD activities to support a movement to contact at company, battalion and brigade levels are shown in the following table.

FSCOORD ACTIVITIES IN A MOVEMENT TO CONTACT

COMPANY	BATTALION	BRIGADE
As the company FSCOORD, the company FSO advises the company commander on fire support and manages available fire support. This usually consists of mortars and field artillery, but it may include naval gunfire and air support (Army aviation and TACAIR). The FIST headquarters locates with company headquarters. The FO parties deploy with supported platoons of the company. The company FSO works under the immediate supervision of the FSO at the maneuver battalion headquarters. If FO parties are unavailable, the company FSO keeps key platoon personnel informed of the fire support situation and how to obtain fire support. He helps platoon personnel request and adjust fire support. The company FSO plans on-call fires on the basis of the company battle plan and known enemy tactics. He ensures the adequacy of on-call fires and eliminates unnecessary duplication of fire support. He keeps the battalion FSO and the supporting field artillery informed of company fire support needs. He provides emergency control of CAS assets in the absence of qualified Air Force personnel (ALO, ETAC, or AFAC).	As the maneuver battalion FSCOORD, the battalion FSO advises the battalion commander and staff on fire support matters and manages these assets for the battalion. He supervises the battalion FS cell. Air support and 81-mm mortar fires usually are available in addition to 60-mm mortar fire support common to companies. Naval support may also be available. The main fire support effort is concerned with augmenting the fires planned for the companies. The battalion FSO supervises the fire support activities of FISTs with the companies of the battalion. He develops the fire support portion of battle plans based on guidance from the supported commander. He recommends positions for FA target acquisition means. Primary enemy targets are direct and indirect fire weapons, observers, and command and control facilities. On-call fires are planned on likely enemy locations (on the basis of known enemy tactics). As the force advances, outdated on-call targets are replaced with new ones. Fire support coordinating measures are recommended as needed. The battalion FSO keeps the FSO at brigade headquarters informed of the fire support situation. He provides fire support guidance to liaison representatives from other fire support means.	As the primary representative of the brigade FSCOORD, the brigade FSO advises the brigade commander and staff on fire support matters and manages the available fire support assets. These assets usually include FA indirect fire weapons and air support, but they may also include naval gunfire support. The brigade FSO establishes the FS cell at the brigade headquarters and advises liaison personnel there on fire support. He supervises the fire support activities of the FSOs with subordinate maneuver battalion headquarters. He helps develop brigade battle plans and prepares the fire support portions of these plans. He recommends positions for FA target acquisition means to the DS battalion S3. Primary targets are the same as those for the battalion FSO plus deeper target areas. On-call fires are planned as likely enemy locations. As the force advances, outdated on-call targets are replaced with new ones. The brigade FSO ensures that FO shortfalls for lead elements are filled; he requests help from the DS battalion S3, as needed. Fire support coordinating measures are recommended, established, and reestablished, as needed. The brigade FSO keeps the division main FS cell and the parent FA battalion FDC informed of the fire support situation of the brigade.

Fire Support Planning

The movement to contact is a fluid situation in which supported elements try to locate the enemy. Initially, top-down fire planning will be used if time permits. Targeting for fire support usually is based on predicted enemy locations (targets). Past enemy tactics under similar conditions and the terrain influence this targeting effort. On-call fires are planned to meet possible contingencies. As the advance continues, plans at brigade are updated. Fire support planning at the two levels normally executing the movement to contact when planning time is limited is shown below.

FIRE SUPPORT PLANNING IN A MOVEMENT TO CONTACT

COMPANY	BATTALION
On the basis of guidance from the company commander and the supervising FSO, the company FSO plans on-call fires to support the company once contact is made. Most targets are on likely enemy locations (predicted targets) and are based on past enemy tactics and the terrain. Target acquisition means available to the company FSO are oriented on the most critical areas of advance. Usually, fire planning is informal – quick (hasty) procedures and formats are used. **NOTE:** Informal fire planning is a dynamic process that responds to the immediate problems on the battlefield. Generally, it flows from lower to higher echelons and is done primarily at the maneuver company and battalion. Informal planning is a product of the situation and the time available at the echelon for which it is devised. Because it is a spontaneous process tied to the immediate needs of the force, informal planning normally is done verbally. The fire support weapons normally considered are mortars and field artillery. These may be augmented by naval gunfire and air support. Every effort is made to ensure the responsiveness of planned fire support. The company FSO gives fire planning guidance to the forward observers, if available. The company FSO plans fires on targets sent down by the battalion FSO. He requests augmenting fires from the battalion FSO, when needed. Most of the on-call fires are devoted to suppression, obscuration, and screening. All fire planning stresses response of weapon systems so that, when called for, fires are almost immediately available.	The battalion FSO supervises the fire planning actions of the FISTs with supported companies. He advises on fire support characteristics. He augments the fires planned by the FISTs and eliminates duplications. He plans fires on targets sent down from higher headquarters and incorporates targets requested by the FISTs. **NOTE:** At this level, fire plans are normally informal. See the previous note pertaining to informal fire planning. If additional fire support is needed, the FSO requests it from the brigade FSO. The battalion FSO keeps liaison personnel from other fire support agencies at the FS cell informed of the need for their fires and of changes to existing planned fires. He also informs the supporting FA and mortar FDCs of changes in fire plans.

Positioning of Fire Support Assets

Success in fire support operations requires the proper positioning of contributing assets, such as weapons and target acquisition means. Some of the positioning considerations are shown below.

Fire Support Coordinating Measures

The most commonly used fire support coordinating measure in a movement to contact is the coordinated fire line (CFL). Because of the fluidity of the enemy situation the CFL is moved forward, keeping with the advance of the supported maneuver element. The fire support coordinating measures at each level are discussed below.

POSITIONING OF FIRE SUPPORT ASSETS IN A MOVEMENT TO CONTACT

COMPANY	BATTALION	BRIGADE
The company FSO may recommend the positioning of company mortars and may request positioning of supporting mortars and field artillery. Most often, positioning is influenced by the targets he presents to the FDC. Target acquisition means (FOs and other) are positioned to best cover critical areas and to avoid dead spots in the coverage. Usually, weapons are positioned well forward to exploit their ranges and to ensure that continuous support will be available once the contact is made.	The battalion FSO evaluates positioning requests from company FSOs, recommends positioning of battalion mortars to the battalion commander, and requests positioning of the field artillery from the brigade FSO. He may be concerned with positions for NGF ships. Recommended positions for FA radars in the area may be needed. Coverage should favor the lead elements of the maneuver battalion. When available, aerial observers may be used to extend the depth of ground observation.	The brigade FSO is continuously aware of the current positions of field artillery and NGF ships supporting the brigade. He influences future positions when possible. Until contact is made, weapons and supporting target acquisition means are deployed well forward. Air support aircraft may be requested to be on ground alert to enhance responsiveness. The brigade FSO keeps the field artillery FDC and other fire support representatives informed of positioning concerns.

FIRE SUPPORT COORDINATING MEASURES IN A MOVEMENT TO CONTACT

COMPANY	BATTALION	BRIGADE
Usually, the company FSO does not establish fire support coordinating measures. However, he must adhere to those established by higher headquarters. If the situation develops faster than anticipated, the lead company FSO may have to request the shifting of the CFL. Measures are posted to appropriate maps and overlays to ensure that fires adhere to them. The FO parties and key platoon personnel must be informed of locations of current measures and any changes as they occur.	The battalion FSO keeps subordinate FISTs, supporting FDCs, and the brigade FSO informed of changes to fire support coordinating measures. All measures in effect are posted to maps and overlays. A leading battalion may establish the CFL for the parent brigade. The FSO must recommend locations for the CFL and advise the commander when it should be displaced. As the task force (TF) advances, the CFL is moved accordingly. New locations are disseminated.	The brigade FSO ensures that measures in effect are posted to maps, charts, and overlays. He ensures that existing measures and any changes are disseminated to appropriate FDCs and FSOs.

Fire Support Considerations

Immediately responsive fires are provided initially to the lead element and then to the lead company as contact develops. Responsive fires are provided by –

- Assignment of priorities of fire.
- Allocation of priority targets to the company or team performing a mission requiring responsiveness.
- Responsive repositioning of firing batteries by the artillery S3 as the movement to contact progresses.
- Effective positioning by FOs and/or COLTS.
- Integration of additional assets, such as the immediate response of mortars upon contact with the enemy.

Responsive fires are also enhanced by effective assignment of forward observers to the available communications nets. Assignment can give specific observers priority of response. The quick fire net and the exclusive net are options. They do not prevent the firing unit from answering calls for fire from other than the specific observer.

- A **quick fire net** (voice) authorizes a direct association of an observer with a selected weapon system (normally field artillery). Although the designated observer is not the only observer on the net, he has the highest priority for calls for fire. In a voice net, the net control station (NCS) (normally the FDC) will restrict all other net traffic immediately upon receiving a request for fire from the priority observer. In a quick fire net (digital), the designated observer may be given priority in the tactical fire direction system (TACFIRE) or the observer may be allowed to communicate directly with a designated battery computer system (BCS). (See TC 6-40A.)

NOTE: In either digital case, the operators must diligently and continuously review input queues to ensure Immediate actioning of the priority call for fire.

- An **exclusive net** is a fire direction net designated (as a field expedient) to be used for a limited period of time solely by the observer and the appropriate FDC. No other subscriber will enter the net except in an emergency. This procedure will be used only for special situations. The commander, considering the factors of METT-T, must determine that absolute responsiveness to a specific unit is mandatory. This procedure requires frequencies and radio equipment that normally are not readily available. Therefore, the FDC may switch from a net it normally monitors to the exclusive net; but it will always monitor its fire direction net.

On the basis of the commander's guidance, TACAIR and massed fires are scheduled on deep targets. Fires are planned on and around reserves and logistics sites to hinder their movement onto the battlefield. Fires are planned on flanks to protect the flanks and to reduce the number of maneuver forces committed to the flanks.

Fires are planned on the terrain to be traversed. As maneuver forces move, immediate suppression missions are fired to help the maneuver force get within range of the enemy direct fire weapon systems. Immediate smoke is fired to obscure OPS, screen friendly movement and help maneuver forces breach obstacles. COLTS may be positioned forward near the advance guard in an overwatch position to provide responsive fires when contact is made. Once contact is made with the enemy, the FSO must be prepared for either a hasty attack or a defense.

Coordinated fire lines are placed well forward of friendly maneuver forces. On-order CFLs

are planned on phase lines so the CFLs can be lifted and shifted quickly.

Hasty Attack

Description

The hasty attack is launched with minimum advanced planning. The main goal of a hasty attack is to seize the initiative. It is usually conducted following a movement to contact, during a counterattack, or when unexpected enemy contact is made. The commander attacks quickly from his existing dispositions to gain the upper hand or to keep the enemy from organizing resistance. Planning is normally extremely limited. The **principles** of the attack – concentration of effort, surprise, speed, and flexibility – apply to the hasty attack. The need for rapid, decisive action results in a need for simpler schemes and a greater reliance on SOPs and independent execution. The FSCOORDs must be prepared to ensure rapid reaction of the fire support system.

Once enemy contact has been made during the movement to contact, supported maneuver commanders deploy and attack from the march. They coordinate their maneuver and supporting means in an attempt to fight through and continue the advance. The FSCOORD participates in this coordination.

The hasty attack is a difficult operation. It tries to maintain the momentum of the force. It seeks to fix the enemy's forward elements in place with firepower, to find gaps and/or weak spots or open flanks, and to move quickly through. Speed is essential. Fire support plays a key role. Often, it allows supported commanders to bring down massed fires in selected areas and to quickly shift these fires throughout their sectors.

FSCOORD Activities

FSCOORD activities to support a hasty attack at company, battalion, and brigade levels are shown below.

FSCOORD ACTIVITIES IN A HASTY ATTACK

COMPANY	BATTALION	BRIGADE
The company FSO's primary concern is that fire support is responsive. Suspect enemy locations are targeted. Enemy direct and indirect fire means must be suppressed. A hasty fire plan must be prepared and executed. Speed of the attack offsets complete preparation. Friendly forces must be screened from hostile ground observation. Some deeper fires are needed to close off the immediate battle area to enemy reinforcements and/or resupplies.	The battalion FSO must help the supported commander as he war-games for the hasty attack. He ensures the proper integration of fire support in the battle plan. He ensures that the fire support planned by the company FSOs is adequate; he adds targets as required. He eliminates duplicate targets and informs those concerned. He assigns targets to appropriate fire support means (FA, mortars, and so forth). He develops the maneuver battalion fire support plan for the hasty attack, incorporating targets submitted in the company FSOs' fire plans. He sends the plan to concerned agencies.	The brigade FSO is concerned with fires to augment those planned at lower echelons and with fires requested by higher levels. He recommends fire support coordinating measures. He prepares the fire support plan for the brigade. He provides guidance to liaison representatives from other fire support agencies.

Fire Support Planning

Fire support planning time for the FSCOORD to prepare for the hasty attack is **very limited.** He must capitalize on existing fire plans, adding targets as necessary. The commander's priorities may change for both the targets and the firing means. Fire support planning involvement of the FSCOORD at each level of concern is discussed below.

Positioning of Fire Support Assets

Positioning concerns for fire support assets are discussed below.

FIRE SUPPORT PLANNING IN A HASTY ATTACK

COMPANY	BATTALION	BRIGADE
The company FSO helps the company commander develop the company attack plan. He recommends targets and fires to support the plan. The primary fire support means are usually field artillery and mortars. Primary targets planned are those that suppress enemy gunners, obscure observation, and close off the immediate battle area. A few well-placed on-call targets are beneficial. During the attack, fires can be shifted from these locations. Quick (hasty) fire plans are used. As the attack progresses and new targeting information becomes available, old targets are replaced with new ones. The battalion FSO is kept informed of the company fire support plans and changes as they occur.	The fire support plan is usually informal and includes FA and mortar fires. It may also include NGF and air support fires. The battalion FSO participates in the development of the attack plan. He passes targets to fire support agencies (FA, mortars, and so forth). He requests fires from the brigade FSO, when necessary. He keeps all concerned informed of changes in fire support for the hasty attack plan.	The brigade FSO prepares the brigade fire support plan. It is based on the brigade commander's guidance on targets and fire support means. He includes those targets of major concern to the brigade plus those requested by lower and higher levels.

POSITIONING OF FIRE SUPPORT ASSETS IN A HASTY ATTACK

COMPANY	BATTALION	BRIGADE
The company FSO is most concerned with positions for the supporting mortars, field artillery, and target acquisition means. Usually, these means are positioned well forward as when supporting the movement to contact. Such positioning precludes the need for early displacements and allows them to reach out for deeper targets. Indirect fires should be continuously available.	The battalion FSO is concerned with positions for indirect fire weapons and target acquisition means. He coordinates with FDCs and with the brigade FSO on these actions. He ensures that some indirect fire weapons are always available to support the hasty attack. When supporting, NGF ships are positioned to exploit the range of their weapons. This is coordinated with SALT personnel at the FS cell.	The brigade FSO is concerned with the positions for indirect fire weapons (usually FA and NGF) and with available target acquisition means. If the brigade has been allocated TACAIR, the FSO will be concerned with its responsiveness. Some aircraft may be kept on ground or air alert to meet this need. This is arranged through the ALO at the FS cell.

Fire Support Coordinating Measures

Usually, the nature of a hasty attack inhibits the establishment and dissemination of formal fire support coordinating measures.

Deliberate Attack

Description

The deliberate attack is one that is **thoroughly** planned and coordinated. Fires and maneuver are fully meshed. Time is available to do this. Usually, this type of attack is necessary when the unit is confronted with a well-organized enemy defense and when the enemy cannot be turned or bypassed. Attacking forces must be organized in depth. Reserves must be positioned and prepared to replace lead elements or to exploit success wherever it is achieved. Fire support must be flexible to meet all contingencies.

Usually, attack planning begins with the receipt of a mission. Tasks needed to accomplish the mission are developed in estimates by the supported commander and his staff, to include the FSCOORD. Usually, a mission is translated into the seizure of certain objectives to accomplish the mission.

In designating objectives for the attack, commanders consider the factors of METT-T. Once objectives are selected, the scheme of maneuver and the allocation of forces and fire support can be determined.

The scheme of maneuver seeks to gain a position advantage over the enemy, to close with him quickly, and to destroy his capability to defend. The attack may be oriented against the front, flanks, or rear of the defender. It may be conducted from the ground, the air, or both. The specific form is determined after METT-T are considered. The scheme selected must promise the quickest possible seizure of the objective. It must facilitate future operations. The scheme identifies where the main attack is made and the provisions for exploiting success when it occurs. In the attack, the maneuver commander must be prepared to shift his main attack to exploit unanticipated successes elsewhere.

In some cases, the enemy situation may be so obscure that the supported commander may **not** designate a main attack until the situation develops.

The allocation of forces and fire support is determined concurrently with the scheme of maneuver. Combat power is concentrated against enemy weaknesses. Commanders weight the main attack by positioning reserves to reinforce the main effort, by assigning a narrower zone to the main attack force, or by assigning priority of fires and other support to the main attack.

The reserve is one of the commander's principal means of influencing the action once the attack is under way. It is used to reinforce success in the attack. Usually, the reserve is positioned near the area in which it is most likely to be committed. The FSCOORD ensures that fire support for the reserve, when committed, is planned.

The fire support plan provides for fires that directly support assault elements and for fires in general support of the entire force. Provisions are included for support of the reserve when committed. An important consideration in deliberate attack planning is the decision on whether to fire a preparation. This decision is based on the need for surprise, knowledge of the enemy strength and dispositions, NBC protection requirements, available munitions and/or weapon systems, and the results desired from the preparation.

FSCOORD Activities

FSCOORD activities to support a deliberate attack at company, battalion, and brigade levels are discussed in the following table.

FSCOORD ACTIVITIES IN A DELIBERATE ATTACK

COMPANY	BATTALION	BRIGADE
Adequate fire support planning time is usually available. The company FSO receives guidance on the attack plan from the supported commander. Forward observers are given the necessary planning guidance. Fire support targets are received from the battalion and analyzed. The company FSO adds any other targets he has already developed on the basis of the company scheme of maneuver. The refined target list is then transmitted back to battalion. The company FSO develops the company fire support plan. The company FSO keeps the company commander, subordinate FOs, and supervising FSOs informed of changes in the fire support situation.	The battalion FSO helps the supported battalion commander develop the attack plan. He supervises the functioning of the FS cell and the subordinate FISTs. He receives targets from the brigade FSO, modifies them as necessary, and adds targets that he already developed which are of concern to the battalion commander. He forwards the target list to subordinate company FSOs. Refined target lists developed by battalion and company FSOs are transmitted to brigade. The battalion FSO develops the task force fire support plan. He recommends sectors of search for target acquisition means. He keeps the battalion FDC informed.	The brigade FSO helps the brigade commander develop his attack plan by recommending fire support for it. He receives targets from division. With other members of the staff, he develops additional targets in the brigade zone and transmits the target list to the battalion FSOs. Additional targets received are resolved, prioritized, and transmitted to the DS battalion. He supervises the functions of the brigade FS cell. He develops the brigade fire support plan. He supervises the activities of subordinate FSOs. He keeps the parent FA organization informed of brigade attack plans and changes as they occur. He recommends the allocation of fire support.

Fire Support Planning

Fires are planned to support maneuver phases of the operation. Groups and series are planned to support the movement. Suppressive fires are planned on enemy overmatching direct fire systems to help maneuver direct fire systems engage them. Smoke is planned to screen movement, obscure vision from enemy OPs, and help in breaching operations. Preparation fires should be planned and may be executed at the commander's discretion. During the attack, immediately responsive fires are provided to the lead elements by assigning priority of fire support. Consolidation of the objective is supported. Fires must be planned beyond the objective to prevent reinforcement of the enemy and to defeat enemy counterattacks. A hasty attack or defense is planned. Throughout the operation, the attack of deep targets is planned to block movements of reserves and follow-on forces into the close-in battle area. The FSCOORD at each level must ensure the adequacy of fire support for his level. Actions for fire support planning in the deliberate attack at company, battalion, and brigade levels are discussed on the next page.

Positioning of Fire Support Assets

Some of the positioning considerations for fire support assets supporting a deliberate attack are discussed on the next page.

FIRE SUPPORT PLANNING IN A DELIBERATE ATTACK

COMPANY	BATTALION	BRIGADE
Fire support usually consists of field artillery and mortars. Targets are developed at the platoon and company headquarters in addition to targets sent down from the battalion FSO. Usually, a fire support execution matrix serves as the company fire support plan. Targets for indirect fire weapons are passed to the appropriate FDCs. Requests for air support and additional fires go to the battalion FSO. On-call targets are updated as needed.	Fire support available usually includes FA and heavy mortar fires. Naval gunfire ships and tactical air support aircraft may also support. The battalion fire support execution matrix may constitute the fire support plan at this level. Targets planned at lower levels are used to refine target lists developed at battalion and higher levels. If additional fire support is needed, requests are passed to the brigade FSO. Targets to be fired by outside agencies (such as Navy or Air Force) are passed to their liaison representatives in the FS cell for action. On-call targets are updated as needed.	Development of fire support plans tends to be more formal than at lower levels. Target lists are developed, and targets are passed to appropriate battalion FSOs and firing agencies through the liaison representatives in the brigade FS cell. Targets received from lower levels are used as refinement for the brigade fire support plan. Requests for additional fire support are passed to the division (div arty CP for FA fires and division main FS cell for other types of support). The brigade FS cell prepares the fire support plan (usually a portion of the brigade OPORD).

POSITIONING OF FIRE SUPPORT ASSETS IN A DELIBERATE ATTACK

COMPANY	BATTALION	BRIGADE
The weapons of concern at this level are the company mortars. They are usually positioned well forward to exploit their range and to preclude early displacements. FO parties are positioned with the platoons to cover platoon sectors.	Positioning concerns center on the heavy mortars at this level. On occasion, field artillery and NGF ships may be in direct support of the maneuver battalion task force. These weapons are positioned to cover as much of the area of operations as possible. Target acquisition means are positioned to cover as much of the task force sector as practical.	Direct support field artillery, to include the AN/TPQ-36 radar if available, is positioned well forward to support the deliberate attack. Displacements of field artillery should ensure continuous FA support. TACAIR assets may be placed on ground alert to increase their responsiveness.

Fire Support Coordinating Measures

These measures are used in the deliberate attack to facilitate attack of the enemy and provide safety for friendly troops. At all levels, fire support coordinating measures in effect are posted to maps, charts, and overlays. Actions to implement fire support coordinating measures at each level are discussed on the next page.

FIRE SUPPORT COORDINATING MEASURES IN A DELIBERATE ATTACK

COMPANY	BATTALION	BRIGADE
Normally, the company does not establish fire support coordinating measures; however, it does adhere to those established by higher levels. The company FSO keeps the platoons informed when changes occur.	Fire planners adhere to existing fire support coordinating measures established by higher levels. Occasionally, the parent brigade may direct the lead battalion or task force to establish a coordinated fire line. All existing measures are disseminated to lower level FSOs as are changes to these measures.	Normally, the brigade commander establishes a brigade CFL and advances it as the attack moves forward. The division main FS cell and FS cells with adjacent and lower levels are kept informed of changes in fire support coordinating measures. The brigade FSCOORD recommends the locations for brigade-established measures.

Exploitation

Description

Exploitation follows an attack and is initiated from an attack formation. Exploitation forces usually go for deep objectives. They seize command posts, sever escape routes, and hit reserves, field artillery, and combat support units. Exploitation forces keep the enemy from reconstituting an effective defense. Field artillery movements and positions are carefully planned and coordinated.

Supported forces drive swiftly for deep objectives. The force should be large, fairly self-sufficient, and well supported by combat support assets. It should be able to change direction quickly.

Decentralized execution is characteristic of an exploitation. However, the major command must retain enough control to preclude an overextension of its force.

Forces in the exploitation usually advance rapidly. Actions are characterized by speed, boldness, responsive fire support, and speedy commitment of reserves.

Follow-and-support forces may be used in exploitation and pursuit actions. These forces –

- Widen or secure the shoulders of a penetration.

Ž Destroy bypassed enemy forces.

- Relieve supported units that are halted to contain enemy elements.
- Open and secure lines of communication.
- Guard prisoners and key areas or installations.
- Control refugees.

The exploiting force clears only as much of the assigned sector as necessary to permit the advance to continue. Threat forces that interfere or can interfere with exploiting forces are destroyed. Others are bypassed and reported to the next higher headquarters. Occasionally, some forces may remain to fix enemy pockets of resistance until relieved by follow-and-support elements.

FSCOORD Activities

The FSCOORD activities at any level to support an exploitation include the following:

- Continuously coordinate with the FSCOORD of the follow-and-support force to identity bypassed enemy elements and to pass fire support tasks.

- Anticipate situations that would require rapid transition to more centralized fire support.

Ž Ensure that ammunition, supplies, and maintenance are moved forward with the exploiting fire support means.

- Plan for a hasty attack.

- Use on-order CFLs to quickly activate them. Restrictive fire lines (RFLs) may be necessary between the direct pressure force and the follow-and-support force.

Once brigades begin their exploitation, the division need for highly centralized control and deliberately planned massed fires decreases. There is an increase, however, in the need for highly mobile, flexible fire support that is responsive to the needs of the exploiting brigades. Fire support tasks for the exploitation include–

Ž Suppression of bypassed pockets of enemy resistance.

- Support for maneuver elements left behind to fix bypassed enemy.

- Support for hasty attacks against the enemy that cannot be bypassed.

Ž Fires to prevent counterattack by enemy forces.

- Deep fires to block the retreat of enemy forces and to prevent enemy reinforcements.

Ž Counterfires on enemy indirect and air defense weapon systems.

Fire Support Planning

Fire support may include TACAIR and attack helicopters in addition to field artillery.

TACAIR. An exploiting brigade should be allocated as many TACAIR sorties as division can afford. These aircraft can –

- Operate wide and deep, given at least air parity.

Ž Seek out, follow, and destroy withdrawing enemy forces.

Attack Helicopters. When task-organized by division, attack helicopters can accomplish missions similar to those of TACAIR. However, the refueling and rearming burden remains a division task.

Field Artillery. Fire planning for the exploitation may be fairly detailed for the first few kilometers beyond the penetration zone. After that point, however, it is hasty and informal, orienting on the rapid attack of targets of opportunity. It is done primarily by company and battalion FSOs.

If an exploiting maneuver element meets a pocket of resistance that can be bypassed, supporting field artillery may have to place continuous suppression fires on the bypassed enemy until the supported element is safely past. In other situations, the supported element may have to leave a task force in position to fix the bypassed enemy force while the exploitation continues. The FSCOORD with the exploiting element must then arrange for fire support for the stay-behind force.

The FSCOORDs at battalion and brigade levels must continually anticipate and plan for hasty attacks in case major resistance is met and cannot be bypassed.

Positioning of Fire Support Assets

Because of the speed inherent in the exploitation, positioning of fire support weapons is extremely challenging. Both weapons and target acquisition assets must be

positioned to meet the needs of supported forces. The speed of an exploitation limits use of many TA assets because of emplacement and displacement times. Hasty survey techniques are normal. Naval gunfire ships, if available, are positioned to exploit the ranges of their weapons. Supporting aircraft may be on ground or air alert to enhance their responsiveness.

Fire Support Coordinating Measures

The brigade FSCOORD closely monitors the progress of exploiting elements to ensure that fire support coordinating measures are updated quickly. Usually, the FSCOORD recommends that the CFL be kept well forward. Locations for the advancing friendly units are constantly changing, and all fire support in the objective areas must be closely coordinated.

Pursuit

Description

Pursuit, like exploitation, may also follow an attack and is started from an attack formation. The pursuing commander keeps constant pressure on the enemy to prevent his orderly withdrawal. Fire support helps maintain this pressure by timely field artillery movements and positioning. Follow-and-support forces may be used as in the exploitation.

The pursuit to destroy a retreating enemy is an extension of the exploitation. Its purpose is to cut off the enemy and completely destroy him. The force commander quickly commits all available elements to pursue when the enemy can no longer operate effectively and tries to flee.

Forces conducting a pursuit continue direct pressure with one element on a broad front against the enemy. Another highly mobile encircling element cuts the enemy's line of retreat to intercept and destroy him. If the encircling force cannot outdistance the enemy, it attacks the enemy's main body on its flank.

Air assault forces may secure key terrain in the path of the retreating enemy to block his escape routes. Fire support strikes deep and concentrates on escape routes and enemy reserves.

In many respects, fire support for the pursuit is similar to that for the exploitation. The main differences are explained by the single goal of the pursuit, which is to **destroy the enemy.** Rapid advances on multiple routes characterize both operations. However, in the pursuit, the objective is to bring the elements together to destroy the enemy.

The fire support system must be flexible enough to allow independent support for both the direct pressure forces and the encircling forces during the pursuit yet allow coordinated employment to destroy the enemy after he is trapped.

FSCOORD Activities

Tasks for fire support in the pursuit are discussed below.

The direct pressure force is supported as follows:

- Fires are placed on retreating enemy units to slow, erode, demoralize, and destroy them.
- Enemy rear guard and strongpoint elements are suppressed so that they can be bypassed and contact with the main force can be maintained.
- Fires from all fire support means are massed on enemy forces concentrated around choke points, defiles, communications centers, and bridges.

The encircling force is supported as follows:

- Enemy positions are suppressed with smoke, HE, and improved conventional munitions (ICM) so that the enveloping force can bypass them.

- Fires support the encircling force flank attack if it is unable to outdistance the enemy's main body.

The converging direct pressure and encircling forces are supported by massing fires from all fire support means to destroy the trapped enemy.

Fire Support Planning

Like for the exploitation fire planning for the pursuit is primarily hasty and informal.

Fire Support Coordinating Measures

The most critical coordination problem facing the FSCOORD of a pursuing element occurs when the direct pressure and encircling forces converge on each other to destroy the enemy. The FSCOORD must ensure that all fires concentrate on the trapped enemy. Normally, an RFL is placed between the two converging friendly forces to ensure smooth and safe coordination of fires.

Special Offensive Operations

Ambush

An ambush is a surprise attack by fire from concealed positions on a moving or temporarily halted enemy. It is an excellent technique to destroy enemy forces if intelligence about enemy dispositions and intentions is limited.

Fire support for the ambush includes the following:

- Fires planned along reconnaissance routes. These should be fired only if surprise is lost. They include identifying or marking fires and smoke for screening-or obscuring.
- Fires in support of the deception plan.
- Fires planned on checkpoints, rally points, rendezvous points, and along planned withdrawal routes.
- Fires planned to support primary and alternate ambush positions.
- Blocking fires to keep the enemy force from escaping.

An FO should go with the ambush force. If that is not possible, a communications net for calls for fire must be established and monitored by the appropriate fire support personnel or agency.

Raid

A raid is an operation, usually small-scale, involving a swift penetration of hostile territory to secure information, to confuse the enemy, or to destroy his installations. It ends with a planned withdrawal upon completion of the assigned mission.

Feint

A feint is an offensive operation intended to draw the enemy's attention away from the area of the main attack. This induces the enemy to move his reserves or to shift his fire support in reaction to the feint. Feints must appear real; therefore, some contact with the enemy is required. Usually, a limited-objective attack ranging in size from a raid to a supporting attack is conducted.

Reconnaissance in Force

A reconnaissance in force is a limited-objective operation conducted by at least a battalion task force. Its purpose is to get information and to locate and test enemy dispositions, strengths, and reactions. Even though a reconnaissance in force is executed primarily to gather information, the force conducting the operation must seize any opportunity to exploit tactical success. If the enemy situation must be developed along a broad front, the reconnaissance in force may consist of strong probing actions to determine the enemy situation at selected points.

Section III. FIRE SUPPORT PLANNING FOR THE DEFENSE

Purpose of Defensive Operations

The purpose of any defense is to defeat an enemy attack and gain the initiative for offensive operations. Light forces defend to deny the enemy, the initiative and as a prelude to offensive operations. The use of superior positions, terrain positioning, and fighting the enemy throughout the depth of his formation set the stage for successful offensive operations. The key to defense is depth. Light forces must be able to attack the enemy throughout his formations from positions that are mutually supporting and arrayed in depth.

Types of Defensive Operations

The most traditional defensive operations are those characterized by the use of control measures. They include–

- Defend in sector.
- Defend from a battle position.
- Defend from a strongpoint.

Ž Perimeter defense.

Battalions and above are normally given the mission to defend in sector, leaving the commander the most latitude to develop his own defensive plan. Battalions may be given one of the more restrictive or defined defensive missions, but these are normally reserved for smaller units.

Defend in Sector

The most frequent and least restrictive defensive operation that a commander may receive is to defend in sector. It requires him to defend in an area defined by two lateral boundaries – a rear boundary and the forward edge of the battle area (FEBA). The unit may defend forward in sector, denying enemy penetration or simply countering enemy attempts to infiltrate it may defend to draw the enemy into the sector to expose his flanks and rear to attack. Also, light infantry defend-in-sector operations may be defending river-crossing sites; denying road or trail use in an area; or forcing an enemy to dismount by impeding mechanized movement along a major, high-speed avenue through close terrain. Regardless of the specific mission, when assigned a defend-in-sector operation, the commander is responsible for the positioning and maneuver of his force. Coordination is made with the units on both flanks to ensure that fields of observation and fire overlap and that there are no gaps in the defense.

Defend From a Battle Position

Defend from a battle position is used when the terrain is suited to concentrating fires. Battle positions are normally used when key terrain must be held or when the position commands a good engagement area. Obstacles are used to slow the enemy and canalize him in the engagement area in such a reamer that the battle position units can engage targets from the flanks and rear.

Defend From a Strongpoint

A strongpoint defense is unique because it is a mission, a technique, and a control measure. A unit can defend from a strongpoint, but the planning and preparation for this mission are time- and resource-intensive. The enemy cannot bypass or reduce the strongpoint without expending excessive resources and time. It is essentially an antiarmor nest. Because of the nature of the operation, strongpoints are located in restrictive terrain – such as urban areas, mountains, and thick forests – that cannot be bypassed easily. Since the defending unit must keep the enemy from bypassing or reducing the strongpoint, priority tasks for engineers are countermobility and survivability. The strongpoint is defended until the defending unit is formally relieved by the commander directing the defense.

Units may be directed to construct a strongpoint as part of a larger overall defensive plan. To do this, the defending unit must be augmented with extensive engineer support, additional key weapon systems, pioneer tools, additional transportation assets, and CSS resources. To offset some of the support requirements, the commander may decide to take advantage of an existing obstacle, such as a town or village, to reduce the time required to develop a strongpoint.

Strongpoints may be on the FEBA or in the depth of the battle area. The commander makes that determination on the basis of the time and resources available, the availability of engineer support, the terrain available to serve as the choke point and his ability to tie the choke point into the rest of the defense.

Several aspects of the strongpoint defense are critical. The following aspects are incorporated into the overall plain:

- Covered and concealed routes are constructed or planned between positions, along routes of supply and communication, and to support counterattacks and maneuver within the strongpoint.

- Food, water, ammunition, pioneer tools, and medical supplies are stockpiled in each fighting position.

- The strongpoint is divided into several independent but mutually supporting positions or sectors. If one of the positions or sectors must be evacuated or is overrun, obstacles and fires limit the enemy penetration and support a counterattack.

- Obstacles and minefield are constructed to disrupt and canalize the enemy formations, to reinforce fires, and to protect the strongpoint from assault. The obstacles and mines are placed as far out as friendly units can observe and cover with fire, within the strongpoint itself, behind the strongpoint, and at points in between where they will be useful.

Ž Several means of communication within the strongpoint and to higher headquarters are planned and tested. They include radio, wire, messenger, pyrotechnics, and other signals.

- The strongpoint is improved or repaired until the unit is relieved or withdrawn. Additional positions can be built tunnels and trenches can be dug existing positions can be improved or repaired and barriers can be built or fixed.

- The strongpoint position itself must be an obstacle to enemy mounted movement.

A strongpoint may be part of any defensive plan. It may be built to protect vital units or installations around which more mobile units maneuver, or it may be part of a trap designed to destroy enemy forces that attack. It may be in an urban area or in a wilderness.

Urban areas are easily converted to strongpoints. Stone, brick or steel buildings provide cover and concealment. Buildings, sewers, and some streets provide covered and concealed routes. Buildings can be rubbled to provide obstacles. Telephone systems can provide communications.

Nonurban areas are also used as strongpoints. Normally, they are constructed by digging into the earth. Sometimes parapets may be built. However, in most cases, concealment should not be sacrificed to provide cover. The strongpoint is molded to the terrain and uses natural camouflage and obstacles. Mountains, rivers, swamps, and forests can support formidable strongpoints.

Perimeter Defense

The perimeter defense is conducted in the same manner as defense from a battle position, except the perimeter defense orients on 360 degrees. The perimeter defense is often used as a light infantry technique.

While a battle position can allow for some penetration, a perimeter defense cannot. Perimeter defenses protect the force, hold specific terrain or protect a key installation from destruction by ground attack or infiltration. In the perimeter defense, the flanks of all units are tied together to provide mutual support.

If the perimeter is penetrated, the reserve blocks the penetration or it counterattacks to restore the perimeter. Units obtain depth by planning positions in depth. Antiarmor weapons are positioned on the most likely enemy avenues of mounted approach. Mortars are usually positioned in the center of the perimeter and can fire 360 degrees. Perimeters may defend assembly areas, specific installations or equipment (such as CPs, downed aircraft, bridges, airfields, and roadblocks), or key terrain; or they may be part of a larger unit perimeter, airheat or lodgment.

Patrols provide early warning and harass the enemy.

Fire Support for Defensive Operations

General fire support considerations for the defense apply to all defensive operations discussed above. Key is the application of fire support as early as possible throughout the entire defensive sector in support of the defensive battle plan.

Fires Forward of the Main Battle Area

Counterreconnaissa nce fires are planned to deny the enemy information about friendly forces. The following considerations apply:

- Fires are executed on reconnaissance (recon) and intelligence-gathering elements (the combat recon patrol and forward security element).

- Fires should be planned to support the forward recon or scout elements according to their mission guidance from the commander. Fires should be planned to help these elements move and disengage as they fall back.

- Augmentation of forward elements with observers or additional target acquisition assets may be required.

- Laser-guided munitions, guided by COLTS placed forward or by aerial fire support systems, may be used in the counterreconnaissance effort. If COLTS are employed their proper positioning to support the commander's intent will be key.

Fires are planned to develop the situation early by forcing early deployment by the enemy. Actions that contribute to early deployment are as follows:

- Engage the enemy at the maximum effective range of available fire support systems.

Ž Ensure observers are in forward positions to be effective; they may be placed in key positions overmatching avenues of approach.

- Plan fires to delay enemy advances and to cause enemy armor or mechanized elements to button up.

- Canalize the enemy into choke points and preplanned, long-range engagement areas; plan to mass fires on choke points and engagement areas to inflict maximum early casualties.

- Plan fires to isolate lead echelons from follow-on forces. This makes it easier for friendly maneuver forces to defeat the enemy in sequence. Plan smoke and FASCAM, if available, behind enemy forward elements and in front of follow-on forces.

Ž Engage high-payoff targets in follows forces early to disrupt enemy operations.

- Plan a counterpreparation, which may be executed at the commander's discretion.

- If a covering force is deployed forward of the main battle area (MBA), coordinate fires on targets in the security area with the covering force.

Ž Plan TACAIR on known, likely, or suspected enemy locations.

Fires in the Main Battle Area

Throughout the Depth of the Main Battle Area. As the enemy moves into the MBA use fire support to force him to deploy early, revealing his main attack. Contingency plans must be made to reallocate fire support assets once the main attack is identified. Plan fires throughout the depth of the MBA as follows:

- Mass fires to delay, disrupt, and destroy the enemy throughout the sector.

Ž Plan supporting tires, smoke, suppression fires, and priority targets along withdrawal routes.

Ž Plan fires to help maneuver move and disengage from enemy forces as they fall back through the MBA.

Planned Engagement Areas. Plan fires as follows in support of planned engagement areas:

- Use fire support to canalize the enemy into choke points and/or engagement areas.

- Plan groups for simultaneous engagement of enemy within the engagement area.

- Plan series to preclude the enemy's movement out of the engagement area and to keep him moving under continuous fire.

Ž Consider an illumination schedule over the engagement area.

Ž Plan massed fires to inflict maximum casualties on enemy within the engagement area.

- Plan TACAIR and the airspace management requirements for its employment.

- Consider the use of attack helicopters in a fire support role.

Support of the Obstacle Plan. Plan fires in front of, on top of, to the sides of, and behind obstacles to maximize their effect as combat multipliers. These fires may be shifted from one or more planned targets, depending on the size of the obstacle. Plan fire support as follows:

- Plan fires far forward of obstacles to disrupt enemy formations, to separate attacking echelons, and to force enemy deployment into forward engagement areas. As the enemy approaches an obstacle, massed fires and priority targets maximize casualties on enemy elements halted or bunched by the obstacle.

- Plan fires on top of obstacles to hinder breaching attempts and to destroy breaching teams or equipment, including lane markers. The commander must consider the effects of these fires on the obstacle itself when deciding to fire on top of it.

- Plan fires to the sides of obstacles to hinder enemy attempts to bypass obstacles.

- Plan fires behind the obstacle to destroy the enemy piecemeal as he passes through the obstacle, to support the withdrawal of friendly elements, and to force the enemy into another engagement area.

Ž Consider smoke to support the obstacle plan. Fired in front of the obstacle, smoke obscures the obstacle from the enemy. Fired on top of and to the sides of the obstacle, smoke hinders breaching or bypassing efforts; it silhouettes the enemy for overwatching elements if the enemy succeeds in breaching or bypassing.

- Devise an observation plan that provides for continuous observation (to include periods of limited visibility) from multiple vantage points.
- Designate redundant responsibilities for executing fires in support of obstacles and primary and alternate communications means.

Ž Defensive Fires Plan defensive fires as follows:

- Integrate indirect fire support into direct fire defensive plans,
- Suppress enemy direct and indirect fire weapons.

Ž Assign priority targets and final protective fires to battle positions strongpoints, or perimeter defenses to preclude the enemy's breaching of defenses.

Ž Consider the use of appropriate fire support coordinating measures to facilitate attack of the enemy.

- Make contingency plans to reallocate fire support assets to strengthen vulnerable areas. On-order priorities of fire must be designated and TACAIR must be planned to support contingencies.

Support of the Hasty Attack. The opportunity to counterattack may appear quickly, Plan continuously to support a hasty attack:

- Use quick fire planning techniques as planning time will be limited.

Ž Place CFLs close to forward units to open up the area for rapid engagement of the enemy.

Section IV. SPECIAL TECHNIQUES

This section Implements STANAG 2082, Edition 5.

Delay

Description

The delay trades space for time while inflicting maximum punishment on the enemy without becoming decisively engaged. The delaying force selects positions that provide long-range observation and fields of fire. Thus, friendly forces can engage the enemy at long ranges and bring him under increasingly heavy fires as he maneuvers toward friendly positions. The delaying force seeks concealment and cover for delaying position assembly area and routes of movement. It occupies battle positions long enough to cause the enemy to deploy and to allow the delaying force to develop the situation and maneuver to an attack position. The delaying force normally deploys to the next delay position before becoming decisively engaged.

Fire Support Considerations

Fires are planned to engage the enemy early, before he gets to the battle positions, to inflict casualties and disrupt his approach to the positions. Massed fires on high-payoff targets and canalizing terrain are planned. Enemy reserves and logistic sites are engaged to reduce the ability of the enemy to support the attacking force.

All fire support assets must be used to support the forces as they proceed to the rear. Priority targets are planned and designated as are fires along the route from the old position to the next position. Observers are placed in position to support the displacing force. COLTS may be needed to provide the degree of support necessary. All assets are used to support the movement. Smoke may be used to screen the movement.

Fires must be planned in front of, on top of, and to the sides of the battle position to engage the

enemy immediately before his attack of that position. Also, FPFs should be planned.

Fires must be planned for the disengagement. Specifically, massed fires on likely and known enemy positions and smoke should be planned. Use of the COLT can help in this.

At some time during the battle, the enemy may become particularly vulnerable. The commander may decide to conduct a counterattack. There may be enough planning time to use quick fire planning procedures. Otherwise, the FSO must be prepared to shift and mass fires. He must plan continuously. If the counterattack is going to be more than a limited one, the FSO must be prepared to reallocate assets in support of it.

Withdrawal

Description

During a withdrawal, all or part of a force disengages from the enemy and moves away in an organized manner. A withdrawal may occur under enemy pressure or not under pressure, It may be executed during daylight or darkness. When withdrawing from the enemy, it is important to put distance between the disengaging force and the enemy as quickly as possible, preferably without the enemy's knowledge. Withdrawal is best done under the cover of darkness or limited visibility, even though command and control is more difficult. Smoke helps conceal the operation. In the case of the withdrawal under enemy pressure, the commander will leave an overmatching force, a covering force, or a detachment left in contact (DLIC) to maintain contact with the enemy and keep him from spoiling the withdrawal. The DLIC may have to perform a delay to keep enemy forces from engaging friendly forces at this critical time.

Fire Support Considerations

Withdrawal Without Enemy Pressure. Ideally, the maneuver force will be able to withdraw without enemy pressure. In such a case, the commander will want to use a deception plan to make it look as though the force is still in contact with the enemy. The withdrawal may be detected by the enemy. Therefore, the FSCOORD must be prepared to support a withdrawal under enemy pressure.

Wlthdrawn Under Enemy Pressure. If the force must withdraw under enemy pressure, the DLIC must be given maximum fire support to help in the disengagement. Suppression of enemy direct fire systems and the use of smoke to obscure enemy OPs must be planned. Because of terrain considerations, smoke may be required to screen friendly movement. TACAIR and attack helicopters in a fire support role may be used to provide effective support.

Barriers and obstacles become critical to the success of the operation. Massed fires in support of barriers and obstacles and the use of smoke can severely restrict enemy movement.

Passage of Lines

Description

A passage of lines is conducted to allow a moving unit to pass through a stationary unit. It can be conducted in offensive or defensive operations. During this passage, both units are temporarily concentrated in the same area and are, therefore, vulnerable to enemy action. The normal confusion of combat is increased by having two units in an area where only one was before. Therefore, extremely detailed planning and coordination are required. A passage of lines is rarely a specified mission; rather, it is usually an implied task.

Planning

Extremely detailed planning is required for a passage of lines to avoid unnecessary casualties and damage to equipment and to deceive the enemy. The aspects of planning that the FSCOORDs of the stationary **and** passing forces must be concerned with are discussed below.

Control Measures. The following data must be passed between the forces involved:

Ž Location of passage lanes.

Ž Location of passage points.

• Location of contact points.

• Recognition signals.

• Attack positions or assembly area (in a forward passage).

• Routes (start points [SPs] and release points [RPs]).

Ž Location of CS and CSS units (in a rearward passage).

Transfer of Control. The commanders of the two forces decide when transfer of control will be effected. Most often it will be determined by event; however, the commanders may select a time (H-hour) to effect transfer of control. This transfer of control impacts on fire support (that is, the mission changes from DS to GS, GSR or reinforcing [R] or from GS, GSR, or R to DS). Also, responsibility for fire support coordination passes from the FSCOORD of the force in contact to the FSCOORD of the passing force at H-hour (or event). In a fluid situation which will be the norm, this transfer of control will probably not occur across the front at the same time. Therefore, it must be planned for and procedures established such as for collocation of DS battalion CPs, to ensure smooth transition.

Targeting. Targeting is similar for forward and rearward passages of lines.

For a forward passage of lines –

• Screen enemy forward observation of passage.

• Plan groups and/or series of targets on enemy direct fire systems, command and control, indirect fire systems, TA systems, and AD.

Ž Plan fires to support the deception plan.

• Plan smoke to screen friendly movement through passage points.

• Plan fires to interdict enemy counterattacks in the area of passage and reinforcements.

• Emphasize massing indirect fires.

• Ensure the stationary force supports the close battle while the passing force indirect fire assets move through.

• Ensure counterfire is planned and controlled by the stationary force.

• Position COLTS of both forces to designate targets for precision guided munitions.

• Plan fire support coordinating measures.

• Use aerial fire support observers (AFSOs) to cover dead space and flanks.

• Ensure the passing force plans fires to support operations after the passage of lines.

For a rearward passage–

Ž Plan smoke to conceal movement through passage points.

Ž Plan fires to disengage forces.

• Plan fires to support the obstacle and barrier plans.

• Plan fires to support the deception plan.

• Plan fire support coordinating measures.

• Ensure the stationary force supports the close battle while the passing force indirect fire assets move through.

Ensure counterfire is planned and controlled by the stationary force.

Plan fires on the passage points to be fired after friendly units have passed through.

Ensure the stationary force plans fires to support operations after the passage-of lines.

Positioning of Field Artillery

Positioning is a critical task in the support of a passage of lines.

Forward Passage. The field artillery of the passing force should be infiltrated from the rear assembly area to the designated primary positions to support the operation. These positions should be near the passage lanes but not so close that they interfere with the maneuver force movement. On a forward passage, position priority goes to the passing force. During the passage of lines the passing force FS cell and/or CPs collocate with the stationary force FS cell and/or CPs. The FSCOORD must coordinate FA position areas with the maneuver commander. Position areas forward of the passage points are away from the passage points. Their selection is based on the anticipated rate of movement of the maneuver forces and terrain availability.

Rearward Passage. The field artillery of the stationary force should be positioned well forward to provide deep fires to support the withdrawal of the passing force. Again these positions should be away from passage lanes. In the rearward passage, the stationary force has positioning priority. As the passing force artillery moves through, it should position behind the stationary artillery and move laterally away from the passage lanes.

Coordination

Close cooperation and coordination of plans between the commanders and staffs of the involved forces are mandatory. Once the passage of lines is ordered, the FSCOORD of the passing force in a forward passage of lines needs to send a liaison section to the FSCOORD of the force in contact. In a rearward passage, the FSCOORD of the stationtary force needs to send a liaison section to the FSCOORD of the passing force. The FSCOORDs define and assign mutually agreed upon fire support responsibilities to facilitate the passage. It is important to remember that each unit will be in the area of responsibility of another unit for a period of time and that detailed coordination is vital to ensure each unit understands how the other operates. The two FSCOORDs need to share information and coordinate as follows:

- Exchange unit SOPS, and resolve differences in operating procedures.
- Exchange existing targets and fire plans.

Ž Describe unit target acquisition assets.

- Exchange high-payoff target matrix, attack guidance, and casualty criteria.
- Exchange control measures in effect; for example, passage points, passage lanes, and contact points.
- Exchange fire support coordinating measures currently in effect and those that will be in effect.
- Coordinate recognition signals.

Ž Provide information on obstacles and barriers.

- Coordinate position areas.

Ž Provide met information to passing force.

- Provide available survey control to passing force.
- Exchange SOIs, and resolve communications differences; for example, frequencies, call signs, and challenge and password.

• Coordinate security measures in effect.

• Exchange intelligence.

Deliberate River Crossing

Maneuver Tasks and Events

In the deliberate river crossing, maneuver tasks are as follows:

In the **advance to the river–**

• The crossing site must be secured.

• Control measures must be established.

Ž Control must be transferred from the assault force to the crossing area commander, who controls the movement within the crossing area.

In an **assault crossing of the river –**

• Support forces develop crossing sites emplace crossing means, and control unit movement into and away from the crossing sites.

• Defensible terrain is secured on the exit bank The area must be large enough to accommodate the assault force and other essential elements.

• Follow-up forces provide overmatching direct and indirect fire support crossing site security and follow-and-support assistance to the assault force.

In the **advance from the exit bank–**

• Assault forces lead, making the initial assault of the river and continuing to attack from the exit bank.

• Support forces help the assault forces to the objective.

• The assault force may make a hasty or deliberate attack from the exit bank.

In **securing the bridgehead,** CSS elements sustain the assault and subsequent advance to the bridgehead. When the bridgehead is secured, the river crossing is complete.

Fire Support Considerations

Fire Support Tasks. The following are fire support tasks in the deliberate river crossing:

Ž Make fires immediately available to crossing forces.

• Assign priority of fires to assault forces.

• Plan smoke and suppression fires in greater than normal amounts if necessary.

Ž Use smoke to screen both actual and dummy crossing sites.

Ž Use smoke to obscure enemy direct fire positions in the bridgehead area until the crossing forces can engage them.

• Suppress enemy forces in the bridgehead area until the assault force can provide its own suppressive fires.

• Follow river-crossing SOP in planning fire support.

• Use all available targeting assets to develop targets in the bridgehead area. A direct link between TA assets and supporting artillery should be considered.

Ž Use target value analysis to help develop high-value targets and facilitate effective engagement of high-payoff targets.

Ž Ensure that DS and reinforcing units move into the bridgehead area as soon as feasible behind the assault force. This maximizes range capability of the weapon system and enhances coordination.

NOTE: Movement by battalion is appropriate If reinforcing FA is available.

Command and Control. Maneuver forces may move into temporary defensive positions pending the crossing. The massed units at the crossing site are vulnerable to indirect fire and counterattack. Fire support must be planned accordingly.

Procedures to request, control, and coordinate fires must be designated to provide continuous fire support when DS artillery battalions cross the river. The following considerations apply:

- Designate and disseminate on-order fire support coordinating measures.
- Ensure that advance coordination, between GS and DS units addresses C3 considerations to facilitate a smooth transition.

Ž Include all FS cells in the planning process.

Fire Support Planning and Coordination. The width of the crossing area will affect the planning. The amount of time necessary to cross a river – hence, the vulnerability of the crossing force –will affect the types and volume of fires requested.

Prepare fire plans to soften enemy defenses at crossing sites and to seal off far bank positions. Fire planning should include the following:

- Fires to facilitate the assault force securing the exit bank.
- Preparations, groups, and series to support the operation as the assault force secures the bridgehead.
- On-order fire support coordinating measures.
- Interdiction fires to isolate the bridgehead area from enemy reinforcement.

Plan smoke to obscure actual and decoy crossing sites and to screen friendly movements. Mortars and artillery may be used to establish a smoke screen on the enemy side of the river. Smoke pots and generators will be required to establish large-area screens and to sustain a smoke screen to support the operation.

NOTE: Smoke created by almost any means will pinpoint the area. Smoke used in river crossings will draw the enemy's attention; therefore, it is important that the smoke screen extends over enough of the area so that the actual point of crossing is not obvious to the enemy.

Relief in Place

Description

Supported maneuver forces conduct a relief in place to remove units from combat. A deployed force is replaced by another unit, which assumes the mission and the assigned sector or zone of action of the outgoing unit.

The relief in place is executed in stages, from front to rear or rear to front. The incoming unit assumes the general defense plans of the relieved unit.

Secrecy is vital to success, as the operation must be conducted without weakening security. Normal patterns of activity must be maintained to deceive the enemy. The relief in place must be executed expeditiously, and it is normally conducted at night or during periods of limited visibility.

The following principles apply to all relief operations:

- The relief sector remains under the control of the outgoing commander until all his forward elements are relieved (or as mutually agreed upon or directed).

Ž Normally, the CP of the incoming commander is collocated with that of the outgoing commander.

- Liaison and communications between outgoing and incoming FS cells are established.
- SOPs are exchanged by outgoing and incoming units.

Ž Existing fire plans are passed to the incoming FSCOORD.

• Routes and times for the withdrawal of the outgoing field artillery are established.

Fire Support Considerations

Fire Support Tasks. The following are fire support tasks in a relief in place:

• Arrange for an exchange of outgoing and incoming FS cell liaison personnel.

• Provide incoming field artillery with existing fire plans.

• Determine needs for smoke and other types of ammunition.

Ž Establish how the outgoing field artillery will be relieved.

• Establish how the outgoing field artillery will contribute.

Command and Control. Normally, the field artillery units will not be relieved at the same time as the maneuver forces. The change of fire support responsibilities is as agreed upon by the two FSCOORDs unless otherwise directed.

Fire Support Planning and Coordination. The outgoing force passes fire plans to the incoming force so that plans can be continued. The following are specific tasks in fire support planning and coordination:

• Prepare and disseminate plans to support the incoming force.

• Make available to all concerned fire planning SOP items of the incoming force.

Ž Make arrangements for the incoming force to use the targeting list and fire support means of the outgoing force.

Ž Ensure that fires have been planned to support or emplace a barrier or ‘an obstacle to slow advancing enemy.

• Plan smoke to screen friendly movements.

Ž Support the deception plan.

Encircled Forces

Description

A force is considered encircled when all ground routes of evacuation and reinforcement have been cut by enemy action. A force may be ordered to remain in a strong position on key terrain to deny the enemy passage through a vital choke point following an enemy breakthrough or it may be left to hold the shoulder of a penetration. In either case, it may become encircled.

When the encirclement occurs, the senior maneuver commander within the encirclement assumes control of all forces. He must quickly establish a viable defense, and fire support must be centralized.

If there is a breakout it will be attempted as soon as possible. The longer the encircled force takes to reorganize and break out, the more organized the enemy becomes. The breakout is normally conducted during periods of darkness or limited visibility. Overwhelming combat power is focused at the breakout point. Tank-heavy or mechanized forces, when available and terrain permitting lead the attack. The rest of the forces right a delaying action or defend the perimeter during the initial stages, FA units are integrated into the formations.

Fire Support Considerations

Fire Support Tasks. The following are fire support tasks in an encirclement:

Ž Reorganize available fire support.

Ž With the force commander, determine the most critical areas in defense, future breakout plans, and the amount of outside help available.

• Prepare for the breakout.

Command and Control. Field artillery and mortars are centralized and positioned throughout the encirclement to limit vulnerability and mass fires. Communications are reestablished with FA units and higher and lower FS cells.

Fire Support Planning and Coordination. The following are fire support planning and coordination tasks in the encirclement:

- Plan fires for both the defense and the subsequent breakout.
- Effect fire support coordination with FS cells outside the encircled area.
- Use fire support for deception, if necessary.
- Establish fire support coordinating measures (an RFL if necessary).
- Use TACAIR and precision guided munitions during the breakout.
- Plan massed fires at breakout points to enhance momentum.

Linkup Operations

Description

Linkup operations join two friendly forces. They may be moving toward one another, or one may be stationary. It is a complex operation that requires detailed planning and coordination. Linkup operations often require a passage of lines when the linkup is made, the linkup force may join the stationary force or it may pass through or around and continue the attack.

The controlling headquarters of both forces establishes the command relationship between the two forces and the responsibilities for each. It also establishes the control measures to be used.

Forces that are linking up exchange as much information as is practical before an operation. Considerations may include–

- Fire support needed before, during, and after the linkup.
- Recognition signals and communications needs from both forces.
- Future operations following the linkup.

Fire Support Considerations

Fire Support Tasks. The following are fire support tasks in the linkup:

- Ensure all fire support personnel know the fire control measures and recognition signals for the linkup.
- Ensure fire support personnel are continuously aware of the progress of the linkup forces.

Command and Control. Centralized control is desirable.

Fire Support Planning and Coordination. The following are fire support planning and coordination considerations in the linkup operation:

Ž Most planned fires are short of the RFL.

- Targets beyond the RFL must be cleared by the controlling headquarters.
- Smoke and illuminating fires must not cause adverse effects on the other friendly forces.
- Fires must ensure the enemy force between the two friendly forces cannot escape. Use of FASCAM maybe considered to block enemy withdrawal.
- Indirect fire weapons are positioned to allow them to mass fires at linkup points.
- Positions should afford easy access to routes to be used after the linkup.

Security Operations

Description

Security missions do counterreconnaissance tasks and prevent harassment surprise, or sabotage by

enemy forces. Units conducting security operations provide information about size, composition location and direction of movement of enemy forces. Reaction time and maneuver space gained by this information allow the main body to prepare and to deploy to engage the enemy. Security operations include–

- Screening.
- Guarding.
- Covering (discussed with defensive operations).
- Area security operations.

A screening force –

Ž Maintains surveillance and gives early warning to the main body.

- Impedes and harasses the enemy with supporting indirect fires.
- Destroys enemy reconnaissance elements within its capability.

A guard force does all the tasks of a screening force and prevents enemy ground observation, direct fire, and surprise attack. A guard force reconnoiters, attacks, defends, and delays as necessary to give the main body time to react or to continue its mission. It can be conducted to the front rear, or flanks of the main body and is normally done within friendly field artillery range.

Area security is normally associated with rear battle operations. It protects units, installations, facilities, and lines of communication from enemy attack or sabotage and reestablishes support capabilities.

Fire Support Considerations

Fire Support Tasks. Fire support must be highly responsive to the security forces, The following are fire support considerations:

- Fire support means must be as mobile as the force being supported.
- Fire support communications means must be flexible.

Ž The requirement for stealth will often dictate the nature of operations.

Command and Control. As security forces may operate some distance forward of the main body, FA may be attached to the supported security forces.

Fire Support Planning and Coordination. Fires should be planned to cover the security operations of the force. The following are considerations:

Ž Fires may be used to screen movements or areas.

- Illuminating fires may be needed during night operations.
- AFSOs and sensors may be used.

Ž TACAIR reconnaissance aircraft can assist in most operations.

Ž Indirect fire weapons are positioned to allow massing of fires in the target areas of interest.

- COLTs in overwatch positions should be used as designators for laser-guided munitions.

Reconnaissance Operations

Description

Reconnaissance operations are used to gather information. There are three types of reconnaissance operations:

- **Route reconnaissance** missions are assigned to gather detailed information about a specific route and all adjacent terrain or about an enemy force moving along a route.

- **Zone reconnaissance** is a thorough reconnaissance of all routes and terrain within specified boundaries. It is made to report the location of all enemy forces within the unit zone,

Ž **Area reconnaissance** is conducted when a commander needs information concerning a specific area such as a town, proposed assembly area or other feature that may be critical to an operation.

Fire Support Considerations

Fire support contributes to the reconnaissance efforts by using aerial and ground observers, sensors and radars to gather combat information and intelligence.

Fire Support Tasks. Fire support helps a reconnaissance force by–

- Orienting on the location or movement of the recon objective.
- Reporting all information quickly and accurately.
- Helping the force retain freedom to maneuver.

Ž Gaining and maintaining enemy contact.

Ž Developing the situation quickly.

Command and Control. Attachment of FA may be considered.

Fire Support Planning and Coordination. The planning and coordination parallel those for security operations.

Mobility. Fire support must be as mobile as the supported force.

CHAPTER 4

EXECUTION

Introduction

This chapter focuses on execution. Narrative examples of offensive and defensive operations are provided to portray actions taken by FSOs at the company, battalion, and brigade levels in executing a fire plan. Key items addressed are—

- The shifting or priorities of fire.
- Employment of night close air support.
- Employment of special munitions (illuminating, smoke, Copperhead, and FASCAM).
- Priority targets and final protective fires.
- Control of fires.
- Coordination of fires within a zone of action.
- Fire support coordinating measures.
- Coordination within an FS cell as the status of assets changes.

Key Fire Support Officer Considerations

Fire support officers at all echelons must be aggressive in the execution phase of an operation. This requires a thorough knowledge of the fire support plan as it applies to the maneuver commander's concept of the operation. Using the fire support execution matrix when participating in the maneuver commander's rehearsal allows the FSO to anticipate events that must occur at specific times on the battlefield. Thus, he can be more aggressive in ensuring the fire support tasks are done by subordinate FSOs and all fire support systems.

The fire plan must be flexible to meet changing situations on the battlefield. Plans are seldom executed without changes being required as the enemy alters his course of action. The maneuver commander's rehearsal allows for the final war gaming of contingencies.

The FSO must be constantly aware of the current status of weapon systems available for the operation and of their capabilities. However, he must also be aware of the positions, status, and capabilities of the observers who will execute fires. Using his expertise, he must be prepared to advise the commander on the best asset to be used against specific targets and to tell him where observers should be positioned to best accomplish the mission.

The FSO must prepare to handle maneuver requests for special munitions. He should conduct realistic training so he can better advise the commander on–

- The operational time required to fire FASCAM.
- The benefits of firing the mission early.
- The methods of engagement and control to be used in firing illumination.
- The employment and/or positioning of COLTS to engage the enemy with Copperhead.
- The effects of smoke munitions.

Finally, the FSO must be constantly aware of all actions required to put effective fires on the target. For example: he must know what actions will occur in an FA battalion CP and

in a firing battery in response to a call for fire from an observer. He must know the response time of other fire support assets. He must know the control means used by FS cell personnel (for example, those an ALO uses to guide aircraft to, into, and out of the target area) if he is to execute the fire plan to support the maneuver commander. The FSO must be acutely aware of the importance of execution and must react to unplanned demands with a sense of urgency.

Offensive Narrative Example

The battalion OPORD that follows corresponds to the brigade-level order shown in Appendix E. In this example, the fire support execution matrix is the fire support plan for 1st Bn, 22d Inf.

GLOSSARY FOR EXAMPLES

ADAM	=	area denial artillery munitions	G/VLLD	=	ground/vehicular laser locator designator
admin	=	administration	hel	=	helicopter
AT	=	antitank	LOA	=	limit of advance
atk	=	attack	log	=	logistics
BP	=	battle position	mm	=	millimeter
btry	=	battery	mvr or MAN (in TACFIRE)	=	maneuver
div	=	division	NOD	=	night observation device
EA	=	engagement area	obj	=	objective
engr or ENG (in TACFIRE)	=	engineer	O/O	=	on order
FAC	=	forward air controller	PP	=	passage point
FAST	=	forward area support team	RFA	=	restrictive fire area
FRAGO	=	fragmentary order	tm	=	team
FS	=	fire support	TOW	=	tube-launched, optically tracked, wire-guided missile
gp	=	group	VT	=	variable time

OFFENSIVE NARRATIVE EXAMPLE

OPERATION ORDER

(Classification)

Copy No____of____copies
1st Bn, 22d Inf, 2d Bde
QUANAH (BL972070)
091200L Jul 89
ADS

OPERATION ORDER 1

Reference: Map, series F375, VICTORIA, sheet 2456 IV, 1983, edition 2-DMA, 1:50,000.

Time Zone Used Throughout the Order: Local.

Task Organization:

Company A	Company B
Company C	Bn Control
3/B/21st Engr	Bn scouts Bn mortars

1. SITUATION

a. Enemy Forces. (See Annex A, Operation Overlay.) 1st Bn, 22d Inf is opposed by one company of the enemy's insurgent forces in delay positions. The company is in well-dug-in positions but is widely spread over the terrain because of low personnel strength. Indirect fires expected to be available to the enemy include 82-mm mortars and a 122-mm artillery battalion that is at 50 percent strength. The enemy security force is estimated to be less than a platoon. The enemy maintains only a low-level AD threat, and enemy air attacks are not expected.

b. Friendly Forces. (See 2d Bde, 21st Inf Div (L) OPORD STRIKE.)

(1) The 2d Bde, 21st Inf Div (L) conducts a deliberate night attack commencing at 102015L Jul 89 to defeat insurgent forces on Objectives TIM and TOM; rapidly links up with 1st Bn, 16th Inf at the crossing site on the JOBIA River; and continues the attack to secure Objectives TACO and RICE on the far side of the river.

(Classification)

OFFENSIVE NARRATIVE EXAMPLE (CONTINUED)

(Classification)

OPORD 1--1st Bn, 22d Inf, 2d Bde

(2) 1st Bn, 16th Inf conducts a night infiltration to assault positions forward of the JOBIA River before the brigade deliberate night attack. Upon reaching its assault positions, 1st Bn, 16th Inf conducts a deliberate night attack to secure the crossing site (Obj BRAD). On order, 1st Bn, 16th Inf assists in the forward passage of lines of 1st Bn, 22d Inf.

(3) On order, 1st Bn, 36th Inf conducts a supporting attack in the north against company (-) positions on Objective TIM and continues the attack to secure Objective RICE.

(4) On order and in coordination with the 2d Bde night attack, 1st Bde, 21st Inf Div (L) conducts a deliberate night attack in the south as the division main effort against entrenched enemy positions in zone.

c. Attachments and Detachments. See Task Organization.

2. MISSION

On order, 1st Bn, 22d Inf conducts a deliberate night attack to seize Objective TOM and continues the attack to secure Objectives 20 and 21 (2d Bde Objective TACO).

3. EXECUTION

a. Concept of Operation. (See Annex A, Operation Overlay.) The 1st Bn, 22d Inf conducts a battalion deliberate night attack on order to seize Objective TOM; rapidly advances to link up with 1st Bn, 16th Inf; conducts a passage of lines, crossing the JOBIA River at the secured crossing site; and attacks to secure Objectives 20 and 21.

(1) Maneuver. Companies C and A conduct the main attack in the south, moving rapidly in column to secure Objectives 21 and 20. Company B conducts a supporting attack to seize Objective TOM in the north. After consolidation on Objective TOM, Company B moves from Checkpoint 6 to Battle Position WOLF to become the battalion reserve.

(2) Fires. Priority of fires initially to Company B; on order, to Company C. Companies C and A plan one field artillery FPF each upon consolidation.

(Classification)

OFFENSIVE NARRATIVE EXAMPLE (CONTINUED)

(Classification)

OPORD 1--1st Bn, 22d Inf, 2d Bde

(3) Engineer. Mobility priority of support is to Company C. Countermobility priority of support is to Company C once Objective 20 is secure.

b. Tasks to Maneuver Units.

(1) Company A.

(a) Follow Company C along the direction of attack.

(b) On order, become lead element if Company C is engaged.

(c) Conduct forward passage of lines through 1st Bn, 16th Inf at Passage Point 5.

(d) Follow and support Company C attack to secure Objectives 21 and 20.

(e) On order, establish a battle position to defeat enemy counterattacks on Objective 21.

(2) Company B.

(a) Conduct a supporting attack to destroy the enemy and seize Objective TOM.

(b) Upon consolidation on Objective TOM, advance and link up with 1st Bn, 16th Inf at PP 5.

(c) Occupy BP WOLF as the battalion reserve. Prepare to reinforce Company C on Objective 20 or Company A on Objective 21.

(3) Company C.

(a) Conduct forward passage of lines through 1st Bn, 16th Inf at PP 5.

(b) Conduct main attack in the south to secure Objective 21. Continue attack to secure Objective 20. On order, follow and support Company A attack if it is committed as lead element.

(c) On order, defend from Objective 20 to defeat enemy counterattacks.

(Classification)

OFFENSIVE NARRATIVE EXAMPLE (CONTINUED)

(Classification)

OPORD 1--1st Bn, 22d Inf, 2d Bde

(4) Scout Platoon.

(a) Conduct reconnaissance of Objective TOM beginning at 102015L Jul 89.

(b) Provide liaison at PP 5 to assist in the passage of lines.

(c) Conduct reconnaissance of Objectives 20 and 21.

c. Tasks to Combat Support Units.

(1) Fire Support. (See Annex B, Fire Support Execution Matrix.)

(2) Engineer Support. 3/B/21st Engr gives priority of support to mobility for Company C; on order, to Company A.

d. Coordinating Instructions.

(1) PIR.

(a) Enemy night observation device capability?

(b) Location and strength of insurgent reserve?

(2) High-Payoff Targets.

(a) Neutralize any ADA (SA-7) concentrations.

(b) Neutralize any indirect fire weapon systems.

(3) Priority of Friendly Information Requirements.

(a) Report enemy Hind overflights.

(b) Report consolidation on Objective TOM.

(c) Report crossing Phase Line RED.

(d) Report linkups at PP 5.

(e) Report when Objectives 20 and 21 are secure.

(Classification)

OFFENSIVE NARRATIVE EXAMPLE (CONTINUED)

(Classification)

OPORD 1--1st Bn, 22d Inf, 2d Bde

4. SERVICE SUPPORT

a. General. See admin/log overlay. (Omitted)

b. Supply. Class V resupply for direct and/or indirect systems to be effected in BP WOLF.

c. Medical Evacuation and Hospitalization. Casualty evacuation pickup points as designated by brigade order.

5. COMMAND AND SIGNAL

a. Command.

(1) Battalion command group moves with Company A.

(2) Battalion CP initially at grid BL787784; on order, to BP WOLF.

b. Signal.

(1) Current SOI in effect.

(2) Battalion retrans station at BL777792.

Acknowledge.

