FIELD MANUAL

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HEADQUARTERS

DEPARTMENT OF THE ARMY

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Signal

Signal Tactical Satellite Company

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***This manual supersedes FM 11-24, 3 November 1972.**

PREFACE

This manual describes the Signal Tactical Satellite Company. It provides U.S. Army doctrine for the employment and operations of a Signal Tactical Satellite Company in a theater of operations and supports the AirLand Battle concept.

The proponent agency of the manual is the U.S. Army Signal Center and Fort Gordon. Users of this manual are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forward directly to the Commander, U.S. Army Signal Center and Fort Gordon, ATTN: ATZH-DTL, Fort Gordon, GA 30905-5070, with an information copy to the Commander, U.S. Army Information Systems Command (USAISC), ATTN: AS-PLN-RM, Fort Huachuca, AZ 85613-5000.

This manual applies to commanders and personnel assigned to a Signal Tactical Satellite Company, Theater Signal Brigades, and a Theater Communications Command (Army), major Army commands, and Army service schools.

Communications equipment quantities and types specified in this manual may not coincide with some actual authorizations. Changing communications support requirements should be reflected in authorization documents which can be specifically tailored and are adaptable to new and changing concepts.

This manual does not contain information that affects the New Manning System.

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Interim changes to this manual are not official unless they are authenticated by The Adjutant General. Users will destroy interim changes on their expiration dates unless sooner superseded or rescinded.

Chapter 1

Introduction

1-1. Purpose

This manual provides doctrinal guidance for the employment and operations of the Signal Tactical Satellite (TACSAT) Company at echelons above corps (EAC) in a theater of operations. It also provides doctrinal guidance on the functions of the Tactical Satellite Communications Control Section (TSCCS) AN/MSQ-114 and the Defense Satellite Communications System (DSCS) ground mobile force (GMF) control link section. The manual is oriented towards communications support operations behind the corps rear boundary in a large theater of operations. However, it is not limited to any particular theater of operations. In certain situations, the TACSAT Company may be employed in the communications system of the combat zone.

1-2. References

Required and related publications are listed in the appendix.

1-3. Related manuals

This manual is one of seven manuals prepared by USAISC for communications doctrine at EAC. All seven volumes provide a comprehensive understanding of theater level communications.

a. FM 11 –23 is the keystone manual which contains an overview of EAC communications. It provides a structure for a type Theater Communications Command (Army) (TCC(A)) and introduces the building block units which may be assigned to a TCC(A).

b. FMs 11–24 through 11–29 provide specific doctrinal guidance for the employment and operations of individual building block units (battalion and company size).

1-4. Explanation of abbreviations and terms

Abbreviations and special terms used in this manual are explained in the glossary

1-5. The Airland Battle

a. The U.S. Army must be prepared to meet a variety of challenges on battlefields worldwide. It must be prepared to fight both highly mechanized forces and light, well-equipped forces. In the areas of greatest strategic concern, the Army must expect battles of greater scope and intensity than ever fought before. It must anticipate battles that include the use of nuclear, biological, chemical (NBC) warfare and electronic warfare (EW). To win, all available military forces must be coordinated in pursuit of common objectives. AirLand Battle doctrine provides the Army's basic operational concepts to meet these challenges. FM 100–5 describes the AirLand Battle doctrine.

b. AirLand Battle doctrine fuses the separate geographical areas of combat into one battle. It extends from our own rear areas, across the forward line of own troops (FLOT), deep into the enemy's second echelons and rear areas. The theater commander directs the battle by planning, integrating, and executing the deep battle; the actions in the main battle area and the rear battle. The following basic characteristics express the essence of the AirLand Battle which apply to all levels of command.

(1) Initiative is the ability to set the terms of battle by action. Commanders must seize and preserve the initiative. This generates an offensive spirit in the conduct of all operations.

(2) Depth refers to time, space, and resources. Commanders need to use the entire depth of the battlefield to strike the enemy. Depth of resources provides the commander great flexibility over large areas. These resources include the integration of ground and air operations.

(3) Agility means to act faster than the enemy. Commanders must learn of critical events as they occur and act swiftly to avoid enemy strength and exploit enemy weaknesses. This must be done repeatedly.

(4) Synchronization means achieving maximum combat power. Commanders must waste no effort, initially or as an operation develops. Operations must be synchronized with other services and allies.

c. Communicators must be aware that decision-making by battle commanders is extremely time critical. Our decision cycle must be less than that of the enemy. The range, scope, and support of operations is thus highly dependent on command and control. The AirLand Battle requires immediately responsive and highly reliable communications involving signal commanders and officers at all levels.

1-6. Theater Army communications

a. Theater Communications System (Army).

(1) When the Army operates on a large land mass, the scope of combat forces, support services, and duration of involvement are increased significantly. Extended operations also introduce requirements for Navy and Air Force support, as well as an expanded administrative and logistical base. Each service usually provides its own support services and command structure to ensure the best possible support of its tactical commanders. The Army headquarters which provides this support is the theater Army (TA). The TA headquarters and its assigned units generally operate in the area to the rear of the corps boundary called the communications zone (COMMZ). The COMMZ can extend to the water's edge in a large land mass, across a major water body to another land mass, or even to the continental United States (CONUS).

(2) FM 100–16 provides a detailed discussion of support operations in EAC. It is the source of concepts and doctrine for EAC communications-electronics (C-E) TA operations and relates the C-E role to the command and control requirements of theater.

(3) FM 11–23 describes the Army's overall telecommunications system for command and control. The system is called the Army Automation Communications (ATUOCOMM) Network. The AUTOCOMM provides tactical, strategic, general support, and theater subnets. The theater subnet is called the Theater Communications System (Army) (TCS(A)). The TACSAT Company is employed in the TCS(A).

(4) Traditionally, the concepts and doctrine for a theater have been focused on Europe, with its combined and joint command structures. This thinking has led to heavy reliance on C-E support from the commercial services and facilities which exist in industrially developed central Europe. Communications plans and forces have become very dependent on such host nation support (HNS). Future United States (U. S.) military commitments could require the Army to operate in a variety of geographical environments.

(5) Vietnam and other recent experiences demonstrated the tremendous resources required to support ground combat in undeveloped regions. Multichannel radio played a major role in providing communications to dispersed units. Tropospheric scatter and satellite radio proved themselves important to theater command and control. Today's tactical satellite radio systems greatly enhance the flexibility and capacity of the theater communications. They can be moved and put into operation more rapidly than their predecessors. Their area of coverage is greater than other multichannel radio system.

b. Army command and area communications system.

(1) The TCS(A) provides both command and area communications. It consists primarily of command and area links in a nodal configuration called the Army Command and Area Communications System (ACACS).

(2) The ACACS provides service to the TA in the COMMZ on a common-user, geographical basis. TA headquarters is supported by the Signal Command Operations Battalion (Theater) (FM 11–28) and will access the ACACS through at least two area signal nodes. Major functional headquarters will be interconnected with TA headquarters through the ACACS. This procedure is accomplished through an extension node provided from the supporting major area node. The major area nodes and extension nodes are provided by the Signal Telecommunications Battalion (Area). The area nodal portion of the ACACS also provides C-E services to other units assigned to or transiting through the COMMZ.

(3) Figure 1-1 shows a representative ACACS found in the TCS(A). The ACACS can provide the high volume telephone, radio, and record copy services required by larger headquarters. Tactical satellite radio may be employed in either the command or the area portions of the communications sytems. It can connect the TCS(A) to the strategic or tactical subnets of the AUTOCOMM network. The ACACS is required to interface with the Defense Communications System (DCS) in at least two locations. The corps area signal system will also interface with ACACS. See FM 11–23 for a more complete description of the services provided by the TCS(A).

c. TCC(A).

(1) The TCC(A), which is designed on a building block principle, is a USAISC unit under the operational control of the TA commander. It provides communications for U.S. Army units throughout the COMMZ. The TCC(A) may be directed to provide C-E support to other U.S. and non-U.S. units, to include combined headquarters, and to provide some or all of the strategic networks in the theater. It also is responsible for supply and maintenance support for TCC(A) unique C-E, air traffic control (ATC) and navigational aids (NAVAIDS) equipment.

(2) Figure 1–2 shows a typical TCC(A). The types and number of building block units assigned can be changed to meet the C-E requirements. C-E requirements almost always exceed available

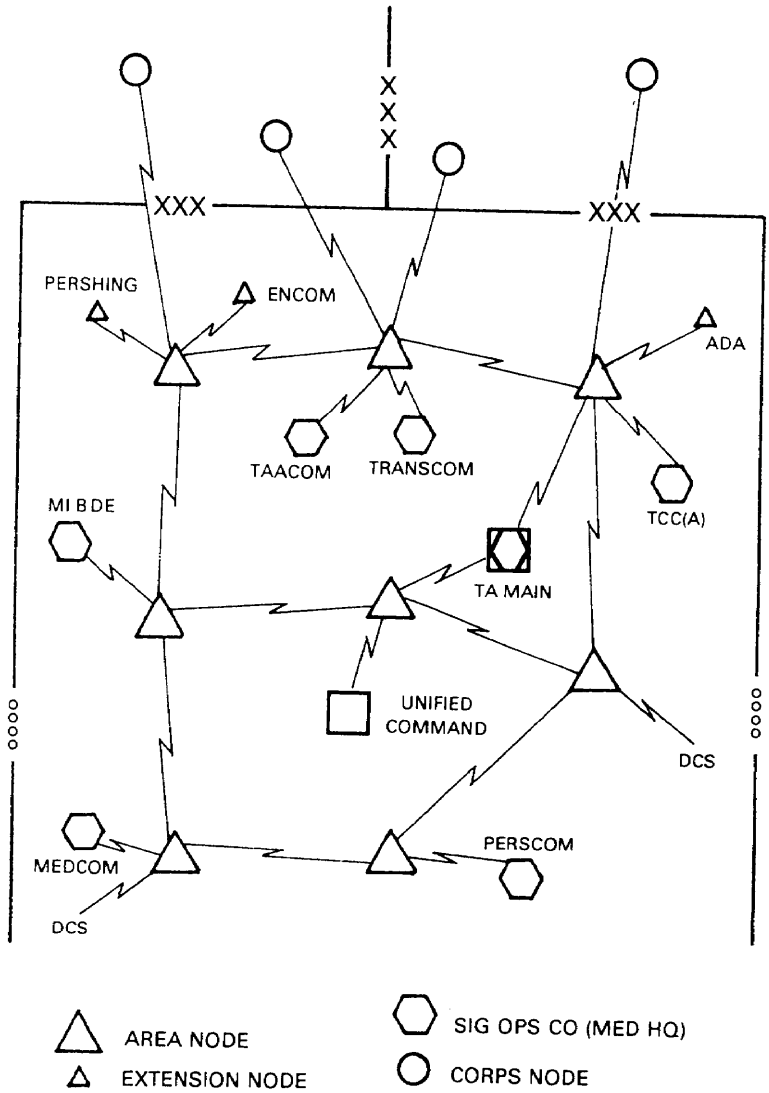

Figure 1–1. Army Command and Area Communications System

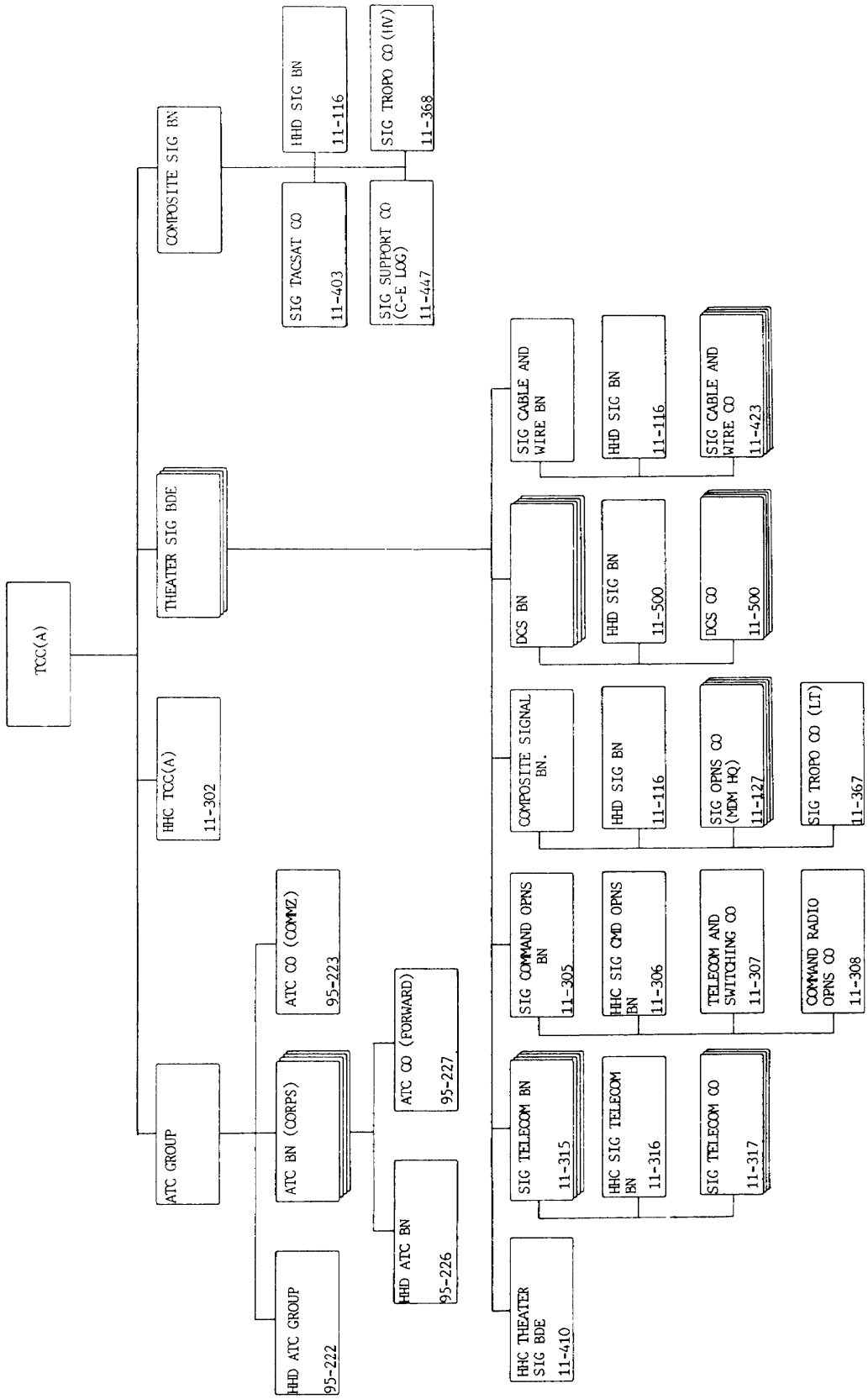

Figure 1–2. Type Theater Communications Command (Army)

resources. If a major conflict should occur, available resources will be severely taxed by current force restrictions. Very important, also, is the fact that our major opponents have made known their intention of disrupting the Army's support areas. C-E units will be primary targets of this threat and must be prepared to combat it effectively. A future war will not be fought only at the front; it will cover the breadth and depth of the entire theater in a simultaneous or nearly simultaneous series of actions.

(3) All these factors emphasize the need for detailed planning at each level within the TCC(A). Thorough planning and frequent practice is the only way to prepare for the surprises which occur in wartime. FM 11–23 provides detailed concepts and doctrine for the TCC(A). Generally, one TACSAT Company is assigned to a TCC(A). The TACSAT Company is an essential element in the theater subnet.

1-7. Echelons above corps support

EAC commanders must be prepared to operate in both joint and combined operations on the AirLand Battlefield. FM 100–16 includes broad doctrine concerning EAC support in both type operations and contingency deployment. Particularly in combined operations, command and control as well as intelligence collection and dissemination present unique problems. Nations are reluctant to relinquish sovereign rights in these areas. In all cases, C-E support must be specifically tailored to meet the support and operational requirements of the type theater of operations. Signal commanders and planners must be aware of this. These requirements are best understood in terms of the two typical EAC situations explained in FM 100–16. The two major scenarios in which the TCC(A) will be called upon to provide EAC support are discussed briefly in *a* and *b* below.

a. Support to forward-deployed forces, Support to forward-deployed forces normally involves combined operations. U.S. forces are predeployed in a foreign country and operate with allied nations in an established theater. The European North Atlantic Treaty Organization (NATO) and Korean Combined Forces Command (CFC) are examples wherein U.S. forces are forward-deployed in foreign countries. In both cases, an established formal allied command structure exists, HNS agreements exist, and a TCA(A) is in place. A forward-deployed situation provides the benefits of time, planning, and experience in a specific theater of operations prior to an outbreak of hostilities.

b. Support to nonforward-deployed forces. Support to nonforward-deployed forces involves a contingency situation. A joint U.S. contingency force, with or without allied assistance, deploys to an area without a significant preestablished U.S. support base. It is anticipated that prepositioned war materiel stocks and HNS agreements will be minimal or nonexistent. Initial objectives will be limited. Planning must include a follow-on buildup and sustainment capability. The TCC(A) building block concept permits situation dependent growth and maturity of the TCS(A).

1-8. Ground mobile force satellite communications

a. The TACSAT Company represents one of the most modern C-E capabilities supporting our Armed Forces. It can provide 16 satellite terminals in the theater as a subnetwork of the Ground Mobile Force Satellite Communications (GMFSC). The GMFSC is a special user network within the DCSC. Its capabilities provide greater flexibility and capacity to command and control forces. Each member of the TACSAT Company plays a significant role in successful accomplishment of the unit mission.

b. The focus of this manual is on the employment and operations of the TACSAT Company. The manual also provides information on the TSCCS An/MSQ-114 and the DSCS GMFSC control functions as they influence the operations of the TACSAT Company. Associated subjects essential to successful accomplishment of the TACSAT Company's mission are also discussed in this manual. Chapters 8 through 11 provide a ready reference in communications planning, NBC and EW, rear battle operations, and training. These chapters are not all-inclusive; however, they serve as a point of departure and lead to other documents which provide the detail required. FM 100–16 and FM 11–23 provide information on the functional and organizational environment in which TACSAT companies operate.

Chapter 2

Mission of the Signal Tactical Satellite Company

2-1. General

a. The TACSAT Company is organized and equipped to support a wartime TA. Its units normally operate in the COMMZ of a theater of operations.

b. The TACSAT Company must provide versatile and responsive communications support in the TCS(A). Support requirements will be dependent upon—

(1) Satellite resource availability.
(2) Mission of supported headquarters.
(3) Force size.
(4) Geographical area.
(5) Capability of indigenous C-E facilities.
(6) Survivability of indigenous C-E facilities.
(7) Support agreements with allied forces and host nations (for example, NATO satellite).

2-2. Structure

The TACSAT Company, tables or organization and equipment (TOE) 11–403, is a building block unit. It is designed to provide special capabilities, flexibility, and versatility required within the TCC(A).

a. Mission. The TACSAT Company provides satellite communications for command and control of forces throughout the COMMZ, as designated by the theater commander. The TACSAT Company also has the capability to provide out-of-country service, DCS restoral, and contingency missions.

b. Assignment. The TACSAT Company may be assigned to the TCC(A) or a subordinate theater signal brigade. The TACSAT Company is a category II unit. There is one TACSAT Company in a TCC(A).

c. Type organization. The TACSAT Company is not adaptable to a type B organization employing indigenous personnel. See AR 310-31 for additional information on unit categories and type organizations.

d. Organization. The TACSAT Company consists of the following. See figure 2–1 for an organization chart of the TACSAT Company.

(1) A company headquarters.
(2) An AN/TSC-85A platoon with a platoon headquarters and two AN/TSC-85A terminal sections, each with three tactical satellite terminal teams.
(3) An AN/TSC-93A platoon with a platoon headquarters and five AN/TSC-93A terminal sections, each with two tactical satellite terminal teams.
(4) A support platoon with a platoon headquarters, a C-E maintenance/COMSEC section, and a motor maintenance section.

2-3. Command and control

The TACSAT Company may be placed under the command and control of the TCC(A) or other signal organization. Terminals will be widely separated. The commander's means for exercising internal command and control are discussed in *b* below.

a. Company Headquarters.

(1) The company headquarters provides the TACSAT Company commander the means by which he or she directs and coordinates operations and training. It plans and coordinates administrative and logistical support to the other elements of the TACSAT Company. Execution of plans and orders must depend on higher headquarters logistical support, especially transport priorities.

(2) The TACSAT Company commander is responsible for successful accomplishment of all assigned missions and functions. The commander exercises command and control by issuing orders and directives to the operating elements. The TACSAT Company presents a unique command challenge. The wide dispersion of its terminal sections complicates normal administrative and logistic support. It is difficult to exercise command and control and provide leadership by telephone. The TACSAT Company platoon leaders and noncommissioned officers (NCOs), in effect, must function as staff and line leaders.

(a) The first sergeant is the senior NCO in the TACSAT Company. The first sergeant acts in the name of the TACSAT Company commander when dealing with other NCOs and is the commander's principal enlisted advisor. The first sergeant supervises the functions of the enlisted personnel in the TACSAT Company. The fact that TACSAT Company personnel operate at a distance from company headquarters makes this task difficult. All TACSAT

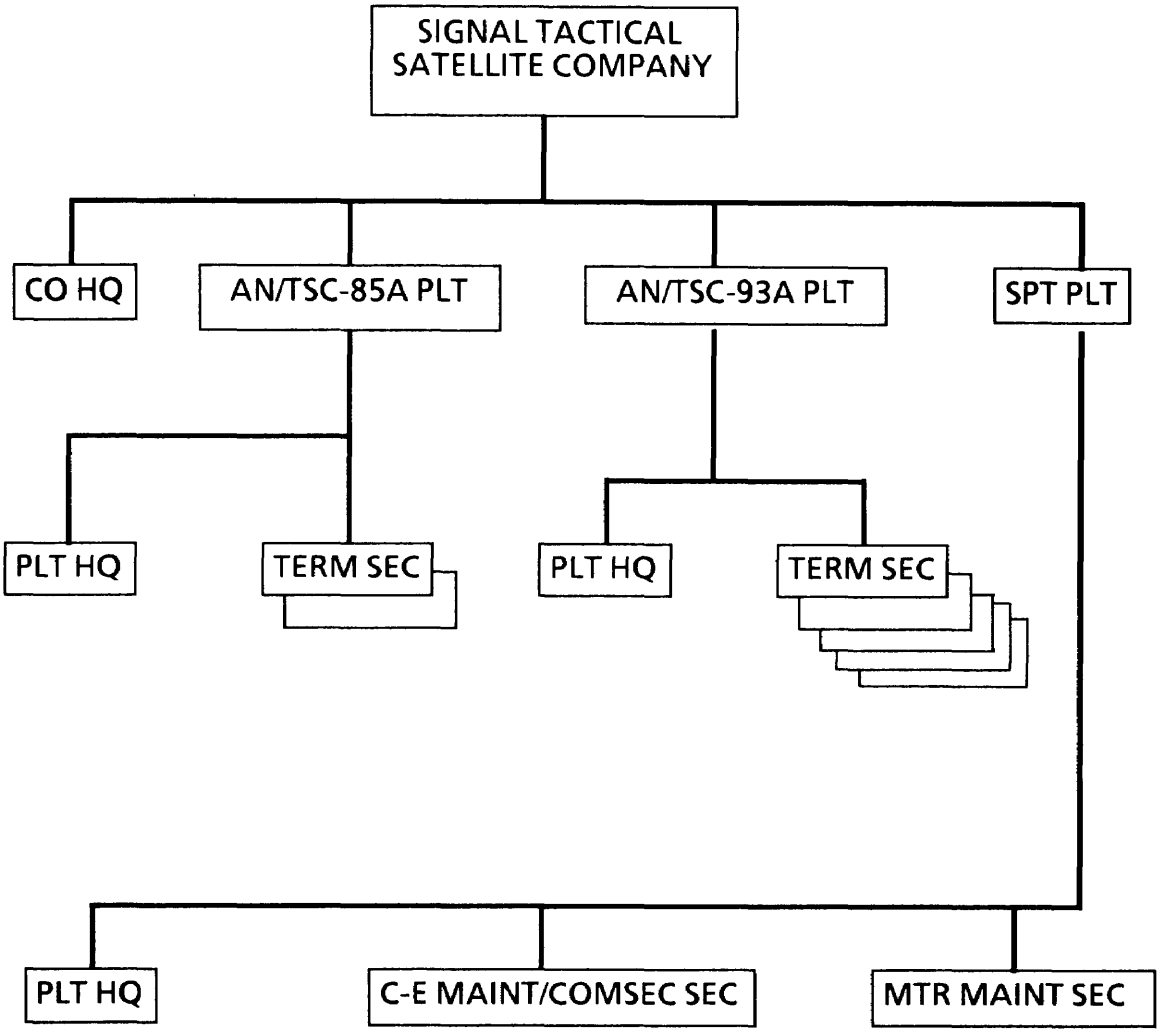

Figure 2–1. Organization of the Signal Tactical Satellite Company

Company NCOs must assume many tasks which would ordinarily be done for them in other type units. The first sergeant assists the commander by ensuring day-to-day tasks are performed, to include administrative, training, scheduling, internal operations, and counseling (enlisted personnel). The first sergeant maintains close contact with the sergeant major and command sergeant major of higher headquarters.