HARDCORE
LTC

OFFICIAL:

CLUB
S3

Annexes:

A--1st Bn, 22d Inf Operation Overlay
B--Fire Support Execution Matrix

Distribution:

(Classification)

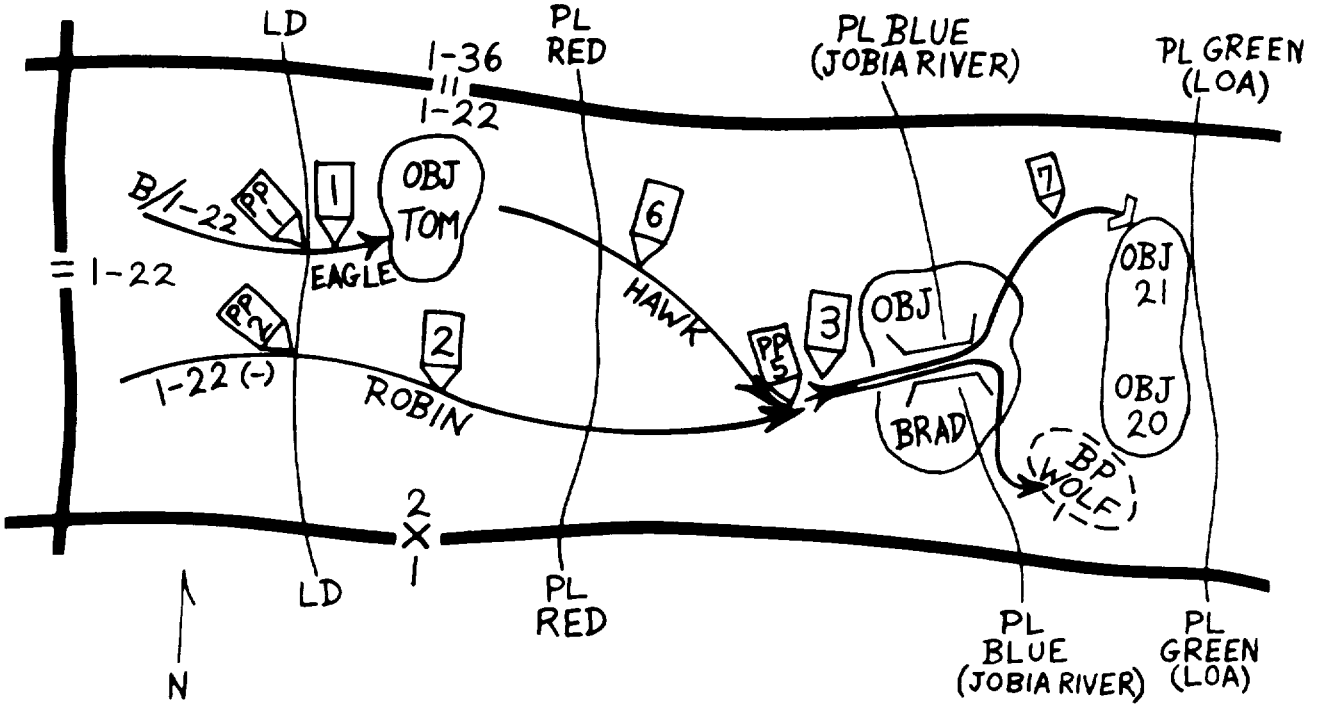
OFFENSIVE NARRATIVE EXAMPLE (CONTINUED)

OPERATION OVERLAY

(Classification)

ANNEX A (OPERATION OVERLAY) TO OPORD 1--1st Bn, 22d Inf

Reference: Map, series F375, VICTORIA, sheet 2456 IV, 1983, edition 2-DMA, 1:50,000



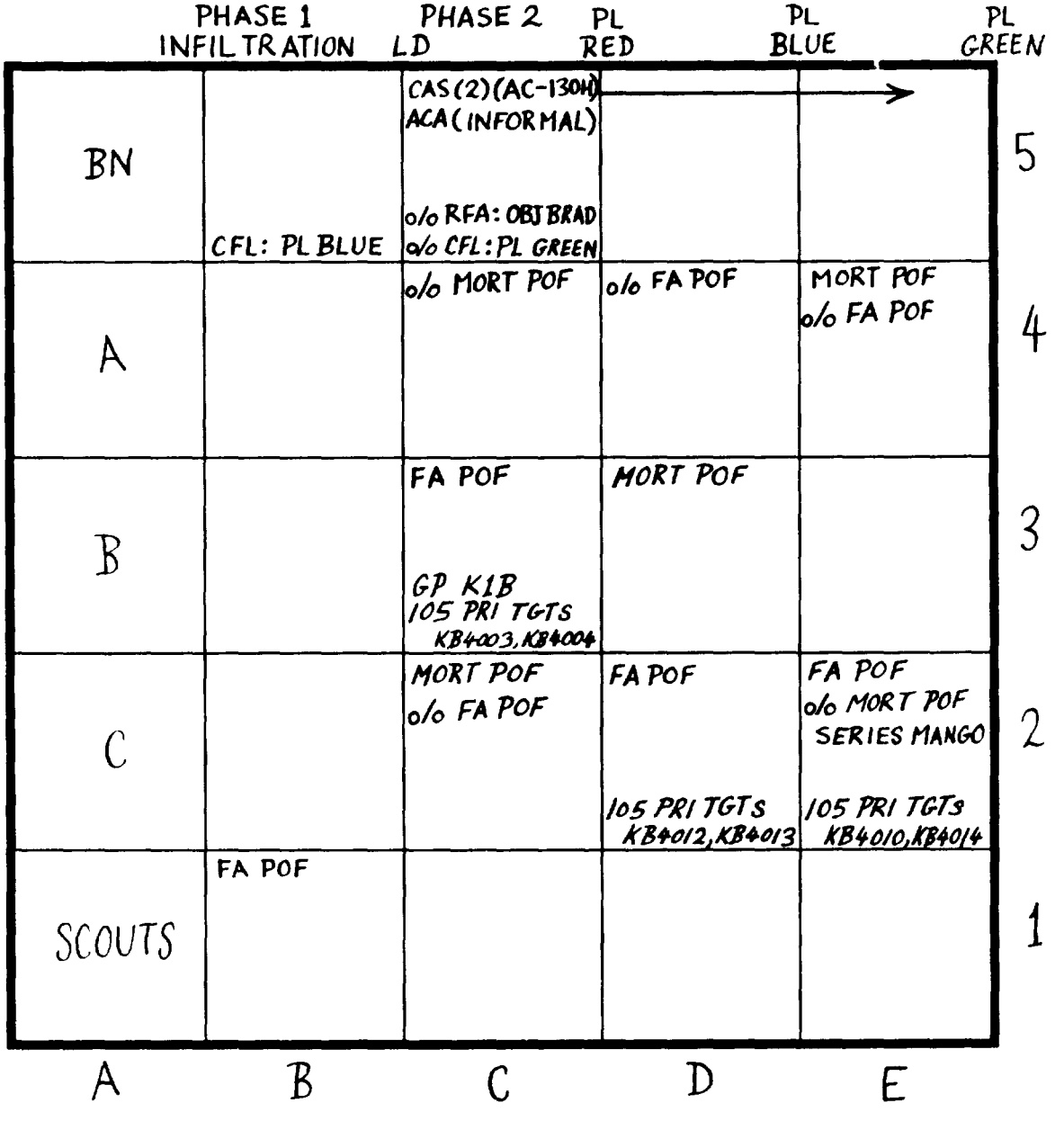
(Classification)

OFFENSIVE NARRATIVE EXAMPLE (CONTINUED)

FIRE SUPPORT EXECUTION MATRIX

(Classification)

ANNEX B (FIRE SUPPORT EXECUTION MATRIX) TO OPORD 1--1st Bn, 22d Inf



(Classification)

OFFENSIVE NARRATIVE EXAMPLE (CONTINUED)

REHEARSAL OF THE MAIN ATTACK

At 0700 hours on 10 July 1989, the battalion commander holds a sand table rehearsal for the main attack. All FS cell personnel are present. The rehearsal is conducted by each company commander and company FSO, in turn, describing critical events by each phase of the operation.

Line of Departure to Phase Line RED

Company B Commander:

"I expect the advance from the LD to Objective TOM to take 2 hours. I am concerned that the enemy will have ambushes set up in support of his obstacle plan. I would like the scouts who recon this area to accompany my lead platoon, along with elements of 3/B/21st Engineers.

"For the final assault on Objective TOM, my main concern is the enemy reinforcing the objective or striking my right flank as I conduct the attack. I expect to take 2 hours to secure the objective and another hour to move to Checkpoint 6."

Company B FSO:

"The company has two priority targets planned along the direction of attack to Objective TOM. They will be updated as a result of the reconnaissance effort. The priority targets have been disseminated to each platoon FO, and each platoon FO will be on the fire direction net of the FA battery assigned the sequential priority targets. I will effect coordination to fire the targets if the call for fire is made by an FO other than the one with the lead platoon. The company has priority of field artillery fire in addition to the priority targets. During this phase of the operation, we have priority of fire for everything available within the brigade except battalion mortars. If the enemy fires illumination, we have planned smoke to cover our movements.

"I plan to accompany the company commander until just short of the objective. There is key terrain there from which I can best see the battle and, more importantly, communicate with the attack systems and platoon FOs of the company. I will rejoin the commander upon consolidation on the objective.

"During the attack on the objective, we have a two-target group planned for known and suspected enemy platoon positions. It will be called for by the lead FO.

"We have planned a coordinated illumination schedule, which I will initiate if there is a requirement for night CAS. We will not be requesting CAS on Objective TOM unless the attack stalls significantly. If a request for CAS is approved, then the following actions will occur: The ALO will direct the aircraft to the target if no airborne FAC is available. Friendly forces will mark their positions with red flares. The coordinated illumination mission will be requested from C/2-12 FA, which has been issued additional illuminating rounds. Duration of the illumination is planned for 15 minutes. The aircraft are AC-130Hs. An informal ACA has been planned for by the brigade FSO.

"If the enemy does not use illumination on the battlefield for his defense, CAS aircraft will be directed to the target by a single marking illuminating round fired to burn on the ground. This will be the preferred method of controlling the aircraft.

"All FS cell members have thoroughly rehearsed control procedures and calls for fire for all systems available."

The battalion commander gives the following guidance on the Company B rehearsal up to Phase Line RED:

"Although illumination is planned, I want the attack to remain nonilluminated for as long as possible. Since brigade is the approving authority, anticipate a need for illumination early. In any event, I do not want illumination adjusted during daylight hours, which will compromise any element of surprise we may attain."

The rehearsal progresses as each company commander and FSO describes critical events and contingency missions for which advance planning must be accomplished. The only change to the fire support execution matrix occurred when the battalion commander directed priority of mortar fires in addition to priority of FA fires be given to the scout platoon during its initial reconnaissance of Objective TOM.

OFFENSIVE NARRATIVE EXAMPLE (CONTINUED)

ACTIONS AT H-HOUR

The scout platoon crossed the LD at 2015 hours to reconnoiter Objective TOM. Information gathered by the scout platoon is reported to the battalion and combined with deductions that were made as a result of the IPB process. Updated information includes the following:

- The location of extensive enemy obstacles and/or barriers along the Company B planned route of advance.
- The enemy's lack of any night observation capability.
- The accurate enemy platoon locations on the flanks of Objective TOM.
- The possible location of an infantry battalion in the vicinity of Objectives 20 and 21.

The battalion FSO updates his planned targets with the information provided by the scouts and passes his refinements and the intelligence to the brigade FSO.

When 1st Bn, 16th Inf reports reaching Checkpoint 3, Companies B and C are ordered to cross the LD from Passage Points 1 and 2 to conduct the deliberate night attack. Company A follows Company C with 100 meters separation between trail elements of Company C and the lead platoon of Company A. 1st Bn, 16th Inf FSO requests and the brigade FSO initiates the on-call RFA on Objective BRAD; he also initiates the on-order CFL at PL GREEN.

Line of Departure to Phase Line RED

The 1st Bn, 22d Inf FSO is collocated with the battalion commander and the battalion command group with the lead platoon of Company A. The FSO, using the battalion commander's radio and the battalion mortar net, monitors the maneuver battalion command net and makes situation reports to the brigade FSO. The battalion fire support sergeant monitors from the FSE still at the battalion main CP.

The Company B supporting attack is discovered, and it is engaged by a squad-size patrol just short of Checkpoint 1. The lead platoon engages the enemy with the company 60-mm mortars and maneuvers to defeat the enemy force. The company FSO initiates a field artillery call for fire, shifting from Target KB4004. He adjusts the mission to block the enemy escape.

Enemy illumination lights up the battlefield across the brigade front, primarily in front of Objectives TIM and TOM. While enemy illumination is being fired, the battalion FSO initiates an obscuration smoke mission on Target KB4005 to conceal the Company B approach to Objective TOM and the Company C advance.

Company C reports crossing Phase Line RED with no resistance and continues movement toward Passage Point 5.

Company B passes Checkpoint 1 but must bypass an enemy minefield and wire obstacles, which were located previously by the scout platoon during the recon. The company FSO and FIST headquarters are in position on key terrain to initiate the company commander's requests for fire.

Company C reports contact with a squad patrol immediately beyond PL RED. The lead platoon FO engages the enemy with 60-mm and 81-mm mortar fires, shifting from Target KB4402, while the lead platoon maneuvers to destroy the enemy with direct fire.

The brigade S3 reports that 1st Bn, 16th Inf has taken the near bank of the crossing site.

Having bypassed the obstacles, Company B commander calls for fire on the southernmost enemy platoon position on Objective TOM. The request for fire is delayed by the brigade FSO because of an ongoing division CAS mission for which he had just initiated an informal ACA.

After the CAS mission is completed, the ACA is lifted, and requested fires are delivered. Resistance is still heavy, so the company commander requests additional fire. The company FSO requests continuous fire on Group K1B. The battalion FSO modifies the request to fire the targets at the sustained rate of fire.

OFFENSIVE NARRATIVE EXAMPLE (CONTINUED)

Company C flank security reports two platoons moving to engage the right flanks of Companies C and A. Company C moves to establish blocking positions along the southern flank of the battalion. The Company C FSO requests fires, shifting from Target KB4012 to engage the enemy force located just outside the brigade boundary. The battalion FSO, monitoring the request and knowing that the fires across the boundary must be coordinated, contacts the brigade FSO to coordinate with the adjacent 1st Brigade. After trying unsuccessfully to coordinate with 1st Brigade, the 2d Brigade FSO approves the mission and reports his action to the division FS cell.

The battalion FSO monitors a call for fire initiated by Company A which will impact in the vicinity of Company C. The FSO holds the mission to confirm friendly unit locations. He cancels the mission because Company C reports no enemy at the grid location of the fire request. He notifies Company A of the cancellation and the Company C report.

On the basis of his evaluation of the current engagement of Company C, the battalion commander orders Company A to bypass and assume the mission of lead company in the attack. As Company A passes to the rear of the Company C blocking position, it receives the ground FAC who was located with Company C. He is then positioned with the company command group.

Company B reports overrunning the initial enemy squad position and initiates a call for fire on the second enemy squad position (KB4003).

1st Bn, 16th Inf reports successfully gaining control of the exit bank of the crossing site.

Company A reports crossing Phase Line RED. The battalion FS cell coordinates the pending change in priority of fire with the mortar platoon leader and the 2-12 FA CP. During the coordination process, blocks A2 and A4 of the fire support execution matrix are interchanged at all levels, since Company A, not Company C, is now leading the attack. The mortars are directed to remain in position to continue support of Company C in disengaging from blocking positions. Company B retains FA priority of fires, since it has not yet seized Objective TOM.

Phase Line RED to Phase Line BLUE

1st Bn, 16th Inf reports enemy contact on the exit bank of the JOBIA River. It expects a counterattack within the next 30 minutes. The brigade commander requests CAS for the battalion. He receives two CAS sorties to support the mission. He also gives priority of NGF to 1st Bn, 16th Inf.

Company A, now leading the main effort of 1-22 Inf, has two priority FA targets and priority of field artillery fires.

Company C reports that it is withdrawing from blocking positions after repelling the enemy attack and is continuing along Route ROBIN. The battalion FSO changes priority for mortar fires to Company B and orders the mortars to displace by squad so that they can be in place to support the final attack to seize Objectives 20 and 21.

Company B reports a successful attack on the last position on Objective TOM. Company B begins moving to Checkpoint 6 along Route HAWK. The battalion FS cell coordinates the change of mortar and FA priorities of fire with Companies B and A, respectively.

As Company A approaches Passage Point 5, it is attacked from its northern flank by a reconstituted enemy platoon. Company C will not reach Passage Point 5 for approximately one half hour. Company B has just reported reaching Checkpoint 6.

As the Company A lead platoon meets the attack by the enemy platoon, it engages with indirect fires from company mortars and with FA by shifting from Target KB4005. The enemy platoon is to the west side of the RFA established by the brigade commander, and indirect fires need not be coordinated with 1st Bn, 16th Inf. However, the battalion FSO does coordinate with the FSO of Company B to determine the Company B location on Route HAWK.

The Company A commander pushes his remaining two platoons through Passage Point 5 to reinforce 1st Bn, 16th Inf. The battalion FSO establishes contact with the 1st Bn, 16th Inf FSO as Company A enters the RFA at Passage Point 5 to ensure no engagement from indirect fires called by 1st Bn, 16th Inf observers. 1st Bn, 22d Inf reinforces the 1-16th Inf positions at 0300 hours.

OFFENSIVE NARRATIVE EXAMPLE (CONTINUED)

Objective BRAD

As information is passed from 1st Bn, 16th Inf to the commander of Co A, 1st Bn, 22d Inf, it is confirmed that the main enemy troop concentration is at Objective TACO. 1st Bn, 22d Inf is directed to move out to attack Objective TACO at 0400 hours.

The battalion FSO immediately asks the 1st Bn, 16th Inf FSO for the latest updates or modifications of known enemy locations that have been made or that need to be made to the existing target list.

The ALO informs the FSO that the Spectre (AC-130H) will be available only until 0500 hours.

The FSO confirms that the battalion mortars will be in place and ready to fire from positions on the west bank of the JOBIA River not later than 0400 hours.

The **battalion commander** reviews his concept of operation for the attack against Objectives 20 and 21:

"Company A will advance along the most direct route to seize Objective 21. Company C follows Company A in support and is prepared to assume the main attack. Company B will continue its advance along Route HAWK and occupy Battle Position WOLF. It will support by fire attacks by Companies A and C. On order, Company B will be prepared to reinforce Company A in the attack or to defeat any counterattack."

The **battalion commander** also reviews the fire support plan with the FSO:

"Smoke has been planned on the forward edge of the objective to screen friendly movement, particularly if the enemy employs illumination. CAS will be used to neutralize the enemy on Objective 20, with the air strike timed to occur when Company A attacks Objective 21. The battalion FSO will initiate the CAS."

The battalion commander decides to use the planned series (MANGO) as preparatory fires on Objective 21 as Company A departs Checkpoint 7 to soften the defense. The FSO confirms a priority target (KB4014) along the axis of advance.

The **battalion FSO** refines the fire plan target list. He makes the following recommendations to the maneuver battalion commander:

"An informal ACA should be used during the assault. The lateral separation technique (shifting indirect fires away from the routes of ingress necessary for the aircraft) should be used as a means of controlling the sorties. Field artillery fires should be used to neutralize the objective, as they can be easily lifted and shifted during the final stages of the attack. Smoke targets will be fired by the mortars but only if the enemy uses illumination."

After the battalion commander's approval of his recommendations, the battalion FSO makes final coordination with company FSOs to review the fire support execution matrix for the attack.

Phase Line BLUE to Phase Line GREEN

At 0440 hours, Company A approaches Checkpoint 7 and encounters a previously undetected enemy position. As the lead platoon FO calls for 60-mm mortar fire over the company command net, the company FSO calls for FA fire and shifts from priority target KB4010 to fix the enemy in position. The lead platoon is able to maneuver and gain a position of advantage for successful direct fire. The platoon neutralizes the enemy position.

Company A reaches Checkpoint 7 and starts its attack on Objective 21 by using fire and maneuver. The battalion FSO initiates Series MANGO and calls for the CAS.

The battalion FSO receives the lineup information from the ALO and reports it to brigade and Company A. He also tells them of the scheduled attack and that a single illuminating round burning on the ground will be used as a marking round for the aircraft.

OFFENSIVE NARRATIVE EXAMPLE (CONTINUED)

The Company A FSO and FAC receive the lineup information. The battalion FSO coordinates with the battalion mortars to fire the illumination **AT MY COMMAND**. At 15 seconds plus time of flight before the aircraft departs the IP, the battalion FSO fires the marking round and establishes the informal ACA, which shifts indirect fires. The FAC directs the CAS strike to the target. The informal ACA is lifted after the aircraft departs.

As Company A continues its attack on Objective 21, the enemy fires illumination. The Company A FSO immediately fires smoke on preplanned targets to mask the continued company attack. Company A consolidates on Objective 21. Company C passes to the west of Company A and assaults Objective 20, quickly overrunning the remaining enemy positions and securing the objective.

The FSOs now analyze the terrain around them, discuss possible targets with their respective commanders, refine their target lists, and plan or adjust FPFs to support the battalion against counterattacks. Moreover, planning continues for the next operation.

Defensive Narrative Example

The defensive narrative example depicts a brigade defense in sector.

DEFENSIVE NARRATIVE EXAMPLE

FRAGMENTARY ORDER

(Classification)

FRAGO 1-1--2d Bde, 21st Inf Div (L)

Task Organization:

1-16th Inf Bn

2/B/21st Engr (DS)

1-22d Inf Bn (+)

A/1-36th Inf
1/B/21st Engr (DS)
3/B/21st Engr (DS)
2/C/1-440 ADA (S) (DS)

21st Atk Hel Bn (OPCON)

1-36th Inf Bn (-)

B/1-36th Inf
C/1-36th Inf

Bde Control

1-12th FA (105, T) (DS)
C/1-440 ADA (Vulcan) (DS)
Tm B/21st MI Bn
2d FAST

(Classification)

DEFENSIVE NARRATIVE EXAMPLE (CONTINUED)

(Classification)

FRAGO 1-1--2d Bde, 21st Inf Div (L)

1. SITUATION

a. Enemy Forces.

(1) The insurgent forces have been reinforced by another infantry regiment, which occupied hasty defensive positions 20 kilometers east of the JOBIA River during the deliberate attack by the 21st Inf Div (L). The enemy is expected to conduct a major counterattack into the 2d and 1st Brigade sectors to recapture crossing sites on the JOBIA River.

(2) The 2d Bde, 21st Inf Div (L) can expect to be opposed by the remnants of the insurgent force, previously located at the JOBIA River, now reinforced by its second-echelon infantry regiment. The insurgents are expected to approach the division sector along an avenue of approach that leads into the 1st Bn, 22d Inf sector.

(3) The enemy is expected to receive indirect fire support from two battalions of 122-mm howitzers. 82-mm mortar batteries accompany each battalion.

(4) Enemy CAS assets are limited.

b. Friendly Forces.

(1) See Annex A, Operation Overlay.

(2) 21st Div (L) defends in sector to retain the crossing sites on the JOBIA River by defeating enemy attacks forward of PL GREEN.

(3) 1st Bde, 9th Inf Div defends in sector along PL ROSE in the north to defeat enemy attacks forward of PL GREEN.

(4) 1st Bde, 21st Inf Div (L) defends in sector along PL ROSE in the south to defeat enemy attacks forward of PL GREEN.

(5) 3d Bde, 21st Inf Div (L) initially is the division reserve west of PL RED.

(6) 1st Bn, 31st FA (155, T) is GSR to 1st Bn, 12th FA.

(7) US Navy Destroyer FF1072 is GS to 2d Brigade.

(Classification)

DEFENSIVE NARRATIVE EXAMPLE (CONTINUED)

(Classification)

FRAGO 1-1--2d Bde, 21st Inf Div (L)

c. Attachments and Detachments.

(1) See Task Organization.

(2) 2d Bde receives one additional COLT effective 111200L Jul 89 from 21st Inf Div Arty.

2. MISSION

111200L Jul 89, 2d Bde, 21st Inf Div (L) defends in sector along PL ROSE to defeat the attack by elements of a reinforced infantry regiment forward of PL GREEN.

3. EXECUTION

a. Concept of Operation. The 2d Brigade will destroy enemy recon elements and begin destruction of main forces forward of PL ROSE; defend in sector to defeat the enemy forces forward of PL GREEN; and counterattack, if necessary, to reestablish the FEBA. The brigade defends in sector with two battalions on line--1st Bn, 22d Inf in the north and 1st Bn, 16th Inf in the south--and 1st Bn, 36th Inf in reserve.

(1) Maneuver. See Annex A, Operation Overlay.

(2) Fires. Priority of fires initially to 1st Bn, 22d Inf (+); on order, to 1st Bn, 36th Inf (-).

(3) Engineer. Priority is to countermobility for 1st Bn, 22d Inf (+) and on order, to mobility for 1st Bn, 36th Inf (-).

b. Tasks for Combat Units.

(1) 1st Bn, 16th Inf.

(a) Defend in sector from BL897785 to BL857785.

(b) Allow no penetration of PL GREEN.

(2) 1st Bn, 22d Inf (+).

(a) Defend in sector from BL897810 to BL858810.

(b) Allow no penetration of PL GREEN.

(Classification)

DEFENSIVE NARRATIVE EXAMPLE (CONTINUED)

(Classification)

FRAGO 1-1--2d Bde, 21st Inf Div (L)

(3) 1st Bn, 36th Inf (-).

(a) Occupy AA SHRIKE as the brigade reserve.

(b) On order, prepare to reinforce 1st Bn, 22d Inf (+) or 1st Bn, 16th Inf.

(c) On order, counterattack to reestablish the FEBA at PL ROSE.

(4) 21st Atk Hel Bn.

(a) Occupy AA ROBIN.

(b) On order, conduct JAAT operations to defeat the enemy's main attack.

c. Tasks to Combat Support Units.

(1) Fire Support. See the brigade fire support execution matrix.

(2) Engineer. See the brigade obstacle overlay. (Omitted)

d. Coordinating Instructions.

High-Payoff Target List.

Priority	Category	Description
1	(5) Engr	Enemy breaching units
2	(3) Mvr	Recon units
3	(2) FS	122-mm howitzer batteries
4	(2) FS	82-mm mortar batteries
5	(1) C^3	CPs

(Classification)

DEFENSIVE NARRATIVE EXAMPLE (CONTINUED)

(Classification)

FRAGO 1-1--2d Bde, 21st Inf Div (L)

4. SERVICE SUPPORT. (Omitted)

5. COMMAND AND SIGNAL

a. Command.

(1) Division tactical CP located at BL821753.

(2) Brigade main CP located at BL831790.

(3) Brigade forward CP located at BL855795.

(4) Brigade rear CP located at BL816789.

b. Signal. Current SOI in effect.

Acknowledge.

GILBERT
COL

OFFICIAL:

BOYD
S3

Annexes:

A--Operation Overlay
B--Fire Support Execution Matrix

Distribution:

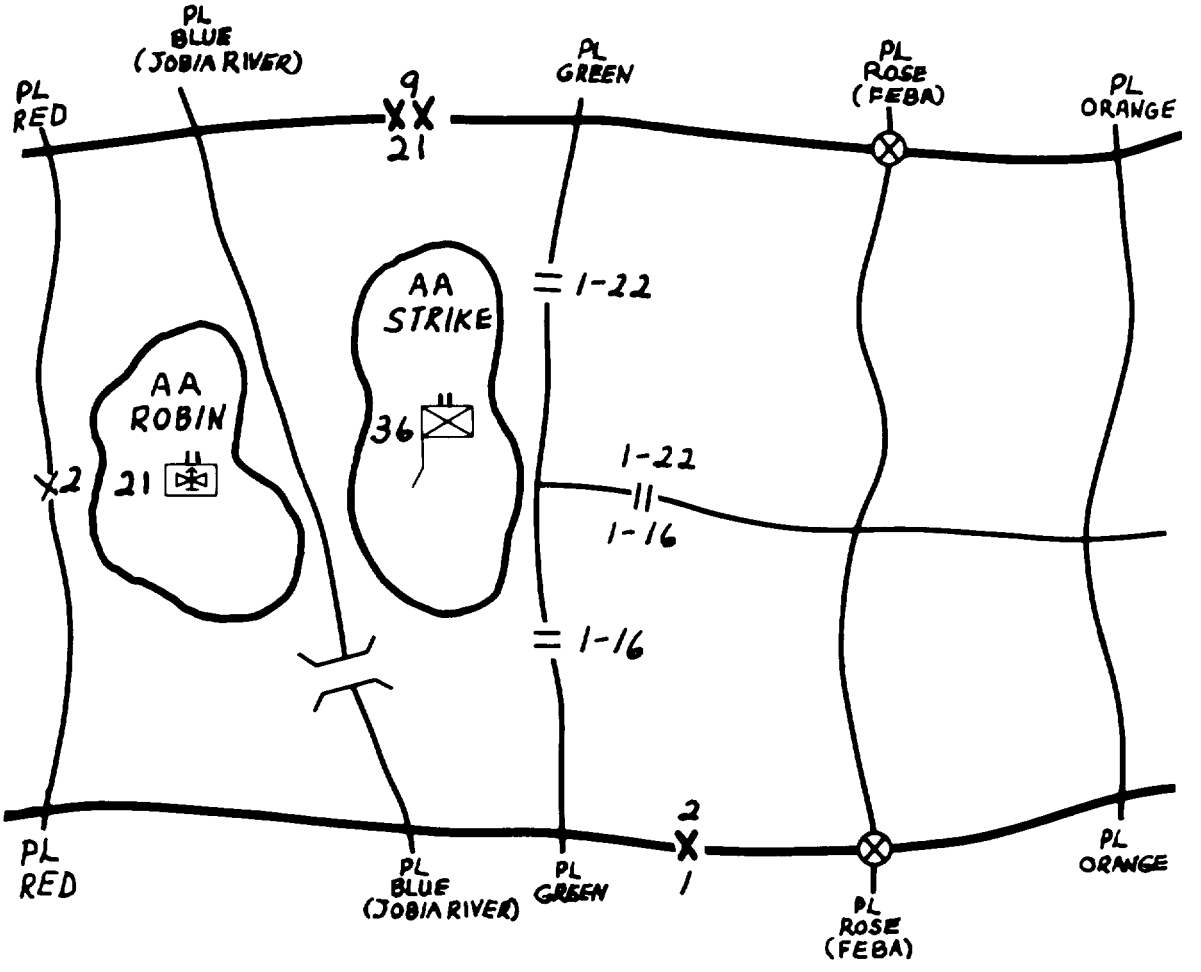
(Classification)

DEFENSIVE NARRATIVE EXAMPLE (CONTINUED)

OPERATION OVERLAY

(Classification)

ANNEX A (OPERATION OVERLAY) TO FRAGO 1-1--2d Bde, 21st Inf Div (L)



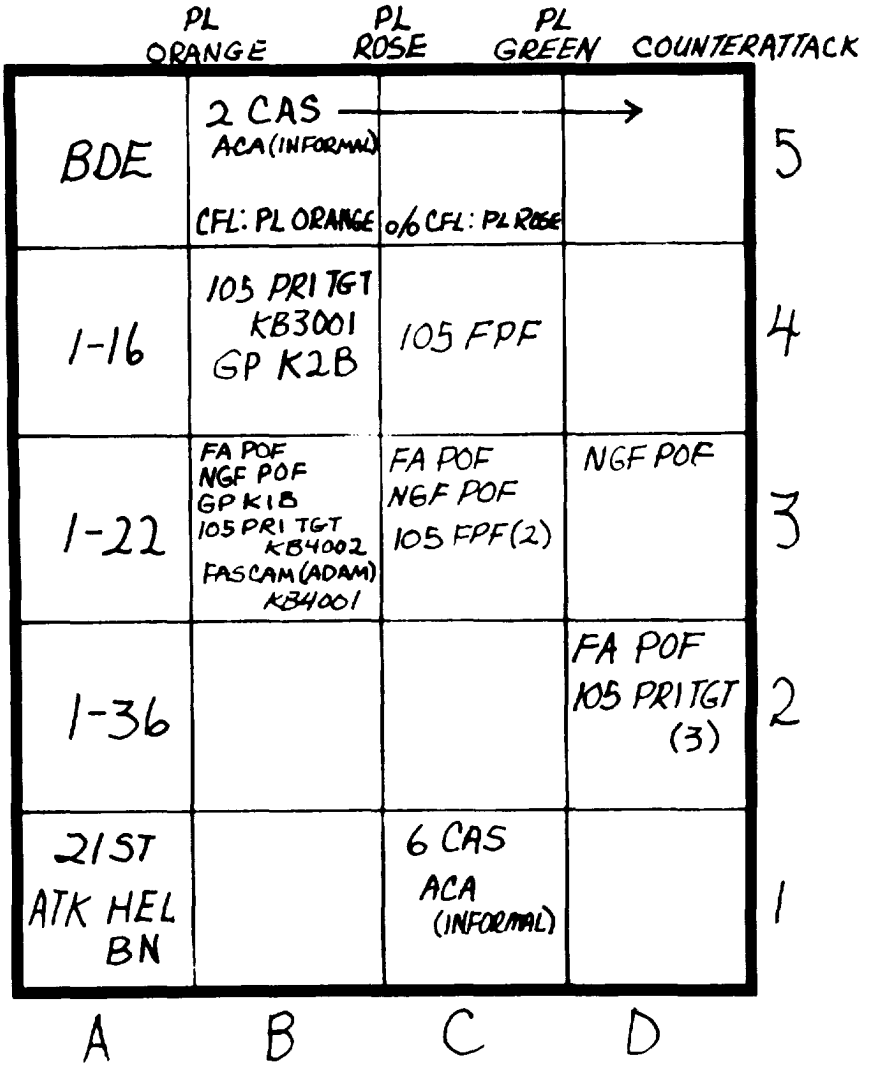
(Classification)

DEFENSIVE NARRATIVE EXAMPLE (CONTINUED)

FIRE SUPPORT EXECUTION MATRIX

(Classification)

ANNEX B (FIRE SUPPORT EXECUTION MATRIX) TO FRAGO 1-1--2d Bde, 21st Inf Div (L)



(Classification)

DEFENSIVE NARRATIVE EXAMPLE (CONTINUED)

1ST BATTALION, 22D INFANTRY (+) REHEARSAL OF DEFENSIVE PLAN

The brigade commander, upon issuing FRAGO 1-1, has allowed subordinate battalion commanders and their staffs planning time in which to issue their own orders and begin actual preparation of defensive positions with allocated resources. As part of the planning process, each defending battalion was tasked to plan for a JAAT to support its defense.

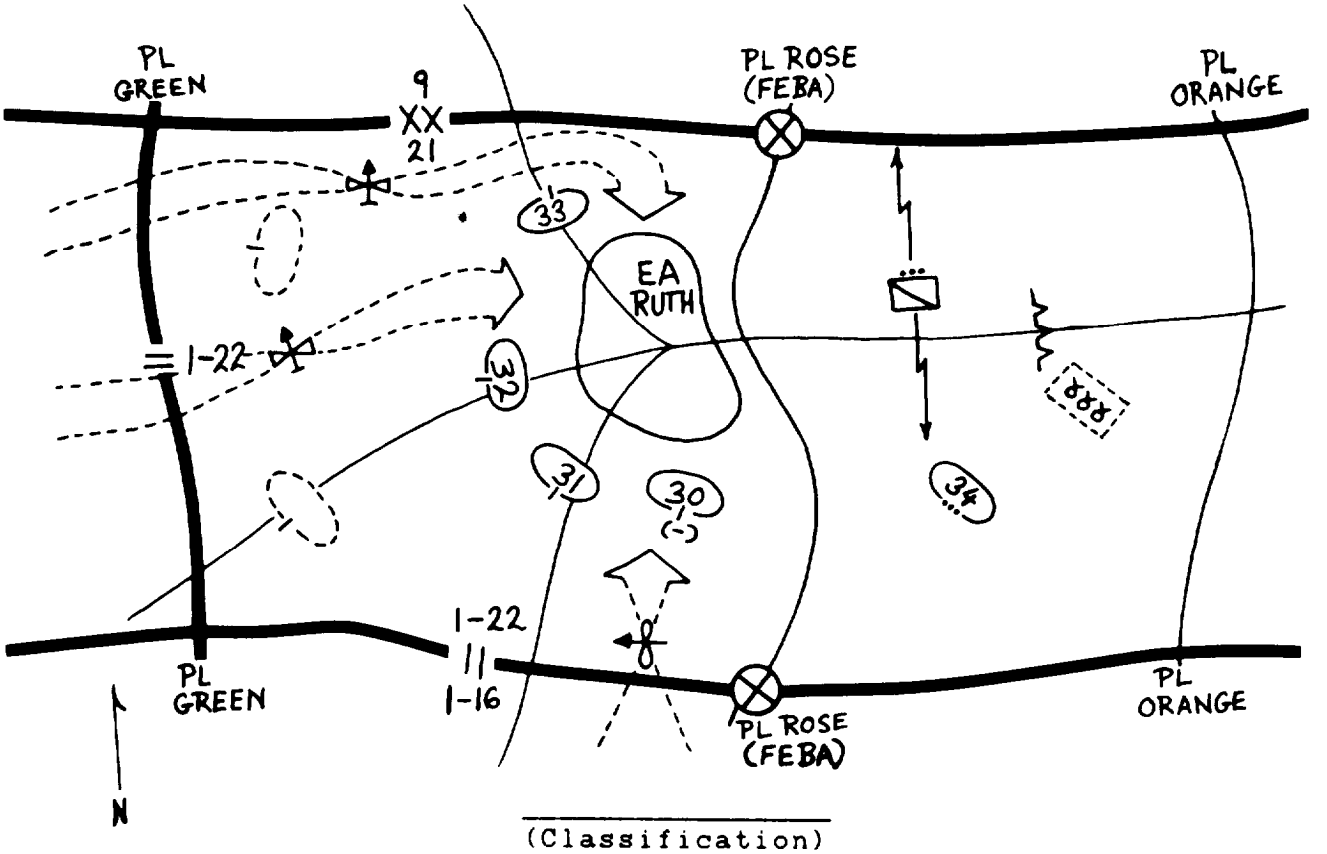
The FSCOORD and/or brigade FSO issued top-down fire planning guidance and targets based on IPB and TVA. The targets were the result of a combined effort primarily made by the brigade S3, brigade S2, targeting officer, and brigade engineer. Subordinate FSOs have modified the targets according to the actual grid coordinates of obstacles as they were emplaced and have added targets of concern to the battalion and company commanders.

As the brigade commander inspects the defensive positions of the 1st Bn, 22d Inf and 1st Bn, 16th Inf commanders, he has them conduct a rehearsal of the plan at their respective command posts. He does not hold the rehearsal over the actual terrain for reasons of OPSEC; however, he ensures that communications checks are made with appropriate attack systems and between command and control centers from the actual defensive positions. The battalion commanders of 1st Bn, 12th FA and the 21st Atk Hel Bn go with the brigade commander to the rehearsals.

DEFENSIVE OPERATION OVERLAY

(Classification)

DEFENSIVE OPERATION OVERLAY--1st Bn, 22d Inf



(Classification)

DEFENSIVE NARRATIVE EXAMPLE (CONTINUED)

FIRE SUPPORT EXECUTION MATRIX

(Classification)

FIRE SUPPORT EXECUTION MATRIX--1st Bn, 22d Inf

	PL ORANGE	PL ROSE	PL GREEN	COUNTERATTACK	
BN CONTROL	BDE CFL: PL ORANGE	o/o ACA (INFORMAL) o/o BDE CFL: PL ROSE			7
CO A (BP 33)		MORT POF 81-MM FPF (KB4002)	MORT POF		6
CO B (BP 31)		FA POF GP K2B 105 FPF (KB4301)	FA POF		5
CO C (BP 30)	I COLT FCT	NGF POF 105 FPF (KB4408) I COLT o/o BP 35) FCT (o/o BP 35)	NGF POF		4
A/1-36 (BP 32)		o/o FA POF 105 FPF (KB4501) I COLT (o/o BP 36)	o/o FA POF		3
SCOUT PLATOON	MORTAR POF	o/o MORT POF	o/o MORT POF		2
1/C/1-22 (BP 34)	FA POF NGF POF FASCAM (1)(ADAM) KB4001 GP KIB 105 PRI TGT KB4002 I COLT (o/o BP 32)				1
	A	B	C	D	

(Classification)

Phase Line ORANGE to Phase Line ROSE

1st Bn, 22d Inf Commander:

"I have placed two forces in the security area. The battalion scout platoon will screen along the expected enemy main avenue of approach in the east. One platoon deployed from Company C at BP 30 is placed well forward in platoon BP 34 and is reinforced by one section from the battalion AT platoon on key terrain which is extremely defensible. Their mission is to detect, engage, and destroy enemy reconnaissance elements and to deny the enemy infiltration by dismounted forces. They have received engineer support to strengthen their position and will be able to observe the battlefield for a distance of 2 to 3 kilometers to the front. They will displace, on order, back to BP 30."

DEFENSIVE NARRATIVE EXAMPLE (CONTINUED)

1st Bn, 22d Inf FSO:

"The platoon FO at BP 34 will be responsible for calling for indirect fires to engage the enemy at the earliest opportunity and at the greatest range. We have been allocated one FA-delivered (ADAM) minefield, which will be used beyond Phase Line ROSE at the brigade commander's directive. The minefield is to be fired by the platoon FO or, if he is unable, by the COLT or the scout platoon leader, in that order. We will have priority in calls for fire for FASCAM and Copperhead missions only. The minefield has been planned so that it augments the emplaced barrier along the main avenue of approach. We have selected a trigger point on the ground which, according to known enemy rates of advance, will place the FASCAM in the path of the enemy as he seeks to bypass the obstacle. The minefield further establishes an engagement area at the obstacle. Sir, we need your approval for this planned minefield.

"Most of our fires planned in the security area in some way support the obstacle plan. Our long-range fires in front of the obstacle are designed not only to slow the enemy down and give our forces additional warning of the attack but also to help canalize the enemy into our obstacle. Planned smoke will help separate initial elements from follow-on forces and will silhouette those initial elements for our direct fire assets overwatching the obstacle. We've planned fires on top of and to the sides of the obstacle to hinder breaching and bypassing by the enemy. We've also planned fires behind the obstacle and minefield to attack breaching elements as they present themselves piecemeal and to help the withdrawal of our forward elements. We have Group K1B scheduled in support of the engagement area in front of the obstacle to fix the enemy at the obstacle, to inflict maximum casualties, and to allow for quick engagement if the enemy succeeds in maneuvering.

"We have one priority target (KB4002) which will be used for quick, responsive fires in support of the platoon on BP 34. The smoke for the withdrawal of the scouts and to aid in the disengagement of the platoon on BP 34 will be fired by the battalion mortars.

"We have priority of field artillery and NGF until 1st Bn, 36th Inf is committed. We have accurate grid locations on targets supporting obstacles, and we have identified trigger points on the ground to supplement existing key terrain and have assigned responsibility for them. This provides for maximum fields of observation to aid in target engagement."

FSCOORD:

"The COLTs will be employed forward initially. One COLT will be placed on BP 34; it has a designated route into and out of the position. The other COLT will be on BP 30 to provide for continuous coverage as the COLT on BP 34 displaces to BP 32, the platoon displaces back to BP 30, and the scouts displace to the MBA. The forward COLT at BP 34 will have maximum fields of observation of 2 to 3 kilometers because of the terrain. That COLT is the backup for the platoon FO if he is unable to call for the FASCAM minefield or Group K1B. If they engage at the maximum range, the COLT will also aid significantly in slowing the enemy advance to allow more time for the initial minefield to be emplaced. Any Copperhead missions are to be fired by Btry C, 1st Bn, 31st FA, which is in the best position to support the battalion with Copperhead. We coordinated the exact position of Battery C with the division FSCOORD and the S3, 1st Bn, 31st FA to ensure angle T requirements for Copperhead missions were considered in positioning Battery C. PRF codes have been coordinated by the brigade FSO with the firing unit and COLTs. The COLTs have already helped get accurate target locations by using their G/VLLDs for target area survey."

Phase Line ROSE to Phase Line GREEN

1st Bn, 22d Inf Commander:

"We intend to destroy the enemy in Engagement Area RUTH. I have four company battle positions established to engage the enemy with direct fire in concert with the JAAT operation, if it is available. The JAAT would be on call and would be initiated when the enemy main attack commences. To trigger the JAAT operation, I will contact you on your command frequency when the enemy lead element is in EA RUTH. If you don't approve the JAAT, we will hit the enemy in the engagement area with all other fire support available to us. If the enemy makes any penetration that threatens BP 31, I will contact the brigade main CP for possible commitment of the 1st Bn, 36th Inf (-). I will be located at BP 32."

DEFENSIVE NARRATIVE EXAMPLE (CONTINUED)

1st Bn, 22d Inf FSO:

"At Phase Line ROSE, we have priority of FA and NGF. We have either targeted, or can quickly shift from preplanned targets to cover, obstacles that canalize the enemy and help keep him in EA RUTH. The two artillery FPFs have been allocated to BP 31 and BP 32 along the most direct route to our rear areas. We plan to engage the enemy in depth by using the firepower control team on BP 30 to isolate the enemy in the engagement area with NGF."

The brigade commander agreed with the plan (to include the ADAM minefield). The commander of the 21st Atk Hel Bn briefed the initial plan for a JAAT in 1st Bn, 22d Inf sector.

Commander, 21st Atk Hel Bn (JAAT Commander):

"The JAAT operation will require a timed sequential attack of targets by CAS aircraft, attack helicopters, and artillery. The target area is in close terrain and is small in size. This precludes the use of lateral separation while the A-10s are over the target area. The routes of ingress for TACAIR generally run from the south perpendicular to the indirect fire gun-target line. I would recommend my attack helicopter battalion initiate the engagement from positions north and west of the engagement area. The lead attack helicopter company would depart Assembly Area ROBIN on your order. Attack helicopters and indirect fires will attack targets in the engagement area at the same time. I will coordinate CAS as a sequential attack.

"I recommend that, as the first two aircraft approach from the south, I will lift the indirect fires and the simultaneous attack by my first company. I will do this over the brigade fire support net, which we will use as the ground-to-air communications net for this mission. The second company of attack helicopters will move to positions between BPs 32 and 33. As the first two aircraft depart to the north, artillery will resume firing in conjunction with the second company of attack helicopters. Indirect fires and attack helicopter fires will again be lifted as the second flight of two aircraft approaches the target area using the same routes of ingress and egress. After the departure of the second flight of aircraft, the third company of attack helicopters will engage the enemy again from the north together with indirect fires. The final flight of two aircraft will approach from the west and depart to the north. Positive control of CAS, attack helicopters, and indirect fires will be my responsibility. The friendly unit positions in BPs around the engagement area will be marked with green smoke."

FSCOORD:

"The battalion FSO and battalion ALO will assume responsibility for positive control of the JAAT should the JAAT commander become a casualty."

The FSCOORD continues discussing the plan for coordinated illumination, if required. The battalion FSO will initiate the call for fire if the illumination schedule is requested by the battalion or brigade ALO. The JAAT commander will be notified if illumination is to be used over EA RUTH. The artillery will be controlled through the 1st Bn, 12th FA CP. The battalion mortars will be controlled by the battalion FSO over the battalion mortar net. The battalion ALO, collocated with the battalion FSO, will monitor his air-to-air net.

The brigade commander approves the concept of the JAAT plan but retains approval authority for execution in the 1st Bn, 22d Inf sector. The rehearsal continues at the 1st Bn, 22d Inf CP, to include covering the actions and events should the counterattack of the 1st Bn, 36th Inf (-) be executed through the 1st Bn, 22d Inf. The two remaining CAS sorties are planned for use by brigade in support of the 1st Bn, 36th Inf counterattack. If the JAAT is not called, the six CAS sorties allocated to 21st Atk Hel Bn will be returned to brigade control.

The battalion commander's review of the battalion defensive plan highlighted his desire for a backup means of calling for the FASCAM minefield in case communications with forward elements are lost or those responsible for triggering are unable to do so. He directed that each platoon leader forward of PL ROSE take a green star cluster to be used as the alternate means of *triggering* the minefield.

A similar battalion-level rehearsal is performed at the 1st Bn, 16th Inf and 1st Bn, 36th Inf command posts as the brigade commander continues to inspect and check the brigade defensive area.

DEFENSIVE NARRATIVE EXAMPLE (CONTINUED)

BATTALION DEFENSIVE ACTIONS

Phase Line ORANGE to Phase Line ROSE

The enemy does not conduct an illuminated night attack as expected. He conducts a reconnaissance throughout the evening of 12 July 1989, and friendly calls for fire against the enemy recon patrols come from the scouts and BP 34. These missions are fired primarily by the battalion and company mortars.

At 130630L Jul 89, the battalion scouts and the platoon FO on BP 34 both report a massive enemy obscuration effort, with a blanket of smoke drifting down the main avenue of approach toward friendly unit positions. The platoon FO immediately initiates the call for fire to emplace the FA-delivered minefield.

1st Bn, 16th Inf reports initial contact with enemy forces and appears to be facing a company of dismounted infantry. The enemy begins a limited attack in the 1st Bn, 16th Inf sector.

At 0650 hours, the GSR platoon reports to the brigade S2 and targeting officer that dismounted forces and vehicles have been located at the FA-delivered FASCAM minefield. The enemy is being engaged with the TOWs from BP 34, and the platoon FO has already called for fire on Target KB4003 with HE-VT in effect.

The battalion FSO initiates the call for fire for Group K1B, since the platoon FO has not done so at this point.

The platoon at BP 34 is attacked by a reinforced company of dismounted infantry that has bypassed the obstacle and minefield. The enemy attack is supported by heavy indirect fire. Although in engineer-prepared positions, the COLT is destroyed by the enemy indirect fire. The platoon FO shifts from a priority target, KB4002, to engage the attacking enemy with artillery fire.

At 0735 hours, the platoon position at BP 34 becomes untenable. Using the previously planned smoke as a cover, the platoon conducts its withdrawal to BP 30 under heavy pressure. At 0740 hours, the battalion scouts report the minefield has been breached and lead elements of the insurgents have crossed Phase Line ROSE.

The brigade commander issues a warning order to the 21st Atk Hel Bn commander to prepare to execute the JAAT operation.

Phase Line ROSE to Phase Line GREEN

The enemy again uses smoke—this time delivered by indirect fire—as he approaches EA RUTH.

At 0747 hours, the platoon from BP 34 has entered the perimeter of BP 30. The brigade FSO establishes the CFL at Phase Line ROSE.

At 0750 hours, the lead element of the insurgents enters EA RUTH and directs its main effort against BP 33 in the north. Targets KB4010 and KB4013 are used as known points from which platoon FOs shift and engage the enemy with indirect fires. Company C in BP 30 reports contact with an enemy infantry battalion. The company FSO shifts defensive fires from Targets KB4406 and KB4409.

The battalion commander requests execution of the JAAT from the brigade commander; the brigade commander approves and notifies the JAAT commander to execute the plan.

At 0755 hours, the ALO located with the battalion FSO requests an illuminating round to be placed on the ground in the center of EA RUTH. This will help the A-10 pilots identify the engagement area in spite of the smoke. The insurgent forces continue to move forward into EA RUTH.

The brigade FSO notifies the JAAT commander. The unit to fire the illumination mission is identified; the mission is placed **AT MY COMMAND.** The time for firing the mission is computed on the basis of the aircraft IP-to-target time, illumination burn time, and time of flight of the round. The JAAT commander assumes control of the JAAT mission.

At 0803 hours, the aircraft are at the IP; the JAAT commander directs the firing of the illuminating round. On seeing the illuminating round burning on the ground, the JAAT commander clears the CAS for attack.

DEFENSIVE NARRATIVE EXAMPLE (CONTINUED)

The two A-10s make a coordinated series of sequential attacks for 10 minutes. The first attack helicopter company attacks as the second company moves into position. As the first aircraft departs, the artillery resumes firing at high angle at the same time as the initial attack of the second attack helicopter company. The ALO tells the JAAT commander that the remaining sorties of A-10s have been diverted en route by division to higher priority targets in the south. Upon completion of attack by his second company, the JAAT commander cancels the informal ACA and puts his third company temporarily on hold in AA ROBIN.

To help isolate the engagement area and to avoid having to lase through the clutter of the battle in the engagement area, the COLT (BP 30) picks out a high-payoff target for Copperhead missions beyond Phase Line ROSE and initiates a call for fire to Btry C, 1st Bn, 31st FA. He lases the target for the required 13 seconds, and the mission is successful in destroying the target. He then tries to shift to a second target, which is near the first, for the second round. As the round is in flight, the target becomes obscured by the increased clutter (smoke, dust, and so forth) of the battle in the engagement area. Since there is no other COLT to lase the TAI from a different observation point, the COLT reports to the battalion FSO that the COLT can no longer effectively lase the TAI.

The battalion FSO tells the firepower control team, located with Company C in BP 30, to engage second-echelon elements of the attacking forces with naval gunfire, since precision-guided munitions are no longer available to isolate the engagement area.

At 0830 hours, Company C, in BP 30, reports that the enemy has bypassed its position and is continuing to advance to the rear of BP 31.

The brigade commander directs the third attack helicopter company against the threat to BP 31 instead of using it to complete the JAAT operation. The attack helicopter company eliminates the threat in conjunction with the destruction of the remaining enemy in EA RUTH by 1st Bn, 22d Inf. The 1st Bn, 22d Inf is directed to reestablish its positions forward of PL ROSE.

All companies consolidate on their original positions (1st Platoon, Company C reoccupies BP 34; and the scouts resume their forward screen) and immediately begin improving them in preparation for another enemy attack. The battalion is now at about 85 percent strength. The engineers restore the barrier forward of PL ROSE.

Before the next attack, the battalion FSO continues planning and coordinating fire support. He talks to the S2 and the targeting officer to find out what the enemy is likely to do next and how that impacts on the fire support plan and target list. He contacts the brigade FSO to get information on the status of fire support assets—their positions and ammunition status. He also asks about changes to the priority of fires, if any, and changes to target lists. He must also determine the status of the battalion mortars. As he gathers all this information, he constantly updates the company FSOs.

Most importantly, he maintains constant contact with the battalion commander and S3 to provide input and to make changes to the fire support plan based on the commander's modifications to the scheme of maneuver.

APPENDIX A

LOW-INTENSITY CONFLICT

Description

Low-intensity conflict (LIC) is a limited politico-military struggle to achieve political, social, economic, or psychological objectives. It is often protracted and ranges from diplomatic, economic, and psycho-social pressures through terrorism and insurgency. LIC is generally confined to a geographic area and is often characterized by constraints on the weaponry, tactics, and level of violence. LIC involves the actual or contemplated use of military capabilities up to, but not including, combat between regular forces. (For a detailed discussion on the LIC, see FM 100-20.)

Mission

The Army mission in LIC can be divided into four general categories:

- Peacekeeping operations.
- Foreign internal defense (FID).
- Peacetime contingency operations.
- Terrorism counteraction.

Peacekeeping Operations

Increasing world tension continuing conflicts, scarce resources, and general distrust have created environments in which a military force may be employed to achieve, restore, or maintain peace. A peacekeeping mission may require forces to deal with extreme tension, sabotage, and minor military conflicts from known or unknown belligerents. The two common missions in peacekeeping operations are cease-fire supervision and law-and-order maintenance.

Peacekeeping forces can be deployed to observe and report on compliance with diplomatically arranged cease fires. The force must be able to deploy rapidly to perform its peacekeeping function. It must be initially self-sufficient, have a self-defense capability, and have effective internal and external communications. The terms of the cease-fire agreement may call for the peacekeeping force to supervise withdrawals and disengagements of the belligerents, to supervise exchange of prisoners of war (POWs), or to monitor demobilization.

Peacekeeping operations also include restoration or maintenance of law and order. Traditional civilian law enforcement functions are generally not performed by US military personnel. However, situations may arise that require limited support to duly authorized law enforcement authorities of a receiving state.

Foreign Internal Defense

Insurgency is an extremely dangerous and complex form of LIC. An environment that gives rise to insurgency is one in which a government tries to reduce political instability and internal conflict among its citizenry during a period of rapid societal development or change. This instability stems from a perception by a segment of the population that the established government is unwilling to resolve those perceived injustices. These issues are not always economically centered but may include political, social, and religious issues. The government may be unwilling or unable to satisfy the demands for change. Often, the government does not recognize the depth of unrest nor the potential for political violence.

The potential for insurgency to occur is greatest in Third World countries, where fragile political structures, fluctuating economic conditions, and rapid population growth rates aggravate long-standing political and social instabilities. These problems give rise to internal unrest, revolutionary movements, and insurgences. Two types of combat assets can be used – special forces and conventional forces. Special forces can be used before and after the introduction of conventional combat forces. US light forces are ideally suited and optimized in an FID environment.

Peacetime Contingency Operations

In certain environments, peacetime contingency operations become necessary when diplomatic initiatives have been, or are expected to be, ineffective in achieving extremely time-sensitive, high-value objectives. Failure to influence a belligerent nation or activity through diplomatic means may necessitate the use of military forces to protect US national interests, rescue US citizens, or defend US assets. These operations encompass intelligence-gathering missions, strike operations, rescue and recovery, demonstrations or shows of force, unconventional warfare, counterterrorism, and noncombatant evacuation.

Terrorism Counteraction

These operations would be conducted by specially trained forces and are not discussed in this publication.

Overall Threat

In LIC, the tactical threat facing light forces within target nations ranges from national and international terrorism to armed forces conducting tactical operations. The commander can expect to learn more about his opponent from extended operations than from a doctrinal profile. Battle management practices and the habits, preferences, and idiosyncrasies of commanders who oppose friendly light forces must be studied. The demonstrated capabilities of particular units must be evaluated as part of the intelligence estimate. Generally, the enemy in LIC is characterized by the type of opponent, his strategy, his organization, and his weapons.

Enemy

The types of opponents that light forces might fight in a low-intensity conflict are discussed below.

Terrorist

The terrorist uses violence and threats, generally for ideological purposes, to paralyze the political sector and population. The terrorist is unpredictable. Terrorists refuse to recognize neutral territory, noncombatants, and innocent bystanders. Their violent acts are meant to impact on the minds of the people. Terrorism may signify the first stage of LIC, and it is often a tactic of the enemy throughout the conflict spectrum. Terrorists are limited only by resources, skill, and imagination.

Guerrilla

The guerrilla organization uses a higher level of sustained violence than do terrorist organizations, although it may use terrorism as a tool. A guerrilla organization will usually have a more sophisticated organizational infrastructure, better weapons and financing, and greater legitimacy, which results from having more popular support than a terrorist group. The guerrilla organization ranges in size from one- or two-person cells to regiments and possibly larger groups. Offensively, in the initial stages, rather than try to capture physical objectives, the guerrillas stress raids and ambushes. Guerrillas prefer to operate under conditions that offer them an

overwhelming numerical advantage. By using secrecy and surprise, they try to gain the advantage over their enemy. Guerrillas rely heavily on the support of the population. They can make use of urban and rural terrain in which conventional forces find it difficult to move and operate (for example, in deep jungle with good canopy, in large marshy areas, in remote mountains, and in cities). Light forces are designed to operate effectively in these types of terrain.

Insurgent

Insurgencies do not follow specific guidelines. Methods are developed to meet the circumstances of the region in which the movement takes place. Insurgents manipulate circumstances such as ethnic, tribal, or religious differences and political or economic weaknesses. They do this to change the loyalties of the population, to destroy or neutralize the government security forces, and to overthrow and replace the existing government or regime. The insurgent will use terrorism, guerrilla warfare, subversion, and any other techniques available to achieve this end. An insurgent organization has three essential parts.

Leadership Party. An insurgent organization must be founded on a strongly disciplined party. The party controls the armed forces and the mass organizations. The cell is the base of the mass insurgency party structure, and party groups are formed from two or more party cells. The party groups are responsible to an interparty committee. The party revolutionary committee carries out the day-to-day activities of the party.

Mass Organizations. Mass organizations are used by insurgents to achieve control and influence over the population. They exploit them for intelligence, logistics, and recruiting requirements. Types of mass organizations are special-interest groups, local militia, and large popular organizations.

Armed Element. Military forces are but one of several instruments used by insurgents to achieve power. Military forces fall into two categories –the main force and regional forces. Insurgency allows for military reversals and the possible need to retrench, restructure, or temporarily disband its military force should the existing government prove too powerful.

Organized Forces

Another threat may be found in newly emerging nations. Because of varying degrees of ability to sustain armed forces, the organization will vary. Generally, it mirrors a *Cuban model* which could be encountered in any area of the world.

Emerging nations start the formation of their armed forces as light units (battalions) with limited organic weapons support, normally a mortar battery of six tubes (82- or 120-mm) and two antitank guns (57- or 76-mm). Nonorganic support to a battalion normally takes the form of small artillery and armor units. Whether a battalion receives direct support from any of these elements depends on the mission, terrain, and enemy situation. Support available in the Cuban model would ideally be in the types and quantities shown in the graphic on the next page.

Above battalion level, forces would normally be organized into infantry regiments or brigades. Armor support would be drawn from the attachment of armor companies or a tank battalion to the infantry regiment. Artillery support is allocated from an artillery regiment to the infantry regiments or battalions as Threat missions require.

CUBAN MODEL OF NONORGANIC SUPPORT AT BATTALION LEVEL

ARTILLERY	ARMOR	AIR DEFENSE	ANTITANK
One mortar battery of six mortars (82 mm or 120 mm) One artillery battalion of 18 howitzers and guns (122 mm or 130 mm) One multiple rocket launcher (MRL) battalion of 18 MRLs (130 mm, 132 mm, or 140 mm)	One tank battalion of 21 medium tanks or 11 medium tanks and 10 assault guns One platoon or company of 3 or 10 armored personnel carriers (APCs) (BTR-40, BTR-152, BRDM, or BTR-60)	One AD battery of six towed AD guns (M-53, ZPU-2, ZPU-4, ZU-23, M-1939, KS-12a, KS-19, or S-60)	One antitank battalion of 18 towed AT guns (ZIS-2 or ZIS-3)

Threat Assets

It must be remembered that emerging nations or counterinsurgency forces may well be armed with a wide variety of weapons. Many of these may be of western or even US manufacture, obtained through various sources. It is also likely that the sophistication of weapons within a given force will vary widely. Because of the importance of identifying enemy strengths, the intelligence officer will have to carefully identify the assets belonging to the enemy, their organization, and their effects when employed against light forces.

Threat Concepts

Three factors guide Threat maneuver forces:

- In offensive operations, attempts are made to get as close to the enemy as possible to deter his use of superior firepower to offset numerical inferiority.
- Infiltration is used to reduce enemy morale and to block routes of withdrawal.
- Most movement and operations are conducted at night or in limited visibility to lessen the effects of enemy air operations,

Fire Support

In counterinsurgency operations, the techniques of conventional fire support operations require some modification because of the frequent movement of guerrilla forces and consideration of METT-T. Field artillery provides one of the most rapid means of placing accurate fire on moving guerrilla forces. The fire support personnel must fully understand the rules of engagement (ROE).

Missions for fire support assets normally center around consolidation and strike campaigns conducted by the maneuver forces.

Strike Campaign

During a strike campaign, the tactics associated with fire support in the offensive phase of a maneuver operation apply.

Consolidation

During consolidation operations, the tactics associated with fire support normally shift to defense tactics. The centralization of fire support assets in support of host country population centers and resources are extremely important. Also, because of the increased population density in such areas, restrictive fire

measures become extremely important. Fire support can be used for effective support as discussed below.

Security Posts, Checkpoints, Roadblocks, and Patrols and Ambushes. In May of 1970, Viet Nam Lessons Learned Number 77, on fire support coordination, stated: "The requirement for military and political clearances for artillery fire on or near populated areas has an adverse effect on the responsiveness of artillery fire." The goal of responding within 2 minutes after receiving a fire request was “seldom met for targets near any populated areas.” Clearance requirements commonly delayed missions up to 10 minutes. “In fact,” the report continued, it was “not uncommon for the artillery to be unable to fire at all because of lack of clearance.” To reduce the time lost in firing, liaison with local government agencies and with allied forces was established. The creation of combined fire support coordination centers in some areas minimized the delays. “But,” the report concluded, “the lack of responsiveness is a source of constant concern and frustration at all echelons of command.”

Deception Plans. Artillery fires may be placed in areas other than those in which an operation is planned to distract guerrilla forces from the main effort.

Populace and Resources Control Operations. These operations may provide illumination and other munitions as required for police-type cordon and search operations or raids. FSOs can plan the use of illumination for defense against guerrilla attacks on installations such as air bases, power plants, communications centers, supply points, bridges, and communities. Planned fires may be provided to defend a convoy or tactical column. An overriding issue in any counterguerilla action is winning the people’s loyalty for their government. They must be shown that the government can improve their lot as well as protect them from the insurgents. Field artillery firing units may be positioned to provide maximum coverage of population centers, lines of communication, and government installations. Firing units answer calls for fire support from any friendly party, civil or military, within range. Positioning of each firing unit has to be carefully planned in relation to the positions of all others to provide for mutual support.

Fire Support Coordination

Fires must be closely coordinated not only with tactical operations in the area but also with civilian activities. Counterguerilla operations normally dictate the following:

- Host country rules of engagement.
- Reduced capability for brigade-level control and coordination of fires within the operational area.
- Greater security requirements for firing positions of indirect fire weapons, to include planning direct fires for defense.
- Requirement to fire in all directions (6,400-mil capability).
- Avoidance of indiscriminate use of fire support to preclude noncombatant casualties. These would alienate the population and produce hostile attitudes toward US units and the host government.
- Close coordination with host country official in the operational area.

Fire Support Planning

Lack of time may preclude the preparation of a formal coordinated and integrated fire support plan for every contingency; however, SOPs should provide for all likely contingencies. Close liaison and continuous contact between the supported commander

and the fire support coordinator provide the required coordination.

Communications

Counterguerilla operations place a burden on communications and fire control. Communications must be maintained with the local host country forces and area control center (ACC) or equivalent civilian control center. Innovation will be the key to maintaining adequate communications. At times, aircraft may have to be used as radio relay stations.

APPENDIX B

JOINT AND AIR ASSAULT OPERATIONS

Introduction

This appendix describes the planning process for airborne, amphibious, air assault, and ranger operations. It also discusses the US Marine Corps fire support interface.

Airborne Operations

Airborne operations are usually joint operations conducted with the US Air Force. The Air Force provides the airlift, close air support, and aerial resupply for the airborne ground forces. Normally, units participating in an airborne operation are assigned to a joint task force (JTF). In this instance, the senior Army commander (division or higher) is designated the Army Forces (ARFOR) commander.

Command and Control

The ARFOR commander is responsible for fire support planning and coordination for the overall operation. His FSCOORD advises on and recommends the use of, fire support assets. The ARFOR FSCOORD is responsible for preassault fire planning and coordination.

During the assault phase of the operation, C2 (including fire support planning, coordination, and targeting) is conducted from an airborne platform called the airborne command and control center (ABCCC). The ARFOR commander uses the ABCCC secure communications system to interface with any long-range reconnaissance and surveillance team inserted early in the operation; the combat control teams (CCTS), also inserted early if possible; the assault force commander and FSCOORD; and fire support assets.

Two Air Force elements normally on the ground early during the airborne assault are the TACP and the CCT. They are an essential part of the overall fire support effort and, as such, must be included in the planning effort. They must be fully briefed and thoroughly knowledgeable of the fire support plans for the airborne assault and subsequent operations.

The TACP may–

- Relay transmissions from ground FS cells to the airborne FS cell when normal communications are unavailable.
- Coordinate and control CAS as required.

The CCTs may be inserted into the area well before the assault begins. Their job is to locate targets, determine suitability of the LZ and/or drop zone (DZ), and control airlift assets. All members of the CCT are trained to call for and adjust indirect fires. The CCTs may aid the fire support effort by–

- Communicating with the ABCCC platform if other than FM communications are required.
- Communicating with TACAIR if other than FM communications are required and the TACP did not arrive in the airhead.

Transfer of Control

Conduct of fire support coordination distinguishes the initial assault phase from subsequent phases. Fire support planning and coordination functions are transferred when the assaulting force commander and his FSO are on the ground and operational.

At first, the assaulting force FSO is concerned with close-in targets, while the airborne FS cell focuses on deeper targets. As the airhead matures, the ground commander progressively assumes total responsibility.

Planning

Upon receipt of the warning order, the assault force develops four basic plans regardless of the type of mission, the force size, or the duration of the operation. They develop these plans in a reverse planning sequence.

Ground Tactical Plan. This includes the scheme of maneuver and fire support that the unit will use on the ground. It includes all actions from the time the unit has assembled on the drop zone or landing zone through the completion of the operation. The most likely light infantry operation to occur in the initial stage of an airborne assault is the hasty attack followed by the establishment of a perimeter defense. (See Chapter 3 for fire support considerations.) Control of fire support assets is highly centralized. Fire planning should emphasize–

- Blocking enemy avenues of approach to the DZ.
- Eliminating enemy resistance.
- Defending the airhead.

Landing Plan. The purpose of the landing plan is to ensure the correct units arrive at the correct location on the DZ. The assaulting force FSO must review the plan to ensure fire support personnel and equipment are correctly cross-loaded. The loss of aircraft should not completely disrupt the fire support provided to the assaulting force. The assaulting force FSO must also ensure all fire support personnel understand their assembly instructions. The assaulting force FSO should review the preassault fire plan to ensure it supports the assaulting force commander's plan. Consideration must be given to the level of surprise desired, the rules of engagement, collateral damage, and airfield damage.

Air Movement Plan. The S3 air, an air movement officer for each participating unit, and an Air Force representative develop the air movement plan. The assaulting force FSO must ensure that fire support personnel and equipment are included on load plans and manifests. The assaulting force FSO should review the fires planned on enemy AD targets along the primary and alternate flight routes.

Marshaling Plan. The marshaling plan covers all actions from the time the warning order is received until the units have loaded the aircraft.

Amphibious Operations

The complex nature of amphibious operations makes detailed planning of paramount importance. Centralized control is lost from the time of embarkation aboard ship until reorganization ashore. Light forces may be transported to a contingency area by US Naval forces. The following discussion explains to the FSO how these operations are conducted and emphasizes transfer of control from aboard ship to the ground forces.

Phases of Operations

Fire support for amphibious operations is planned to support three phases.

Pre-D-Day Fires. Often referred to as preliminary bombardment, these fires are delivered primarily to destroy defenses which might hinder or disrupt the landing.

D-Day Operations Fire Support. This consists of fires delivered by the ships during the landing of assault landing forces and the establishment of a beachhead. These fires include landing beach preparation, prearranged close support, and deep fires. In general, these fires neutralize enemy defenses to cover waterborne and helicopter assaults and disrupt enemy command, communications, and observation. Also, they are fired in direct support of the landing force.

Post-D-Day Fire Support. This fire support continues until the landing force is out of

naval gunfire range or naval gunfire is no longer needed. At this time, ships are given other missions, among which is delivery of supporting fires on the flanks of the landing area and on targets of opportunity along coastal areas.

Command and Control

An amphibious operation requires detailed planning, precise timing of air and naval gunfire, and effective command relationships. The overall commander of the amphibious operation is a naval officer. His title is commander amphibious task force (CATF). He ensures that coordinated naval gunfire and air support plans are prepared for all phases of the operation. He establishes a supporting arms coordination center (SACC), which plans and coordinates fires for the task force during the planning and execution of the operation. The SACC is responsible for coordinating all fires during the assault. The naval officer who supervises the SACC is called the supporting arms coordinator. The SACC is located on the command ship.

The commander of the maneuver force that conducts tactical operations on the ground is called the commander landing force (CLF). The CLF determines his needs for air, naval gunfire, field artillery, and mortars and prepares the fire support plan. This is done in the FS cell established by the FSO of the landing force. While afloat, the FS cell is located with or adjacent to the SACC. Common communications facilities are used until the FS cell moves ashore. The FSO advises the supporting arms coordinator to ensure effective integration of the fire support plan that supports naval operations and the landing force scheme of maneuver.

Air and Naval Gunfire Liaison Company

The air and naval gunfire liaison company (ANGLICO) is provided by the USMC. It provides personnel to control and coordinate both naval gunfire and naval air support for the US Army. It is essential that ANGLICO representatives be attached to the landing force as early as possible. This is to ensure rapid establishment of communications to provide the required fire support for the landing force commander's scheme of maneuver. The ANGLICO provides each brigade a platoon of personnel and communications equipment to plan, request, coordinate, and control naval gunfire and naval air. Each brigade platoon has two battalion supporting arms liaison teams. The SALTS support and are attached to two maneuver battalions within the brigade. Each SALT has a liaison section to be located in the FS cell and two firepower control teams, which are attached to maneuver companies.

Duties of the air and naval gunfire liaison officers are as follows:

- Serve as a member of the brigade FS cell.
- Determine requirements for NGF and naval air support.
- Prepare requests for NGF and naval air support.
- Perform target analysis.
- Help coordinate NGF and integrate it with other supporting arms.
- Ensure that timely information is furnished to fire support ships regarding location of maneuver units.
- Provide information on the status of naval ammunition supplies and resupply.

Duties of the SALT officers are as follows:

- Supervise firepower control teams.
- Advise the battalion FSO on naval gunfire and naval air employment.
- Coordinate naval gunfire and air employment.
- Act as expert on naval gunfire and naval air.

ANGLICO PERSONNEL AND COMMUNICATIONS

PERSONNEL		
Brigade Air and Naval Gunfire Platoon	**Battalion SALT (Two Per Brigade)**	**Company Firepower Control Team (Two Per Battalion)**
1 Air officer and platoon commander, MAJ (USMC) 1 Naval gunfire liaison officer, Lt (USN) 7 Enlisted personnel	2 SALT officers, CPT (USMC) 6 Enlisted personnel	1 Firepower controller, 1LT (USMC) 5 Enlisted personnel
COMMUNICATIONS		
Brigade Air and Naval Gunfire Platoon	**Battalion SALT**	**Company Firepower Control Team**
1 TACAIR request net 1 Naval gunfire control net 2 Naval gunfire ground spot nets 1 ANGLICO command net 1 Tactical air direction net 1 Naval gunfire air spot net	1 TACAIR request net 1 Naval gunfire ground spot net 1 ANGLICO command net 1 Tactical air direction net 1 Naval gunfire air spot net	1 TACAIR request net 1 Naval gunfire ground spot net 1 ANGLICO command net 1 Tactical air direction net 1 Naval gunfire air spot net

NOTE: Early attachment of ANGLICO personnel and rapid establishment of communications with the FS cell afloat are vital to the success of the landing forces mission once ashore.

Transfer of Control and Coordination of Supporting Arms

The place at which fire support coordination is effected distinguishes the initial assault phases of the operation. The transfer of these functions depends largely on the ability of the SACC and the FS cell to communicate. During the assault phase, fire support planning and coordination and targeting are conducted from the FS cell afloat. Communication with the landing forces is through the SALTS of the ANGLICO. At this time, the landing forces are concerned with close-in targets while the FS cell afloat focuses on deeper targets affecting the landing. Fire support coordination is transferred from afloat to land when the landing force commander's FS cell is established. (This should occur at the same time the CLF TOC is established.) There is no specific doctrinal time for this transfer; however, once the landing force is ashore, the CLF will recommend to the CATF when the transfer should occur. It is imperative that the transfer take place as soon as possible. The transfer may be conducted in the following steps:

- Landing force begins centralizing control of fire support assets; that is, FO calls for fires from the FSO, who allocates the mission to assets he has centralized.
- There is more interaction between the landing force FS cell and the FS cell afloat. Targeting is transferred to the landing force FS cell.
- FS cell functions are transferred to the landing force. The FS cell now can communicate with tactical units and the SACC. Decentralized FA battery operations are centralized into FA battalion or div arty operations.

Ž After the beachhead is secured, the landing force resumes normal tactical operations.

US Marine Corps Organizations

The purpose of this paragraph is to familiarize the Army FSO with the Marine Corps organization.

Landing Force

The landing force is a task organization of troop units that include both aviation and ground organizations. (Collectively, all aviation units assigned are called landing force aviation.)

The culmination and ultimate purpose of US amphibious power is the projection ashore, by vertical and/or surface assault, of the landing force. The landing force is a Marine air-ground task force (MAGTF) varying in size and composition with its mission. It is landed from and subsequently supported by the amphibious task force (ATF). Both the landing force and the ATF can be task-organized rapidly for a mission or for a variety of missions. The landing force organization for combat meets this requirement for flexible yet accurate response through three basic task organizations:

Ž The Marine expeditionary unit (MEU).

Ž The Marine expeditionary brigade (MEB).

Ž The Marine expeditionary force (MEF).

Marine Air-Ground Task Force

A MAGTF is a task organization of Marine forces from a division, an aircraft wing, and service support groups (units, personnel, and equipment) under a single command. It is structured, manned, and equipped to do the specific mission(s) assigned. This task organization is designed to exploit the combat power inherent in fully integrated air and ground operations. The composition of a MAGTF may vary considerably, but normally it includes the following major components:

Ž A command element.

Ž A ground combat element.

Ž An aviation combat element.

Ž A combat service support element (including Navy support elements).

The MAGTF commander has a separate headquarters, which is structured for operational functions and is tailored to the mission. The task organization of the MAGTF HQ is one of the most critical aspects of MAGTF activation and operations. There are some notable differences between a MAGTF HQ and the headquarters of a more traditional organization such as a division, a regiment, or a battalion. The establishment of separate air-ground headquarters permits subordinate commanders to direct their attention primarily to the command of their respective elements. The MAGTF staff extends and complements the capabilities of headquarters of major elements of the MAGTF but, under normal circumstances, should not duplicate them.

Marine Expeditionary Unit

The MEU is a task organization which normally is built around a battalion landing team (BLT) and a composite squadron. It is normally commanded by a colonel and is used to fulfill routine forward afloat deployment requirements. The MEU can react immediately to crisis situations and is capable of relatively limited combat operations. Because of comparatively limited sustainability, it is not envisioned that the MEU will routinely conduct amphibious assaults. When committed, the MEU is normally supported from its sea base. The MEU is considered to be the forward afloat deployed element of a larger landing force.

The ground combat element of the MEU is normally a BLT. Only under unusual circumstances would the ground combat element consist of two BLTs.

The aviation combat element of the MEU is a composite squadron which includes two or more types of helicopters and elements from the wing support group. In some situations, the composite squadron may also include vertical/short takeoff and landing (VSTOL) attack aircraft. Normally, the MEU includes a direct air support center (DASC) for control of aircraft ashore. Under such circumstances, the DASC is normally collocated with the BLT fire support coordination center (FSCC).

The combat service support element (CSSE) of the MEU is the MEU service support group (MSSG). It is formed from elements of the Marine division and the force service support group (FSSG). Detachments from Navy CSS resources may also be required.

The artillery support normally provided to the MEU is an artillery battery. This battery is normally attached to the infantry battalion that is the ground combat element of the MEU. A problem here is that the battery is not capable of sustained independent operations. It must rely on the infantry battalion for supply, maintenance, and administrative support. An artillery battery has a large maintenance requirement. Therefore, a close relationship must exist between the infantry battalion, the maintenance management officer (MMO), the battery MMO, and the logistics support unit (LSU). Other artillery units, or sections thereof, may be necessary to satisfy additional fire support requirements. For example, medium or heavy artillery may be necessary to deliver counterfire and nuclear weapons. In selecting and organizing artillery for combat, the mobility and amphibious compatibility of the units must be considered, since all artillery cannot be moved quickly during the early hours of the assault.

Naval gunfire requirements are determined during the planning phase. As a minimum, each committed battalion should have one naval gunfire ship in direct support and should be furnished one or more shore fire control parties (SFCPs) from the artillery battalion.

The MEU headquarters may or may not have an FSCC, depending on the number of ground combat elements it has for the operation. For example, the MEU may have two battalions operating in the MEU zone of action and each battalion may have its own boundaries, each responsible to the MEU. Then the MEU must coordinate the maneuvering and fire support through its operations center and FSCC. If it has only one battalion for the operation, the FSCC of the maneuvering battalion serves as the landing force FSCC. The physical location (sea or land) of the MEU headquarters does not change this arrangement.

Marine Expeditionary Brigade

The MEB is a task organization which is normally built around a regimental landing team (RLT) and a provisional Marine aircraft group. It is normally commanded by a brigadier general and can conduct amphibious assault operations of limited scope. During potential crisis situations, the MEB may be forward deployed afloat for an extended period to provide immediate response and may seine as the precursor of the MEF. Under these conditions, MEB combat operations may be supported from the sea base, facilities ashore, or a combination of the two.

The ground combat element of the MEB is tailored to accomplish the mission assigned; however, the ground combat element of the MEB normally equates to an RLT.

The normal aviation combat element of the MEB is a provisional Marine aircraft group, including elements from the wing support group. This provisional Marine aircraft group has substantially more varied aviation capabilities than those of the air element of the MEU. It contains those antiair warfare capabilities required by the situation. Unlike

the MEU, the aviation combat element of the MEB is organized and equipped to be capable of early establishment ashore as existing airfields in the landing area become available. Should the landing area not contain suitable airfields, an expeditionary airfield will be developed by using assets organic to the MEB.

The CSSE of the MEB is a brigade service support group (BSSG). It is formed from elements of the Marine division and the FSSG. Detachment from Navy CSS resources may also be required.

The artillery support normally provided to the MEB is an artillery battalion. Its tactical relationship to the ground combat element (GCE) may be direct support or attachment. Attachment to the GCE infantry regiment is situation-dependent. Other artillery units may be required to provide additional fire support. For example, heavy artillery may be necessary to deliver counterfire and nuclear weapons. In selecting and organizing artillery for combat, the mobility and amphibious compatibility of the units must be considered, since some artillery cannot be moved quickly during the early hours of the assault.

Naval gunfire requirements for the MEB are determined during the operations planning base. As a minimum, each committed GCE battalion should have one naval gunfire ship in direct support, and a general support ship should be provided to each committed regiment.

The MEB may have two regiments operating in its zone of action; and each regiment may have its own boundaries, each responsible to the MEB. Then the MEB must coordinate the fire support and maneuver through its operations center and FSCC, which is formed and resourced by division headquarters as an augmentation to the MEB headquarters. Likewise, if the MEB has only one regiment for the operation, the FSCC of the maneuvering element will serve as the landing force FSCC. The physical location (sea or land) of the MEB headquarters does not change this arrangement.

Marine Expeditionary Force

The MEF, the largest of the MAGTFs, is normally built around a division or wing team. However, it may range in size from less than a complete division or wing team u to several divisions and aircraft wings, together with an appropriate CSS organization. The MEF is commanded by either a major general or a lieutenant general, depending on its size and mission. It can conduct a wide range of amphibious assault operations and sustained operations ashore. It can be tailored for a wide variety of combat missions in any geographic environment.

The ground combat element of the MEF is usually a Marine division reinforced with appropriate force combat support units.

The aviation combat element of the MEF is usually a Marine aircraft wing task-organized to conduct all types of tactical air operations. The aviation combat element is organized and equipped to facilitate its early establishment ashore in amphibious operations and is designed for operations in an expeditionary environment. In the MEF that has two or more aircraft wings, the senior wing commander is usuall designated the tactical air commander of the MEF.

The MEF may include an organic MEB or MEU as a separate element. This allows the MEF to conduct air-ground operations separated sufficiently in space or time from other MEF elements or to temporarily use an in-being, cohesive MEB or MEU when the MEF is a follow-on force. Such operations involving a separate MEB or MEU would normally be of limited duration.

The artillery regiment is the primary source of firepower for the MEF.

Ships assigned to naval gunfire support are usually provided one in direct support of each committed maneuver battalion and a general support ship to each committed regiment. The MEF headquarters should also have a general support ship for its use.

The combat service support element of the MEF is an FSSG.

USMC Fire Support Coordination Facilities

Composition

The composition of the USMC FSCC includes a designated FSCOORD, supporting arms representatives, and staff personnel necessary for conducting operations, to include target intelligence and communications duties. The number of personnel and amount of equipment vary with the level of command and responsibility, the size and complexity of the forces involved, the degree of planning and coordination required, and the desires of the commander.

NOTE: The Marines use the acronym FSC when referring to the FSCOORD. However, to facilitate understanding, this publication will use FSCOORD when referring to the fire support coordinator.

Personnel and Equipment

The FSCC is the only installation in which the necessary communications facilities and supporting arms personnel to coordinate and plan air, artillery, and naval gunfire support are centralized. At the division and MAGTF levels, when an FSCC is required, it will have the personnel and equipment for a formal operation. Operations of the battalion and regiment are generally informal. The informal operation is characterized by close liaison, frequent meetings, and flexible communications. The operation of all FSCCS is based on the same fundamental of fire support coordination; however, the extent, type, and requirements for planning, coordination, and control differ at the various echelons of the landing force. The necessity for the difference in FSCC operations is reflected in the fact that neither the requirements for, nor the supporting arms available to, the infantry battalion and regiment are as great as those for divisions or MAGTFs.

Staff Relationships

The FSCC functions under the general staff supervision of the G3 or S3. Since the FSCC is an advisory and coordinating element only, it is not an additional echelon vested with command functions nor is it charged with actual control or direction of a fire support mission. The artillery commander or his representative is normally designated as the fire support coordinator. This, however, does not result in the air and naval gunfire officers becoming his assistants. The FSCOORD is assigned responsibility only for the coordination of fire support plans and recommendations. The air, artillery, and naval gunfire officers have special staff functions; and each has individual access to the commander and his staff. The requirements of the commander necessitate that the individuals composing the FSCC operate under the direction and guidance of the FSCOORD to comply with proper staff functioning and relationships.

Rifle Company Fire Support Coordination Center

The rifle company has no FSCC as such. The rifle company commander is his own FSCOORD. He is assisted by his FOs, FAC, NGF spotter, and so forth. It is at his echelon that *control and coordination at the lowest possible level* take place in most instances. The artillery forward observer team provided to each maneuver company is from the DS battalion. The artillery forward observers are assigned on the TOE of the firing batteries of the DS battalions. The forward observer teams are composed of a second lieutenant forward observer, a scout observer (corporal or lance corporal), and two radio operators. The infantry company may also be provided an 81-mm mortar FO, a FAC, and a naval gunfire spotter team.

Battalion-Level Fire Support Coordination Center

The battalion-level FSCC is established by the battalion commander under the staff cognizance of his S3. The FSCC operates in the same manner whether it is an individual battalion, a BLT, or a MEU. The liaison sections provided to each maneuver battalion FSCC are from the corresponding artillery firing batteries. These sections are headed by first lieutenant liaison officers, who are to provide the necessary artilley expertise to the maneuver battalion. The FSCOORD at the infantry battalion FSCC is the weapons company commander from the infantry battalion. The NGLO is the Navy officer of the SFCP organic to the artillery battalion. The ALO is organic to the infantry battalion headquarters S3 section. The battalion commander and the battery commanders of the artillery battalion establish and maintain command liaison with the supported infantry. In armored battalions, the FSCOORD is normally the assistant S3.

Regiment-Level Fire Support Coordination Center

The regiment-level FSCC is established by the regimental commander under the staff cognizance of his S3. It operates in the same reamer whether it is an individual regiment or an RLT. When a single reigment comprises the ground component of the MEB, the regimental FSCC usually is designated as the landing force FSCC and coordinates fire support for the entire force as well as the regiment. When the ground component consists of more than one regimental headquarters, there should be FSCCs at both regimental and landing force levels. The artillery battalion provides an artillery LO and personnel to the FSCC. A naval gunfire officer is assigned with a naval unfire liaison team from the headquarters battery of the artillery battalion. An air officer and a nuclear and chemical weapons employment officer are both organic to the infantry regimental S3 section. The artillery battalion commander establishes and maintains command liaison with the supported infantry regimental commander. Either the artillery commander or his representative maintains a close relationship with the regimental staff (especially the S3) to provide guidance and make recommendations for effective employment of artillery.

Division-Level Fire Support Coordination Center

The division-level FSCC is established by the division commander under the staff cognizance of his G3. It operates in the same manner whether it is an individual division or a component of a larger force. The personnel for operation of the division FSCC are provided from the artillery regiment. The artillery regimental commander is the FSCOORD. The headquarters battery of the artillery regiment provides an FSCC section with two assistant FSCOORDs, intelligence and communications personnel, appropriate equiment, and the related , materiel, forms, and references required to plan and coordinate artillery fires of a division. When the artillery commander must be absent from the CP or is occupied with the direction of his command, a designated assistant FSCOORD performs the duties of the FSCOORD. The naval gunfire officer, air officer, and nuclear and chemical weapons employment officer are all organic to the division headquarters. The headquarters battery provides facilities for the division FSCC. Whenever the need arises for an alternate, or additional, division FSCC, personnel and equipment from the primary division CP are used.

Landing Force Fire Support Coordination Center

The FSCCs of MAGTFs are established by their commanders as required. The landing force (LF) FSCC is the FSCC of the senior echelon comprising the landing force. It is responsible for determining the overall requirements of the support for the landing force and for maintaining coordination and direct liaison with the amphibious task force. The landing force FSCC differs from other FSCCS only in its external relationship with supporting arms agencies and higher headquarters. The extent of operational responsibility is prescribed by the landing force

commander for each operation. Personnel and equipment in the amount required are provided by the parent headquarters which provides the ground combat element. If the ground combat element of the MAGTF consists of a single headquarters, the FSCC of that headquarters will function as the FSCC for the MAGTF .

Air Assault Operations

The formation of an air assault task force (AATF) is directed by division (or higher) headquarters because that echelon controls the aviation assets. The task force is designed for a specific mission and consists of an infantry battalion and an aviation company. When an infantry company combines with aviation elements, they form an air assault team (AATM). An AATF exists as long as an aviation unit remains under the control of the infantry unit commander. When that relationship ends, the AATF ceases. Overall command goes to the infantry commander who directs the operation and provides and/or coordinates required support. He is called the air assault task force commander. Battalion is the lowest echelon that has enough personnel to plan and control an air assault operation. Operations of aviation elements providing AATF support are controlled by the commander of the largest supporting aviation unit. He is designated the air mission commander (AMC). He is subordinate to the AATF commander and serves as special staff officer and technical advisor for aviation employment to the AATF commander. The AATF commander may control the operation from a command and control helicopter or from a ground position. The command group usuall consists of the AATF commander, AATF S3, AMC, FSO, and forward air controller. The group may be in one or more aircraft and augmented with radio telephone operators, depending on the aircraft. However, the command group and the FS cell should never be placed in one helicopter.

Planning Considerations for Fire Support

Five plans are developed for the execution of an air assault operation:

Ž Staging plan.

Ž Loading plan.

Ž Air movement plan.

Ž Landing plan.

Ž Ground tactical plan.

Air assault operations are planned in a reverse sequence. Planning for each phase is not done in isolation from the other phases. Planning that pertains to several different phases may go on simultaneously.

Staging Plan. The staging plan contains the schedule of the arrival of troops, equipment, and supplies at their respective pickup zones (PZs). The plan –

Ž Identifies, establishes, and provides control for primary and alternate pickup zones and landing zones.

Ž Explains the movement of troops and equipment to the PZ.

Ž Establishes sequence and priority for loading.

Ž Provides for troop briefings.

The FSO considerations include–

Ž Planning fires for primary and alternate PZ protection without endangering the arrival and departure of troops and aircraft.

ŽEnsuring FOs are included in load plans so that they arrive at the LZ early in the operation.

Loading Plan. The loading plan is based on the air movement plan. The purpose of the loading plan is to ensure that troops, equipment, and supplies to be moved b helicopter are loaded on the correct aircraft. It is critical to distribute essential items of equipment and weapons among the aircraft. Copies of the loading plan are distributed to PZ control, unit command control elements, and the aviation flight leader.

Air Movement Plan. The air movement plan is based on the ground tactical plan, the landing plan, and the enemy air defense threat. Its purpose is to schedule and provide instructions for moving troops, equipment, and supplies from PZ to LZ. The plan provides coordinating instructions regarding air routes, checkpoints, speeds, altitudes, formations, actions en route, and recovery of downed aircraft. Task force planners select air routes which accomplish the mission while limiting exposure to enemy air defense systems. If enemy AD locations are known, it is better to fly around them rather than attempt to suppress while flying over them.

Fire support considerations include the following:

- Plan fires to cover primary and alternate PZs and LZs.
- Plan fires along the flight route(s) to aid aircraft flying past areas of known or suspected enemy positions. These fires, called SEAD, should be intense and of short duration. SEAD fires and smoke protect and obscure friendly movements, Fires must not obscure pilot vision. When planning SEAD, consider all fire support assets:
  - EW and jamming assets.
  - Chaff air-dropped by USAF to confuse enemy AD radars.
  - Artillery, CAS, and attack helicopters for suppression by fires.

NOTE: CAS and/or attack helicopters may be the only assets capable of ranging targets along flight routes and on LZs.

- Plan on-call fires along the flight route to ensure rapid adjustment on targets of opportunity.

Fires to support the air movement plan are executed under procedural control, under positive control, on call, or a combination of the three based on METT-T:

- Procedural control—fires are initiated and terminated according to a strict time schedule.
- Positive control—fires are executed with phase lines, air control points, and/or other control measures to initiate, shift, and terminate fires.

Landing Plan. The landing phase is developed concurrently with the ground phase, This phase consists of the time, place, and sequence of AATF arrival into the LZs. Primary and alternate LZs are selected for each unit.

Fire Support for the Landing Plan. Often, it is desirable to make the initial assault without scheduled fires in order to achieve tactical surprise. However, scheduled fires are planned for each LZ to be fired if needed. Scheduled fires include the following considerations:

- Plan fires for known or suspected enemy forces regardless of size.
- Plan fires in support of the deception plan.
- Plan fires for the primary and alternate LZs. Be prepared to execute fires on LZs not being used to deceive the enemy as to which LZs are to be used.

Targets should be scheduled as groups, series, or programs as appropriate. These plans should be short in duration and intense in volume of fire, providing maximum surprise and shock effects. Ordnance for these plans should not create unnecessary obstacles to landing and maneuver; for example, craters, tree blowdown, fires, and low visibility. (Napalm

and other incendiary ordnance are not normally used on the LZ and its immediate vicinity just before landing.) Fires are lifted and shifted to coincide with arrival times of the aircraft formations.

Timing Considerations From the Pickup Zone to the Landing Zone. The FSO must carefully consider flight times when scheduling fires for the LZ. The basis for timing is the time when the first aircraft in the first lift of the operation is to touch down on the LZ. It is referred to as H-hour. All times in air assault operations are referenced from H-hour. Normal distances for SPs and RPs from the PZs and LZs, respectively, are from 3 to 5 kilometers. Planning time for navigating these distances is 2 to 3 minutes. If the SP or RP is 3 kilometers from the PZ or LZ, the flight time for that distance is 2 minutes. According to these figures, for the first aircraft to land in the LZ at H-hour, it must reach the RP at H - 2 minutes. The example on the next page explains how to compute the time required to cover the distance from the SP to the RP.

TIME COMPUTATION FORMULA

$$T = \frac{D \times 60}{S \times 1.84}$$

T = Time in minutes

D = Distance in kilometers

S = Ground speed in knots (provided by the AMC)

NOTE: The figure 60 converts hours to minutes. The 1.84 converts knots to kilometers per hour. A fraction of a minute is rounded up to the next higher minute.

EXAMPLE TIME COMPUTATION

The distance of the flight route between the SP and the RP is 50 kilometers; average ground speed is 60 knots.

$$\text{Time} = \frac{50 \times 60}{60 \times 1.84} = \frac{3000}{110.4} = 27.17 \text{ minutes,}$$

rounded to next higher minute = 28 minutes

These times are computed for the entire length of the flight route from the SP to the RP. The length of each of the flight routes is measured so en route times can be computed.

The flight leader sets en route flight speed to ensure the flight crosses the SP on time. If directed in the order, serial leaders report on passing each communications checkpoint (CCP). The AMC ensures that the FSO is aware of the MTF location. Thus, fires can be placed on targets of opportunity or on enemy positions that threaten the task force. The FSO, through prior planning, has designated the assets and observers who will execute these fires. Further, he has linked all concerned on a common radio net. Security during the flight may be provided by attack helicopters or a combination of USAF and Army aviation assets. These assets provide security to the flanks, front, and rear of the aircraft formation. They may be used to selectively jam enemy radar and communications signals. Indirect fire weapons, if available, provide suppressive fires along the flight routes as planned or as necessary. After passing the release point, the serials proceed to assigned LZs. The RP crossing is used to time the lifting. and/or shifting of artillery and CAS strikes. Lifting and/or shifting of fires is critical and should be completed **approximately 15**

seconds before landing. A positive control measure should signal the lifting and/or shifting of fires. One method of shifting fires is to shift indirect fires to one flank, conduct a simultaneous air strike on another flank, and use the attack helicopters to orient on the approach and departure routes. This technique requires precise timing and assault formation navigation to avoid flight paths of other aircraft and gun-target lines of indirect fire weapons.

Fires to Support the Consolidation on the Landing Zone. These fires are similar to those planned on any objective and/or perimeter defense as described in Chapter 3.

NOTE: When FOs arrive on the LZ, they must be prepared to control and use any CAS or attack helicopter sorties and/or ordnance that was planned but not used during the movement phase.

Fire support considerations include planning–

Ž Informal ACAs to allow simultaneous attack.

Ž Fires to isolate the landing zone.

Ž Final protective fires.

Ž Suppression of enemy air defenses.

Ž Prearranged signals to quickly lift and/or shift fires.

EXAMPLE FSO ACTION DURING LANDING

The task force FSO is aboard the command and control helicopter over the battle location. He is prepared to coordinate the delivery of fires to ensure that forces reach a *softened* LZ. He has good communications and positive control over assets that are providing the LZ preparatory fires. A timing reference point has been established. Attack helicopters and other fire support agencies are on the FSO's common radio net. The flight leader of the first flight reports he has reached the timing reference point.

The FSO directs the LZ to be marked for tactical air strike. The FAC monitors, confirms target location being marked, and gets clearance for the strike to start. Timing is critical; if fighter aircraft cannot be exactly on time, then the air strike must be aborted. The air assault helicopters cannot afford to orbit above the LZ awaiting the air strike. Indirect fire assets monitor and await clearance to fire. Through positive control (aircraft and indirect fires separated on opposite ends of the LZ), the fires are initiated. They are short in duration and violent in volume.

The FSO monitors the strike to ensure safety, timeliness, and adequacy of fires.

During execution of the strike, the flight leader reports arrival at the RP. The FSO now has 2 minutes to lift and shift fires. He wants shifting completed 15 seconds before landing. The FSO directs all fire support assets to lift or shift fires as previously planned. He uses a predesignated signal to ensure all fires have lifted or shifted to areas a safe distance from the LZ. (In this example, the FSO designated the last round fired to be WP.) The WP round would be fired at a 600- to 800-meter height of burst, 2,000 to 3,000 meters from the LZ, to make it visible to the helicopters and himself.)

The FSO observes the WP round and clears the attack helicopters, which precede the lift helicopters. They deliver their fires on the LZ. Once completed, they proceed to a predesignated orbit point to provide security for the LZ. The FSO directs lifting of fires as the first flight prepares to depart. Aviation elements return by preselected routes to complete subsequent lifts or to conduct other operations.

Ground Tactical Plan. After the TF completes its consolidation of the LZ, it is reorganized as necessary and prepares to implement the ground tactical plan. Depending on the plan, fire support considerations discussed in Chapter 3 apply.

Control of mortars, especially battalion-level mortars, is difficult in an air assault operation. If an LZ is expected to be *cold,* mortars should be sent in early so that mortar sections can set up and prepare ammunition for any enemy reactions to the air assault. If the LZ is expected to be *hot,* mortars should land later to avoid being caught in a direct fire battle. Another important consideration is ammunition availability. Knowing the location and amount of mortar ammunition is crucial to coordinating current fire support and facilitating future plans.

NOTE: More Information for air assault operations is in FM 90-4.

Air Assault Mission Brief Checklist

Before any air assault operation, the AATF commander and his staff conduct an air mission brief. The example checklist and flight communications card on the following pages represent one way to record critical information in the brief.

GLOSSARY FOR AIR MISSION BRIEF CHECKLIST AND FLIGHT COMMUNICATIONS CARD

alt	= altitude	freq	= frequency
ASSLT	= assault	IFF	= identification, friend or foe
BAE	= brigade aviation element	illum	= illumination
BMNT	= beginning of morning nautical twilight	max	= maximum
CAN	= control aviation net	NVG	= night vision goggles
cdr	= commander	PA	= pressure altitude
C/S	= call sign	PF	= Pathfinder
DA	= density altitude	temp	= temperature
EENT	= end of evening nautical twilight	UHF	= ultrahigh frequency
FARP	= forward area rearm/refuel point	VHF	= very high frequency

EXAMPLE AIR MISSION BRIEF CHECKLIST

1. SITUATION – FRONT LINE TRACE
   a. Enemy_____
   b. Enemy Air Capability_____
   c. Enemy ADA Capability_____
   d. Weather
      (1) Moonrise_____
      (2) Moonset_____
      (3) Sunrise_____
      (4) Sunset_____
      (5) % Illum_____
      (6) Illum Angle_____
      (7) NVG Window_____
      (8) Ceiling/Visibility_____
      (9) Max Temp_____
      (10) Max DA/PA_____
      (11) EENT_____
      (12) BMNT_____
   e. Friendly Forces_____
   f. Friendly AD Status_____
2. MISSION
3. EXECUTION
   a. Concept of the Operation
      (1) Infantry Scheme of Maneuver_____
      (2) Fire Support_____
   b. Missions to Subordinate Units
      (1) Air Cavalry_____
      (2) Attack_____
      (3) Lift_____
      (4) CH-47_____
      (5) Pathfinders_____
   c. Coordinating Instructions
      (1) PZ
         (a) Name/Number_____
         (b) Coordinates_____
         (c) Load Time_____
         (d) Takeoff Time_____
         (e) Markings_____
         (f) Control_____
         (g) Landing Formation_____
         (h) Approach/Departure Direction_____
         (i) Alternate PZ Name/Number_____
         (j) Aircraft Load/Sling Load_____
         (k) Penetration Points_____
         (l) Extraction PZ_____
      (2) LZ
         (a) Name/Number_____
         (b) Coordinates_____
         (c) H-Hour_____
         (d) Markings_____
         (e) Control_____
         (f) Landing Formation/Direction_____
         (g) Alternate LZ Name/Number_____
         (h) Deception Plan_____
         (i) Extraction LZ_____
      (3) Laager Site
         (a) Communications_____
         (b) Security Force_____
      (4) Flight Routes/Alternates_____
      (5) Abort Criteria_____
      (6) Down Aircraft/Air Crew_____
      (7) Special Instructions_____
      (8) Cross-FLOT Considerations_____
      (9) Aircraft Speed_____
      (10) Aircraft Altitude_____
      (11) Aircraft Crank Time_____
4. SERVICE SUPPORT
   a. Forward Area Rearm/Refuel Points_____
   b. Class I, III, and V Specifics_____
5. COMMAND AND SIGNAL
   a. Command_____
   b. Call Signs_____
   c. SOI/Challenge/Password_____
   d. IFF Mode IV_____
   e. Fire Net/Quick Fire Net_____
   f. Time Zone_____
   g. Time Hack_____

EXAMPLE FLIGHT COMMUNICATIONS CARD

COMMUNICATIONS				
NET	CDR C/S	BAE C/S	PF C/S	FREQ
ASSLT				
CAN				
BN				
CO				
CO				
CO				
FS				

AVIATION ELEMENT				
	C/S	FM	UHF	VHF
AMC				
FLT LEAD 1				
FLT LEAD 2				
FLT LEAD 3				
CAVALRY				
ATTACK				
CH-47				
FARP				

CODE WORDS			
MEANING	CODE WORD	MEANING	CODE WORD
CLEAR		EXTRACT	
SECURE		ALT PZ	
HOT		ALT LZ	
COLD		DOWN AIRCRAFT	
ABORT			

Ranger Operations

The ranger regiment is a unique light infantry unit tasked to conduct special military operations in support of national policies and objectives. These operations require highly-trained, well-disciplined units that can be employed in any environment, either alone or in concert with other military forces. Ranger operations may support conventional military operations, or they may be conducted independently when conventional forces cannot be used. Fire support assets available to support ranger operations are as follows:

Ž Organic–The ranger regiment has limited organic fire support assets. The six 60-mm mortars in each ranger battalion (two in each rifle company) provide the only organic indirect fire support available to the battalion commander.

Ž Nonorganic – The missions assigned to the ranger regiment and its subordinate battalions normally require fire support from organizations outside the regiment.

Field Artillery Fire Support

Many ranger unit operations are out of the range of supporting field artillery fires. Whenever such fires are available, they are planned for and integrated into the ranger force ground tactical plan.

Coordination and exchange of call signs, frequencies, and target lists occur before insertion of the ranger force. Unless required by the tactical situation, ranger units do not normally receive augmentation forward observers from supporting field artillery units. The organic FIST from the ranger battalion requests and adjusts field artillery fires for the ranger force.

Field artillery fires can be used to support the ranger force even if the objective area is out of range. Field artillery cannon fire and multiple launch rocket system (MLRS) fire can be used to suppress enemy air defenses as the ranger force crosses the FEBA during airborne or air assault operations.

Field artillery fires can be used to support the exfiltration of ranger elements as they approach friendly lines. These fires can contribute to the deception plan and add combat power to feints used to support ranger operations.

When in range of the objective area, field artillery units can be used to emplace field-artillery-delivered FASCAM to enhance the security of the ranger force.

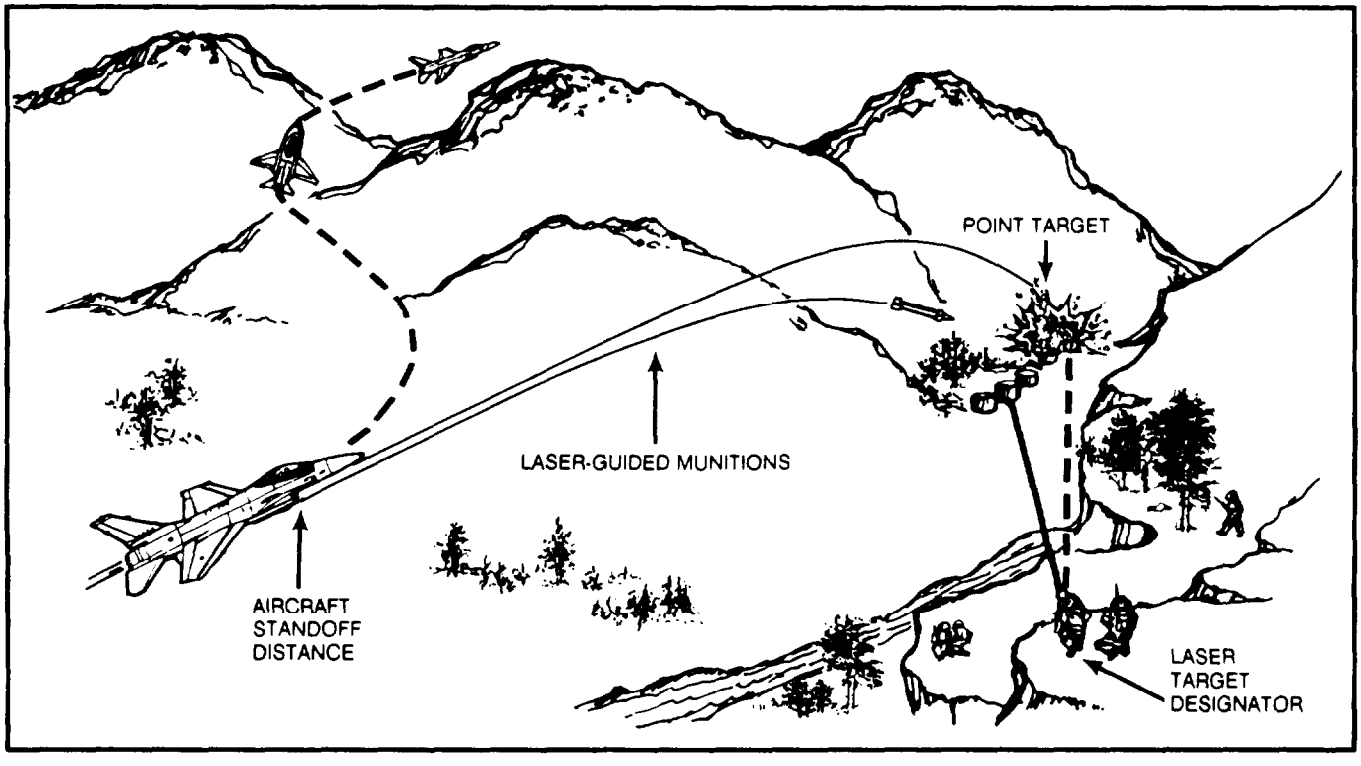
Copperhead rounds fired by 155-mm field artillery units can be terminally guided by the ranger FIST forward observers. They can attack hardened point targets or enemy armored vehicles by use of a man-portable laser target designator (LTD).

Aerial Fires

Aerial fire support is usually the prime means supporting the ranger force because of the distance behind enemy lines at which most ranger operations take place. Aerial fire support can be provided by either fixed-wing air craft or helicopters.

Fixed-Wing Aircraft. Fixed-wing aerial fire support may come from USAF, USN, or USMC units. The type of unit providing support the aircraft, and the mix of ordnance earned all affect the fire support planning and coordination process. Some aircraft have a night and all-weather strike ability, which enables them to support the ranger force during any level of visibility. Operations during poor weather that limits visibility to less than 3 nautical miles are still somewhat restricted, however. The ranger FSCOORDS and ALO must ensure that the correct aircraft are requested and employed effectively on the enemy. The TACP directs and adjusts aerial fires in the objective area.

STANDOFF AIR STRIKE



The ranger force can use ground LTDs to pinpoint targets for air strikes as well as electronic navigation aids to permit nonvisual air strikes (beacon bombing). The ranger rifle company FIST or the TACP can control a laser-designated standoff air strike.

If the enemy AD ability is not great or if it can be degraded to a low level, the ranger force uses specially equipped and armed AC-130 aircraft for fire support. These aircraft provide an invaluable combination of firepower, night observation and illumination, communications, and long loiter time. A well-planned and executed SEAD program, coupled with electronic countermeasures (ECM) directed against enemy AD units, normally permits the use of AC-130 aircraft.

Helicopters. The attack helicopter, armed with a mix of antitank guided missiles (ATGMs), 2.75-inch rockets, 20-mm cannon, and 40-mm grenade launchers, is accurate and responsive aerial fire support. The ranger force commander plans to use all sources of aerial fire to help accomplish his mission. However, the nature of ranger operations may preclude the extensive use of armed helicopters because of their limitations. Some attack helicopters are limited in range and lack an all-weather ability. They are restricted during operations at night by a lack of sophisticated night vision devices. Attack helicopters may be used to escort and assist the ranger force as it crosses the FEBA. They may also be used to conduct feints and demonstrations to cover the insertion of the ranger force.

If attack helicopters are used to support a ranger operation, planned indirect fires are normally delivered along entry and exit corridors. Attack helicopters approach and depart the objective area by using nap-of-the-earth flight profiles.

Fires from armed helicopters are normally requested and controlled by the company FS or one of his FOs operating on a special ground-to-air net. The LTD may be used to precisely identify targets for attack helicopters. Friendly unit locations may be marked by smoke, panels, lights, mirrors, or infrared sources.

Naval Gunfire

During amphibious assaults or operations near a coastline, the ranger force may receive indirect fire support from naval gunfire. Normally, a ranger battalion would be supported by either a destroyer or a cruiser in a direct support role. However, the type and importance of the mission, the type of targets, the ships available, the hydrographic conditions, and the enemy capability determine how many and which type of ships are provided to support the ranger force.

Naval gunfire is characterized by large volumes of highly destructive, flat-trajectory fire. Planned strikes in support of the ranger force may also include surface-to-surface missile fire. Some naval guns can fire a laser-guided projectile much like the Copperhead.

When ranger units are being supported by naval gunfire, a USMC ANGLICO element is routinely attached to the ranger force. This element normally consists of a SALT and two FCTs, The SALT is integrated into the operations of the FS cell at the ranger battalion CP. The FCTs are attached to the ranger rifle companies. The SALT is the NGF representative to the ranger commander, through the FSO. The FCTs request and adjust fires from surface vessels. They can also request and control air strikes by carrier-based aircraft.

The SALT and FCTs operate in the naval gunfire ground spot net, communicating with the ship by HF radio to request and adjust naval gunfire. The SALT or FCT can communicate with aircraft using UHF radios.

Coordination and control measures that apply to naval gunfire are the same as for field artillery, with the addition of two terms:

Ž Fire support area (FSA) – A sea area within which a ship may position or cruise while firing in support. It is labeled RSA and

numbered by a Roman numeral (for example, FSA VII).

Ž Fire support station (FSS) – A specified position at sea from which a ship must fire. This is very restrictive positioning guidance. It is labeled FXS with an Arabic numeral (for example, FSS 7).

Fire Support Organization

Regimental Fire Support Element. The ranger regiment has an organic fire support element consisting of an FSO (MAJ), a senior fire support sergeant (SFC), a fire support sergeant (SSG), and two fire support specialists (SPCs). Since most ranger operations depend heavily on tactical aircraft, a USAF tactical air control party is permanently attached to the regimental FS cell. The regimental TACP includes two ALOs (MAJ and CPT) and two enlisted terminal attack controllers The TACP brings to the FS cell sufficient USAF tactical radios for requesting and controlling TACAIR support.

The regimental FS cell advises the commander on all fire support matters, allocates fire support assets to ranger battalions, develops fire support plans, and executes the regimental fire support plan.

Battalion Fire Support Element. The ranger battalion headquarters has a FIST headquarters consisting of the battalion FSO, two noncommissioned officers, and two fire support specialists. The FSO is the prime fire support coordinator for the ranger battalion commander. He maintains coordination with the regimental FSO and any attached fire support coordination personnel, such as the USAF TACP or the USMC SALT. The FSO–

Ž Advises the ranger battalion commander on all fire support matters.

Ž Recommends allocation of fire support.

Ž Prepares fire support plans.

Ž Assigns target numbers.

Ž Processes target lists from the ranger company FISTS to eliminate duplication.

Ž Monitors and functions as net control on the ranger battalion fire support coordination net.

Ž Reports changes in the status of fire support units to the ranger battalion commander, staff, and FISTs.

When the ranger battalion is operating a single CP, the FSO and his element are normally located there. When the ranger battalion is operating two CPs, one CP is normally manned by the FSO, the fire support sergeant, and a fire support specialist. The senior fire support sergeant and the other fire support specialist would then monitor the fire support coordination net at the other CP. The FSO ensures that any attached fire support elements also divide when needed to operate in a two-CP configuration.

The ranger battalion FIST headquarters has three fire support teams assigned to it. Each team has one FSO (LT), one fire support sergeant (SSG), three FOs (SGTs), and four RATELOs (one SPC and three PFCs). These are normally allocated one to each of the ranger rifle companies. The company FSO and his team-

Ž Locate target and request and adjust surface-to-suface fire support (mortor, field artillery, naval gunfire).

Ž Plan fires to support the company ground tactical plan and prepare target lists.

Ž Coordinate fire support request through the FSO for surface-to-surface and air-to-surface fires.

Ž Report battle information.

Ž Control air-to-surface fires of helicopters and prepare to assume control of fires from fixed-wing aircraft.

Ž Coordinate airspace use within the ranger rifle company operational area.

Ž Advise the ranger company commander on all fire support capabilities, limitations, and methods of employment.

Ž Inform all fire support units of target priority changes.

Ž Designate targets for laser-guided munitions.

Ž Assume operational control of, and administrative responsibility for, all augmentation fire support personnel (TACP, FCR, and attack helicopter liaison teams).

The company FSO is normally with the ranger rifle company commander. The FOs and their RATELOs are normally with the ranger rifle platoon leaders.

Combat Observation/Lasing Team Operations

Ranger COLTS (using LTDs assigned to FIST headquarters [two each] and company FS teams [nine each]) strike high-priority targets that pose threats to the success of ranger operations. The COLT operations are characterized by –

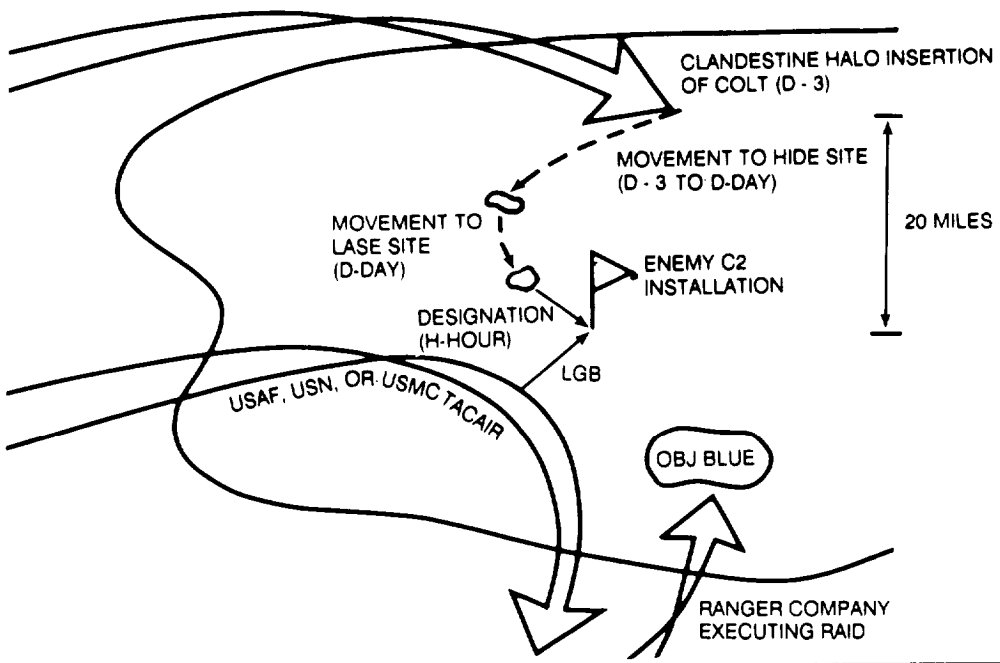
Ž Detailed premission planning.

Ž Clandestine insertion into an operational area by high-altitude, low-opening (HALO) and/or high-altitude, high-opening (HAHO) parachute techniques; overland movement; or movement by water routes.

Ž Employment of air-delivered laser-guided munitions.

A typical COLT mission profile is shown below.

COLT MISSION PROFILE



LEGEND: LGB = laser-guided bomb

APPENDIX C

FIRE SUPPORT ASSETS

Section I. FIELD ARTILLERY

This section implements STANAG 2887, Edition 3 and QSTAG 217, Edition 2.

Missions

The mission of the field artillery is to destroy, neutralize, or suppress the enemy by cannon, rocket, and missile fire and to help integrate all fire support into combined arms operations, The primary characteristic of field artillery is its massive firepower. It can deliver nuclear, chemical, and massed conventional fires rapidly within a large area and on a wide front, under all conditions of visibility, weather, and terrain. The four tactical missions and seven inherent responsibilities of the field artillery are outlined in the first table below. The second table shows the tactical tasks and responsibilities for. control of artillery in an ABCA (Australia, Britain, Canada, America) operation.

SEVEN INHERENT RESPONSIBILITIES OF FIELD ARTILLERY STANDARD TACTICAL MISSIONS

AN FA UNIT WITH A MISSION OF–	DIRECT SUPPORT	REINFORCING	GENERAL SUPPORT REINFORCING	GENERAL SUPPORT
Answers calls for fire in priority from–	1. Supported unit. 2. Own observers.[1] 3. Force FA HQ.	1. Reinforced FA. 2. Own observers.[1] 3. Force FA HQ.	1. Force FA HQ. 2. Reinforced unit. 3. Own observers.[1]	1. Force FA HQ. 2. Own observers.[1]
Has as its zone of fire–	Zone of action of supported unit.	Zone of fire of reinforced FA.	Zone of action of supported unit to include zone of fire of reinforced FA unit.	Zone of action of supported unit.
Furnishes FIST or FSE[2]–	Provides temporary replacements for casualty losses as required.	No requirement.	No requirement.	No requirement.
Furnishes liaison officer–	No requirement.	To reinforced FA unit HQ.	To reinforced FA unit HQ.	No requirement.
Establishes communications with–	FSOs and supported maneuver unit HQ.	Reinforced FA unit HQ.	Reinforced FA unit HQ.	No requirement.
Is positioned by–	DS FA unit commander or as ordered by force FA HQ.	Reinforced FA unit or as ordered by force FA HQ.	Force FA HQ or reinforced FA unit if approved by force FA HQ.	Force FA HQ.
Has its fires planned by–	Develops own fire plans.	Reinforced FA unit HQ.	Force FA HQ.	Force FA HQ.

[1]Includes all target acquisition means not deployed with supported unit (radar, aerial observers, survey parties, and so forth.)
[2]An FSE for each maneuver brigade, battalion, or cavalry squadron and one FIST with each maneuver company or ground cavalry troop are trained and deployed by the FA unit authorized these assets by TOE. After deployment, FISTs and FSEs remain with the supported maneuver unit throughout the conflict.

TACTICAL TASKS AND RESPONSIBILITIES FOR CONTROL OF ARTILLERY (ABCA)

ARTILLERY WITH A TACTICAL TASK OF	ANSWERS CALLS FOR FIRE IN PRIORITY FROM	ESTABLISHES LIAISON WITH	ESTABLISHES COMMUNICATION WITH	FURNISHES FORWARD OBSERVERS TO[1]	WEAPONS MOVED AND DEPLOYED BY (POSITIONED BY)	HAS AS ITS ZONE OF FIRE	HAS ITS FIRES PLANNED BY	NATIONS TO WHICH TERMINOLOGY APPLIES
Direct Support	Directly supported formation or unit. Own observers. Force field artillery.[2]	Directly supported maneuver formation or unit.	Directly supported formation or unit (battalion, regiment, or brigade).	Each maneuver company of the directly supported formation or unit.	Direct support artillery unit commander or as ordered by force field artillery HQ.[2]	Zone of action of the directly supported formation or unit.	Develops own fire plans in coordination with directly supported formation or unit.	US
	Directly supported formation or unit. Any other formation or unit as authorized by the controlling HQ.	Directly supported formation or unit.	Directly supported formation or unit.	Directly supported formation or unit.	Next higher artillery HQ.	Zone of action of the directly supported formation or unit or as ordered by higher artillery HQ.	Artillery formation or unit in direct support in conjunction with directly supported formation or unit.	UK CA AS
In Support	Supported formation or unit. Any other formation or unit as authorized by the controlling HQ.	No inherent requirement.	No inherent requirement.	No inherent requirement.	Next higher artillery HQ.	Zone of action of the supported formation or unit or as ordered by higher artillery HQ.	Next higher artillery HQ.	UK CA AS
At Priority Call	Formation or unit to which placed at priority call. Any other supported formation or unit. Any other formation or unit as authorized by the controlling HQ.	No inherent requirement.	No inherent requirement.	No inherent requirement.	Next higher artillery HQ.	Zone of action of the formation or unit to which placed at priority call or as ordered by higher artillery HQ.	Formation or unit to which placed at priority call.	UK CA AS
General Support	Force field artillery HQ[2] and target acquisition artillery. Own observers.	No inherent requirement.	No inherent requirement.	No inherent requirement.	Force field artillery HQ.[2]	Zone of action of the supported formation or unit or zone prescribed.	Force field artillery HQ.[2]	US
General Support Reinforcing	Force field artillery HQ.[2] Reinforced artillery unit. Own observers.	Reinforced artillery unit.	Reinforced artillery unit.	Reinforced artillery unit if approved by force field artillery HQ.[1,2] Applies also to the provision of liaison officers.	Force field artillery HQ[2] or reinforced artillery unit if approved by force field artillery HQ.[2]	Zone of action of the supported formation or unit to include zone of fire of the reinforced artillery unit.	Force field artillery HQ[2] or as otherwise specified.	US AS
Reinforcing	Reinforced artillery unit. Own observers. Force field artillery HQ.[2]	Reinforced artillery unit.	Reinforced artillery HQ	Reinforced field artillery unit. Applies also to the provision of liaison officers.	Reinforced artillery unit or as ordered by force field artillery HQ.	Zone of fire of the reinforced artillery unit or zone prescribed.	Reinforced artillery unit.	US

[1]The US will not furnish forward observers but will furnish fire support teams (on request).
[2]Force artillery headquarters or higher artillery headquarters.

LEGEND: AS = Australia; CA = Canada; UK = United Kingdom; US = United States

Employment

An FA battalion is normally placed in direct support of a maneuver brigade. The direct support FA battalion may have one or more FA battalions reinforcing it. Generally, the brigade FSO coordinates field artillery positioning within the brigade zone; however, the battalion FSO may be required to coordinate positioning in the battalion zone with the battalion commander and/or S3. In a brigade zone, priorities for positioning are as follows:

Ž Direct support units.

Ž Reinforcing units.

Ž Divisional GSR, then GS units.

Ž Corps GSR, then GS units.

Considerations

An FSO must consider the following in planning FA support.

Ž Assigned tactical mission.

Ž Number and caliber of artillery units in support.

Ž Range capabilities, including special munitions and rocket-assisted projectiles (RAFs).

Ž Munitions available and quantity on hand.

Ž Position location to include primary, alternate, supplementary, and future positions.

Ž Size of the final protective fire.

Ž Radius of burst.

Ž Maximum and sustained rates of fire.

Section II. MORTARS

Mission

Mortars are the only organic indirect fire support asset in the maneuver arms arsenal. Mortars provide responsive high-angle fires that can kill the enemy, suppress enemy fires, and conceal the movement of friendly forces. Therefore, it is extremely important to include mortar fires in all fire support plans. The FSO's doctrinal responsibility is limited to recommending the positioning and integration of mortars into the fire support plan. For considerations of mortar employment, refer to FM 7-90. Some of the areas that the FSO must be concerned with are as follows:

Ž Characteristics and capabilities.

Ž Support and command relationships.

Ž Employment.

Ž Displacement.

Additional guidance for FSOs on the use of mortars includes these considerations:

Ž Recommend positioning the mortars to ensure maximum effectiveness within range of the enemy.

Ž Ensure company FSOs and platoon FOs make use of this asset by giving them appropriate fire missions.

Ž Establish procedures to integrate mortars with other indirect fire assets in the fire support plan.

Characteristics and Capabilities

The maneuver battalion mortar platoon consists of four 8l-mm mortars (two sections with two mortars each). The mortars are transported in high-mobility multipurpose wheeled vehicles (HMMWVs). When planning mortar fires, the FSO must consider the high rate of fire versus

ammunition availability. A mortar platoon can fire over 300 rounds in less than 5 minutes, which exhausts the ammunition supply very quickly. Methods of 81-mm ammunition resupply include –

Ž Organic HMMWV.

Ž Air assault or airdrop.

Ž Cache.

Ž Individual soldiers.

Support and Command Relationships

Support and command relationships are means by which the commander can designate priorities for mortar fires or establish command relationships. Previously, mortars and other battalion organic assets were given missions of direct or general support. Because mortars are organic to the battalion, the assignment of such missions is not necessary. However. the commander must clearly establish priorities of fire as required.

Priorities

The commander may specify support by assigning priority of fires and/or priority target(s) to a subordinate unit.

Command Relationships

There may be situations in which the mortar platoon cannot support all of the battalion while remaining under battalion control. This may occur when a maneuver unit is given a mission that separates it from its parent unit. In those situations, a platoon or a section may be placed under operational control of or attached to the supported unit.

Operational Control. This gives a commander the authority to direct forces provided him to do specific missions, usually limited by function, time, or location. The commander controls the tactical employment, movement, and missions of the mortars. He is not responsible for logistical or administrative support.

Attachment. This temporary relationship gives the commander receiving the attachment the same degree of command and control as he has over units organic to his command. The commander selects the general location of the attached mortar element and controls its deployment as well as its fires. He is also responsible for logistical support and security of the mortars. Attachment is appropriate when units are assigned independent missions.

Employment

The commander has three options when considering how to employ the battalion mortar platoon. It can be employed by squad, by section or by platoon. A squad consists of one mortar and its crew. Squads can be grouped together into sections. Finally, the entire platoon may be employed together. The option is selected on the basis of commander's guidance METT-T, and priority of fires. The FSO must be prepared to advise the commander on which option to use. When employing mortars, the FSO must consider the following:

Ž Mortars are most effective against soft-skinned targets.

Ž Their high-angle trajectories make mortars effective against targets masked or in defilade.

Ž High-angle fires are easily detected by enemy radars.

Ž High-angle fires are adversely affected by strong winds.

Ž Mortar positions are seldom surveyed; therefore, more adjustments are needed and surprise may be lost when targets are

attacked. (Overcome this by requesting FA survey support.)

- Mortars are effective in military operations on urban terrain (MOUT).
- METT-T must be considered when mortars are employed. General positioning guidelines are as follows:
  - In the offense, one-half to two-thirds of the maximum range should be in front of lead elements.
  - In the defense, one-third to one-half of the maximum range should be in front of the lead elements,
  - Positions should be selected to minimize the number of moves required.
  - The mortars must be able to displace quickly and provide continuous support.

Platoon Employment

The platoon operates from one or two firing positions and fires as one unit. The best way to position a platoon of mortars is to place the sections in two separate locations, at least 300 meters apart. This distance must be based on the terrain, the ability to cover the sector, and limits in command and control. A platoon located in a single area enhances command and control and local security but is more vulnerable to enemy counterfire. The FDCs are trained to mass fires from separate locations onto a single target.

Section Employment

This places each section as a separate firing unit. The mortar platoon is normally employed by section to cover wider frontages. Each section is positioned so it can provide fires within the zone of action of the supported maneuver element. When employed by section, each section has an FDC or a computer. Depending on the range to target and separation, both sections may be able to mass fires on the same target.

Squad Employment

This places one or more mortar squads on the battlefield as separate firing units. This is usually done to support special requirements, such as–

- One-mortar illumination mission(s).
- Roving mortar adjustments.
- Antiarmor ambushes.
- Support of a very wide front.
- Coverage of a large front by the maneuver element.
- Support for critical installations during rear operations.

Displacement

It is essential that the mortars displace quickly and stay flexible to provide continuous fire support. On the basis of the scheme of maneuver, the mortar platoon leader forms a displacement plan in support of the fire plan. The displacement plan is a map overlay showing initial positions, subsequent positions, routes between the positions, and any control measures in effect.

Section III. TACTICAL AIR SUPPORT

Missions

TACAIR supports the AirLand Battle by providing interdiction (air interdiction [AI] and battlefield air interdiction [BAI]) and close air support missions. At the brigade and battalion levels, CAS will be the primary support mission. CAS involves air actions against hostile targets

that are in close proximity to friendly forces and that require detailed integration of each air mission with the fire and movement of friendly forces. CAS includes the delivery of munitions by Air Force, Navy, and Marine Corps aircraft. The missions are distributed to each corps by the land component commander. The corps commander then further distributes the CAS missions down the Army chain of command. Usually, CAS missions are distributed no lower than brigade. CAS targets are either preplanned or immediate.

Preplanned Close Air Support

Preplanned CAS may be categorized as follows:

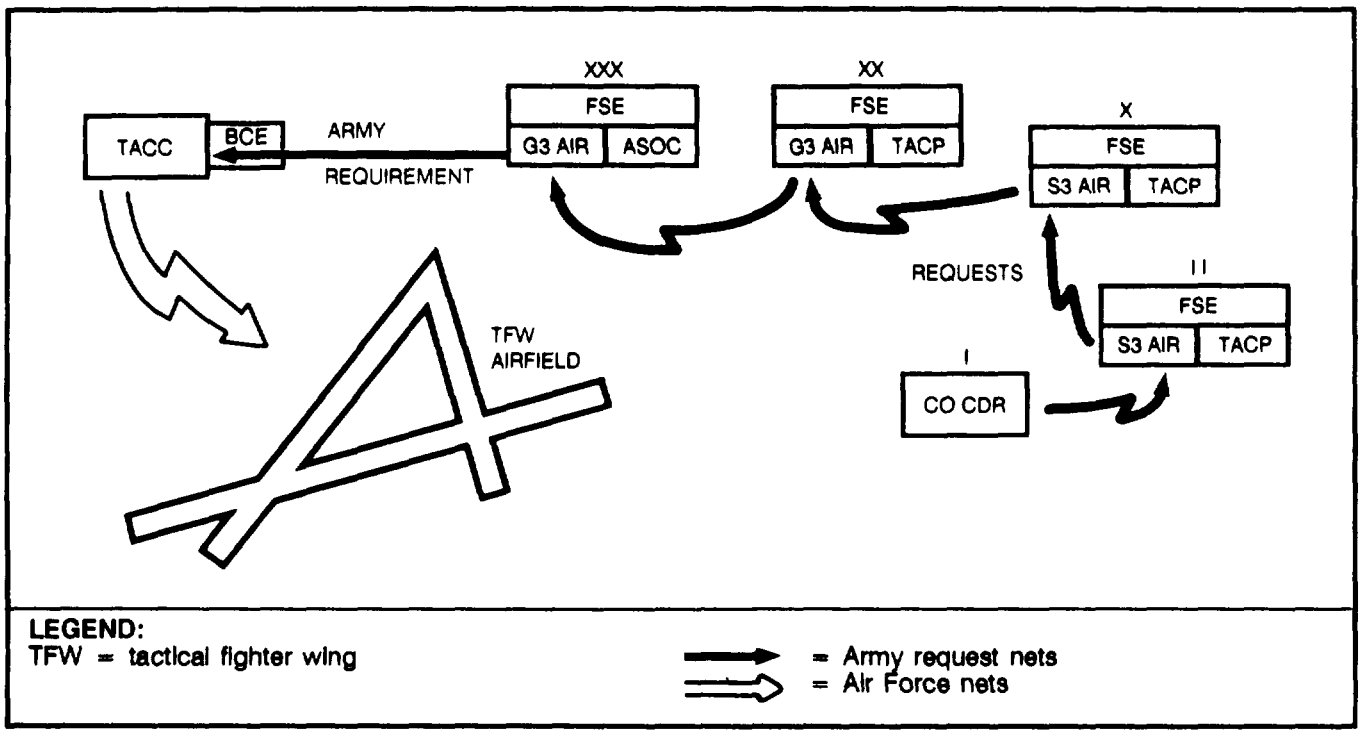
- Scheduled mission – CAS strike on a planned target at a planned time (TOT).
- Alert mission–CAS strike on a planned target or target area executed when requested by the supported unit. Usually, this mission is launched from a ground alert (scramble); but it may be flown from an airborne alert status. Alert (on-call) CAS allows the ground commander to designate a general target area within which targets may need to be attacked. The ground commander designates a conditional period within which he will later determine specific times for attacking the targets.

To plan CAS, the S3 air must work closely with the S3, FSO, and ALO.

Requirements that can be foreseen in time to be included in the tactical air control center (TACC) air tasking order (ATO) are forwarded as preplanned air requests. Ground unit planners must forward CAS requests as soon as they can be forecast. These requests for CAS normally do not include detailed timing information because of the lead time involved. Preplanned CAS requests involve any information, even general information about planned schemes of maneuver, that can be used in the apportionment, allocation, and distribution cycle. Estimates of weapons effects needed by percentage (for example, 60 percent antiarmor and 40 percent antipersonnel), sortie time flows, peak need times, and anticipated distribution patterns are vital to preplanning the air tasking order. The ALOs and S3s at all planning echelons must ensure that such information is forwarded through the battlefield control element (BCE) as soon as it is foreseen by the echelon planners. Do not wait to plan all details of an individual CAS mission before forwarding preplanning data to higher echelons.

There are specific request channels for preplanned CAS. Requests for preplanned tactical air support missions are submitted to the FS cell. The commander, ALO, and S3 at each echelon evaluate the request; coordinate such requirements as airspace, fires, and intelligence; consolidate; and if approved, assign a priority or precedence to the request. The S3 air then forwards approved requests over Army communications nets to the next higher echelon. The FS cell of the corps main CP makes the final consolidation and approves preplanned requests for TACAIR support. After approval, the requests become the ground force request that is passed through the BCE to the TACC for execution. The requestor is notified of the approval. The requestor is also notified if requests are disapproved at any echelon. The TACC does the necessary planning and includes the mission in the ATO for execution. Requests for CAS that do not reach the TACC in time to be included in the ATO are treated by the air support operations center (ASOC) the same as immediate requests.

PREPLANNED CLOSE AIR SUPPORT REQUEST CHANNELS



The CAS aircraft assigned to attack preplanned targets may be diverted to higher priority targets; therefore, the FSO should plan for the engagement of CAS targets by alternate fire support assets. Specific planning considerations are as follows:

Ž Unit mission.

Ž Enemy air defenses. What are the enemy air defense capabilities?

Ž Terrain, Does the terrain restrict the use of any type of munition or aircraft?

Ž Weather, Does the weather favor the use of aircraft? What is the weather forecast for the immediate future?

Ž Time available for planning.

Ž Weapons effects. What types of targets are to be engaged, and what are the desired weapons effects?

Ž Command, control, and communications.

Ž Mission response time.

Ž Close air support and artillery integration.

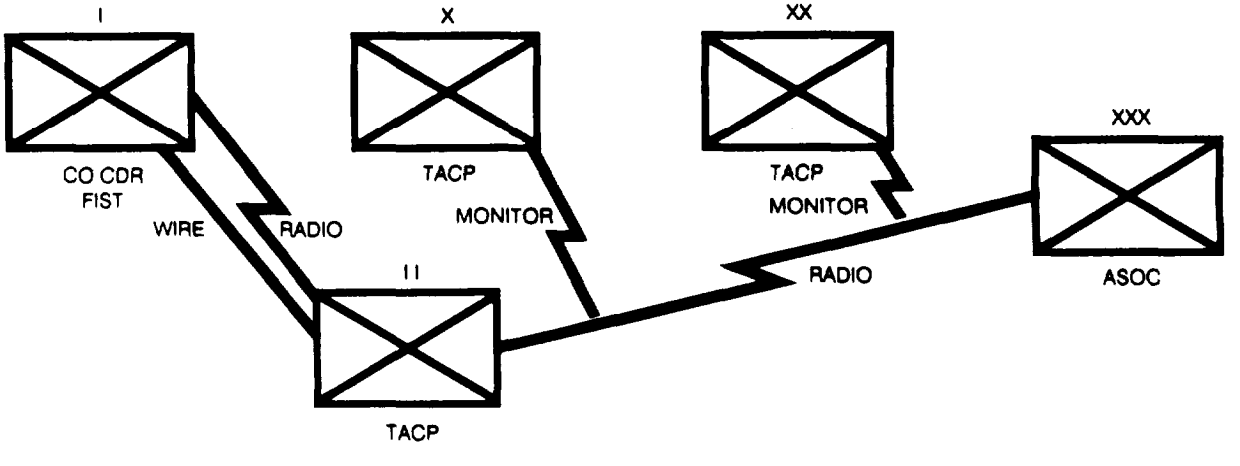
Immediate Close Air Support

Immediate requests are used for air support mission requirements that were identified too late to be included in the current air tasking order. They are sent through specific request channels.

Those requests initiated below battalion level are forwarded to the battalion command post by the most rapid means available. At battalion level, the commander, ALO, and S3 consider each request. Approved requests are transmitted by the TACP over the Air Force air request net directly to the ASOC collocated with the corps or separate division TOC. The TACP at each intermediate headquarters monitors and acknowledges receipt of the request. Silence by

an intermediate TACP indicates approval by the associated headquarters unless, within a specified period, a disapproval is transmitted. The ASOC coordinates with the corps G3 air for all air support requests initiated by the corps. Meanwhile, intermediate TACPs pass the request to the associated headquarters G3 or S3 for action and coordination. All echelons coordinate simultaneously. If any Army echelon above the initiating level disapproves a request or substitutes another support means (for example, Army aviation or field artillery), the TACP at that headquarters notifies the ASOC at corps and the originating TACP, which notifies the requester. When the corps commander or his representative approves the request, the ASOC initiates the necessary action to satisfy the request. If all distributed sorties are committed, the corps commander can request additional sorties from the next higher echelon, when appropriate. If the ASOC has no CAS missions available, it can, with Army concurrence, divert sorties from lower priority targets or request support from lateral or higher commands.

IMMEDIATE CLOSE AIR SUPPORT REQUEST CHANNELS



NOTE: Air Force communications channels are used. Corps is the final approval authority.

Organization

At brigade and battalion levels, a TACP advises the maneuver commander on the capabilities and proper use of air support, requests immediate CAS through the Air Force air request net, helps with planning if required, and provides final control of CAS missions. The TACP is composed of two ALOs who are trained to control air strikes and two NCOs called tactical air command and control specialists (TACCSs). At battalion, the TACP is composed of one ALO and two enlisted specialists. At least one TACCs per battalion TACP is qualified as an ETAC (qualified to control CAS sorties).

The person who has final control of CAS missions, formerly referred to as the FAC, will vary from mission to mission according to the situation. Threat permitting, the AFAC is best able to control CAS because of his mobility, wide field of observation, and improved line-of-sight communications. If an AFAC is not available, the ALO and ETAC members of the TACP are qualified to control CAS from the ground. In this publication, the term *FAC* has been used to refer to the particular individual – ALO, ETAC, or AFAC – who performs the final coordination and control of CAS missions.

Attack Coordination

After submitting a CAS request, the TACP and FIST must take a number of actions before munitions can hit the target.

Communications

Radio frequencies (primary and alternate) and laser designation settings used by FISTS, TACPs, airborne FACS, tactical air controllers-airborne (TAC-As), and tactical fighters should be predetermined and forwarded to all parties. Not all CAS aircraft have FM radios. The TACP may have to relay FIST FM transmissions to the fighters by UHF (Have Quick) or VHF if available. The Army SOP is to operate FM-secure. Most Air Force FM is not secure-capable. Even if it is secure-capable, Air Force FM is not compatible with the Army secure FM because of encoding procedures.

Authentication

Proper authentication procedures must be used during CAS missions. Because Air Force and Army authentication tables differ, each air and ground element must obtain the joint authenticator, AKAC-1553, through unit communications security (COMSEC) custodians. This joint authenticator, which has been developed for crisis or contingency and exercise use only, is called the dryad numeral authentication system. This system is used for joint interoperability worldwide and is a part of the intertheater COMSEC package.

Tactical Air Control Party Functions

The battalion TACP directs contact between a FAC and a FIST on a common frequency. The FAC moves to where he can observe the target. When the FAC arrives, the FIST orients him to the target friendly positions, and known enemy ADA positions. If no FAC is available, the TACP contacts the FIST. The FIST becomes the eyes for the TACP in the target area. These actions take place while higher echelons process the air request.

After approval of the air request, either the TACP or the TAC-A or both receive fighter mission data from the ASOC. Data include–

- Mission number.
- Fighter call sign.
- Number and type of aircraft.
- Ordnance.
- Time on target.

While the air request is being processed the FAC, battalion ALO, or TACP determines additional mission-essential information. Such information includes, but is not limited to–

Ž Updated target location and identification means.

Ž Availability of fires for SEAD.

Ž Fighter communications capability.

Ž Attack restrictions.

Ž Friendly AD considerations.

Ž Time factors for the attack.

If the aircraft have airborne laser spot trackers (LSTs), the laser setting must be passed to the attack aircraft. If the aircraft have laser-guided weapons (LGWs), the laser setting to be used (Army setting for LSTs, Air Force setting for LGWs) and the laser target line must be passed to the TACP.

When the aircraft arrive in the target area, the TACP gives them current target information navigation data, and a verbal *picture* of the specific target. The FAC must pass enough information that the pilots can positively identify the targets. If required he calls corrections from target marks or the flight leader's bombs. He is prepared to abort the attack if the safety of friendly troops is threatened. During the entire attack the FAC watches for enemy surface-to-air fires and warns the aircraft accordingly.

After the attack, the FAC or FIST or both send their bomb damage assessment (BDA) to the TACP. The TACP relays the BDA to the appropriate headquarters.

Airborne Forward Air Controller Functions

The airborne FAC, when available, usually operates in a fixed-wing aircraft. With his excellent mobility and improved line-of-sight communications, he is better able to observe and describe the target. His functions are–

Ž To coordinate with the TACP and ground commander.

Ž To relay CAS requests if required.

Ž To observe the target.

Ž To provide or relay the mission briefing to the flight leader.

Ž To provide final attack control when the threat permits.

Ž To mark the target with WP rockets.

Ž To observe (if possible) and report BDA.

Fire Support Team Functions

As new targets appear, the company FIST may be in the best observation position. The FIST can help in CAS by orienting the FAC to the target, friendly positions, and enemy ADA. The FIST should also prepare to initiate on-call SEAD and to mark the target. The call for fire for SEAD or for target marking goes to a predesignated fire direction center.

If no FAC is available, the FIST becomes the eyes of the battalion TACP. Target data from the FIST are relayed to the fighters by the TACP. Should troop safety so require, the FIST calls for a mission-abort through the TACP. He also passes munitions corrections and assesses mission results. Regardless of the type of munitions used, Air Force mission results are referred to as BDA.

If no AFAC or battalion TACP is available in an emergency, the FIST will direct tactical fighters which are equipped with compatible radios. In this case, the brigade TACP prepares the CAS mission briefing.

Laser Target Designation Procedures

The TACP coordinates with the FIST on using lasers to accurately mark targets for aircraft with airborne LSTs. A FIST can mark a target by placing a laser spot on or near the target. The LST-equipped aircraft receives the reflected laser energy, locks onto it, and displays an aiming cue in the pilot's head-up display (HUD). The pilot uses the aiming cue to locate the target and aim the aircraft weapons.

The LST on the A-7 is called a target identifier set, laser (TISL) and on the A-10 aircraft, a Pave Penny. The Air Force uses FIST laser settings with Pave Penny or TISL, while the FIST uses the Air Force laser setting for Air Force LGWs. When Air Force settings are required, the TACP passes them to the FIST. The USAF laser code is a four-digit number; the first digit is always 1. The Army laser code uses the last three digits of the USAF code. The laser code setting of three digits is passed in the CAS briefing.

Even when using laser designations, TACPs and FISTS should also consider marking with smoke. Marking smoke allows a pilot to point his LST accurately enough to acquire the laser spot. Caution should be used to avoid laser-to-target visibility problems or attenuation problems caused by the smoke. However, without marking rounds, aircraft may be pointed too far away from the target area for the LST to acquire the laser spot.