(b.) The supply sergeant requisitions, stores, issues, and turns in TACSAT Company property. He or she is responsible to the accountable officer for all accountable TACSAT Company equipment. In many cases, day-to-day logistical support of sections must be coordinated with units of other commands.

(c) The chemical sergeant is responsible for the accomplishment of the company commander's NBC program. As a minimum, the chemical NCO serves as the principle NBC advisor to the TACSAT Company commander; ensures that authorized NBC equipment is requisitioned and is properly maintained; develops individual and collective NBC training for unit personnel; determines unit NBC team requirements and ensures that each team member is appointed on unit orders, is properly equipped, and thoroughly trained; ensures that NBC training is conducted in natural environments (for example, during physical training and while performing normal daily routines); evaluates individual and unit competence in NBC defense and advises

the commander on the unit's ability to survive and continue operations in an NBC environment; and prepares or supervises the preparation of the unit NBC defense standing operating procedure (SOP).

b. Resources available. The company commander has the following resources for command and control:

(1) Existing common-user telephone network, if available.

(2) Local message centers.

(3) Internal telephone network.

(4) High frequency (HF) net.

(5) AN/TSC-85A and/or AN/TSC-93A voice orderwire.

2-4. Employment

The modern battlefield demands extensive command and control communications. The TACSAT Company augments the terrestrial communications systems in fulfilling these requirements. It is possible, that in special situations, other communications systems (for example, line of sight (LOS) and/or cable) may be used to augment the TACSAT Company.

a. Functions. At full strength, the TACSAT Company can install, operate, and maintain 16 satellite terminals. These terminals are ground transportable and can be installed and disassembled rapidly. They are also air transportable and cannot operate during transit.

b. Employment in the TCC(A). One TACSAT Company is assigned to a TCC(A). It is employed as a multichannel command and control net for the TA. Control of the TACSAT Company is determined by its level of assignment.

2-5. Operations

The TACSAT Company will augment communications links served by LOS, troposcatter, and HF radio systems. In some cases it may be the primary means of communications. Proper planning for terminal employment will reduce requirements for conventional radio. Satellite power and frequency allocations are controlled by the Defense Communications Agency (DCA). GMF allocations are managed by the GMFSC manager. Satellite access control is performed by the AN/MSQ-l14 in accordance with the USAISC Operations and Control Procedures for the GMF Satellite Communications System, Volumes I, II, III, and IV.

a. Capabilities. Tactical satellite communications systems can provide extended range, reliability, flexibility, and survivability. All GMF super high frequency (SHF) terminals within a satellite's gimbal-dish antenna footprint can be served by one satellite. This allows for continuous communications between widely dispersed elements. If a mission changes, connectivity can be quickly reconfigured to meet new requirements.

b. Limitations.

(1) The following are physical limitations of satellite facilities:

(a) Must be located in an area with level ground and low horizon.

(b) A high degree of physical security is required. Satellite facilities will be high priority targets.

(2) The TACSAT Company requires support in the following areas:

(a) Medical.

(b) Religious.

(c) Finance.

(d) Legal.

(e) Personnel and administrative services.

(f) Food service.

(g) Bulk petroleum, oils, and lubricants (POL) resupply.

(h) Supplemental transportation.

(3) The Theater Army Area Command (TAACOM) will provide the following:

(a) Direct support (DS) supply and intermediate (DS) maintenance for noncommunication electronics equipment.

(b) General Support (GS) supply and intermediate (GS) maintenance for non-USAISC unique C-E equipment.

(4) Army Aviation support from TA will be required to provide the maintenance support team transportation, critical equipment evacuation, and replacement flights.

c. *Defense.*

(1) Members of the TACSAT Company may be used to conduct a coordinated defense of their area or a limited defense of an installation. Use of TACSAT Company personnel in defense may result in reduced communications support.

(2) Operations in an NBC environment depends upon the ability of the individuals and the unit to achieve the standards of proficiency prescribed for NBC defense, the existing limitations of current NBC equipment, and the unit's overall vulnerability to NBC attack.

(3) Chapter 10 discusses rear battle operations and operations in an NBC environment.

d. Mobility.

(1) The company headquarters has the following TOE vehicles to transport personnel and equipment throughout the area of responsibility:

(a) Truck Utility: Tactical 3/4 ton W/E M1009.

(b) Truck Cargo: Tactical 5/4 ton 4 *x* 4 W/E M1008.

(c) Truck Cargo: 2-1/2 ton 6 *x* 6 W/E.

(2) If more vehicular support becomes necessary, the TACSAT Company commander may use assets assigned to other elements of the TACSAT Company or request assets of the supported headquarters.

(3) Army Aviation support from TA should be requested for special or emergency movement of personnel and equipment.

2-6. Deployment

a. The company's multichannel SHH satellite terminals—

(1) Will augment HF, LOS, and troposcatter multichannel systems in the EAC.

(2) Operate in a portion of the DSCS.

(3) Provide a portion of the GMFSC system.

b. In some cases, satellite communications will reduce the number of multichannel LOS and troposcatter radio systems. These multichannel terminals could then be used to support less critical and/or shorter communications links.

c. A nondeployed TACSAT Company could have terminals in a theater, but terminals could also be deployed within CONUS to support staging bases. Current plans could require a deployed unit to have terminals on two different landmasses. Such deployment would further complicate command, control, and support.

d. Chapters 3 through 7 describe how a TACSAT Company is employed in a theater.

Chapter 3

AN/TSC-85A Tactical Satellite Platoon

3-1. General

a. The AN/TSC-85A Tactical Satellite Platoon is organized and equipped for use in several configurations in a satellite communications trunking network. It can be deployed in a mesh, hub-spoke, or point-to-point configuration.

b. The terminals operate in the space segment of DSCS II and III networks. Terminal configurations include shelters, standard trucks, power sources, power switching gear, and trailers.

3-2. Structure

The AN/TSC-85A Tactical Satellite Platoon is a pivotal element in the building block concept of the TACSAT Company. Terminal sections can provide the hub of a hub and spoke configuration. Other terminal sections may be configured as a meshed system. Terminal sections may be attached to major supported headquarters. Figure 3–1 shows some typical representative configurations. Terminals may be used as needed to implement the required configuration.

a. *Mission.* The mission of the AN/TSC-85A Tactical Satellite Platoon is to provide the tactical satellite communications net for the TA. Terminal facilities are provided at major functional command headquarters in the EAC. Terminal facilities also may be provided at corps or unified and combined headquarters. Terminals also may be used in the area network of the TCS(A).

b. Assignment.

(1) Terminal section teams of the AN/TSC-85A Tactical Satellite Platoon may be attached to headquarters such as—

(a) Theater main.

(b) Theater Army main.

(c) Theater Army alternate.

(d) Theater Air Force.

(e) Air Defense Artillery Command.

(2) These headquarters are representative only, as terminals can be attached wherever the need arises.

c. *Organization.* The AN/TSC-85A Tactical Satellite Platoon organization consists of a platoon headquarters and two AN/TSC-85A terminal sections. Each section has three tactical satellite teams.

(1) The platoon headquarters has a platoon leader, platoon sergeant, and light vehicle driver.

(2) Each terminal section team is staffed and equipped for standalone operation.

3-3. Command and control

The TACSAT Company commander employs the operating elements in accordance with mission requirements and operational directives. The extended distance between company headquarters and terminal section teams makes it necessary for the TACSAT Company commander to extend operational control to the platoon leader, platoon sergeant, and section team chiefs. They, in effect, are the TACSAT Company commander's operations staff. The platoon leader directly supervises operations of the widely dispersed teams. He or she keeps the unit commander informed on the operational status of the platoon.

a. Platoon personel.

(1) The platoon leader serves as the direct representative of the TACSAT Company commander. He or she is responsible for the routine administration and operation of the platoon headquarters and the eight terminal teams.

(2) The platoon sergeant, as senior NCO, acts in the name of the platoon leader when dealing with others NCOs. He or she helps the platoon leader ensure mission accomplishment and is the principal enlisted advisor.

(3) The tactical satellite systems section chiefs are responsible for accomplishment of missions and functions of their AN/TSC-85A teams. They advise the platoon leader and platoon sergeant on the operational status of their terminals and assist the platoon sergeant in the administration of enlisted personnel management. Because of their separation from company headquarters, they must be able to make support arrangements for their teams.

(4) The tactical satellite systems operators are responsible for the actual performance of the terminal. The operators provide status reports to the team chiefs.

b. Internal communications. The following internal communications exist within the AN/TSC-85A Tactical Satellite Platoon:

(1) AN/TSC-85A voice orderwire.

(2) HF net.

3-4. Employment

a. The assets of the AN/TSC-85A Tactical Satellite Platoon are employed to support major headquarters command and control communications.

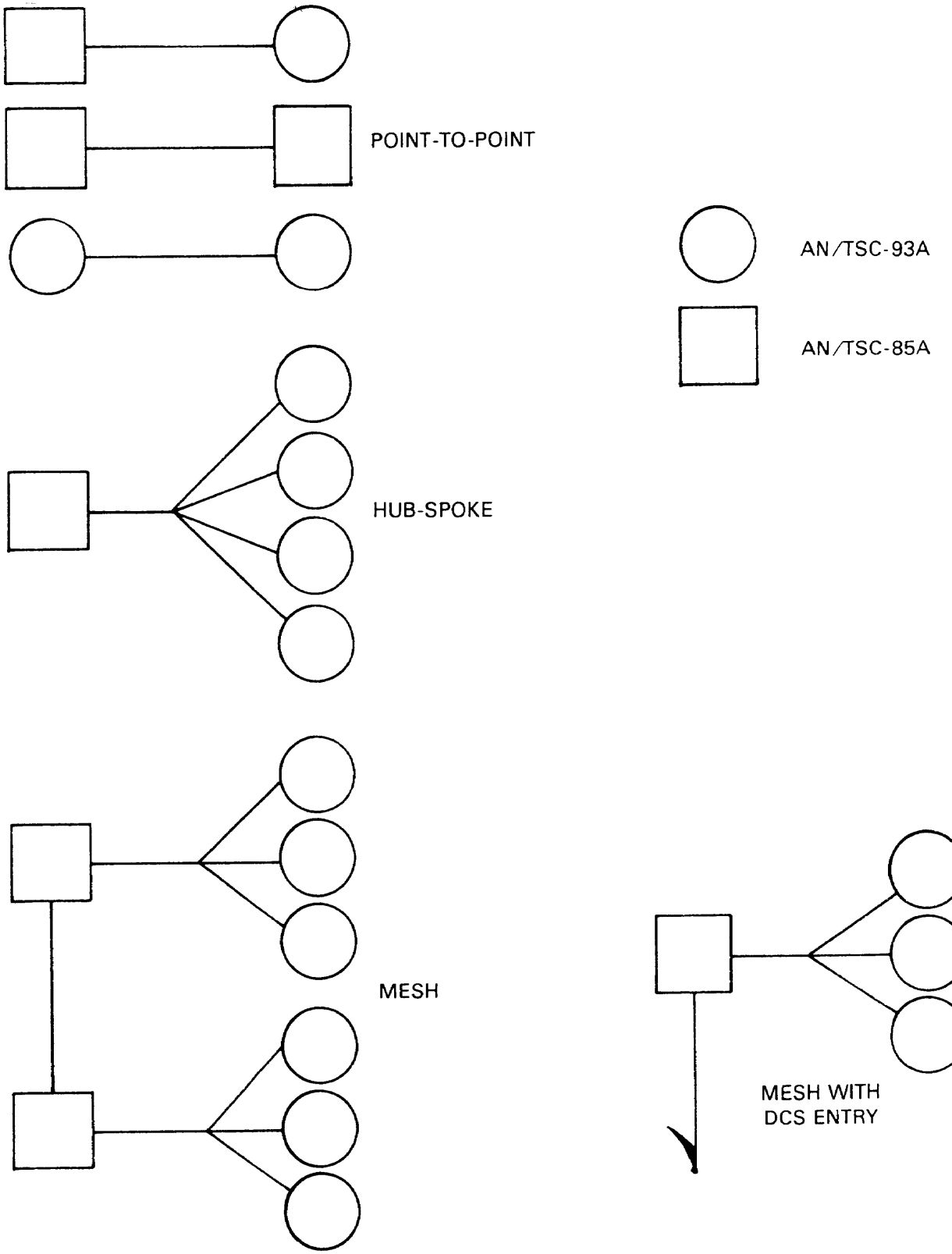

Figure 3–1. Typical configurations

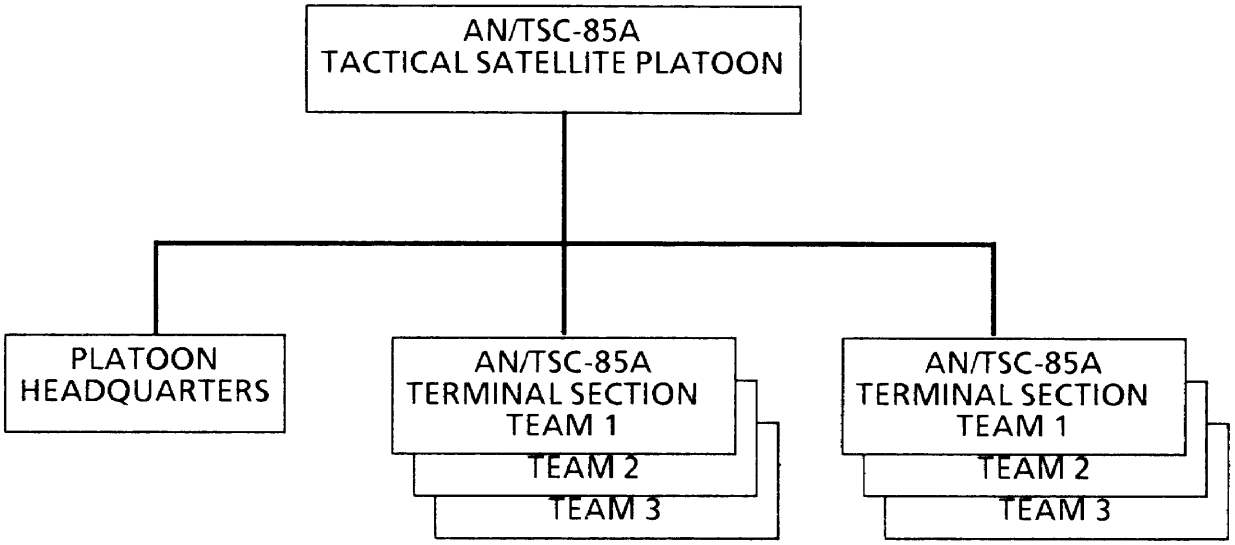

Figure 3-2. AN/TSC-85A Tactical Satellite Platoon Organization

They augment the existing terrestrial communications systems. They can also be used to interconnect the TCS(A) area nodal system.

b. Individual terminal teams will be widely dispersed. Each team will be dependent upon the headquarters of attachment, particularly for billeting, POL, food service support, and security.

c. The platoon headquarters will make arrangements for command and control, administrative, and logistical support to the dispersed terminal teams.

d. At full strength, the AN/TSC-85A Tactical Satellite Platoon is capable of installing, operating, and maintaining six AN/TSC-85A tactical satellite communications terminals. The terminals are highly mobile and can be installed and disassembled rapidly.

3-5. Operations

The AN/TSC-85A Tactical Satellite Platoon may be used to augment communications links which are curently served by LOS, troposcatter, and HF radio systems. Operating frequencies, transmit power settings, antenna angles, and so forth, are received from the Satellite Communications Control Center (SCCC) described in chapter 6. A full-time satellite orderwire connects the SCCC to each deployed terminal. Instructions from the SCCC must be followed explicitly, since numerous SHF terminals are sharing the same satellite. This is elaborated upon in chapter 6. All platoon personnel must be thoroughly aware that they must not change any of the operating parameters (for example, frequency, power) of the terminal without approval of the SCCC.

a. Capabilities. The ANITSC-85A tactical satellite terminal has the following capabilities:

(1) Transmission of a single SHF uplink carrier with up to 48 channels of voice and/or digital data (internally multiplexed). An additional 48 channels of voice and/or digital data from a remote (externally) multiplexed source may be transmitted.

(2) On the downlink side, four carriers can be received, demodulated, and switched to user interfaces.

(3) Fully independent operation from a 15 kW, 3-phase engine generator or compatible commercial power.

(4) Link with a nodal terminal in the point-to-point mode.

(5) Operational in severe environments.

b. Limitations.

(1) The terminal teams are not manned for a rear battle role except in extreme emergencies. If assigned personnel are used for security purposes, communications service may be degraded.

(2) Each team will require billet and food service support from the headquarters of attachment.

(3) Administrative and unit level logistical support will be provided by the TACSAT Company.

(4) DS supply and intermediate (DS) maintenance for organic equipment, except C-E equipment, will be provided by the TAACOM. GS supply and intermediate (GS) maintenance for C-E equipment and specialized repair activity (SRA) support for communications security (COMSEC) equipment will be provided by the TAACOM.

(5) Transportation of maintenance support team personnel and critical equipment evacuation

and replacement flights must be provided by the TA Aviation assets.

(6) AN/TSC-85A Tactical Satellite Platoon communications terminals have the following system limitations:

(a) Cannot communicate with U.S. Air Force AN/TSC-94A and AN/TSC-OOA until low rate multiplex equipment modification is performed.

(b) DCS interface is restricted or limited by the amount of equipment in the DSCS or GMF gateway entry at the DSCS earth terminals.

c. Defense. Neither the platoon headquarters, the two AN/TSC-85A terminal sections, nor the individual tactical satellite terminal teams are manned with sufficient personnel for active rear battle operations. Limited area defense may be conducted for short periods of time. Extended security must be provided by the headquarters of attachment. Operations in an NBC environment will be dependent upon the situation.

d. Mobility.

(1) The AN/TSC-85A Tactical Satellite Platoon headquarters has the following TOE vehicles:

(a) Truck Utility: Tactical 3/4 ton W/E M1009.

(b) Truck Cargo: Tactical 5/4 ton 4x4 w/Commo Kit.

(2) The AN/TSC-85A Tactical Satellite Platoon terminal sections each have the following TOE vehicles:

(a) Truck Cargo: Tactical 5/4 ton 4X4 w/Commo Kit.

(b) Truck Cargo: 2-1/2 ton W/E.

3-6. Deployment

a. The AN/TSC-85A Tactical Satellite Platoon is housed in a modified S-280 shelter. It operates with an organic AS-3036/TSC (8-foot diameter) antenna which is moved in an antenna pallet transit frame (APTF). It may operate with the nonorganic AS-3199/TSC (20-foot diameter) antenna. Both antennas are designed for operation with DSCS satellites.

b. The baseband (multiplexing or demultiplexing) equipment is located on the four curbside racks inside the shelter. Modems and intermediate frequency (IF) or radio frequency (RF) assemblies are located in four racks on the roadside of the shelter. The electronic equipment can operate in an NBC environment.

c. Each part of the satellite terminal equipment (shelter and APTF) is transportable by road; air (C-130, C-141, C-5A, or helicopter); rail (flatbed); and sea, For the shelter to be mobile by rail or air, the M720 mobilizer (nonorganic) must be used.

d. Setup time for a trained team using the organic AS-3036/TSC should be 20 minutes (4-person crew) or 30 minutes (3-person crew).

e. Each terminal is capable of independent operation. AN/TSC-85A normally will operate with the AN/TSC-93A described in chapter 4.

Chapter 4

AN/TSC-93A Tactical Satellite Platoon

4-1. General

The AN/TSC-93A Tactical Satellite Platoon is organized and equipped for use in a non-nodal or point-to-point configuration. The terminals operate in the space segment of DSCS II and III. Terminal configurations include shelters, standard trucks, power sources, power switching gear, and trailers.

4-2. Structure

The AN/TSC-93A Tactical Satellite Platoon fills a key position in the building block concept. Terminal sections provide the spoke portion of the hub and spoke configuration described in chapter 3. The terminal teams are attached to the major headquarters they support.

a. Mission. The mission of the AN/TSC-93A Tactical Satellite Platoon is to provide the tactical satellite communications net for the TA. Terminal facilities are provided at major functional command headquarters in the EAC. Terminal facilities also may be provided at corps, field army, or unified and combined headquarters. Terminals also may be used in the area network of the TCS(A).

b. Assignment.

(1) The terminal section teams of the AN/TSC-93A Tactical Satellite Platoon may be attached to headquarters such as—

(a) Theater Navy.
(b) Theater Air Force.
(c) Army alternate.
(d) TAACOM.
(e) Pershing Brigade.
(f) Field Army.
(g) Army corps..

(2) AN/TSC-93A may be assigned wherever there is a need.

c. Organization. The AN/TSC-93A Tactical Satellite Platoon consists of a platoon headquarters element and five AN/TSC-93A terminal sections. Each section has two tactical satellite teams.

(1) The platoon headquarters has a platoon leader, platoon sergeant, and tactical satellite system operator.

(2) Each terminal section team is staffed and equipped for standalone operation.

4-3. Command and control

The TACSAT Company commander employs the operating elements according to mission requirements and operational directives. The extended distance between company headquarters and terminal section teams makes it necessary for the TACSAT Company commander to extend operational control to the platoon leader, platoon sergeant, and section team chiefs. They, in effect, are the TACSAT Company commander's operations staff. The platoon leader directly supervises operations of the widely dispersed teams. He or she keeps the unit commander informed on the operational status of the platoon.

a. Platoon personnel.

(1) The platoon leader represents the company commander. The platoon leader is responsible for the routine administration and operation of the platoon headquarters and the nine tactical satellite terminal teams.

(2) The platoon sergeant, as senior NCO, acts in the name of the platoon leader when dealing with other NCOs. He or she helps the platoon leader ensure mission accomplishment and is the principal enlisted advisor.

(3) The Tactical Satellite Systems Platoon section chiefs are responsible for accomplishment of missions and functions of their AN/TSC-93A Tactical Satellite Platoon teams. The section chiefs advise the platoon leader and platoon sergeant on the operational status of their terminals. They assist the platoon sergeant in the administration of enlisted personnel. Because of their separation from company headquarters, they must be able to make support arrangements for their teams.

(4) The tactical satellite systems platoon operators are responsible for the actual performance of the terminal. The operators provide status reports to the team chiefs.

b. Internal communications. The following internal communications exist within the AN/TSC-93A Tactical Satellite Platoon:

(1) AN/TSC-93A voice orderwire.
(2) HF net.

4-4. Employment

a. The assets of the AN/TSC-93A Tactical Satellite Platoon are employed to support major headquarters command and control communications. They augment the existing terrestrial communications systems. They can also be used to interconnect the TCS(A) area nodal system.

b. Individual terminal teams will be widely dispersed. Each team will be dependent upon the headquarters of attachment, particularly for billeting, food service support, and security.

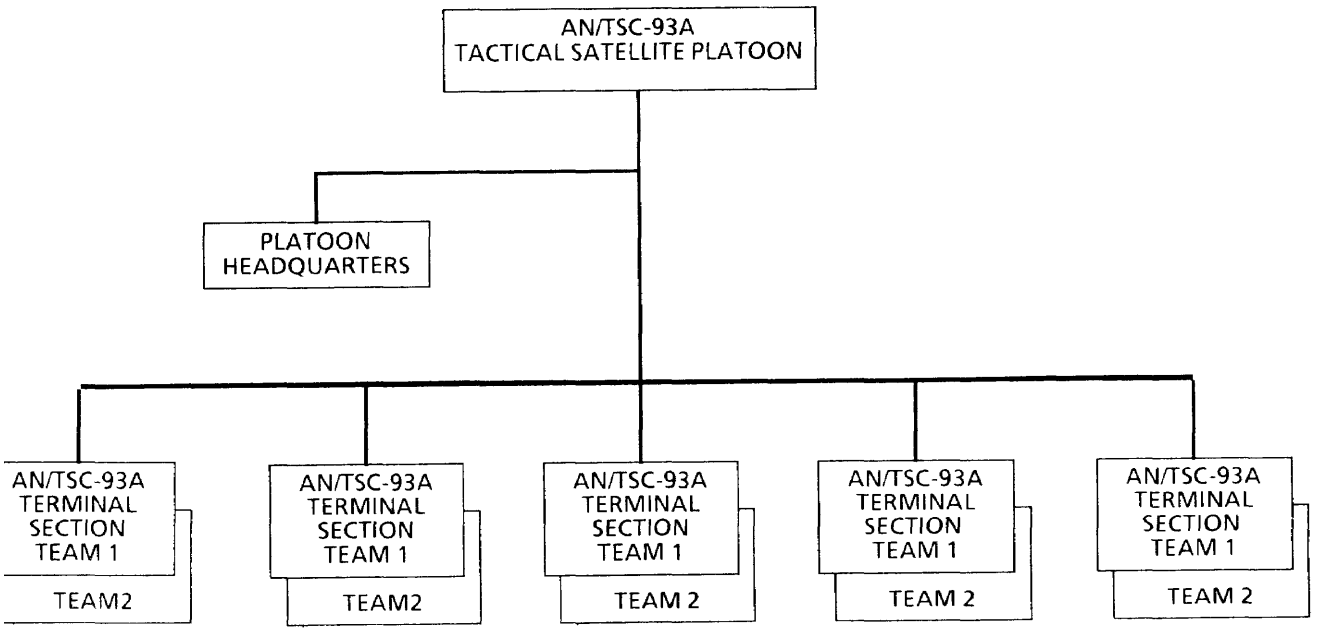

Figure 4–1. AN/TSC-93A Tactical Satellite Platoon Organization

c. The platoon headquarters will make arrangements for command and control, administrative, and logistical support to the dispersed terminal teams.

d. At full strength, the AN/TSC-93A Tactical Satellite Platoon is capable of installing, operating, and maintaining ten AN/TSC-93A tactical satellite communications terminals. Terminals are highly mobile and can be installed and disassembled rapidly.

4-5. Operations

The AN/TSC-93A Tactical Satellite Platoon augments communications links which are currently served by LOS, troposcatter, and HF radio systems. Operating frequencies, transmit power settings, antenna angles, and so forth, are received from the SCCC described in chapter 6. SCCC instructions must be followed exactly. Operating parameters must not be changed without specific approval of the SCCC.

a Capabilities. The AN/TSC-93A Tactical Satellite Platoon terminal provides the following capabilities:

(1) Transmission of an SHF uplink carrier with up to 12 channels of voice and/or digital data (internally multiplexed).

(2) Link with a nodal terminal or with a terminal in the point-to-point mode.

(3) Can, on the downlink side, receive, demodulate, and switch a single SHF carrier via the demultiplexing equipment to the user interface.

(4) Fully independent operation from a 10 kW, single-phase engine generator or compatible commercial power.

(5) Operational in severe environments.

b. Limitations.

(1) The terminal teams are not manned for rear battle operations except in extreme emergencies. If assigned personnel are used for security purposes, communications may be degraded.

(2) Each team will require billet and food service support from the headquarters of attachment.

(3) Administrative and unit level logistical support will be provided by the TACSAT Company.

(4) DS supply and intermediate (DS) maintenance for organic equipment, except C-E equipment, will be provided by the TAACOM. GS supply and intermediate (GS) maintenance for C-E equipment and SRA support for COMSEC equipment will be provided by the TAACOM.

(5) Transportation of maintenance support team personnel and critical equipment evacuation or replacement flights must be provided by the TA aviation assets.

(6) The AN/TSC-93A Tactical Satellite Platoon communications terminals have the following system limitations:

(a) Cannot communicate directly with U.S. Air Force AN/TSC-94A and AN/TSC-100A until low-rate multiplex equipment modification is performed.

(b) DCS interface is restricted or limited by the amount of equipment in the DSCS or GMF gateway entry at the DSCS earth terminals.

c. *Defense.*

(1) Neither the platoon headquarters, the five AN/TSC-93A terminal sections, nor the individual tactical satellite terminal teams have sufficient personnel for active rear battle operations.

(2) Limited area defense may be conducted for short periods of time. Extended security must be provided by the headquarters of attachment. Operations in an NBC environment will be dependent upon the situation.

d. Mobility.

(1) The AN/TSC-93A Tactical Satellite Platoon headquarters has the following TOE vehicles:

(a) Truck Utility: Tactical 3/4 ton W/E M1009.

(b) Truck Cargo: Tactical 5/4 ton 4 x 4 w/Commo Kit.

(2) The AN/TSC-93A terminal sections have the following TOE vehicles:

(a) Truck Cargo: Tactical 5/4 ton 4 x 4 w/Commo Kit.

(b) Truck Cargo: Tactical 5/4 ton 4X4 Shelter Carrier W/E M1028.

4-6. Deployment

a. The AN/TSC-93A Tactical Satellite Platoon is housed in a modified S-250 shelter. It operates with the AS-3036 (8-foot diameter) antenna. The antenna is designed for operation with DSCS satellites. The tracking algorithm function is incorporated within the shelter electronics complement.

b. The shelter is normally transported on the bed of a 5/4 ton tactical cargo truck with the disassembled 8-foot antenna on a second truck. Each truck tows a trailer-mounted engine generator or power unit.

c. The baseband (multiplexing or demultiplexing) equipment is contained within three curb-side racks inside the shelter. The modem and IF or RF assemblies are located in three racks on the road side of the shelter. The electronic equipment can operate in an NBC environment.

d. Each part of the satellite terminal equipment is transportable by road; air (C-130, C-141, C-5A aircraft or helicopter); rail (flatbed); and sea (ship).

e. Each terminal is capable of independent operation.

Chapter 5

Support Platoon

5-1. General

The Support Platoon provides organizational and intermediate DS maintenance on organic TACSAT Company equipment. The platoon leader and platoon sergeant are the TACSAT Company commander's maintenance staff. C-E and COMSEC equipment are maintained by the C-E maintenance/ COMSEC section. Vehicles and power generator equipment are maintained by the motor maintenance section.

5-2. Structure

The Support Platoon is critical to the success of the TACSAT Company. It is the fix-it element that ensures mission accomplishment.

a. Mission. The mission of the Support Platoon is to provide intermediate DS maintenance for C-E and COMSEC equipment and organizational level support for other equipment organic to the TACSAT Company.

b. Assignment. The sections of the Support Platoon operate under the control of the platoon headquarters.

c. *Organization.* The Support Platoon consists of a platoon headquarters, a C-E/COMSEC section, and a motor maintenance section.

(1) The platoon headquarters has a platoon leader, platoon sergeant, equipment records and parts specialist, and a prescribed load List (PLL) clerk.

(2) The C-E/COMSEC section has a C-E repair technician, COMSEC technician, microwave systems supervisor, cryptomaterial NCO, and repairmen.

(3) The motor maintenance section has a motor sergeant, senior wheel vehicle mechanic, power generator equipment repairperson, and mechanics.

5-3. Command and control

The Support Platoon leader is responsible for the supervision of the support platoon. He or she keeps the TACSAT Company commander informed of its operational status. The platoon leader is responsible for accomplishing the platoon missions. Conflicting requirements should be resolved based on circuit or system priorities. Priorities should not be established independent of command guidance or the appropriate systems control element.

a. Platoon personnel.

(1) The platoon sergeant, as senior NCO, acts in the name of the platoon leader when dealing with other NCOs. He or she assists the platoon leader to ensure mission accomplishment.

(2) In addition to organizational C-E maintenance, the C-E repair technician is responsible for directing, coordinating, planning, and supervising all activities within the C-E repair section. The microwave systems supervisor assists the C-E equipment repair technican.

(3) The COMSEC technician operates and maintains the unit COMSEC account and is responsible for the training of the cryptomaterial NCO and the COMSEC equipment repairmen. The cryptomaterial NCO assists the COMSEC technician in the operation and maintenance of the COMSEC account.

(4) The motor sergeant is responsible for the maintenance of organic wheeled vehicle and power generator equipment.

5-4. Employment

a. The Support Platoon supports the company headquarters, the two satellite platoons, and its organic equipment. Equipment of dispersed terminal teams that cannot be evacuated will be maintained by maintenance support teams. The platoon headquarters provides command and control, administrative, and logistical support to operating elements.

b. The Support Platoon performs organizational maintenance on organic equipment. It provides intermediate DS level maintenance for organic COMSEC and C-E equipment.

5-5. Operations

Support Platoon operations require accurate recording of equipment failures. This must include specific identification of equipment serial number, faults, frequency of occurrence, and any other data which might have influenced the problem. Operators must be continuously trained in new diagnostic and repair procedures. Parts inventory and ordering procedures to maintain proper PLL must be accurate and current.

a. Capabilities.

(1) The C-E maintenance/COMSEC section provides organizational and intermediate DS maintenance for the C-E and COMSEC equipment. Maintenance support teams provide onsite repair or replacement of terminal team's equipment.

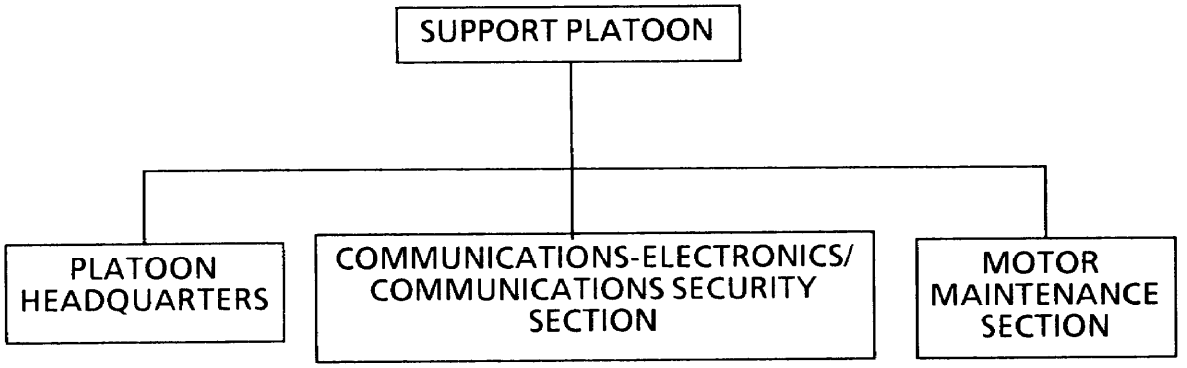

Figure 5–1. Support Platoon organization

(2) The motor maintenance section provides organizational maintenance for vehicles, generators, and refrigeration equipment. Members may be assigned to maintenance support teams.

b. Limitations. Administrative, billeting, food service, and logistical support must be provided by the TACSAT Company. DS supply and intermediate DS maintenance for organic equipment except C-E will be provided by the TAACOM. Transportation of maintenance support team personnel and critical equipment evacuation or replacement flights must be provided by TA aviation assets.

c. Defense. Members of the Support Platoon may be used for rear battle operations. They must be ready to react quickly to maintenance needs. They should be used to augment the existing security force. Support platoon personnel can continue their assigned mission in an NBC environment for a limited period. Extended operations in an NBC environment require higher headquarters support.

d. Mobility.

(1) Support Platoon headquarters has the following:

(a) Truck Cargo: 2-1/2 ton 6x6 W/E.

(b) Trailer Cargo: 1-1/2 ton 2 Wheel W/E.

(2) C-E maintenance/COMSEC section has the following:

(a) Truck Cargo: Tactical 5/4 ton 4x4 w/Commo Kit.

(b) Truck Cargo: Tactical 5/4 ton 4X4 W/E M1008.

(c) Truck Cargo: 2-1/2 ton 6x6 W/E.

(d) Trailer Cargo: 3/4 ton 2 Wheel W/E.

(3) Motor maintenance section has the following:

(a) Truck Cargo: Tactical 5/4 ton 4X4 W/E M1008.

(b) Truck Cargo: 2-1/2 ton 6x6 W/Winch W/E.

(c) Trailer Cargo: 3/4 ton 2 Wheel W/E.

(d) Trailer Cargo: 1-1/2 ton 2 Wheel W/E.

5-6. Deployment

The Support Platoon will normally be deployed with the TACSAT Company headquarters. The Support Platoon will be used throughout the theater in support of the dispersed terminal teams. If the TACSAT Company headquarters is not forward deployed, platoon operations and basing plans must be revised to ensure rapid response to all terminal sections. SCCC repairmen can provide technical assistant (chap 6).

Chapter 6

Tactical Satellite Communications Control Center (AN/MSQ-l14)

6-1. General

The GMFSC is a special user network within the DSCS. GMFSC must provide its own control subsystem. Portions of the DSCS SHF satellite frequency and power are allocated to the special user networks. Each network must be engineered and controlled by a special user control subsystem. The USAISC GMF SCCC is a special user control subsystem. It controls the GMFSC community comprised of Army, Air Force, and Marine Corps satellite terminals of forces engaged in land and tactial air operations. One method of providing this control is through the transportable SCCC (AN/MSQ-114). Another method of control is discussed in chapter 7. The SCCC (AN/MSQ-114) also provides control under stress conditions.

6–2. Structure

The SCCC (AN/MSQ-114) is organized under a tables of distribution and allowances (TDA) augmentation. It is structured to provide a theater level tactical satellite control facility to manage and access the network. Figure 6–1 shows a diagram of the SCCC (AN/MSQ-114).

a. Mission. The SCCC (AN/MSQ-114) provides control for up to 100 terminals using frequency modulated (FM) orderwire. It can control 50 terminals in the anti-jam or control mode. The missions of the *SCCC* (AN/MSQ-l14) are—

(1) Satellite request initialization.
(2) Satellite terminal monitoring.
(3) Satellite link reconfiguration.
(4) Interface with DSCS controller.
(5) Fault location or jamming response.

b. Assignment. One SCCC (AN/MSQ-114) is assigned per satellite area of operations.

c. *Type organization.* The SCCC (AN/MSQ-114) is not adaptable to a type B organization.

d. Organization. The *SCCC (AN/MSQ-114)* is part of a chain that provides real-time satellite control. Figure 6-2 shows a diagram of real-time satellite control. At full strength the SCCC (AN/MSQ-l14) is comprised of 15 personnel. The senior officer is the station manager and commander. The station manager is supported by an operation or maintenance NCO and operator repairpersons. The section also has a supply specialist, a generator repairperson, and a utility equipment repairperson.

6-3. Command and control

The SCCC (AN/MSQ-114) is under the operational control of the GMF manager for their assigned satellite. Technical monitoring of GMFSC SHF satellite terminals is accomplished via the SCCC (AN/MSQ-

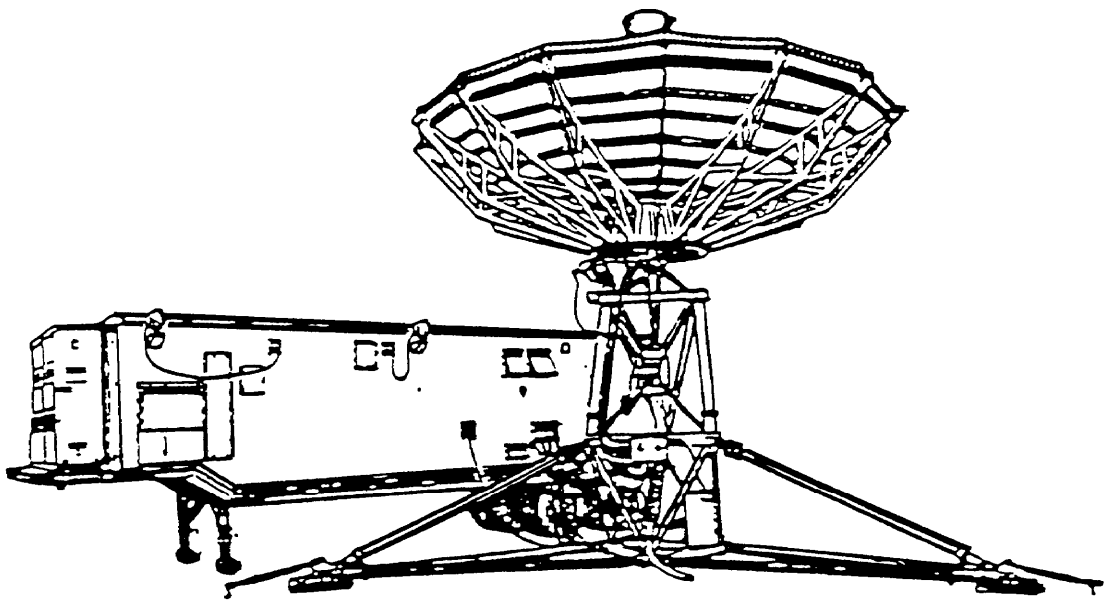

Figure 6–1. Satellite Communications Control Center (AN/MSQ-114)

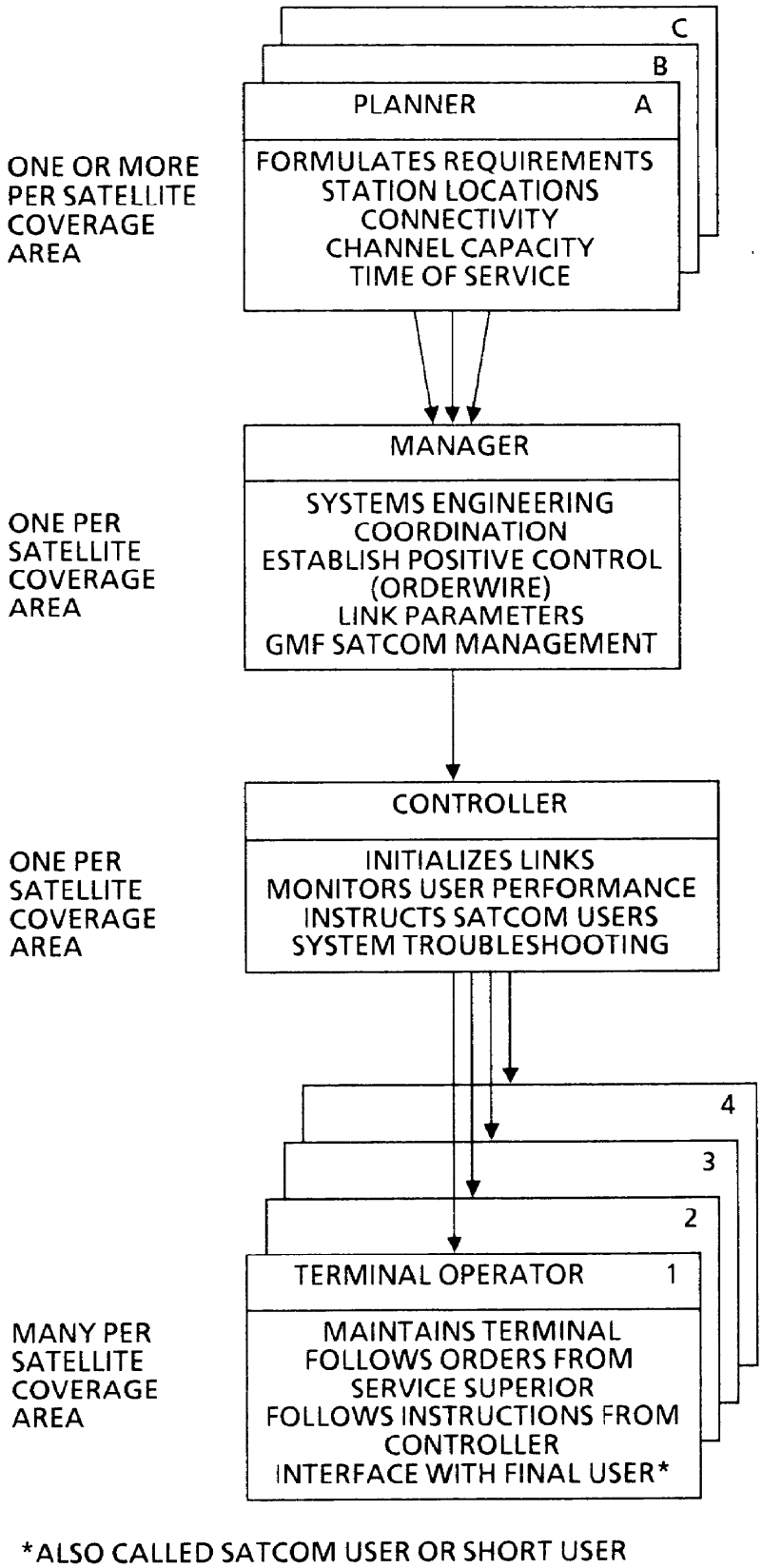

Figure 6–2. Real-time satellite control

114) Satellite Automatic Monitoring Subsystem (SAMS).

a. Resources available. The SCCC (AN/MSQ-114) uses TCC(A) assets for command and control. The SCCC (AN/MSQ-l14) is housed in a 34-foot semitrailer. It has its own prime mover; power generator; and test, measurement, and diagnostic equipment (TMDE), but is dependent upon theater assets for personnel and additional equipment transport. The section has limited organic assets.

b. Internal communications. The SCCC (AN/MSQ-114) has a satellite orderwire. It can communicate with all deployed GMFSC SHF terminals for control purposes. It has two AN/UGC-74s for communications with the DSCS controller and the GMFSC manager. The SCCC (AN/MSQ-114) is also tied into the TCC(A) network.