Effective employment of laser designation depends on timely and correct radio calls between the FAC or FIST and the CAS aircraft. The pilot will make the following radio calls when using a laser:

Ž **10 SECONDS** (time until **LASER ON** call is expected).

Ž **LASER ON.**

Ž **SPOT.**

Ž **TERMINATE.**

Saying **10 SECONDS** means the pilot wants the laser on in approximately 10 seconds. The FAC relays the call to the laser designator operator (LDO).

LASER ON directs the FAC or FIST to ensure that the LDO designates the target immediately. Maximum laser designation time is usually 20 seconds. The pilot may request a longer laser-on time by saying **LASER ON** and the time; for example, **LASER ON, 30 SECONDS.** The FAC should acknowledge this call.

The pilot calls **SPOT** when he acquires the laser spot. This confirms to the FAC and the pilot's wingman that the pilot sees the designated target.

The last all in the sequence is **TERMINATE.** The pilot makes this call to turn the laser off. Minimizing laser-on time is important in a laser countermeasure environment and when battery-operated laser designators are used. The LDO will turn the designator off–

Ž When he hears **TERMINATE.**

Ž When the weapon hits the target.

Ž After 20 seconds (or longer, if requested).

Detailed information on CAS laser procedures is in TRADOC Pamphlet 34-3.

After a request for immediate CAS is approved the TACP and FIST perform the functions shown on the next page.

LASER TARGET DESIGNATION FUNCTIONS OF TACTICAL AIR CONTROL PARTY AND FIRE SUPPORT TEAM

WHEN FAC CAN OBSERVE TARGET	WHEN FAC CANNOT OBSERVE TARGET
The FAC locates– • The target. • Friendly forces. • Enemy air defense. The FAC passes the mission briefing. The FAC requests, as required– • AD suppression. • Target marking. • Abort code (from fighters). The FAC– • Considers troop safety. • Warns flight leader of enemy AD fires. • Orients flight leader to target. • Calls corrections. • Provides BDA. The FIST helps the FAC– • Locate the target. • Locate friendly forces. • Locate enemy air defense. • Initiate and control on-call SEAD. • Mark the target with smoke or laser-designate. • Integrate fire support with CAS.	The TACP passes the following target information from the FIST to the TAC-A or flight leader: • Target location. • Description. • Location of friendly forces. • FIST frequencies and call signs. • Laser code. The TACP requests, as required– • AD suppression. • Target marking. • Abort code (from fighters). The TACP is prepared to relay the following instructions to the flight leader: • Orientation to the target. • Abort calls. • AD warnings. • Corrections. • Troop safety. The TACP relays bomb assessment from the FIST. The FIST passes target information to the TAC-A and is prepared– • To initiate and control on-call SEAD. • To mark with smoke or laser-designate the target. • To pick up fighters visually, if possible. • To orient fighters to the target. • To call corrections, if appropriate. • To call **ABORT** (danger to friendly ground or air forces or wrong target), if required. • To provide BDA.

Planning Considerations

CAS mission success is directly related to thorough mission planning. Planners must consider weather, target acquisition, SEAD, target identification, identification of friendly forces, general ordnance characteristics, final attack heading, troop safety, and integration of CAS and artillery.

Weather

Weather is one of the most important considerations in visual employment of weapons. Poor light, limited visibility (rain, snow, fog, smoke, or night), low clouds, or attack into a low sun all hinder target identification. Gusty winds can degrade the accuracy of weapons employment.

Target Acquisition

Well-camouflaged or small stationary targets are difficult to acquire from fast-moving aircraft, as are targets masked by hills or other natural cover. On the other hand moving vehicles may highlight themselves by their dust trails, exhaust smoke, and relative movement against their background. The use of marking rounds can key the attacking pilot's eyes to the right target area, enhance target identification and help ensure first-pass success.

Suppression of Enemy Air Defenses

SEAD may be required, depending on the capabilities of the tactical aircraft and the presence of enemy air defense systems in the target area.

Target Identification

A precise description of the target in relation to terrain features easily visible from the air, smoke or laser target marking, or other means is critical to avoid attacking friendly forces by mistake. Target identification is always difficult at the ranges at which fighter aircraft must line up on the target. This task becomes even more difficult when both sides use similar vehicles.

Radar beacons are an alternate means of target identification. USREDCOM Manual 525-5 provides a single-source document for planning and executing beacon procedures.

Identification of Friendly Forces

Pilots of fighter aircraft must know the position of friendly forces before attacking. Several safe means of friendly identification may be used. These include a mirror flash, a marker panel, and the direction and distance from prominent land features or target marks.

General Ordnance Characteristics

Tactical fighter aircraft can use a wide variety of general- or specific-use weapons. Newer weapons are designed to produce specific effects against specific targets. Some weapons require restrictions when used with troops in contact. Modifications to existing aircraft, such as improved weapons delivery computers and sight systems, also improve their capability to use existing general-purpose (GP) weapons more effectively.

Final Attack Heading

Choice of the final attack heading depends on considerations of troop safety, aircraft survivability, and optimum weapons effects. For example, overflying a ZSU-23-4 on an otherwise perfect final attack heading would be foolish. In general, linear targets should be attacked at a small angle off the long axis to ensure target coverage and to increase the probability of multiple hits. Missiles or bombs are effective from any angle; cannons, however, are more effective against the sides and rears of armored vehicles.

Troop Safety

Troop safety is a key consideration in using CAS. The primary cause of friendly air attacks on friendly troops is misidentification of friendly forces as enemy forces.

Close Air Support-Artillery Integration

Army artillery and tactical air power are complementary. Because artillery support available to ground forces is more continuous and faster to respond than CAS, ground elements depend heavily on artillery and are reluctant to impose firing restrictions. CAS missions, therefore, must integrate with artillery so that only limited firing restrictions are required. The ACA is the fire support coordinating measure that accomplishes this integration.

Airspace Coordination Area Development. The following criteria will be considered in developing an ACA for an operation:

- The ACA should be easily identifiable from the air.
- It must allow the particular aircraft involved enough room for maneuver.
- It must allow access to and egress from the initial point to the target area. Establish an IP that is deconflicted with the mortars, AD, and FA.
- It must consider the ordnance and capabilities of the aircraft. (Will the aircraft use the standoff technique, or must it overfly the target?)
- When possible, it should include terrain that masks aircraft from hostile air defense systems.
- It should separate the aircraft from friendly fires and their effects by either time or space.
- It should allow surface systems to provide SEAD and to mark targets if necessary.
- It should be simple so dissemination to both pilots and surface systems is easy.

Separation Plans. FACs learn four standard separation plans and coordination procedures at the Air-Ground Operations School and basic FAC flight school:

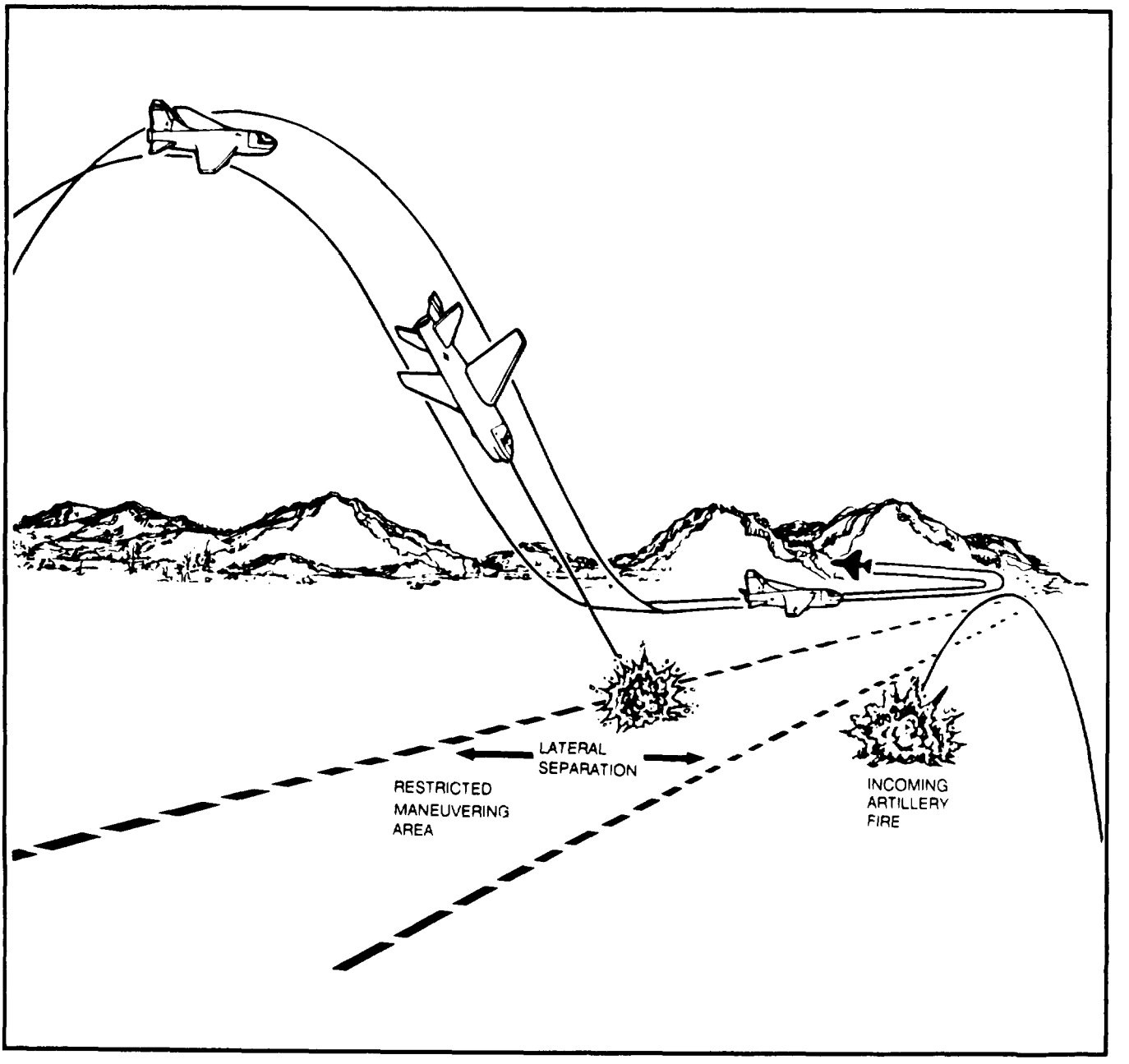
- Lateral separation.
- Altitude separation.
- Time separation.
- Altitude and lateral separation.

The degree to which these plans are practiced varies greatly. It is based on the theater, the availability and restrictions of ranges, and unit safety restrictions. Air Force FACs understand the importance of not restricting Army artillery unnecessarily during CAS.

Lateral Separation (Adjacent Targets). Lateral separation plans are for coordinating attacks against two targets that are close together. The FAC needs to know the gun-target (GT) line so he can restrict any fighter attack run from crossing this line. Establishing a temporary

ACA is one way to do this, It will keep the fighters and airborne FAC away from indirect supporting fires. The ACA should be big enough that fighters can operate over the target yet small enough that supporting fires are not too restricted. The ACA can be defined by grid coordinates, geographical features, or time.

ARTILLERY-FIGHTER LATERAL SEPARATION



Altitude Separation (Same Target). Altitude separation plans apply when both CAS and artillery attack the same target and the artillery fires at a low angle. Lateral separation and recovery altitude restrictions ensure clearance from the artillery trajectory and frag pattern. Other restrictions normally include–

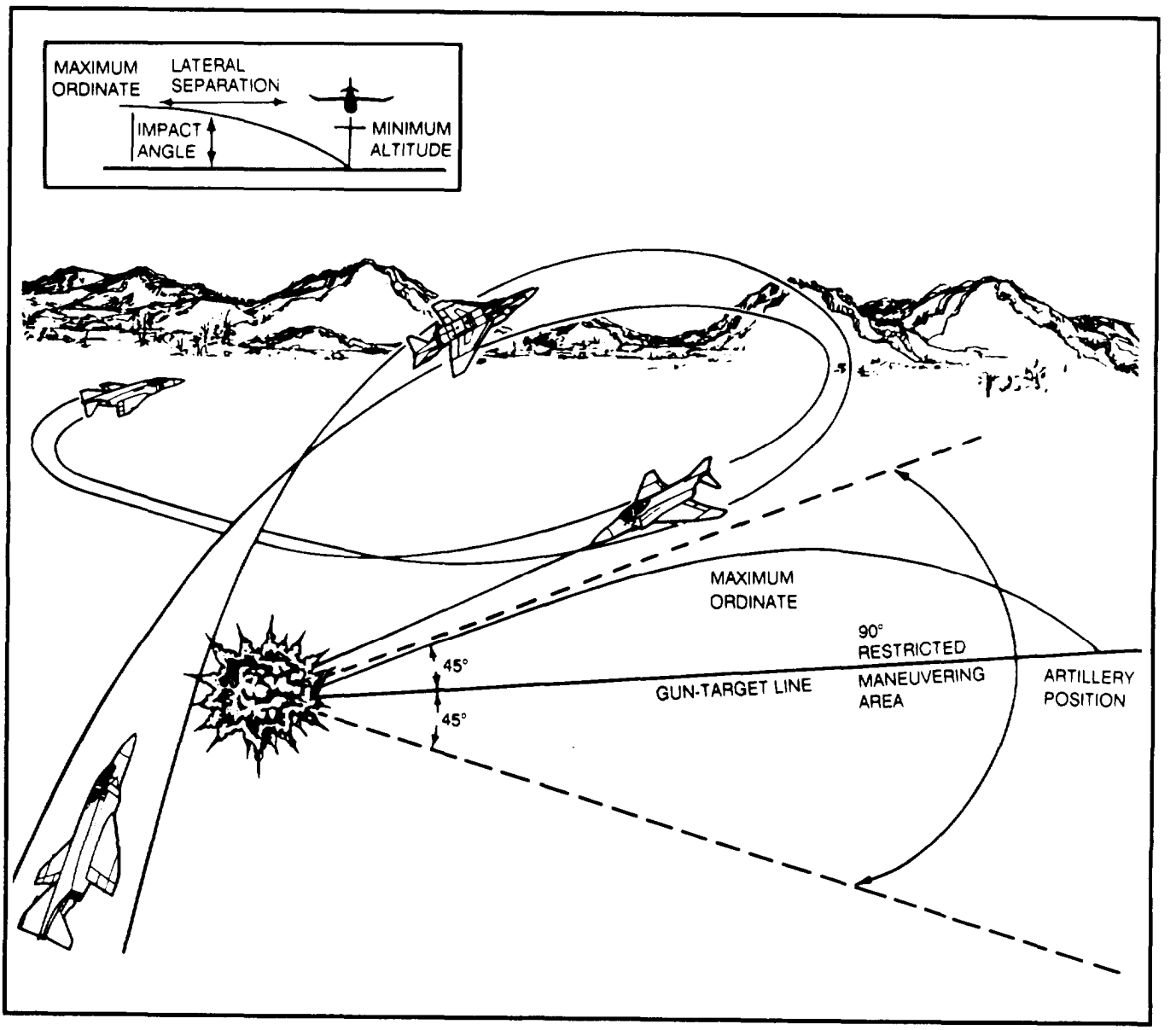
Ž No change in artillery trajectories.

Ž No overflight of the GT line by the fighters except at the impact point.

Ž Restricted final attack heading.

When fighter pilots cannot adhere to these restrictions, the FAC must instruct them to recover above the maximum ordinate altitude or fragmentation pattern, whichever is higher.

ARTILLERY-FIGHTER ALTITUDE SEPARATION



Time Separation (Same Target.). Time separation plans specify the intends during which artillery and/or mortars fire. The FAC determines these intervals in conjunction with the FSO. The artillery and/or mortar fires are controlled by the call for fire. The aircraft is controlled by appropriate instructions included in the CAS mission briefing, sometimes called the *nine-line brief.* These controls ensure a time separation of aircraft and artillery and/or mortar fires on the same target or target area.

EXAMPLE OF TIME SEPARATION

The FSO and ALO determine the IP to be used. The time separation agreed upon between the ALO and FSO is 30 seconds.

Call for Fire:

(BATTALION FDC), **THIS IS** (TF FSO) (use appropriate call signs).

TARGET AC2101, 2-MINUTE SEAD PROGRAM, FINAL VOLLEY IMPACT 6 MINUTES FROM MY MARK.[1]

TARGET AC2103 MARKING ROUND 6 MINUTES FROM MY MARK, PREPARE TO MARK.[2]

PREPARE TO MARK, 5, 4, 3, 2, 1, MARK. (The mark given is for both the SEAD program and the marking round.)

CAS Mission Briefing (transmitted concurrently by the ALO):

(1) X RAY.

(2) 075 OFFSET LEFT.

(3) 10.2.

(4) 1,200 FEET (mean sea level [MSL]).

(5) TANK COMPANY ATTACKING WEST.

(6) QA044092.

(7) WP.

(8) 2,000 METERS SOUTH ON HIGH GROUND.

(9) WEST TO AVOID ARTILLERY SUPPRESSION.

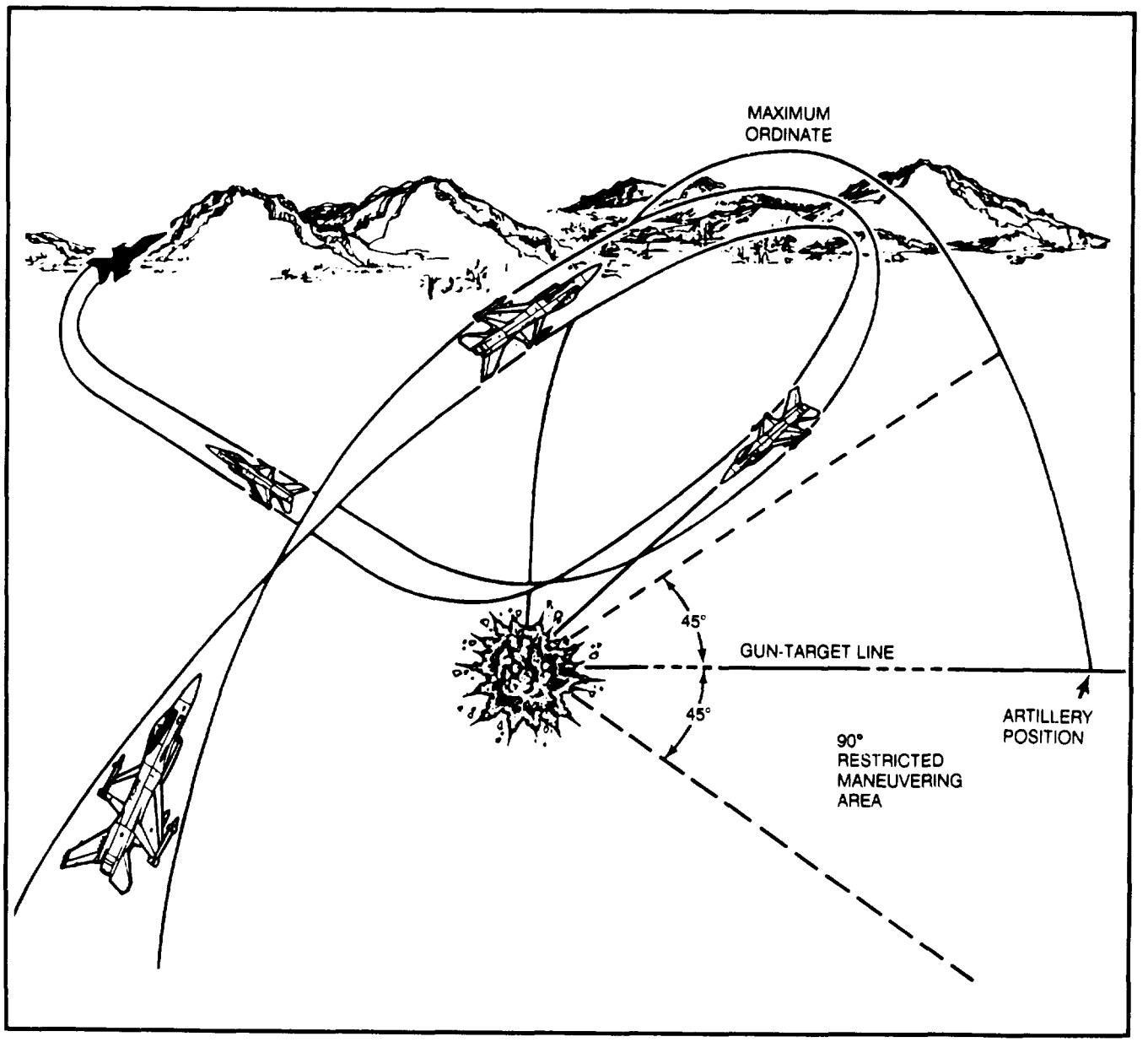
REMARKS: TOT 6 MINUTES FROM MY MARK. (Abort instructions, in case rounds are not complete on SEAD program, may be issued here.)

The FSO waits 30 seconds, taking into account transmission time, and tells the ALO to give the 6-minute mark to the aircraft. The ALO contacts the aircraft and transmits **6-MINUTE MARK, MARK.**

At minute 4 of the schedule, the first artillery and/or mortar rounds impact; at minute 6, the final rounds impact (both suppression and marking rounds). Aircraft will be 30 seconds behind the final volley impacting. The ALO will clear the aircraft to attack.[3]

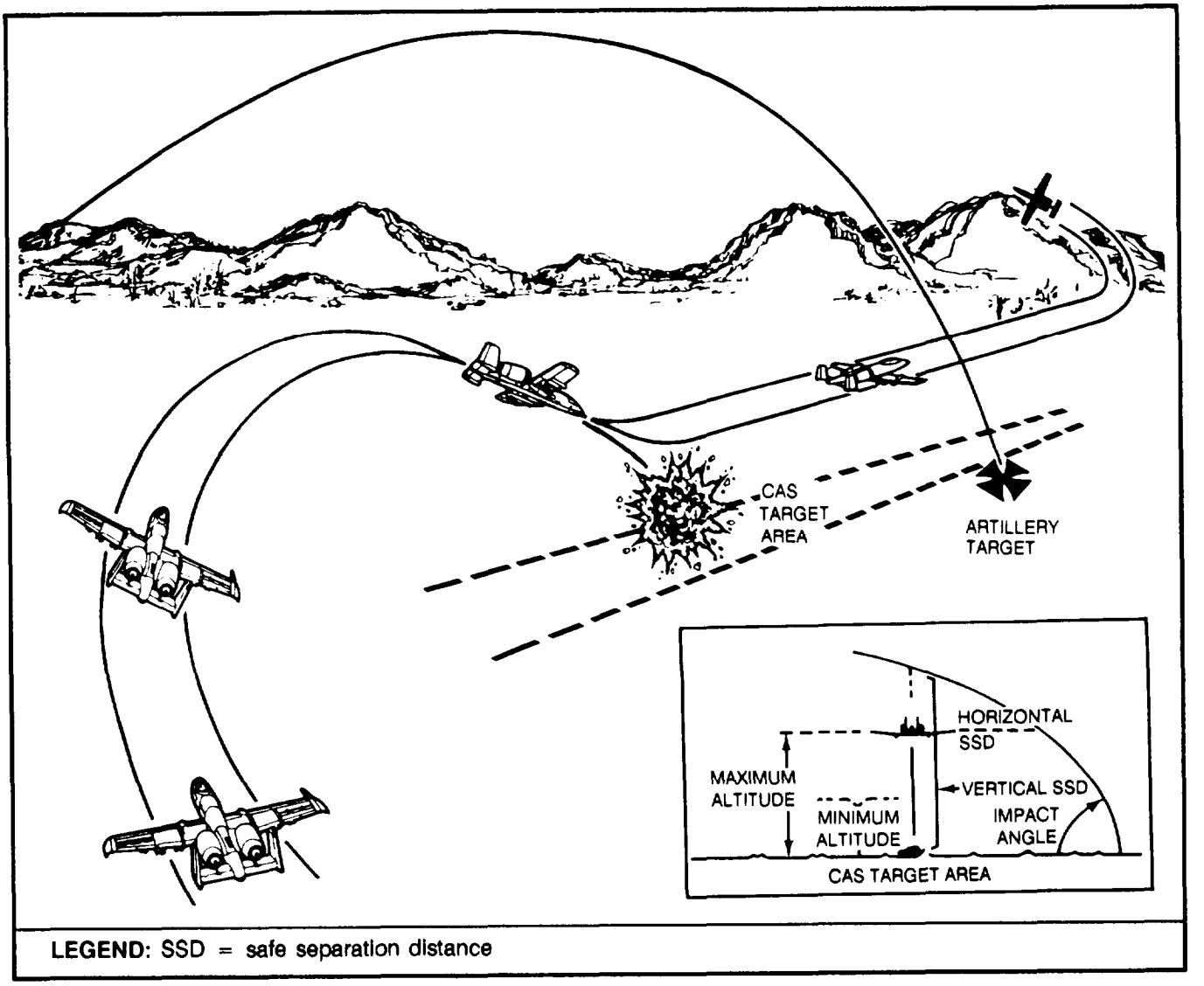
[1]The artillery and/or mortars execute the mission as a schedule of fires.
[2]The marking round may or may not be requested.
[3]The artillery and/or mortars may still be firing elsewhere in the zone but only through positive clearance by the TF FSO.

ARTILLERY-FIGHTER TIME SEPARATION



Altitude and Lateral Separation (Closely Adjacent Targets). Altitude and lateral separation plans are the most restrictive. They provide for SEAD when the CAS target is between the artillery and enemy antiaircraft positions. As shown in the graphic on the next page, the vertical restriction is a maximum altitude directly over the CAS target and under the gun line. This restriction provides both horizontal and vertical clearance. The fighters need to know the minimum ordinate over the target. To avoid artillery, they must remain well below this altitude when near the gun-target line. Normally, the fighters will restrict their attack headings to within + 45° of a line perpendicular to the gun line.

ARTILLERY-FIGHTER LATERAL AND ALTITUDE SEPARATION



LEGEND: SSD = safe separation distance

Attack Execution

Close Air Support Mission Briefing

The CAS mission briefing format varies slightly from theater to theater; however, the information is the same. Target information may be passed to a TACP, an airborne FAC, or a TAC-A. It will be properly formatted and passed to the flight leader.

EXAMPLE CLOSE AIR SUPPORT BRIEF

CLOSE AIR SUPPORT BRIEF (GIVEN TO THE AIRCRAFT)

(AIRCRAFT CALL SIGN) THIS IS (YOUR CALL SIGN) CAS BRIEFING FOLLOWS:

(1. INITIAL POINT (IP)) " XRAY "

(2. HEADING (IP TO TARGET [TGT]) " 075 "
(MAGNETIC) (OFFSET:) " L / R "

(3. DISTANCE (IP TO TGT)) " 10.2 " (NAUTICAL MILES)

(4. TARGET ELEVATION) " 1,200 " (FEET MEAN SEA LEVEL)

(5. TARGET DESCRIPTION) " TANK COMPANY ATTACKING WEST "

(6. TARGET LOCATION) " QA044092 "
(LATTITUDE/LONGITUDE OR UTM OR OFFSETS OR VISUAL)

CLOSE AIR SUPPORT BRIEF (CONT'D)

(7. TYPE MARK) " LASER " (CODE) " 372 "
(WP, BEACON, LASER) (BEACON, LASER)

(8. LOCATION OF FRIENDLIES) " 2,000 METERS SOUTH ON HIGH GROUND "

(9.) "EGRESS WEST TO AVOID ARTILLERY SUPPRESSION "

(REMARKS)" "

(TIME ON TARGET) "TOT _____ " OR
(TIME TO TARGET (TTT)) "STAND BY _____ (MIN) PLUS _____ (SEC) HACK"

OMIT DATA NOT REQUIRED. LINE NUMBERS ARE NOT TRANSMITTED. UNITS OF MEASURE ARE STANDARD; SPECIFY IF OTHER UNITS OF MEASURE ARE USED.

NOTES:
1. For further information, see TC 90-7
2. The three-digit number in item 7 is the laser designator setting.

The preceding brief would be transmitted as follows: **X RAY** (pause), **075** (pause), **10.2** (pause), **1,200** (pause), **TANK COMPANY ATTACKING WEST** (pause), **QA044092** (pause), **LASER 372** (pause), **2,000 METERS SOUTH ON HIGH GROUND** (pause), **EGRESS WEST TO AVOID ARTILLERY SUPPRESSION.**

The mission briefing format may include the following additional information:

- Hazards (weather or high terrain, for example).
- Attack restrictions (assume none unless specified).
- Attack frequency and FAC call sign.
- Fire support integration.
- Threat update.
- Detailed description of target area.
- Abort code (obtained from the attack aircraft).
- Clearance (for example, **CLEARED TO DEPART, CALL DEPARTING).**

Additional data may be passed if the situation permits. The FAC will assume that a jamming environment exists and transmit the FAC-to-fighter briefing using short, concise transmissions. When the FAC gets to the additional information step, he may try to expand on his briefing, The fighters should use this time to ask for repeats or to ask questions critical to the attack. Some information can be passed only after the fighters see the target area.

Final Attack Control

At the contact point, the TAC-A, TACP, or FAC updates the flight leader as he flies toward his initial point. When cleared to attack, the flight leader switches to the attack frequency, checks in with the FAC or FIST, and calls as his flight departs the 1P, This radio call is used to coordinate SEAD and/or marking rounds, Whenever tactically possible, the FAC will try to pick up the fighters visually and give them final directions to help the pilots acquire the target.

Direction and Distance Reference

If the tactical situation permits, a direction and distance reference can be used to aid in target acquisition. The FAC should provide a common reference for orientation. For example, **THE MAIN ROAD** (or river, tree line, and so forth) **RUNS EAST-WEST.** Next, the FAC must select some discernible ground feature to establish a common distance reference. A river, road, or field can be used; and distances are given in meters. For example, **THE MAIN FIELD** (or drop zone, assault strip, and so forth) **IS 100 METERS LONG.** Use definite statements in this and all other briefing items, The fighters expect the FAC to give them the best available measurements and estimates, Words like *about, approximately, let's,* and *please* waste radio transmission time. Specific and authoritative instructions are needed to accomplish a mission.

EXAMPLES OF DIRECTION AND DISTANCE REFERENCE

STAR 11, THIS IS ALFA 53.

THE RIVER RUNS NORTH-SOUTH.

THE FIELD IS 100 METERS LONG.

OFF YOUR RIGHT WING, NOTE SANDBAR IN RIVER.

TARGET IS 400 METERS EAST OF SANDBAR.

and

STAR 11, THIS IS ALFA 53.

THE TREE LINE RUNS EAST-WEST.

FROM X INTERSECTION TO Y INTERSECTION IS 100 METERS.

HALFWAY BETWEEN X AND Y, TARGET IS NORTH 25 METERS.

Call to Abort Attack

If the fighters are not aligned with the correct target or if it appears that friendly troops may be endangered, the attack must be aborted. The authentication abort code is obtained from the attack aircraft during the CAS briefing, To abort a CAS attack, the FAC and FIST must have the same authentication system as the aircraft.

The CAS abort procedure uses the challenge-reply response. The flight leader gives the FAC the two-letter challenge code. The reply letter is the abort-call code word. The reply letter will be given to the fighters only when an abort is desired. The letter should be transmitted after the words **ABORT, ABORT, ABORT.**

EXAMPLE ABORT CALL

STAR 11, ALFA 53.

ABORT, ABORT, ABORT.

DELTA (authentication of the abort code received from the attack aircraft).

Reattacks

The FAC or FIST coordinates reattacks with the fighters, This may require additional coordination such as SEAD, fire support coordination, and re-marking the target, In a medium- to high-threat environment, reattacks degrade aircraft survivability.

Bomb Damage Assessment

The BDA provides the same information as does mortar or artillery fire mission surveillance, The TACP relays the BDA through USAF channels, while the FIST uses Army channels,

Night Close Air Support

The capability of TACAIR to attack moving targets or to provide CAS at night is limited to low-threat situations. In a night high-threat scenario, current capability is very limited, To enhance execution of night CAS in the future, the Air Force is acquiring additional night-capable systems such as the low-altitude navigation and targeting infrared for night system (LANTIRN).

Advantages. For tactical fighters engaged in CAS, the most important advantage of night is the limitation it imposes on all enemy optically-sighted antiaircraft artillery (AAA) and infrared (IR) surface-to-air missiles (SAMs). This is particularly true if operators do not have night vision devices, Also, airborne and ground illumination may degrade enemy night vision capabilities.

Disadvantages. Darkness imposes limitations on the use of tactical fighters for CAS, During night and twilight, pilots have more difficulty visually pinpointing targets and accurately locating enemy and friendly forces.

Levels of Threat Air Defense. Enemy muzzle flash, tracer, and missile burn are easier to identify at night. However, radar-guided SAMs and AAA and enemy air-to-air operations may hinder night CAS operations.

Low-Threat Close Air Support. The Air Force considers small arms, optically-sighted possible SA-7, and limited enemy counterair - operations as low-threat defenses, In such an environment, expect the Air Force to fly more night CAS missions.

High-Threat Close Air Support. Radar-guided SAMs and AAA and enemy air-to-air operations pose a high threat to CAS aircraft. Such defenses may cause high losses and require limiting CAS to tactical emergencies. SEAD operations greatly increase the chances of success.

Planning. CAS missions at night require extensive planning. The TACPs and FISTS must emphasize –

- Target and friendly force identification.
- The availability of mortars or artillery for target illumination and SEAD.

The maneuver commander, his chain of command, and the ALO must plan and coordinate as early as possible, The ALO, in turn, coordinates with the ASOC to ensure that they have addressed all the necessary planning considerations. In this regard, planning for night CAS should include all day CAS considerations plus those discussed in this appendix.

In general, two to four aircraft will perform night CAS. They will fly at low, medium, or gigh altitude, depending on the threat, offensive tactics, and avionics capabilities.

Targets. The first priority for a successful night CAS mission is identifying the target. The second is accurately marking the friendly forces whose safety is important. Once supporting aircraft have identified the target and friendly positions, enemy defenses can be referenced from the target location. The ground commander should rely first on Army assets to mark and/or illuminate the target, The Air Force ground or airborne FAC may also request Air Force illumination.

Airborne and Artillery Illumination. Artillery or mortar illumination is preferable because Army units can provide continuous illumination within their resources.

Flares released from AFAC aircraft, fighters, or flare aircraft can effectively illuminate an area. The A-10, A-7, F-4, OV-10, OA-37, and AC- 130 can carry target-marking flares. For effective lighting, the flares must be close enough to the target and at the proper height. Then fighters will be able to respond to a detailed target description. The Air Force fighters capable of night CAS missions under battlefield illumination are the A-10, A-7, F-16, F-4, and F-111,

Flare aircraft or AFAC aircraft can drop long-burning illumination markers (LOGS) to mark targets for use as a common reference for fighter employment, After being dropped, the LOGs burn on the ground for 30 minutes, Ground fires from any source may also serve the same purpose. Once there is a reference on the ground, fighters can use the reference mark to attack the marked position or other locations.

Enemy Ground Fire. Enemy ground fire, AAA, tracer rounds, and surface-to-air missile firings can disclose targets,

Laser Designators. Laser designators can enhance night target acquisition. CAS aircraft may be equipped with laser energy receivers known as laser spot trackers, They can acquire targets without using conventional illumination, The LST receives laser energy and provides cockpit head-up steering to the source. When LSTs are used, coordination is paramount between the ground unit, the FAC, and the fighters,

Radar. The F-4, F-16, F-111, and A-7 can use radar-significant terrain points, radar reflectors, or portable radar beacons to provide reference information for blind or beacon bombing,

Friendly Positions. Friendly marks improve CAS safety and can provide target area references, Tracers and radar beacons can serve both purposes. Whenever possible, friendly positions should be marked if safe separation is a factor.

Flares. Fired in the air, flares such as trip flares and 40-mm illuminating grenades are effective marks. However, they are usually visible to the enemy as well.

Both wind and cloud cover are important factors in using flares successfully at night. Planners and flare aircraft should calculate the time of delivery and the wind drift to make sure that the target is illuminated during the attack. Flares used during limited visibility can create a milk *bowl* effect, making it more difficult for an aircraft to find the target, When used under a cloud deck, the flares might highlight the fighters against the clouds. Under these conditions, LOGS will be better than flares to mark the target.

Lights. Strobe lights are often excellent for night marking. They are commonly used with blue or infrared filters. They can be made directional by using any opaque tube. In overcast conditions, strobe lights can be especially useful.

Bright directional lights are useful marks, especially in overcast conditions. They are highly directional and can easily be covered with colored filters. Vehicle lights are useful

nighttime marks; but for security, it is best to cover headlights and use tail or brake lights, Any light source that can be readily covered and uncovered can be used for coded signaling.

Combinations of Marks. Combinations or arrays of two or more signaling devices improve chances of acquisition and security of the signal.

Additional Night Close Air Support Capabilities. Other CAS capabilities for night operations are discussed below.

Laser Target Designation Systems. Pave Tack is a pod-contained laser target designating, ranging, and tracking system. Pave Tack uses forward-looking infrared (FLIR). It can be installed on the RF-4C, F-111F, and certain modified F-4E aircraft. The pod provides laser tracking of ground targets' for attack with conventional ordnance or laser-guided weapons.

AC-730A/H Spectre Gunships. The primary missions of the AC-130s are special operations and conventional CAS for troops in contact. They also conduct armed reconnaissance, convoy escort, and perimeter defense. AC-130s normally remain rear-area CAS assets and will not cross the FLOT unless the threat is low and friendly air superiority prevails. An AC-130 carries the following guns:

- 7.62 mm (AC-130A only) for use against personnel under light cover.
- 20 mm for use against personnel under light cover.
- 40 mm for use against trucks and personnel under medium cover.
- 105 mm (AC-130H only) for use against trucks, tanks, and personnel under any condition.

NOTE: Ammunition includes HE, WP smoke, and HE plastic tracers.

Using one sensor or a combination of them, AC-130s can locate enemy and friendly positions as follows:

- The radar can locate beacons and ground reflectors.
- The television (TV) or laser platform provides low-light-level TV (LLLTV) during darkness and during day or night laser designation.

Ž The IR detection set provides visual presentations of the temperature differentials between objects. IR strobes, reflective panels, or reflective tape can help locate friendly positions.

- Xenon are lamps and infrared lamps provide airborne illumination.

Ž The Black Crow direction finder searches for electromagnetic energy in subradar frequencies, Detectable signatures include those from generators, alternators, and some radio condensers.

Section IV. NAVAL GUNFIRE

General Mission

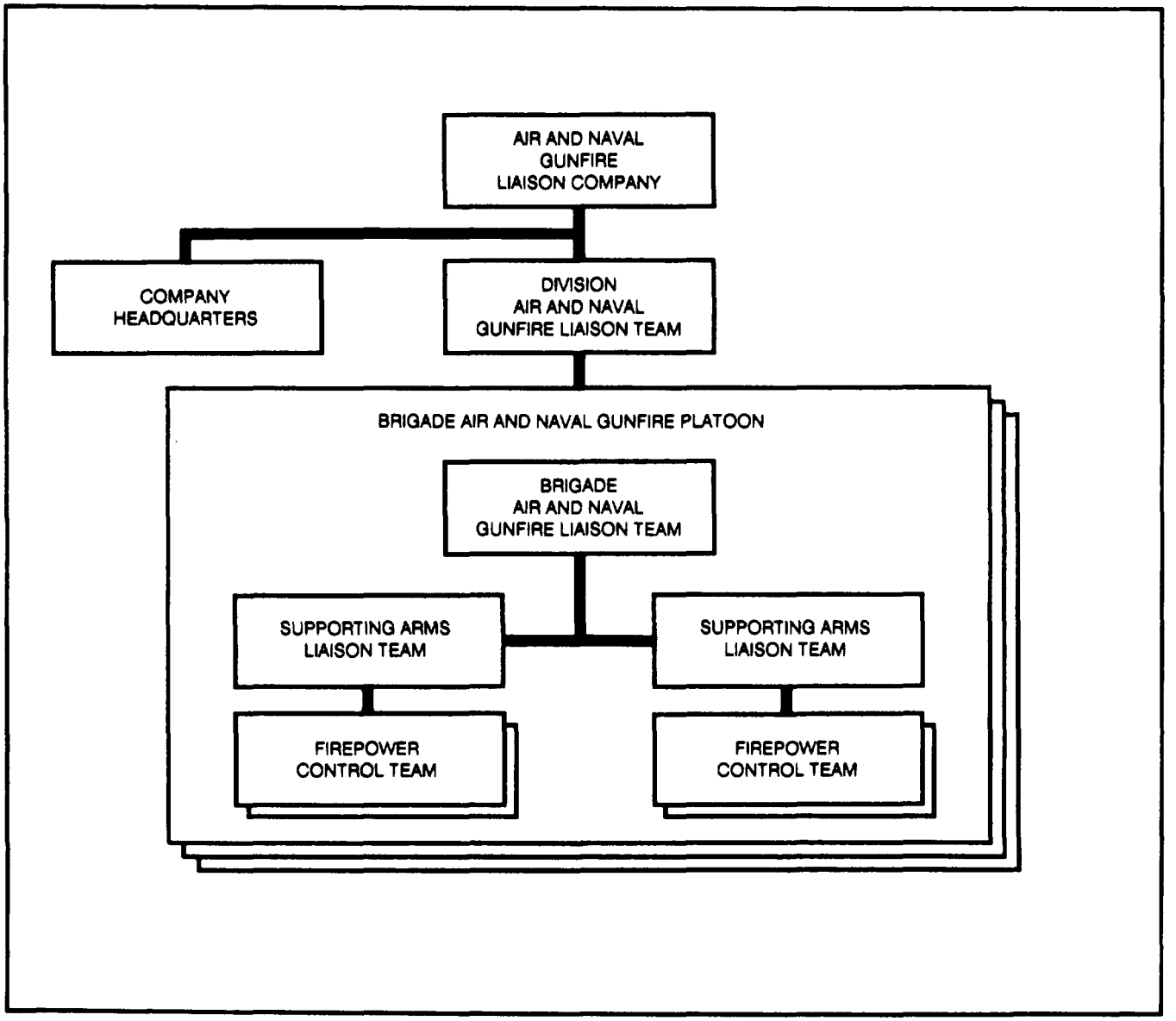
The general mission of naval gunfire support is to assist the ground force by destroying neutralizing, or suppressing targets that oppose that force.

Organization

Naval gunfire is coordinated by the brigade air and naval gunfire platoon, a part of the ANGLICO. The ANGLICO is a Marine organization. The brigade air and naval

gunfire platoon is organized and equipped to plan, request, coordinate, and control naval gunfire and naval air at the brigade level. Each brigade platoon is organized with a team to support the brigade and two battalion supporting arms liaison teams. Under normal conditions, each of two maneuver battalions is provided a SALT. The SALT is composed of two SALT officers and six personnel, who become part of the FS cell. Two firepower control teams are available to be sent to the maneuver companies to request, observe, and adjust naval fire support. The SALT officers coordinate all naval gunfire and supervise the activities of the FCTs. In addition, they advise the FSCOORD on all matters pertaining to naval gunfire employment, to include capabilities, limitations, and targets suitable for naval gunfire engagement.

ANGLICO ORGANIZATION



Tactical Missions

Naval gunfire ships are assigned one of two missions – direct support or general support – in much the same way that field artillery is organized for combat.

Direct Support

A ship in direct support usually supports a battalion. This ship can deliver both planned and call fires. Call (on-call) fires are normally requested and adjusted by the firepower control team of the supported unit or by an air spotter.

General Support

A ship is usually placed in general support of committed brigades and divisions. The fires for a GS ship are conducted as directed by the naval gunfire officer of the unit being supported. The primary purpose of a GS ship is to allow the supported commander to add depth to the fires of the DS ships without the necessity for requests to higher echelons An understanding of the capabilities and limitations of the naval gun facilitates its use in the ground support role. In considering the characteristics of naval gunfire, it should be remembered that the naval gun was designed for ship-to-ship combat.

Capabilities

Ammunition Variety

The variety of projectiles, powder charges, and fuzes permits selection of optimum combinations for the attack of targets.

Muzzle Velocity

The high muzzle velocity and relatively flat trajectory make the naval gun suitable for direct fire or assault fire, particularly against reinforced targets such as bunkers and hardened positions.

Rates of Fire

Some naval guns have a very rapid rate of fire.

Dispersion Pattern

The normal dispersion pattern is narrow in deflection and long in range. It permits effective coverage of such targets as roads and runways when the GT line coincides with the long axis of the target. Very close supporting fire can be delivered when the GT line is parallel to the front line of troops.

Mobility

Within the limits imposed by hydrographic conditions, the naval gunfire ship may be positioned for the best support of the , ground force. The ability of the ship to maneuver is an important factor in planning for support of separated forces. It also allows selection of the most favorable GT line.

Fire Control Equipment

Precision fire control equipment permits accurate direct and indirect fires while the ship is underway or at anchor.

Limitations

Range Probable Error

The relatively flat trajectory results in a large range probable error, Therefore, the dispersion pattern of the naval gun is roughly elliptical, with the long axis in the direction of fire. The GT line and its relation to the FLOT must be considered by the FSO in selecting naval gunfire as a fire support means, Friendly units should avoid the GT line, If possible, the GT line should be parallel to the FLOT.

Changing Gun-Target Line

Because of the movements of the ship while firing, the GT line in relation to the FLOT may change. This can cause cancellation of the fire mission, as the large range probable errors may cause rounds to endanger friendly forces.

Communications

The sole means of communication between the ship and shore is HF radio, which can be interrupted or jammed.

Hydrography

The hydrographic conditions of the sea area in which the naval gunfire ship must operate may be unfavorable. They may cause undesirable firing positions or require firing at longer ranges.

Fixing of Ship Position

The accuracy of naval gunfire depends on the accuracy with which the position of the firing ship has been fixed. Navigational aids, prominent terrain features, or radar beacons emplaced on the shore may be used to compensate for this limitation.

Weather and Visibility

Bad weather and poor visibility make it difficult to determine the position of the ship by visual means and reduce the observer's opportunities for locating targets and adjusting fires. Bad weather also might force the ship out to sea.

Enemy Action

If the naval gunfire ship comes under enemy surface, subsurface, and/or air attack the ship may cancel its fire mission with the ground forces and try to counter this threat.

Magazine Capacity

The shore bombardment allowance varies with the ship type (600 to 1,800 rounds). When the need arises, remaining rounds will be held for self-defense of the ship.

Control Measures

Measures used by the Navy for its operations are identical to those used by the FSCOORD to control other surface-to-surface fires. Those peculiar to naval operations which limit ship movement or affect the fire support provided are discussed below.

Zone of Fire

The objective area is divided into zones into which ships are assigned to coordinate their efforts. The zones depend on locations of boundaries, size, visibility, and accessibility to fire.

Fire Support Area

An FSA is a definite sea area assigned to an individual fire support ship or a fire support unit (more than one ship). These areas are selected on the basis of factors such as hydrographic conditions, minefield, antiaircraft and antisubmarine disposition, other naval activity, and the best position based on GT line, range, and observation.

Fire Support Station

An FSS is a specific location in which ships may be placed and maintained while providing fire support.

Communications

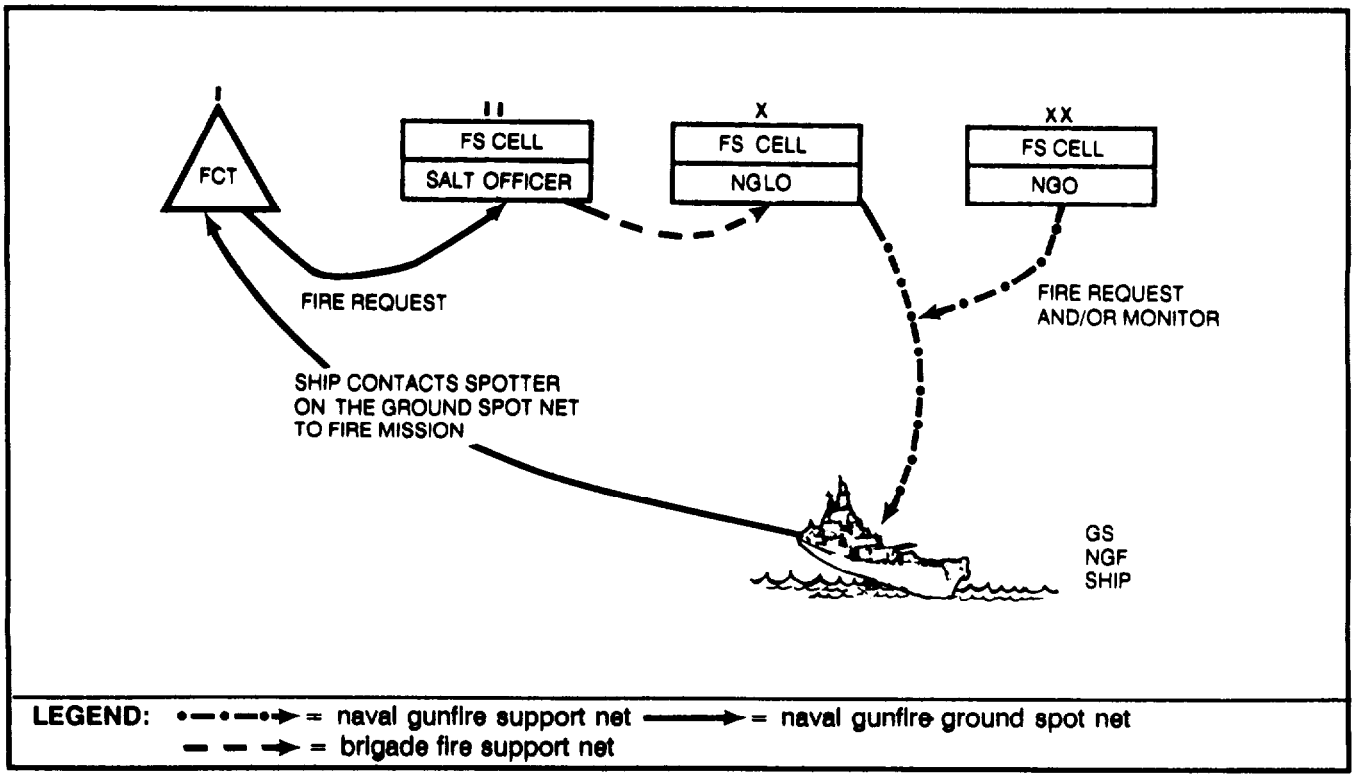
The brigade team operates on the division naval gunfire support net (HF), This net provides for communication between the division naval gunfire officer (NGO), the brigade NGLO, and the ships in support of these units. This net is used for the day-to-day planning between the units. No direct naval communications net exists between the battalion FCTs and the brigade SALTS. Fire support or maneuver nets must be used for communication between these two agencies. Brigade-initiated requests for fire support are transmitted to the brigade air and naval gunfire liaison team, which then forwards the requests to the ship. A SALT officer at the maneuver battalion FS cell monitors the request and coordinates as necessary at his echelon. This coordination is much the same

as for field artillery engagement. The one exception is that the SALT officer at maneuver battalion must contact the NGLO at brigade, if brigade coordination is necessary. He does this over the FSO's communications means, as he does not have direct communication with the brigade NGLO.

Naval and/or US Marine Corps Air

Naval and/or USMC air requests are forwarded by the respective SALTS to the aviation support unit in support of the unit. The brigade FSO submits his requests through the Marine air officer. The actual terminal control of the air is done by the firepower controller of the FCT. In the absence of an observer, naval and/or USMC air may be controlled by the company FSO, the ALO, or the Air Force FAC.

GENERAL SUPPORT NAVAL GUNFIRE REQUEST CHANNELS AT BRIGADE LEVEL



Section V. ARMY AVIATION

Fire Support Tasks

In general, attack helicopter units are not attached lower than division level; but they may be placed OPCON to a brigade. The organization and equipment of combat aviation units enable them to do several key fire support tasks. They –

- Provide limited aerial fire support to ground maneuver units.
- Coordinate and adjust indirect fires when tactical air and artillery are employed.

Ž Conduct JAAT operations.

The attack helicopter can mount an impressive array of weapons and can be used in a fire support role similar to that of air support aircraft, In this role, the attack helicopter battalion may –

- Attack critical logistics and command and control facilities.

Ž Control JAAT operations.

Ž Perform SEAD missions.

- Provide fire support for rear operations.

Capabilities

Attack helicopter capabilities include –

- 4-km standoff capability.
- Rapid movement to the engagement area.

Ž Delivery accuracy.

- Air-ground communications.

Ž Quick maneuver and massed fires regardless of battlefield dispersion.

Limitations

Attack helicopters –

- Have a limited time on station and delayed response.
- Are affected by weather and visibility.
- Are affected by the air defense threat.

Targets

The type of targets should be carefully specified to ensure the best ordnance is used to attack the target. The objective of attack helicopter employment is to put the aircraft on station at the right time with the right munition. Scheduled or on-call SEAD fires may be required to suppress enemy air defenses for the attack and to cover helicopter withdrawal after the mission.

Section VI. JOINT AIR ATTACK TEAM

Description

The JAAT is a combination of scout and attack helicopters and tactical aircraft supported by field artillery, all operating together to attack a single high-priority target or target array. The JAAT may operate either with or independently from ground units. When operating with ground forces, the JAAT may be strengthened by the firepower capabilities of maneuver forces.

When to Use JAAT

The JAAT is most effective against moving targets in open areas. It is least effective when attacking targets that are in camouflaged, dug-in positions. The combination of TOWs (from attack helicopters), Maverick missiles, and 30-mm gunfire (from the A-10s) is deadly against moving armored units.

Planning Considerations

JAAT operations, whether planned or spontaneous, require a thorough understanding of the maneuver commander's intent and of factors influencing the battlefield, and a knowledge of JAAT capabilities. Key JAAT members must stringently use the time available to develop an in-depth JAAT plan and must coordinate in detail with all participants, The amount of time available will be a major factor in the complexity of the plan.

Staffs at all levels influence JAAT planning through their IPB. Through this analytical approach, appropriate targets and target areas for employment of a JAAT can be identified. The identification of key intelligence trigger events which signal the buildup of a likely enemy target is essential to effective JAAT employment, Also, intelligence on Threat air defense by type, amount, and location is vital to the success of a JAAT operation.

The foundation of a successful JAAT operation is the maneuver commander's tactical plan, around which JAAT plans are based. The maneuver commander's tactical plan specifies actions in the objective area to ultimately accomplish the mission and to prepare for subsequent operations, A JAAT should be planned for and used in support of this overall mission, JAAT mission assignment considerations include the following:

- Massed enemy armored and/or mechanized vehicles.

Ž Whether the enemy is on the move.

- Availability of JAAT assets.
- Whether the enemy can be flanked.
- Whether local air superiority can be seized.
- Whether enemy helicopters can be suppressed.

Ž Likely offensive operations:

  - Enemy counterattacks.
  - Exploitations.
  - Pursuits.

- Likely defensive operations:

  - Reinforcement of committed ground maneuver units.
  - Destruction of enemy penetrations.

- Deep operations to attack follow-on elements.

Brigade should be the lowest level at which a joint air attack is planned. Coordination with the appropriate task force is required if the JAAT is to be employed in the task force sector; execution may be handed off to the task force.

The ground maneuver commander is responsible for planning, coordinating, and employing the JAAT. The plan to employ the JAAT should allow for multidirectional attack. This enhances the survivability and success of the JAAT by denying the ability of the enemy AD assets and maneuver forces to focus or orient in one direction.

The key staff members who plan and coordinate for the JAAT, on the basis of the commander's guidance, are discussed below. The coordination process takes place in the FS cell under the supervision of the FSCOORD or FSO and the S3 air.

S3 Air

The S3 air plans for and requests the use of close air support and attack helicopters to support the commander's concept of the operation.

S2

The S2 –

- Provides information on the avenues of approach, target array, terrain, and weather as it applies to the time and location of the JAAT operation.

Ž Plans and coordinates the use of nonlethal attack assets to complement the JAAT.

Attack Helicopter Battalion and/or Company Commander or Liaison Officer

This officer –

- Provides status of Army aviation assets available.
- Begins planning the air corridors and air battle positions (ABPs) to support the operation.
- Coordinates with the FSCOORD or FSO and the air defense officer (ADO) to deconflict air corridors.
- Coordinates for the planned ACAS.

Fire Support Coordinator or Fire Support Officer

The FSCOORD or FSO –

Ž Determines the need, availability, and positioning of artillery, commensurate with the Threat update, to support the JAAT.

- Coordinates with the aviation representative to provide call signs and frequencies to the supporting FDC.

Ž Helps the TACP deconflict the IPs from artillery positions and develop ACAs to support the mission.

- Determines the need for SEAD.

Ž Determines when and how priorities of fires shift.

Ž Recommends fire support coordinating measures to enhance the success of the mission.

Ž Establishes a quick fire channel if necessary.

Air Defense Officer

The air defense officer –

- Coordinates to ensure that the AD assets know the location of air corridors, ABPs, IPs, and ACAs.
- Ensures these resets are informed of friendly air operations and their integration into the battle.

Tactical Air Control Party

The TACP –

- Develops contact points and/or initial points and ACAs in coordination with the FSCOORD or FSO and the ADO.

Ž Disseminates contact point and/or 1P and ACAs to the ASOC for dissemination to the ground liaison officer (GLO) and wing operations center (WOC) for preflight briefing.

- Helps the TAC-A move aircraft forward to the appropriate contact point or 1P and then hand them off to the aviation commander conducting the JAAT operation.

Preparation

The preparation phase includes briefing the plan, ensuring dissemination of the plan to subordinate units that may have an impact on the mission, reconnaissance, and rehearsal.

Reconnaissance by the aviation commander is critical to the success of the JAAT. It allows him to see the terrain and determine if the ABPs need to be adjusted because of dust signature, survivability, or communications and/or to facilitate control of the JAAT. Upon completion of the recon, the aviation commander will provide feedback to the FSCOORD or FSO and the S3 air, If refinements to the plan are needed, they will be made and disseminated expeditiously.

Rehearsals are crucial to check communications channels, routes and ABPs to be used, time required to move assets forward, graphical control measures, and the fire plan. The JAAT rehearsal participants should be as follows:

Ž Aviation commander (JAAT commander).

- Attack helicopter platoon leader.
- Brigade FSO (may require the TF FSO).
- Brigade air liaison officer.
- Aviation liaison officer.
- Battalion and/or battery fire direction center.

Ž Aerial observer and/or AFSO (if available).

Execution

During the execution phase, the aviation commander is the director and coordinator of the total team effort.

The A-10 flight leader and aviation platoon leaders manage their own individual elements. The aviation commander does not dictate their attack methods.

En route to the target or engagement area the aviation commander contacts the ground commander for a tactical update.

The aviation commander should talk directly to all fire support assets involved in the JAAT operation. However, the ground commander's staff will monitor their appropriate nets to keep abreast of the JAAT operation and to help the aviation commander as needed.

NOTE: The following checklist may aid in fixing responsibility for each facet of ACA planning and execution of CAS or JAAT operations.

PLANNING AND EXECUTION RESPONSIBILITIES FOR JAAT OPERATIONS

	PLANNING	EXECUTION
S3	Plan for the use of CAS and helicopters to support the commander's concept of the operation. Brief FAC and FSO on commander's concept and his intent. Identify the JAAT commander who will control and execute the air movement and attack.	Determine if the timing of the air attack is still valid and synchronized with the commander's intent. Determine if the enemy situation and predicted location are valid, and make any required changes to the kill zone. Pass control of the air attack to the appropriate FAC or JAAT commander.
S2	Prioritize electronic support measures and target acquisition assets in support of the maneuver mission. Develop appropriate targets for inclusion in the brigade or task force FSO's SEAD program. Use all assets available to provide real-time enemy AD targets to the FSO and FAC. Plan and coordinate attack of enemy targets with electronic countermeasures. Jam and disrupt enemy AD C2 links and AD radars. Use IPB to identify potential engagement areas to employ TACAIR and/or JAAT.	Initiate jamming of enemy AD radars and C2 links when FAC or JAAT commander reports that aircraft are crossing the SP.
Brigade or Task Force Fire Support Officer	Plan the integration of indirect fires in support of the operation. Integrate fire support coordinating measures into the operation. Plan for SEAD based on intelligence from the S2. Develop a plan for marking the target area and employing SEAD.	

PLANNING AND EXECUTION RESPONSIBILITIES FOR JAAT OPERATIONS (CONTINUED)

	PLANNING	EXECUTION
	Coordinate with the S3 air and the TACP to input the required ACAs that support the operation. Develop fire plans for indirect fires in support of the operation. Request and plan for use of aerial observers or AFSOs, if applicable. Coordinate with the direct support FA battalion S3 for positioning of the FA batteries to ensure minimal disruption from the proposed ACA on their support to maneuver forces. Coordinate positioning of the heavy mortar platoon with the same considerations as for positioning FA batteries. Coordinate with the JAAT commander and FAC for marking rounds on the target area. Determine and disseminate PRF codes, as required.	
Forward Air Controller	In conjunction with the ADO and FSO, plan air routes for attacking aircraft. Inform brigade or TF FSO and S3 air. Coordinate ACAs with FSO and ADO to support aircraft attack of enemy forces. Ensure ADO receives ACAs for dissemination to AD assets. Plan for optimum location of FAC to control attacking aircraft. Request that target updates from USAF sources be passed to S2 and FSO, attack helicopter liaison officer (AHLO), JAAT commander, and FAC. Plan air routes for attacking helicopters (in conjunction with S3 air and JAAT commander). Consider location of ABPs to facilitate control of aircraft by JAAT commander. Inform brigade or TF FSO. Coordinate the synchronization of the air movement and attack. Provide frequencies to the JAAT commander who will control the air attack. Coordinate with the brigade or TF FSO, JAAT commander, and other agencies to ensure expeditious activation and cancellation of an ACA.	Relay to brigade or TF FSO the position and movement of aircraft through communication with the controlling JAAT commander.

PLANNING AND EXECUTION RESPONSIBILITIES FOR JAAT OPERATIONS (CONTINUED)

	PLANNING	EXECUTION
S3 Air	Plot attack routes and attack and/or loiter areas received from FAC and AHLO. Coordinate with brigade or TF FSO, S3, and division FS cell to deconflict air operations with maneuver operation. Coordinate with supporting AD units for appropriate weapon status during the air operation.	
JAAT Commander	Coordinate directly with the FSO and FAC. Receive from these agencies call signs, frequencies, target lists, proposed ACAs, priority target types, and so forth. Plan with the FSO and TACP for priority calls for fire, aerial observation tasking, net usage and assignment, and so forth. Pass all USAF graphics (IPs and so forth) and known aircraft weapon configurations. Receive enemy AD locations to pass to appropriate agency.	Report aircraft IP inbound to FSO. Report entering attack area. Report clearing attack area. Report aircraft departing maneuver sector. Coordinate direction of fires on targets of opportunity with the attack helicopter FSO. Report any intelligence received from the aircraft to FSO and S2.
JAAT Commander or AFSO		Initiate SEAD program in synchronization with air movement. Initiate the fire plan in coordination with the attack helicopter FSO and the FAC. Activate ACAs when aircraft are about to enter the attack area. Activate air corridors as necessary. Cancel the ACA when the aircraft have cleared.
Air Defense Officer	Help the FAC identify friendly air routes for CAS and attack helicopters. Provide input to ACA and IP location based on location of AD assets and posture.	
DS Artillery Battalion and Mortars		Plot all active ACAs onto firing charts. Maintain status of those ACAs that are active and those that have been cancelled.

APPENDIX D

FIRE SUPPORT TASKS SUMMARY

Major Tasks

The tasks and subtasks in this appendix apply to all operations, The FSCOORD or FSO at each level must either perform, coordinate, or assist, as required, in the accomplishment of each of the following tasks:

- Support forces in contact.
- Synchronize fires.
- Defeat high-payoff targets.
- Sustain.

Subtasks required to execute the four major tasks from corps level down to and including battalion level are discussed in the following paragraphs. Subtasks are sequential, generally forming a closed loop; therefore, they are not prioritized.

Support Forces In Contact

Description

Provide fires in support of the close combat commander to ensure mission accomplishment and survivability of forces in contact.

Subtasks

Know and understand the commander's intent. To do this –

- Analyze the mission.
- Recommend priorities for fire support.
- Allocate direct support and reinforcing fires for FPFs and for attack of priority targets.
- Recommend positioning of target acquisition systems and weapon systems.
- Establish C3 interface.
- Determine ammunition requirements.

Establish fire support coordinating measures close, rear, and deep.

Respond to calls for fire as follows:

- Locate targets.
- Select appropriate delivery means for-
  - Close support.
  - Counterfires.
  - Suppression of enemy air defenses.
  - Interdiction.

Synchronize Fires

Description

Coordinate the delivery of all indirect fires, optimize the selection of delivery systems, and maximize target effects.

Subtasks

Synchronize fire support with the maneuver concept.

Establish communications interfaces as follows:

- Provide all service interfaces.
- Provide unity of command and control.
- Determine critical targets as follows:
- Determine Threat intent via IPB.
- Determine high-value targets via TVA.
- Determine high-payoff targets; analyze mission and assets.
- Prioritize TVA target sets.

Establish target selection standards, To do this, you must –

- Know attack system requirements.

- Estimate Threat countermeasures capabilities.
- Know target activity profiles.

• Define target selection standards as follows:
- State eligible target descriptions.
- State target size requirements.
- State battlefield location characteristics.
- State dwell-time characteristics.
- State situational requirements.

• Exchange information with intelligence and EW systems.

Position acquisition and attack assets as follows:

Ž Conduct terrain analysis.

Ž Examine vulnerabilities.

• Synchronize with the battle plan.

• Task-organize—
- Target acquisition assets.
- Weapon delivery systems.

Task sensors as follows:

Ž Assign high-payoff targets to sensors.

• Disseminate target selection standards.

Ž Integrate FA acquisition with intelligence acquisition systems, This includes the following tasks:
- Net sensors.
- Cue sensors.
- Incorporate electronic counter-countermeasures (ECCM).

• Acquire targets as follows:
- Identify targets.
- Locate targets.
- Correlate data to meet target selection standards.
- Nominate targets.
- Transmit fire requests.

Establish fire support coordinating measures at corps, division, and brigade levels.

Assess effects as follows:

• Correlate target damage assessment with the target list.

Ž Estimate effects on Threat capabilities.

• Analyze impact on the battle plan.

• Reexamine targeting requirements.

Ž Interface with other services and critical combat service support (CCSS) nodes.

Defeat High-Payoff Targets

Description

Provide fires in support of the force commander's guidance for success of the battle plan.

Subtasks

Establish target attack criteria as follows:

• Establish desired target effects, which are-
- Suppress.
- Neutralize.
- Destroy (percent destruction).

• Establish the following restrictions:
- Accuracy.
- Time since acquisition.
- Required coordination.
- Munition restrictions.
- Whether observed or unobserved.

Ž Establish weapon-munition configurations as follows:
- Ammunition requirements.
- Weapon system configuration, especially close air support.

Acquire high-payoff targets as follows:

- Ensure that target selection standards are met.
- Nominate targets to the FS cell.
- Establish Firefinder call-for-fire zones (CFFZs) to prioritize sectors of search.

Process targets as follows:

- Receive nominated targets.
- Compare with fire support coordinating measures.
- Determine relative priority.
- Compare with attack criteria.
- Formulate decisions and/or orders as follows:
  - Coordinate with other command and control systems.
  - Select attack mode (for example, offensive electronic warfare, nuclear, chemical, or conventional).
  - Task attack system (for exanple, mortars. field artillery, offensive air support, naval gunfire, or EW assets).

Attack high-payoff targets as follows:

- Receive fire orders.
- Compare with attack criteria.
- Examine range to target.
- Determine system availability.
- Select aiming points, fire units, and volume of fire.
- Engage high-payoff targets.

Conduct target attack assessment as follows:

- Determine sensor availability.
- Task sensors.
- Determine attack results.
- Determine if attack criteria are met or exceeded.

Ž Refine target information.

- Provide feedback as follows:
  - Reattack targets as necessary.
  - Provide intelligence target information.

Sustain

Description

Provide the support essential to delivery of indirect fires, such as logistics, survey, and weather data.

Subtasks

Ensure survival of –

- Command, control, communications, and intelligence (C3I) assets.
- Personnel.
- Equipment.
- Support services.

Provide logistical support as follows:

Ž Predict requirements.

- Allocate to subordinate

Perform tactical movement.

Communicate. This includes the following tasks:

- Maintain command and control channels.

Ž Receive, process, and disseminate information.

Provide met support as follows:

- Process and disseminate FA met data.
- Determine low-level wind information.
- Determine target area met.

Provide survey support as follows:

- Establish location and directional control for the following:
  - Target acquisition system.
  - Target attack systems.

Ž Know friendly force disposition.

APPENDIX E

FIRE SUPPORT DOCUMENTS

This appendix implements STANAG 2014, Edition 5, and QSTAG 506, Edition 1; and portions of STANAG 2031, Edition 5, and QSTAG 515, Edition 1.

The operation order displays in a written format the commander's selected course of action, his concept of the operation, and all guidance given during the planning of the operation. It merges maneuver, fires, combat support, and combat service support into a synchronized operation. In this appendix, the OPORD format is shown and fire support documents are incorporated into the OPORD.

GLOSSARY FOR OPORD

A	= as acquired (attack guidance matrix)	I	= immediate (attack guidance matrix)
ADA	= air defense (attack guidance matrix)	LIFT	= general transportation (attack guidance matrix)
AF	= azimuth of fire	LOC	= lines of communication
ammo	= ammunition	maint	= maintenance
ANX	= annex	N	= neutralize (attack guidance matrix)
APERS	= antipersonnel	N/CH	= nuclear and/or chemical (attack guidance matrix)
AS	= azimuth of search	P	= plan (attack guidance matrix)
ASP	= ammunition supply point	pos	= position
ATP	= ammunition transfer point	REC	= radio electronic combat
CFZ	= critical friendly zone	regt	= regiment
cml	= chemical	RSO	= reconnaissance and survey officer
CMO	= civil military operations	RSTA	= reconnaissance, surveillance, and target acquisition
D	= destroy (attack guidance matrix)	S	= Stinger
DSA	= division support area	spt	= support
fwd	= forward	TBP	= to be published
HP	= high payoff (attack guidance matrix)		
HPT	= high-payoff target		

EXAMPLE OPERATION ORDER FORMAT

OPERATION ORDER

(Classification)

Copy No ____ of ____ copies
2d Bde, 21st Inf Div (L)
ALBERTA (CK015092)
090600L July _____
MED

OPERATION ORDER STRIKE

Reference: Map, series F375, VICTORIA, sheet 2456 IV, 1983, edition 2-DMA, 1:50,000.

Time Zone Used Throughout the Order: Local.

Task Organization:

1st Bn, 16th Inf
- 2/B/21st Engr (DS)
- 4/C/1-440 ADA (S) (DS)

1st Bn, 36th Inf
- 1/B/21st Engr

1st Bn, 22nd Inf
- 3/B/21st Engr
- 2/C/1-440 ADA (S) (DS)

Bde Control
- 2-12 FA (105, T) (DS)
- C/1-440 ADA (-) Vulcan (DS)
- Tm B/23d MI Bn (DS)
- B/21st Engr (-) (DS)
- B/Cml (-) (DS)
- 2/21st MP (DS)
- 2d FAST (DS)

1. SITUATION (Refer to Annex A [Sketches].)

a. Enemy Forces.

(1) 2d Bde faces an insurgent light infantry battalion force aided by Threat block advisors and equipment. They are armed with the current Threat automatic weapons and are supported by a platoon of 82-mm mortars and a battery of 122-mm towed artillery. Hind MI-24 attack helicopters have been observed operating in the area.

(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)

(Classification)

OPORD STRIKE--2d Bde, 21st Inf Div (L)

(2) The insurgents are currently conducting delaying operations to the west of the JOBIA River and are preparing defensive positions to deny the crossing sites. They have left a company forward, west of the JOBIA River, to conduct security force operations. A company (minus) is positioned in the vicinity of Objective TIM, and a platoon is near Objective TOM. The insurgent battalion headquarters, with its logistical assets secured by an infantry company, is located in the vicinity of Objective TACO. The enemy's strength is at 80%, but morale remains high.

b. Friendly Forces.

(1) The 21st Inf Div (L) conducts a deliberate attack to secure the villages east of the JOBIA River.

(2) 1st Bde, 21st Inf Div (L) conducts a deliberate attack in the south to secure the villages and high-speed avenues of approach into the division sector on the west side of the JOBIA River.

(3) The 9th Inf Div conducts deliberate attacks in the north.

(4) 3d Bde, 21st Inf Div (L), initially the division reserve, follows 1st Bde. On-order, it continues the attack.

c. Attachments and Detachments. See Task Organization.

2. MISSION

At 102015L Jul, 2d Bde, 21st Inf Div (L) conducts a deliberate attack to destroy the insurgent battalion and seize Objectives TACO and RICE.