6-4. Employment

a. GMFSC configurations. The SCCC (ANIMSQ-114) controls individual GMFSC configurations, as shown in figure 6-3. These are—

(1) Point-to-point configurations.

(2) Hub-spoke configurations with up to four spoke terminals.

(3) Mesh configurations with two or more hubs and associated spoke terminals.

b. Communications terminals. The Army and Marine Corps terminals are not compatible with the Air Force terminals and vice versa, until the army and Marine terminals are modified with the low rate multiplex equipment. The following types of communications terminals may be used in the GMF:

(1) Army and Marine Corps terminals:

(a) AN/TSC-85A. Hub terminal capable of communicating with one to four other Army or Marine Corps terminal.

(b) AN/TSC-93A. Capable of communicating with one other Army or Marine Corps terminal.

(2) Air Force terminals:

(a) AN/TSC-100A. Hub terminal capable of communicating with one to four other Air Force terminals.

(b) AN/TSC-94A. Capable fo communicating with one other Air Force terminal.

c. *Functions.* The functions of the SCCC (AN/MSQ-114) are to—

(1) Coordinate satellite access data with the GMFSC manager.

(2) Establish positive GMFSC subnetwork satellite control.

(3) Evaluate and determine satellite link parameters.

(4) Establish and reconfigure approved satellite networks.

(5) Conduct anti-jam operations.

d. Employment in the theater of operations. Normally one SCCC (AN/MSQ-l14) is employed per satellite area of operations. It provides control using currently fielded orderwire on a real-time basis. Figure 6-4 depicts a typical theater network with the GMFSC as a subnet.

6-5. Operations

a. GMFSC terminal. Two conditions must be met before a GMFSC terminal can start transmitting on a given frequency:

(1) The GMFSC must be authorized DSCS satellite access on an assigned frequency. This authorization is granted by the GMFSC manager. The GMFSC manager selects the frequency from an allotment granted to the GMFSC by DCA.

(2) The assigned transmit frequency must be cleared for the terminal location by the local frequency authority. This ensures the GMFSC does not interfere with other services in that area or country. It is the responsibility of the TCC(A) communications system planning element (CSPE) to obtain local frequency authority.

b. SCCC (AN/MSQ-114) *system operations.*

(1) *Initializations.* When the SCCC (AN/TMSQ-114) terminal is setup at a new location, the control orderwire to the DSCS controller is activated. The SCCC controller initiates and calibrates the SAMS. Transmit power is adjusted to achieve the planned link performance via the orderwire. Final settings are documented.

(2) *Monitoring.* The SCCC controller monitors the network for out-of-tolerance conditions using the SAMS, manual spectrum analyzers, and user reports. These may be caused by bad weather, equipment problems, operator errors, satellite problems, as well as intentional or unintentional interference. The SCCC controller detects and analyzes network problems and directs work-around solutions such as temporary power adjustments, reduction-in-link capacity, or instructions to operators. It may even be necessary to temporarily interrupt service for major maintenance actions. The SCCC controller maintains a network status display and a log of problems and terminal faults.

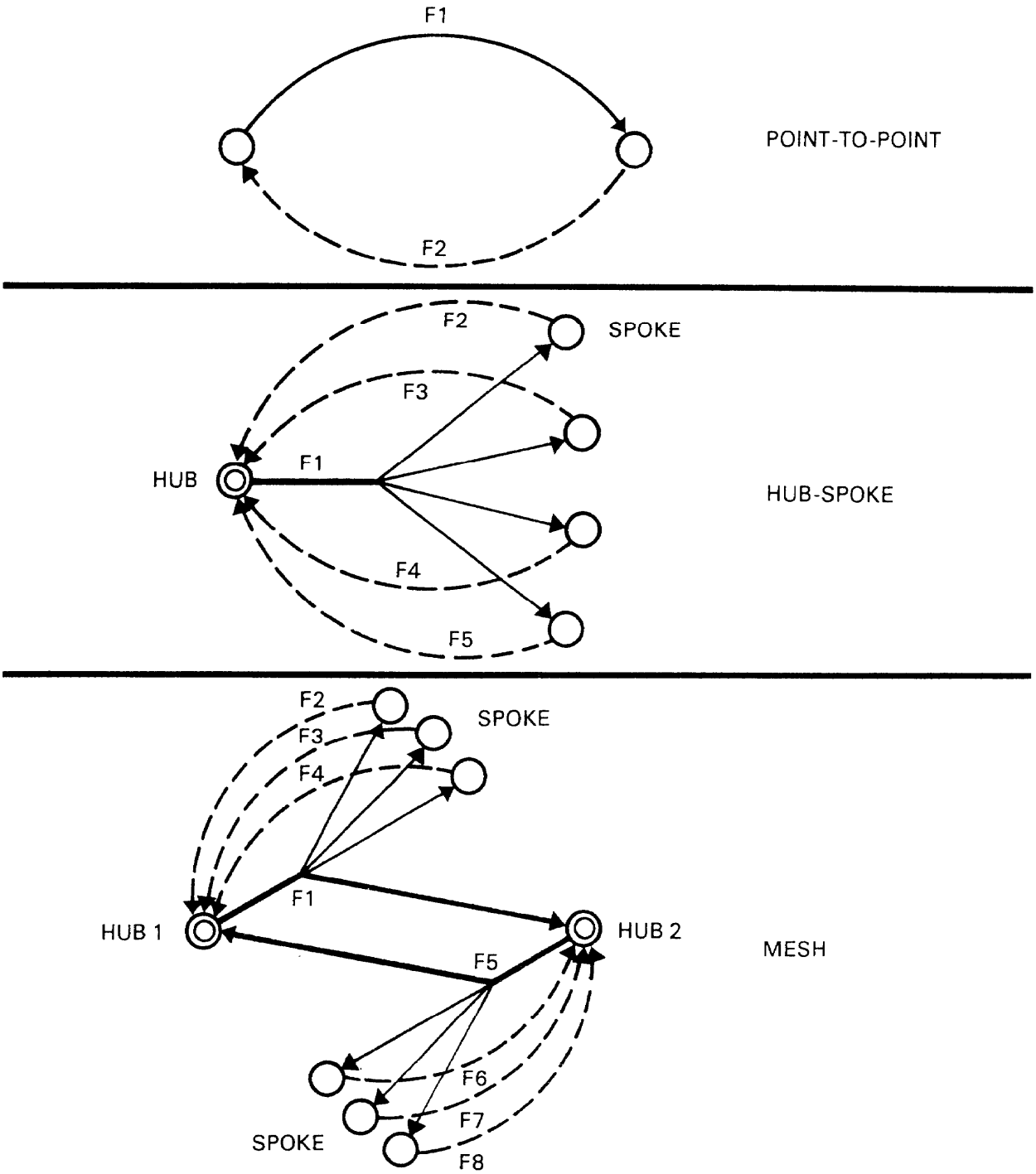

Figure 6–3. GMF network configurations

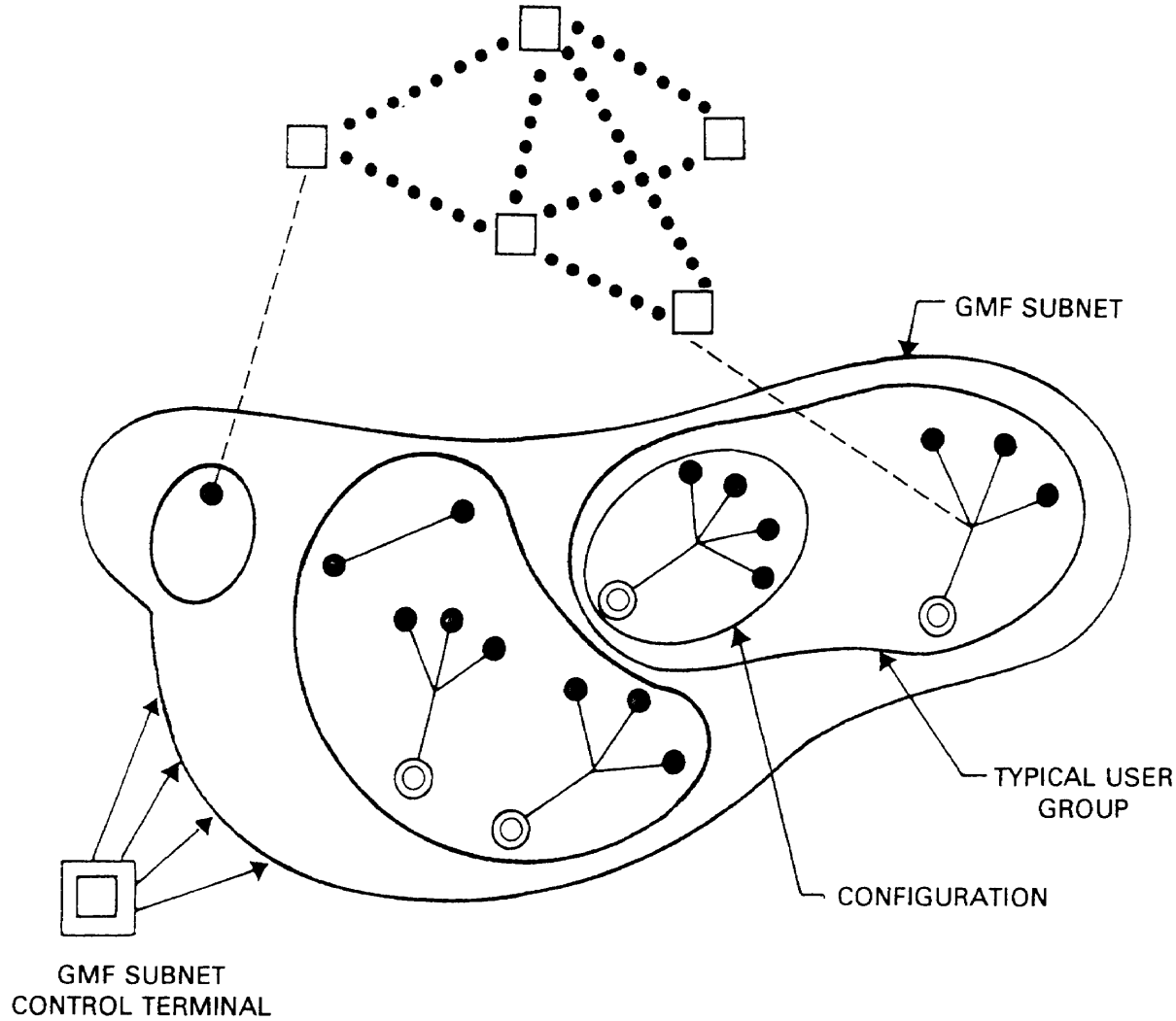

Figure 6–4. Type theater network, GMFSC subnet

(3) *Reconfiguration.* The SCCC controller directs any required real-time link or network reconfiguration. These reconfigurations may be required because of rapid terminal movement, enemy action, or changes in communication requirements. The SCCC controller has the authority to do this unless additional satellite power or new frequency assignments are required. The GMFSC manager must be informed to obtain additional power and/or frequency changes.

(4) *Interfacing with the DSCS controller.* The DSCS controller is responsible for the DSCS satellite communications (SATCOM) network. The GMFSC is only a subnet. The SCCC controller must work with the DSCS controller when SCCC (AN/MSQ-114) actions may impact on network performance.

(a) Coordination normally occurs before the GMFSC carriers come on the air, when changes in GMFSC satellite transmit power are required, or when serious link degradations occur that cannot be traced.

(b) The DSCS controller informs the SCCC controller of violations by the GMFSC user community.

(5) *Fault locations and response to jamming.*

(a) A major duty of the SCCC controller is to monitor and analyze the total downlink spectrum for faults. TACSAT terminal operators are assisted in detecting which stations are at fault. In severe cases, such as satellite failure and jamming, aid is required from the DSCS controller to pinpoint a problem.

(b) The SCCC controller also directs and coordinates implementation of network anti-jamming plans. Anti-jam responses must be closely coordinated with the DSCS controller. Anti-jamming actions are addressed further in chapter 9 and in detailed plans.

c. Capabilities.

(1) The SCCC (AN/MSQ-114) equipment is housed in an environmentally controlled 34-foot M373A2E7 (modified) semitrailer (van). The van contains all required communications equipment, status displays, TMDE, air conditioning, and records storage. It provides space for 90 days running spares and expendable supplies. The power generators and 20-foot parabolic ground-mounted antennas are moved by two M35 trucks. The van is moved by a 5-ton tractor.

(2) The SCCC (AN/MSQ-114) provides real-time monitoring of satellite output and ground terminal performances. Its controllers approve and monitor assignment of scheduled channel and power allocations. They assure assignments are followed. The system consists of the following:

(a) Transmitter group.
(b) Receiver group.
(c) Three SCCC (AN/MSQ-l14) orderwire modems.
(d) Monitoring group.
(e) Antenna group.
(f) Two power generators.

d. Limitations. The SCCC (AN/MSQ-114) is dependent upon the TCC(A) for transportation, supply service support, medical, financial, personnel, and other logistical support.

e. Defense. The SCCC (AN/MSQ-114) will normally be located towards the rear of the COMMZ with the theater commander. Personnel will not normally be used for defense purposes.

f. Mobility. The SCCC (AN/MSQ-114) personnel are dependent upon the Theater Transportation Command for transport. Setup or teardown time for the SCCC (AN/MSQ-114) is approximately 12 hours. Frequency of movement coincides with movement of the TCC(A) headquarters.

6-6. Deployment

One SCCC (AN/MSQ-114) is deployed per theater of operation. This deployment can either be in support of forward-deployed forces, nonforward-deployed forces, or contingency operations.

a. Forward-deployed support. In forward-deployed support, the SCCC (AN/MSQ-l14) and the SCC (AN/MSQ-114) personnel may be located adjacent to the TCC(A) headquarters, but remain under the operational control of the GMFSC manager,

b. Nonforward-deployed support. The SCCC (AN/MSQ-114) can support a theater from outside that theater. For example, the SCCC (AN/MSQ-114) located at Fort Detrick, Maryland, is capable of supporting the GMFSC European theater missions via the DSCS II Atlantic satellite.

c. Contingency suport. The SCCC (AN/MSQ-114) can only support operations from outside the contingency theater when controlling GMFSC missions on a DSCS II satellite. For example, an SCCC (AN/MSQ-114) located in Italy could support a Southwest Asia scenario when operating with a DSCS II satellite, but would have to be located in Southwest Asia with the GMFSC terminal when operating on the DSCS III satellite. Operations security (OPSEC) is improved when operating on the DSCS II satellites.

Chapter 7

Defense Satellite Communications System Ground Mobile Force Control Link Section

7-1. General

The Defense Satellite Communications System Ground Mobile Force Control Link Section (DGCL) provides an interface between the strategic and tactical SATCOM network controllers. Since the DGCL will operate as the largest special user subnet within the DSCS Operational Control System (DOCS), the DGCL requires its own subnet controller at selected DOCS sites. Figure 7-1 shows a diagram of the GMF satellite communications network.

7-2. Structure

DGCL principal components are identical to the SCCC (AN/MSQ-114). They are categorized as orderwide subsystem, SAMS, and teletype subsystem. The DGCL uses the host terminal RF equipment for transmission and monitoring of the GMFSC terminals.

a. Mission. The DGCL personnel—

(1) Coordinate with DSCS and GMFSC controllers on matters affecting GMFSC deployments. Coordination is accomplished via the DGCL orderwide.

(2) Exercise control of the GMFSC terminals in the DSCS operations FGFSC gateway link.

(3) Can provide contingency control of the GMFSC network in the absence of the SCCC (AN/MSQ-114).

b. Assignment.

(1) The DGCLs are located in fixed station earth terminals. The present locations are:

(a) Camp Roberts, California.
(b) Fort Buckner, Okinawa.
(c) Fort Detrick, Maryland.
(d) Landstuhl, West Germany.
(e) Fort Gordon, Georgia (training).

(2) There is presently one DGCL allocated per theater of operations.

(3) Future DGCLs will be located at:

(a) Sunnyvale, California
(b) Washington, DC, area.
(c) Northwest, Virginia.
(d) Clark Air Base, Philippines.
(e) Wahiawaha, Hawaii.
(f) Fort Monmouth, New Jersey (support system).

c. Organization. There are five full-time personnel assigned to the DGCL at the DSCS operation centers located at Camp Roberts, Fort Detrick, and Landstuhl. There are also five full-time personnel assigned to the DGCL located at the Fort Buckner earth terminal.

7-3. Command and control

The DGCL provides orderwire communications with GMFSC terminals and measurement of GMFSC satellite use. The DGCL operates in the SHF military satellite communications band. Unlike the SCCC (AN/MSQ-114), the DGCL is not self-sufficient. The DGCL uses the antenna, receive RF amplification, and transmit RF amplification of a DSCS host satellite terminal. The terminal connection does not reduce the normal communications capacity of the host terminal. The DGCL will be installed in buildings with other equipment. Normally, the only communications available to deployed GMFSC terminals is via satellite orderwire.

a. Section personnel. At this time, five personnel are authorized for the DGCLs. If a large GMFSC mission is required, the DGCL must be augmented by additional personnel. The complexity and size of the DGCL require a crew of two persons per shift. Maintenance requirements for the SAMS and other special DGCL control equipment are unique. The DGCL operators are trained to provide intermediate (GS) maintenance.

b. Internal communications. The internal communications for the DGCL consists of class A phone access, automatic voice network (AUTOVON), automatic digital network (AUTODIN), and automatic secure voice communications (AUTOSEVOCOM) and orderwire subsystem.

7-4. Employment

a. The DSCS or DGCL provides the required control for the following SHF satellite terminals:

(1) *Production Model*

(a) AN/TSC-85A.
(b) AN/TSC-93A.
(c) AN/TSC-94A.
(d) AN/TSC-100A.

(2) Development model.

(a) AN/TSC-85.

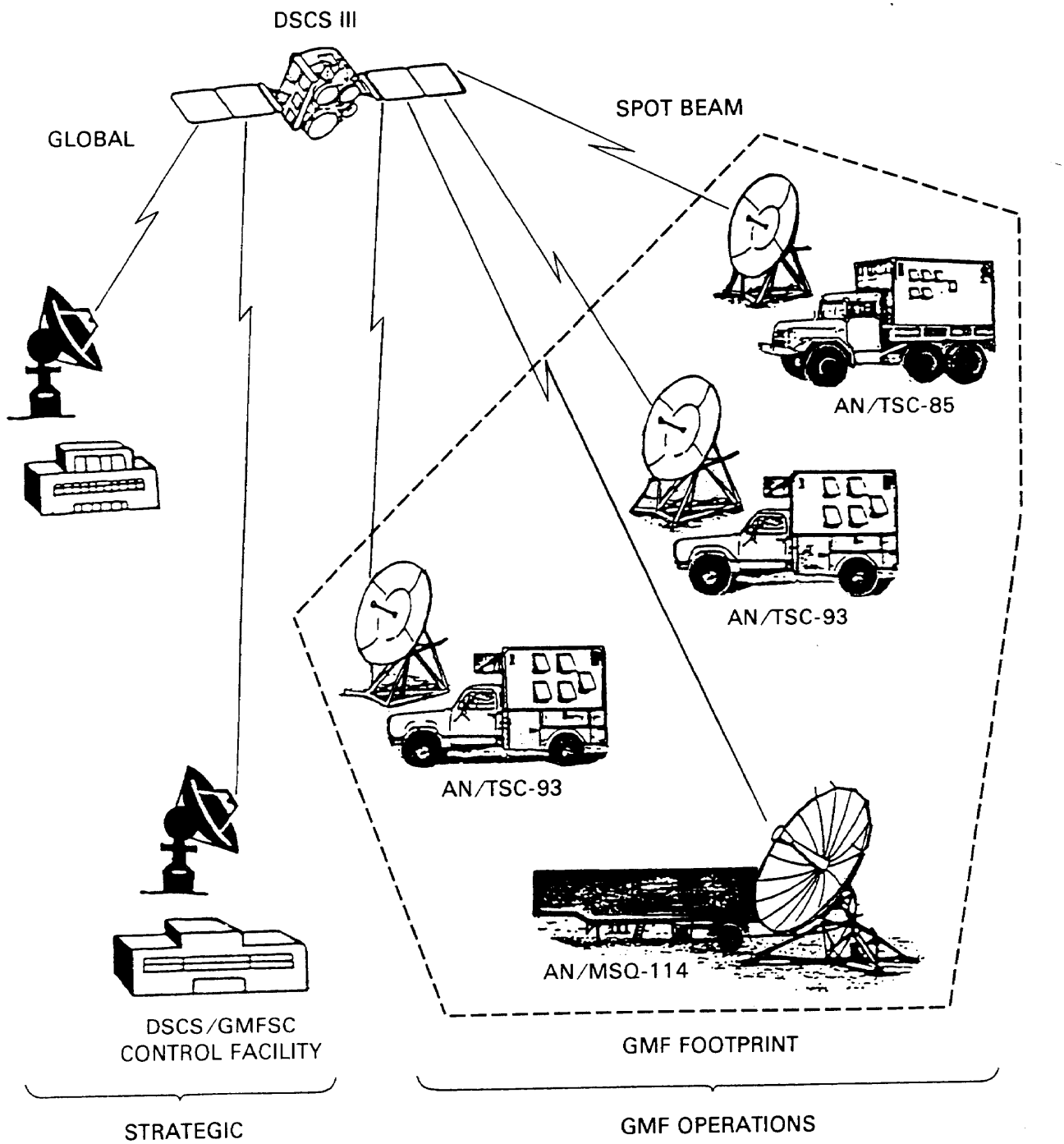

Figure 7–1. Ground Mobile Forces Satellite Communications Network

(b) AN/TSC-93.
(c) AN/TSC-94.
(d) AN/TSC-100.

b. Complexity of employment scenarios depends on the timeframe and tactical situation. The SCCC (AN/MSQ-114) provides SCCC control for GMFSC links.

c. The operation of DGCL equipment is dependent on equipment within the DSCS host facility. The DGCL is under the operational control of the satellite area GMFSC manager.

7-5. Operations

The DGCL has four mission capabilities (DSCS gateway control, GMFSC network control, large GMF terminal deployment, and small GMF terminal deployment) which are shown in figure 7-2.

a. Capabilities. The DSCS or DGCL cannot do all four missions simultaneously. Normally the DGCL will have two full-time functions:

(1) Control orderwire circuits to SCCC (AN/MSQ-114) and SATCOM NCT deployed in the covered area.

(2) Exercise control of interoperable (gateway) links. Contingency control for GMFSC networks and control of small GMFSC operations for extended periods require personnel augmentation.

b. Limitations. The DGCL depends on host-station DSCS equipment. It is not transportable. All support (for example, personnel, medical, financial, and so forth) comes through the host-station commander.

c. Defense. The DGCL personnel augment the host-station personnel for site defense. Within a theater of operations the DGCL sites are lucrative targets for the enemy. Site defense consists of physical security, protection against electromagnetic pulse (EMP), and operations in an NBC environment.

d. Mobility. The DGCL is neither mobile nor transportable. The three subsystems can be removed from a DSCS earth terminal and reinstalled at another earth terminal. Disassembly or installation would take 1 day if another site is prepared in advance.

7-6. Deployment

The DGCL accomplishes the missions in either a forward-deployed mode or nonforward-deployed mode.

a. Forward-deployed support. The DGCLs located within a satellite area of operations provide support to the TCC(A) commander. As such, the personnel are under the command of the TCC(A) commander, but under the operational control of the GMFSC manager.

b. Non-forward-deployed support. The DGCL in a satellite area may provide support to another satellite area. For example, the DGCL facility located at Fort Detrick, Maryland, frequently controls the European theater via the DSCS II Atlantic satellite.

c. *Contingency deployment.* The DGCL can control DSCS II satellite contingency operations from outside the theater. This control reduces aircraft and personnel requirements. It also enhances OPSEC considerations. The DSCS or DGCL is also used to provide contingency control when the SCCC (AN/MSQ-114) is being deployed.

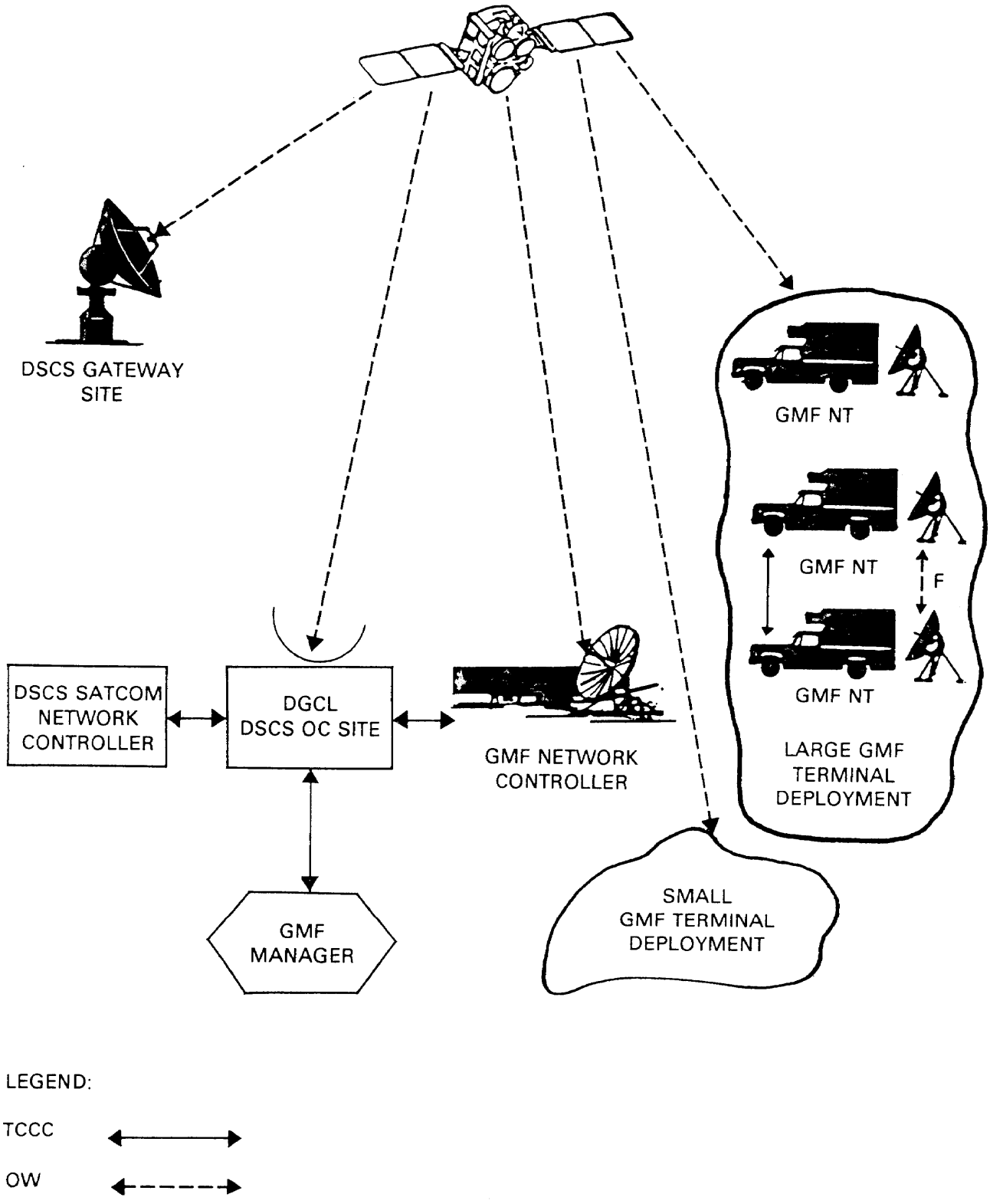

Figure 7-2. DSCS/DGCL Mission Capabilities

Chapter 8

Planning

8-1. General

a. C-E planning is a continuous process. It involves analyzing, allocating, and integrating C-E resources to support requirements. All commanders rely on communications to—

(1) Control elements of their command.
(2) Gather information.
(3) Distribute intelligence.
(4) Coordinate operations.

b. When you are out of communications, you are out of command! TACSAT communications planning is guided by the supported commander's priorities. It must be geared to accomplish the mission. The planning demands that TACSAT Company planners understand TACSAT capabilities and limitations. Further, the company commander must see that no details are overlooked. This chapter provides an overview of C-E planning with emphasis on planning for TACSAT operations. It briefly discusses the standardized planning procedures and techniques that help to ensure all relevant factors are considered. Other publications listed in the appendix provide more detail on TACSAT operations.

8-2. Tactical satellite operations planning

a. Planning for TACSAT employment is accomplished at TCC(A) and theater signal brigade level. Plans and orders generally will originate at the signal brigade's CSPE. If the TACSAT Company is assigned to a composite battalion, the plans will be further developed by the battalion staff. Technical operations of the terminal sections are directed by SCCC and DSCS GMFSC as described in chapters 6 and 7. The TACSAT Company must advise higher headquarters commanders and staff of unit readiness and be involved in higher headquarters planning.

b. During field operations, the composite battalion CSCE provides circuit direction on as near a real-time basis as possible. The CSCE also coordinates with the communications nodal control elements (CNCE) in the area nodal system. FM 24-22 provides a detailed discussion of management and control planning under the C-E Management System (CEMS). The battalion CSCE accomplishes the following for TACSAT operations:

(1) Allocates circuits based on priorities.
(2) Designates traffic routes and reroute as necessary.
(3) Establishes restoration priorities.
(4) Develops system reconfiguration including signal center displacements.
(5) Ensures maintenance of records.
(6) Supervise closeout procedures.

c. Important to TACSAT operations are numerous functions that must be planned within the TACSAT Company. The include logistics support, unit movements, and site preparation and defense. Since the TACSAT Company does not have a planning staff, this planning must be done by the TACSAT Company commander and all subordinate leaders. TACSAT terminal chiefs, unlike NCOs in most units, must do their day-to-day work independent of the company. When doing so, they should follow the same sequence of commander and staff planning actions used by higher headquarters commanders and their staffs. This sequence, shown in figure 8-1, describes a logical and systematic way to solve problems. The extent to which each step (exclusive of the decision) is performed by the TACSAT Company commander varies. It can be influenced by the situation and time available. Frequently, many of these steps are carried out concurrently. The initial step involves mission analysis. What has to be done must be determined precisely before determining how best to accomplish it. This decisionmaking process is described in detail in FM 101-5.

8-3. Plan development and orders

TACSAT operations require extensive coordination and rapid adjustment to changing situations. The use of standardized planning and decisionmaking techniques will provide the detail necessary to achieve these ends. This paragraph provides a brief description of some techniques for TACSAT Company planners. Other publications in the appendix provide more detail. The best planning results from careful application of common sense to these fundamental planning techniques. C-E planning must be included in TACSAT Company leader training.

a. C-E estimate of the situation. C-E planning starts with an estimate of the situation. Table 8-1 shows the 5-step basic process. At company level, a mental estimate or informal written estimate may be enough. The C-E estimate begins when a mission is assigned or deduced. The estimate is continuously updated. FM 24-16 contains a detailed discussion on the preparation of a C-E estimate.

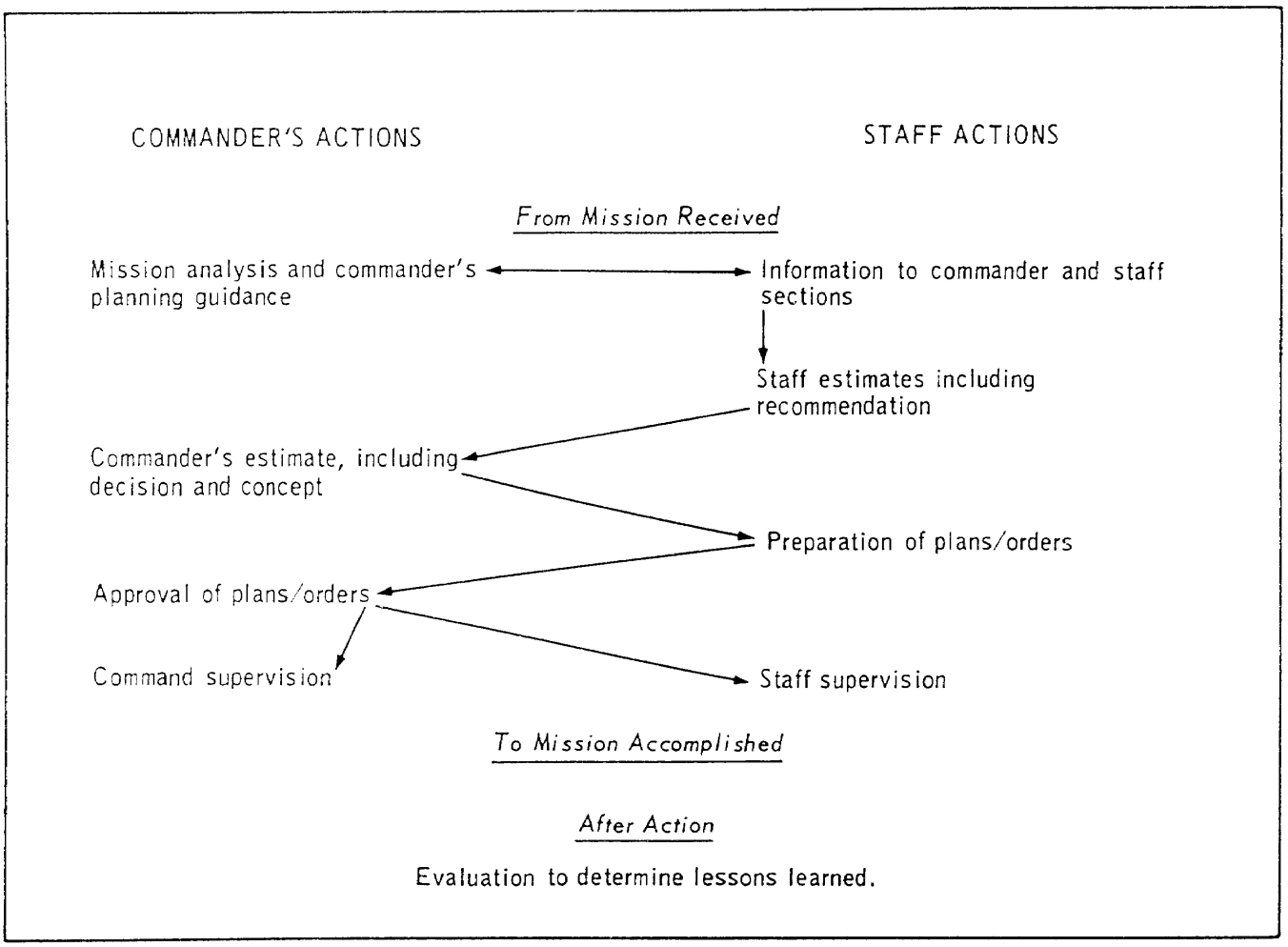

Figure 8–1. Commander and staff planning actions

b. C-E plan. Th C-E plan amplifies the decision in paragraph 5 of table 8-2. The C-E planning format is the same used to develop an operation order (OPORD) and its C-E annex.

(1) TACSAT Company planning involves anticipation of future resource needs. Many resource needs (for example, air transport, bulk fuels, rations) must be obtained from other units or services. Planning matches what is required with what is available. Requirements are compared and weighed against capabilities. If requirements cannot be met, either requirements must be reduced or more resources obtained. For detailed discussion on considerations for developing C-E plans, see FM 11-23, FM 24-1, and FM 24-16.

(2) Weather, terrain, and the enemy are routine considerations in the estimate process. Unusual terrain and extreme climatic conditions have a significant effect on operations. Detailed information about operations in special climatic environments is found in the FM 90-series and FM 24-21. NBC warfare also presents unique circumstances. The NBC environment is introduced in chapter 10 and discussed in detail in FM 3-100.

c. Classes of signal unit orders. Orders fall into two general classes: routine and combat. Routine orders cover administrative matters. Combat orders pertain to operations in the field. They are used to direct, control, and/or govern the use of C-E assets. Detailed discussions of signal unit operation orders, procedures, and instructions are found in FM 24-16. Combat orders express the commander's concept of the operation. They convey instructions to subordinate commanders and must be clear, complete, and concise. TACSAT Company officers and NCOs should make a practice of issuing instructions in the appropriate order format. There are three common types of combat orders.

Table 8-1. Format for the estimate of the situation

ESTIMATE OF THE SITUATION (See FM 24-16, app B, for an example C-E estimate)

1. MISSION
   Know the problem.
2. THE SITUATION AND COURSES OF ACTION
   Assemble all the facts that bear on the problem.
   Consider difficulties that could adversely affect mission accomplishment.
   Determine possible solutions.
3. ANALYSIS OF OPPOSING COURSES OF ACTION
   Analyze each possible solution to determine advantages and disadvantages.
4. COMPARISON OF OWN COURSES OF ACTION
   Compare possible solutions.
   Select solution that best solves the problem.
5. DECISION (OR RECOMMENDATION)
   Transcribe the selected solution into a decision (if it is the commander's estimate) or recommendations (if it is the staff's estimate).

Table 8-2. Format for a signal unit operation order

Operation order (See FM 24-16, app C, for an example signal unit OPORD; also see app D for an example C-E annex).

1. SITUATION
   a. Enemy forces (location, strengths, capabilities, activity).
   b. Friendly forces (task organization, locations, signal support).
   c. Attachments and detachments (units attached or detached and effective time).
2. MISSION (clear, concise statement of battalion or company mission).
3. EXECUTION
   a. Concept of operation (types and phasing of communications support).
   b. Tasks for subordinate units (specific tasks for subordinate signal units).
   c. Coordinating instructions (information common to two or more units concerning signal centers, C-E systems, messenger, wire, radio, and so forth).
4. SERVICE SUPPORT (information pertaining to rations, medical support, transportation, and other combat support matters).
5. COMMAND AND SIGNAL
   a. Command (location of command post).
   b. Signal (CEOI number in effect, reference to applicable C-E annex or SOP).

(1) *Warning order.* A warning order gives advance notice of an operation or an order that is to follow. It contains as much information that is available at the time and is usually issued orally.

(2) *OPORD.* OPORDS detail coordinated actions necessary to carry out the commander's concept. They follow the standard 5-paragraph format shown in table 8-2. TACSAT Company OPORDs can usually be issued orally.

(3) *Fragmentary order (FRAGO).* FRAGOS are essential for contingency and other quick reaction changes to plans, such as CP relocation, enemy jamming, or intrusions. They are usually issued orally.

d. Operating procedures and instructions. Other documents have the authority of combat orders. Communications users must use and follow the procedures and instructions they contain.

(1.) *SOP.* SOPS contain instructions which lend themselves to a definite or standardized procedure. In particular, the operation of C-E equipment, facilities, and systems require SOPS. Other SOPs are prepared as required. Uniform practices established by SOPS promote understanding and teamwork and minimize confusion and error. FM 24-16 suggests subjects for signal unit SOPs.

(2) *C-E Operating Instructions (CEOI).* CEOIs provide the guidance communications users need to operate most command and control communications. The primary feature of the CEOI is its capability to change call signs, suffixes, and frequencies at least every 24 hours. This does not apply to frequency assignments for TACSAT terminals as discussed in chapter 6. The command CEOI is the only authorized document from which to extract other call signs and frequencies. FM 24-16 should be consulted for a detailed description of the CEOI and how to use it.

(3) *Allied and joint publications.* A series of international agreements and procedures governs the operation of C-E systems in support of combined operations. Under certain circumstances, there may be memorandums of agreement or memorandums of understanding with a host nation. Other agreements and procedures are called Allied Communications Publications (ACP) and International Standardization Agreements (STANAGs) Joint Army-Navy-Air Force Publications (JANAPs) are a series of service agreements governing communications procedures in joint operations. The instructions in JANAPs are in agreement with those in allied publications and all take precedence over conflicting provisions of Army publications (AR 310-20). A reference listing of pertinent ACPs, STANAGs, and JANAPs is in the appendix.

8-4. Records and reports.

Accurate C-E records and reports are an absolute necessity. They provide commander and staff with impartial and factual data about a unit's operations. TACSAT operations records and reports are established by the SCCS and DSCS GMFSC. FM 24-16 discusses records and reports that pertain to operations, supply and maintenance, and unit readiness. Examples of many records and reports are also shown in FM 24-6, appendix G.

8-5. Site planning

TACSAT systems design and general location of sites are in the OPORD. The exact location must be selected and the signal system configured on the ground. Site planning is usually carried out at the platoon level. In some cases the terminal section chief must do the site plan. The plan must consider communications requirements, engineer support, logistics support, protection of resources, and the electronic threat. The need for antenna stability demands firm base foundation. A series of alternative site diagrams should be prepared for various antenna, generator, and shelter configurations.

8-6. Movement planning

Under AirLand Battle doctrine, a signal unit cannot expect to stay in one place very long, even at EAC. Supported units and command posts (CPs) will be displacing. TACSAT terminal sections will be constantly planning, installing, and moving communications facilities. Sometimes this must be done without TACSAT Company level support. They must be able to set up, tear down, and reestablish communications faster than ever before. The TACSAT Company commander should be aware of these mobility objectives and emphasize movement training.

a. Road marches.

(1) A primary concern is rapid movement of units in support of tactical operations. Road march planning must often be accomplished hastily. It consists of concurrently determining requirements, analyzing capabilities, and establishing priorities. Success or failure of a major mission may depend on the ability to move rapidly and reestablish necessary communications. The preparation of unit movement SOPS and movement training will help in achieving proficiency in road marching. Proper driver and preventive maintenance training also contribute to the quick and safe movement of the unit.

(2) The following routine items should be included in TACSAT Company movement SOPs:

(a) Loading plans.
(b) Composition of march units.
(c) Control meaures.
(d) Rates of march.
(e) Time intervals and distances.
(f) Timing and duration of halts.
(g) Tasks during halts.
(h) Organization of reconnaissance parties.
(i) Security measures.
G) Reporting instructions.
(k) Location of CP.
(l) Communications.

(3) Training must be conducted to test and check load plans, improve SOPS, and maintain operational efficiency. Integrate occupation of assembly areas and road marches into other types of training whenever possible. See FM 55-30 for details on motor transport operations.

b. CP displacement. TACSAT personnel must be particularly proficient during CP displacement. The following two methods of displacement are generally used. In each case, site planning must be accomplished. FM 24-1 contains information concerning CP displacements during combat.

(1) *Phased displacement.* In this method, minimum essential communications are installed at the new site. This provides communications for the first CP elements that displace. Continuity of operations is maintained as elements phase out of the old location and build-up in the new area.

(2) *Total displacement.* In this method, operations close out at the main CP at a designated time and all elements move at once. An alternate CP is established for command and control until the main CP has displaced and has sufficient communications.

c. Air, water, and rail movement.

(1) TACSAT deployment to a theater may involve one or all three of these types of movements. Support of rapid deployment forces will require air movement. TACSAT is ideally suited to the role of high-level command and control communications. Higher headquarters coordinates with appropriate units (Air Force, TAACOM, and so forth) and plans for the specific types of movement. The TACSAT Company must have basic plan and SOPS for movement by air, sea, or rail. Designated unit personnel must be trained in air-loading procedures. Rail movement is often a TACSAT Company responsibility. Coordination with movement experts is mandatory. This ensures that all unique aspects of the C-E equipment or unit are addressed.

(2) Specific plans for known operations must be developed in advance. This avoids confusion at the air, sea, or rail embarkation point. Units moving into such ports must be prepared to sustain themselves. Delays can occur and rations and supplies may not be available. Safety, SOPS, and unit training are essential. See AR 55-355, chapter 214, for additional information on movement planning.

Chapter 9

Electronic Warfare

9-1. General

a. Communications have always been the heart of command and control. On today's highly sophisticated battlefield, the Army places even greater dependence on communications and other battlefield electronic systems. The enemy knows this. A large part of the enemy's resources will be dedicated against U.S. Army command and control systems. Electronic Warfare (EW) will be used by both sides to an extent not known in the past. How vulnerable we are to enemy EW depends very much on the communicator.

b. TACSAT Company personnel must be trained to recognize the enemy's EW activities and to know what to do about them. This chapter introduces EW and highlights actions taken at the C-E operating level to minimize its effect. Specific tactics that will help defend against EW are found in FM 32–30 and equipment TMs.

9-2. Components of electronic warfare

Three components of EW are described in FM 32–30. They include all types of battlefield electronic systems: communications, surveillance, target acquisition, and others. This manual deals with EW only as it involves communications systems that support TA command and control. Table 9-1 summarizes the three components of EW as they pertain to communications devices. The first two EW components, electronic warfare support measures (ESM) and electronic countermeasures (ECM), are technical. We rely on military intelligence (MI) units and Intelligence and Security Command (INSCOM) for advice and implementation of ESM and ECM. The enemy equivalent of our ESM and ECM is described as radioelectronic combat (REC). To counter enemy use of REC, the Army relies on communicators to use electronic counter-countermeasures (ECCM).