3. EXECUTION

a. Concept of Operation. Initially, conduct a night infiltration to secure the crossing site intact on the JOBIA River. Then conduct a deliberate attack with two battalions abreast to defeat insurgent forces in zone and seize Objectives RICE and TACO. (Annex B, Operation Overlay)

(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)

(Classification)

OPORD STRIKE--2d Bde, 21st Inf Div (L)

(1) Maneuver. 2d Bde conducts an infiltration with 1st Bn, 16th Inf in the south, followed by deliberate attacks by 1st Bn, 22d Inf in the south and 1st Bn, 36th Inf in the north. The attack will be conducted in two phases.

(a) Phase I. 1st Bn, 16th Inf conducts a night infiltration commencing 102015L Jul to secure the crossing site at Objective BRAD.

(b) Phase II. When 1st Bn, 16th Inf reports reaching its assault position for Objective BRAD, 2d Bde commences the deliberate night attack. 1st Bn, 22d Inf conducts the main attack in the south to seize intermediate Objective TOM and continues to secure Objective TACO. 1st Bn, 36th Inf conducts a supporting attack in the north to seize intermediate Objective TIM and continues to secure Objective RICE.

(2) Fires. Priority of fires during Phase I to 1st Bn, 16th Inf. Priority of fires for Phase II to 1st Bn, 22d Inf. An additional COLT has been allocated from div arty to support the brigade for Copperhead missions and laser designation of CAS precision munitions. The division commander retains FASCAM employment authority.

(3) Counterair Priority. Priority for protection, in order, to maneuver units in the main attack, CP, FA, and BSA. On order, priority of AD to critical crossing site on JOBIA River. Weapon control status is TIGHT. AD warning is WHITE.

(4) Engineer. Mobility priority of support is to 1st Bn, 22d Inf; 1st Bn, 36th Inf; and then 1st Bn, 16th Inf. Upon consolidation, countermobility support is to 1st Bn, 22d Inf then 1st Bn, 36th Inf.

b. Tasks to Maneuver Units.

(1) 1st Bn, 16th Inf.

(a) Conduct a passage of lines with 1st Bn, 22d Inf from AA LION to the LD.

(b) At 102015L, conduct night infiltration along lanes to assault positions (Checkpoint 3).

(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)

(Classification)

OPORD STRIKE--2d Bde, 21st Inf Div (L)

(c) Report reaching Checkpoint 3.

(d) Attack to secure the crossing site at Objective BRAD.

(e) Assist passage of lines of 1st Bn, 22d Inf through Objective BRAD.

(f) Be prepared to attack Objective TACO.

(g) Become the brigade reserve once Objectives TACO and RICE have been secured.

(2) 1st Bn, 22d Inf.

(a) Assist passage of lines of 1st Bn, 16th Inf.

(b) On-order, conduct deliberate attack in zone to seize Objective TOM and secure Objective TACO.

(c) Conduct passage of lines through 1st Bn, 16th Inf at Objective BRAD.

(3) 1st Bn, 36th Inf. On-order, conduct a deliberate attack in zone to seize Objective TIM and to secure Objective RICE.

c. Tasks to Combat Support Units.

(1) Fire Support.

(a) Air Support. 2d Bde has been allocated four AC-130H sorties for the operation.

(b) Chemical Support. Per SOP.

(c) Field Artillery Support.

1. Phase I. Priority of fires to 1st Bn, 16th Inf. 1st Bn, 16th Inf has three priority targets along the infiltration route.

(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)

(Classification)

OPORD STRIKE--2d Bde, 21st Inf Div (L)

2. Phase II. Priority of fires and two COLTs to 1st Bn, 22d Inf. From LD to PL BLUE, 1st Bn, 22d Inf receives two priority FA targets and 1st Bn, 16th Inf receives one priority FA target and one FA FPF for securing Objective BRAD. From PL BLUE to PL GREEN, 1st Bn, 22d Inf has two FA FPFs upon consolidation on Objective TACO; 1st Bn, 36th Inf receives one FA FPF upon securing Objective RICE.

(d) Fire Support Coordinating Instructions.

1. Initially, PL BLUE is brigade CFL; on order, PL GREEN.

2. Upon 1st Bn, 16th Inf arriving at Checkpoint 3, RFA is established on Objective BRAD. All fires within the RFA will be cleared by FSO, 1st Bn, 16th Inf.

3. Attack Guidance Matrix.

CATEGORY		HP	WHEN	HOW	RESTRICTIONS
1	(C^3)	26, 28, 47	I	N/EW	Coordinate attack with S2
2	(FS)	21, 45, 19, 18	A	N	
3	(MAN)	51	A	N	
4	(ADA)	61, 57	A	N	
5	(ENG)	69	I	N	
6	(RSTA)		P	N	
7	(REC)		A	N	
8	(N/CH)		*	*	
9	(POL)		P	D	
10	(AMMO)		P	D	
11	(MAINT)		P	N	
12	(LIFT)		A	N	
13	(LOC)		P	N	Not HPT

4. Fire Support Execution Matrix. Annex C.

5. Effects criteria for neutralization is 15 percent casualties.

(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)

(Classification)

OPORD STRIKE--2d Bde, 21st Inf Div (L)

(2) Engineer Support. Priority initially to mobility, countermobility, and then survivability. Priority shifts to countermobility, survivability, and mobility during consolidation on Objectives RICE and TACO.

(3) Military Police. Priority of effort to battlefield circulation control within BSA, then rear area protection to BSA.

d. Coordinating Instructions.

(1) PIR.

(a) What are the location and size of the insurgent reserve?

(b) Is bridge at crossing site rigged for demolition?

(2) Priority of Friendly Information Requirements.

(a) Report if infiltration compromised.

(b) Report initial observation of insurgent CP.

(c) Report all enemy Hind overflights.

4. SERVICE SUPPORT

a. General. Priority of effort before attack is haul for pre-positioning of indirect Class V. During the attack, priority is to resupply of direct fire Class V. During consolidation, priority of support is to barrier haul.

b. Materiel and Services.

(1) Supply.

(a) Class I. A 2-day supply is available at the forward support company.

(b) Class II. A 1-day supply is available.

(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)

(Classification)

OPORD STRIKE--2d Bde, 21st Inf Div (L)

(c) Class IV. Barrier materials are command-regulated.

(d) Class V.

1. ATP located in BSA. ASP located in DSA.

2. CSR:

	D-Day	S-Day
105 mm (ICM)	50	35
105 mm (HE)	50	40
105 mm (ILLUM)	10	5
105 mm (WP)	5	5
105 mm (SMOKE)	7	7
105 mm (APERS)	5	5
GM, TOW	8	6
81 mm (HE)	30	30
81 mm (WP)	10	10
81 mm (ILLUM)	8	8
60 mm (HE)	20	20
60 mm (WP)	5	5
60 mm (ILLUM)	3	3

(e) Class IX. No shortages exist.

(2) Transportation. SOP.

(3) Services. Priority to main effort.

c. Medical Evacuation and Hospitalization. SOP.

d. Personnel. SOP.

e. CMO. SOP.

5. COMMAND AND SIGNAL

a. Command.

(1) Div tac CP located BL767759.

(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)

(Classification)

OPORD STRIKE--2d Bde, 21st Inf Div (L)

(2) Div main CP located BL732784.

(3) Div rear CP located BL648762.

(4) Bde CP located BL778801.

(5) Bde CP (fwd) located BL786786.

b. Signal.

(1) Current SOI in effect.

(2) Maintain radio silence except for PIR.

Acknowledge.

GILBERT
COL

OFFICIAL:

BOYD
S3

Annexes: A--Situation Sketches
B--Operation Overlay (TBP)
C--Fire Support Execution Matrix
D--Brigade Target List
E--FA Support Plan

Distribution:

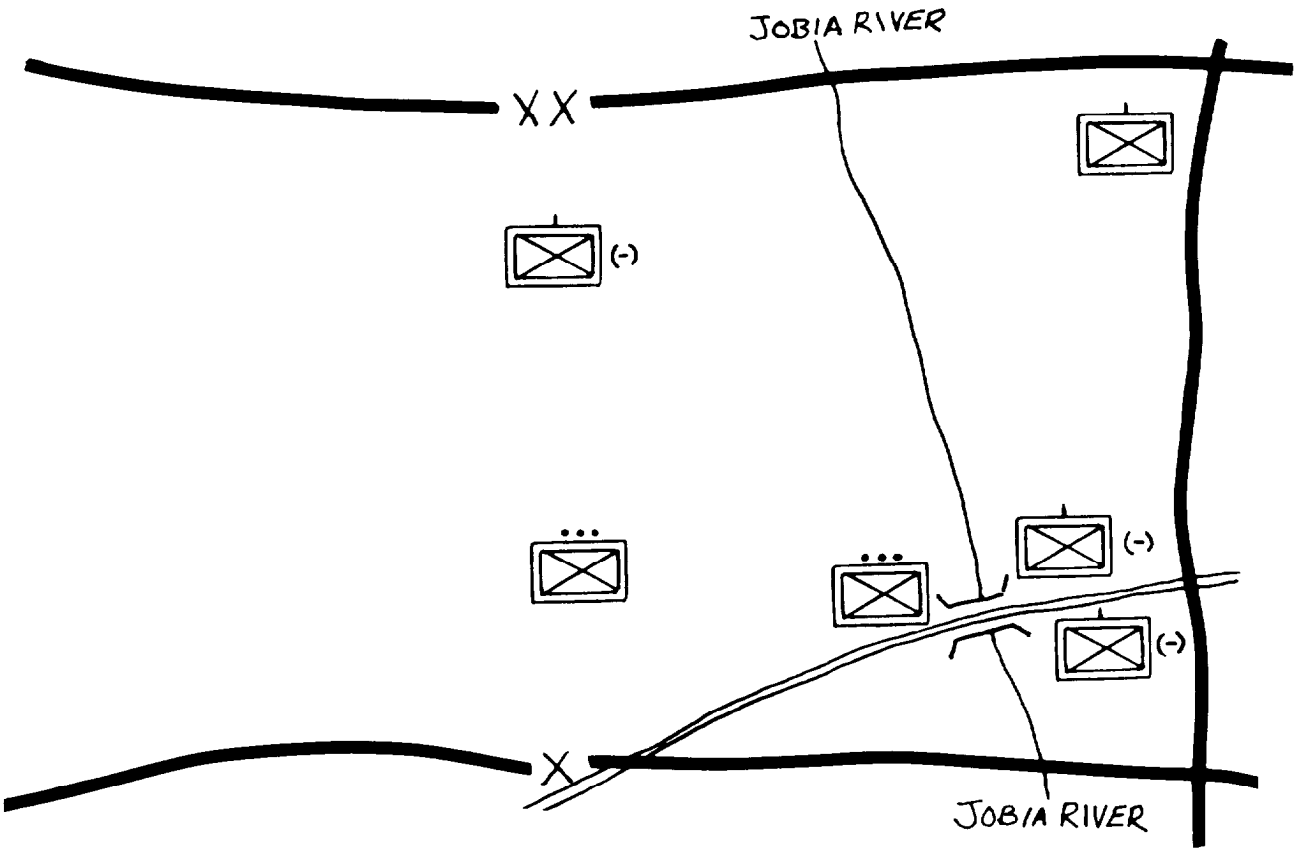
(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)
THREAT SKETCH

(Classification)

APPENDIX 1 (THREAT SKETCH) TO ANNEX A (SKETCHES) TO OPORD STRIKE--2d Bde, 21st Inf Div (L)

Reference: Map, series F375, VICTORIA, sheet 2456 IV, 1983, edition 2-DMA, 1:50,000



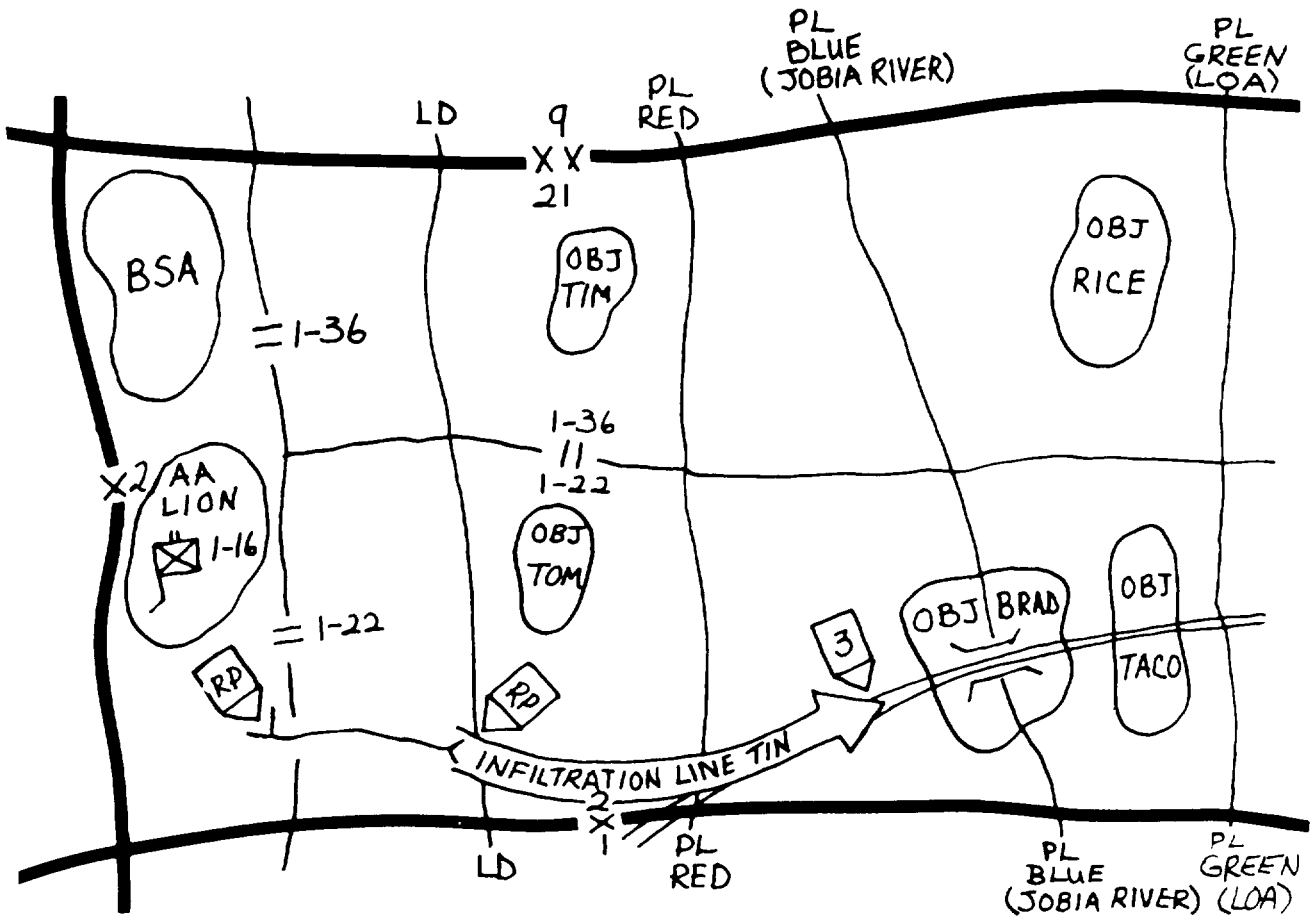
(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)
FRIENDLY SKETCH

(Classification)

APPENDIX 2 (FRIENDLY SKETCH) TO ANNEX A (SKETCHES) TO OPORD STRIKE--2d Bde, 21st Inf Div (L)

Reference: Map, series F375, VICTORIA, sheet 2456 IV, 1983, edition 2-DMA, 1:50,000



(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)

FIRE SUPPORT EXECUTION MATRIX

(Classification)

ANNEX C (FIRE SUPPORT EXECUTION MATRIX) TO OPORD STRIKE--2d Bde, 21st Inf Div (L)

	A UNIT	B INFILTRATION	C LD TO PL BLUE	D PL BLUE TO PL GREEN	
5	1-16	FA PRI FIRES 3 PRI TGT	1 PRI TGT 1 FA FPF		5
4	1-22	2 COLTS	FA PRI FIRES 2 PRI TGT GP K1B	SERIES MANGO 2 FA FPF	4
3	1-36		GP K2B	1 FA FPF GP K3B	3
2	BDE	4 CAS →			2
1	FIRE SUPPORT COORDINATING MEASURES	CFL PL BLUE	O/O CFL PL GREEN O/O RFA OBJ BRAD		1

(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)

TARGET LIST

(Classification)

ANNEX D (TARGET LIST) TO OPORD STRIKE, 2d Bde, 21st Inf Div (L)

Reference: Map, series F375, VICTORIA, sheet 2456 IV, 1983, edition 2-DMA, 1:50,000

LINE NUMBER	TARGET NUMBER		DESCRIPTION	LOCATION
1	KB0001		Road intersection	831804
2	KB0002		Road intersection	854775
3	KB0003	(a)	Enemy position	801785
4	KB0004	(a)	Enemy position	803780
5	KB0005	(b)	Hilltop	803806
6	KB0006	(b)	Hilltop objective	807813
7	KB0007	(c)	Enemy plt position	860784
8	KB0008	(c)	Enemy plt position	862775
9	KB0009	(c)	Enemy plt position	862769
10	KB0010	(d)	Enemy pos/road junction	855808
11	KB0011	(d)	Enemy pos/road junction	859814
12	KB0012	(d)	Enemy pos/road junction	856821
*	*	*	*	* *

REMARKS:

(a) Group K1B.
(b) Group K2B.
(c) Series MANGO.
(d) Group K3B.

(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)
FA SUPPORT PLAN

(Classification)

Copy No _____ of _____ copies
2d Bn, 12th FA
ALBERTA (CK015092)
090600L July _____

ANNEX E (FA SUPPORT PLAN) TO OPORD STRIKE--2d Bde, 21st Inf Div (L)

Reference: Map, series F375, VICTORIA, sheet 2456 IV, 1983, edition 2-DMA, 1:50,000

Time Zone Used Throughout the Plan: Local.

1. SITUATION.

a. Enemy Forces. Insurgent forces have a variety of Soviet weaponry from 81-mm mortars to 122-mm towed howitzers. They are down to 80% strength, and there is no evidence of reinforcing artillery. Our main threat is from insurgent ground forces. Enemy air threat has been limited to rotary wing and has been negligible.

b. Friendly Forces. The 21st Inf Div (L) conducts a deliberate night attack. 1st Bde is the main effort in the south, followed by 3d Bde.

2. MISSION

2d Bn, 12th FA provides direct support to the 2d Bde two-phased attack in zone beginning at 102015L Jul.

3. EXECUTION

a. General. Priority of fires to 1st Bn, 16th Inf during their infiltration in Phase I. 1st Bn, 16th Inf has three priority targets along the infiltration route. Priority shifts to 1st Bn, 22d Inf for Phase II. Bn FSO, 1st Bn, 22d Inf receives two COLTs throughout the attack, has two priority targets, and plans two FPFs upon consolidation of Objective TACO. 1st Bn, 36th Inf FSO plans one FPF. Counterfire priorities are mortars, then towed cannons.

(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)

(Classification)

ANNEX E (FA SPT PLAN) TO OPORD STRIKE--2d Bde, 21st Inf Div (L)

b. Positioning. The batteries will displace by echelon from initial positions after the intermediate objectives are taken. Commanders must recon positions thoroughly before making our night moves. The S3 has aerial photos of all proposed positions. See Appendix 1 (FA Support Matrix) for movement priority and positions.

c. Coordinating Instructions.

(1) Target Acquisition.

(a) Processing. All requests for counterfire against mortars will be sent to the 2d Bn, 12th FA FDC. All artillery and other counterfire targets will be sent to div arty.

(b) Visual Observation. All observers search for and engage mortars, towed artillery, and counterfire radars. Report immediately any SEAD-type targets.

(c) Radar.

1. AN/TPQ-36 from 2d Bn, 12th FA, receives radar deployment order from battalion S2. Initial location 783782, azimuth 1700. Critical friendly zones (CFZs) are 1st Bn, 16th Inf; 1st Bn, 36th Inf Command Group; 2d Bn, 12th FA CP; and Batteries A, B, and C, 2d Bn, 12th FA.

2. Cueing Instructions. Q-36s radiate on order of the S2, 2d Bn, 12th FA. All other acquisition assets request radar coverage through the S2.

(2) Meteorology. Computer met to be sent by div arty every 2 hours or when conditions dictate.

(3) Target List. See Bde Annex D.

(4) Schedules. See Appendixes 2 and 3.

(5) Survey. RSO coordinates survey with S2 for radar and brigade FSO. Survey priorities are firing batteries, radars, COLTs, and mortars.

(6) Special Instructions. Neutralization effects criterion is 15%. Destruction is 35%.

(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)

(Classification)

ANNEX E (FA SPT PLAN) TO OPORD STRIKE--2d Bde, 21st Inf Div (L)

(7) Ammo Restrictions. Illumination will not be fired without permission from brigade FSE, with the exception of marking for CAS. Division retains authority for FASCAM employment.

4. SERVICE SUPPORT

a. ATP located in BSA 760810.
ASP located in DSA 723697.
2-12 combat trains at 781794.
2-12 field trains at 760810.

b. CSR:

	D-Day	S-Day
105 mm (ICM)	50	35
105 mm (HE)	50	40
105 mm (ILLUM)	10	5
105 mm (WP)	5	5
105 mm (SMOKE)	7	7
105 mm (APERS)	5	5

5. COMMAND AND SIGNAL

a. Command.

(1) 2d Bde CP at 768782.

(2) 2d Bde CP (Fwd) at 786791.

(3) 2d Bn, 12th FA CP at 785789.

(4) Div arty CP at 757732.

b. Signal.

(1) Current SOI in effect.

(2) 2d Bde COLT PRF code is 1126.

LANCE
LTC

(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)

(Classification)

ANNEX E (FA SPT PLAN) TO OPORD STRIKE--2d Bde, 21st Inf Div (L)

OFFICIAL:

MACKENZIE
S3
APPENDIXES: 1--FA Support Matrix
2--Groups
3--Series MANGO

(Classification)

FA SUPPORT MATRIX

(Classification)

APPENDIX 1 (FA SUPPORT MATRIX) TO ANNEX E (FA SUPPORT PLAN) TO OPORD STRIKE--2d Bde, 21st Inf Div (L)

UNIT	INFILTRATION	LD TO PL BLUE	PL BLUE TO PL GREEN	
BN CP	POS 40	POS 41		6
A	POS 10 AF1700	O/O POS 11 AF 1800		5
B	POS 20 AF1700	POS 21 AF1600		4
C	POS 30 AF1600	POS 31 AF1500		3
Q-36	POS R1 AS1700	POS R2 AS1600		2
FIRE SUPPORT COORDINATING MEASURES		CFL: PL BLUE O/O RFA OBJ BRAD	O/O CFL: PL GREEN	1
A	B	C	D	

(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)

GROUPS

(Classification)

APPENDIX 2 (GROUPS) TO ANNEX E (FA SUPPORT PLAN) TO OPORD STRIKE--2d Bde, 21st Inf Div (L)

LINE NUMBER	FIRING UNIT	TARGET NUMBER	ROUNDS
Group K1B			
3	A/2-12	KB0003	30
4	B/2-12	KB0004	30
Group K2B			
5	C/2-12	KB0005	36
6	B/2-12	KB0006	36
Group K3B			
10	A/2-12	KB0010	30
11	B/2-12	KB0011	30
12	C/2-12	KB0012	30

* * * * * * *

REMARKS:

Fire HE-PD on all groups.

(Classification)

EXAMPLE OPERATION ORDER FORMAT (CONTINUED)
SERIES MANGO

(Classification)

APPENDIX 3 (SERIES MANGO) TO ANNEX E (FA SUPPORT PLAN) TO OPORD STRIKE--2d Bde, 21st Inf Div (L)

LINE NUMBER	FIRING UNIT	TARGET NUMBER	ROUNDS	TOT
7	A/2-12	KB0007	60	0
8	B/2-12	KB0008	60	0
9	C/2-12	KB0009	60	0

* * * * * * *

REMARKS:

Btry C, 2d Bn, 12th FA prepares to shift KB0009 west to allow friendlies to cross bridge.

(Classification)

APPENDIX F

FIRE PLANNING TERMS, SYMBOLS, SCHEDULES, AND TOOLS

This appendix implements portions of STANAG 2031, Edition 5, and QSTAG 515, Edition 1.

Target Terms

The term target is the most fundamental term used in fire support planning, A target is personnel, materiel, or a piece of terrain that is designated and numbered for future reference and/or attack.

Target of Opportunity

A target of opportunity is a target that appears during combat and against which no attack has been prearranged.

Planned Target

A planned target is a target upon which fires are prearranged. The degree of prearrangement varies, but some prior coordination or action has been done to facilitate its engagement, Planned targets may be further subdivided into scheduled, on-call, and priority targets.

Scheduled Target. A scheduled target is a planned target that will be attacked at a specific time. This time may be related to an H-hour or to another time reference.

On-Call Target. An on-call target is a planned target which has not been scheduled for attack at a specific time but which may be attacked when requested. The on-call target requires less reaction time than a target of opportunity.

Priority Target. A priority target is a target the attack of which, when requested, takes priority over all other requests. Priority targets are designated by the maneuver commander. He also gives specific guidance as to when the targets will become priority, the munitions to use, the accuracy required, and the desired effects, When not engaged in fire missions, firing units lay on priority targets. FSOs should note that they can get as many as three priority targets from a six-gun battery or four priority targets from an eight-gun battery. Two priority targets may be assigned to an 81-mm mortar platoon – one per section.

Final Protective Fires. Final protective fires are a special set of priority targets. They are designed to create a final *barrier of steel* that keeps the enemy from moving across defensive lines. Final protective fires are desperation fires.

Target Numbering System

This paragraph implements STANAG 2147, Edition 4, and QSTAG 221, Edition 2.

To designate nonnuclear targets for fire support operations, the Army adheres to the provisions of STANAG 2147 and QSTAG 221. Target designators consist of two letters followed by four numerals; for example, CB3002. This numbering system is used for each corps-size force.

Normally, nuclear targets are not assigned a special block of target numbers. A target

should be assigned a number when it is received at a fire planning agency. If a target is selected for attack, the most appropriate means (nuclear, chemical, or conventional), as determined by target analysis, will be used to attack the target. That analysis is guided by the commander's attack guidance and other factors such as nature of the target and munitions available.

The first letter of the two-letter group designates a particular nation or a corps associated with a particular nation.

NATIONAL IDENTIFYING LETTERS

NATION	LETTER
Australia	V
Belgium	B
Canada	C, Z
Denmark	D
France	F
Germany	G
Greece	E
Italy	R
Luxemburg	L
Netherlands	H
Norway	N
Portugal	P
Spain	S
Turkey	T
United Kingdom	U, X
United States	A, K, Y, W
*AMF (L)	M
LEGEND: AMF(L) = ACE (Allied Command Europe) Mobile Force (Land)	
NOTE: The letters O and I are not used.	

Each Army headquarters allocates a first letter to its corps. A corps may be assigned more than one letter. Letters assigned to each nation may be reused as long as adjacent corps of that nation do not share the same letter.

The second letter is assigned by corps down to brigade level. Also, second-letter designators are made for corps artillery CPs, corps FS cells, div arty CPs, and division FS cells.

EXAMPLE LETTER DESIGNATORS FOR 12TH (US) CORPS WITH 54TH MECH DIV AND 16TH INF DIV (L)

ORGANIZATION	LETTER DESIGNATOR
12th (US) Corps	A
12th (US) Corps Artillery CP	AX
12th (US) Corps FS Cell	AY
54th Mech Div FS Cell	AA
54th Mech Div Arty CP	AB
1st Bde, 54th Mech Div	AC
2d Bde, 54th Mech Div	AD
3d Bde, 54th Mech Div	AE
4th Bde, 54th Mech Div	AF
16th Inf Div (L) FS Cell	AG
16th Inf Div (L) Div Arty CP	AH
1st Bde, 16th Inf Div (L)	AJ
2d Bde, 16th Inf Div (L)	AK
3d Bde, 16th Inf Div (L)	AL
4th Bde, 16th Inf Div (L)	AM

Blocks of numbers are assigned by those headquarters having two assigned letters. Field artillery CPs assign blocks from 0001 through 7000 as needed.

A battalion- or squadron-size element with a block of numbers may suballocate numbers as shown below.

ASSIGNMENT OF BLOCKS OF NUMBERS

NUMBERS	ASSIGNED TO
0001-1999	FS cell
2000-2999	FSO, lowest number maneuver battalion or squadron[1]
3000-3999	FSO, second lowest numbered maneuver battalion or squadron
4000-4999	FSO, third lowest numbered maneuver battalion or squadron
5000-6999	Additional FSOs
7000-7999	FDC, direct support artillery
8000-8999	Counterfire targets
9000-9999	Toxic chemical targets

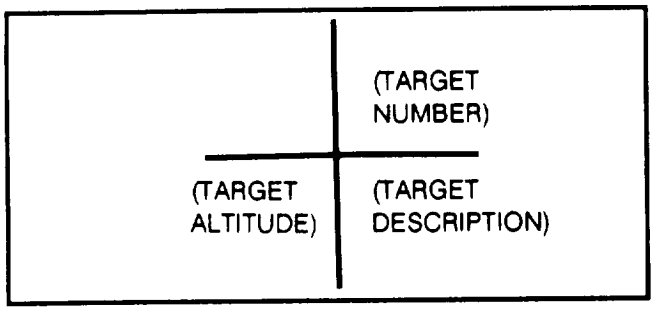
[1]Lowest regimental number.

SUBASSIGNMENT OF BLOCKS OF NUMBERS

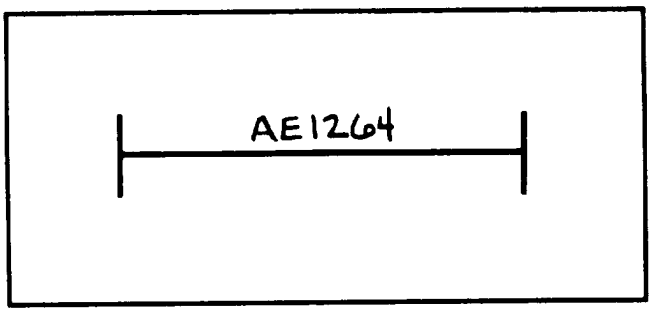
NUMBERS	ASSIGNED TO
000-199	FSO
200-299	FIST, Co A
300-399	FIST, Co B
400-499	FIST, Co C
500-699	Additional FISTs and/or COLTs
700-799	Battalion mortar platoon, squadron, or howitzer battery
800-999	As required

NOTE: If additional numbers are needed, company FSOs get them from the battalion FSO. The target numbering system in effect within your unit should be a part of the unit SOP, when possible. For contingency units, the system is OPORD-dependent.

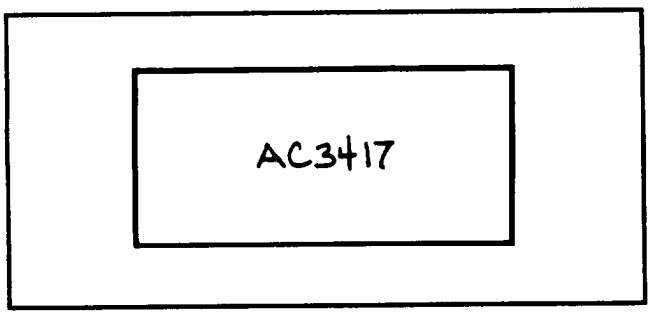
POINT TARGET SYMBOL



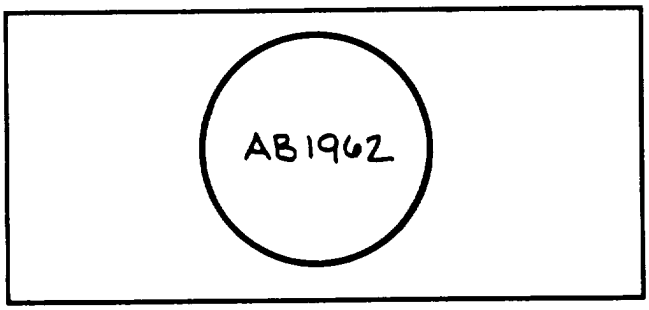
LINEAR TARGET SYMBOL



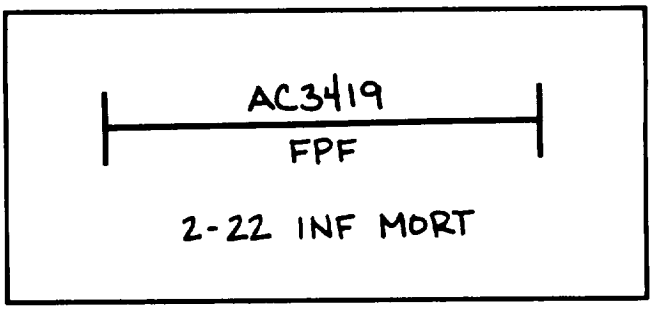
RECTANGULAR TARGET SYMBOL



CIRCULAR TARGET SYMBOL



FINAL PROTECTIVE FIRE SYMBOL



Target Symbols

Standard symbols are used in the preparation of maps, charts, and overlap to identify targets by type.

Point Target

A point target is a target that is less than 200 meters wide. The symbol with relevant information is as shown.

Linear Target

A linear target is more than 200 meters but less than 600 meters long. Targets longer than 600 meters require fire support assets other than field artillery or must be further subdivided into multiple targets for attack by field artillery. A linear target is designated on the target list by two grids or by a center grid, length, and attitude.

Rectangular Target

A rectangular target is wider and longer than 200 meters. It is designated on the target list by four grids or by a center grid, length, width, and attitude.

Circular Target

A circular target is circular in nature or its exact shape is vague. On the target list, it is designated by a center grid and a radius.

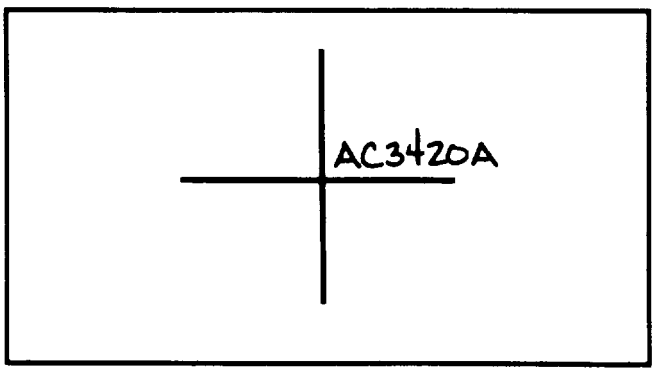
Final Protective Fire

An FPF is a type of priority fire which is similar to a linear target. The symbol used includes the target number, the designation of FPF, and the system and/or unit to deliver the fires.

Target Reference Point

Maneuver elements use an easily identifiable target reference point to orient direct fire weapon systems. This is one of our direct interfaces into the direct fire system. All TRPs should be dually identified in terms of the direct fire system and the target numbering system. The symbol is the same as that for a standard target with a target number and a TRP letter. Each TRP should be plotted on the map and identified as a target. Maneuver will call for it to be fired. TRPs are included on the target list and are identified in the remarks section as TRPs.

TARGET REFERENCE POINT SYMBOL



Target List Work Sheet

DA Form 4655-R (Target List Work Sheet) is a document which-facilitates fire planning by the fire support coordinator. (A reproducible copy of the form is in Appendix M.) It is a preliminary listing of all targets and their descriptions from which the FSO can select and plan.

Preparation of the Target List Work Sheet

The procedure for preparing a DA Form 4655-R is outlined below.

Line Number

This is an administrative control measure for internal use. Assign each target a line number.

Target Number

Assign each target a target number from the block of numbers given to the planning source.

Description

Enter a concise target description that is adequate for a decision on how the target should be attacked.

TARGET LIST WORK SHEET

TARGET LIST WORK SHEET

For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC

SHEET 1 OF 1

LINE NO	TARGET NO	DESCRIPTION	LOCATION	ALTITUDE	ATTITUDE	SIZE		SOURCE ACCURACY	REMARKS
	a	b	c	d	e	LENGTH f	WIDTH g	h	
1	AC 3411	82-mm MORTAR POSITION (4 TUBES)	923435						
2	AC 3412	MECH INF IN TRENCH LINE	918560		1600	400	50		
3	AC 3413	AIRCRAFT LANDING STRIP	920450		4800	1200	200		
4	AC 3414	SUSP REGT CP	947343			(RADIUS 800 m)			
5	AC 3415	FPF	875689	340	1650	200			ADJ W/+2 DELAY
6	AC 3416	ROAD JUNCTION	885670						TRP A3

Location

Enter grid coordinates for point, rectangular, and circular targets. For linear targets, enter the coordinates of the center point.

Altitude

Show the altitude of the target in meters, unless otherwise specified.

Attitude

Enter the attitude of linear and rectangular targets in grid azimuths.

Size (Length and Width)

Enter no dimensions for a point target, one dimension (length) for a linear target, two dimensions (length and width) for a rectangular target, or the radius of a circular target (width).

Source and/or Accuracy

The information in this column aids in determining how to attack the target. When known, enter the source and accuracy of the target data.

Remarks

Enter any special consideration(s) for attack of the target. The target description may be amplified here.

Work Columns

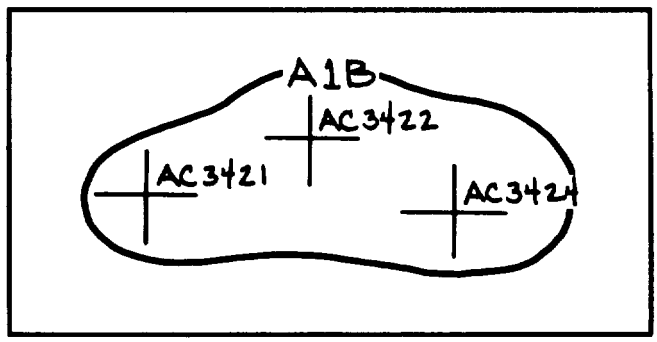
These columns are used to indicate targets that are to be included in a particular fire support schedule. Enter one diagonal line(/) under the appropriate column to show the target is to be included in a particular schedule. When the target has been scheduled, enter an opposing diagonal line, forming an X to show the action is complete.

Types of Planned Fires

Group of Targets

A group of targets consists of two or more targets upon which simultaneous attack is desired by the maneuver commander. It is graphically portrayed by circling the targets and identifying them with a group designator. This designator consists of the two letters assigned to the maneuver brigade with a number between the letters. The numbers should be assigned sequentially as they are used. The number of FA firing batteries and/or battalions available must be considered in planning groups of targets, Inclusion of individual targets in a group does not preclude them from being attacked individually.

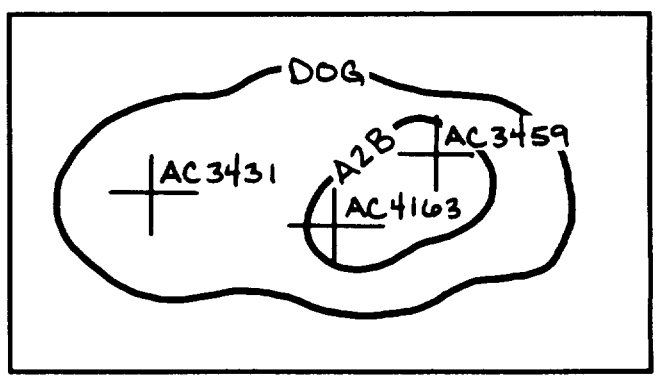
GROUP OF TARGETS



Series of Targets

A series of targets is a number of targets and/or groups of targets planned to be fired in a predetermined time sequence to support a maneuver operation. A series may also be fired on call, at a specified time, or when a certain event occurs. The need for a series is determined by the maneuver commander on the advice of his FSO. The series is indicated by a code name or nickname, Inclusion of individual targets or a group of targets in a series does not preclude them from being attacked individually.

SERIES OF TARGETS



Program of Targets

A program is the predetermined sequential attack of targets of a similar nature. It may be executed on call, at a specific time, or when a particular event occurs. Targets are designated by their nature and are based on the commander's guidance. For example, in a counterfire program, all the targets are artillery-system-related – OPs, artillery batteries, mortar platoons, CPs. A program is not graphically displayed.

Preparation Fire

Fire delivered on targets preparatory to an assault is called preparation fire. The preparation is planned by a direct support FA battalion or higher echelon. It is an intense volume of fire delivered in accordance with a time schedule. The fires normally commence before H-hour and may extend beyond it. They may start at a prescribed time or be held on call. The duration of the preparation is influenced by factors such as the fire support needs of the entire force, the number of targets, and the firing assets and ammunition available.

Counterpreparation

A counterpreparation is an intense volume of prearranged fire which is delivered when the threat of enemy attack is discovered.

> **NOTE:** The decision to plan and/or fire a preparation or counterpreparation is made by the maneuver commander with advice from his FSO. These fires, along with the other types of fires discussed, are an integral part of the overall operation and must be synchronized with other activities.

Scheduling of Fire Support Assets

Once the decisions are made concerning planned targets, the FSO coordinates fire support assets to implement the plan. For example, if mortars and artillery are available assets, the FSO, with input from personnel of those various systems, coordinates which targets and when the mortars will attack. The same is true for the artillery. The various fire support systems retain the responsibility for the more precise scheduling of their integral fire units.

Target Overlay

The target overlay is used to supplement the DA Form 4655-R. It is a graphical representation of the target list work sheet. Symbols used on it should be standard military symbols. Targets are plotted on the overlay by symbols and target numbers. Fire support assets supporting the maneuver unit, as well as all coordinating measures, should be plotted on the overlay. The overlay is used as a tool –

- To resolve duplications of targets.
- To integrate the scheme of maneuver with the plan of supporting fires.
- To determine the most appropriate unit to engage the target.

Scheduling Work Sheet

The FSO finds the commander's guidance and the fire support requirements in the fire support plan. He analyzes this information, plus that on DA Form 4655-R, and determines what schedules of fire must be prepared to support the scheme of maneuver. The FSO then passes these requirements to the DS battalion CP, where the necessary DA Forms 4656-R (Scheduling Work Sheets) are prepared, (A reproducible copy of DA Form 4656-R is in Appendix M.) Any of the following schedules may be prepared, depending on the situation:

- Groups.

Ž Series.

Ž Programs.

- Preparations.
- Counterpreparations.
- Illumination.
- Harassing.
- Interdiction.
- Smoke.

A separate DA Form 4656-R is prepared for each. It is the fire planner's tool for organizing the targets that appear on the DA Form 4655-R into specific schedules. The DA Form 4656-R provides the following information:

- A specific sequence during which the targets scheduled will be engaged.
- Targets requiring more than one volley. These will be scheduled at the sustained rate of fire for the weapon system being used.
- The total expenditure of ammunition by each firing unit on each target.

Ž The shell-fuze combination for each target if it deviates from the standard of HE-quick.

Ž Any targets that are to be engaged on call.

Ž Any special instructions, such as 50 percent VT on OPs.

Ž The fire support assets available.

Unless otherwise indicated in the REMARKS column, all targets will be engaged with HE-quick. For planning purposes, the schedule reflects time of impact (TOT) for all targets. Targets that appear on the target list work sheet but do not appear on the scheduling work sheet are on call.

Preparation of the Scheduling Work Sheet

The procedure for preparing a DA Form 4656-R is outlined below.

Heading

Enter the type of schedule, the supported unit, and the OPORD for which it is being prepared.

Line Number

This is an administrative control number, Number each line sequentially, This gives a quick reference for all holders of the schedule concerning which units have been scheduled and specific information that relates to those targets.

Organization and Caliber

Enter the organizational informatin, to include caliber and weapon type, for each unit for which you have planning authority.

Firing Units

Information entered here reflects the size and designation of the firing unit.

Scheduling Targets

To the upper right of the FIRING UNITS column is an untitled portion of the work sheet referred to as the timing block.

The upper portion of the block is used by the firing units to establish time to fire, or *lanyard pull time,* so that the rounds impact at the scheduled times.

Information in the lower portion of the block is based on time of impact of rounds fired. The purpose of the block is to establish the duration of a particular schedule relative to time. Schedules may start at a specific time (H-hour) or may be scheduled on call (start plotting at time O).

Below the timing block is a block of intersecting horizontal and vertical lines called the time matrix. It is used to assign targets to firing units. This assignment is based on the ability of the unit to adequately engage the target as shown by the target overlay. The time matrix graphically portrays time of impact and duration of fires and may refer to a specific shell-fuze combination to be used. This is done by representing the target to be engaged by either a dot (one volley) or a horizontal line (more than one volley). The interval between the vertical lines is based on the weapon system rate of fire and the number of different systems being scheduled on the same work sheet. For example, for a 105-mm howitzer, the internal is 20 seconds; for a 155-mm howitzer, the interval is 1 minute. Thus the interval for a schedule using both 105-mm and 155-mm howitzers would identify a planning interval of 20 seconds, the shorter of the two intends. Another factor that must be considered in scheduling is the shift time of the weapon system being scheduled. Shift time is the length of time needed for the firing unit to cease firing on one target and commence firing on the next scheduled target.

SHIFT TIMES

WEAPON	SUSTAINED RATE OF FIRE	SHIFT TIME
60-mm mortar	15 rd/min	1 min
81-mm mortar	8 rd/min	1 min
81-mm mortar (improved)	15 rd/min	1 min
105-mm howitzer	3 rd/min	1 min
155-mm howitzer	1 rd/min	1 min
203-mm howitzer	0.5 rd/min	2 min

LEGEND:
min = minute
rd/min = rounds per minutes

Remarks

The REMARKS column is used to amplify information in the time matrix portion of the work sheet and to include information for the engagement of on-call targets. A parenthetical letter refers to amplifying information in the REMARKS column. On-call targets are listed on the line of the firing unit assigned to engage them Any other amplifying information is listed starting under the last firing unit line. No duration lines or dots are used for on-call targets because the duration of fire is not specified. If a unit is ordered to fire its on-call target while it is firing the schedule, it will–

- Leave the schedule.
- Fire its on-call target at the maximum rate of fire.
- Rejoin the schedule at real time.
- Report to its controlling headquarters those scheduled targets that were not engaged and those targets on which commander's effects were not achieved.

It is up to the controlling headquarters to notify the commander and recommend appropriate action to engage these targets.

SAMPLE GROUPS OF FIRES SCHEDULE

(GROUPS FOR 16 INF DIV OPORD 20) SCHEDULING WORK SHEET

For use of this form see FM 6-20-40 or FM 6-20-50. the proponent agency is TRADOC

SHEET 1 OF 1

LINE NO	ORGANIZATION AND CALIBER	FIRING UNITS	(A1Y)			(A2Y)			REMARKS
1.	3-47 FA	A	AB 24	4074 (a)		AB 48	4108 (a)		
2.	(105, T)	B	AB 30	4083 (a)		AA 48	3251 (a)		
3.		C	AZ 30	4123 (a)					(a) 50% VT

SAMPLE SERIES SCHEDULE

(SERIES PAUL FOR 16 INF DIV OPORD 20)

SCHEDULING WORK SHEET

For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC

SHEET 1 OF 1

LINE NO	ORGANIZATION AND CALIBER	FIRING UNITS	0	1	2	REMARKS
1	3-47 FA	A	AA 3251 18 (a)	AA 3246 6 (b)		AA 3260 12 (b)
2.	(105, T)	B	AA 3251 18 (a)	AA 3246 6 (b)		
3.		C	AA 3251 18 (a)	AA 3246 6 (b)		
4.	1-2 FA	A	AA 3263 8	AA 3267 16		(a) 50% VT
	(155, T)					(b) 50% SMK

SAMPLE COUNTER-OP PROGRAM SCHEDULE

(COUNTER-OP PROGRAM FOR 16 INF DIV OPORD 20)

SCHEDULING WORK SHEET

For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC

SHEET 1 OF 1

LINE NO	ORGANIZATION AND CALIBER	FIRING UNITS	0	1	2	REMARKS
1.	3-47 FA	A	AA 3232 24 (a)	AY 0074 6 (a)		
2.	(105, T)	B	AB 4092 24 (a)	AY 0074 6 (a)		
3.		C	AY 0063 24 (a)	AY 0074 6 (a)		
						(a) 50% SMK

APPENDIX G

FIRE SUPPORT COORDINATING MEASURES

This appendix implements STANAG 2099, Edition 4, and QSTAG 531 (Draft).

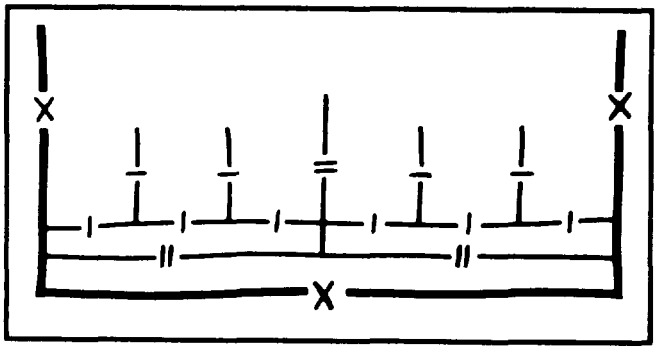
Maneuver Control Measures Affecting Fire Support

Boundaries are the basic maneuver control measures used by commanders to designate the geographical area for which a particular unit is tactically responsible. They are normally designated along terrain features easily recognizable on the ground. They affect fire support in two ways:

- They are **restrictive** in that no fire support means may deliver fires across the boundary unless those fires are coordinated with the force having responsibility for the area within that boundary (unless a permissive measure is in effect).
- They are **permissive** in that the maneuver commander has complete freedom of fire and maneuver within his boundaries unless otherwise restricted by higher headquarters.

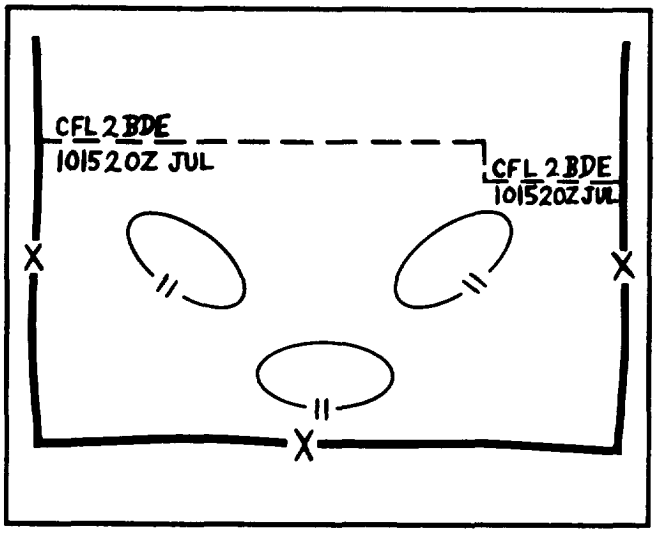
Many times, boundaries negate the need for fire support coordinating measures.

EXAMPLE OF BOUNDARIES



In many instances, the maneuver commander may choose not to establish boundaries for his subordinate elements. In that case, the FSO at that level is responsible for all fire support coordination within the area of operations or zone of action. The graphic below shows just such a situation. The brigade commander has assigned battle positions to his subordinate units and has not designated battalion boundaries. Thus, the brigade FSO is now responsible for coordinating all fires in the brigade sector except in those areas bounded by the battle positions. He may recommend to the brigade commander the use of fire support coordinating measures as the situation dictates; for example, a brigade CFL.

EXAMPLE OF FIRE SUPPORT COORDINATING MEASURES



Fire Support Coordinating Measures

Fire support coordinating measures are designed to facilitate the rapid engagement

of targets and, at the same time, provide safeguards for friendly forces. They ensure that fire support will not jeopardize troop safety, will interface with other fire support means, and/or will not disrupt adjacent unit operations. Graphic portrayal is in black and includes, as a minimum, the abbreviation of the measure, the establishing headquarters, and the effective date-time group (DTG). Usually, coordinating measures are labeled at each end of a line or within the graphic, space permitting.

Permissive Measures

Permissive measures are those which facilitate the attack of targets.

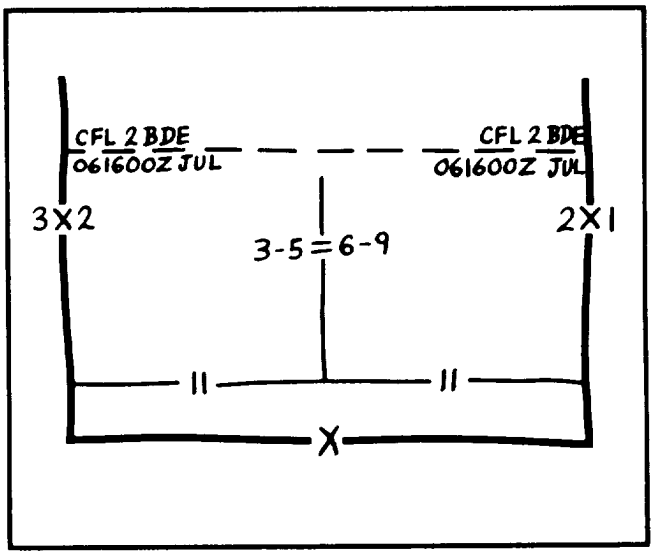
Coordinated Fire Line

The CFL (denoted by a broken line) is a line beyond which conventional surface-to-surface fires may be delivered within the zone of the establishing headquarters without additional coordination. Normally, it is established by brigade or higher headquarters; however, it may be established by a battalion operating independently. In the example below, the area that extends from the CFL forward to the end of the 2d Brigade boundary may be attacked by all surface-to-surface fire support means without coordination with 2d Brigade. This attack includes units in and adjacent to 2d Brigade.

In the offense, the CFL should be placed far enough in front of friendly forces to facilitate lifting and/or shifting of the measure to avoid friendly casualties and to allow room for the maneuver forces. Always be aware of the time required to lift and/or shift the measure.

In the defense, the CFL should be brought in close to friendly forces. Considerations for how close are based on weather, terrain, and munitions effects.

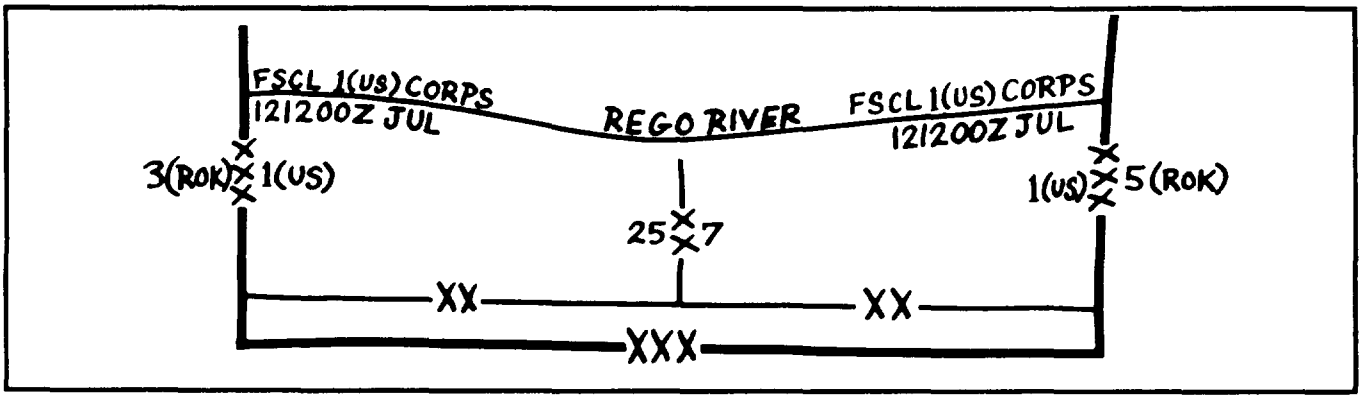
EXAMPLE OF COORDINATED FIRE LINE



Fire Support Coordination Line

A fire support coordination line (FSCL) may be established by corps within its area of operation to support its concept of the operation. The FSCL is used to coordinate fires of air, ground, or sea weapon systems using any type of ammunition against surface targets. The location of the FSCL must be coordinated with the appropriate tactical air commander and other supporting elements. The purpose of this permissive fire control measure is to allow the corps and its subordinate and supporting units (such as the Air Force) to expeditiously attack targets of opportunity beyond the FSCL. The attack of targets beyond the FSCL by Army assets should be coordinated with supporting tactical air. This coordination is defined as informing and/or consulting with supporting tactical air. However, the inability to effect this coordination will not preclude the attack of targets beyond the FSCL. The interface within the FS cell between the various fire support representatives provides an excellent means of initially coordinating the attack of targets in this area. The FSCL is denoted by a solid line.

EXAMPLE OF FIRE SUPPORT COORDINATION LINE



Free-Fire Area

A free-fire area (FFA) is an 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.

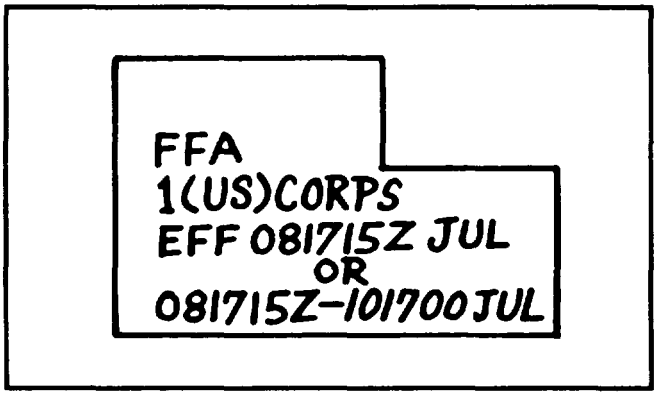
Restrictive Measures

Restrictive measures are those which provide safeguards for friendly forces, facilities, or terrain.

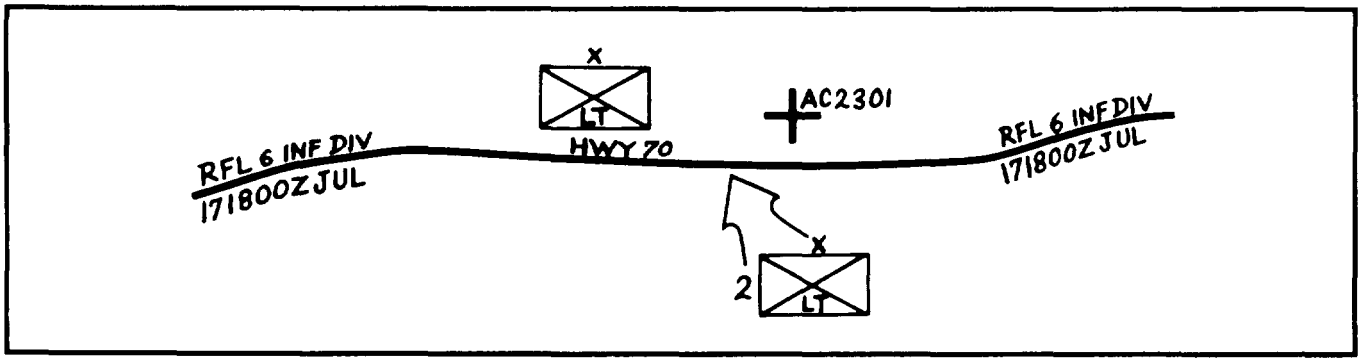
Restrictive Fire Line

An RFL is a line between converging friendly forces which prohibits fires, or their effects, across the line without coordination with the affected force. It is established on identifiable terrain by the common commander of the converging forces. In the graphic below, 2d Brigade is-conducting a linkup with 1st Brigade. The 6th Inf Div commander, the common commander of both forces, has established the RFL. If 2d Brigade wants to attack Target AC2301, it must coordinate with 1st Brigade.

EXAMPLE OF FREE-FIRE AREA



EXAMPLE OF RESTRICTIVE FIRE LINE



Restrictive Fire Area

The RFA is an area with specific restrictions and in which fires that exceed those restrictions will not be delivered without coordination with the establishing headquarters. It is established by battalion or higher headquarters. On occasion, it may be established by a company operating independently. The imposed restriction is as shown in the graphic below, or a reference to the OPORD or OPLAN where the restriction can be found is annotated on the overlay.

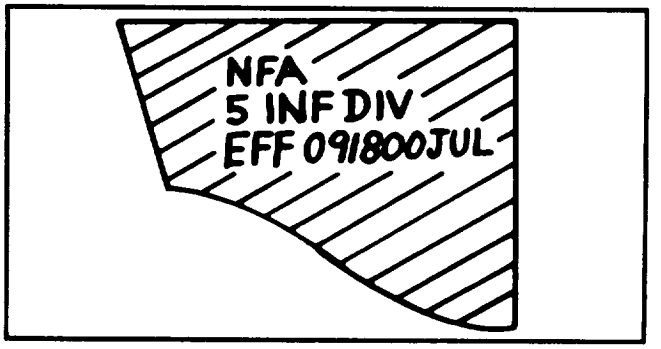
EXAMPLE OF RESTRICTIVE FIRE AREA

No-Fire Area

The no-fire area (NFA) is an area into which no fires or their effects are allowed. It is established on identifiable terrain, normally by division or higher headquarters. It may be established in conjunction with a host nation to preclude damage or destruction to a national asset, population center, or shrine. Also, it may be established to protect an element of tactical importance, such as a fuel storage area. Two exceptions to the no-fire rule exist:

- When the establishing headquarters allows fires on a mission-by-mission basis.
- When a friendly force is engaged by an enemy located within the NFA and the commander returns fire to defend his forces. The amount of return fire should not exceed that sufficient to protect the force and continue the mission.

EXAMPLE OF NO-FIRE AREA



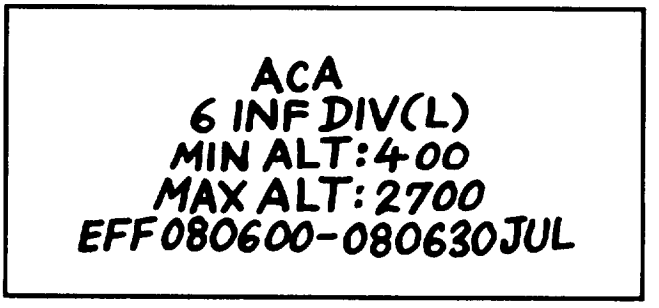
Airspace Coordination Area

An ACA is a block of airspace in the target area in which friendly aircraft are reasonably safe from friendly surface fires.

Informal ACAs are most often used and are the preferred method. An informal ACA can be established at task force or higher level and normally is not depicted on charts or maps. It can be established by using lateral, altitude, time, or lateral and altitude separation. Informal ACAs are normally in effect for very short periods of time. Usually, the period is only long enough to get the mission into and out of the target area (3 to 6 minutes). (See Appendix C.)

Occasionally, a formal ACA is established by brigade or higher headquarters. The ALO recommends the size. **Altitude is in feet above see level.**

EXAMPLE OF FORMAL AIRSPACE COORDINATION AREA



APPENDIX H

COMMUNICATIONS

Introduction

This appendix is intended for users, supervisors, and planners. It provides basic guidance on planning and employing communications assets. The development of operating procedures and doctrinal changes is an evolutionary process. The information in this appendix is modeled on an objective light infantry division (LID) (L-series) TOE. Users operating under modification TOEs (MTOEs) must understand that procedures and methods outlined herein are a **recommended** solution and may be tailored to meet specific requirements.

Communications Systems

Radio is the primary means of voice and digital communications with the field artillery. Separate radio nets are established for command and control, fire direction, fire support coordination, and administration and logistics. The execution of AirLand Battle doctrine requires the skillful use of all communications resources. Thus, close coordination and a clear understanding of radio net structure are necessary.

With restrictions on light division personnel and on weight and size of equipment, FA units must have reliable and efficient communications systems with fewer assets. The growth and development of requirements for fire support, fire direction, administration and logistics, and command and control communications over long distances have placed even more responsibilities on the commander.

A communications system is the result of a plan designed to fulfill the requirements of a light infantry division mission. As a result of net standardization, units can quickly and accurately communicate in combat. Command discipline must be established so that standard net structures and purposes are not arbitrarily changed except to tailor for a specific modified mission. This tailoring is based on the factors of METT-T. Standard net structures (net title, purpose, users, and equipment) should be defined in unit SOP and should be kept current as changes in procedures and/or systems occur.

Communications system planning must include advance coordination for SOI and COMSEC materials for secure operations. Consider the fire support scheme of maneuver for planned, on-order, and anticipated missions.

Radio Net Structures

Voice Communications

Company-Level Fire Support. In units not equipped with digital devices, company fire support personnel should operate in the following nets:

- Maneuver battalion mortar fire direction net FM (voice). This net is used for battalion mortar fire direction and voice coordination between fire support entities within the maneuver battalion. The battalion FSE is the net control station.
- Direct support battalion fire direction net 1, 2, or 3 FM (voice). This net is used for FA fire direction. There are three FA fire direction nets at DS battalion level. Normally, they are assigned on the basis of one per maneuver battalion. The FIST headquarters may control calls for fire from its observers on this net. The DS battalion FDC is the NCS.
- Maneuver battalion fire support net FM (voice). This net is used for fire support coordination between maneuver and fire support elements. The battalion FSE is the NCS.

- Maneuver company command/operations net FM (voice). This net is used for command and control by maneuver elements and as an alternate fire support coordination net for non-field-artillery observers (such as scouts). The NCS is the company CP. The company FSO is in this net when he is not physically located with the maneuver commander.

Battalion-Level Fire Support. The battalion fire support personnel operate in the following nets:

- Maneuver battalion fire support net FM (voice) (NCS).
- Maneuver battalion mortar fire direction net FM (voice).
- Direct support battalion fire direction net 1, 2, or 3 FM (voice).
- Maneuver brigade fire support net FM (voice). This is a secure net linking the battalion FSO and FSE to the brigade FSO and FSE and the FA battalion CP. It is used for planning and coordinating fire support within the brigade. The brigade FSE is the NCS.
- Direct support battalion operations/fire net FM (voice). This net is used within the field artillery for fire support planning and coordination. Reinforcing units should use this net. The NCS is the DS battalion operations section.
- Maneuver battalion command/operations net FM (voice) (as required).

Brigade-Level Fire Support. The brigade fire support personnel operate in the following nets:

- Maneuver brigade fire support net FM (voice).
- Div arty command net FM (voice). This secure net links the brigade FSEs with the division FSE and the div arty CP. It is used for command and control. The div arty CP is the NCS.
- Direct support battalion operations/fire net FM (voice).
- Maneuver brigade command/operations net FM (voice). This net is used for dismounted FSO operations.
- Div arty operations/fire direction net 1, 2, or 3 FM (voice) (as required).
- Div arty fire support net amplitude modulated/single sideband (AM/SSB) (voice). This net accomplishes long-distance fire support with elements throughout the division (including separate, air assault, and aviation elements) and brigade FSEs. It is used to plan nuclear and/or chemical fires and to coordinate the delivery of CAS or naval gunfire. The FSE at the division main TOC is the NCS.

Digital Communications

Company-Level Fire Support. In units equipped with forward entry devices (FEDs), the following nets should be used:

- Maneuver battalion mortar fire direction net FM (digital).
- Maneuver company command/operations net FM (voice).
- Direct support battalion fire direction net 1, 2, or 3 FM (digital).
- Maneuver battalion fire support net FM (voice).

Battalion-Level Fire Support. The battalion fire support personnel operate in the following nets:

- Maneuver brigade fire support net FM (voice).
- Direct support battalion operations/fire net FM (digital).
- Maneuver battalion- fire support net FM (voice).
- Direct support battalion fire direction net 1, 2, or 3 FM (digital).

- Maneuver battalion mortar fire direction net FM (digital).
- Maneuver battalion command/operations net FM (voice) (as required).

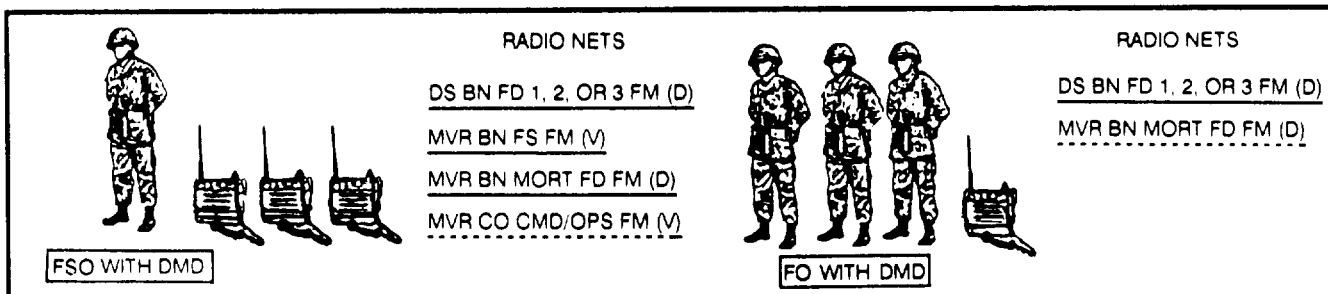
Brigade-Level Fire Support. The brigade fire support personnel operate in the following nets:

- Div arty operations/fire direction net 1, 2, or 3 FM (digital).
- Direct support battalion operations/fire direction net FM (digital).
- Maneuver brigade fire support net FM (voice).
- Div arty command net FM (voice).
- Maneuver brigade command/operations net FM (voice) (as required).
- Div arty fire support net AM/SSB (voice).

Far-Term Communications

Radio net structures will not change appreciably with the advent of the single-channel ground-airborne radio system (SINCGARS).

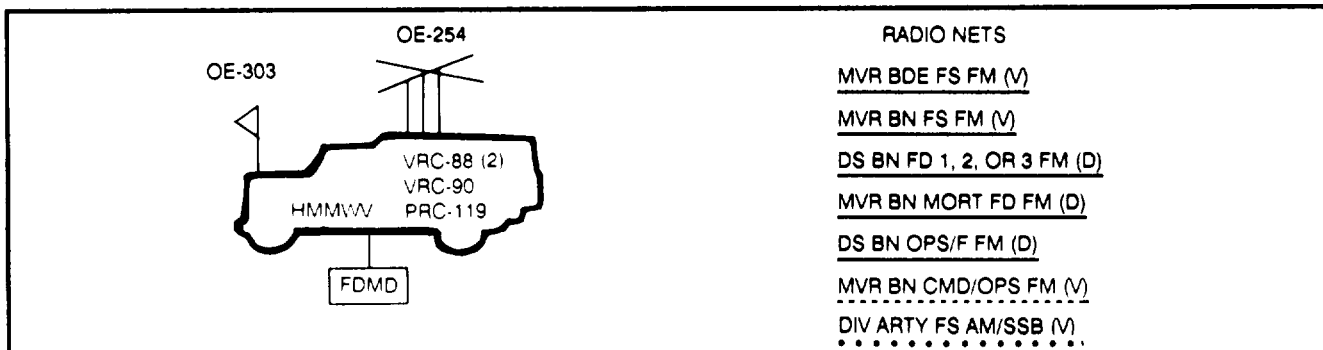
FIRE SUPPORT TEAM COMMUNICATIONS



LEGEND:

CMD/OPS	= command/operations	(V)	= voice
DMD	= digital message device	———	= primary net
(D)	= digital	----------	= as needed

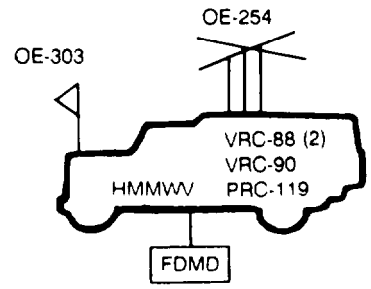
BATTALION FIRE SUPPORT ELEMENT COMMUNICATIONS



LEGEND:

FDMD	= FIST digital message device	----------	= as needed
OPS/F	= operations/fire	• • • • • • •	= for air assault raid or interdiction operations
———	= primary net		

BRIGADE FIRE SUPPORT ELEMENT COMMUNICATIONS



RADIO NETS

DIV ARTY CMD FM (V)

MVR BDE FS FM (V)

DS BN OPS/F FM (D)

DIV ARTY OPS/F 1, 2, OR 3 FM (D)

MVR BDE CMD/OPS FM (V)

DIV ARTY FS AM/SSB (V)

LEGEND:

———— = primary net

---------- = as needed

• • • • • • • = for air assault raid or interdiction operations

FIRE SUPPORT NET USAGE

NET	FO	FIST	CO FSO	BN FSE	BN FSO	COLT	BDE FSE	BDE FSO	FA BTRY FDC	FA BN FDC	BN MORTARS	DIV FSE (TAC)	DIV FSE (MAIN)	DIV ARTY TOC
Maneuver co cmd/ops net FM (V)		X[1]												
Maneuver bn cmd/ops net FM (V)				X[1]										
Maneuver bde cmd/ops net FM (V)							X[1]							
Maneuver bn FS net FM (V)	X[2]	X	X[3]	X	X[3]	X					X			
Maneuver bde FS net FM (V)				X	X		X	X						
Maneuver bn mortar FD net FM (D)[4]	X[1]	X	X[1]	X		X[5]					X			
DS bn FD net 1, 2, or 3 FM (D)[4]	X[6]	X		X		X[5]			X	X				
DS bn ops/F net FM (D)[4]				X			X			X				
Div arty ops/F net 1, 2, or 3 FM (D)							X			X		X	X	X
Div arty FS net AM/SSB (V)[4]				X[7]			X[7]					X[7]	X[7]	X[7]
Div arty cmd net FM (V)							X			X		X	X	X

[1]As needed.
[2]May enter for voice coordination.
[3]Net used by FSO when separate from the FSE.
[4]When there is no digital capability, this is a voice net.
[5]COLTs will operate in the net directed by brigade FSO.
[6]As directed.
[7]For assault raid or interdiction operations.