9-3. Electronic threat

The enemy uses REC measures to collect intelligence data against our C-E systems. This is what intercept provides. The enemy then decides what REC would be appropriate from the data gained through intercept. High on enemy REC target list will be TACSAT communications. The enemy will use selected reconnaissance assets to detect and locate terminals, links, and relays. The enemy will attempt to those communications which he considers are priority targets. Figure 9-1 depicts the enemy's REC cycle. The goal of REC is to disrupt friendly use of the electromagnetic spectrum through destruction, deception, or jamming. The enemy will coordinate all three in an attempt to deprive us of command and control. All TACSAT Company personnel must understand the severity of this electronic threat.

a. Interception of signals intelligence. It is difficult for the enemy to fix on a satellite terminal. However, the radios used for TACSAT Company command and

Table 9-1. Components of electronic warfare

Component	Objective	Actions
ESM	Disclose information about enemy communications	Search, intercept, identify, locate
ECM	Deny or reduce use of enemy communications	Jam, deceive
ECCM	Ensure continued effective use of friendly communications (protect against enemy detection, location, and identification)	Anti-jam, circuit discipline, use approved operating techniques, security, harden, move, improve equipment, report, plan, train

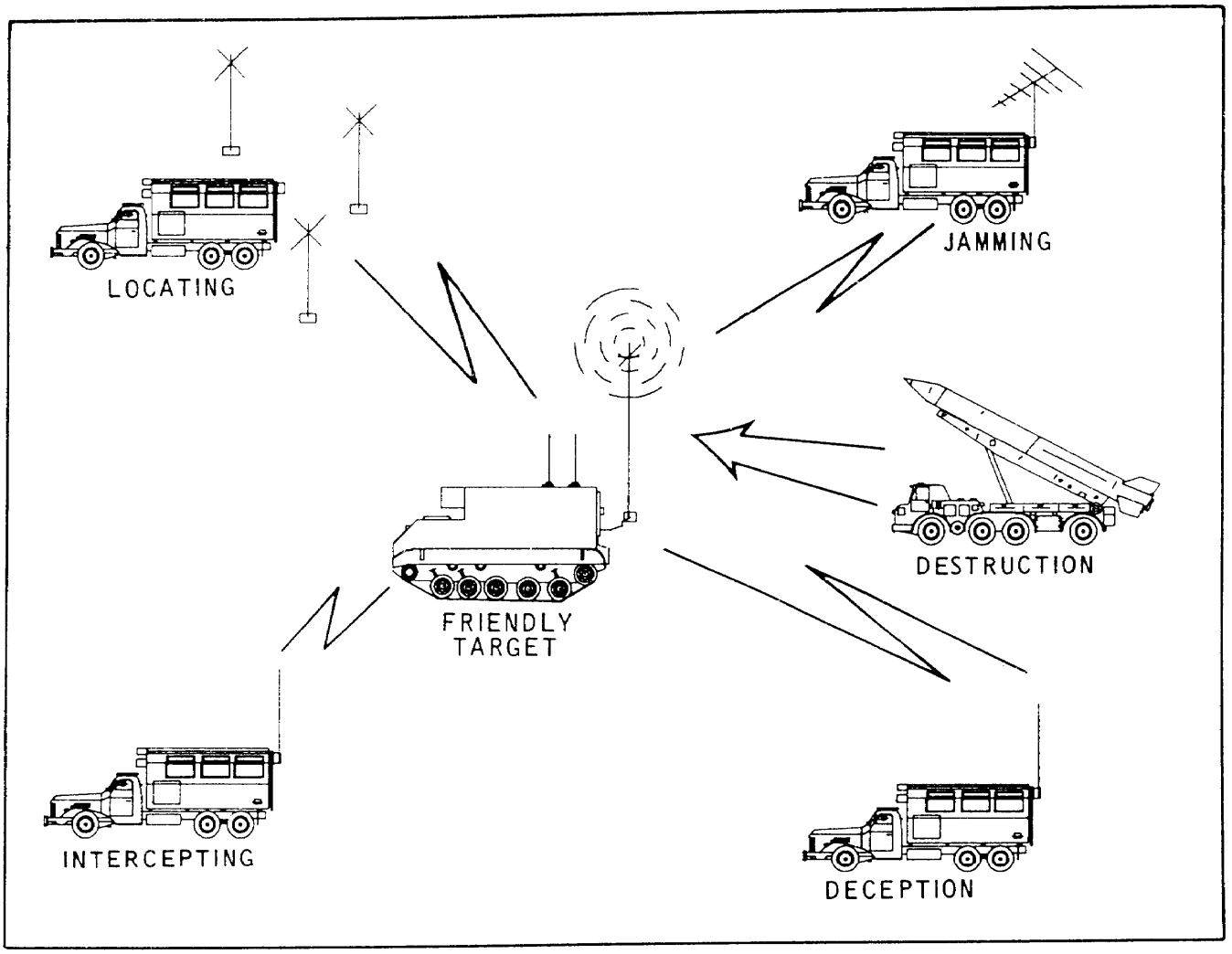

Figure 9-1. Enemy radioelectronic combat (REC) cycle

control are highly vulnerable to REC. Through an alert enemy signals intelligence effort, the Army risks disclosing Army TACSAT capabilities and operations. The enemy monitors intercepted signals and performs traffic analysis to provide a variety of information which can be exploited, such as—

(1) Supported CP identification.
(2) Location of TACSAT terminals.
(3) Tracking of unit movements.
(4) Relative importance of TACSAT to command and control.
(5) Weaknesses in our command and control systems—poor operating procedures, poor COMSEC, lack of redundant or alternate systems, and overloaded networks.

b. Location of emitters. A primary REC threat is the enemy's ability to locate key communications through radio direction finding (RDF). The enemy's goal is to limit, delay, or nullify our command, control, and intelligence systems during critical combat periods. RDF is especially effective against CPs which rely heavily on radios with omnidirectional antennas. Through the RDF technique, the TACSAT terminals themselves may be placed in jeopardy. When the enemy locates a friendly communication emitter, he determines if it is a primary target. Once an emitter becomes a primary target, disruption may take the form of destruction, deception, or jamming.

(1) *Jamming.* Enemy jammers attempt to disrupt the Army's conduct of the battle by interjecting delay and confusion into the command and control communications system. These jammers operate against receivers, not transmitters. They attempt to

transmit with enough power to override friendly signals before they can be received. This jamming may be subtle and difficult to detect, or it may be overt and obvious. It can be accomplished from both ground and aerial platforms. However jamming is accomplished, it is often most effective when opertors become impatient and relax signal security (SIGSEC) and OPSEC procedures, thus providing additional opportunities for deception or destruction operations. TACSAT radio operators must be familiar with this form of EW. The more common jamming signals are described in FM 32-30.

(2) *Deception.* REC attempts to deceive friendly emitters through intercepting, locating, and inserting false or misleading information. Enemy REC may imitate friendly forces to gain access to Army communications nets or provide incorrect or misleading information over enemy communications links. They may also establish dummy nets to feed false information to Army forces or to simulate nonexistent forces.

9–4. Defensive electronic warfare

Communications can still operate within the REC environment just described. To do this, it is necessary to maximize the efficiency of available equipment and use sound, common sense countermeasures. Communications discipline, security, and resourcefulness underlie countermeasures to shield emissions. COMSEC techniques give the commander confidence in the security of communications materials and communications. ECCM techniques provide some degree of confidence in the continued use of communications in a hostile EW environment. The two are closely related; many COMSEC techniques also serve an ECCM role. Thus, the more effective the TACSAT Company is in COMSEC, the more effective it is in ECCM.

a. Communications security techniques.

(1) COMSEC is a component of SIGSEC. It protects communications through the use of security measures and techniques such as those shown in table 9-2.

(a). Physical security safeguards COMSEC materiel and information from access or observation by unauthorized personnel through the use of physical means.

(b). Crypto security protects radio communications through the use of technically sound cryptosystems.

(c) Transmission security is designed to protect transmissions from hostile intercept and exploitation.

(d) Emission security involves studies, investigations, and tests to control comprising and inadvertent emissions from equipment.

(2) Most TCS(A) circuits are protected by COMSEC equipment. However, orderwire and internal TACSAT Company command and control nets may not be secure. Technical discussions between operators can contain information of vital importance to the enemy. The very nature of any communications mission gives them access to critical information about commanders, organizations, and locations of headquarters. This information, although gained casually on the job, is sensitive and must be protected. COMSEC must be a function of everyone who uses C-E equipment. It begins with command emphasis. FM 32-6 covers overall SIGSEC and contains detailed information on COMSEC measures and techniques.

b. ECCM techniques.

(1) ECCM are taken to protect against enemy attempts to detect, deceive, or destroy friendly communications. The first line of defense against REC is a well-trained and alert operator, because as mentioned earlier, many COMSEC techniques are equally ECCM techniques. To combat enemy REC efforts, operators must use ECCM techniques identified in OPSEC surveys and unit SOPs, or as outlined in table 9–2.

(2) Unit SOPS must include actions to be taken against jamming and deception. Specific techniques are described in TACSAT TMs. Prearranged plans and frequent training exercises are mandatory. Operators must follow SOPs to maintain or restore communications. Anti-jamming equipment may be available to some terminals. ECCM plans must consider possible up-link and down-link jamming. The jamming noise must be defeated by increases in transmit power or changes in link capacity.

(3) There are other ECCM actions that will lessen our vulnerability to an enemy REC effort.

(a) Prepare backup system-orderwire, messenger, and HF radio.

(b) Prepare to operate with the minimum amount of communications.

(c) Move CPs frequently.

(d) Use state-of-the-art equipment and apply authorized modifications to equipment.

(e) Report all known or suspected REC activities.

(f) Plan and train to counter an REC threat.

(g) Disperse communications equipment over a wide geographical area.

(4) FM 32-30 contains appendixes that cover ECCM checks, ECCM planning, and ECCM

Table 9-2. COMSEC measures and techniques

Physical Security	Crypto Security	Transmission Security	Emission Security
Facility approvals	Machine crypto	Emission control	Site surveys
Facility inspections	Non-machine crypto	Change of frequencies and call signs	Engineering
Materiel control system	Electronic crypto	Authentication codes and brevity lists	Inspections
Transportation security		Protective deception site masking	Studies
Storage security		Vary power directional antennas	Tests

training. It also covers EW reporting using the meaconing, intrusion, jamming, and interference (MIJI) report. AR 105-3 requires that all incidents of an electromagnetic nature that affect C-E opertions be reported. Unit SOP and other instructions must include the MIJI program.

c. Emission control.

(1) Emission control (EMCON) is both a COMSEC and ECCM technique and probably the best method to counter the enemy REC effort. Radio transmissions should be kept to the minimum required to accomplish the missions. Transmissions should be short. The enemy gains less information from a short transmission and it also limits the enemy's capability to locate the transmitter by RDF.

(2) EMCON can also be total or selective. sometimes, strict radio silence is necessary. The TACSAT Company commander may also designate certain nets as free nets and others as on order nets. Controls such as frequent changes in call signs and frequencies and relocation of emitters will tend to confuse the enemy. Commanders must teach their personnel to "think EMCON".

9-5. Electromagnetic compatibility

a. In an EW environment, we know that the enemy will intentionally try to interfere with Army communications. Self-inflicted unintentional interference is also possible. It may be caused by the Army's own transmitted signals, faulty electronic components, poorly insulated high power lines, noise producing equipment, and so forth. This type of interference is treated under the term "electromagnetic compatibility (EMC)." EMC is that desirable condition when all of our electronic and electrical equipment, such as radios, radars, generators, and vehicle ignition systems, operate without interfering with each other.

b. Terminal site planners and operators must be aware of EMC and its advantages. We do not want to assist the enemy in REC efforts. When planning the layout of the TACSAT Company CP or a terminal site, EMC must be considered. Operators experiencing interference must take every effort to determine if the interference is intentional or unintentional. The following are some typical common sense procedures to promote EMC:

(1) Know the technical operating characteristics of the equipment.

(2) Properly ground, operate, and maintain the equipment.

(3) Site antennas away from noise sources.

(4) Move noise-producing equipment out of transmission paths.

(5) Provide for adequate receiver-transmitter frequency separation.

Chapter 10

Rear Battle

10-1. General

a. To provide continuous effective communications at EAC, the TACSAT Company must be able to survive in a hostile environment. A major aspect of enemy doctrine is to disrupt rear area operations. When CPs and communications nodes are located, the enemy will try to neutralize them. Detection must be avoided to survive. Also, it may be necessary to defend terminal sites. Successful self-defense requires planning, preparing, rehearsing, and virgorous execution.

b. The TACSAT Company commander must prepare personnel for defense. Plans are based on coordination with supported units. This chapter will highlight the various types of threats to the TACSAT Company. It will then emphasize defensive considerations. Because the subject is too broad and technical to cover completely, reference will be made to appropriate manuals to consult for details. Also, soldier's manuals (SM) for the senior skill levels within the TACSAT Company list many of the tasks to be performed for specific security and defense situations.

10-2. Rear battle threat

a. The rear area is the space within a command where the majority of the combat support and combat service support functions are peformed. In a fully developed theater of operations, the whole COMMZ is classed as rear area. The enemy has the capability to initiate and support combat operations deep in the COMMZ. Their objective is to destroy critical elements, cause disruption, and degrade capabilities. The TACSAT Company is usually employed in the COMMZ but may also be employed in the rear of the combat zone.

b. The enemy threat to rear battle opertions may be of low, medium, or high intensity. These three levels of threat are summarized in table 10-1. Commanders develop alert systems and response actions according to the level of threat that must be countered. Elements of the TACSAT Company may face any combination of enemy forces at the same time. Other disruptive occurrences include conventional and NBC shelling and bombing and natural disasters.

Table 10-1. Rear battle threat levels and responses

Threat Level	Threat	Response Forces
Level I	Agents, saboteurs, terrorists	Base defense
Level II	Diversionary operations and sabotage by unconventional and reconnaissance forces, raids by tactical units, special or unconventional warfare missions	Military police (base defense)
Level III	Airborne, heliborne, amphibious, and ground forces deliberate operations, infiltration operations	Tactical combat forces (military police) (base defense)

10-3. Unit security and defense

a. General. TACSAT Company security and defense is accomplished within guidelines established by U.S. Army rear battle doctrine. The rear battle is designed to make collective use of units in the rear area to prevent or minimize interruption of operations. It includes measures taken to protect the resources of rear area commands against sabotage, enemy activity, and natural disasters. Rear battle objectives include the following:

(1) Secure the rear area and facilities.

(2) Prevent or minimize enemy interference with command, control, and communications.

(3) Prevent or minimize disruption of combat support and combat service support forward.

(4) Provide unimpeded movement of friendly units throughout the rear area.

(5) Find, the, and destroy enemy intrusions in the rear area.

(6) Provide area damage control (ADC).

b. Rear battle command and control. The TA commander is responsible for rear battle planning and execution at EAC. Rear battle operations are conducted through decentralized command and control systems used by EAC rear area operations centers (RAOCs). RAOCs are usually established at TA, TAACOM, and TAACOM area support group (ASG) levels. Each echelon commander will appoint a rear battle officer to conduct rear battle operations. Where HNS agreements have been reached, certain rear battle responsibilities may be assumed by the host nation. Within a TAACOM, TACSAT elements would be assigned to particular bases for defense purposes. The base commander provides the command and control headquarters for base defense. The base defense operations center (BDOC) is staffed and equipped by the host and tenant units. Sometimes, base clusters are formed for mutual defense and controlled through a base cluster operation center (BCOC). TACSAT elements plan for the defense of of their sites as part of base defense. Terminal section chiefs submit plans to the BDOC for approval. Defense plans should also include ADC considerations. See FM 90-14 for complete details on rear battle command and control.

c. Conduct of the rear battle. Responses to enemy attacks in the rear area must be rapid and strong enough to defeat the enemy. They must minimize disruption of friendly operations. Table 10-1 also shows rear battle responses to the various threat levels. Obviously, base defense is the cornerstrone for effective conduct of the rear battle.

d. Unit defense planning. Detailed planning is done by the dispersed TACSAT sections per unit SOP. Frequently, TACSAT Company assets will be deployed to remote locations. Site defense planning should be as complete as possible but flexible. One cannot plan for every situation. Defense or security requirements beyond organic capability should be identified. When unable to defeat attacking forces, site defense forces attempt to defend the site or base until other forces can respond. Defense procedures should be simple and easy to implement. Individual responsibilities should be clearly defined. One basic plan with alternative courses of action for meeting various threats is probably best.

e. Defense against air and ground attack.

(1) TACSAT terminal sections have a distinctive signature. They must rely heavily on sound (OPSEC). This includes taking all counter reconnaissance and surveillance actions (for example, camouflage, watching thermal signature, controlling electronic emissions, and so forth). Facilities should be camouflaged, concealed, covered, and dispersed as much as possible (FM 5-20). Warnings against air attack are broadcast over the air warning net which should be constantly monitored. Army counterintelligence (CI) also can provide early warning and recommend OPSEC procedures to counter enemy intrusions into the rear area (FM 34-60). Defense against ground attack should be based on a sound site defense plan. Some actions to be taken in most defensive situations are listed below:

(a) Assign sectors of defense.

(b) Locate a focal point for command and control.

(c) Ensure individuals are familiar with their responsibilities.

(d) Prepare positions (FM 5-15).

(e) Place weapons to cover avenues of approach.

(f) Use artificial obstacles and mines as required.

(g) Coordinator with adjacent units.

(h) Hold frequent rehearsals and inspections.

(i) Practice camouflage, light, and noise discipline.

(j) Design a warning system.

(k) Establish procedures for requesting artillery and air support.

(l) Designate assembly points for reserve forces and fire fighting crews.

(m) Plan for the evacuation of casualities.

(n) Plan for the destruction of equipment and supplies.

(2) Personnel are trained in the use of their individual weapons and in defensive measures, but have a limited capability to defend themselves. The TACSAT Company commander should schedule refresher training and conduct defense exercises.

f. Area damage control. The TACSAT Company must plan and train for ADC operations. ADC limits damage, seals off affected areas, salvages equipment, saves lives, and restores operations. ADC activities should be included in SOPs and rehearsed to ensure individuals are certain of their responsibilities (FM 90-14). In most cases, the dispersed TACSAT elements should incorporate their ADC measures with those of collocated units.

1O-4 Emergency destruction of equipment

a. Emergency destruction (ED) is a command responsibility. Sensitive equipment and cryptomaterial are involved in all TACSAT units. Due to the lack of mobility of the terminal sections, ED is a distinct possibility. The TACSAT Company SOP must include ED plans. Plans should be simple, capable of rapid execution, and should include priorities and methods for destruction. Specific people

must be designated to perform the destruction. Common methods of destruction include smashing, cutting, burning, bending, breaking, burying, and scattering. If explosives are required, people must be trained to use them. See appropriate TMs for destruction procedures.

b. Proper authorization for ED is required. ED is usually ordered by higher commanders as a last resort. The SOP should be specific as to what constitutes a local decision to destroy equipment. When ED is accomplished, a report should be made to higher headquarters. For more detail on ED of equipment, see AR 380–5 and FM 5–25.

10–5. Nuclear, biological, and chemical threat

A coordinated enemy attack of the COMMZ may well include NBC warfare. Few munitions can disrupt operations as extensively as NBC. The effects cover large areas. They are capable of causing enormous destruction and massive casualties. Communications centers and nodes will likely be prime targets. The purpose of this section is to acquaint TACSAT Company personnel with the severity of the threat posed by NBC munitions. You can consult FM 3-100 for more complete information on the effects of NBC warfare.

a. Nuclear weapon effects. There are five main effects from a nuclear detonation: blast, thermal radiation, nuclear radiation, electromagnetic pulse (EMP), and nuclear blackout. Aside from the obvious devastating effects of a nuclear explosion, C-E systems are extremely susceptible to EMP and blackout.

(1) *Blast.* Blast causes most of the destruction created by a nuclear detonation. Exposed troops can be crushed by the overpressures or injured by flying debris. Personnel inside structures can be injured by their collapse.

(2) *Thermal radiation.* Immediate intense heat starts fires in buildings and forests. The heat can also burn exposed skin at distances where blast and nuclear radiation effects are minor. The extremely bright light formed can cause temporary or permanent blindness.

(3) *Nuclear radiation.* Initial nuclear radiation is emitted within the first minute after detonation. To survive initial radiation, personnel must be in a protected position before the detonation. Residual radiation lasts after the first minute. It consists of fallout or neutron-induced radiation near the point of detonation. Fallout is the primary residual hazard. Electronic systems are also sensitive to nuclear radiation effects.

(4) *Electromagnetic pulse.* EMP is a short duration radio frequency pulse. EMP does not affect personnel. However, radio and TACSAT equipment can be damaged or made inoperative by EMP. Unless well buried, cable and wire will pick up EMP energy which is higher than the circuit and component capabilities of the equipment. The damage can range from burned out fuses, transistors, and coils to the destruction of complete power supplies. Table 10-2 provides an indication of the vulnerability of tactical equipment to EMP.

(5) *Nuclear blackout.* Nuclear blackout is the result of the fireball itself and the large dust clouds which may be created. It can last from a few seconds to many hours. It affects radio and TACSAT communications by—

(a) Refraction (bending of the waves).

(b) Absorption (consuming the waves).

(c) Scattering (scattering the waves in all directions).

b. Biological agent effects. Biological agents consist of disease-producing germs and toxins. These agents may be dispersed as aerosols by generators, explosives, shells, missiles, and aircraft. The aerosol form allows them to be spread rapidly by the wind and cover large areas. Harmful germs may also be spread by the release of infected insects. Germs and toxins can be used to cause injury, death, and disease among humans, animals, and plants. They also can be used to cause deterioration of materials and contaminate supplies. Anti-personnel biological agents have little affect on electronic components. However, C-E equipment may require decontamination in order to eliminate persistent contact hazards.

c. *Chemical agent effects.*

(1) Chemical agents are a significant threat to TACSAT Company personnel as well as to equipment. They can be disseminated by aircraft, artillery, rockets, and missiles. The severity of the effect is dependent upon the dose received. Chemical agents fall into four classes:

(a) Nerve agents that directly affect the nervous system.

(b) Blister agents that affect the eyes and lungs and blister the skin.

(c) Blood agents that affect the circulatory and respiratory systems by preventing the body's cells from using oxygen.

(d) Choking agents that affect the respiratory system by attacking the lungs.

(2) Persistent chemical agents may contaminate supplies and equipment and restrict the use of terrain and facilities for hours and days.

Table 10-2. Equipment vulnerability to EMP

Equipment Categories	Probability of Damage	Equipment Included in Category
I	Very low	Artillery, tactical equipment (excluding communications equipment).
II	Low	Fire direction control equipment, nuclear warheads, missiles.
III	Medium	Long-range communications equipment (greater than 100 km), air defense radars.
IV	High	Target acquisition radars, short-range communications equipment (less than 100 km), command and control equipment.

10-6. Nuclear, biological, and chemical defense

The TACSAT Company must be prepared to function under NBC conditions. FM 11-23 directs every TCC(A) unit to become proficient in the survival techniques and operational standards for NBC warfare. NBC defense must be fully integrated into unit planning and training programs.

a. Defense tasks and planning.

(1) The TACSAT Company must plan for three basic NBC defense tasks discussed in *(a)* through *(c)* below. The successful performance of these tasks should be the objective of the TACSAT Company NBC training program.

(a) Contamination avoidance. Contamination avoidance is accomplished through NBC awareness, detection and warning of NBC hazards, and limiting the spread of contamination. Contaminated areas should be bypassed if possible. If not, personnel must use protective clothing and equipment. FM 3-3, chapter 2, covers the marking of contaminated areas.

(b) Protection of Personnel. Personnel must be protected to maintain the integrity of TACSAT operations. During the threat of an NBC attack, the TACSAT Company commander can balance personnel safety with unit effectiveness by using a mission-oriented protective posture (MOPP). The MOPP prescribes what clothing and equipment must be worn and/or used and what operational precautionary measures must be applied. Table 10-3 shows example requirements for protective clothing and equipment for different MOPP levels. FM 3-100 must be consulted for the detail necessary to prepare MOPP levels appropriate to the TACSAT Company. FM 3-3 provides added detail to prepare nuclear MOPP levels. All MOPP information should be placed in the TACSAT Company SOP. Protective clothing and equipment should be carried at all times. Also, see FM 3-4 for NBC protection procedures.

(c) Decontamination. Decontamination reduces casualties and improves individual and unit effectiveness. Individuals must be trained to perform emergency self-decontamination. Units must have the capability to perform personnel decontamination and partial equipment decontamination. The source of decontamination devices and trained specialists should be determined. FM 3-5 provides a guide for NBC decontamination.

(2) The NBC plan can be part of the unit defense plan or an annex to it. Dispersed TACSAT elements must be integrated into the supported unit NBC plan. For the details needed to plan and train for NBC defense, see FM 3-100. As indicated, unit SOP for defense against NBC is a requirement.

(3) The TACSAT Company's NBC program is directed by the chemical NCO. An NBC control party is formed to plan and conduct unit NBC defense. Other teams should be designated as required. Each element of the TACSAT Company must be made aware of its responsibilities for NBC defense.

b. Decontamination of communications equipment. Decontamination of TACSAT Company equipment must be done very carefully. Ensure the power supply is disconnected to prevent injury to personnel and damage to the equipment. FM 3-5 provides instructions for the decontamination of metal, plastic, leather, and wood parts. Crae must be taken not to damage electronic components with decontamination solutions. Some decontaminants, by their nature, are reactive chemicals which can seriously corrode materials. For the electronic components themselves, the use of hot air, aeration, and weathering provide the best methods of decontamination for chemical and biological agents. Some decontamination takes place from heat given off by operation of the equipment. For radiation, little can be done

Table 10-3. Protective clothing and equipment for MOPP levels

MOPP	OVERGARMENT	OVERBOOTS	MASK/HOOD	GLOVES
0	Carried	Carried	Carried	Carried
1	Worn, opened or closed based on temperature	Carried	Carried	Carried
2	Same as MOPP 1	Worn	Carried	Carried
3	Same as MOPP 1	Worn	Worn, hooed opened or closed based on temperature	Carried
4	Worn, closed	Worn	Worn, hood closed	Worn

except to reduce radiation levels through aging. Complete decontamination is very difficult, time consuming, and often impossible to accomplish.

c. Electromagnetic pulse and blackout defense.

(1) Protective measures taken for EMP before a nuclear attack are critical to unit survival. Cables, wires, antenna systems, and all metal structures are good electrical conductors. They absorb EMP energy. Material that couples with electromagnetic energy can absorb enough EMP energy to induce voltage and currents. The key to protection is to reduce EMP coupling. The best protection is to have the TACSAT terminals shut down and disconnected prior to a nuclear attack. If not possible, a portion of the equipment may be able to be off the air. Do not forget to take precautions with organic command and control C-E equipment. Protective measures may include ferrous shielding, special voltage limiting devices, and filtering systems built into the equipment. Also, new fiber optic cable systems are EMP resistant and may be used as a replacement for current video and metallic cable systems.

(2) EMP can enter electrical systems through intentional antennas, unintentional antennas, and direct penetration. Intentional antennas are standard radio and radar antennas. An unintentional antenna can be any device (masts, wiring loops, cables, and so forth) that can act as an antenna, even though it is not meant to be one. In direct penetration, internal electronic components act as loop antennas, allowing strong electromagnetic fields to be created inside equipment. See table 10–4 for simple protective measures to use in the absence of built-in protection.

(3) Protective measures for nuclear blackout are extremely limited. Conventional HF, VHF, and UHF techniques for overcoming nuclear blackout are not effective for TACSAT terminals. GMFSC and DSCS controllers will be the only source for assistance. Remember that nuclear blackout lasts for only a limited time, and because it does not affect cable and wire systems, using them might be a simple solution to communicating. However, cable and wire systems are extremely susceptible to EMP energy. Alternate routing can be used to bypass affected regions.

(4) Because TACSAT equipment is so unique, specific details for operating such type under NBC conditions could not be provided here. TACSAT personnel should refer to specific equipment NBC manuals for more detailed instructions.

Table 10-4. EMP protective measures

FOR INTENTIONAL ANTENNAS—

a. Disconnect the antenna.

b. Disconnect all coax, antennas, power sources, cables, and wires from spare equipment.

FOR UNINTENTIONAL ANTENNAS—

a. Keep cable and wire lengths as short as possible. (Energy collected by a cable directly relates to its length.)

b. Bury cables and wires at least 18 inches deep.

c. Never leave cable or wire that is connected to equipment coiled on a reel. (A coil will pick up more EMP than a straight cable run.)

d. Use a common ground for all equipment whenever possible.

e. Ensure antenna guy lines are insulated.

f. Avoid use of commercial sources of power.

FOR DIRECTION PENETRATION—

a. Shield all C-E equipment with iron or steel if available; any metal if not available.

b. Close all enclosure doors, vents, access panels, and ducts.

(Cover with honeycomb metal screens, line with aluminum foil.)

Chapter 11

Training

11-1. General

a. Preparing and conducting training properly is one of any commander's most difficult, but most important, responsibilities. The primary objective is to produce a well-trained unit ready for field operations. The time to do that is now. Training is the central and primary task of the TACSAT Company in peacetime.

b. The Army training system, taken as a whole, is a complicated subject. This chapter emphasizes those aspects that will assist the TACSAT Company commander in accomplishing the TACSAT Company's training requirements. The chapter will be oriented towards TACSAT training in general. Detailed training information must be taken from technical manuals prepared for each item of TACSAT Company equipment. The need for training in the areas of C-E planning, NBC and EW, and rear battle operations has been emphasized in previous chapters. Information that guides the overall conduct of Army training is found in a series of training field manuals:

(1) FM 25-1 provides overall training philosophy and doctrine for the U.S. Army.

(2) FM 25-2 describes the Army training system and training management in units.

(3) FM 25-3 contains principles and procedures for the conduct of training in units.

(4) FM 25-4 describes how to plan, conduct, and control training exercises.

11-2. Army training concepts

Reliable long-range communications are essential for command and control of the TA. The TACSAT Company must achieve and maintain the highest proficiency level. It must train as it will operate under field conditions, and train continually. Adherence to two fundamental concepts of training discussed in *a* and *b* below will assist the training effort. All leaders and trainers should thoroughly appreciate and understand them.

a. Decentralized training.

(1) The decentralized training concept places the authority and responsibility to organize, conduct, evaluate, and supervise training at the battalion or separate TACSAT Company level. The training effort itself takes place at or below company level where the job is actually performed. This means that the TACSAT Company commander and subordinate leaders must be able to determine specific training objectives. These objectives are based on the supported unit mission, available training resources, and present level of training. The principal trainers should be the first line leaders who directly supervise the soliders and head the sections. Training is decentralized to these leaders because they—

Know the soliders and their-training needs.

(b) Know the section and its training needs.

(c) Can better control what motivates the soliders.

(d) Have much to gain from having a skillfully trained unit.

(2) The decentralized training concept also presents several advantages for the TACSAT Company commander:

(a) Training can be tailored to specific unit needs.

(b) Limited resources can be applied to priority programs.

(c) Junior leaders are directly involved in managing the time and training of personnel.

(d) Responsibility for training is consistent with the commander's responsibility for unit readiness.

b. Performance-oriented training.

(1) Training can be described as preparation for performance. Performance-oriented training is learning by doing. It focuses on those critical tasks that prepare soldiers to do their jobs. Proper training consists of establishing objectives, conducting training, testing, and evaluating. Think of this as a formula:

EFFECTIVE TRAINING = TRAINING OBJECTIVE + TRAINING + TESTING + EVALUATING

Once this idea becomes ingrained, training can be developed that serves the needs of the unit and its soldiers.

(2) The key to effective training is the development of performance-oriented training objectives. The objectives must facilitate clear and concise thinking about training for TACSAT operations. They must contain precise statements of the task, conditions under which it is performed, and the training standards of acceptable performance. Table 11-1 illustrates parts of a training objective. FM 25-3 contains a detailed explanation of how to develop peformance-oriented training objectives.

Table 11-1. Three parts of a training objective

Task	Defines what skill the soldiers being trained are expected to acquire.
Condition	Shows the soldiers the conditions under which they must be able to demonstrate the skill.
Standard	Defines how well the soldiers are expected to perform.

11-3. Training in the company

Training that takes place outside traning centers and schools is conducted predominantly in operational units. Training in the TACSAT Company includes both individual and collective training. Individual training is preparing individuals to do individual tasks; to accomplish their mission and stay alive. Collective training prepares soldiers to perform those team, section, or company tasks essential to the accomplishment of the TACSAT Company's mission. FM 25-3 provides details for the conduct of training in units.

a. Individual training. TACSAT specialists receive advanced individual training in training centers or service schools. There, they gain only a working knowledge of thier MOSs. This is the essential knowledge to perform a job under supervision. Training in system employment is gained in the TACSAT Company with leader supervision. Supervised on-the-job training (SOJT) is a way to complete a soldier's training. It can also be used to retrain a soldier into a new, critical shortage MOS. The complexity of satellite communications demands constant training for quick response to technical instructions. There are various training methods and tools to employ within TACSAT Company or local schools that focus on the mastery of mission-essential skills. It is important that TACSAT Company leaders and trainers understand these and use them to the advantage of the TACSAT Company.

(1.) *Individual training methods.*

(1) Sustainment training is conducted to maintain skill and task performance at a required level of proficiency dictated by the TACSAT Company commander. This helps to ensure that a directed level of TACSAT readiness is maintained.

(b) Train-up training prepares soldiers to perform tasks at higher levels of responsibility. This provides the TACSAT Company with experienced personnel to assist in training and prepares soldiers for promotion.

(c) Cross-training prepares soldiers for other jobs and MOSs within the section or team. This improves the TACSAT Company' ability to survive in combat and contributes to the soldier's professional development.

(d) Leader training prepares leaders to perform leadership tasks, employ the section, and make decisions. This training can be conducted through coaching as well as in a TACSAT Company school.

(2) Individual training tools. Training managers and trainers have numerous tools at their disposal. These include the familiar SM, trainer's guides (TG), job books, a variety of extension training materials (ETM), and the Individual Training and Evaluation Program (ITEP) (AR 350-37). The tools are used for analyzing, training, and evaluating and provide the basis for allocating resources. In a limited resource environment, making proper use of the tools is a must.

b. Collective Traning.

(1) Collective training is where teamwork comes in. It is every bit as important as individual training. In a TACSAT Company, this training should involve the entire unit so that total impact of all terminals is involved. The success of the TACSAT Company mission depends on how well all sections do their job together. The TACSAT Company Army Training and Evaluation Program (ARTEP) serves as the basis for developing collective training. It is important that training derived from the ARTEP be as realistic as possible.

(2) Special emphasis must be placed on field training exercises to practice section proficiency, Only by constant practice will leaders be able to perfect what is expected of them. The supported headquarters may conduct a field exercise to refine command, control, and communications procedures. They are an effective vehicle to teach commanders and staffs how to operate together without using troops as training aids. Real equipment is used and interaction takes place with personnel in a tactical configuration. The TACSAT Company may conduct its own signal field exercise (SFX). The TACSAT Commander should ensure each section is involved in live equipment exercises as often as possible. Logistical support for terminal sections during an exercise may require support from other units. Detailed planning and support arrangements must be completed. Each element of the TACSAT Company should have a defined objective to accomplish before an exercise is terminated.

11-4. Training management

The Army training management system is the framework within which the TACSAT Company is trained. It incorporates concepts, responsibilities, and tools to acieve and sustain a high state of

training readiness. The system is responsive to individual and collective training needs. This section only provides a brief overview of training management. FM 25-2 provides the details,

a. Training responsibilities. Training responsibilities are established by commanders. This requires the TACSAT Company commander and subordinate leaders to be abreast of current training techniques and EAC communications doctrine. Leadership emphasis and active supervision are essential to execute the TACSAT Company's training program. Training responsibilities are divided between the training manager (the commander) and the trainers. The TACSAT Company commander works with higher signal headquarters to develop and implement a specific company training program. TACSAT Company officers and NCOs, as both supervisors and trainers, must ensure their platoons and sections can perform training objectives successfully. Each must be thoroughly knowledgeable of the soldier's individual tasks, The officers are primarily oriented towards collective training. The NCO is the principal individual trainer. Each individual soldier is responsible for keeping up his skill level. In team training, one soldier should learn to assist the other.

b. Training management systems. The Army's Battalion Training Management System (BTMS) is designed to standardize and teach the latest in training methodology. It is the system the TACSAT Company uses for training management. It covers the planning, preparation, conduct, and evaluation of training. See FM 25-2 for a detailed description of BTMS. Other programs that TACSAT trainers must use include—

(1) *Army Standardization Program (ASP).* A program to ensure that common tasks, drills, and procedures will be performed in a single prescribed manner throughout the Army (AR 350-1, chap 5).

(2) *Common Military Training {CMT) Program.* A program that identifies selected DA training requirements (AR 350–1, table 4–1).

(3) *New Equipment Training (NET).* A program conducted by a materiel developer or contractor that provides initial training on new equipment.

c. Training phases.

(1) Training management is a continuous process of—

(a) Planning training to achieve desired proficiency.

(b) Providing resources for planned training.

(c) Conducting the training.

(d) Providing evaluation feedback.

(2) This four-phased process is shown graphically in figure 11-1. The process is described in detal in FM 25-2. One of the most important steps in planning training is to find out which tasks soldiers, sections, and the TACSAT Company already know how to do. By analyzing training results, strengths and weaknesses can be identified. A list of training objectives can then be developed as described earlier. The training program is based on these objectives.

d. Training support.

(1) Training support provides the foundation for Army training. Trainers must be able to obtain the training materials and resources needed to conduct individual and collective training. Locally, training materials are obtained as follows:

(a) The unit learning center (LC) is the trainer's primary source. The trainer can get training aids, films, technical extension course (TEC) lessons, television equipment, and training materials. The LC should have a library of ARTEPs, SMs, FMs, and training circulars.

(b) The Training Aids Support Center (TASC) usually serves an Army post or geographical area. The TASC has access to audiovisual materials. It can also order certain types of custom-made training aids. TASCs publish a periodic catalog of the materials they have available. The unit LC should keep an updated copy of this catalog available. The TASC is also the storage and issue facility for simulation devices.

(c) Training funds, fuel, terrain, and ammunition are essential training resources managed by the higher signal commander and staff. Trainers and leaders must provide their requirements for resources to the TACSAT Company commander. The TACSAT Company commander must ensure training resource needs are made known. Resources must be requested early enough to be reasonably sure of receiving them.

(2) There are other programs and materials to help train soliders to perform individual tasks to standard. The Army training system provides a variety of nonresident ETM that are exportable to units. These include TEC lessons, SMs, FMs, and graphic training aids (GTA). Published training materials exportable to units are found in ETM catalogs in the 350–100 series of DA Pamphlets. DA Pamphlet 350-100 provides a one-source listing of all applicable and available ETM for all Army MOSs. Other 350-100 series catalogs list ETM for various type signal units. The last chapter in each catalog explains how to order the training materials. Additionally, DA Pamphlet 351-20 lists correspondence course programs and materials available to TACSAT Company personnel.

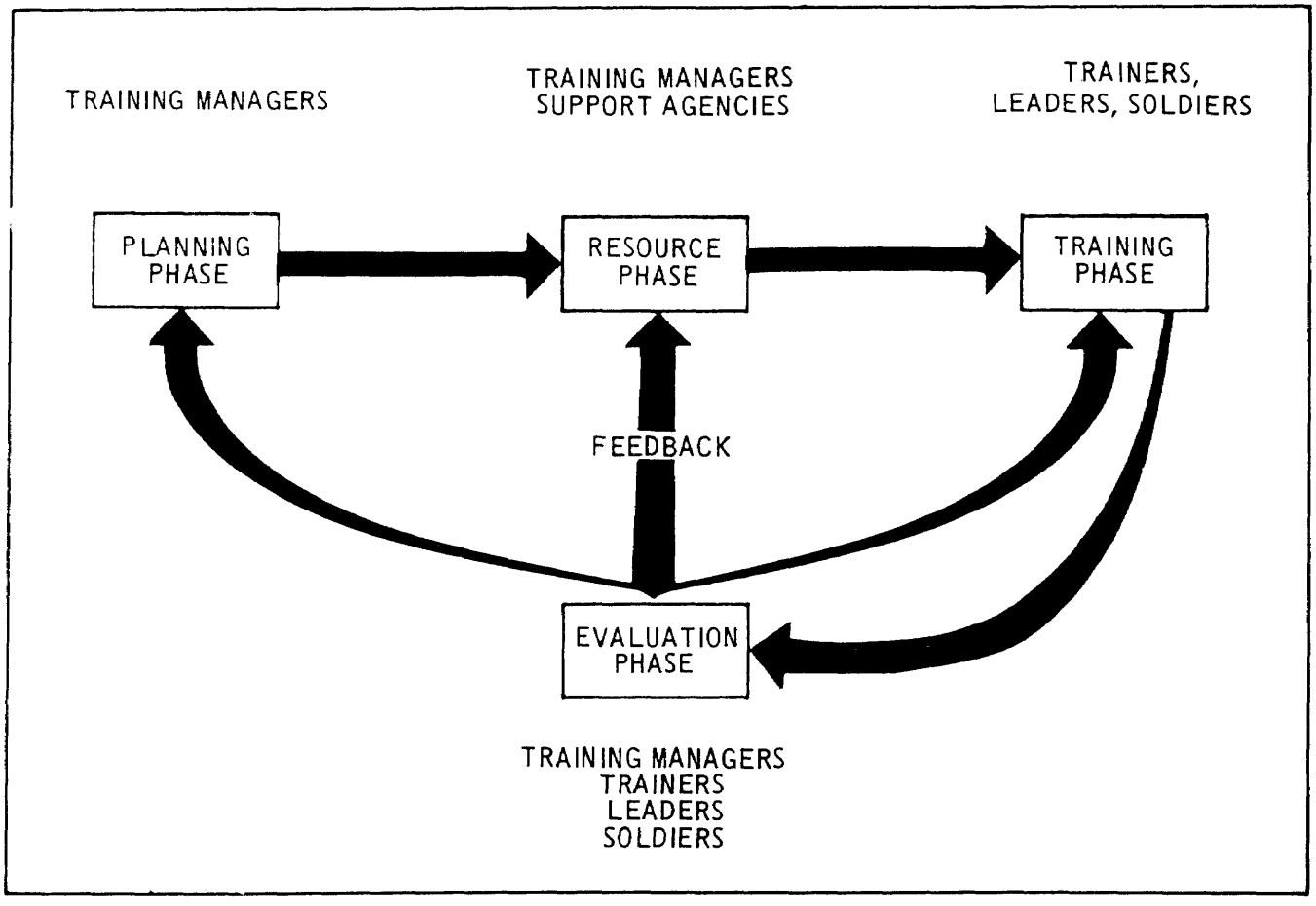

Figure 11-1. Phases of training management in units

11-5. Training tips

A TACSAT Company provides a service to other units. While the supported unit is training, TACSAT sections are essentially operating to make that training a success. Therefore, the bulk of TACSAT training must take place before supporting an exercise. This means that the TACSAT Company commander must maximize the use of what little training time is available. Be imaginative. Good training is accurate, well structured, efficient, effective, realistic, and safe.

a. Realistic training. Realistic training to develop full readiness should be conducted. The classroom setting should. be avoided as much as possible. Satellite radio operators need to experience the power level, synchronization, frequency, and interference problems that occur in live operations. They must learn to take direction and be coordinated by GMFSC or DSCS net control centers. Realistic training includes realistic problem solving. This training will aid personnel to overcome sticky situations they are sure to meet in the field. Instead of learning lessons the hard way, practice field skills such as the following:

(1) Operate under stressed conditions such as in an EW jamming environment.

(2) Test alternate means of communications.

(3) Train everyone connected with communications to use communications.

(4) Communicate with other services.

(5) Operatre under adverse conditions such as bad weather, threat of enemy attack, and/or NBC warfare.

(6) Accomplish required maintenance under field conditions.

(7) Logistically support communications elements in the field.

(8) Deploy maintenance support teams on no notice situations.

(9) Select and layout sites, and establish TACSAT links at night.

(10) Establish TACSAT links without aid of SCCC (AN/MSQ-114) or DSCS DGCL (must be pre-coordinated).

b. Motivation for good training. Realistic, effective training enables a unit to accomplish its mission. For a TACSAT Company, that mission is to provide reliable TACSAT communications. There are other payoffs to consider. When the TACSAT Company is well trained, the chances are good that the amount of equipment loss and replacement is reduced. Repair and maintenance are kept to a minimum and spare parts can be conserved. C-E equipment will be there when it is needed. Cross-training and trainup contribute to increased flexibility. For 24-hour operations, an operator must master a variety of skills with a lot of different equipment. Team members are often diverted for site preparation, improvement, and defense. Most important, increased morale is a by-product of good collective training. A soldier will give more when a member of a skilled team.

c. Comprehensive evaluation of training. The final step in conducting effective training is to complete a training evaluation. This is much more than supervision of training by the commander, subordinate leaders, and trainers, Supervisors can assist and encourge soldiers. Supervising also helps determine soldier performance of intermediate objectives. Training evaluation is more comprehensive. Always remember, the right things must not only be done well, they must be done well in the right way. The overall training must be evaluated from two viewpoints: training effectiveness and training efficiency. They are different and both are important.

(1) Training effectiveness relates to how well the soldier performs the overall training objectives.

(2) Training efficiency relates to how well resources were used to conduct the training.

d. Training in support type units. The TACSAT commander must consider the unique aspects of training in a support type unit. The training environment must be studied to determine training variables. This analysis will result in a list of actions that guide the planning and management of training. For a start, a few general hints are suggested below:

(1) Be sure supported commanders know the unit's mission uniqueness, capabilities, and special training needs.

(2) Carefully coordinate training with the diverse nature of TACSAT operations.

(3) Identify skill qualification tasks (SQT) performed on the job. Identify remaining tasks for individual or collective training.

(4) Integrate training on the job, in the motor pool, in the field, and everywhere possible.