Single-Channel Ground-Airborne Radio System

SINCGARS is the new generation combat net radio designed to provide the primary means of command and control. Its main features are its resistance to jamming through frequency hopping and its increased capacity of 2,320 channels. The basic radio is designed on a modular basis to achieve commonality among various system configurations. It can be used in the manpack or vehicular package. It is interoperable with AN/VRC- 12-series radios. The present radio net structures will not change in terms of mission capability, net size, assignment of net stations, or distance covered. Planning considerations, however, require frequency management on a decentralized basis. This means frequency management will be done at battalion level and intensive management by staff and supervisors at all levels of command will be necessary.

Battlefield Electronic CEOI System

The battlefield electronic communications-electronics operation instruction (CEOI) system (BECS) is a decentralized system for frequency management and the publication of unit CEOIs (now called signal operation instructions). The BECS has been designed to provide more responsiveness to rapidly changing and highly mobile battlefield conditions. The system consists of a basic generation unit (BGU) and an electronic notebook (EN). Distribution channels are the same as presently used for the paper SOI.

Loss of Communication

Communication is essential for fire support. If communication with a station is lost, everything possible must be done to reestablish the link. Digital nets are backed up by voice nets and vice versa. If digital communication is lost, resolve the problem on the voice net. If a station cannot be contacted on any fire support net, coordinate with maneuver counterparts to use their nets to reestablish communication. Unit SOPs must delineate exact actions to be taken to reestablish communication, and all personnel must be intimately familiar with those actions.

COMMUNICATIONS TIPS

DO	DON'T
Use the lowest power possible for effective transmissions.	Use homemade codes.
Make transmissions as short as possible.	Use homemade call signs.
Use the proper antenna (directional antenna if possible).	Start vehicles with radios on.
Use masking, if possible, to hide your signal.	Try to talk around sensitive information.
Use only authorized codes.	Display frequencies or call signs.
Remote radios if possible.	Create antenna *farms*.
Enforce net discipline.	
Authenticate.	
Try to work through jamming.	
Plan for the use of retrans.	

Retransmission

The FM VHF transmission distances are restricted by terrain and obstacles. The siting of radio equipment is often critical. The following are helpful hints for using FM retrans:

- As a minimum, make a map recon of the area of operation. Coordinate with the S2 and S3 during the planning phase.
- Analyze the terrain for optimum communications to support the scheme of maneuver.

- Select primary and alternate locations for retrans. Consider accessibility, defense, and logistical support.
- Arrange the timetable for site occupation and net operation. Don't wait until retrans is needed before sending it out.
- Ensure operators are well trained. They must be able to provide manual relay if they have equipment failures.
- Ensure operators are aware of the tactical situation.
- Ensure users understand how retrans works.

Communications Planning Ranges

The table below is to be used in communications planning. The ranges presented here were determined under ideal conditions; weather and terrain may have drastic degrading influences.

PLANNING RANGES FOR FIRE SUPPORT RADIOS

RADIO	RANGE (KM)[1]	
	Low Power	High Power
AN/PRC-77 with whip antenna	8	NA
AN/PRC-77 with long-wire antenna (AT-984/G)	28	NA
AN/GRC-160 with whip antenna	8	NA
AN/GRC-160 with RC-292, OE-254, or OE-303 antenna	19	NA
AN/GRC-160 with long-wire antenna (AT-984/G)	28	NA
AN/VRC-46 with whip antenna	8	40
AN/VRC-46 with OE-254, RC-292, or OE-303 antenna	19	58

[1]The normal planning range for the AN/GRC-160 series is 8 km; for the AN/VRC-46 series, it is 40 km. The above extended ranges are achieved by use of various antenna arrays.

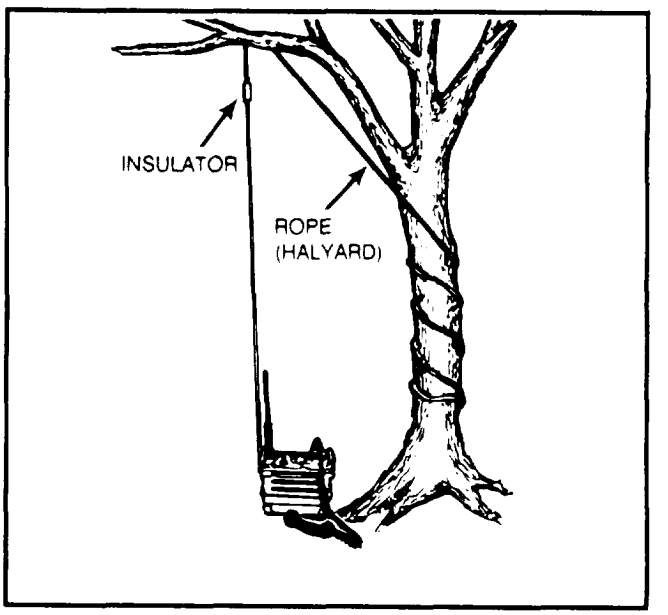
Field-Expedient Antennas

Poor or erratic radio communications may be the result of excessive distances between radios, unfavorable terrain or weather, or defective equipment. All fire support personnel must understand the application of field-expedient antennas for maintaining or enhancing communications and for ECCM. Regardless of the type of antenna used, proper maintenance must be performed to get the optimum performance from the equipment. The field-expedient antennas discussed below are relatively simple, easy to construct from available materials, and highly effective.

Replacement Whip Antenna

In a static position, a broken whip antenna may be replaced by use of WD-1 communications wire and an overhead branch or some support assembly. Cut a 10-foot piece of wire, attach an insulator to one end, and use a rope attached to the insulator to elevate the antenna. Strip about 1 inch of insulation from the end to be attached to the radio. Loosen the antenna base on the radio, place the bare wire between the antenna base and the antenna support receptacle, and retighten the antenna base. Ensure the improvised antenna is vertical.

REPLACEMENT WHIP ANTENNA



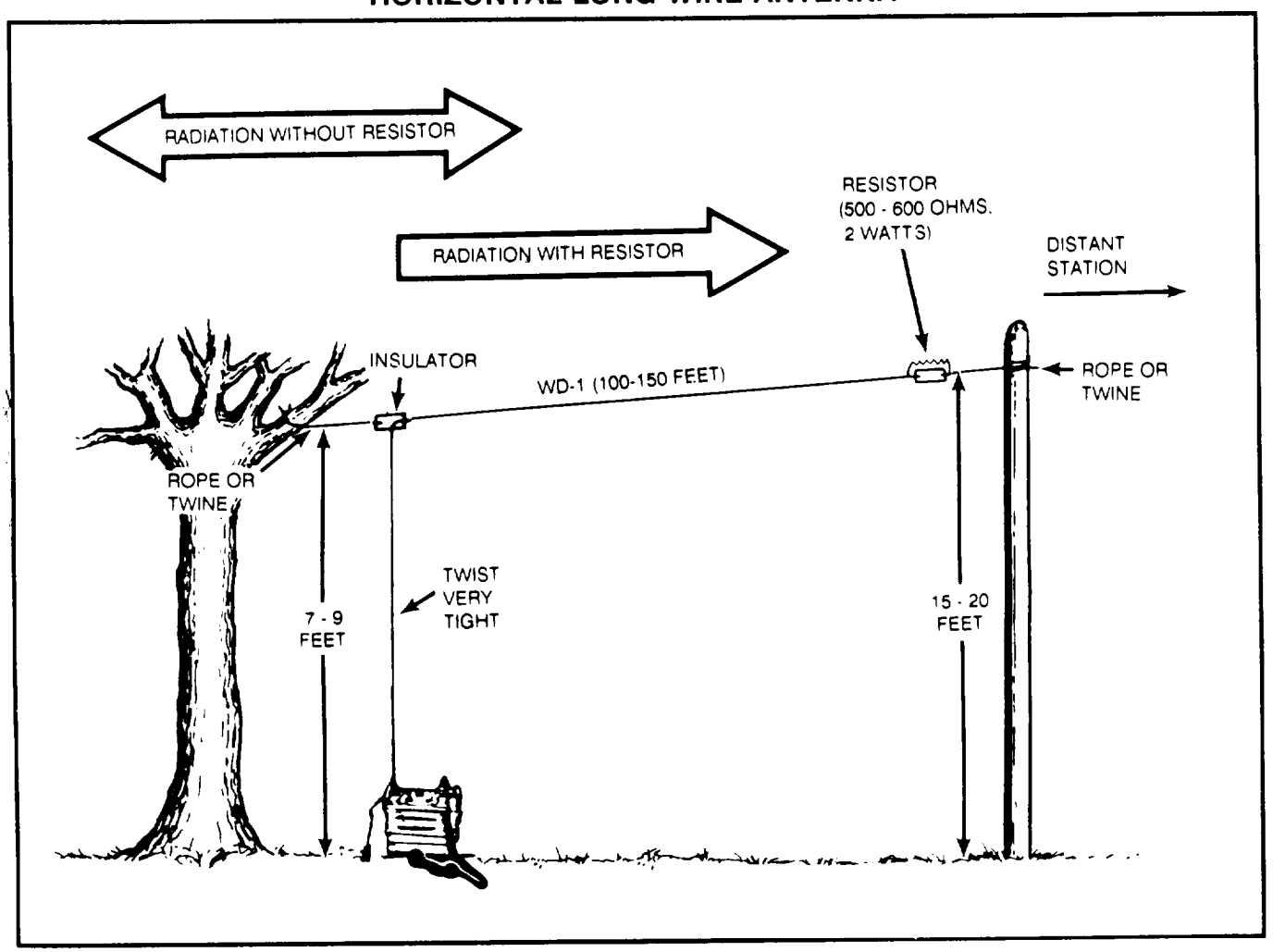
Horizontal Long-Wire Antenna

This is probably the simplest, yet most effective, antenna for communicating over long distances. Maximum radiation is off the ends of this antenna; thus, it is highly directional. It not only increases the range of transmission and reception, but it tends also to reject or reduce signals from other directions. This makes it an excellent antijamming device.

WD-1 is ideal for this antenna. The wire must be 100 to 150 feet long. Tightly twist the first section of the WD-1, and connect the end between the antenna base and the antenna support receptacle on the radio. The wire must be adequately insulated to prevent accidental grounding. The antenna should be erected at least 7 to 9 feet high at the radio and 15 to 20 feet above ground at the other end. Connect the other end to a pole or a tree in the direction in which communication is required. This ground clearance is necessary to prevent accidents or injuries involving personnel or vehicle traffic.

To make this a one-way (unidirectional) antenna, add a resistor at the end toward the distant station. A dead flashlight battery BA-30 makes an ideal resistor for low-power radios. Attach a nail or screw to each end of the battery, ensuring they don't touch, and connect the wire to each.

HORIZONTAL LONG-WIRE ANTENNA



Center-Fed Doublet Antenna

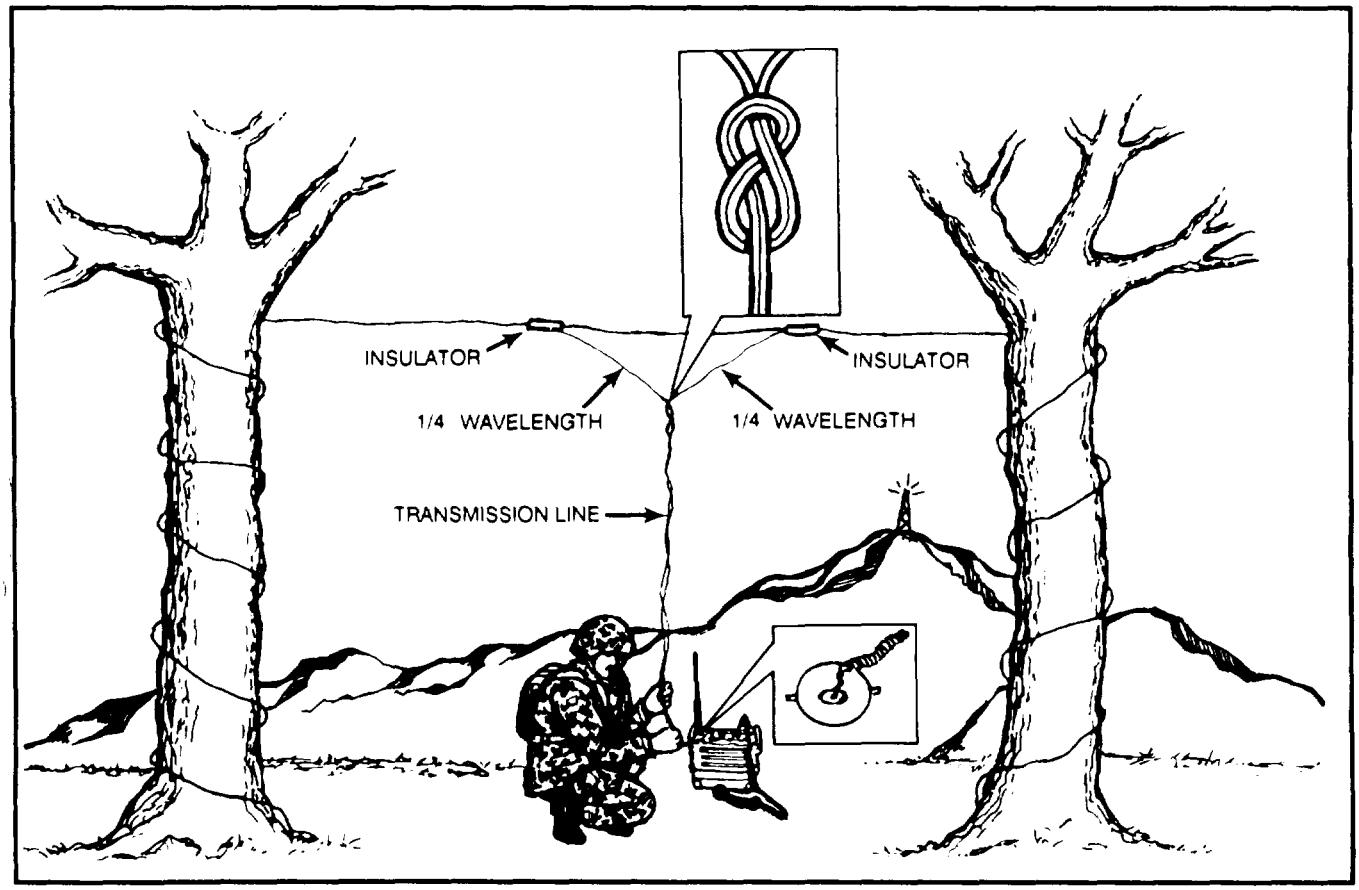
The center-fed doublet is an effective two-way (bidirectional) antenna. It is particularly efficient in jungle environments and for ECCM if both the sending and receiving stations are using the same type of antenna. Unlike the whip and many other antennas discussed in this appendix, this antenna is electronically horizontal and will not communicate with those that are electronically vertical.

The length of each element is critical and depends on the operating frequency. This length must be one-quarter wavelength. To determine the length of each element in feet, divide 468 by the frequency in megahertz (which gives you one-half wavelength). Then divide this result by 2 to get one-quarter wavelength in feet. An example using the operating frequency of 46.80 MHz follows:

468 ÷ 46.80 = 10; 10÷2= 5 feet; so each element is 5 feet long.

After determining the length of each element, construct the antenna by measuring off slightly more than the required length of wire and tie a figure-eight knot at that point. Separate the wire into the elements, and attach insulators at each end. Ensure the elements are the exact length required. Tightly twist the remaining wire going to the radio to make a transmission cable, and strip each end of the wire. Put one wire into the center of the antenna cable connector, and attach the other wire to the metal case of the radio. Attach the insulators to the rope to permit erecting the antenna between two trees or other support assemblies. Raise the antenna 20 to 30 feet, and ensure the broadside is directed toward the receiving station(s).

CENTER-FED DOUBLET ANTENNA

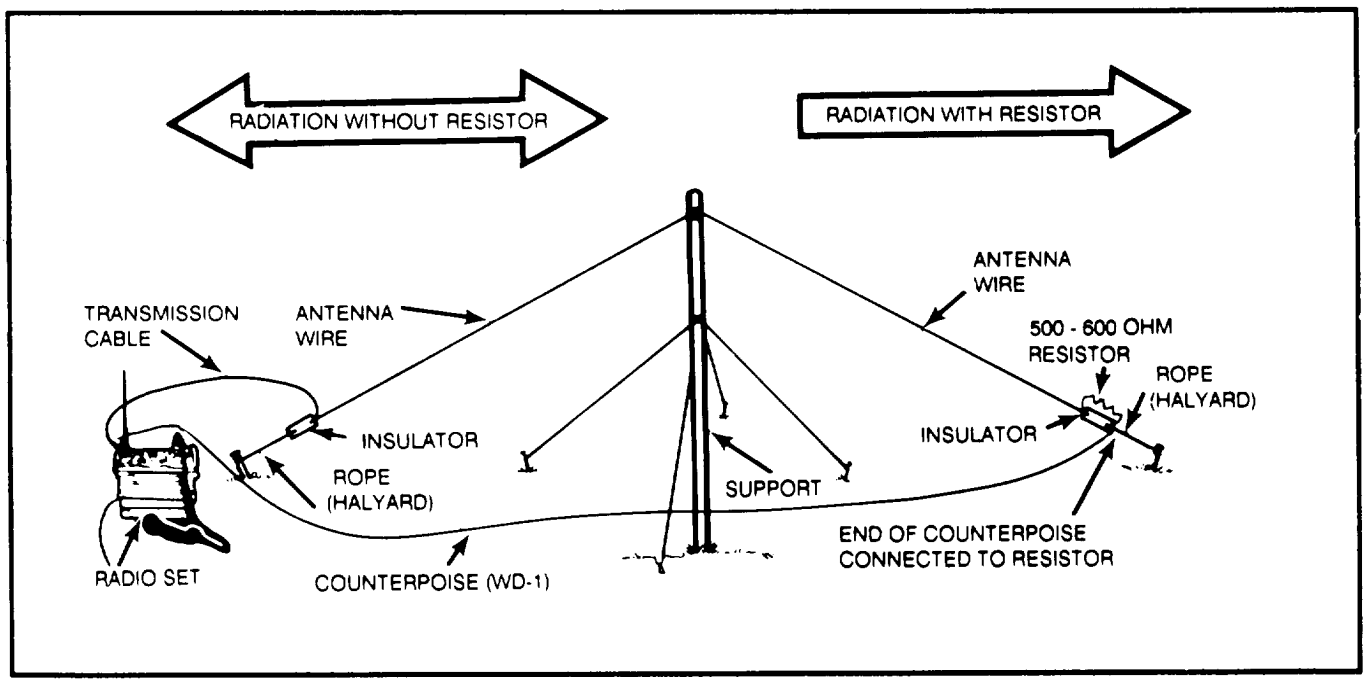


Vertical Half-Rhombic Antenna

The typical vertical half-rhombic antenna consists of 100 to 150 feet of WD-1 wire on a 30- to 45-foot-high support. The support should be centered with approximately half of the wire on each side. Attach insulators to the ends, and fasten rope to these insulators. This permits the ends to be tied down to stakes and the antenna element to be insulated from a ground. Make a transmission cable by tightly twisting the section of WD-1 coming from the radio end of the antenna element. Strip the ends of the cable approximately 1 inch, and connect these leads between the antenna base and the antenna support receptacle on the radio. The antenna in this configuration is a two-way (bidirectional) antenna.

To make this a one-way (unidirectional) antenna, add a resistor at the end toward the distant station. A dead flashlight battery BA-30 makes an ideal resistor for low-power radios. Attach a nail or screw to each end of the battery, ensuring they don't touch, and connect the wire to each.

VERTICAL HALF-RHOMBIC ANTENNA WITH RESISTOR



Resistors and Field-Expedient Resistors

Resistors are used to draw the signal in the desired direction of transmission.

Resistors used to construct the long-wire and half-rhombic antennas are readily available through supply channels and local radio repair shops. These resistors must have a resistance of 500 to 600 ohms and must be at least half the wattage of the transmitter power output. For example, a 600-ohm, 2-watt resistor works with the AN/PRC-77. Typical power outputs for combat net radios are as follows:

- AN/VRC- 12 series (-46, -47, and so forth):
  - High power = 35 watts (minimum).
  - Low power = 0.5 to 8 watts.
- AN/PRC-77 = 4 watts.
- SINCGARS = 50 watts.

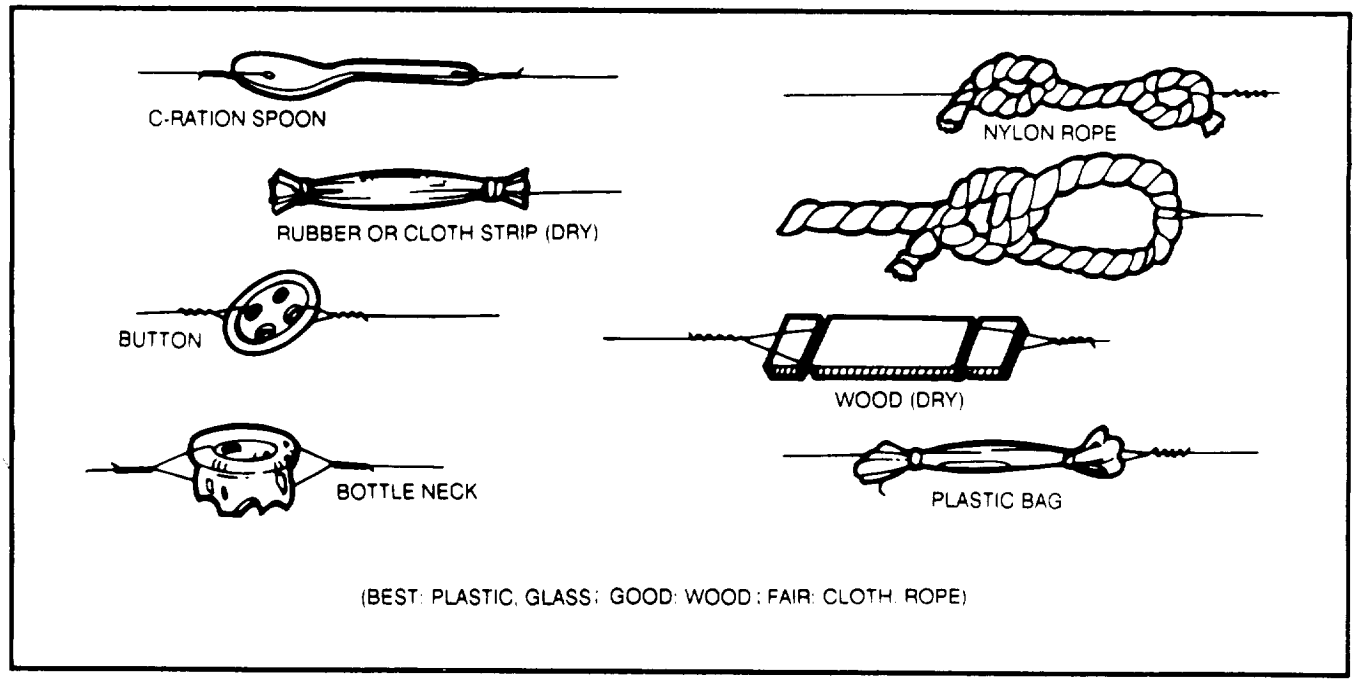
NOTE: SINCGARS radios do not perform frequency hopping very well with field-expedient antennas, but any antenna Is better than none at all. The use of a field-expedient antenna may degrade the SINCGARS to a single-channel operation, but it will permit communication.

Field-expedient resistors should be of the same values as those listed above, approximately 500 to 600 ohms at about half the wattage output. A BA-30 with nails driven into each end will approximate 500 to 600 ohms at 1 to 3 watts. An earplug container with holes drilled in the case opposite each other and filled with sand and a few drops of crankcase oil will work much like the battery.

Field-Expedient Insulators

Insulators keep the signal from going in an unwanted direction. Almost anything that will not conduct electricity but that has some strength can be an insulator. The very best insulators are glass, plastic, and rubber. Less effective but still usable are cloth, wood, and rope; however, these are not good when wet.

FIELD-EXPEDIENT INSULATORS



Extended-Range Communication

Communication is necessary in long-range, cross-FLOT operations such as raids or air assault operations. Extensive consideration, planning, and coordination are required for those units with no long-range communications assets. FM retrans is limited during these types of operations by distance, terrain, obstacles, and possible Threat forces. The following are a few considerations for long-range operations:

- AM voice radios do not depend on terrain. They will transmit greater distances, but their electronic signature may make them vulnerable to enemy radio electronic combat.
- The single-channel tactical satellite (TACSAT) may be employed when use of FM is limited.
- Aerial retrans may be coordinated for use behind or near the FLOT.
- Use of AM or TACSAT might be coordinated through the division signal officer or the supported unit.
- Other considerations might include –
  - Experienced operators to work the equipment.
  - Frequency allocations and propagation.
  - Location of satellite (magnetic azimuth).
  - Logistics to support nonorganic communications equipment (batteries, spare parts, maintenance).

NOTE: The US Army Signal School is in the process of replacing the terms *FM (frequency modulated)* and *AM or AM/SSB (amplitude modulated and single sideband)* in most radio net titles with terms more closely denoting frequency range. The following frequency range designations will be used:

- HF — high frequency (replacing AM/SSB).
- VHF — very high frequency (replacing FM).

APPENDIX I

SPECIAL MUNITIONS

Section I. FAMILY OF SCATTERABLE MINES

Employment Considerations

The decision to use and the purpose of FA-delivered FASCAM must be carefully considered by the commander, engineer, FSO, and S3. The engineer officer provides the expertise on employment of all types of FASCAM. The FSO provides the technical expertise to the engineer concerning the employment of FA-delivered FASCAM. The ALO advises the engineer officer concerning FASCAM delivered by the Air Force. As part of the planning process, the FSO should advise the commander of anticipated FA-delivered FASCAM safety zones. The estimated safety zones could affect the use and/or positioning of FA-delivered FASCAM. There are two types of FA-delivered FASCAM: an area denial antipersonnel mine (ADAM) and the remote antiarmor mine system (RAAMS) (for use against lightly armored vehicles). **Both are available only in 155 mm.** FASCAM has two preset self-destruct times:

- Short duration (unclassified self-destruct time of less than 24 hours).
- Long duration (unclassified self-destruct time of greater than 24 hours).

The corps commander has the authority to employ FASCAM. Employment may be delegated for specific operations or for limited periods of time as follows:

- Long duration down to maneuver brigade.
- Short duration down to maneuver battalion.

FA-delivered FASCAM enables the maneuver commander to quickly emplace a minefield. Like any obstacle, FASCAM is best used at a choke point covered by effective indirect and antitank fires. These principles apply even more strongly to FASCAM because the mines are surface-laid and visible. An undisturbed enemy in column can work through this type of field quickly.

Capabilities

In the defense, FASCAM is used to —

- Develop targets for long-range antitank weapons.
- Close gaps and lanes in other obstacles.
- Delay or disrupt attacking forces.
- Deny the enemy unrestricted use of selected areas.
- Disrupt movement and commitment of second-echelon forces.
- Disrupt and harass enemy command and control, logistics, or staging areas.
- Reinforce existing obstacles.
- Disrupt or delay river crossings.

In the offense, FASCAM is used to —

- Supplement flank reconnaissance and security forces in protecting flanks along avenues of approach.
- Suppress and disrupt enemy security elements once contact has been made.
- Hinder withdrawal of enemy forces.
- Hinder the ability of the enemy to reinforce the objective area.

Employment Options

FASCAM may be delivered all RAAMS. all ADAM, or a combination of both. If RAAMS and ADAM are employed on the same target, ADAM is fired as the last volley.

ADAM may be used without RAAMS. Five basic missions for ADAM (besides augmenting RAAMS on an artillery-delivered minefield) are as follows:

- Reinforce antitank obstacles. ADAM can be used to augment antivehicle obstacles by inhibiting dismounted clearing parties. Having ADAM available for this task allows engineer units to concentrate their efforts on antivehicle obstacles such as antitank minefields, abatis, and road craters.
- Reinforce antipersonnel obstacles. ADAM can be used in a similar manner to augment barbed wire or concertina wire obstacles against personnel.
- Interdict unarmored vehicles. When used IAW guidelines discussed later, ADAM can be used for interdiction or area denial against a variety of soft targets. These include resupply vehicles; towed artillery and mortars; and truck-mounted headquarters, communications, and EW sections.
- Augment conventional fires on unarmored targets. ADAM can be used to increase the effectiveness of fires against the same sort of targets it can interdict. These targets can be engaged with HE or ICM, followed by ADAM to limit their ability to reconstitute or reorganize and displace.
- Provide counterfire or suppress enemy air defense or field artillery, ADAM could be delivered after HE or dual-purpose ICM (DPICM) volleys on enemy AD or indirect fire units. This use would prolong the effectiveness of the artillery attack by disrupting and neutralizing or suppressing the target after firing has ceased. If the enemy indirect fire units are self-propelled, RAAMS could be used in conjunction with ADAM.

FASCAM may be delivered in conjunction with other munitions. In that way, it extends the effects of other munitions. For example, ADAM may be fired into a logistical site after DPICM is fired. If fired in conjunction with other munitions, FASCAM is fired in the last volleys.

Basic Uses of FASCAM

There are four basic uses of FA-delivered FASCAM:

- Interdiction or area denial.
- Employment as an obstacle.
- Employment to augment an obstacle.
- Employment against targets of opportunity.

Interdiction or Area Denial

FA-delivered scatterable mines are not well suited for interdiction or area denial. Because FA-delivered minefields tend to be small and of low density (because of low ammunition availability), they are easily bypassed and/or breached. FA-delivered mines are poorly suited for interdicting roads for three reasons:

- The mines tend to break up or malfunction when they land on a hard-surface road.
- The mines are easy to see against the uniform background of a road.
- Units on roads are already moving in column, and columns are the best formations for breaching scatterable minefields.

If RAAMS and ADAM are used for interdiction or area denial, there are three employment guidelines:

- Employ them only at choke points to keep the enemy from easily bypassing the minefield.
- Employ them in high-density fields to prevent breaching.
- Employ them when and where they are hard to detect; for example, in limited visibility (at night or in fog) or where the enemy will be buttoned up (for instance, in a chemically contaminated area).

In summary, FA-delivered minefields can be used for interdiction and area denial, but a larger amount of ammunition must be delivered at a carefully chosen place and time. In general, RAAMS and ADAM are most effectively employed when covered by direct fire.

Employment as an Obstacle

Any type of FASCAM should be employed according to the basic principles of minefield employment:

- Employ mines at a choke point.
- Cover mines with effective direct fire and indirect fire by using HE-VT or DPICM.
- Keep minefields under continuous observation. Use night observation devices and planned illumination targets at night.
- Emplace minefields in belts if possible. It is better to force the enemy to breach three narrow minefields than to have him breach one wide one.
- Plan to defeat enemy breaching efforts. Coordinate with the S2 and engineer to anticipate how and where the enemy will try to breach the minefield. Plan direct and indirect fires to defeat enemy breaching parties.

FASCAM in general presents a unique planning challenge for fire support personnel because it is visible and vulnerable on the surface of the terrain. This leads to two special considerations:

- Reduce the enemy's ability to see. Use indirect fire to make him button up. If you can force the enemy into MOPP 4 with a real or simulated chemical attack, that is even better.
- Minimize indirect fires on top of the FASCAM. This represents a judgment call. Firing on the minefield destroys breaching parties, but it also makes the minefield easier to breach (by destroying the exposed mines).

One compromise is to concentrate indirect fires on targets immediately beyond the minefield and direct fires on targets in the minefield. (This also keeps the artillery from interfering with TOW gunners.) If a mine plow or other mine-clearing vehicle enters the minefield and clears a lane, following vehicles will have to bunch up to enter the lane and may present a good target.

If the enemy has cleared a lane and is on the verge of breaching the minefield, consider firing a heavy concentration of smoke and/or DPICM directly on top of the minefield. The smoke should obscure the remaining mines as well as the clear lane markers that the vehicles are trying to follow. Use of smoke will have to be carefully coordinated, since it will inhibit friendly direct fire weapons. However, a fire mission of this type should be on call in case the enemy places smoke between your maneuver force and the minefield to screen his breaching efforts. If the enemy fires smoke first, it is to your advantage to shoot the minefield with smoke and/or DPICM to disrupt his crossing efforts.

FA-delivered scatterable mines introduce another planning problem–timing. Firing

mines too early gives the enemy time to avoid them, limits friendly freedom to maneuver, and can result in the mines self-destructing too early. Firing mines too late can result in their landing behind attacking enemy forces and being worthless.

For these reasons, the trigger point for firing RAAMS and/or ADAM must be very carefully coordinated between the S3, the S2, and the FSO. The trigger point for firing FA-delivered mines must meet two criteria:

- When the enemy reaches the trigger point, he must be committed to the avenue of approach on which the mines will be delivered.
- The trigger point must be far enough forward of the proposed minefield that the minefield can be emplaced before the enemy reaches it.

The trigger point should be a target area of interest in the brigade S2's IPB. The TAI should be under surveillance at all times (use NODs and planned illumination targets at night). The element observing the TAI should have the authority to fire the minefield or a direct communications link to whoever is going to call for the mines.

The TAI must be far enough beyond the minefield that the minefield will be in place in time in a worst-case scenario. The FSO should allow for the time it takes to send the call for fire, process the call for fire, execute the mission, and arm the mines (remember, the mines do not arm immediately on impact).

The key consideration in emplacing FA-delivered mines is that mines delivered too early may be less effective than they could be, but mines delivered too late are worthless.

Employment to Augment an Obstacle

FA-delivered scatterable mines are optional weapons for closing lanes in existing obstacles or reseeding breached minefields.

RAAMS and/or ADAM used to close a lane(s) in an obstacle should be planned with the same considerations as RAAMS and/or ADAM planned as an obstacle. Another consideration in using RAAMS and/or ADAM to close a lane is how wide the artillery minefield should be. A rule of thumb is to use the width of the lane plus the expected delivery error when the mines are fired. This leads to two planning considerations to minimize the amount of ammunition used:

- Get the best possible grid to the center of the lane. Use the position and azimuth determining system (PADS) if possible – intersection or resection if necessary.
- If possible, depending on METT-T, adjust the mission in advance onto the center point of the lane; and record it as a target.

Planning for using artillery-delivered mines to close breached obstacles should involve the S3, S2, engineer, and FSO. This group should identify the most likely points at which the enemy will try to breach the obstacle and how wide the breach will probably be. As with using mines to close a lane, these points should be identified by the most accurate grid attainable, fired in, and recorded as targets. Even if the enemy does not breach at these exact locations, the targets should provide accurate points from which to shift in firing mines.

The FSO must identify which observer is to fire RAAMS and/or ADAM to close a breach and under what conditions the obstacle is considered breached. (For example, is it when one vehicle passes through or when one engineer vehicle has passed through and marked a lane?) The FSO should identify an alternate observer to fire the minefield in case smoke screens, communications problems, or enemy fire prevents the primary observer from reseeding the obstacle at the proper time.

A call for fire for mines to close a breach may conflict with conventional calls for fire on the breaching units. If a RAAMS and/or ADAM call for fire is going to take priority over other calls for fire, an alternate channel could be set up; or the priority should be stated in the fire support plan.

Employment Against Targets of Opportunity

Minefields against targets of opportunity (unplanned) must be emplaced immediately because of the fleeting nature of the targets. Minefields may be requested through the fire support channels at any level. Once the maneuver commander has approved the use of FA-delivered FASCAM, minefields can be emplaced according to his guidance.

Normally, these minefields are used against targets that can be observed (by the FIST or AFSO) or that are specifically identified by target acquisition sources such as radar, sensors, and other acquisition devices. Their processing is similar to that of FA target-of-opportunity missions. Fire for effect (FFE) or observer adjustment is used against either moving or stationary targets.

Density and Duration. Unplanned minefields are standard in density and duration, depending on the tactical situation and the commander's guidance. An example is as follows:

- Density: 24 RAAMS, 6 ADAM.
- One aimpoint.
- Short duration.

Target Location. There are two types of aimpoints – stationary and moving targets:

- The aimpoint for a **stationery target** is placed directly over the target center. Aimpoints are located to an accuracy of 100 meters (adjust fire) and 10 meters (FFE).
- The aimpoint for a **moving target** is placed directly in front of the enemy axis of advance, 1,000 meters in front of the enemy target for every 10 kilometers per hour (kmph) of speed. This allows enough time for mine delivery and arming before enemy encounter.

Fire Mission Request. The fire mission request is transmitted and processed generally the same as other requests for target-of-opportunity fire missions. The requestor must specify the following:

- Identification (call sign).
- Warning order (include RAAMS, ADAM, or both).
- Target location (aimpoint).
- Target description.
- Method of engagement.
- Method of fire and control.

Unless the observer requests ammunition for adjustment, he will receive DPICM (self-registering) in adjustment and the standard minefield in effect (6 ADAM and 24 RAAMS, according to the previous example).

WARNING

Targets of opportunity are either FFE or adjust fire missions. FFE missions should not be requested if the center of the minefield is less than 700 meters from the nearest friendly position. Adjust fire missions should not be requested if the center of the minefield is less than 425 meters from the nearest friendly position.

EXAMPLES OF FIRE MISSION REQUEST

Fire-for-Effect Mission

A4Z57 THIS IS A4Z42, FIRE FOR EFFECT, ADAM, OVER.

GRID 18045132, OVER.

PLATOON IN THE OPEN, OVER.

Adjust Fire Mission

A4Z57 THIS IS A4Z42, ADJUST FIRE, RAAMS, OVER.

GRID 180513, OVER.

FIVE T72 TANKS ATTACKING, OVER.

The FA battalion receiving the call for fire designates the firing unit(s). Upon completion of the minefield emplacement, the fired data are forwarded to the division, brigade, or battalion FSE. The fired data are recorded in Section D of DA Form 5032-R (Field Artillery Delivered Minefield Planning Sheet). A reproducible copy of this form is in Appendix M. The FSE computes the safety zone according to the fired data and passes it to the engineer for dissemination to higher, lower, and adjacent units as appropriate.

Firing In Artillery-Delivered Mines

One of the key considerations in emplacing a minefield with indirect fire is to get a precise target location. The three basic ways of doing this, from most to least desirable, are as follows:

- Use target area survey.
- Fire the center grid with DPICM in the self-registering (ground burst) mode, and have the FDC replot to get the adjusted grid.
- Carefully map-spot the grid through intersection, resection, or terrain association.

No matter which method is used, the center grid of the proposed minefield should be recorded as a target. This provides a center for RAAMS and/or ADAM fires, a target for smoke and/or ICM to attack breaching forces, and a known point from which to shift when calling fires onto units just beyond or in front of the minefield. The use of FA target numbers for FASCAM planning by the engineer facilitates coordination.

Choosing Minefield Width and Density

The first, and most obvious, consideration is ammunition availability. This, combined with fire unit positioning and minefield depth, will provide an estimate of how many meters of minefield width are available for various densities.

Lane-closing mines should be delivered in sufficient width to cover the lane and to allow for delivery error. If the aimpoint grid has been determined by PADS or by replot procedures after being fired in, the delivery error probably will be small. If the aimpoint location is map-spotted, the minefield width must allow for errors in grid location.

Artillery-delivered minefields used for interdiction or area denial or as an obstacle should be wide enough to fill the choke point and to tie into natural or artificial obstacles at either end. Again, the width of the minefield should allow for errors in delivery and aimpoint location.

Density depends on the mission of the minefield. If a minefield is covered with direct and indirect fire (for example, if the enemy is buttoned up and maneuvering), a low-density minefield will provide an effective obstacle. If the mines are available, a medium-density field is desirable but not absolutely necessary.

Medium- and high-density fields are particularly useful for defending forces that are heavily outnumbered and/or who need time to move to alternate firing positions or withdraw to a subsequent battle position.

In general, the greater the enemy combat power, the denser the minefield should be. If the defending force has a relatively large amount of firepower, the minefield serves to slow and restrict enemy units so that they can be engaged with direct fire. If the defending force has relatively little firepower, the direct fire of the force is used to make the enemy maneuver through the minefield so that he can be engaged by the mines.

Fire Unit Selection Considerations

Two questions should be answered in selecting a fire unit:

- What is the counterfire threat?
- What could the battery do if it were not firing RAAMS or ADAM?

The competition for artillery tubes during battle will be great. This tends to increase the time between mission request and completion. The proliferation of artillery munitions and limited haul capabilities of artillery units may tend to reduce the number of mine rounds immediately available at battery level. Given a limited carrying capacity for artillery ammunition, a choice must be made whether to leave behind other ammunition to carry additional FASCAM. Requesting ammunition for immediate consumption, stockpiling of ammunition on the ground, and other measures can be used to overcome the constraint.

Another factor in the counterfire threat is how good the enemy target acquisition assets are. If a battery fires one volley, it is acquired; if a battery fires 20 volleys, it is acquired. The key question becomes not whether or not a battery will be acquired (it **will** be) but how long it will be before acquired batteries will be engaged. If you will be acquired on the first round and you have to move anyway, you might as well finish your mission before you go.

Safety Zone Determination

The FSO is responsible for obtaining safety zones. Safety zones may be computed by the DS battalion FDC or by the FSO by using the safety zone table on the next page. An alternative method is to use the mine safety template. (See TC 6-40 for specific delivery techniques.) The engineer is responsible for disseminating the safety zones to appropriate units.

Use of Safety Zone Table

Use the following fired minefield data:

- Type of projectile fired (ADAM or RAAMS).
- Trajectory (high or low angle).
- Range (to minefield center).
- Technique (met + VE/transfer or observer adjust).
- Aimpoint coordinate(s) (single or left and right).

Enter the table at the nearest range for the projectile type and trajectory, and use the correct employment technique column to determine the size of the safety zone.

Draw the determined safety zone centered over each aimpoint to establish the minefield safety zone.

NOTE: Approximately 99 percent of all mine-delivery missions will result in the entire minefield (minefield modules) being inside the safety zone squares.

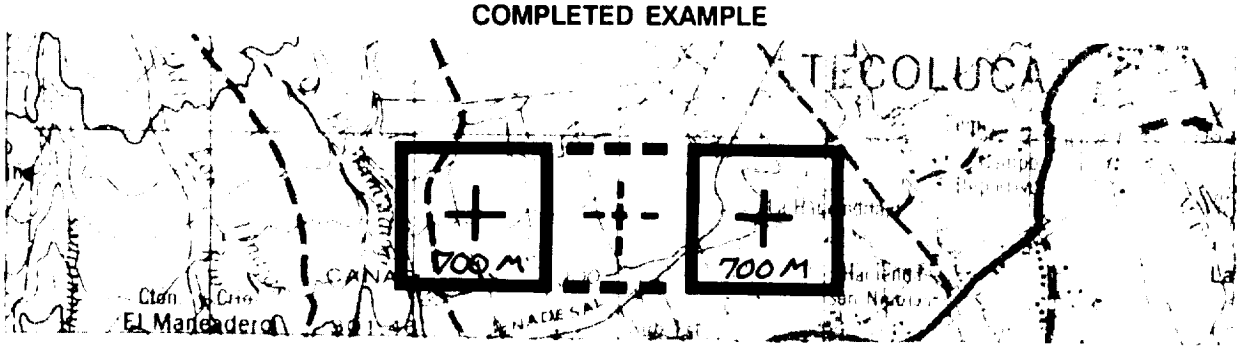
MINEFIELD SAFETY ZONES

PROJECTILE AND TRAJECTORY	RANGE (KM)	MET + VE/TRANSFER TECHNIQUE	OBSERVER ADJUST TECHNIQUE
RAAMS Low-Angle	4	500 x 500	500 x 500
	7	550 x 550	500 x 500
	10	700 x 700	550 x 550
	12	850 x 850	550 x 550
	14	1000 x 1000	650 x 650
	16	1050 x 1050	650 x 650
	17.5	1200 x 1200	650 x 650
ADAM Low-Angle	4	700 x 700	700 x 700
	7	750 x 750	700 x 700
	10	900 x 900	750 x 750
	12	1050 x 1050	750 x 750
	14	1200 x 1200	850 x 850
	16	1250 x 1250	850 x 850
	17.5	1400 x 1400	850 x 850
RAAMS or ADAM High-Angle	4	750 x 750	700 x 700
	7	900 x 900	700 x 700
	10	1050 x 1050	750 x 750
	12	1200 x 1200	750 x 750
	14	1400 x 1400	850 x 850
	16	1500 x 1500	850 x 850
	17.5	1400 x 1400	850 x 850

EXAMPLE SAFETY ZONE DETERMINATION

FIRED DATA		ACTION
Projectile:	RAAMS	Enter the table at range 10 km (closest) for RAAMS, low-angle, and met + VE. The safety zone for each aimpoint is 700 x 700 meters.
Trajectory:	Low-angle	
Range:	9 kilometers	
Technique:	Met + VE	Draw the 700- x 700-meter safety zone over the left and right aimpoints. To determine the safety zone for the minefield, draw lines connecting the two squares.
Aimpoints:	Three (left and right aimpoint coordinates given)	

COMPLETED EXAMPLE



Use of the Mine Safety Template

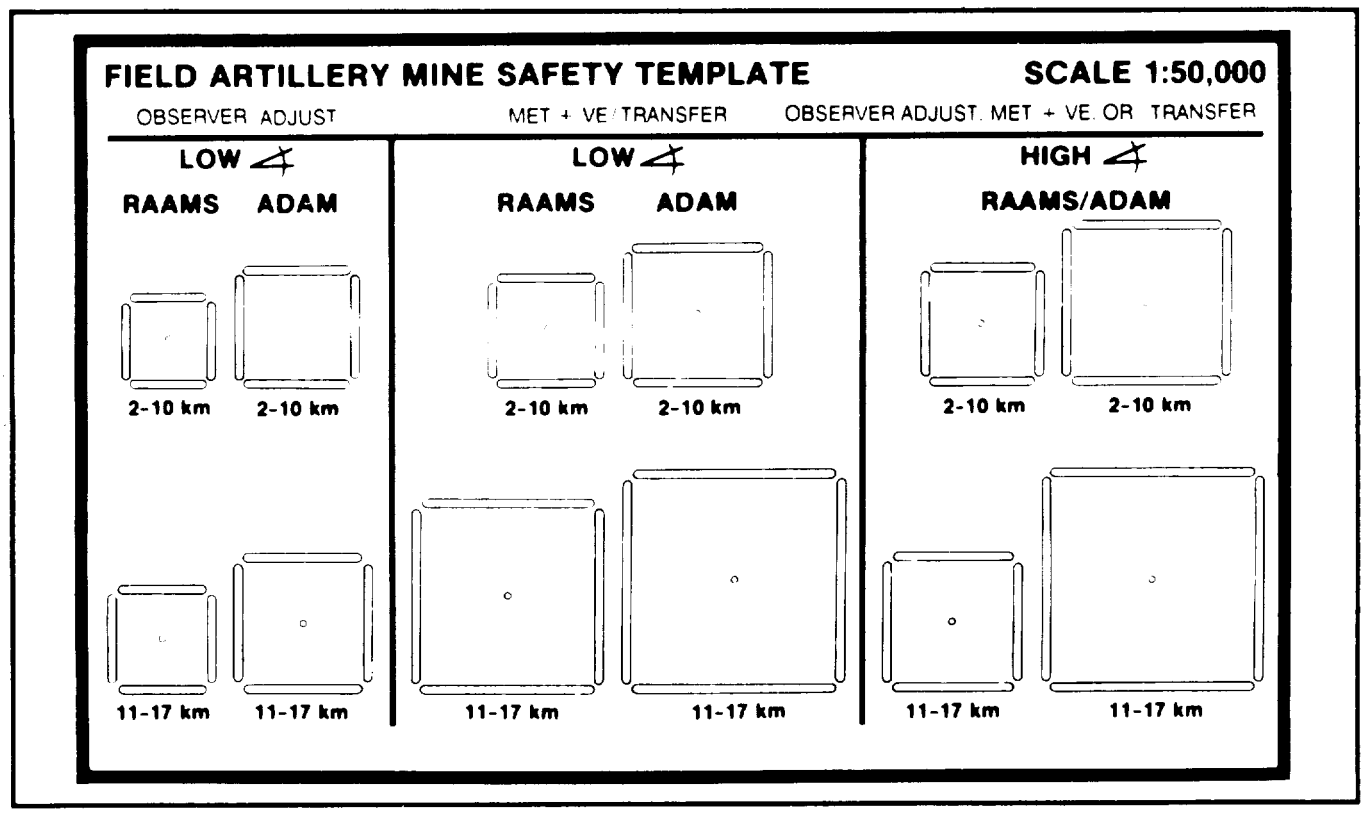
Enter the template with the fired minefield data:

- Technique (met + VE/transfer or observer adjust).
- Trajectory (high or low angle).
- Type projectile fired (RAAMS or ADAM).
- Range (to minefield center).
- Aimpoint coordinate(s) (center or left and right).

Center the selected template safety zone square over the aimpoint(s). Draw a square to establish the minefield safety zone.

NOTE: A template pattern is in Appendix M.

FIELD ARTILLERY MINE SAFETY TEMPLATE



SCATTERABLE MINEFIELD REPORT FORMAT

LINE	INFORMATION REQUIRED	INSTRUCTIONS
1	Approving authority	Enter the approving authority; for example, *CDR 3AD.*
2	Target or obstacle	If the minefield is part of an obstacle plan, enter the obstacle number (such as *2XXX0157*, which represents 2d Corps, target number 157). If the minefield is not a part of an obstacle plan or does not have a number, then leave this line blank or enter *NA.*
3	Type emplacing system	Enter the type of system that emplaced the minefield; for example, *GEMSS, ARTY,* or *Volcano.*
4	Type mines	Enter *AP* for antipersonnel mines or *AT* for antitank mines. If both are used, enter *AP/AT.*
5	Self-destruct period	Enter the time period in which the minefield will self-destruct.
6-14	Almpoint or corner points of minefield	If the system emplacing the minefield uses a single almpoint to deliver the mines, enter that almpoint; for example, *MB10102935.* If the system has distinct corner points, as does GEMSS, enter those corner points; for example, *MB17954790, MB18604860, MB18504890, MB18054895, MB17804850.*
15	Size of safety zone from almpoint	If an almpoint is given in line 6, enter the size of the safety zone from that almpoint. For example, if artillery emplaces a minefield from almpoint MB10102935 and the safety zone is 1,000 by 1,000 meters, enter *500 M* so that personnel plotting or receiving the information can plot the coordinate and then plot the safety zone 500 meters in each direction from the almpoint.
16	Unit emplacing mines and report number	Enter the unit emplacing the mines and the report number; for example, *CO B, 23 ENGR BN 4.* (Reports are numbered consecutively.) This would be the fourth minefield that Co B, 23d Engr Bn has emplaced.
17	Person completing report	Enter the name of the person completing the report; for example, *SFC Hollings.*
18	Date-time group of report	Enter the date-time group of the report; for example, *160735ZJUL89.*
19	Remarks	Enter any other items the reporting unit may consider important.

LEGEND:
AP = antipersonnel
ARTY = artillery
GEMSS = ground emplaced mine scattering system

Scatterable Minefield Report

The FASCAM delivery unit is responsible for initiating the scatterable minefield report, first by radio and later by hard copy. This report is submitted through the FS cell to the engineer. The format is as shown above.

Field Artillery Employment Tables

Matrix Key

As a quick reference, use the matrix key to determine the minefield employment table to be used. Enter the matrix from the left with the appropriate delivery technique,

shell, trajectory, and battery-minefield angle (BMA). Read right and then up to select the proper employment table.

MATRIX KEY TO FA-DELIVERED SCATTERABLE MINE EMPLOYMENT TABLES

	EMPLOYMENT TABLE							
ENTRY DATA	1	2	3	4	5	6	7	8
Transfer or met +VE	X	X	X	X				
Observer adjust					X	X	X	X
M718/741 (RAAMS) low angle	X	X			X	X		
M718/741 (RAAMS) high angle			X	X			X	X
M692/731 (ADAM) low or high angle			X	X			X	X
BMA ≤ 800 mils	X		X		X		X	
BMA > 800 mils		X		X		X		X

Employment Tables

Once the correct table has been located, the entry arguments into each table are the range to the minefield center (expressed to the nearest 2,000 meters; if exactly halfway between, express to lower range) and the desired width of the minefield. Extract from the table the number of aimpoints required to emplace the minefield.

MINE EMPLOYMENT TABLE 1

Delivery Technique: Transfer or met + VE — Trajectory: Low angle
Shell: M718/741 (RAAMS) — BMA: Equal to or less than 800 mils

RANGE (METERS)	DESIRED MINEFIELD WIDTH (METERS)									
	100	200	300	400	500	600	700	800	900	1,000
4,000	2	3	3	4	4	5	5	6	6	7
6,000	2	3	3	4	4	5	5	6	6	7
8,000	2	3	3	4	4	5	5	6	6	7
10,000	3	3	4	4	5	5	6	6	7	7
12,000	3	4	4	5	5	6	6	7	7	8
14,000	4	4	5	5	6	6	7	7	8	8
16,000	4	4	5	5	6	6	7	7	8	8
17,500	4	5	5	6	6	7	7	8	8	9

MINE EMPLOYMENT TABLE 2

Delivery Technique: Transfer or met + VE
Shell: M718/741 (RAAMS)
Trajectory: Low angle
BMA: Greater than 800 mils

RANGE (METERS)	DESIRED MINEFIELD WIDTH (METERS)									
	100	200	300	400	500	600	700	800	900	1,000
4,000	1	2	2	3	3	4	4	5	5	6
6,000	1	2	2	3	3	4	4	5	5	6
8,000	1	2	2	3	3	4	4	5	5	6
10,000	2	2	3	3	4	4	5	5	6	6
12,000	2	3	3	4	4	5	5	6	6	7
14,000	2	3	3	4	4	5	5	6	6	7
16,000	3	3	4	4	5	5	6	6	7	7
17,500	3	3	4	4	5	5	6	6	7	7

MINE EMPLOYMENT TABLE 3

Delivery Technique: Transfer or met + VE
Shell: M692/731 (ADAM)
M718/741 (RAAMS)
Trajectory: Low angle or high angle (ADAM)
High angle (RAAMS)
BMA: Equal to or less than 800 mils

RANGE (METERS)	DESIRED MINEFIELD WIDTH (METERS)									
	100	200	300	400	500	600	700	800	900	1,000
4,000	1	2	2	2	2	3	3	3	3	4
6,000	1	2	2	2	2	3	3	3	3	4
8,000	1	2	2	2	2	3	3	3	3	4
10,000	2	2	2	2	3	3	3	3	4	4
12,000	2	2	2	3	3	3	3	4	4	4
14,000	2	2	3	3	3	3	4	4	4	4
16,000	2	2	3	3	3	3	4	4	4	4
17,500	2	3	3	3	3	4	4	4	4	5

MINE EMPLOYMENT TABLE 4

Delivery Technique: Transfer or met + VE
Shell: M692/731 (ADAM)
M718/741 (RAAMS)
Trajectory: Low angle or high angle (ADAM)
High angle (RAAMS)
BMA: Greater than 800 mils

RANGE (METERS)	DESIRED MINEFIELD WIDTH (METERS)									
	100	200	300	400	500	600	700	800	900	1,000
4,000	1	1	1	2	2	2	2	3	3	3
6,000	1	1	1	2	2	2	2	3	3	3
8,000	1	1	1	2	2	2	2	3	3	3
10,000	1	1	2	2	2	2	3	3	3	3
12,000	1	2	2	2	2	3	3	3	3	4
14,000	1	2	2	2	2	3	3	3	3	4
16,000	2	2	2	2	3	3	3	3	4	4
17,500	2	2	2	2	3	3	3	3	4	4

MINE EMPLOYMENT TABLE 5

Delivery Technique: Observer adjust
Shell: M718/741 (RAAMS)
Trajectory: Low angle
BMA: Equal to or less than 800 mils

RANGE (METERS)	DESIRED MINEFIELD WIDTH (METERS)									
	100	200	300	400	500	600	700	800	900	1,000
4,000	2	2	3	3	4	4	5	5	6	6
6,000	2	2	3	3	4	4	5	5	6	6
8,000	2	3	3	4	4	5	5	6	6	7
10,000	2	3	3	4	4	5	5	6	6	7
12,000	2	3	3	4	4	5	5	6	6	7
14,000	2	3	3	4	4	5	5	6	6	7
16,000	3	3	4	4	5	5	6	6	7	7
17,500	3	3	4	4	5	5	6	6	7	7

MINE EMPLOYMENT TABLE 6

Delivery Technique: Observer adjust
Shell: M718/741 (RAAMS)
Trajectory: Low angle
BMA: Greater than 800 mils

RANGE (METERS)	DESIRED MINEFIELD WIDTH (METERS)									
	100	200	300	400	500	600	700	800	900	1,000
4,000 through 17,500	1	2	2	3	3	4	4	5	5	6

MINE EMPLOYMENT TABLE 7

Delivery Technique: Observer adjust
Shell: M692/731 (ADAM)
M718/741 (RAAMS)
Trajectory: Low angle or high angle (ADAM)
High angle (RAAMS)
BMA: Equal to or less than 800 mils

RANGE (METERS)	DESIRED MINEFIELD WIDTH (METERS)									
	100	200	300	400	500	600	700	800	900	1,000
4,000 through 17,500	1	1	1	2	2	2	2	3	3	3

MINE EMPLOYMENT TABLE 8

Delivery Technique: Observer adjust
Shell: M692/731 (ADAM)
M718/741 (RAAMS)
Trajectory: Low angle or high angle (ADAM)
High angle (RAAMS)
BMA: Greater than 800 mils

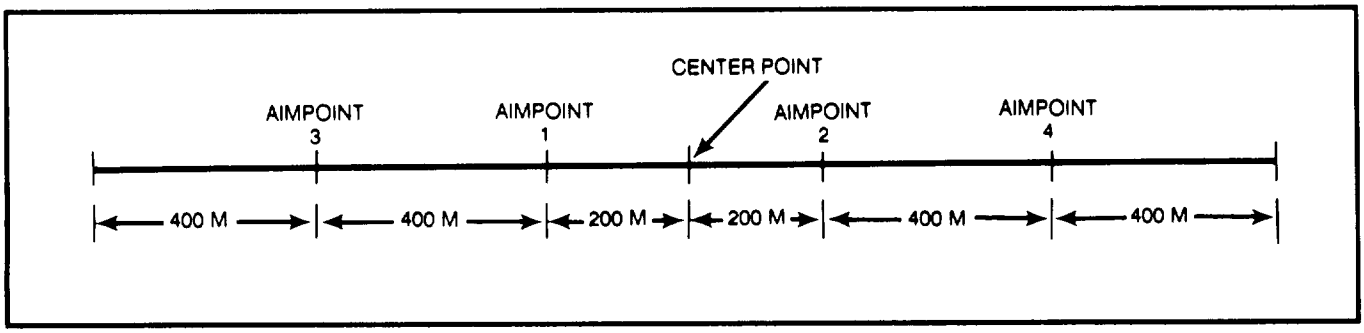
RANGE (METERS)	DESIRED MINEFIELD WIDTH (METERS)									
	100	200	300	400	500	600	700	800	900	1,000
4,000	1	1	2	2	2	2	3	3	3	3
6,000	1	1	2	2	2	2	3	3	3	3
8,000	1	2	2	2	2	3	3	3	3	4
10,000	1	2	2	2	2	3	3	3	3	4
12,000	1	2	2	2	2	3	3	3	3	4
14,000	1	2	2	2	2	3	3	3	3	4
16,000	2	2	2	2	3	3	3	3	4	4
17,500	2	2	2	2	3	3	3	3	4	4

Location of Aimpoints

To locate aimpoints for 400- by 400-meter modules –

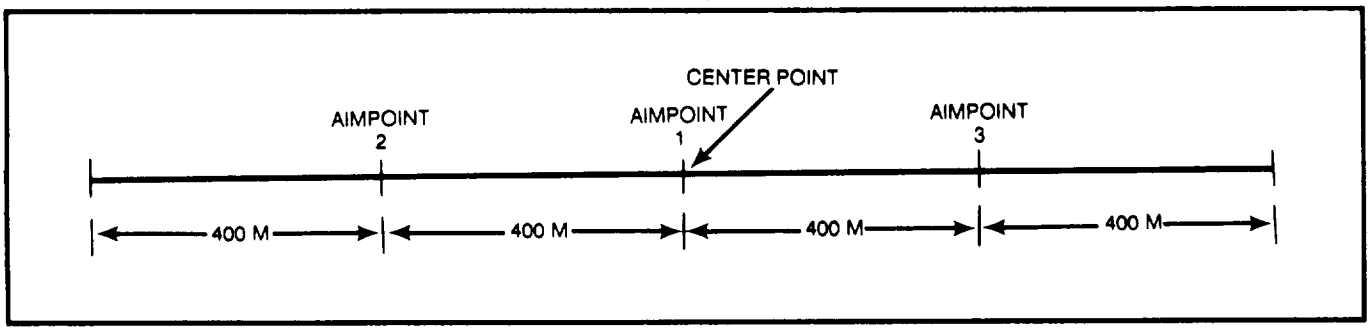
- For an even number of aimpoints, place the aimpoints 200 meters left and right of the center point along the center line with the remaining points at 400-meter intervals.

MODULE SIZE 400 X 400 METERS, EVEN NUMBER OF AIMPOINTS



- For an uneven number of aimpoints, place the first aimpoint at the center point of the minefield and the others at 400-meter intervals.

MODULE SIZE 400 X 400 METERS, ODD NUMBER OF AIMPOINTS



Projectiles Per Aimpoint

The number of projectiles required to achieve the desired density within each module (as defined by each aimpoint) is determined from the table below. Entry arguments are the projectile type, trajectory, and desired density.

M718/M741 RAAMS AND M731 ADAM ROUNDS PER AIMPOINT

	HIGH-ANGLE RAAMS			LOW-ANGLE RAAMS			HIGH- OR LOW-ANGLE ADAM		
Desired density	0.001	0.002	0.004	0.001	0.002	0.004	0.0005	0.001	0.002
Rounds per aimpoint	24	48	96	6	12	24	3	6	12

EXAMPLE PROBLEMS

PROBLEM 1

Given		Action
Delivery Technique:	Met + VE	Select Table 2.
Shell:	M718/741 RAAMS	
Trajectory:	Low angle	Enter at range 14,000 to 600-meter minefield width
BMA:	840 mils	
Range:	14,000 meters	Number of aimpoints = 5
Minefield Width:	600 meters	

PROBLEM 2

Given		Action
Delivery Technique:	Observer adjust	Select Table 5 for RAAMS and Table 7 for ADAM.
Shell:	M718/741 RAAMS and M692/731 ADAM	Enter at range 14,000 meters (If over 15,000 meters in range, round up) to 300-meter minefield width.
Trajectory:	Low angle	
BMA:	660 mils	
Range:	15,000 meters	Number of aimpoints = RAAMS 3, ADAM 1
Minefield Width:	300 meters	

PROBLEM 3

Given		Action
Delivery Technique:	Transfer	Select Table 4.
Shell:	M692/731 ADAM	
Trajectory:	High angle	Enter at range 12,000 meters to 500-meter minefield width.
BMA:	830 mils	
Range:	12,350 meters	Number of aimpoints = 2
Minefield Width:	460 meters	

NOTE: The RAAMS or ADAM minefield is based on a 400- x 400-meter planning module with one exception. When RAAMS is delivered by low angle, a 200- x 200-meter module is used. Consider this when determining the delivery technique to provide the minefield depth required.

Section II. OBSCURANTS

Applications

Obscurants have many applications on the battlefield. During offensive operations, they are used to conceal units and individual weapon systems. This allows the commander to maneuver behind a screen and to deceive the enemy about his strength and position. Obscurants are also used to blind acquisition means. During defensive operations, smoke is used to separate and isolate attacking echelons, which creates gaps and disrupts enemy movements. Smoke can slow and blind individual units and weapon systems, forcing mechanized infantry to dismount. Also, it makes enemy targets easier to hit and may conceal defensive positions.

There are four general applications of obscurants on the battlefield:

- Obscuration.
- Screening.
- Marking and signaling.
- Deception.

Obscuration

Smoke placed on or near the enemy position to interfere with his observation of the battlefield is called obscuration smoke.

Screening

Screening smoke is placed within the areas of friendly operation or in areas between friendly and enemy forces to degrade enemy observation and fire. It is primarily intended to conceal movement of friendly forces.

Marking and Signaling

Smoke is used to communicate actions on the battlefield or to mark locations.

Deception

Smoke is used in conjunction with other actions to confuse or mislead the enemy. This use is generally in conjunction with other deceptive measures.

Employment Considerations

To be effective, obscurants must be used in sufficient quantities. Factors affecting the amount used are atmospheric conditions, type of smoke required, size of the area to be obscured, and length of time needed. On the basis of those conditions, excessive amounts of ammunition may be required to meet the commander's guidance.

Smoke may adversely affect battlefield systems that must operate in concert, such as tactical air, armor, infantry, field artillery, and Army aviation.

Smoke hinders visual communications, which causes the unit to rely to a greater degree on radios.

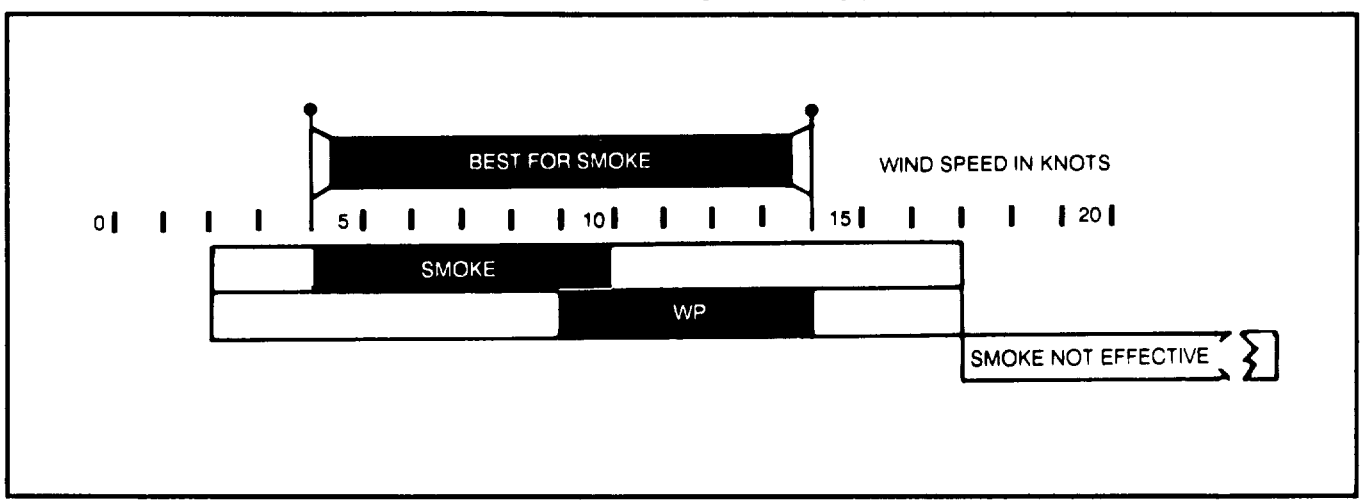
Sources of Obscurants Available to the Fire Support Officer

Mortars can deliver a high volume of smoke at midranges. They are the most rapid and effective indirect delivery means.

Field artillery cannons can deliver smoke out to distant targets. They can deliver HC and WP; however, as smoke is available in limited quantities, high-volume use must be planned in advance.

Smoke pots can produce large volumes of smoke for extended periods. They are the commander's primary means of producing small smoke screens.

SMOKE EFFECTIVENESS



The light infantry division does not have organic mechanical generators to provide smoke support. These are provided by chemical units from corps. Airborne and air assault divisions do have organic smoke generators.

Obscurant Employment Tasks

When obscurants are to be used, the FSO must do the following:

- Coordinate with the commander or S3 to determine obscurant requirements for the unit.
- Obtain from subordinate FSOs their lists of obscuration targets which require engagement beyond their capability.
- Identify the potential sources of obscurants that will support the operation (mortars, FA, and smoke generators if available).
- For FA-delivered smoke, use the graphics in the rest of this section to determine the number of rounds required to support screens.

NOTE: The first three graphics provide general employment data and/or specific weather characteristics. These serve as planning factors and as entry values to the last two tables for the purpose of calculating the number of obscuration munitions required to support the operations. For specific employment techniques, refer to TC 6-40.

- Notify FA units of calculated ammunition requirements. If insufficient ammunition exists, delete targets or select an alternative delivery source.
- For any delivery source other than field artillery, coordinate with the brigade chemical officer to determine brigade capability to support.
- For smoke planned at brigade level, designate the person, event, or time that will initiate the smoke mission.
- For smoke planned at brigade level, coordinate with units that might be affected by the smoke.
- Before firing the smoke, check weather conditions to determine if conditions still support the smoke mission.

GENERAL ATMOSPHERIC CONDITIONS AND THE EFFECTS ON SMOKE

SMOKE CONDITION (TEMPERATURE GRADIENT)	TIME OF DAY WEATHER CONDITIONS	EXPECTED SMOKE BEHAVIOR AS THE SMOKE DRIFTS DOWNWIND (WIND DIRECTION → →)
Ideal (inversion)	1. Night – until 1 hour after sunrise. 2. Wind speed less than 5 knots. 3. Sky cover less than 30 percent. **All three conditions must be met.**	 Stable condition – ideal for smoke employment.
Favorable	This condition occurs most often 1 to 2 hours before and after sunrise and when the wind speed is 5 knots or more and/or the sky cover is 30 percent or more.	 Neutral condition – favorable for smoke employment.
Marginal (lapse)	1. Day – beginning 2 hours after sunrise. 2. Wind speed less than 5 knots. 3. Sky cover less than 30 percent. **All three conditions must be met.**	 Unstable condition – marginal for smoke employment.

EQUIVALENT WIND SCALE FOR ESTIMATING WIND SPEED

KNOTS	OBSERVATION
1	Smoke, vapor from breath, or dust raised by vehicles or personnel rises vertically. No leaf movement.
1-3	Direction of wind slightly shown by smoke, vapor from breath, or dust raised by vehicles or personnel. Slight intermittent movement of leaves.
4-6	Wind slightly felt on face. Leaves rustle.
7-10	Leaves and small twigs in constant motion.
11-16	Wind raises dust from ground. Loose paper and small branches move.
17-21	Small trees with leaves sway. Coastal wavelets form on inland waters.
22-27	Large branches on trees in motion. Whistle heard in telephone or fence wires.
28-33	Whole trees in motion. Inconvenience felt walking against wind.

NOTE: One knot equals 1.15 miles per hour (mph).

PLANNING DATA FOR SMOKE

DELIVERY SYSTEM	TYPE ROUND	TIME TO BUILD EFFECTIVE SMOKE	AVERAGE BURNING TIME	AVERAGE OBSCURATION LENGTH (METERS) PER ROUND WIND DIRECTION		
				Cross	Quartering	Head/Tail
155 mm	WP	1/2 min	1-1 1/2 min	150	75	50
	HC	1-1 1/2 min	4 min	350	250	75
105 mm	WP	1/2 min	1-1 1/2 min	75	60	50
	HC	1-1 1/2 min	3 min	250	175	50
107 mm	WP	1/2 min	1 min	200	80	40
81 mm	WP	1/2 min	1 min	100	60	40
60 mm	WP	1/2 min	1 min	75	50	40

NOTE: All rounds are fired as standard missions with parallel sheafs under favorable conditions.