(5) Plan SOJT. Soldiers are seldom adequately trained for C-E systems employment in Army schools.

(6) Plan consolidated training on common subjects for isolated sections or shift workers.

(7) Conduct signal support operations under field conditions to evaluate the unit's proficiency.

(8) Study ways to minimize the unit's field signature.

(9) Insist on the same high standards for training both in garrison and in the field.

(10) Visit as many training sessions as possible. Get involved personally in both signal and common subject training.

Appendix

References

Section 1. Required Publications

Army Regulations (ARs)

AR 105–3	Reporting Meaconing, Intrusion, Jamming and Interference of Electromagnetic Systems (RCS JCS-1066 (MIN))
AR 220–1	Unit Status Reporting (RCS JCS 6–11-2–1–6)
AR 350–1	Army Training
AR 350–35	New Equipment Training
AR 350–37	Army Individual Training Evaluation Program

Field Manuals (FMs)

FM 3–3	Nuclear, Biological, and Chemical Contamination Avoidance
FM 3–4	Nculear, Biological, and Chemical Protection
FM 3–5	Nuclear, Biological, and Chemical Decontamination (DECON)
FM 3-100	Nuclear, Biological, and Chemical Operations
FM 11–23	Theater Communications Command (Army) (TCC(A))
FM 11–25	Signal Troposcatter Company (Light and Heavy)
FM 11–26	Signal Operations Company (Medium Headquarters)
FM 11–27	Signal Cable and Wire Company
FM 11–28	Signal Command Operations Battalion (Theater)
FM 11–29	Signal Telecommunications Battalion (Area)
FM 11–50	Combat Communications Within the Division
FM 11–92	Combat Communications Within the Corps
FM 24–1	Combat Communications
FM 24–16	Communications-Electronics: Operations, Orders, Records and Reports
FM 24–22	Communications-Electronics Management System (CEMS)
FM 24–33	Electronic Counter-Countermeasures
FM 25–1	Training
FM 25–2	How to Manage Training in Units
FM 25–3	Training in Units
FM 25–4	How to Conduct Training Exercises
FM 34–1	Intelligence and Electronic Warfare Operations
FM 34–62	Signal Security
FM 55–30	Army Motor Transport Unit and Operations
FM 90–14	Rear Area Protection Operations
FM 100–5	Operations
FM 100-10	Combat Service Support
FM 100–16	Support Operations: Echelons Above Corps

Arm Training and Evaluation Program (ARTEPs)

ARTEP 11–403	Signal Tactical Satellite Company (TOE 11–403)

Section II. Related Publications

Army Regulations (AR)

AR 55-355	Military Traffic Management Regulation Organization and Training for Nuclear, Biological and Chemical Defense
AR 310-2	Identification and Distribution of DA Publications and Issue of Agency and Command Administrative Publications
AR 310-25	Dictionary of United States Army Terms
AR 310-31	Management System for Tables of Organization and Equipment (The TOE System)
AR 380-5	Department of the Army Information Security Program
AR 381-19	Intelligence Support

Field Manuals (FMs)

FM 5-15	Field Fortifications
FM 5-20	Camouflage
FM 5-25	Explosives and Demolitions
FM 24-2	Radio Frequency Management
FM 24-17	Tactical Communications Center Operations
FM 24-18	Field Radio Techniques
FM 24-20	Field Wire and Field Cable Techniques
FM 24-21	Tactical Multichannel (MCHAN) Radio Communications Techniques
FM 24-24	Radio and Radar Reference Data
FM 24-25	Wire and Multichannel Reference Data
FM 24-26	Tactical Automatic Switching
FM 34-60	Counterintelligence Operations
FM 90-2	Tactical Deception
FM 90-3	Desert Operations
FM 90-5	Jungle Operations
FM 90-6	Mountain Operations
FM 100-2-1	Soviet Army Operations and Tactics
FM 101-5	Staff Officers Field Manual: Staff Organization and Procedure
FM 101-31-2	Staff Officers Field Manual: Nuclear Weapons Employment Effects Data (U)
FM 101-31-3	Staff Officers Field Manual: Nuclear Weapons Employment Effects Data (classified version: FM 101–31–2)

Department of the Army Pamphlets (DA Pares)

DA Pam 350-100	Extension Training Materials Catalog: Consolidated MOS Catalog
DA Pam 350-111-2	Signal Operations Company
DA Pam 350–111–4	Headquarters and Headquarters Detachment, Signal Battalion, Signal Support and Signal Radio Operations Company
DA Pam 350–111–5	Signal Troposphere and Signal Messenger Companies
DA Pam 525-33	U.S. Army Operational Concept for Army Air Space Management
DA Pam 710-2-1	Using Unit Supply System, Manual Procedures

Allied Communications Publications (ACPs)

ACP–1OO (Allied)	U.S. Call Sign and Address Group System-Instructions and Assignment (U) (Initial distribution of ACPs and JANAPs will be made by TAGO as requested by CG, USAISC. Using Army units will submit requests for resupply on DA Form 4569 to Chief, U.S. Army C-E Services Office, A'ITN: AS-OPS-CE-M, Washington, DC, 2031 O-5OO9 (AR 310-20).)

ACP-1OO, U.S. Suppl–1	Allied Call Sign and Address Group System-Instructions and Assignments (U)
ACP--1OO (Allied)	Tactical Call Sign Book (U)
ACP–11O U.S. Suppl-1 (Allied)	Tactical Call Sign Book Master Index Suppl (U)
ACP-112	Task Organization Call Sign Book (U)
ACP–112, U.S. Suppl–1	Task Organization Call Sign Book (U)
ACP--117	Allied Routing Indicator Book (U)
ACP--17, U.S. Suppl–1	Allied Routing Indicator Book
ACP--1I7, U.S. Suppl–2	Routing Indicator Book for Mobile Commands and Units
ACP–117, U.S. Suppl–3	Defense Communications Systems Routing General Purpose Networks
ACP–117, U.S. Suppl–4	U.S. Special Purpose Routing Indicator Book (U)
ACP-117, U.S. Suppl–5	CONUS Military TWX/ TELEX Directory
ACP–117, CAN-U.S. Suppl–1	Allied Routing Indicator Book Canada-United States
ACP–117, NATO Suppl–1	NATO Routing Indicator Book (U)
ACP–117, SEATO Suppl–1	SEATO Tape Relay Routing Indicator Book (U)
ACP–118	Visual Call Sign Book
ACP–119	Allied Tactical Voice Call Sign System-Instruction and Assignments
ACP-121	Communications Instructions—General (U)
ACP-121, U.S. Suppl–2	Communications Instructions—General Air Ground
ACP-121, NATO Suppl–1	Communications Instructions—General NATO Basegram System (U)
ACP-121, SEATO Suppl–1	Communications Instructions—General (U)
ACP-122	Communications Instructions—Security (U)
ACP-122, NATO Suppl–1	Communications Instructions–Security (U)
ACP-124	Communications Instructions—Radiotelegraph Procedures (and radiotelephone)
ACP-125, U.S. Suppl–2	Radiotelephone Procedures for the Conduct of Artillery and Naval Gunfire
ACP-125, U.S. Suppl–3	Radiotelephone Procedures for Ciphony (CONF NOFORN) Communications (U)
ACP–126 (Allied)	Communications Instructions—Teletypewriter (Teleprinter) Procedures (U)
ACP–126B	communications Instructions-Radio-Teletypewriter Procedures
ACP–127 (Allied)	Communications Instructions—Tape Relay Procedures
ACP–127, U.S. Suppl–1	Communications Instructions—Tape Relay Procedures (U)
ACP–127, U.S. Suppl–1	Communications Instructions—Tape Relay Procedures (NATO-Naval Broadcast. Shipshore and Inter-RATT Procedures) (U)
ACP–127, NATO Suppl–2	Communications Instructions On-Line Cryptographic Tape Relay Procedures (U)
ACP–128	Automatic Digital Network (AUTODIN) Operating Procedures
ACP–129	Communications Instructions—Visual Signaling Procedures
ACP–131, U.S. Suppl–1	Communications Instructions—Operating Signals
ACP–134	Telephone Switchboard. Operating Procedures
ACP–135	Communications Instructions—Distress and Rescue Procedures
ACP–136	Communications Instructions Panel Signaling
ACP–150	Recognition and Identification Instructions Air, Land and Sea Forces (U)
ACP–165 (Allied)	Operating Brevity Codes (U)
ACP–167	Glossary of Communications-Electronics Terms
ACP–168	Pyrotechnic Signals
ACP–117 (Allied)	Land Forces Electronic Warfare Instructions (U)

ACP–190	Guide to Frequency Planning
ACP–198	Instructions for the Preparation of Allied Communications Publications
ACP-201	Index of Allied Communications Publications

Joint Army-Navy-Air Force Publications (JANAPs)

JANAP–119	Joint Voice Call Sign Book (U) (for availability, see ACP–1OO (Allied)).
JANAP-128	AUTODIN Operating Procedures (U)
JANAP-138 (NOFORN)	Automatic Secure Voice Communications Network (AUTOSEVOCOM) Operating Procedures (U)
JANAP–141	U.S. Joint Military Radio Frequency Allocation Plan (U)
JANAP–194	Basic Armed Forces Communications Plan (BAFCOM) U.S. Army Frequency Plan (U)
JANAP-195	Basic Armed Forces Communications—U.S. Navy Frequency Plan (U)
JANAP-201	Status of Noncryptographic JANAPs and ACPs (U)
JANAP-299	U.S. Joint Code Work Index (U)

Standardization Agreements (STANAGs)

STANAG-2014	Operation Orders, Annexes to Operation Orders, and Administrative/Logistics Orders (See DA Pam 310-35 for STANAGs of interest to the U.S. Army. Initial distribution of STANAGs will be made by TAGO as requested by CG, USAISC. Using Army units will submit requests for resupply to U.S. Naval Publications and Forms Center, Philadelphia, PA 19120 for unclassified and U.S. Army Materiel Command, A'ITN: AMCIRD, 5001 Eisenhower Avenue, Alexandria, VA 22333 for classified (AR 34–1).)
STANAG-2019	Military Symbols
STANAG–2020	Operational Situation Reports
STANAG-2028	System for Field Wire Labeling
STANAG-2043	Principles and Procedures for Establishing Communications
STANAG–2047	Emergency Alarms of Hazards of Attack
STANAG–2109	Telecommunications Symbols

Glossary

Section I. Abbreviations

ACACS	Army Command and Area Communications System
ACP	Allied Communications Publication
ADC	area damage control
APTF	antenna pallet transit frame
ARTEP	Army Training and Evaluation Program
ASG	area support group
ASP	Army Standardization Program
ATC	air traffic control
AUTOCOMM	Army Automation Communications Network
AUTODIN	automatic digital network
AUTOVON	automatic voice network
AUTOSEVOCOM	automatic secure voice communications
BCOC	base cluster operations center
BDOC	base defense operations center
BTMS	Battalion Training Management System
C-E	communications-electronics
CEMS	Communications-Electronics Management System
CEOI	communications-electronics operating instructions
CESE	communications equipment support element
CFC	Combined Forces Command
CI	counterintelligence
CMT	Common Military Training
CNCE	communications nodal control element
COHORT	cohesion, operational readiness, and training
COMMZ	communications zone
COMSEC	communications security
CONUS	continental United States
CP	command post
CSCE	communications system control element
CSPE	communications system planning element
DCA	Defense Communications Agency
DCS	Defense Communications System
DGCL	defense ground control link
DOCS	DSCS Operational Control System
DS	direct support
DSCS	Defense Satellite Communications System
EAC	echelons above corps
ECCM	electronic counter-countermeasures
ECM	electronic countermeasures
ED	emergency destruction
EMC	electromagnetic compatibility
EMCON	emission control
EMP	electromagnetic pulse
ESM	electronic warfare support measures
ETM	extension training materials
EW	electronic warfare
FLOT	forward line of own troops
FM	frequency modulated
FRAGO	fragmentary order
GMF	ground mobile force
GMFSC	Ground Mobile Force Satellite Communications
GS	general support
GTA	graphic training aids
HF	high frequency
HNS	host nation support
ITEP	Individual Training and Evaluation Program
JANAP	Joint Army-Navy-Air Force Publication
LC	learning center
LOS	line of sight
MI	military intelligence
MIJI	meaconing, intrusion, jamming, and interference
MOPP	mission oriented protective posture
NATO	North Atlantic Treaty Organization
NAVAIDS	navigational aids
NBC	nuclear, biological, and chemical
NCO	noncommissioned officer
NET	new equipment training
OPSEC	operations security
PLL	prescribed load list
POL	petroleum, oils, and lubricants

RAOC	rear area operations center
RATT	radio teletype
RDF	radio direction finding
REC	radioelectronics combat
SAMS	Satellite Automatic Monitoring Subsystem
SATCOM	satellite communications
SCCC	Satellite Communications Control Center
SCCS	Satellite Communications Control System
SFX	signal field exercise
SHF	super high frequency
SIGSEC	signal security
SM	soldier's manual
SOJT	supervised on-the-job training
SOP	standing operating procedure
SRA	specialized repair activity
SQT	skill qualification test
STANAG	standardization agreement
TA	theater Army
TAACOM	Theater Army Area Command
TACSAT	Tactical Satellite (Company)
TASC	Training Aids Support Center
TCC(A)	Theater Communications Command (Army)
TCS(A)	Theater Communications System (Army)
TDA	tables of distribution and allowances
TEC	technical extension course
TG	trainers guide
TM	technical manual
TMACS	Training Management Control System
TMDE	test, measurement, and diagnostic equipment
TOE	table of organization and equipment
TRADOC	Training and Doctrine Command
TSCCS	Tactical Satellite Communications Control
USAISC	United States Army Information Systems Command

Section II. Terms

Area signal node

Signal facility that provides communications to units within its assigned geographical area of responsibility. This ties the units into the TCS(A) and supplements their organic means for communications with higher, subordinate, or adjacent headquarters.

Army training system

System within which the Army develops, manages, and conducts training. System components are institutional training, unit training, and training support.

Authentication

A security measure designed to protect a communications system against fraudulent transmissions.

Base

A unit or multiunit position that has a definite perimeter. Army, other services, or host nation units may make up a base.

Base cluster

Combat support and combat service support units in the rear area grouped together for rear battle operations or mission-related purposes. A base cluster has no clearly defined perimeter.

Base defense operations

Defense measures taken by a base to provide internal and perimeter security. Measures include organizing and preparing personnel and equipment in an effective manner to defend themselves until military police and, if needed, tactical combat forces can respond. A base defense operations center (BDOC) is established to coordinate base defense and area damage operations.

Brevity code

A code which provides no security but which has as its sole purpose the shortening of mesages rather than the concealment of their contents.

Call sign

Any combination of characters or numbers or pronounceable words which identifies a communications facility, command, authority, activity, or unit. It is used primarily for establishing and maintaining communications.

Circuit

Communications term: An electronic path between two or more points capable of providing a number of channels. *Engineering term*: A number of conductors connected together for the purpose of carrying an electrical current.

Code

Any system of communications in which arbitrary groups of symbols represent units of plain text of varying length. Codes are provided primarily for one of three purposes: (1) In the broadest sense, coding is a means of converting information into a form suitable for communication and encryption; (2) brevity codes are used to reduce the length of time necessary to transmit information; (3) security codes are used to provide some degree of cryptographic protection for the information being transmitted.

Collective training

The preparation of soldiers to perform those team or unit tasks essential to the accomplishment of a unit's TOE or operational mission.

Command and control

An arrangement of personnel, facilities, and the means for information acquisition, processing, and dissemination employed by a commander in planning, directing, and controlling operations.

Command post

A unit's headquarters from which command and control is centrally exercised.

Common-user circuit

A circuit allocated to furnish communications paths between switching centers to provide communications service on a common basis to all connected stations or subscribers.

Communications-electronics (C-E)

Embraces the design, development, installation, operation, and maintenance of electronics and electromechanical systems associated with the collecting, transmitting, storing, processing, recording, and displaying of data and information associated with all forms of military communications.

Communications-electronics operating instructions (CEOI)

A series of orders issued for the technical control and coordination of the signal communications activities of a command.

Communications equipment support element (CESE)

Individual elements of the C-E system—radio, switch, multiplex, wire teams, maintenance, and so forth.

Communications nodal control element (CNCE)

A dual function facility that incorporates both facilities control and technical control requirements. The technical control element of the CNCE contains patching, testing, conditioning, and monitoring equipment and provides technical control of circuits in an through the facility. The management element of the CNCE provides management and control of C-E functions within the node.

Communications system control element (CSCE)

Provides actual focal point for dynamic control, acts as operations center for command system, and directs organic and subordinate C-E systems. It maintains the data base.

Communications system planning element (CSPE)

Consists of the staff and operational planners at each element and provides all the long-range planning.

Communications zone (COMMZ)

The portion of the theater of operations that begins at the corps rear boundary and extends rearward to include the area necessary to provide support to forces in the combat zone. The combat zone begins at the corps rear boundary and extends forward to the extent of the corps commander's area of influence.

Cross-training

The systematic training of the soldier on tasks related to another job within the same MOS or tasks related to a secondary MOS within the same skill level.

Data link

A communications link suitable for transmission of data.

Decentralized training

The process whereby authority and responsibility for the detailed planning, organizing, conducting, evaluating, and supervising of training is delegated to the lowest command element having the capability to manage effective training.

Echelons above corps (EAC)

Those headquarters and organizations that normally operate within the theater of operations and provide the interface between the deployed corps and higher operational, lateral, and/or support headquarters, and respective national control authorities, to include service components as required. The term is generic in nature and does not refer to a specific level of command. Functions provided and controlled at EAC may be operational, administrative, logistical, or any combination of the above.

Electromagnetic emission control

The control of friendly electronic emissions (for example, radio and radar transmissions) for the purpose of preventing or minimizing their use by unintended recipients.

Electronic counter-countermeasures (ECCM)

That division of EW involving actions taken to ensure friendly effective use of the electromagnetic spectrum.

Electronic countermeasures (ECM)

That division of EW involving actions taken to prevent or reduce the effectiveness of enemy equipment and tactics employing or affected by electromagnetic radiations, and to exploit the enemy's use of such radiations.

Electronic deception

The deliberate radiation, reradiation, alteration, absorption, or reflection of electromagnetic energy in a manner intended to mislead an enemy in the interpretation of use of information received by the Army's electronic systems. There are three categories of deception: manipulative, imitative, and simulative.

Electronic jamming

The deliberate radiation, reradiation, or reflection of electromagnetic energy with the object of impairing the use of electronic devices, equipment, or systems being used by an enemy.

Electronic warfare (EW)

That division of the military use of electronics involving actions taken to prevent or reduce an enemy's effective use of radiated electromagnetic energy, and actions taken to ensure our own effective use of radiated electromagnetic energy.

Electronic warfare support measures (ESM)

That division of EW involving actions taken to search for, intercept, locate, record, and analyze radiated electromagnetic energy, for the purpose of exploiting such radiations in support of military operations. ESM provides a source of EW information required to conduct ECM, ECCM, threat detection, warning, avoidance, target acquisition, and homing.

Individual training

Training received that enables officers, NCOs, and soldiers to perform the specific duties and tasks related to their MOS and duty position.

Institutional training

Training, either individual or collective, conducted in schools (Army service school, U.S. Army Reserve school, NCO academy) or Army training centers. Institutions which conduct this training are referred to as being part of the training base.

Link

A general term used to indicate the existence of communications facilities between two points.

Military occupational specialty (MOS)

A term used to identify a grouping of duty positions possessing such close occupational or functional relationship that an optimal degree of interchangeability among persons so classified exists at any given level of skill.

Net

An organization of stations capable of direct communications with each other using a common frequency or channel.

Net control station (NCS)

A station designated to control traffic and enforce circuit discipline within a given net.

Network

Communications term: An organization of stations capable of intercommunication but not necessarily on the same channel. *Engineering term*: Two or more interrelated circuits.

New manning system

Name applied to the concept for the replacement of U.S. Army personnel. It consists of two reinforcing subsystems, the cohesion, operational readiness, and training (COHORT) unit replacement system and the U.S. Army Regimental System (DA Circular 600–82–2).

New equipment training (NET)

Training to transfer knowledge gained during materiel development to trainers, users, and support personnel during development and fielding of new equipment. It has the purpose of training unit soldiers and leaders on how to operate, maintain, and tactically employ the new equipment. Numbers and type of personnel and units to be trained are determined on a system-by-system basis during the NET planning process.

Performance-oriented training

Learning by doing. Performance to standard is required.

Radio direction finding (RDF)

Radio location in which only the direction of a station is determined by means of its emission. Since this tecnique can be used against all electronic emitters, it is sometimes simply referred to as direction finding (DF).

Rear area operations center (RAOC)

Rear area staff responsible for planning, coordinating, directing, and monitoring the rear battle.

Rear area

The area to the rear of the main battle area where supply, maintenance support, communications centers, and administrative echelons are located. The rear area extends from the brigade rear boundary to the theater rear boundary.

Systems approach to training

A logical process for effectively and efficiently determining what, where, when, and how tasks should be taught. It consists of the five interrelated phases of evaluation, analysis, design, development, and implementation.

System control

An engineering center within a telecommunications system at which technical control of facilities is exercised. See also communications system control element.

Supervised on-the-job training (SOJT)

A training process whereby students or trainees acquire knowledge and skills through actual performance of duties under competent supervision, in accordance with an approved, planned program.

Table of organization and equipment (TOE)

A document which prescribes the normal mission, organizational structure, personnel, and equipment requirements for a military unit and is the basis for an authorizations document.

Telecommunications

Any transmission, emission or reception of signals, signs, writings, images, sounds, or information of any nature by wire, radio, visual, or other electromagnetic systems.

Telecommunications center

An agency charged with the responsibility for acceptance, preparation for transmission, receipt, duplication, and delivery of messages.

Text

That part of a message which contains the thought or idea which the originator desires to be communicated.

Traffic (communication)

All transmitted and received messages.

Train-up training

Training that prepares an individual to perform tasks at a higher skill level in his career management field.

Type B organization

An organization with personnel positions that can be filled by non-U.S. personnel. The type B column of a TOE lists those positions which must be filled by U.S. military personnel. Vacancies in this column indicate those positions that may be filled by non-U.S. personnel in support of the Army OCONUS.

Unit category

A category designated in section I of the unit TOE that applies to the assignment of secondary missions (AR 310–31).

a. Category I TOE. In consideration of the primary mission, tactics, and normal employment of category I units, category I TOE will include secondary missions in exceptional cases only. The secondary missions must be directly related to, and an extension of, the assigned primary missions.

b. Category II TOE. Category II TOE will include limited secondary missions when the nature of the primary missions are such that the units using the TOE will not be employed full time in preparing for, or accomplishing, the primary missions. The secondary missions must be related to, and an extension of, the assigned primary missions.

c. Category III TOE. Category III TOE will include secondary missions whenever possible. The secondary missions must be directly related to, and an extension of, the assigned primary mission.

Unit training

Training, individual or collective, conducted in a unit.

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
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Official:

MILDRED E. HEDBERG
Brigadier General, United States Army
The Adjutant General

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