QUICK SMOKE DATA—105-MM SHELL SMOKE

WEAPON AND AMMUNITION	WIND SPEED (KNOTS)	RATE OF FIRE	DURATION REQUESTED BY FORWARD OBSERVER (MINUTES)												
			3	4	5	6	7	8	9	10	11	12	13	14	15
			Rounds Per Tube												
Ideal	5	1 rd per 1 min	2	3	4	5	6	7	8	9	10	11	12	13	14
Favorable	5	1 rd per 1 min	2	3	4	5	6	7	8	9	10	11	12	13	14
	10	1 rd per 30 sec	3	5	7	9	11	13	15	17	19	21	23	25	27
	15	1 rd per 24 sec	4	6	9	11	14	16	19	21	24	26	29	31	34
Marginal	5	1 rd per 20 sec	4	7	10	13	16	19	22	25	28	31	34	37	40

QUICK SMOKE DATA – 105-MM SHELL WP

WEAPON AND AMMUNITION	WIND SPEED (KNOTS)	RATE OF FIRE	DURATION REQUESTED BY FORWARD OBSERVER (MINUTES)												
			3	4	5	6	7	8	9	10	11	12	13	14	15
			Rounds Per Tube												
Ideal	5	1 rd per 40 sec	5	7	8	10	11	13	14	16	17	19	20	22	23
Favorable	5	1 rd per 30 sec	6	8	10	12	14	16	18	20	22	24	26	28	30
	10	1 rd per 15 sec	11	15	19	23	27	31	35	39	43	47	51	55	59
	15	1 rd per 10 sec	16	22	28	34	40	46	52	58	64	70	76	82	88
Marginal	5	Exceeds rate of fire													

Section III. COPPERHEAD

Description

Copperhead is a 155-mm cannon-launched guided projectile (CLGP) with a shaped-charge warhead and a laser seeker. When fired at a moving or stationary hard point target, Copperhead homes in on laser energy reflected from the target. Laser energy is provided by a remote laser designator. Optimum use of Copperhead is against multiple targets in large target arrays outside the range of maneuver direct fire weapon systems (approximately 3,000 meters). Targets appearing within the range of maneuver direct fire weapon systems should be engaged by Copperhead only when the maneuver commander directs or when the direct fire systems are unable to engage the targets.

G/VLLD Employment

Since the success of the Copperhead depends greatly on reflected energy, the FSO should ensure the G/VLLD is positioned to optimize the system capabilities and complement the direct fire weapons. Laser designation requires an uninterrupted line of sight between the designator and the target. Anything that obstructs or weakens the laser signal causes a significant decrease in the performance of the round. Terrain, vegetation, fog, smoke, and dust obstruct visibility.

CHARACTERISTICS OF COPPERHEAD

STRENGTHS	WEAKNESSES
Copperhead has high hit probability on point targets, moving or stationary, at longer ranges than possible with current direct fire weapons.	Responsiveness of the system depends on several variables created by distinct acquisition and delivery components of the system.
Copperhead is extremely lethal.	The G/VLLD and operator are vulnerable to suppressive fires.
Multiple engagement is possible against an array of targets within the same footprint.	The Copperhead system depends on two-way communications between the operator and the firing battery FDC.
A laser designator does not have the pronounced firing signature of an ATGM.	Effectiveness of target engagement is limited by the operator's ability to track the target during the last 13 seconds of the projectile flight. Weather conditions and battlefield obscuration also may degrade observation of the target.
	The emitted signal from the designator can be detected.

Copperhead Employment

Copperhead targets can be engaged as either planned targets or targets of opportunity. Planned targets are preferred because the firing battery requires less reaction time. Most often, the target-of-opportunity technique is used only during offensive operations. Regardless of the method of attacking targets, the FSO must get at least the following guidance from the maneuver commander to effectively employ Copperhead:

- Copperhead usage (when, where, and what type of targets).
- Most likely avenues (areas) to be targeted.

FSOs should recommend the use of Copperhead against command and control vehicles and high-payoff targets rather than against tanks. Command OPs, artillery command and reconnaissance vehicles (ACRVs), radars, bridges, and AD assets are examples of generally good high-payoff targets. Analysis of TVA and METT-T provides the best choices.

Once the targeting information is obtained, the FSO and the G/VLLD operator must be able to visualize Copperhead footprints on existing terrain for effective target planning. Use of the Copperhead footprint template and the ability to construct a visibility diagram for the area contribute to fire planning success. (See TC 6-40 for use of the footprint template.)

Positioning for Copperhead Employment

Effective employment of the Copperhead munition is enhanced by techniques used by the FSO to position the observer or COLT and by the observer or COLT before and during target engagement. Steps involved in optimizing the potential employment of Copperhead are as follows:

Ž Position the observer or COLT to accomplish most effectively the commander's target attack guidance.

- Construct a visibility diagram from the selected position when it is occupied.

Ž Employ the appropriate Copperhead footprint to engage targets effectively.

These steps do not take into account the natural effects of weather, battlefield obscuration, and so forth on Copperhead employment. Since the positioning of the observer or COLT for employment of Copperhead is the concern of the FSO, the first step is discussed below. The other steps are observer tasks; they are described in detail in FM 6-30.

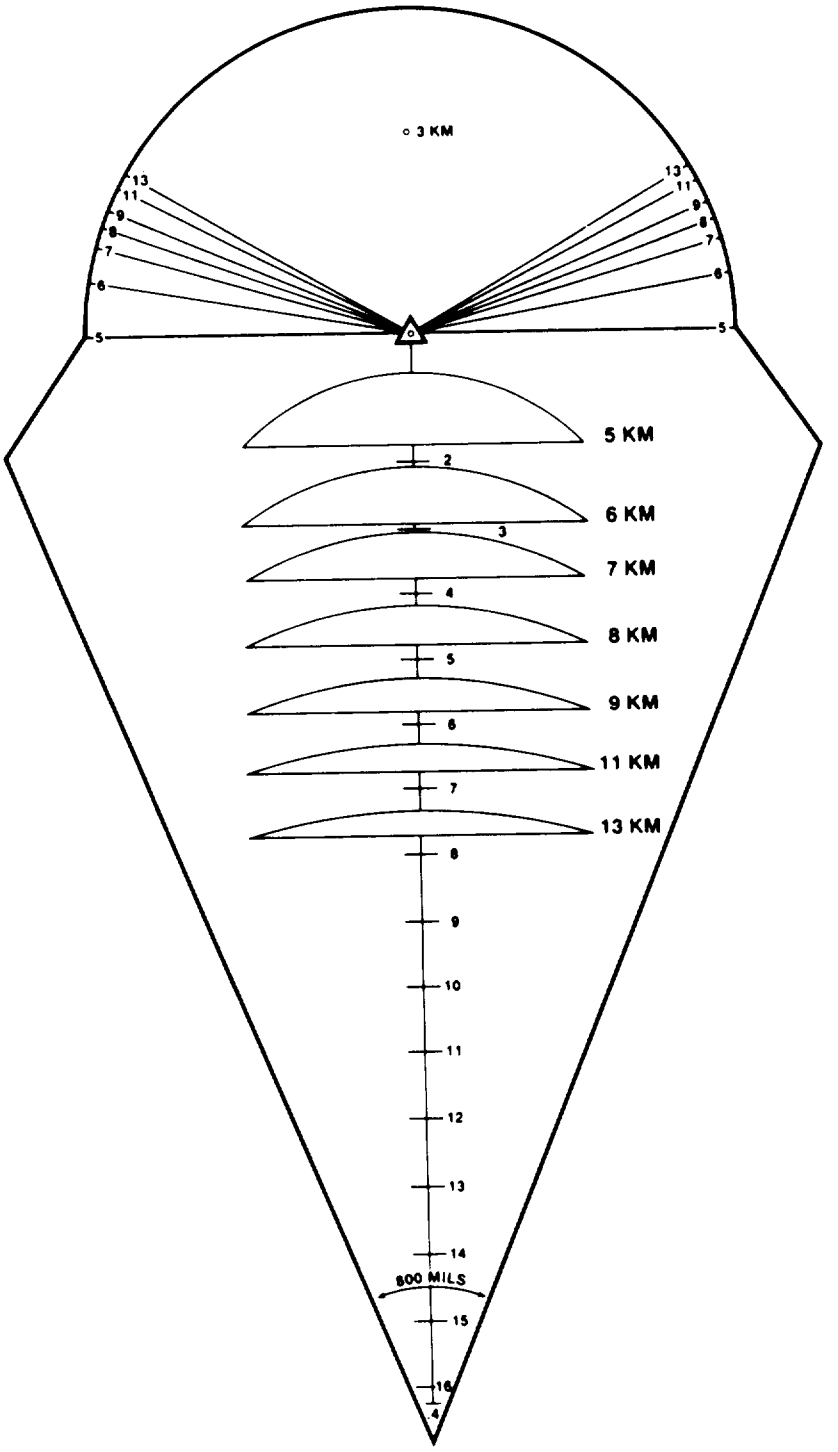
Copperhead Coverage Template

The Copperhead coverage template was designed as an observer position selection aid. It is used to discriminate quickly between *can shoot* and *can't shoot* engagement areas so that positions which will most effectively meet the commander's attack intent can be selected. (A template pattern is in Appendix M.) The template design is based on experience, which has shown that –

- A target engagement angle T greater than 800 mils adversely affects Copperhead targeting.
- The maximum effective distance for G/VLLD operator engagement is 3 kilometers for moving targets and 5 kilometers for stationary targets.

Thus, given desired observer positions and known firing unit locations, the Copperhead coverage template is used to quickly evaluate potential engagement areas.

COPPERHEAD COVERAGE TEMPLATE



There are two different procedures for determining effective Copperhead engagement areas from a given position. They are based on the location of the observer:

- More than 5 kilometers from the delivery unit.
- Less than 5 kilometers from the delivery unit.

More Than 5 Kilometers

The following procedure should be used to determine Copperhead coverage if the observer is located more than 5 kilometers from the FA delivery unit:

- (A) Determine the prospective observer positions to support the commander's intent. Place the template OP symbol over the initial desired OP location. Rotate the template over the selected OP location until the delivery unit location is under the center range line of the template.
- (B) Read the distance on the center range line from the observer to the delivery unit. This distance becomes the entry distance for other parts of the template.
- (C) Mark the distance obtained above at the appropriate point on each side of the 5-kilometer semicircle. Trace the arc along the semicircle between the marks. This arc represents the maximum effective observer engagement distance for stationary targets.
- (D) Select the arc in the middle of the template that is next lowest from the distance determined in (B) above. Reposition the template so that the ends of the selected arc are over the observer location and one end of the 5-kilometer engagement arc drawn in (C) above. Trace the selected arc from point to point. Repeat the step for the other end of the 5-kilometer engagement arc.
- (E) Draw the 3-kilometer engagement arc within the engagement area designated by the previous steps. This may be done by using the holes in the template at the observer location and the 3-kilometer mark of the center range line as a field-expedient protractor.
- (F) This completes the construction of the Copperhead coverage area for the observer's location in relation to the particular FA delivery unit.

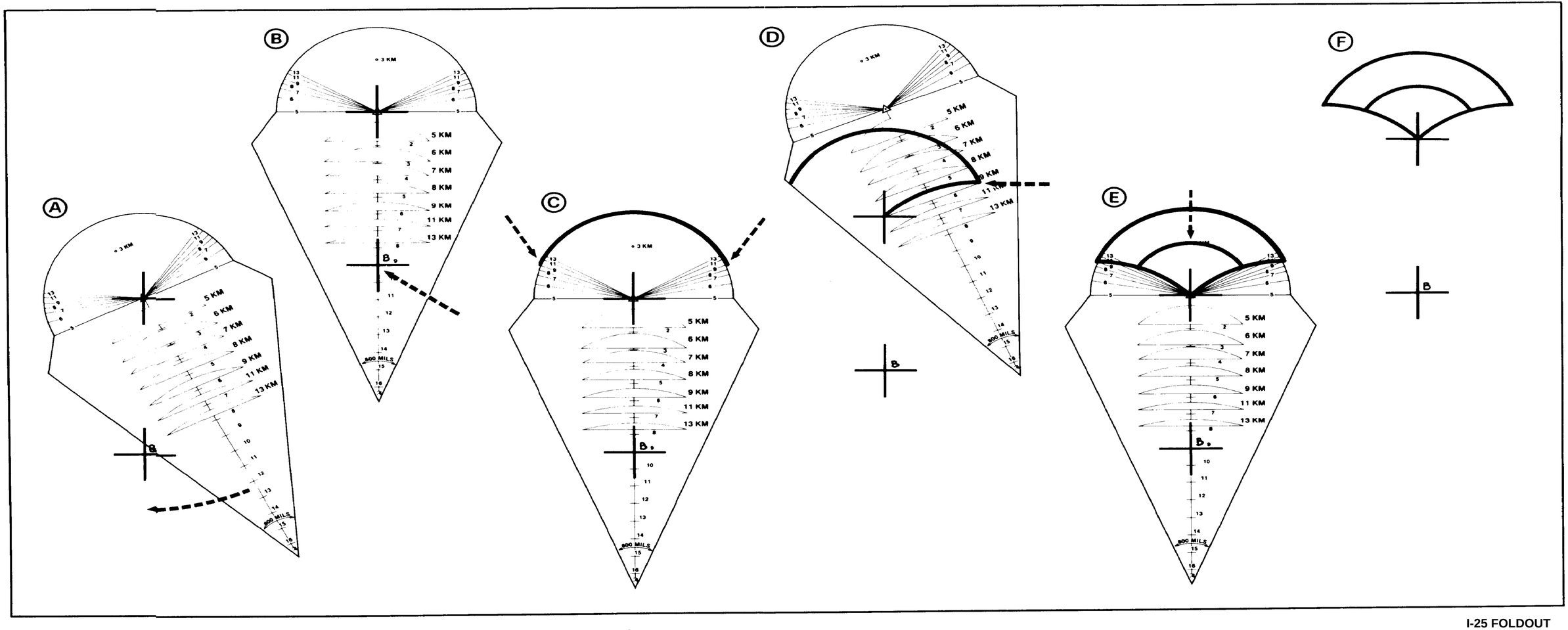
This procedure must be repeated for each additional Copperhead delivery unit that may fire for this observer. Considering the coverage area constructed, the FSO must now determine if the intended observer location will allow the observer to meet the commander's intent for target engagement. If the intended location will not meet the commander's intent, then another location should be selected; or, if the tactical situation does not permit alternative position selection, the commander should be told of the deficiencies in targeting capability in the selected position. A third alternative is to move the firing unit location to better support the desired observer position. This is a less desirable alternative, since the firing unit move undoubtedly would involve a greater distance than a move by the observer.

Less Than 5 Kilometers

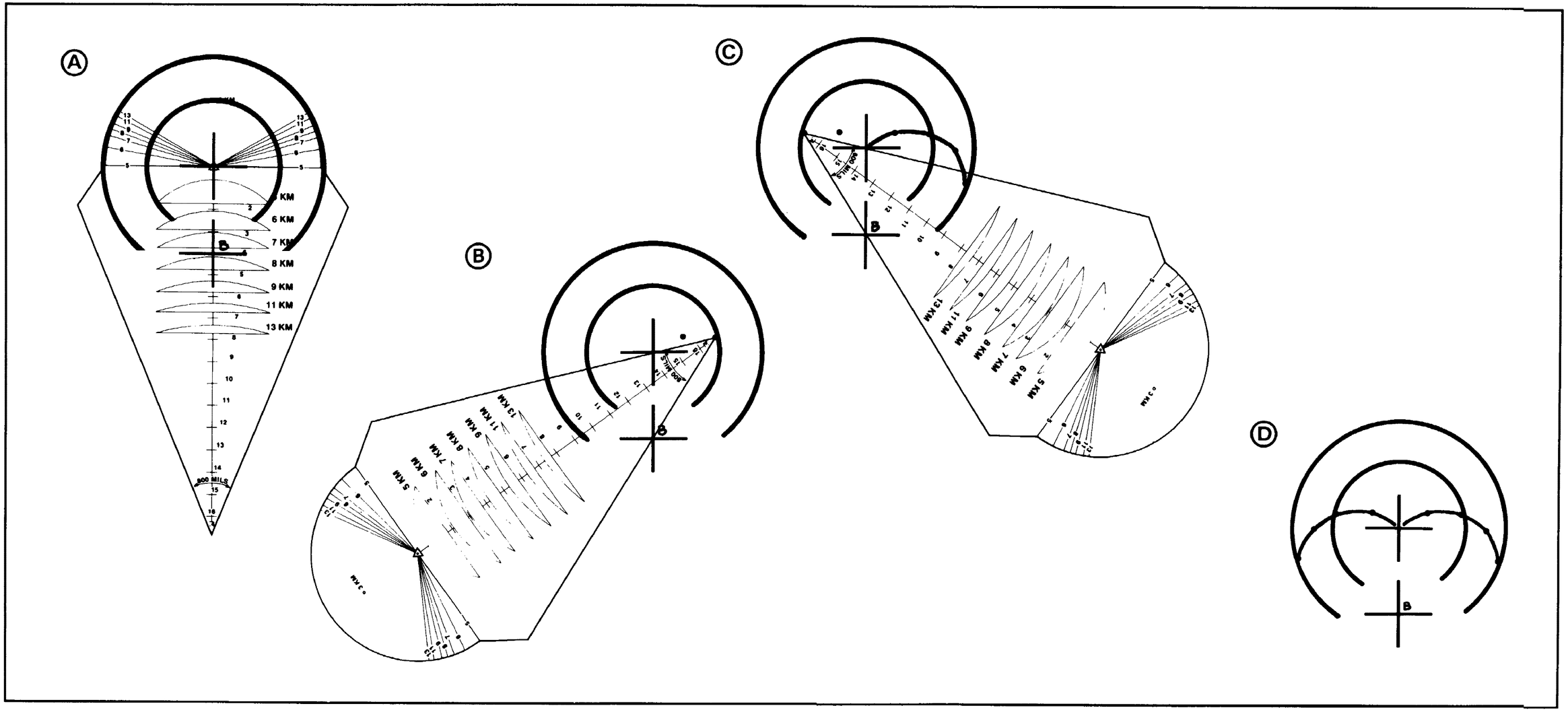
The following procedure to determine Copperhead coverage should be used when the observer is located less than 5 kilometers from the FA delivery unit:

- (A) Draw the 5- and 3-kilometer engagement arcs around the proposed observer location. The 5-kilometer arc and the holes at the observer location and the 3-kilometer center range line mark of the template can be used for this purpose.

OBSERVER POSITION DETERMINATION – DISTANCE MORE THAN 5 KILOMETERS



OBSERVER POSITION DETERMINATION – OBSERVER-TO-DELIVERY-UNIT DISTANCE LESS THAN 5 KILOMETERS



Ž Ⓑ Determine the *minimum distance wings* of the Copperhead coverage area. Position the template so that one side intersects the observer location, the other side intersects the delivery unit location, and the vertex of the 800-mil angle on the template is on the 5-kilometer arc. Mark the location of the vertex. Keeping the sides of the template aligned on the observer and delivery unit locations, move the vertex of the template and mark its location at several points across the radius of the 5-kilometer arc. These points at the vertex of the template 800-mil angle designate the minimum angle T distance for effective target engagement.

Ž Ⓒ Realign the template, and mark points across the opposite radius of the 5-kilometer arc.

Ž Ⓓ Connect the selected points through the observer location. The resulting Copperhead coverage area is the optimum for that observer location with respect to that delivery unit location.

Additional coverage areas should be computed for the intended observer location in relation to other delivery units. As discussed in the previous procedure, the FSO must determine if the coverage area for the intended position meets the commander's intent. If not, another location for the observer should be chosen or the commander should determine whether the degradation of attack capability is acceptable. The third option, moving the firing unit, is also available with the same considerations as discussed previously.

Section IV. CHEMICAL MUNITIONS

Chemical Munitions Employment

The responsibility for controlling chemical weapons remains at corps until after release has been approved by national command authority. The technical aspects of planning and coordination are done at division in the FS cell with assistance from the chemical element. Authority to execute may be delegated to lower echelons (that is, division, separate brigades, or in some cases brigade) in the release message.

Planning for Chemical Munitions

For the brigade, the focal point of chemical fire planning input is the division FS cell.

The brigade may impact on the chemical strike plan by nominating to the division FS cell targets to be considered for chemical attack.

There are two important planning factors to remember:

Ž Chemical agents do not cause many casualties against a well-trained and well-equipped force.

Ž Large quantities of ammunition must be delivered in a very short time period to achieve lethal dose rates.

If authority to plan and fire chemical weapons is delegated to brigade, chemical fire planning is done by the FS cell with the assistance of the S2, S3, and chemical officer. Together they select high-payoff targets for attack with chemical munitions. Constraints from division and corps, along with the brigade commander's guidance, are considered. Just before attack, chemical warning (CHEMWARN) messages are disseminated to higher, lower, adjacent, and supporting units.

Section V. NUCLEAR MUNITIONS

Nuclear Employment

Although US Army light forces are not nuclear-capable, a light brigade may be deployed to a theater with heavy forces. Nuclear fires may be delivered in support of light forces by corps artillery units and air forces. Therefore, the following information is provided.

In most cases, final control for the employment of nuclear weapons rests with the corps commander. It is his responsibility to ensure that nuclear weapons are used to the greatest tactical advantage, integrated into the battle plan, and employed in accordance with guidance from higher commanders. For this reason, corps is the focal point in the planning and employment of nuclear weapons. Divisions are involved in the process but to a lesser extent. Echelons below division level usually are not involved except as executors. Exceptions to this may exist when, for example, a brigade assumes the responsibilities of a division.

Nuclear Planning

For the light brigade, the focal point of nuclear planning is the corps or division FS cell. Nuclear planning is rarely done below this level. Brigade may impact on the nuclear strike plan by nominating to the corps or division FS cell targets to be considered for nuclear attack. (See FM 101-31- 1.)

Nuclear Execution

Just before the nuclear package is executed, the brigade receives the portion of the nuclear strike warning (STRIKEWARN) that affects its zone. The brigade FSO analyzes the brigade battle plan in light of the STRIKEWARN and reports its impact to the brigade commander along with recommended changes. Also, the brigade chemical officer verifies the safety of friendly elements in the brigade zone against the nuclear aimpoints selected by division. If a conflict arises, he takes one of the following actions:

- Recommends to the S3 that the element be moved to a safe area or its protection be increased.
- Tells the division FS cell of the conflict and requests that aimpoint be moved.

Nuclear Vulnerability Analysis

The brigade chemical officer conducts a nuclear vulnerability analysis for all elements of the brigade anytime the brigade is in a nuclear environment (anytime either force has the capability to use nuclear weapons, whether or not they have been employed). Recommendations on increasing protection and dispersal distances are discussed with the S3 and are presented to the commander when the situation dictates.

Fire Support Coordination

The use of nuclear weapons does not change the principles of fire support coordination. However, the greater lethality and variety of effects place an increased importance on methods and procedures for safeguarding friendly troops and activities during nuclear employment.

Fire Support Officer Responsibilities

The brigade FSO is responsible for advising the brigade commander on all aspects of the nuclear operations. These aspects include, but are not limited to –

- Time considerations in performing the nuclear mission.

- How the nuclear weapons effects may enhance the scheme of maneuver.

NOTE: See FM 101-31-1 and FM 6-20-30.

Aimpoint Refinement

Certain aimpoints of the division subpackages may be located in the brigade area of operations. During the decision-making process, the brigade commander or S3 and FSCOORD must analyze the aimpoint locations as follows to ensure that the brigade scheme of maneuver is not affected:

- Will collateral damage rubble structures that will interfere with movement?
- Are aimpoints located where collateral and equipment damage is avoided from tree blowdown, bridge blowdown, and fires?
- Are minimum safe distance constraints followed?
- How will a nuclear detonation at the aimpoints affect the unit RES category?

- If the brigade is required to exploit a nuclear strike, will radiological contamination affect the scheme of maneuver?

APPENDIX J

COMBAT OBSERVATION/LASING TEAM

Description

The COLT is a high-technology observer team designed to maximize the use of *smart* munitions. Although originally conceived to interface with the Copperhead, a COLT can be used with any munition that requires reflected laser energy for final ballistic guidance. Thus, at present, the team can also lase for *smart* munitions delivered by Air Force and Army aircraft. Within the light forces structure, the team is composed of two soldiers equipped with a G/VLLD and the necessary mobility and communications assets. COLTs can also be used as independent observers to weight key or vulnerable areas. By use of the self-location and target-ranging capabilities of the G/VLLD, first-round FFE with conventional munitions can be achieved.

Organization

Each team is composed of one sergeant, who is the team chief and primary operator of the G/VLLD; and one specialist, who is the driver, RATELO, and secondary G/VLLD operator.

Each team is equipped with the following:

- One HMMWV with G/VLLD.
- Two radios – one AN/VRC-46 and one AN/GRC-160.
- One forward entry device.

General Considerations

The COLT laser (G/VLLD) can be used for target ranging and/or designation. A COLT can provide observation for both standard and laser-guided weapons. The G/VLLD is the current organic laser for light forces. However, other Army (LTD and OH-58D helicopter) or Marine (modular universal laser equipment [MULE]) lasers may be available.

Target Ranging

COLTs can use the G/VLLD to provide accurate range, azimuth, and vertical angle to locate targets.

Target Designation for Laser-Guided Weapons

The LGW homes on reflected energy to attack a target. A G/VLLD can be used to designate for a variety of LGWs. These include 155-mm Copperhead (Army field artillery), Hellfire missile (Army aviation), Pave Penny (USAF), LGB (USAF), and Laser Maverick air-ground missile (Marine). For effective use of laser designators, certain criteria must be met:

- The PRF codes of the laser designator (G/VLLD) and the LST or LGW must be the same.
- Prearranged direction of attack (geometry to ensure necessary laser energy reflection is obtained) must be coordinated. For example, Copperhead firings require an angle T of less than 800 mils.
- The laser must lase at the correct time and for the required duration.
- The delivery system must place the LGW into the required footprint or envelope.

Environmental Restrictions

Laser designator and acquisition devices are designed to enhance current capabilities of fire support available to light forces. Several

factors – environment, laser system inherent limitations, and target types–affect laser employment. Tactics and techniques must take these factors into consideration.

Line of Sight. There must be line of sight between the designator and the target and between the target and the laser acquisition device or laser-guided weapon.

Visibility Degradation. Visibility can be degraded as discussed below.

Clouds. Clouds attenuate laser energy and degrade LST and LGW ability to see the spot. Since the laser spot is acquired only after the bomb comes out of the cloud, laser energy acquisition time is short; thus, ballistic accuracy is essential. Typical minimum ceilings and times of flight must be considered. In conditions of reduced visibility, present laser systems provide signal transmission ranges only slightly in excess of visual range.

Darkness. Laser energy transmission is unaffected by darkness, but darkness makes locating, identifying, and tracking targets more difficult for the COLT. The night sights for laser designators enhance operator target identification and engagement during night battlefield operations.

Battlefield Obscuration. Smoke, dust, and chemical particles in the air may attenuate or reflect the laser beam. This prevents sufficient energy reflection from the target for lock-on by LSTs or LGWs. Laser energy reflected from such particles also may present a false target to either the tracker or the munition. When faced with enemy obscurants, a COLT can reduce the impact by following some simple rules of thumb. Generally, if the observer can see a target through either day or night optics, he can successfully designate it. Positioning is key to reducing obscurant degradation of laser performance. Lasers should be positioned on the flanks or on terrain where smoke is likely to be less heavy along the line of sight. Transferring the mission from a laser being obscured to an unobscured laser is another simple way to counter enemy obscurants and tactics. These techniques would require the use of COLTs in pairs or laser combinations.

Concave Targets. Tunnels and other targets that do not reflect laser energy cannot be directly laser-designated. Instead, the designator must be aimed at a nearby surface. For example, aiming the laser slightly above a tunnel opening would allow a weapon to impact at that critical point. For weapons that tend to miss short, like laser-guided bombs, this could guide the bomb to enter the tunnel opening.

Obstructions. Optimum positioning of ground laser designators is essential. Obstructions (trees, leaves, grass, and so forth) between the designator and the target may prevent a clear, unobstructed view for ground laser designator employment. Thus, jungle operations may preclude the use of ground designators and limit the effectiveness of airborne laser designators (ALDs).

Temperature Extremes Extreme temperatures affect battery-powered laser operation. For example, a cold, soaked battery may have a much-reduced capability to power the laser.

Solar Saturation. Laser seekers look for a spot of IR energy that stands out from the background. This can be a problem when engaging with low-angle LGWs or LST-equipped aircraft, especially against targets above the horizon just after sunrise and just before sunset.

Seeker Characteristics

Code

A laser seeker looks for laser designator energy on a specific PRF code. A designator and a seeker must work together as a team on

a specific code. Thus, seekers do not detect or interfere with designators set on other codes.

Field of View

All seekers have a limited field of view. They must be pointed close to the target to see the laser designator spot.

Acquisition Time

To avoid detection by enemy forces and to conserve battery energy, a COLT limits the amount of time it designates a target. Therefore, laser seekers and munitions have a very short time to detect the laser spot and guide to the target.

Sensitivity

Different laser guidance and/or acquisition systems require various amounts of reflected laser energy to operate. Under ideal conditions, a G/VLLD must be within 5 kilometers of an average stationary target to provide optimum Copperhead guidance; whereas under ideal conditions, a Pave Penny LST can acquire an LTD spot as much as 30 kilometers away on a clear day. Less sensitive seekers are more susceptible to reflection and the relative positions of the target, designator, and seeker.

Seeker Types

Airborne Laser Spot Tracker

An airborne LST points out laser-designated targets to the pilot. The pilot can then attack the target with any weapons on board. Pilots require this target cue; without this assistance, it is very difficult for them to see camouflaged targets at long ranges and from high-speed aircraft. Normally, an LST uses a laser pulse code established by the COLT. An LST has a narrow field of view, and the pilot must accurately point the airplane so the seeker lines up on the laser energy.

Laser-Guided Missile and Copperhead Cannon-Launched Guided Projectile

The laser-guided missile (LGM) and CLGP must be precisely aimed to see the laser energy on the target. To optimize LGM or CLGP terminal guidance, laser designation must be timed according to the LGM or CLGP predicted time of flight. If the laser designator is turned on late, the LGM or CIGP may miss; turning the laser designator on early will not cause a miss.

Laser-Guided Bomb

The LGB must be aimed so that the target is within the field of view of the seeker. If the aircraft does not have an LST, a visible target mark may be required as an aiming cue. Since the laser pulse code is preset on the LGB and cannot be changed while it is airborne, the COLT must use the code set in the bomb. When the lofting or shallow delivery method is used, if the laser designator is turned on too early, the LGB will steer to the laser mark too soon and miss by falling short of the target. Whenever possible, the pilot should communicate directly with the COLT so the laser can be turned on at the best time. Delaying designation until the last 10 seconds of weapon flight is ideal. A low-level laser-guided bomb (LLLGB) does not have the LGB early lock-on characteristic.

Designator and Seeker Pulse Code

Coding for laser designators and seekers is based on pulse repetition frequency. This system uses either three- or four-digit numbers made up of the numbers 1 through 8. The three- and four-digit devices are compatible. When a mix of three- and four-digit equipment is used, the first digit of the four-digit code is always 1. For example, a three-digit code of 657 would be set as 1657 on a four-digit code system. To go from a four-digit code to a three-digit code, drop the first number. For example, a four-digit code of 1246 would become a three-digit code of 246.

The joint force headquarters has overall responsibility for code management. The corps FSE manages ground switch settings and provides blocks of settings to divisions (div arty). Brigade FSE is the lowest echelon that manages code settings. It ensures that FDCs and lower FSEs have positive coordination of assigned codes. When COLTs designate for Air Force delivery systems, the FAC receives the designator code from the pilot and passes it to the COLT.

NOTE: The lower the PRF, the faster the lase pulse and the better the *paint* of the target. Lower codes should be assigned to the priority COLT.

Using two or more COLTs in different locations, on the same target, and on the same code offers some advantages in attacking high-payoff targets. The main advantage is that if one designator fails, the round will still have reflected energy from another laser to guide it. The LGW locks on and tracks for the designator with the strongest reflected energy.

Employment Options

Current authorizations for light forces normally provide one COLT to each DS artillery battalion and three COLTs to div arty. The COLT is primarily used as the designator for 155-mm artillery-delivered Copperhead. However, it can be used to optimize Air Force and other aviation systems by providing target designation and laser guidance for air-delivered munitions. The COLT gives the light force commander a powerful capability to attack hard and point targets as well as area targets if the delivery systems are available. To maximize the effectiveness of the COLT while minimizing the mobility limitations of the ground designator, positioning must be carefully considered. Positioning factors include the following:

- Ability to support the commander's intent.
- Intelligence preparation of the battlefield.
- Angle T consideration for each potential shooter.
- Altitude as close as possible to that of the expected target (minimize vertical angle of attack).
- Survivability of the COLT.
- Desirability of survey.
- Maintenance of good communications.

COLTs are positioned by the FSCOORD or his representative to support the maneuver commander's overall intent. The commander approves the COLT positioning as meeting his intent during the rehearsal and/or as part of the published operation plan and/or order. The FSCOORD must consider two aspects in the COLT positioning decision – tactical and technical. The technical aspect concerns positioning to accomplish the commander's intent on the basis of where he wants to engage targets or target sets. The technical aspect concerns the angle T target engagement parameters of the Copperhead.

COLTs assigned to div arty may be task-organized to subordinate artillery battalions or retained centrally. In task-organizing COLTs, all fundamentals of organization for combat should be considered. To provide the best coverage and to allow the greatest survivability for the COLT, COLTs often are employed in pairs. This allows continuous COLT coverage during the operation. Since the COLT is a limited, valuable asset, careful consideration must precede a decision to decentralize the COLTs below brigade level. Any decentralization should be for a designated period of time, not as a matter of SOP.

Considerations in the offense are as follows:

Ž Recommend to the commander appropriate targets for laser-guided munitions.

Ž Consider using COLTS for both marking and designating operations.

Ž Consider using a COLT as an independent observer when LGMs are undesirable or unavailable.

Considerations in the defense are as follows:

Ž Consider using COLTS in pairs to ensure coverage in depth.

Ž Survey COLT positions as a high priority in the survey plan.

Ž Consider using COLTS to survey in obstacles and to cover obstacles by observation.

Ž Consider using COLTS with night sights as an early warning system.

Current and Projected Laser Systems

The tables below show the following:

Ž Current and projected laser spot tracker systems, their general functions, and their characteristics.

Ž Description of each laser designator system.

Ž Descriptions of laser-guided weapons.

GLOSSARY FOR TABLES

AGM	=	air-ground missile	LST	=	laser spot tracker
ARBS	=	angle rate bombing system	LTD	=	laser target designator
DD	=	destroyer	MMS	=	mast-mounted sight
DDG	=	guided missile destroyer	MULE	=	modular universal laser equipment
FAC	=	forward air controller	NA	=	not applicable
FIST	=	fire support team	NGF	=	naval gunfire
GBU	=	glide bomb unit	NOS	=	night observation system
G/VLLD	=	ground/vehicular laser locator designator	TADS	=	target acquisition system and designation sight
LANTIRN	=	low-altitude navigation and targeting infrared for night system	TRAM	=	target recognition attack multisensors
LGB	=	laser-guided bomb			
LGW	=	laser-guided weapon	UAV	=	unmanned aerial vehicle
LLLGB	=	low-level laser-guided bomb	USMC	=	US Marine Corps
LMAV	=	Laser Maverick	USN	=	US Navy

LASER SPOT TRACKERS

SYSTEM	SERVICE	LASER SPOT TRACKER OR ACQUISITION SYSTEM	TARGET DESIGNATION SYSTEM	LASER-GUIDED MUNITION	EMPLOY-MENT PLATFORM	PRF CODE DIGITS	IN-FLIGHT SELECTABLE
TADS	Army	X	X		AH-64A	4	Yes
Pave Penny	Air Force	X			A-7, A-10	4	Yes
TRAM	Navy USMC	X	X		A-6E	4	Yes
MULE	USMC		X		Ground (hand-held or tripod)	3	NA
G/VLLD	Army		X		Ground (tripod or vehicle mount)	3	NA
LTD	Army		X		Ground (hand-held)	3	NA
Pave Spike	Air Force		X		F-4D, F-4E	4	Yes
Pave Tack	Air Force		X		F-4E, RF-4C, F-111F	4	Yes
LANTIRN	Air Force		X		A-10, F-15E, F-16	4	Yes
MMS	Army	X	X		OH-58D	4	Yes
Aquila	Army		X		UAV	3	Yes
NOS	USMC		X		OV-10D	3	Yes
Hellfire	Army USMC			X	AH-64A, UH-60, AH-1	4	Yes
Copperhead	Army USMC			X	155-mm howitzer	3	NA
Paveway I, II (LGB), and III (LLGB)	Air Force Navy			X	Any attack or fighter aircraft	4	No
Laser Maverick	USMC			X	A-4, AV-8, A-7, F/A-18	4	Yes
5-Inch Semiactive Laser-Guided Projectile	Navy			X	DD- and DDG-class ships	4	No
ARBS	USMC	X			A-4M, AV-8B	4	Yes
AGM-123A Skipper II	Navy USMC			X	A-6E, A-7	4	No
Laser Spot Tracker	Navy USMC	X			F/A-18	4	Yes

LASER DESIGNATOR SYSTEMS

GROUND/VEHICULAR LASER LOCATOR DESIGNATOR (ARMY)	
Description	Long-range laser range finder and designator Can provide azimuth and vertical angle
Function	Designates targets or areas that can be detected by aircraft equipped with LST and LGWs set to same code as G/VLLD
Platform	Mounted: In M981 FIST vehicle Dismounted: On tripod
Employment	Located in company and troop FISTs and in COLTs
PRF codes	111 through 888 (see previous discussion)
Target nominal range (for standard target 2.3 x 2.3 meters)	Stationary: 5 km (Copperhead) Moving: 3 km (Copperhead)
System-unique capabilities	Uses night sight Two-man portable for short distances Can be mounted on the M113A1 interim FIST vehicle
Limitations	Limited mobility
LASER TARGET DESIGNATOR (ARMY)	
Description	Battery-operated, lightweight, hand-held
Function	Designates targets that can be detected by aircraft equipped with LST and LGWs set to same code as LTD
Platform	Hand-held
Employment	Used by fire support personnel in airborne, ranger, and special operations forces
PRF codes	111 through 888 (see previous discussion)
Target nominal range (for standard target 2.3 x 2.3 meters)	Stationary: 1 km (Copperhead) point target Stationary: 3 km (Copperhead) area target Moving: 3 km (Copperhead)
System-unique capabilities	Easily transportable
Limitations	Cannot establish range to targets Cannot provide direction and vertical angle Limited laser-on time because of battery life
MODULAR UNIVERSAL LASER EQUIPMENT (MARINE CORPS)	
Description	Man-portable LTD and range finder
Function	Accurately locates targets and provides terminal guidance for LGWs
Platform	Man-packed, tripod-mounted
Employment	Gives forward observers, NGF spotters, and FACs the capability to accurately determine location and range to targets Provides laser designation for all surface- and air-delivered LGWs
PRF codes	111 through 888 (see previous discussion)
Target nominal range (for standard target 2.3 x 2.3 meters)	Stationary: 5 km Moving: 3 km
System-unique capabilities	Consists of three basic modules: • Laser designator range finder module provides the basic laser designator and ranging equipment • Stabilized tracking tripod module provides stabilization for the tracking of moving targets and targets at extended ranges • North-finding module provides a true north reference
Limitations	Subject to visibility restrictions of line of sight, clouds, darkness, smoke, dust, and so forth

LASER DESIGNATOR SYSTEMS (CONTINUED)

OH-58D MAST-MOUNTED SIGHT (ARMY)	
Description	Electro-optical system incorporating television visual and thermal imaging systems and laser range finder, designator, and LST
Function	Sight system to laser-designate for other weapon systems
Platform	OH-58D
Employment	Provides day, night, and adverse weather target acquisition and laser designation capability
PRF codes	All codes; in-flight selectable
Target nominal range (for standard target 2.3 x 2.3 meters)	Stationary: 10 km Moving: 10 km
System-unique capabilities	MMS LST facilitates handoffs from other laser designators Tracks targets manually or automatically
Limitations	Subject to visibility restrictions of line of sight, clouds, darkness, smoke, dust, and so forth

LASER-GUIDED WEAPONS

COPPERHEAD (ARMY AND MARINE CORPS)	
Description	Laser seeker in nose of projectile which homes in on laser energy reflected from the target during the final portion of trajectory
Function	Used in conjunction with a ground or airborne laser designator
Platform	Fired from M109 155-mm self-propelled howitzers and M198 155-mm towed howitzers
Employment	Used primarily to attack high-payoff moving or stationary hard point targets
PRF codes	111 through 888
Target nominal range (for standard target 2.3 x 2.3 meters)	Stationary: Minimum range 3 km, maximum range 16 km Moving: Minimum range 3 km, maximum range 16 km
System-unique capabilities	Point target accuracy Large footprint within which round can acquire target
Limitations	Requires continuous laser designation during the final 13 seconds of projectile flight
HELLFIRE MISSILE (ARMY AND MARINE CORPS)	
Description	Third generation air-launched antiarmor laser-guided missile
Function	Used in conjunction with a ground or airborne laser designator
Platform	AH-64 helicopter
Employment	Employed against armor or other hard point-type targets Autonomous designation or *buddy lasing* for other launch platforms
PRF codes	All codes; in-flight selectable
Target nominal range (for standard target 2.3 x 2.3 meters)	Stationary: 5 km Moving: 5 km
System-unique capabilities	Can launch by use of direct or indirect method Can employ single, rapid, or ripple firing techniques Seeker lock-on options are lock-on after launch and lock-on before launch
Limitations	Subject to visibility restrictions of line of sight, clouds, darkness, smoke, dust, and so forth

LASER-GUIDED WEAPONS (CONTINUED)

LASER MAVERICK AGM-65E (MARINE CORPS)	
Description	A short-range, laser-guided, rocket-propelled air-to-surface missile
Function	Used in conjunction with ground or airborne laser designators
Platform (with modifications)	A-4M and A-6E, F/A-18, AV-8B, A-7 (USN)
Employment	Intended for use against fortified ground installations, armored vehicles, and surface combatants Employs 125-pound warhead or 300-pound Maverick alternate warhead with selectable delay fuze
PRF codes	Classified; cockpit selectable
Target nominal range (for standard target 2.3 x 2.3 meters)	Stationary: Yes Moving: Yes Minimum: Safety considerations only Maximum: Missile seeker; searches a sector 7 miles across and over 10 miles ahead
System-unique capabilities	If missile loses laser spot, missile goes ballistic and flies up and over target Warhead does not explode; it becomes a dud Cockpit-selectable laser coding and fuzing (delay or quick)
Limitations	Subject to visibility restrictions of line of sight, clouds, darkness, smoke, dust, and so forth
LASER-GUIDED BOMB PAVEWAY I OR II (NAVY, AIR FORCE, AND MARINE CORPS)	
Description	500-pound (GBU-12) or 2,000-pound (GBU-10) warhead marked with laser guidance Two generations, Paveway I and II, are compatible with all US ground and airborne designators
Function	Bomb released after aircraft is within delivery envelope
Platform	Bomb begins terminal guidance upon laser energy acquisition
Employment	All aircraft capable of employing conventional weapons of same weight class Level or dive for Paveway I bombs; also loft for Paveway II bombs Optimum against hard point targets
PRF codes	Some set at factory; some set before takeoff
Target nominal range (for standard target 2.3 x 2.3 meters)	Stationary: Up to 6 km Moving: Yes Function of designator-to-target range, designator output, and ballistic delivery range
System-unique capabilities	Accuracy gives high probability of target kill against point targets
Limitations	Early laser lock-on during a loft or shallow delivery angle tends to cause a miss short Requires ballistically accurate delivery and continuous laser energy during last 10 seconds of time of flight Target must subtend 1 mil (at designator-to-target range) Very limited low-altitude capability When delivered from a low-altitude loft maneuver, restricts lase on target to last 10 seconds of flight time
LASER-GUIDED BOMB PAVEWAY III (NAVY, AIR FORCE, AND MARINE CORPS)	
Description	Designated GBU-24 (2,000-pound bomb) No 500-pound version Third-generation LGB
Function	Same as Paveway I or II
Platform	Same as Paveway I or II
Employment	Expanded delivery envelopes allowing very low-altitude, relatively-low-ceiling, longer-range weapon releases
PRF codes	Retains dive delivery option

LASER-GUIDED WEAPONS (CONTINUED)

Target nominal range (for standard target 2.3 x 2.3 meters)	Same as Paveway I and II Same as Paveway I and II
System-unique capabilities	Improved accuracy capability over LGB GBU-10 or 12 Highly resistant to countermeasures Blind launch capability from extended ranges If LLLGB does not detect laser energy, it will maintain level flight and fly beyond the target
Limitations	Requires continuous laser energy during last 8 seconds of time of flight Target must subtend 1 mil (at designator-to-target range)

APPENDIX K

TARGET VALUE ANALYSIS

Description

Targeting is the process of selecting targets and matching the appropriate response, taking into account operational requirements and friendly force capabilities. Attacking targets that the enemy can least afford to lose strips him of his initiative and forces him to conform to our battle plan. Targeting requires interaction between fire support, intelligence, engineer, and maneuver personnel. Target value analysis is an analytical tool to be used in the targeting process by which the maneuver commander—

- Provides focus for his target acquisition effort.
- Identifies priorities for the engagement of enemy targets that will facilitate the success of his mission.

Ž Identifies effects criteria.

- Permits planning for identified contingencies based on enemy options available when the enemy operation fails.
- Better estimates friendly unit capabilities.

Target value analysis is described in Chapter 3 of the Fire Support Mission Area Analysis (FSMAA) (classified SECRET) and in FM 6-20-10. The complete FSMAA is normally distributed to FSEs at division and higher echelons. Selected extracts may be distributed to brigade and battalion levels.

Definitions

High-value targets (HVTs) are targets deemed important to the enemy commander for the successful accomplishment of his mission. The loss of HVTs can be expected to contribute to a substantial degradation of an important enemy battlefield function. High-value targets are developed by using the TVA tools based on the interpretation by the friendly intelligence system of the enemy course of action.

High-payoff targets are HVTs that must be successfully acquired and attacked to contribute substantially to the success of friendly operations. They are developed on the basis of METT-T and are not dependent on the ability of the unit to acquire or attack them. If an HPT is beyond the capability of the unit to acquire, then it should be passed to the next-higher echelon as a priority intelligence requirement.

Attack criteria are a compilation of the commander's guidance, desired effects of attack, high-payoff target lists, and attack priorities.

The attack guidance matrix is a compilation of attack criteria in a format that can be understood by fire support and targeting agencies.

Time-sensitive targets are those targets requiring immediate response because they pose (or will soon pose) a clear and present danger to friendly forces or are highly lucrative fleeting targets of opportunity.

Target development is the process of providing direct combat information, targeting data, and correlated targeting information. It gives the commander and his attack managers timely and accurate locations of enemy weapon systems, units, and activities that may impact on current or projected operations.

TVA Tools

Integral to the performance of duties by the targeting officer is the use of the IPB and the TVA. The TVA tools in the FSMAA include the spread sheets and the target sheets. The high-payoff target list is a product of target value analysis.

Spread Sheets

On the front side of each spread sheet (example below) is information about Threat forces at regiment, division, army, and front with respect to the operations the forces are expected to conduct. On the back side of the spread sheet (example on page K-5) is a summary- of information about the enemy doctrine and tactics. It indicates how the Threat is expected to fight, what his operation is intended to accomplish, and what alternatives he has if he fails to accomplish his primary mission. The major sections of the spread sheet are as follows:

- Title and sheet number (front and back) (A).
- Relative value matrix (front)(B).
- Attack rationale column (front)(C).
- Specific high-value targets (front)(D).
- Doctrinal template (back)(E).
- Threat force doctrinal resume (back) (F).
- Fallback option statement (back)(G).

EXAMPLE SPREAD SHEET (FRONT)

2 REGIMENTAL MEETING ENGAGEMENT 2 ← (A)

(CLASSIFICATION)

DISRUPT	DELAY	LIMIT	TARGET SET	RELATIVE WORTH	(C)	(D)
X	X		C^3		Lead elements concentrated on to slow momentum of attack and cause compression of enemy forces with resulting vulnerability to heavy missile/nuclear strikes.	Movement (43, 44, 46, 48) Deployed Elements (50) Accompanying Arty (45)
X	X	X	FIRE SPT		C^3 attacked to disrupt sequence of attack.	Forward CP (39) Main CP (28, 38)
X	X	X	MANEUVER		*LOC attacked to prevent reinforcement or resupply.*	Ammo transport (118)
X			ADA		FS attacked to prevent use of additional firepower from reinforcing lead element attacks.	Fire Direction (1, 2, 3, 4) Air Support (22, 23) Weapons (19, 20)
X			ENGINEER		ADA attacked to allow friendly aircraft to canalize main forces into undesirable areas.	Weapons (61, 62)
X			RSTA		RSTA deceived as to actual strength of friendly forces, canalized to lead main forces into indefensible terrain, or neutralized.	Battlefield Surv and TA Radar (83) Recon Patrol (84, 85) Radar Intercept (103)
X			REC		*POL storage and transport allow enemy to maintain momentum.*	Transport (111, 128) Storage (114, 115)
*	*	*	NUKE/CHEMICAL		REC attacked as a priority, since enemy forces will not rely on C^3 and thus will be more likely to utilize REC with more frequency than usual.	Comm Jammers (88, 89) Intercept and DF (91, 104)
			CLASS III POL		ENGR attacked to limit the enemy ability to break obstacles.	Movement Support (70)
			CLASS V AMMO			
			CLASS IX MAINT			
			LIFT			
X	X	X	LOC			

(B)

(CLASSIFICATION)

NOTE: This is not an actual spread sheet. It is an example using a notional situation and is not to be used as an actual targeting aid.

Title and Sheet Number

These specify the unit level and enemy mission of interest. This header is shown on the front and back of the spread sheet.

Relative Value Matrix

The relative value matrix is the part of the spread sheet that indicates which of the 13 target sets are high value in that situation. The matrix presents information that aids managers of attack assets (both maneuver and fire support) and collection managers in establishing priorities.

The 13 target categories (center of the matrix) represent target groupings based on their battlefield functions, not on the associated equipment. The categories (also known as target sets) cover all of the major battlefield functions of the Threat. The categories are as follows:

- C^3 targets are command, control, and communications centers that affect maneuver or combined arms.
- The FIRE SPT category covers the entire Threat fire support system.
- MANEUVER targets are combat arms tactical subunits in various postures.
- ADA refers to air defense system targets, including missile unit headquarters and processing centers, radar sites, and short-range air defense platoons.
- ENGINEER denotes engineer targets, including crossing sites, snorkeling sites, and movement support elements.
- RSTA assets include ground surveillance radars, reconnaissance patrols, and airborne sensor systems.
- The REC category is radio-electronic combat, known as offensive electronic warfare. Because of the nature of the Soviet system, some dedicated collection target acquisition assets are listed in this category instead of under RSTA.
- The nuclear and/or chemical (NUKE) CHEMICAL) targets are major firing positions and nuclear and chemical support elements.
- CLASS III POL refers to petroleum, oil and lubricants support and includes transport and pipeline units and POL points.
- The CLASS V AMMO category covers the ammunition support targets.
- CLASS IX MAINT covers maintenance and repair capabilities.
- LIFT refers to general transport units in the Threat.
- LOC represents lines of communication for which no specific target types are designated. However, any target attacked that would interfere with the ground or air lines of communication is a candidate.

The right side of the matrix indicates the relative worth of target sets that are considered high value for the situation. This part of the matrix uses a simple bar chart to show the relative worth of the target sets with respect to each other for the specific operation depicted by the spread sheet. The relative worth of a target refers to the relative effect that successful attack of the target will have on the friendly operation and the friendly scheme of maneuver. The stated relative worth is confirmed by the staff during the war-gaming process. The target sets that are not considered to be of high relative worth are not assigned a value bar.

The left side of the matrix consists of three columns, labeled DISRUPT, DELAY, and LIMIT. An **X** in the column associated with the target set indicates that a benefit may be accrued by attacking the target with one of these particular goals in mind.

An X in the DISRUPT column indicates that attacking a target with the goal of disrupting its function may be of considerable benefit. Such attack can be by continuous suppression, neutralization, or destruction of the target by lethal means or by offensive EW for some types of targets. The enemy function represented by the target is considered unacceptable on the battlefield and must be removed.

An X in the DELAY column indicates that a benefit can be gained by attacking the target to delay its arrival on the battlefield. In some cases, a commander could opt to use a smaller amount of ammunition and slow a second-echelon force for a period of time. This would allow his maneuver forces to recover and conduct a coordinated effort when the enemy second echelon arrives at the FLOT. In this case, the unacceptable aspect of the target set function is its time of arrival at the battlefield. The implication is that the combined arms team can defeat such a target if it is given enough time to prepare.

An **X** in the LIMIT column indicates that a benefit can be gained if the target approach is limited, thus shunting the enemy unit to another portion of the battlefield. This either puts the target into a portion of the battlefield where it can be better handled or puts the enemy on terrain not suitable to his purposes. The unacceptable aspect of this target set function is where it is employed on the battlefield.

Attack Rationale Column

The attack rationale column in the center of the spread sheet provides a guide of the benefits to be derived by attacking targets of a particular category. This column discusses the desired objectives for attack of the target in the category. Each description is connected to the appropriate category by lines. A solid line indicates the primary results of attacking targets in the category from which the line is drawn. (Solid lines should be traced from left to right.) Some descriptions are further attached to other categories by dotted lines. This indicates that a secondary benefit is achieved for that category when the primary target is attacked. Dotted lines are traced from the attack rationale column back to the category (right to left).

Two type styles are used in the attack rationale column. Descriptions in normal type indicate that the greatest benefit is achieved by attacking targets in their associated groups sequentially from the top of the matrix to the bottom. Descriptions in italics indicate that the categories always have the same value throughout the operation, regardless of posture.

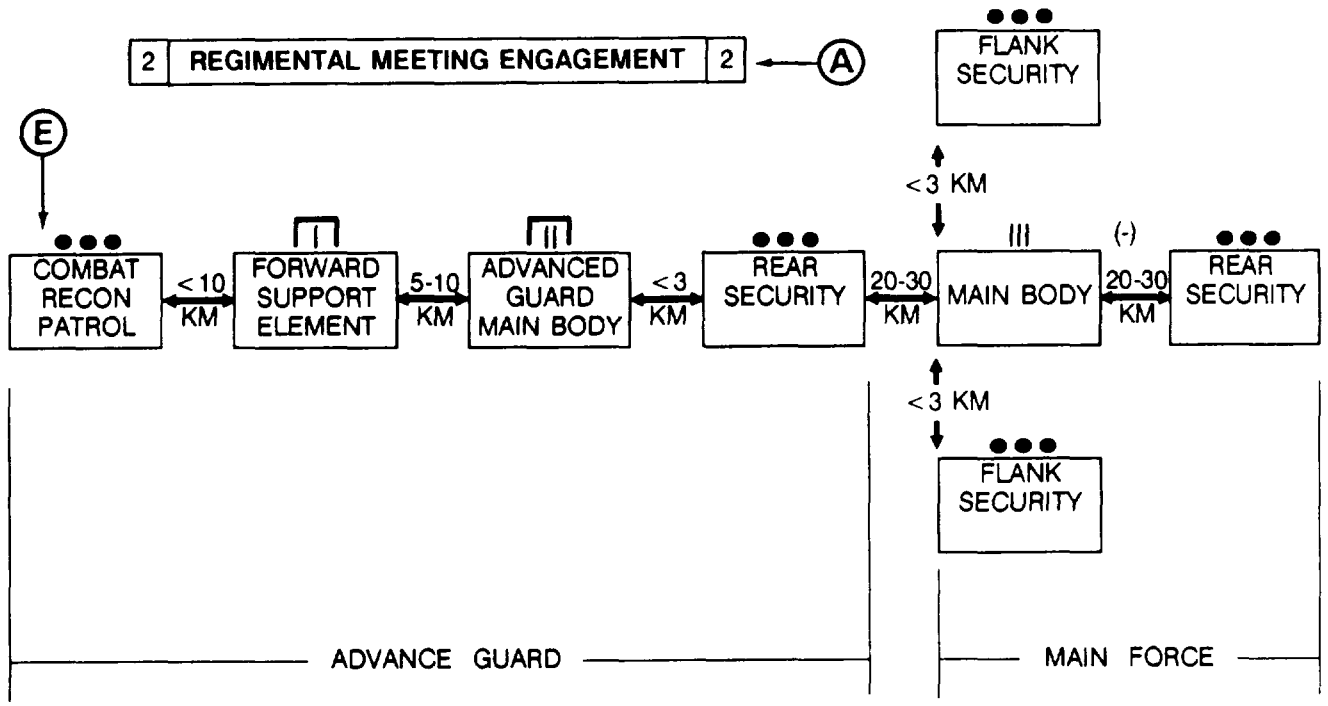
Specific High-Value Targets

The high-value target column of the spread sheet specifies the high-value targets for each set. Numbers in parentheses refer to specific target sheets containing individual target descriptions for the high-value target type given. Usually, there are some high-value targets for each category even though the set itself might be given a low relative value. When formulating detailed attack guidance, one should be aware of all of the specified high-value targets, not just those in the higher-value categories. In developing the high-payoff target list, targeting personnel should consider all of the high-value targets in the context of the situation in addition to the commander's directive.

Doctrinal Template

The doctrinal template indicates the major subunits of the unit considered, deployed to scale, without regard to the effects of terrain and weather. Fire support personnel can use the template to plan acquisition coverage and likely areas of interest. However, it should be used cautiously and only as a guide, because of the effects of terrain.

EXAMPLE SPREAD SHEET (BACK)



REGIMENTAL MEETING ENGAGEMENT

F → **Objective:** Destruction of the enemy forces, seizure of key terrain, and continuation of the advance.

Doctrinal Approach: The regiment is normally part of a division meeting engagement. Continuous and thorough reconnaissance is conducted. The enemy goal is to achieve the initiative immediately. The regiment will deploy into combat from the march at a high rate of speed. The combat recon patrol and forward support element will attempt to penetrate the enemy upon contact. Deployment of the main body depends on the outcome of the advance guard action. The regiment may attempt an envelopment, a flank attack, or a frontal attack (normally conducted with an envelopment or flank attack). Adequate flank and rear security will be maintained throughout the operation.

G → **Fallback:** Given a successful US effort, the following options are available to the Soviet commander:

The division attacks and seizes subsequent objectives (18).

Hasty defense (14).

Withdrawal (16).

Doctrinal Resume

The doctrinal resume is a synopsis of the major features of the operation. This portion indicates the objective of the force and the tactical principle that governs how the unit is supposed to fight.

Fallback Option Statement

The fallback option portion details what we can expect the enemy to do if he fails to accomplish his mission. Contingency plans and high-payoff target recommendations based on the most likely outcome of the current battle can be prepared and presented. Fallback options are referenced to other spread sheets in the FSMAA.

Target Sheet

The target sheet is made up of seven major sections:

Ž Target category.

Ž Target sheet number and title (incorrectly labeled in the FSMAA as high-payoff target).

ŽFunction.

Ž Description.

Ž Signature.

Ž Degradation effect.

Ž Some form of graphic representation.

Target Category, Sheet Number, and Title

The target category indicates in which of the 13 sets the target belongs.

The sheet number can be used to cross reference the target sheet with the spread sheet. The target title refers to the target type and function. The label "high-payoff target" from the FSMAA is a misnomer. This section really represents the high-value target cross-reference number (as shown on pages K-8 through K-11). The other portions of the target sheet are more complex and contain most of the information useful to targeting personnel.

EXAMPLE TARGET SHEET

(Classification)

TARGET CATEGORY:	Engineer
HIGH-PAYOFF TARGET:	Target 75. Ferry crossing site.
FUNCTION:	Provide rapid crossing of water obstacles for tanks and other nonamphibious systems.
DESCRIPTION:	Target radius – point target. Posture – exposed on water surface FEBA distance.
Composition:	Vehicles normally two ferries or rafts (If river over 300 meters wide, may be as many as five).
Personnel:	
SIGNATURE:	Visual – see graphic. Electronic – Other –
DEGRADATION:	Nonamphibious forces must find alternate means to cross. Force that secured bridgehead is not reinforced.
GRAPHIC REPRESENTATION:	(Omitted)

(Classification)

Function

The function section details the specific operations and tasks that the target is expected to perform. It includes the primary and secondary functions and indicates any relationship to the other target categories or types.

Description

The description of the target details the number and type of vehicles and equipment in a position and specifies the approximate number of personnel associated with the position. It details the usual distance from the FEBA and indicates the normal posture of the target with respect to camouflage and orientation and the amount and type of terrain occupied. The description is useful in considering what types of attack systems and munitions are to be used. It also helps to discriminate between targets of a similar function.

Signature

The signature section describes signatures ranging from visual and electronic to auditory and infrared.

Degradation

The degradation portion indicates what happens to the parent unit or an associated unit when the target function is removed. This section can be used by operations and fire support personnel to help determine effects desired against a target.

Graphic Representation

The graphic representation shows in a general overlay format how the target would be arrayed doctrinally on the battlefield.

GLOSSARY FOR TARGET CATEGORIES GRAPHIC

A/C	=	aircraft	MTR	=	motor transport regiment
AD	=	air defense	off	=	offense
ARPD	=	army missile transport battalion	ORPD	=	independent missile transport battalion
CGI	=	control group intercept	PMP	=	heavy folding pontoon (bridge type)
comm	=	communications	POZ	=	mobile obstacle detachment
COP	=	command observation post	PRTB	=	mobile repair technical base (rocket and missile)
CRTA	=	chief of rocket troops and artillery	PSNR-1	=	battlefield surveillance radar
DAG	=	division artillery group	RAG	=	regimental artillery group
DARM-4	=	mobile artillery repair shop complex (type)	regt	=	regiment
def	=	defense	R/R	=	radio/radar
DF	=	direction finding	SASP	=	special ammunition supply point
div	=	division	SIGINT	=	signal intelligence
ERP	=	engineer reconnaissance patrol	SP	=	self-propelled
how	=	howitzer	SSM	=	surface-to-surface missile
hvy	=	heavy	TA	=	target acquisition
inter	=	intercept	tac	=	tactical
MR	=	motorized rifle	TACAN	=	tactical air navigation
MRL	=	multiple rocket launcher	TR	=	tank regiment
MRR/TR	=	motorized rifle regiment/tank regiment	trans	=	transport
MTB	=	motor transport battalion	UHF	=	ultrahigh frequency
mtr	=	motor	VHF	=	very high frequency

TARGET CATEGORIES CROSS-REFERENCE

CATEGORY	NUMBER AND TITLE
Fire Support Command, Control, and Communications	1. Bn FDC (SP) 2. Bn COP 3. RAG COP 4. DAG COP 5. Div arty command battery/CRTA/div COP 6. Btry FDC (SP how) 7. Bn FDC 8. Btry COP 9. Combat control group (air) and forward air controller 10. Vectoring target designation point (air) 11. Radio navigation point (air) 12. CGI radar site

TARGET CATEGORIES CROSS-REFERENCE (CONTINUED)

CATEGORY	NUMBER AND TITLE
Target Acquisition	13. TA btry CP, arty regt, div/army 14. Countermortar/counterbattery site 15. Sound ranging site 16. Radar intercept/DF site (pole dish–twin box) 17. Battlefield surveillance radar site (Big Fred, Small Fred)
Weapons	18. Arty battery firing position 19. MRL firing position 20. SSM firing position 21. Mortar btry firing position 22. Attack helicopter flight 23. Tac air flight
Logistics	24. Ammo resupply trucks/convoy
Command, Control, and Communications Maneuver CPs	25. MR regiment main CP 26. MR regiment forward CP 27. MR regiment rear CP 28. MR battalion main CP/COP 29. Division main CP 30. Division forward CP 31. Division rear CP 32. Division alternate CP 33. Radio relay site 34. Army main CP 35. Army forward CP 36. Army alternate CP 37. Army rear CP 38. TR main CP 39. TR forward CP 40. TR rear CP 41. Tank battalion main CP/COP 42. Traffic control point
Maneuver	43. Advanced guard battalion 44. Advanced detachment 45. Accompanying artillery 46. MR company reinforced (off) 47. MR company reinforced (def) 48. Tank company reinforced (off) 49. Tank company reinforced (def) 50. Tactical march column 51. Battalion assembly area 52. Administrative march column

TARGET CATEGORIES CROSS-REFERENCE (CONTINUED)

CATEGORY	NUMBER AND TITLE
ADA	53. SA-4 brigade CP 54. SA-6 regiment CP 55. SA-8 regiment CP 56. SA-4 battalion CP 57. SA-6 btry CP 58. SA-8 btry CP 59. SA-4 btry CP 60. AD EW/TA radar site, long range 61. ZSU-23-4 platoon 62. SA-9 platoon 63. AD EW site, low level 64. AD EW site, medium range
Engineer	65. Assault crossing company 66. Pontoon bridge company 67. Tracked amphibian company 68. Tracked ferry company 69. Mobile obstacle detachment 70. Movement support detachment 71. Engineer reconnaissance patrol 72. Tank snorkeling site 73. PMP bridge 74. Tracked amphibian crossing site 75. Ferry crossing site
Nuclear/Chemical	76. ORPD 77. PRTB 78. ARPD 79. Nuclear depot/SASP 80. SSM met station 81. 203-mm howitzer firing position 82. 240-mm mortar firing position
RSTA	83. Battlefield surveillance radar site (PSNR-1) 84. Combat reconnaissance patrol 85. Recon patrol, regt, reconnaissance company 86. Recon patrol, regt, div reconnaissance company 87. Airborne sensors 88. HF comm jamming site 89. I band noise jamming site 90. TACAN jamming site

TARGET CATEGORIES CROSS-REFERENCE (CONTINUED)

CATEGORY	NUMBER AND TITLE
	91. Radio/radar intercept/DF site (division) 92. Radio/radar intercept/DF site (front) 93. I band noise jamming site 94. J band noise jamming site 95. A/C comm jamming site 96. HF DF site, army 97. HF DF site, front 98. Processing group, R/R recon company, recon bn, div 99. Airborne SIGINT platform 100. Radar DF site (mobile co, radar ranging intercept regiment, front) 101. Tropospheric scatter intercept site 102. Radio relay airborne jamming system 103. Radar intercept site (hvy co, R/R inter regt, front) 104. Radio inter and DF site 105. VHF/UHF jamming site 106. HF jamming site 107. Radar intercept and DF site 108. Radar intercept and DF site (radio inter regt, front and R/R inter regt, front) 109. VHF jamming site 110. Radio intercept and DF site (radio inter and DF co, radar inter bn, army)
Class III (POL)	111. Mtr trans co, regt 112. POL trans co, MTB, div 113. POL regt, MT bde, front 114. Pipeline bn, front 115. Regt POL point 116. Div POL depot 117. Army POL depot
Class V (Ammo)	118. Ammo transport co, MTB, div 119. Regt ammo depot 120. Div ammo depot 121. Army ammo depot 122. Front ammo depot 123. Front supply base section
Class IX (Maint, Repair Parts)	124. Regt maint co, MRR/TR 125. Bn repair and evacuation group 126. Damaged vehicle collection point 127. DARM-4 mobile artillery repair shop complex
Lift	128. MTR, trans bn, div

High-Payoff Target List

The high-payoff target list identifies the HPTs for a specific point in the battle in the order of their priority for acquisition and attack. While target value is usually the greatest factor contributing to target payoff, other things to be considered include the following:

Ž Sequence or order of occurrence.

Ž Ability to locate and identify the target.

Ž Degree of accuracy and identification available from the acquisition system.

Ž Ability to engage the target.

Ž Ability to defeat the target.

Ž Resource requirements necessary to accomplish all of these.

The PRIORITY column simply listes the priority order of the list. The list may have any number of target priorities.

The CATEGORY column identifies the target category from which each listed high-payoff target comes. Time-sensitive (TS) targets may be identified in this column.

The SHEET NUMBER column identifies the target sheet number of each high-payoff target.

The DESCRIPTION column identifies the target description from the appropriate target sheet.

EXAMPLE HIGH-PAYOFF TARGET LIST

PRIORITY	CATEGORY	SHEET NUMBER	DESCRIPTION
1	8 N/CH (TS)	77, 79	PRTB, nuclear depot
2	1 C^3 (TS)	29, 34	Division, army main CP
3	2 FS (TS)	5	Div arty command btry
4	2 FS	1, 2, 18	Arty bn FDC, COP, FA btry
5	1 C^3	25, 30	Regimental main CP, div fwd CP
6	3 MAN	50, 51, 46, 48	Bn assembly area, march column, MR/TK co
7	4 ADA 7 REC	63, 64 91, 92	AD EW site, radio/radar inter sites
8	9 POL	115, 116	Regimental/division POL points
9	10 AMMO	120, 121	Division/army ammo depots

The TVA Process

The following paragraphs present a divisional how-to guide with enough detail to provide a transition from concepts to workable TVA attack guidance. The specific tasks discussed are not normally done at levels below division. However, similar tasks are done as part of normal operations of a brigade battle staff. In performing its own target value analysis, the brigade concentrates on division-level spread sheets and target sheets. The brigade attack guidance addresses assets the brigade controls. The brigade targeting effort always occurs within the context of the decision support template. The high-payoff target list and attack guidance at brigade and task force or battalion are normally more detailed and focused than those at higher levels. This discussion is presented to facilitate an understanding of the requirements and products of the TVA process that may impact at brigade level and below. Tasks identified are done at division by the field artillery intelligence officer (FAIO) in conjunction with the targeting team and at brigade and below by the targeting officer in conjunction with the battle staff. For a more detailed discussion of specific TVA tasks and the targeting process, see FM 6-2010.

As soon as a likely enemy course of action is determined, determine the tactical situation and find the appropriate spread sheet. Then, identify the target sets with the highest relative worth.

Coordination

Coordinate with G2 and G3 plans as follows:

- From the G2 and G3, get any commander's guidance for relative worth or delay or limit modifications.
- With the G2 and/or G3, integrate finding high relative worth target sets into division priority intelligence requirements.

Get G2 input for the high-value target list based on the G2 estimate of the enemy situation.

Coordinate with G2 for planning target areas of interest and decision points. The FS cell should brief the G2 on the deep attack assets available, their ranges and capabilities, and their reaction times.

Use of Spread Sheets

From the selected spread sheet, extract the following:

- The relative worth for each set. The relative worth will drive target attack guidance.
- Target sets to be delayed or limited. These sets will drive the attack in depth (interdiction) effort.
- High-value targets. Develop the list of high-value targets from the mission area analysis and the commander's guidance. This list will drive the development of the high-payoff target list.
- Enemy fallback options. These will drive preparation of TVA for future operations.

Development of the High-Payoff Target List

Start with the list of identified high-value targets, and prioritize the targets according to their relative worth and the commander's guidance.

Eliminate all targets beyond the range of division-level weapons. When the commander has approved the high-payoff target list, coordinate with the next-higher FS cell and the ALO to engage these targets.

Eliminate those targets that are too large or too hard to engage with division-level assets. Consider these targets for engagement by corps, CAS, and nuclear and chemical weapons.

Coordinate with the G2 and/or ASPS. Eliminate targets to be engaged that cannot be regularly acquired in a timely manner.

The remaining high-value targets, which can be acquired and effectively attacked once they are acquired, comprise the high-payoff target list.

Coordinate with the G2, ASPS, and/or div arty targeting personnel to search for the targets on the high-payoff target list.

Disseminate the high-payoff target list to all fire support agencies.

Preparation of Target Attack Guidance Matrix

The attack guidance matrix is a means used to present the attack guidance for specific high-payoff targets. This guidance is recommended by operations and fire support personnel for approval by the commander. The procedure for preparing a target attack guidance matrix is described below.

Target Category and High-Payoff Target Numbers

First, list the 13 target categories in the CATEGORY column. Transfer all the target sheet numbers for these categories from the high-payoff target list to the HIGH PAYOFF column.

Effects Levels

Determine what effect (suppress, neutralize, or destroy) the commander wants on each target set. Determine if the effect the commander wants requires that a modification be recommended. If ammunition and fire units are plentiful, greater effects may be achievable. If ammunition and fire units are limited, decrease the effects levels for borderline categories. On the basis of this determination. insert the appropriate effects in the HOW column of the attack guidance matrix. Enter the letter S for suppress, N for neutralize, or D for destroy. If a modification or a specific effects level is required, indicate that in the HOW column.

When to Attack

Determine when to attack each target set. Indicate in the WHEN column the decision for each target set. Enter the letter I for immediate. A for as acquired, and P for plan.

Immediate attack should be limited to not more than two target categories. The nuke/chemical target category is always **immediate.** If there is another category that has very high relative worth and is highly mobile, make it **immediate.**

Most targets will fit in the as acquired category. In general, any target that is worth shooting and is expected to move will be classified **as acquired.** Targets that are worth shooting and are not expected to move may be classified **as acquired** or **plan.**

> **NOTE:** The term expected to move means that the target is likely to move before fires on the target are planned and executed. The exact length of this time will depend on both technical considerations (how long It will take to compute the fire plan, move fire units into position, break out ammunition and so forth) and operational considerations (for instance, SEAD plans will not be fired until nearly the time of the air strike, preparations will not be fired until nearly H-hour, and so forth).

The **plan** attack guidance should apply to two different types of-target categories:

- Target categories that, in the current situation, are not worth shooting at this time.
- Targets that may be used in future schedules of fire (such as preparations, counterpreparations, and programs) and are not likely to move before the schedule of fires is expected to be shot.

Determine any exceptions to the I, A, and P guidelines given above and adjust guidance accordingly. For example, The guidance might be "Don't shoot C^3 targets because we are getting good intel from

radio intercepts." This guidance would make C^3 a **plan** target set instead of **as acquired**

Restrictions and/or Remarks

In the RESTRICTIONS column, identify targets that are to be coordinated with or engaged solely by EW assets. Coordinate with the G3 EW officer for guidance on what can be effectively jammed and how jamming can be coordinated.

Identify targets that are well suited for engagement with nuclear and/or chemical weapons. Note which targets should go in the nuclear development file.

Identify targets that should be nominated for attack by CAS or Army aviation assets.

Identify any special ammunition or weapon systems considerations.

Identify specific targets within a category that are much more important than the category as a whole. For instance, if a maneuver commander is particularly concerned about ATGMs, maneuver as a whole might be a category to suppress. To indicate this, include the remark *Neutralize ATGMs.*

Dissemination of Matrix

Finalize the attack guidance matrix as shown below. Disseminate the attack guidance matrix so that all fire support agencies have it.

EXAMPLE ATTACK GUIDANCE MATRIX

CATEGORY	HIGH PAYOFF	WHEN	HOW	RESTRICTIONS
1 (C^3)	25, 29, 30, 34	I	N/EW	Coordinate attack with EW
2 (FS)	1, 2, 5, 18	I	N	Plan all calibers greater than 122 mm
3 (MAN)	46, 48, 50, 51	I	10%	
4 (ADA)	63, 64	A	N	
5 (ENGR)	69, 70	P	N	Not high-payoff target
6 (RSTA)	14, 16, 17, 84, 85, 107	A	D	Not high-payoff target
7 (REC)	91, 92	A	S/EW	Coordinate attack with EW
8 (N/CH)	77, 79	P	D	Forward targets to division
9 (POL)	115, 116	A	D	
10 (AMMO)	120, 121	A	N	
11 (MAINT)		A	S	
12 (LIFT)		A	S	
13 (LOC)	118	A	N	Not high-payoff target

Preparation for Future Operations

To prepare TVA for future operations, identify enemy fallback options. As time permits, perform TVA through the identification of high-payoff targets for each enemy fallback option. Coordinate with G3 plans to update and modify TVA for future operations.

Intearation of TVA Process into Fire Support Planning

In the conduct of combat operations, the TVA process described in this appendix must be modified at brigade level according to the time and resources available for planning. This is because TVA is not conducted formally below brigade level. Targeting at the brigade is focused on close operations, the nature and posture of the opposing force, and the resources available to the commander. Targets of interest are primarily tactical CPs, small combat and combat service support units, and possibly key terrain of immediate concern to the brigade.

If the brigade is deployed as part of a division, the brigade S2 should receive the results of a detailed IPB from the division G2. The brigade S2 will further develop the IPB within the brigade zone in an attempt to identify likely enemy avenues of approach and possible enemy courses of action. The targeting officer, with the maneuver brigade S2, uses target spread sheets (if available) to identify potential high-value targets. Spread sheets are based on the size of the opposing enemy force and a possible enemy course of action. A list of these targets prioritized on the basis of their relative worth to the enemy commander becomes the high-value target list associated with that particular enemy course of action.

As the staff prepares their estimates, staff members consider the high-value target list in determining the friendly course of action. During the staff war-gaming process, the targeting officer (in conjunction with the S2, S3, and FSO) develops the high-value target list into a high-payoff target list based on the targets that are of concern to the friendly maneuver commander and that will facilitate the success of the friendly course of action. The high-payoff target list is sent to the maneuver commander for his approval and to allow him to modify the list as he deems necessary.

The targeting officer recommends attack guidance from the high-payoff target list to describe how targets are to be attacked (effects criteria), when they are to be engaged (prioritization in the engagement of specific target types), and any restrictions that may apply in terms of target dwell time, target location error, or munition type. Some target categories may be restricted from engagement, because of the limited availability of assets or because the target can be exploited for SIGINT information. Attack guidance is disseminated to all fire support attack and acquisition agencies available to the brigade.

The targeting officer recommends changes to the attack guidance based on events that occur during the battle and on target damage assessment (TDA) reports.

APPENDIX L

ENVIRONMENTAL AND TERRAIN CONSIDERATIONS FOR FIRE SUPPORT

Mountain Operations

Characteristics

In combat operations, mountains generally are characterized by rugged, compartmented terrain; steep slopes; and few natural or man-made lines of communication. The weather spans the entire spectrum from extreme cold, with ice and snow, to extreme heat in some areas. Vegetation can vary from dense jungle to barren waste. Variability of weather over short periods of time and of vegetation from area to area significantly influences both maneuver and fire support operations.

Munitions

Munitions effects are affected by the terrain. IPB helps determine where and what munitions- are most effective. Considerations of munitions employment and effect are discussed below.

In snow –

- FASCAM may settle into the snow off-vertical. At temperatures lower than -15° C, very little settling occurs. Settling may cause the antihandling devices to prematurely detonate the munitions.
- VT and time fuzes are most effective in most cases.
- HE-PD, HE-delay, and ICM are ineffective because at least 40 percent of the effects are muted by the snow.
- The phosphorus in WP can burn undetected in snow for up to 4 days.

In rocky terrain –

- HE-PD is very effective because it produces extra fragmentation from splintering rocks.
- VT and time fuzes are very effective.
- ICM are effective; however, when fired into forested areas, they can hang up in trees.
- FASCAM is effective to deny the enemy the use of narrow defiles, valleys, roads, and usable terrain.

Copperhead is effective and should be planned along roads, defiles, and valleys.

When smoke and illumination are used –

- Swirling winds make smoke employment very difficult to adjust and maintain.
- Close coordination is required with adjacent elements to ensure that their vision is not obscured or that they are not highlighted.

Mortars are ideal because of their high-angle fires, They can deliver fires on reverse slopes and over intermediate crests.

Airbursts on reverse slopes are extremely effective.

Target Acquisition and Observation

The following are considerations when forward observers are involved in mountain operations:

- The FOs should be positioned on high ground and spread out to overcome terrain masks and compartments.

- The FOs may need mountaineering equipment to get to the best positions, or they-may be airlifted.
- Terrain sketches and visibility diagrams are essential to deliver fast, accurate fires and to identify blind spots.
- Sound-on-sound adjustments are difficult because of winds; echoes caused by terrain masking; and snow and jungle, which muffle sounds.
- Heavy fogs or low clouds may obscure observation.
- Observers looking up tend to underestimate range, while observers looking down tend to overestimate range.
- Laser range finders and night vision devices must be used.
- Sunglasses may be required if terrain is covered with snow.

Aerial observers –

- Are very effective to observe beyond terrain masks, in deep defilade, and on reverse slopes.
- Complement the FOs.
- Can be used to detect deep targets
- May be confined to valleys and lower elevations because thin air at high elevations makes flying difficult.

Radar considerations in mountain operations are as follows:

- Because of the requirement to fire high angle, radars can detect enemy indirect fire assets.
- Radars should concentrate on terrain that can be occupied by artillery and mortars (as determined by IPB).
- Terrain masks can degrade the effective range of the radar.
- Additional use of ground surveillance radars and remote sensors may be required.
- More extensive use of shelling reports (SHELREPs) is required.

Targeting

The S2's IPB should identify the following:

- Routes that can be used by the enemy to attack, withdraw, and resupply.
- Likely position areas for indirect fire assets, command and control elements, CSS assets, and observation posts.
- Terrain that is subject to snowslides, rock slides, or avalanches. These may deny the enemy use of roads and trails and may destroy elements in defilade.

Positioning

Usually, position areas for mortars and artillery are limited and access thereto may be restricted. Because of the need to fire high angle, it is important that the mortars and artillery be positioned in defilade to increase their survivability. Positioning considerations are as follows:

- Helicopters should be used to airlift artillery into position areas. These air assets also may be required to provide ammunition resupply.
- Helicopters may be useful in performing survey by use of PADS.
- positioning along dry river beds is hazardous because of the danger of flash flooding.
- Towns and cities usually have flat areas (school yards, parks, stadiums, and so forth) that can accommodate firing batteries. However, these towns and cities are often enemy objectives and may be targeted.
- Most mountainous flat land is farmland and is difficult for towed artillery to negotiate from spring to fall. However, in winter, if the

ground is frozen, farmland provides good firing positions for mortars and artillery.

Close Air Support

Because the terrain forces the enemy to concentrate his forces along roads, valleys, reverse slopes, and deep defilades, CAS is very effective. However, the terrain also restricts the attack direction of the CAS strikes. The enemy also conducts an IPB to determine the likely direction of the CAS strikes and will weight his air defenses along those routes. The FSO must aggressively identify the enemy air defense systems and target them to enhance the survivability of the CAS assets.

Communications

Communications considerations in mountain operations are as follows:

Ž Place antennas on sides of hills or mountains.

Ž Make maximum use of directional antennas.

Ž Plan to use retransmission capabilities.

Jungle Operations

Characteristics

Usually, jungle operations are carried out by light forces. Fire support may be limited to indirect fires and air support. Because small-unit operations are commonplace, greater challenges accrue to the FSCOORDs at company and battalion levels.

Munitions

In jungle terrain, most contact with the enemy is at extremely close range. If the friendly force has a substantial advantage in fire support, the enemy will most likely try to come in as close as possible and maintain that close contact. Thus, the friendly force commander cannot employ his fire support advantage without inflicting casualties on his own troops. Therefore, a knowledge of the type of munitions best suited for the terrain and how to employ them is vital. For example, in triple-canopy jungle –

Ž HE-delay penetrates the treetops and splinters the trees, creating additional fragmentation (splintering effect).

Ž Smoke has limited effectiveness.

Ž WP is effective as a marking round and in initial adjustments.

Target Acquisition and Observation

The triple-canopy jungle makes observation beyond 25 to 50 meters very difficult. The jungle also makes map reading, self-location, target location, and friendly unit location very difficult.

Forward Observers. Experience from World War II (WWII) and Vietnam showed that FOs must be able to adjust mortar and FA fire by sound because often they cannot see the rounds to adjust them. This sound adjustment is very difficult and requires experience. Greater accuracy can result from the recommended adjustments of two or more FOs. The battery FDC can help by amounting SPLASH to let the FO know when the round should impact. The FO then counts the seconds until he hears the round detonate. Multiplying the seconds by the speed of sound, the FO can estimate the range to impact. The speed of sound is approximately 350 meters per second. The speed of sound varies according to temperature, wind speed and direction, relative humidity, and air density; but 350 meters per second should be used as a start point.

The FO must determine his location and ensure that the battery FDC has it plotted. The FO then determines the direction to the target and selects a target grid 1,000 meters along the direction to the target. He sends a

call for fire to the FDC using that direction and target grid. He adds 1,000 meters to his position location for safety.

When the initial adjusting round impacts, the FO uses that impact as a known point. He determines the direction to the round, measures the difference between the direction to the target and the impact of the initial round, computes the lateral correction, and makes a range correction, if necessary. Using the shift from a known point call for fire, he sends the data to the FDC, reporting the new direction.

If the FO's position location is way off, the initial round will be way off too. The FO can use the initial round to redetermine his location. For example, the FO in his call for fire told the FDC to fire grid 123456, direction 0200. The round impact is nowhere near the target. The FO then determines the direction and range to the burst. He plots a back-azimuth from the burst and estimates range along that direction to replot his position. Then, using his new position location, he reinitiates the mission.

Vietnam and WWII also showed that the first round in adjustment should be WP. Because the FO is not sure of his own location or those of other friendly elements, WP was usually fired first to avoid inflicting casualties on friendly personnel. (Using a 200-meter height of burst can help the FO see the first round.)

Creeping fires were also used extensively in Vietnam and WWII. The FO adds 300 to 400 meters to his target location in case his own position location is wrong. Then he makes corrections of no more than 50 meters until the fires are on target. In Vietnam, this process sometimes started with an aerial observer and was taken over by the ground observer once he was able to see the rounds. The aerial observer was often required to relay fire requests from the ground because the terrain severely limited the ranges of radio communications. The creeping method of adjustment is used exclusively during danger close missions. The observer makes range changes by creeping the rounds to the target using corrections of 100 meters or less. The observer must know where all friendly troops are to avoid endangering them. All weapons that will fire for effect are used in adjustment. For battalion missions, batteries should be adjusted individually.

To help the FO determine his own location, marking rounds can be fired. The use of marking rounds also helps ensure that the FDC knows what area the friendly unit is in, which ensures more responsive fires. A marking round is usually WP fired 300 to 400 meters forward of friendly units. The FDC plots a target, fires a WP round, and sends the grid of the WP impact to the FO. The FO then has a known position on which to orient.

Because of the close combat, laser range finders may not be of great use; however, night vision devices are extremely critical.

Aerial Observers. Aerial observers could be important in jungle warfare. They can detect enemy movements that ground forces have no way of seeing. They can act in concert with ground observers to deliver accurate fires on enemy elements in close contact with friendly forces. Also, the aerial observers can relay calls for fire from ground elements to the FDC.

Aerial observers could help direct CAS assets against enemy targets. Because ground observers cannot see the whole battlefield, the aerial observer marks targets for the CAS sortie (by use of flares, WP, or smoke).

Field Artillery Radars. Radars are extremely effective in the jungle, since most indirect fires are high-angle fires.

In a guerrilla war, most targets detected by the radars are fleeting in nature (shoot and move) and the radar must be tied in with an indirect fire support asset to ensure quick counterfires. Also, most enemy indirect fires will be directed against friendly unit positions; therefore, the radars should be oriented so as to locate those enemy fires.

Ground surveillance radars and remote sensors must be used.

SHELREPs may not be as effective because the enemy shoots and moves quickly.

Targeting

Targeting is very difficult because of the triple canopy and the fluid nature of the conflict. Experience with the particular enemy will provide some targets indicated by his past performance and techniques.

Targets should be planned –

Ž To support the scheme of maneuver.

Ž Along roads and trails.

Ž At likely ambush sites.

Ž Around clearings.

Ž At river or stream crossings.

Ž Around built-up areas.

Also, isolated units will prepare 360-degree defenses. FPFs must be planned to support that defensive posture.

Consider recommending to the DS battalion commander a munition-specific required supply rate (RSR) to support the operation.

Positioning

Often, firing positions for field artillery and mortars are very limited; and some positions may be inaccessible by roads. It is likely that positions will be clear areas in the jungle and the artillery will be airlifted into those Positions. Firing positions should be selected to ensure that the artillery can continually support the maneuver forces. Several air movements a day may be required. Also, each position must have 6,400-mil firing capability. Remember that a position occupied too long is subject to attack by indirect fire and ground assets. Also, the enemy will quickly determine the range of weapons in that position and stay out of their range. Because of inaccessibility by roads, helicopter survey (PADS) offers rapid and accurate survey for firing elements in this environment.

Close Air Support

Close air support can be effective in the jungle but hard to control because of the inability of the pilot to see the friendly ground elements. Also, because the combat is usually of such close nature, the delivery of the munitions must be closely controlled to avoid injuring friendly personnel. At night, this problem is severely aggravated.

Pyrotechnics should be used to mark friendly forces and the target area. An aerial observer, if available, should control the air strike. It is extremely important that the method used for this marking not be duplicated by the enemy. Strict security is required.

Heavy bombs (2,000 to 3,000 pounds) with fuze extenders can clear away the jungle canopy.

Many Air Force cluster munitions are designed to penetrate jungle canopy. Depending on the type and quantity delivered, bomblets are effective against area targets consisting of personnel, light materiel, and armor.

Communications

The following are communications considerations for jungle operations:

- Remember that communications in a triple-canopy jungle are severely degraded.
- Elevate antennas above the canopy, when possible.
- Use aerial observers or airborne command and control platforms as relay stations.
- Consider using directional antennas.
- Plan to use retrans assets.

Desert Operations

Characteristics

The three types of desert terrain are mountainous, rocky plateau, and sandy or dune type. Fire support planning and considerations vary significantly between operations in each type of desert terrain. Often, those considerations resemble those for other environments, such as arctic and mountain. The type of terrain in the area of operations must be analyzed before effective fire support planning can be performed. Tactics, techniques, and employment of munitions are greatly affected by the different terrain characteristics. Only operations in restricted-type desert terrain, which may be found in desert mountainous areas or rocky plateaus, are suitable for employment of light forces. Restricted desert terrain can offer significant disadvantages for movement and emplacement of indirect fire systems, depending on the trafficability of the surrounding valley areas. Against a mechanized enemy in unrestricted desert terrain, light infantry should be used in combination with heavy forces and appropriate supporting fire support assets. In open and restricted desert warfare, light forces must be augmented with dedicated long-range artillery assets. This is because engagements are fought at extended distances and positioning and resupply activities are difficult.

Munitions

Mountain Deserts. Munitions effectiveness in mountain deserts is the same as in any mountainous region except that the considerations involving snow usually do not apply. The following are added considerations:

- HE-PD is very effective because of the extra fragmentation created by splintering rocks.
- ICM are very effective.
- FASCAM is very effective and should be used to deny the enemy the use of roads, valleys, narrow defiles, and level terrain.
- Copperhead is extremely effective.
- Smoke and illumination may be degraded by swirling winds. They must be closely coordinated with adjacent units to ensure that their vision is not obscured or they are not highlighted. Both can be used to silhouette the enemy.
- Airbursts on reverse slopes are extremely effective.

Rocky Plateau Deserts. The following are munitions considerations in rocky plateau desert operations:

- HE-PD is extremely effective. It creates extra fragmentation by splintering rocks.
- VT and time fuzes are effective.
- ICM are very effective.
- FASCAM is very effective and should be employed with the natural terrain to force the enemy into umavigable terrain.
- Copperhead can be very effective.
- Smoke and illumination may be degraded by high winds but may be used to silhouette the enemy.

Sandy or Dune Deserts. In sandy or dune deserts, the following are munitions considerations:

Ž HE with PD or delay fuze is smothered by deep sand, which makes it ineffective.

Ž VT and time fuzes are very effective.

Ž ICM and FASCAM are smothered by deep sand, which makes them ineffective.

Ž Copperhead is very effective.

Smoke and illumination are effective and can be used to silhouette the enemy.

Target Acquisition and Observation

Forward Observers. Determining location is often very difficult in rocky plateau and sandy or dune deserts. Maps are often inaccurate, dunes shift, and heat waves hamper distance estimations. The Israelis help forward elements determine their own location by bringing in survey to two or more points; putting searchlights on those points; and, upon request, shooting a beam of light into the air. The FO can then shoot an azimuth to the beam of light and perform a map resection. The beam of light must project straight up, and the observer must shoot an azimuth at the lowest visible point on the beam. With this system, pyrotechnics may also be shot into the air. The use of marking rounds as discussed for jungle operations also can help forward units self-locate. Use of pace count or odometer readings is essential for day and night navigation. Resection from available key terrain features in desolate regions may be the best of a few options for self-location.

Laser range finders must be used, especially when heat waves degrade distance estimating by conventional means.

FOs can detect targets by observing dust clouds created by moving enemy forces. Dust clouds created by impacting rounds sometimes make subsequent adjustments difficult. Usually, adjustment of fires by an FO is enhanced when the initial round impacts beyond the target.

The FO should consider using smoke behind the enemy to silhouette him. The sameness of colors in the desert makes specific targets hard to spot. At night, illumination burning on the ground behind the enemy has the same effect.

In WWII, the British and the Germans built mobile elevated platforms to elevate the FO to better observe the battlefield.

Laser range finders may need to be adjusted several times a day because of temperature changes.

COLTS should be employed to engage the enemy at maximum distances.

Most open desert terrain allows a faster or an unimpeded approach and more maneuver space for mechanized forces. Use of trigger points and long-range observation capabilities is critical for effective engagement with available fire support systems. Fast-moving formations are best engaged with TACAIR assets and attack helicopters.

Increased equipment failure can be expected as a result of heat, sand, and dust. Especially susceptible are radios, Vinson equipment, and other electronic equipment.

Aerial Observers. Aerial platforms for target acquisition, coordination of fire support, and adjustment of fires are critical in flat terrain or in a desert of rolling sand dunes. The difficulty of aerial navigation in flat desert terrain is a disadvantage that must be planned for.

The absence of terrain features in an open desert makes aerial platforms more vulnerable to enemy air defense.

Because of the ability to see great distances and the featureless terrain of an open desert, positive identification of friendly troops requires special measures. More than usual coordination may be required, with prearranged signals and procedures established for friendly force locations. Maintaining continuous communications on fire support and/or command nets with aviation elements operating in sector is even more critical.

Radars. Radars are highly effective in the desert. However, they may have to be repositioned more often because the flat terrain does not provide adequate screening crests.

Sandy or dune deserts do not provide a stable base for mortars and tube artillery. Therefore, the radars should be oriented toward areas of stable surface, if there are any.

Targeting

A thorough IPB must be conducted –

- To identify passable terrain for wheeled and tracked vehicles.
- To identify likely mortar and artillery positions.
- To assess the impact of wadis, gulches, and other significant terrain on friendly and enemy mobility.
- To identify likely enemy forward observation positions.

Targets should be planned as follows:

- ICM and FASCAM for roads in restricted terrain.
- FASCAM to deny the enemy navigable terrain and to ty to force him into wadis and gulches.
- VT on reverse slopes.
- VT and time fuzes on targets in deep, sandy deserts.
- Smoke during the day and ground-burning illumination at night to silhouette the enemy.
- Smoke and WP against likely enemy OPs.
- HE-PD on targets in rocky terrain.
- ATGM systems and enemy air defense systems as priority targets.
- Targets identified by dust clouds.

Positioning

Common Grid. Terrain association techniques (map spots) may be inadequate for positioning indirect fire systems.

Concealment. The artillery and mortars should move under cover of darkness, because enemy observers can detect the movement or at least the dust from the movement of vehicles.

Resupply should also be conducted at night, preferably en route between positions.

Emplacement in wadis and gulches offers the best concealment. However, it entails some degree of risk as the result of unexpected flash flooding (size of wadis is relative to degree of risk). Appropriate color of equipment and camouflage systems are essential for effective concealment of firing positions. Sand painting of vehicles and equipment is an alternative.

Movement. Trafficability through the dunes and the absence of roads in the direction of movement slow most moves. Wheeled vehicles have more tire failures than usual in rocky terrain.

During air movement of indirect fire assets, use of extended slings to minimize hovering may be required to reduce brown-out from dusty conditions. Positioning on rocky soil away from roads reduces the dust hazard during air assault operations. Use of helicopter on-board navigational systems (Doppler) can help in locating gun positions. However, they must be updated with accurate grid locations at the PZ.

Position Area Selection. Sandy deserts usually are a problem for mortars and towed artillery. Solid ground to secure baseplates for the M102 howitzer may be rare in certain areas.

Close Air Support

Air support aircraft may be more vulnerable because of the lack of covered approaches. However, the greater visibility common in most deserts allows target engagement from better standoff ranges.

Panels or other visual or electronic signatures are required to help the pilot differentiate between friend and foe.

SEAD is more important because of the air defense advantage.

Detailed planning for CAS is important because of wide dispersion of units.

Night Operations

Reasons for Night Combat

Some specific reasons for night combat are –

- To achieve surprise and to avoid heavy losses which might be incurred in daylight operations over the same terrain.
- To compensate for advantages held by an enemy with superior forces or air superiority.
- To counter the enemy night operations.
- To retain the initiative or freedom of action.
- To exploit the technological advantage of our forces at night over a less sophisticated enemy.

Maneuver

Movement and direct fire are the two areas most affected by the reduced visibility inherent in night operations.

Movement. Movement and land navigation are much more difficult at night. This is largely because of problems with terrain recognition. Maintaining direction while moving is extremely difficult at night. The only sure way is by azimuth and pace count.

Direct Fire. Target acquisition and engagement ranges are limited to the capabilities of night vision devices (NVDs). Ground surveillance radars can be used for early target acquisition and for directing engagement by indirect or direct fires. Controlling the direct fires is critical at night. Control requires effective communications to ensure engagement of the correct targets.

Fire Support

The main consideration in supporting night combat with field artillery, mortars, tactical aircraft, and naval gunfire is the ability to detect the target and coordinate the attack. Several considerations are critical.

Illumination and smoke assets probably will be in short supply. If their use is critical to the success of an operation, the FSO must know the specific area in which the commander desires to use smoke and illumination and for what purpose. If inadequate amounts are on hand, action must be taken to alleviate the shortfall well in advance.

At night, the adjustment of fires without the aid of radars, artificial illumination or sound ranging is virtually impossible. Critical targets should be adjusted during daylight if possible, or target acquisition assets should be allocated for adjustment of fires.

Smoke should be planned at night to degrade enemy night vision capabilities.

The FSO plays a critical role if CAS or attack helicopters are used in night operations. These weapon platforms may not be equipped with adequate night vision equipment; their

effectiveness will depend on the ability of the force to illuminate targets. Additional coordination between the FSO, maneuver S3 or G3 air, and ALO is needed to integrate sorties and plan illumination for their use.

Night Offensive Operations

In planning a night attack the commander must decide what type of attack to conduct. His decision is based on the required fire support.

Illuminated and Nonilluminated Attacks. An illuminated attack is used when the possibility of achieving surprise is remote, when the enemy has NVDs, and where control of units overrides the need for stealth.

The nonilluminated attack is made by using stealth to achieve surprise in closing with the enemy before he discovers the attack. Even though an attack is to be nonilluminated, illumination is always planned. It is executed only on the commander's authority.

Execution of Planned Fires. Stealth and surprise may be more important to the attack objectives than the effects expected by preparation fires. Use of preparation fires alerts the enemy to the objectives of the attack and may compromise any night advantages. However, these fires should always be planned.

The nonilluminated attack with on-call fires offers a better opportunity for surprise. The commander should be prepared to switch from a nonilluminated, nonsupported attack to an illuminated and supported one. He makes this change once he decides that surprise has been lost and the use of fire support would be more advantageous.

Night Offensive Fire Support Considerations. In addition to the planning and coordination considerations for daylight offensive operations, the considerations discussed below apply.

Fires should be planned to disrupt or destroy enemy command and control facilities.

Prearranged visual signals such as hand-held flares can be used for initiating or canceling fires (CAS, FPF, and schedules of fire such as groups). Applicable SOI should be used.

When fires are shifted, they should be moved beyond the friendly unit limit of advance.

Illuminating fires may not be fired but should be planned. Illumination over the objective should be timed to burn out approximately 300 meters above the ground. Illumination beyond the objective should be allowed to bum on the ground to silhouette the defenders on the objective and to provide a heading reference for friendly forces. Also, illumination can be placed on several locations over a wide area to confuse the enemy as to the exact place of the attack. Once used, illumination should probably be continuous, because friendly troops will have temporarily lost their night vision.

Smoke can be used to degrade enemy NVDs. It should be placed in front of the enemy. Smoke also can be used when key terrain is to be bypassed. However, smoke on the objective during the final assault conceals enemy locations. Only thermal devices can see through smoke.

Fire support coordinating measures should be placed on identifiable terrain. Permissive measures should be placed well in front of friendly forces. Restrictive measures should be used minimally and must provide the safety required yet not complicate clearing fires at night. These measures must be disseminated and understood by all friendly elements.

Suppressive fires are planned for the final assault to the objective.

Fires are planned beyond the limit of advance to stop enemy force retreat or reinforcement.

Night Defensive Operations

The effective employment of fire support is critical to the successful night defense. As with the offense, daylight planning and coordination considerations are used in addition to considerations for night defense, which are as follows:

- On-call fires should be used to engage enemy forces as they attack or probe the defense.
- Use of illumination must be planned. The approving authority for defensive illumination should be retained by the appropriate maneuver commander. This is to preclude accidental illumination of recon patrols, engineer activities, and so forth. When used, illumination should be dropped above and behind attacking forces to silhouette them.
- If possible, fires, especially FPFs, should be adjusted during daylight.
- Smoke may be used to slow, confuse, and disorient attacking forces.
- FASCAM may be planned by the engineer to separate forces, disrupt formations, and plug gaps in the defense.
- Permissive fire support measures should be planned as close to friendly troops as possible; however, measures should be placed on positively identifiable terrain.
- Restrictive measures. if required. should be planned and placed on easily identifiable terrain to provide safety to friendly elements.

Psychological Aspects of Night Operations

The psychological or mental factors that affect soldiers most during night operations are those that tend to lessen confidence, cause fear, and increase the perception of isolation.

Fear. Fear is a normal experience in battle, and night intensifies this emotion. Since there is a tendency to doubt things that cannot be seen, fear of the unknown or of an unseen enemy may increase at night.

isolation. AirLand Battle doctrine often requires units to be dispersed on the battlefield. At night, that dispersion seems even greater. At night and during periods of reduced communications, even small distances between individuals, crews, or units seem exaggerated. There is a tendency for one to think “I’m alone out here.”

Continuous Operations

Physiological aspects of continuous operations include those factors that degrade the soldier’s physical ability to function Sleep loss and fatigue induced by night operations magnify stress.

Sleep Loss

After 48 hours of sustained activity, loss of sleep becomes the most significant degrader of soldier performance on the battlefield. As sleep loss begins to accumulate, both physical and mental effects are observed in varying degrees.

Most of the following effects can occur after 24 hours without sleep:

- Tasks may be omitted as a result of a momentary lapse into sleep (falling asleep with eyes open).
- Vigilance decreases rapidly, resulting in missed critical signals.
- Ability to focus on a task for more than a brief period decreases noticeably.
- Memory becomes faulty, particularly short-term memory. This makes it difficult to learn new information, follow instructions, or remember recent decisions.
- Response to events or instructions slows. One seems to be operating in a daze.

- The ability to formulate and make sense from information becomes severely degraded. It takes longer to perform simple tasks such as encoding or decoding messages or plotting grid coordinates. Accuracy suffers.
- The ability to reason logically is degraded, which may result in snap judgments.
- Problems with communication arise. One has difficulty understanding or articulating even simple messages.
- A wide range of mood changes, characterized by depression, anger, lack of patience, and euphoria, is experienced.

Sleep loss is cumulative over time. The number of hours needed to recover is directly related to the number of hours sleep was deprived. As a rule of thumb, a minimum of 6 hours rest is required for every 24 hours without sleep.

The following are recovery and adjustment times:

- 12 hours sleep or rest before a prolonged work period.
- 12 hours sleep or rest after 36 to 48 hours acute sleep loss.
- 24 hours sleep or rest after 36 to 48 hours sleep loss with high work load (12 to 16 hours a day).
- 2 to 3 days off after 72 hours or more acute sleep loss.
- 3 to 5 days to initiate biological adaptation and return to normal day-night cycle from night shift.
- 3 to 4 weeks for full adaptation of biological rhythms to a typical work-rest schedule (as in night shift work).

Fatigue

Fatigue is the result of excessive work and sleep loss. The latent effects of fatigue may linger for about 3 days following sleep deprivation of 48 hours or more.

Military Operations on Urban Terrain

Characteristics

Because conflict on urban terrain is becoming more likely, the FSO at any level must be aware of the special considerations for fire support on urban terrain. Specific characteristics of MOUT are as follows:

- The defender has the advantage.
- Freedom to maneuver is greatly restricted.
- Visibility is reduced because of buildings.
- The attacker and the defender have considerable cover and concealment.
- Operations are normally slow and deliberate.
- Unit boundaries are much smaller.
- Small-unit operations predominate.

Munitions

The following are considerations involving the use of various munitions in urban terrain.

- Careful use of VT is required to avoid premature arming.
- Indirect fires may create unwanted rubble.
- The proximity of friendly and enemy units requires careful coordination.
- WP may create unwanted fires and smoke.
- Fuze delay should be used to penetrate fortifications.
- Illuminating rounds can be effective; however, friendly positions must remain in shadows and enemy positions must be highlighted. Tall buildings may mask the effect.

- VT and time fuzes and ICM are effective for clearing enemy positions, observers, and antennas off building tops.
- Swirling winds may degrade smoke operations.
- FASCAM may be used to impede enemy movements.

Target Acquisition and Observation

Forward Observers. The following are considerations in the employment of forward observers on urban terrain:

- Ground observation is limited because of the buildings.
- FOs may be placed on tops of buildings.
- Adjustment of fires will be difficult because buildings block the view of adjustment rounds.

Forward observers must be able to determine where the dead space is and how large it is. Dead space is the area in which indirect fires cannot fall because of buildings, and it is therefore a safe area for the enemy. For low-angle artillery. the dead space is generally five times the height of the building. For mortars and high-angle artillery, it is generally one-half the height of the building.

Aerial Observers. Aerial observers are very effective to see behind buildings immediately to the front of friendly forces. Aerial observers can also relay calls for fire when communications are degraded because of power lines or building mask.

Radars. Because most indirect fires in urban terrain will be high angle, radars will be able to locate many enemy positions. The radars must not be sited too close behind tall buildings, or they will lose some effectiveness.

Targeting

Targeting is very difficult on urban terrain. Aerial observers are extremely valuable in the targeting process. They can see deep to detect movements, rooftop positions, and fortifications. Targets should be planned on major roads, road intersections, and known or likely enemy fortifications. They should be planned on rooftops to clear away enemy FOs and communications and radar equipment. Consider employing artillery in the direct fire mode to destroy fortifications. (A 105-mm weapon firing HEP-T is very effective in MOUT.)

Positioning

Because of the predominance of concrete surfaces, finding positions for artillery and mortars on urban terrain may be difficult. The following are some positioning considerations:

- Parks, school yards, and other obvious choices for positions are obvious to the enemy also and will be targeted.
- Positions for howitzers within buildings (garages, warehouses, and so forth) provide cover and concealment but may negatively affect high-angle fires.
- Movement between positions may be hampered by street rubble.
- Commanders must have the flexibility to provide survey control by use of conventional means, as the use of PADS may be limited.
- Mortar baseplates on concrete surfaces may be stabilized by use of sandbags.

Close Air Support

The following are considerations in the use of CAS:

- Enemy fortifications should be reduced with precision guided munitions. The presence of tall buildings degrades this capability.

- Ž CAS may create unwanted rubble; therefore, consider using CAS outside the built-up area.
- Ž The presence of civilians or key facilities may limit the use of air weapons,
- Ž Limited ground observation may require that airborne FACS control strike aircraft

Communications

The following are communications considerations in MOUT:

- Ž Radio communicatons are degraded by tall buildings.
- Ž Wire should be routed through sewers and buildings for protection.
- Ž Messengers should be used.
- Ž Local civilian telephone and wire communications facilities, if available, should be used for unsecure communications.

Cold Weather Operations

Fire planning for cold weather operations is no different than that required for more temperate regions. However, limited ground mobility of artillery weapons and ammunition supply and increased time of operation must be considered by the fire support planner.

Characteristics

Extreme conditions of weather can be dramatic and can severely impact on observation, mobility, and delivery of fires. Specific weather phenomena with which the fire support personnel must be concerned are whiteout, grayout, and ice fog.

Whiteout. The observer appears to be in a uniformly white glow. Neither shadows, horizon, nor clouds are discernible, Sense of depth and orientation are lost. Only very near dark objects can be seen. Whiteouts occur over an unbroken snow cover and beneath a uniformly overcast sky. Blowing snow can cause the same effect on aerial observation.

Grayout. Grayout is similar to whiteout, except that the horizon is distinguishable under grayout conditions. It occurs over a snow-covered surface during twilight conditions or when the snow is close to the horizon. There is an overall grayness to the surroundings; and when the sky is overcast with dense clouds, there is an absence of shadows, which results in a loss of depth perception.

Ice Fog. This is common around inhabited areas during cold weather below 35° F. Water vapor created by humans and by vehicle exhausts may appear around soldier and equipment concentrations. Ice fog obscures vision and discloses locations by presenting a visible cloud to the enemy. Artillery batteries may create ice fog when firing.

Munitions

The following are considerations in the employment of various munitions in cold weather operations:

- Ž Make maximum use of airburst munitions.
- Ž HE-PD, HE-delay, ICM, and FASCAM are ineffective in deep snow and unfrozen muskeg. At least 40 percent of the blast from these munitions is smothered by the snow.
- Ž Smoke (HC) is not effective. This is the result of canisters being smothered in the deep snow.
- Ž WP is effective; however, phosphorus may burn undetected in the snow for up to 3 to 4 days and may be a hazard to friendly troops subsequently moving through the area.
- Ž Overall, VT is a good fuze for cold weather operations. However, snow and ice may cause it to detonate prematurely. Also, extreme cold causes a higher number of duds among VT fuzes. The new improved VT fuze has reduced this problem.

Ž Extreme cold weather will affect the range of weapons.

Ž Low temperature may cause illuminating rounds to malfunction as the result of freezing the parachute and its components.

Target Acquisition and Observation

Forward Observers. The following are considerations in FO employment in cold weather operations:

Ž Forward observers should be equipped with snowshoes or skis to allow them to move quickly.

Ž Extreme cold requires that observers in static positions be relieved often.

Ž Visibility diagrams may have to be upgraded because drifting snow changes visibility.

Ž Bright sunlight reflecting off a snow-covered landscape causes snow blindness. Amber filters on binoculars and observation devices reduce the incidence of snow blindness.

Ž Ground bursts may be difficult to observe because of deep snow.

Aerial Observers. Aerial observers are valuable because they can see deep and are not as prone to disorientation as are ground observers. However, weather conditions may reduce the availability of aircraft.

Radars. The following should be considered when radars are used in cold weather operations:

Ž Extremely cold weather may degrade their operations.

Ž Ground surveillance radars are effective.

Ž Remote sensors are not effective when used in deep snow.

Targeting

Because of terrain and weather phenomena, target detection is difficult. However, ice fogs and snow clouds created by moving enemy formations will reveal targets. Also, tracks in the snow may indicate enemy positions.

Close Air Support

The following are considerations in the use of CAS in cold weather operations:

Ž Frequent poor weather reduces the availability of CAS.

Ž The sameness of the terrain makes the marking of targets critical.

Ž Panels or pyrotechnics must be used to indicate friendly locations.

Communications

Effective communications are hampered by –

Ž Electronic interference.

Ž Weakened batteries. Conventional dry-cell batteries are 40 percent effective below 0° F, 20 percent effective below -10° F, and 8 percent effective below -30° F. A similar problem exists for nickel-cadmium (NICAD) and lithium batteries.

Ž Frost from human respiration forms in the mouthpiece. Cover it with cloth or a sock.

Survey

Extreme cold in arctic and subarctic regions adversely affects survey equipment operability. Accuracies may be degraded and impact on transfer data. massed fire, and unobserved fire.

Field Artillery Movement

The following must be considered in FA movement in cold weather operations:

- Consider route reconnaissance by both ground and air.
- Ice thickness and load-bearing capacity must always be determined before the FA crosses frozen lakes and rivers.
- A vehicle may be required to position artillery weapons used in air assault operations.
- Maximum use of aerial resupply should be planned.

APPENDIX M

REPRODUCIBLE FORMS AND TEMPLATE PATTERNS

DA Forms

Reproducible copies of the following forms are provided for local reproduction:

• DA Form 4655-R, Target List Work Sheet.

• DA Form 4656-R, Scheduling Work Sheet.

Ž DA Form 5032-R, Field Artillery Delivered Minefield Planning Sheet.

• DA Form 5368-R, Quick Fire Plan.

Template Patterns

Patterns for the Copperhead Coverage Template and the Field Artillyer Mine Safety Template are printed here with special care to maintain tolerances for use with 1:50,000-scale maps. **Photocopying these template patterns introduces errors** which would make the templates **unsatisfactory** for use. However, local Training Aids Support Centers (TASCs) may use the printed copies as blueprints to locally fabricate the templates for unit use. Before their use, all locally fabricated templates must be checked against 1:50,000-scale maps for accuracy.

TARGET LIST WORK SHEET

For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC.

SHEET _____ OF _____

LINE NO	TARGET NO *a*	DESCRIPTION *b*	LOCATION *c*	ALTITUDE *d*	ATTITUDE *e*	SIZE		SOURCE ACCURACY *h*	REMARKS *i*					
						LENGTH *f*	WIDTH *g*							
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

DA Form 4655-R, Jan 83 replaces DA Form 4655, Oct 77, which is obsolete.

( ) **SCHEDULING WORK SHEET**

For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC.

SHEET_____ OF _____

LINE NO	ORGANIZATION AND CALIBER	FIRING UNITS																REMARKS

DA Form 4656-R, Jan 83 replaces DA Form 4656, Oct 77, which is obsolete.

FIELD ARTILLERY DELIVERED MINEFIELD PLANNING SHEET

For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC.

SECTION A-MINEFIELD DATA

1 TARGET NUMBER	2 PRIORITY	3 REQUESTER
4 MINEFIELD END POINTS (COORDINATES) FROM	TO	
5 MINEFIELD DEPTH	6 MINEFIELD WIDTH	
7 ADAM (APERS) DENSITY	8 RAAMS (AT) DENSITY	
9 SELF DESTRUCT TIME SHORT ☐ LONG ☐	10 SCHEDULED MINEFIELD _____ HRS _____ MIN ON CALL ☐	
11 CAUTION NLT EMPLACEMENT TIME	12 APPROVAL AUTHORITY	13 DATE TIME GROUP (DTG)
14 REMARKS		

SECTION B-G3/S3/ENGR

15 DTG RECEIVED	16 DTG SAFETY ZONE DISSEMINATED
17 REMARKS	

SECTION C-FSE/FSO

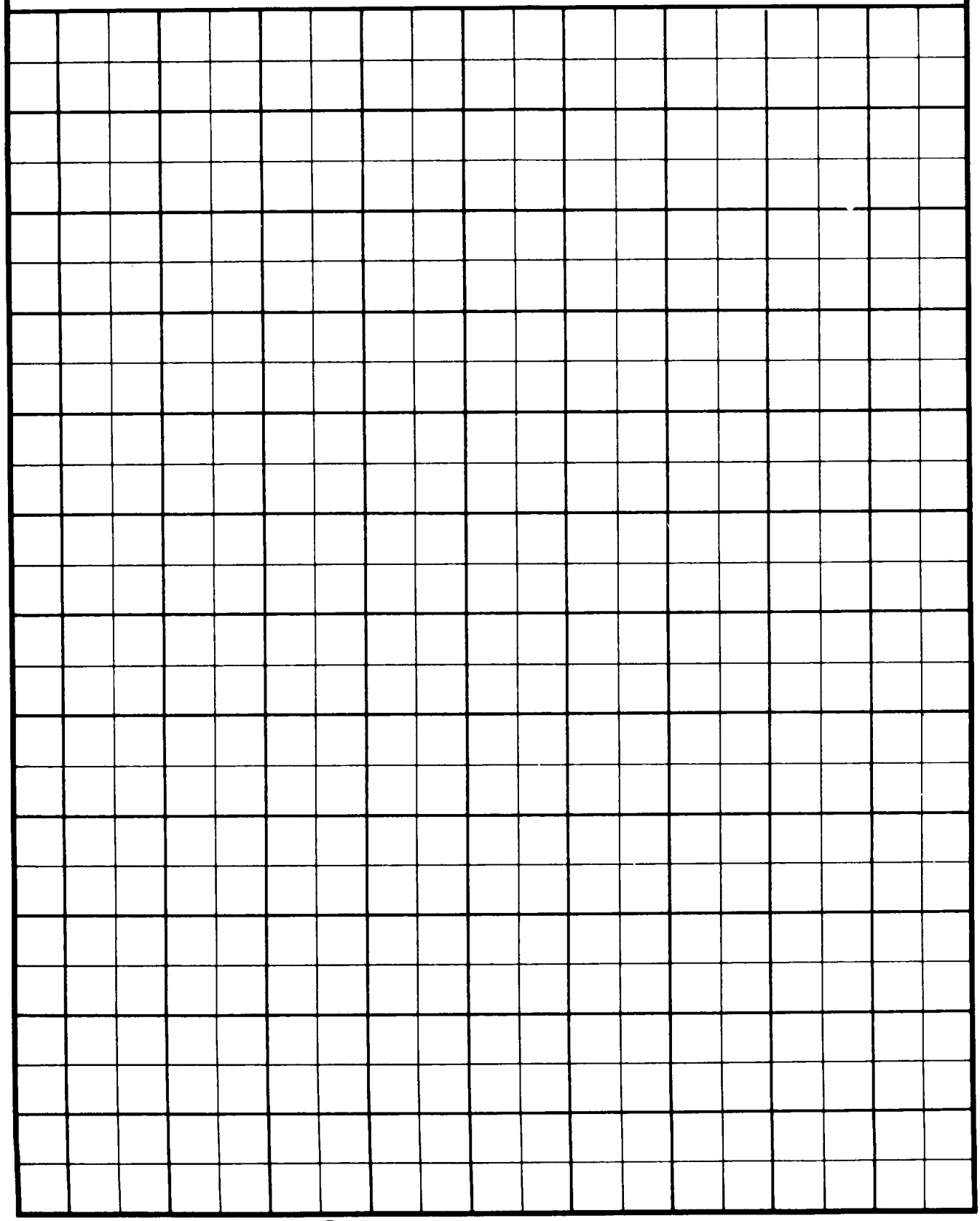
18 DTG TO UNIT	19 DTG FROM UNIT	20 DTG TO G3 S3 ENGR
21 REMARKS		

SECTION D-FDC DATA

22 TARGET NUMBER	23 FIRING UNIT	24 RANGE TO MINEFIELD CENTER
25 TRAJECTORY ADAM ☐ HIGH ☐ LOW RAAMS ☐ HIGH ☐ LOW	26 DELIVERY TECHNIQUE MET · VE TRANSFER ☐ OBSERVER ADJUST ☐	
27 AIMPOINT COORDINATE(S) (LEFT AND RIGHT OR SINGLE) ADAM FROM _____ TO _____ RAAMS FROM _____ TO _____		
28 DTG MISSION COMPLETED		
29 REMARKS		

DA Form 5032-R, Jan 82

SECTION E-MINEFIELD SKETCH WORK SHEET (SCALE 1:50,000)



REVERSE OF DA FORM 5032-R

QUICK FIRE PLAN

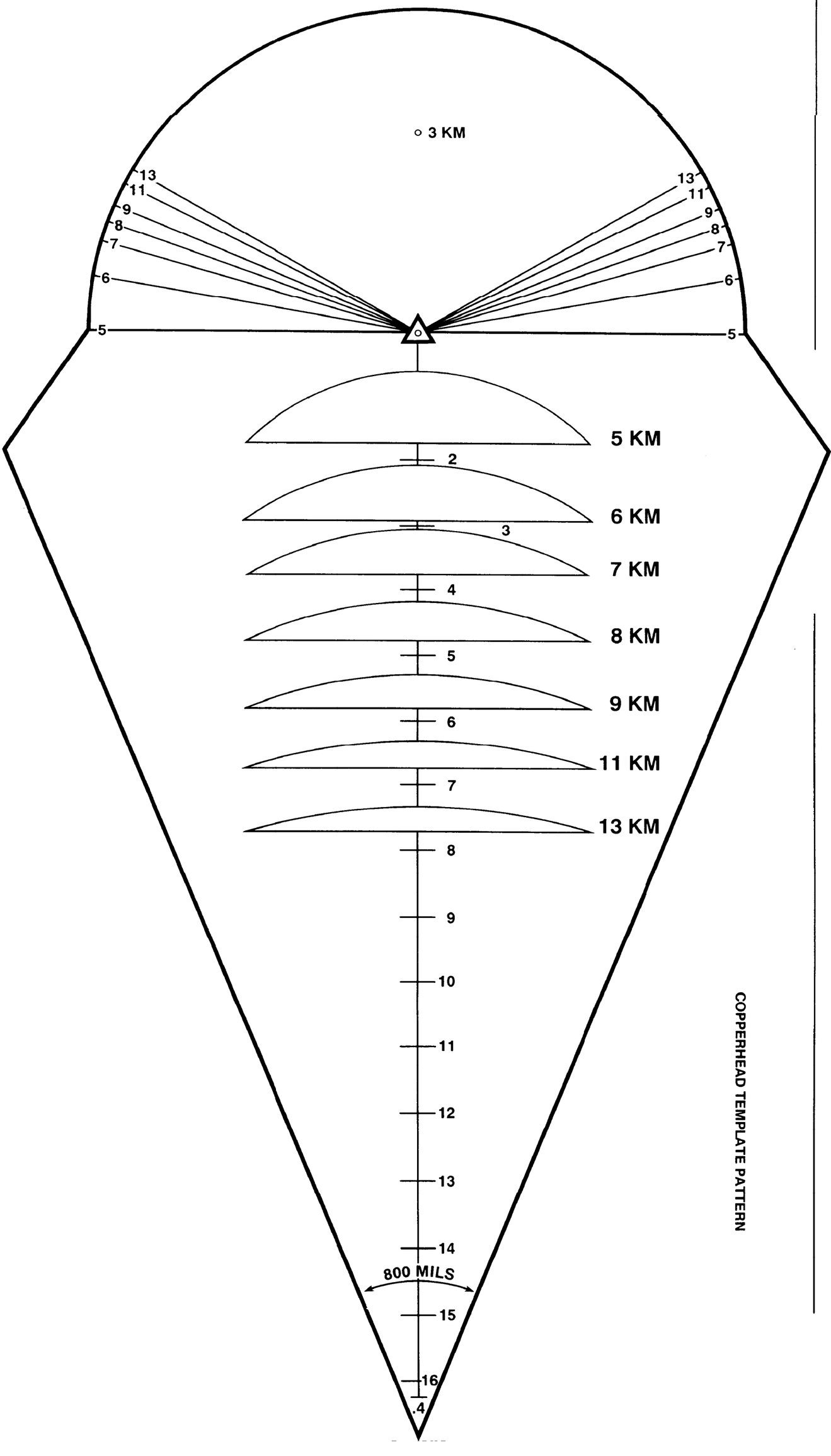
For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC.

FIRE PLAN	SUPPORTING	ORIGINATOR	MODIFICATIONS BY
H-HOUR	SHEET	OF	DATE-TIME GROUP

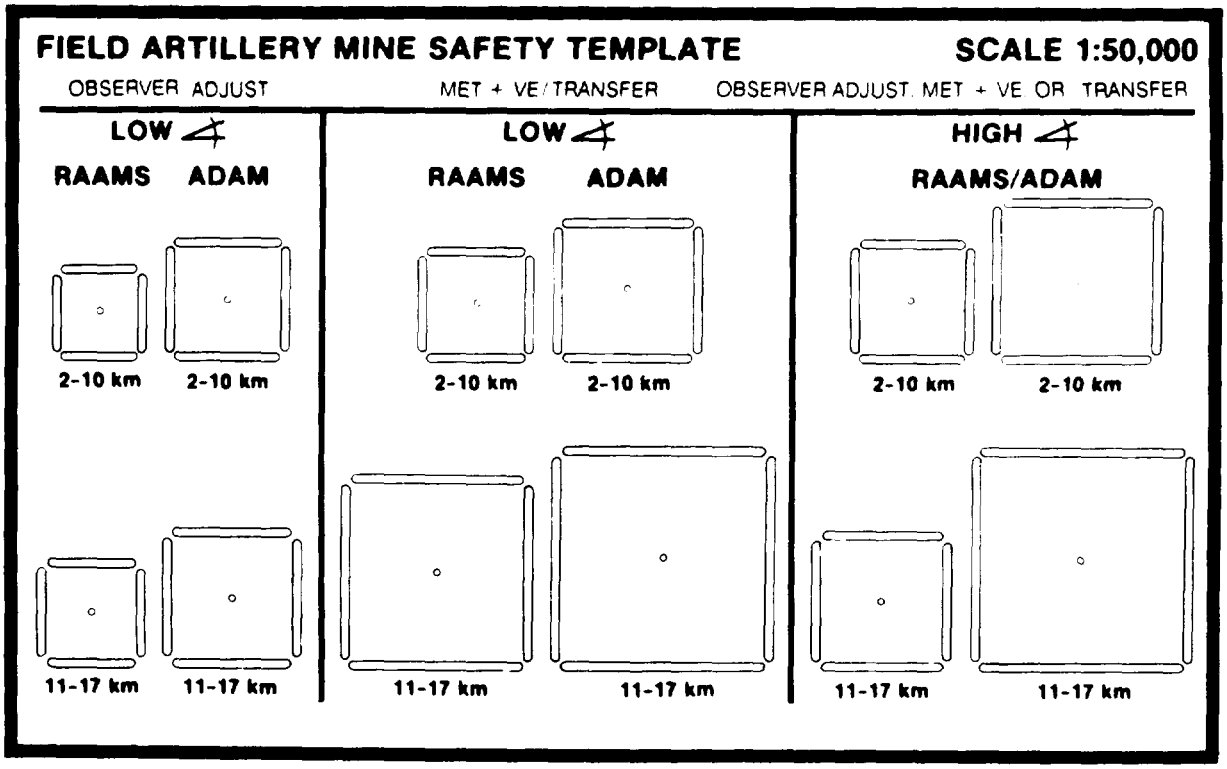
TARGET INFORMATION

LINE	TARGET NUMBER (a)	DESCRIPTION (b)	LOCATION (c)	ALTITUDE (d)	REMARKS (e)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

DA Form 5368-R Dec 84



COPPERHEAD TEMPLATE PATTERN


FIELD ARTILLERY MINE SAFETY TEMPLATE
SCALE 1:50,000
OBSERVER ADJUST
MET + VE / TRANSFER
OBSERVER ADJUST. MET + VE OR TRANSFER
LOW
RAAMS
ADAM
2-10 km
2-10 km
11-17 km
11-17 km
LOW
RAAMS
ADAM
2-10 km
2-10 km
11-17 km
11-17 km
HIGH
RAAMS/ADAM
2-10 km
2-10 km
11-17 km
11-17 km

GLOSSARY

A

A	as required (attack guidance matrix)
AA	assembly area
AAA	antiaircraft artillery
AATF	air assault task force
AATM	air assault team
ABCA	Australia, Britain, Canada America
ABCCC	airborne command and control center
ABP	air battle position
NC	aircraft
ACA	airspace coordination area
ACC	area control center
ACE	Allied Command Europe
ACRV	artillery command and reconnaissance vehicle
AD	air defense
ADA	air defense (attack guidance matrix)
ADAM	area denial artillery munition
admin	administration
ADO	air defense officer
AF	azimuth of fire
AFAC	airborne forward air controller
AFSO	aerial fire support observer
AGM	air-ground missile
AHLO	attack helicopter liaison officer
Al	air interdiction
ALD	airborne laser designator
ALO	air liaison officer
alt	alternate
AM	amplitude modulated
AMC	air mission commander
AMF (L)	ACE Mobile Force (Land)
ammo	ammunition
ANGLICO	air and naval gunfire liaison company
anx	annex
AO	area of operations
AP	antipersonnel
APC	armored personnel carrier
APERS	antipersonnel
ARBS	angle rate bombing system
ARFOR	Army forces
ARPD	army missile transport battalion (Soviet)
arty	artillery
AS	Australia, azimuth of search
ASOC	air support operations center
ASP	ammunition supply point
ASPS	all-source production section
ASSLT	assault
AT	antitank
ATF	amphibious task force
ATGM	antitank guided missile
atk	attack
ATO	air tasking order
ATP	ammunition transfer point

B

BAE	brigade aviation element
BAI	battlefield air interdiction
BCE	battlefield control clement
BCS	battery computer system
BDA	bomb damage assessment
bde	brigade
BECS	battlefield electronic CEOI system
BGU	basic generation unit
BLT	battalion landing team
BMA	battery-minefield angle
BMNT	beginning of morning nautical twilight
bn	battalion
BOS	battlefield operating system
BP	battle position
BSA	brigade support area
BSO	battalion signal officer
BSSG	brigade service support group (USMC)
btry	battery

C

C2	command and control
C3	command, control, and communications
C3I	command, control, communications, and intelligence
CA	Canada
CAN	control aviation net

CAS	close air support
CATF	commander amphibious task force
CCP	communications checkpoint
CCSS	critical combat service support
CCT	combat control team
cdr	commander
CEOI	communications-electronics operation instructions
CEWI	combat electronic warfare intelligence
CFFZ	call-for-fire zone
CFL	coordinated fire line
CFZ	critical friendly zone
CGI	control group intercept
CHEMWARN	chemical warning
civ	civilian
CLF	commander landing force
CLGP	cannon-launched guided projectile
cmd/ops	command/operations (radio net)
cml	chemical
CMO	civil military operations
co	company
COLT	combat observation/lasting team
comm	communication
COMSEC	communications security
COP	command observation post (Soviet)
CP	command post
CPT	captain
CRTA	chief of rocket troop and artillery (Soviet)
CS	combat support
C/S	call sign
CSR	controlled supply rate
CSS	combat service support
CSSE	combat service support element

D

D	destroy (attack guidance matrix)
(D)	digital (radio net)
DA	density altitude
DAG	division artillery group (Soviet)
DARM-4	mobile artillery repair shop complex (type) (Soviet)
DASC	direct air support center
DD	destroyer
DDG	guided missile destroyer
def	defense
DF	direction finding
div	division
div arty	division artillery
DLIC	detachment left in contact
DMD	digital message device
DPICM	dual-purpose improved conventional munitions
DS	direct support
DSA	division support area
DTG	date-time group
DZ	drop zone

E

LA	engagement area
ECCM	electronic cmmter-countermeasures
ECM	electronic countermeasures
EEFI	essential elements of friendly information
EENT	end of evening nautical twilight
EN	electronic notebook
ENG	engineer (in TACFIRE)
engr	engineer
ERP	engineer reconnaissance patrol
ETAC	enlisted terminal attack controller
EW	electronic warfare

F

FA	field artillery
FAC	forward air controller (see ALO, ETAC, and AFAC)
FAIO	field artillery intelligence officer
FARP	forward area rearm/fuel point
FASCAM	family of scatterable mines
FAST	forward area support team
FCT	firepower control team
FD	fire direction (radio net)
FDC	fire direction center
FDMD	FIST digital message device
FEBA	forward edge of the battle area
FED	forward entry device
FFA	free-fire area
FFE	fire for effect
FID	foreign internal defense
FIST	fire support team
FLIR	forward-looking infrared

FLOT	forward lie of own troops
flt lead	flight leader
FM	frequency modulated
FO	forward observer
FPF	final protective fire
FRAGO	fragmentary order
freq	frequency
FS	fire support
FSA	fire support area (Navy)
FS cell	fire support cell
FSC	fire support coordinator (Marine)
FSCC	fire support coordination center (USMC)
FSCL	fire support coordination lime
FSCOORD	fire support coordinator
FSE	fire support element
FSMAA	Fire Support Mission Area Analysis
FSO	fire support officer
FSS	fire support station (Navy)
FSSG	force service support group
fwd	forward

G

GBU	glide bomb unit
GCE	ground combat element
GEMSS	ground emplaced mine scattering system
GLO	ground liaison officer
GM	guided missile
GP	general purpose
gp	group
GS	general support
GSR	ground surveillance radar, general support reinforcing
GT	gun-target
GMLD	ground/vehicular laser locator designator

H

HAHO	high-altitude, high opening
HALO	high-altitude, low-opening
HC	hexachloroethane
HE	high explosive
hel	helicopter
HEP-T	high explosive plastic– tracer
HF	high frequency
HHB	headquarters and headquarters battery
HMMWV	high-mobility multipurpose wheeled vehicle
how	howitzer
HP	high payoff
HPT	high-payoff target
HQ	headquarters
HUD	head-up display
HVT	high-value target
hvy	heavy

I

I	immediate (attack guidance matrix)
IAW	in accordance with
ICM	improved conventional munitions
IEW	intelligence and electronic warfare
IEWSE	intelligence and electronic warfare support element
IFF	identification friend or foe
Illum	illumination
inf	infantry
Inter	intercept
IP	initial point
IPB	intelligence preparation of the battlefield
IR	infrared

J

JAAT	joint air attack team
JTF	joint task force

K

kmph	kilometers per hour

L

LANTIRN	low-altitude navigation and targeting infrared for night system
LC	lime of contact
LD	line of departure
LDO	laser designator operator
LF	landing force
LGB	laser-guided bomb
LGM	laser-guided missile
LGW	laser-guided weapon
LIC	low-intensity conflict

LID	light infantry division
LIFT	general transportation (attack guidance matrix)
LLLGB	low-level laser-guided bomb
LLLTV	low-light-level television
LMAV	Laser Maverick
LO	liaison officer
LOA	limit of advance
LOC	lines of communication
LOG	long-burning illumination marker
log	logistics
LP	listening post
LST	laser spot tracker
LSU	logistics support unit
LT	lieutenant
LTD	laser target designator
LZ	landing zone

M

MAGTF	Marine air-ground task force
maint	maintenance
MAJ	major
MAN	maneuver (in TACFIRE)
max	maximum
MBA	main battle area
MEB	Marine expeditionary brigade
MEF	Marine expeditionary force
met	meteorological
METT-T	mission, enemy, terrain and weather, and troops and time available
MEU	Marine expeditionary unit
MG	machine gun
MI	military intelligent
min	minute
MLRS	multiple launch rocket system
mm	millimeter
MMO	maintenance management officer
MMS	mast-mounted sight
MOPP	mission-oriented protective posture
mort	mortar
MOUT	military operations on urban terrain
MP	military police
mph	miles per hour
MR	motorized rifle (Soviet)
MRL	multiple rocket launcher
MRR/TR	motorized rifle regiment/tank regiment (Soviet)
MSE	mobile subscriber equipment
MSL	mean sea level
MSSG	Marine expeditionary unit service support group
MTB	motor transport battalion
MTOE	modification tables of organization and equipment
mtr	motor
MULE	modular universal laser equipment
mvr	maneuver

N

N	neutralize (attack guidance matrix)
NA	not applicable
NAI	named area of interest
NATO	North Atlantic Treaty Organization
NBC	nuclear, biological, chemical
N/CH	nuclear and/or chemical (attack guidance matrix)
NCS	net control station
NFA	no-fire area
NGF	naval gunfire
NGLO	naval gunfire liaison officer
NGO	naval gunfire officer
NICAD	nickel-cadmium
NOD	night observation device
NOS	night observation system
NUKE	nuclear (spread sheet)
NVD	night vision device
NVG	night vision goggles

O

O&I	operations and intelligence
obj	objective
O/C	on call
OCOKA	observation, cover and concealment, obstacles, key terrain, and avenues of approach
off	offense
O/O	on order
OP	observation post
OPCON	operational control

OPLAN	operation plan
OPORD	operation order
OPSEC	operations security
ops/F	operations/fire (radio net)
ORPD	independent missile transport battalion (soviet)

P

P	plan (attack guidance matrix)
PA	pressure altitude
PADS	position and azimuth determining system
PD	point detonating
PF	Pathfinder
PFC	private first class
PIR	priority intelligence requirements
PL	phase line
plt	platoon
PMP	heavy folding pontoon (Soviet bridge type)
POF	priority of fire
POL	petroleum, oil and lubricants
pos	position
POW	prisoner of war
POZ	mobile obstacle detachment (Soviet)
PP	passage point
PRF	pulse repetition frequency
PRI TGT	priority target
PRTB	mobile repair technical base (rocket and missile) (Soviet)
PSNR-1	battlefield surveillance radar (Soviet)
PZ	pickup zone

Q

QSTAG	quadripartite standardization agreement

R

R	reinforcing
RAAMS	remote antiarmor mine system
RAG	regimental army group (Soviet)
RAP	rocket-assisted projectile
RATELO	radiotelephone operator
RATT	radio teletypewriter
rd/min	rounds per minute
REC	radio electronic combat
recon	reconnaissance
regt	regiment
REMS	remotely employed sensor
RES	radiation exposure state
retrans	retransmission
RFA	restricted fire area
RFL	restrictive fire tine
ROE	rules of engagement
RLT	regimental landing team
RP	release point
R/R	radio/radar
RSO	reconnaissance and survey officer
RSR	required supply rate
RSTA	reconnaissance, surveillance, and target acquisition

S

S	Stinger; suppress (attack guidance matrix)
SACC	supporting arms coordination center
SALT	supporting arms liaison team
SAM	surface-tmir missile
SASP	special ammunition supply point
SEAD	suppression of enemy air defenses
SFC	sergeant first class
SFCP	shore fire control party
SHELREP	shelling report
SIGINT	signal intelligence
sincgars	single-channel ground-airborne radio system
sitrep	situation report
sol	signal operation instruction
SOP	standing operating procedure
SP	start point, self-propelled
SPC	specialist
SPT	support
SSB	single sideband
SSD	safe separation distance
SSG	staff sergeant
SSM	surface-to-surface missile
STANAG	NATO standardization agreement
STRIKEWARN	nuclear strike warning
survl	surveillance

T

TA	target acquisition
tac	tactical
TAC-A	tactical air controller-airborne
TACAIR	tactical air
TACAN	tactical air navigation
TACC	tactical air control center
TACCS	tactical air command and control specialist
TACFIRE	tactical fire direction system
TACP	tactical air control party
TACSAT	tactical satellite
TADS	target acquisition system and designation sight
TM	target area of interest
TASC	Training Aids Support Center
TBP	to be published
TDA	target damage assessment
temp	temperature
TF	task force
TFW	tactical fighter wing
tgt	target
TISL	target identifier set, laser
tm	team
TOC	tactical operations center
TOE	tables of organization and equipment
TOT	time on target
TOW	tube-launched, optically tracked, **wire-guided missile**
TR	tank regiment (Soviet)
TRAM	target recognition attack multisensors
trans	**transport**
TRP	target reference point
TS	time-sensitive
TSOP	tactical SOP
TV	television
TVA	target value analysis

U

UAV	unmanned aerial vehicle
UHF	ultrahigh frequency
UK	United Kingdom
US	United States
USAF	United States Air Force
USAFAS	United States Army Field Artillery school
USMC	United States Marine Corps
USN	United States Navy
UTM	universal transverse mercator

V

(V)	voice (radio net)
VHF	very high frequency
VSTOL	vertical short takeoff and landing
VT	variable time

W

WOC	wing operations center
WP	white phosphorus
WWII	World War II

REFERENCES

Required Publications

Required publications are sources that users must read in order to understand or to comply with this publication.

Field Manuals (FM)

6-20	Fire Support in the AirLand Battle
6-30	Observed Fire Procedures
7-30	Infantry, Airborne, and Air Assault Brigade Operations
71-101 (HTF)	Infantry, Airborne, and Air Assault Division Operations (How to Fight)
100-5	Operations
100-20	Low Intensity Conflict
101-5-1	Operational Terms and Symbols

Related Publications

Related publications are sources of additional information. They are not required in order to understand this publication.

Field Manuals (FM)

1-103	Airspace Management and Army Air Traffic in a Combat Zone
1-111	Aviation Brigade
1-112	Attack Helicopter Battalion
3-3	NBC Contamination Avoidance
(C) 3-10	Employment of Chemical Agents (U)
3-50	Deliberate Smoke Operations
3-100	NBC Operations
5-100	Engineer Combat Operations
6-1	TACFIRE Operations
6-2	Field Artillery Survey
6-15	Field Artillery Meteorology
6-20-1 (HTF)	Field Artillery Cannon Battalion (How to Fight)
6-20-30	Tactics, Techniques, and Procedures for Fire Support for Corps and Division Operations

6-20-40	Tactics, Techniques, and Procedures for Fire Support for Brigade Operations (Heavy)
6-121	Field Artillery Target Acquisition
(C) 6-141-2	Field Artillery Target Analysis and Weapons Employment: Nonnuclear (U)
6-161	Field Artillery Radar Systems
7-8 (HTF)	The Infantry Platoon and Squad (Infantry, Airborne, Air Assault, Ranger) (How to Fight)
7-10 (HTF)	The Infantry Rifle Company (Infantry, Airborne, Air Assault, Ranger)
7-20	The Infantry Battalion (Infantry, Airborne, and Air Asault)
7-72	Light Infantry Battalion Task Force
7-90	Tactical Employment of Mortars
9-6	Ammunition Service in the Theater of Operations
11-50 (HTF)	Combat Communications Within the Division (How to Fight)
17-95	Cavalry Operations
21-26	Map Reading and Land Navigation
24-1	Combat Communications
34-1	Intelligence and Electronic Warfare Operations
34-3	Intelligence Analysis
34-81	Weather Support for Army Tactical Operations
44-1	US Army Air Defense Artillery Employment
90-2	Battlefield Deception
90-3 (HTF)	Desert Operations (How to Fight)
90-4	Air Assault Operations
90-5 (HTF)	Jungle Operations (How to Fight)
90-6	Mountain Operations
90-10 (HTF)	Military Operations on Urbanized Terrain (MOUT) (How to Fight)
90-13 (HTF)	River Crossing Operations (How to Fight)
100-26	The Air-Ground Operations System
100-42	US Army/US Airspace Management in an Area of Operations
101-5	Staff Organization and Operations
101-10-1, Volumes 1 and 2	Staff Officers' Field Manual: Organizational, Technical, and Logistical Data
101-31-1	Staff Officers' Field Manual: Nuclear Weapons Employment Doctrine and Procedures
(C) 101-50-1	Joint Munitions Effectiveness Manual: Air-to-Surface: Weapon Effectiveness, Selection and Requirements, Air-Delivered Non-Nuclear (U)

(C) 101-50-20	Characteristics Handbook (JMEM) (U)
(C) 101-60-1	Joint Munitions Effectiveness Manual/Surface-to-Surface: Effectiveness Data for Mortar, 81-mm: M29 (U)
(C) 101-60-2	Joint Munitions Effectiveness Manual Surface-to-Surface: Effectiveness Data for Howitzer, 105-mm M101A1 (U)
(C) 101-60-3	Joint Munitions Effectiveness Manual: Surface-to-Surface: Effectiveness Data for Howitzer, 155-mm M109 (U)
(C) 101-60-6	Joint Munitions Effectiveness Manual: Surface-to-Surface: Effectiveness Data for 5-Inch/38-Inch Naval Twin-Gun Mount, MK-28, -32 and With Gun, Fire Control System MK-37 (U)
(C) 101-60-7	Joint Munitions Effectiveness Manual: Effectiveness Data for Mortar: 4.2-Inch, M30 (U)
(C) 101-60-9	Joint Munitions Effectiveness Manual: Surface-to-Surface: Effectiveness Data for Naval Single-Gun Mount, MK42 w/Gun Fire Control System, MK68 (U)
(C) 101-61-3	Joint Munitions Effectiveness Manual/Surface-to-Surface: Ammunition Reliability (U)
(C) 101-62-1	Joint Munitions Effectiveness Manual Surface-to-Surface: Safe Distances for Fragmentary Munitions (U)
(C) 101-62-3	Joint Munitions Effectiveness Manual/Surface-to-Surface: Manual of Fragmentation Data (U)

Training Circulars (TC)

6-40	Field Artillery Manual Cannon Gunnery
6-40A	Field Artillery Automated Cannon Gunnery
6-50	The Field Artillery Cannon Battery
34-130	Intelligence Preparation of the Battlefield
90-7	Joint (Army/Air Force) Tactical Air Control Party/Fire Support Team (TACP/FIST) Close Air Support Operations

Department of the Army (DA) Form

2028	Recommended Changes to Publications and Blank Forms
4655-R	Target List Work Sheet
4656-R	Scheduling Work Sheet
5032-R	Field Artillery Delivered Minefield Planning Sheet
5368-R	Quick Fire Plan

Miscellaneous Literature

JCS Pub 1-02	Dictionary of Military and Associated Terms
ATP-27	Offensive Air Support Operations
ATP-35(A)	Land Force Tactical Doctrine
USREDCOM	Joint Terminal Guidance Operations Manual 525-5

Multiservice and Joint Publications

TRADOC Pamphlet 34-3	Joint Laser (J-Laser) Designation Procedures. TACA 50-25/LANTFLT TIP-1/ MCDEC OH 6-2D/USREDCOM Pam 38-1/USAFEP 50-25/AACP 50-25/PACAFP 50-25

NATO Standardization Agreements/Quadripartite Standardization Agreements (STANAG/QSTAG)

2015/506	Operation Orders, Annexes to Operation Orders, and Administrative and Logistics Orders
2031/515	Proforma for Artillery Fire Plan
2082	Relief of Combat Troops
2099/531	Fire Coordination in Support of Land Forces
2103/187	Reporting Nuclear Detonations, Biological and Chemical Attacks, and Predicting and Warning of Associated Hazards and Hazard Areas
2104/189	Friendly Nuclear Strike Warning to Armed Forces Operating on Land
2147/221	Target Numbering System (Nonnuclear)
2887/217	Tactical Tasks and Responsibilities for Control of Artillery
3736	Offensive Air Support Operations (ATP-27B)

NOTE: STANAGS and QSTAGS can be obtained from Naval Publications Center, 5801 Tabor Avenue, Philadelphia PA., 19120, DD Form 1425 may be used to requistion documents.

Projected Publications

Projected publications are sources of additional information that are scheduled for printing but are not yet available. Upon printing, they will be distributed automatically via pinpoint distribution. They may be obtained from the USA AG Publications Center until indexed in DA Pamphlet 25-30.

FM 6-20-10	Tactics, Techniques, and Procedures for the Targeting Process

INDEX

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

WILLIAM J. MEEHAN II
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

Active Army, USAR, and ARNG: To be distributed in accordance with DA Form 12-11E, Requirements for FM 6-20, Fire Support in the AirLand Battle (Qty rqr block no. 772).

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