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Tactics, Techniques, and Procedures for THE FIELD ARTILLERY CANNON BATTALION

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PREFACE

This publication is a guide for the commander of a field artillery cannon battalion organized under either J-series or L-series tables of organization and equipment (TOEs). It is also a guide for the staff, battery commanders, and commanders of the supported units. This publication sets forth doctrine pertaining to organization; command and control; operations and tactics, techniques, and procedures for the battalion. It establishes the responsibilities and general duties of key personnel by focusing on how the field artillery fights. It keys the battalion commander to those areas that must be trained in order to win the fight. The specifics of how we train to fight are outlined in soldier's manuals and Army training and evaluation program (ARTEP) mission training plans (AMTPs). They should be referenced when this area is addressed.

The TOEs detail manpower and equipment authorizations for US Army units. However, all Army units are organized under modification tables of organization and equipment (MTOEs). To determine manpower and equipment authorizations for a specific unit, refer to the authorization document (MTOE) for that unit. The units described in this publication reflect the L-series Department of the Army (DA) objective TOEs.

This publication describes how the cannon battalion operates to support the combined arms team. The tactics and techniques presented apply equally to those battalions that are equipped with the tactical fire direction system (TACFIRE) and those battalions that are not. Any TACFIRE-specific procedures are noted as such. Integration of the operations of TACFIRE and non-TACFIRE units is addressed in Appendix A.

Operations in support of both heavy and light maneuver forces are addressed, as are operations in special environments (Appendix B). The principles set forth in this manual apply to military operations anywhere in the world,

This publication is compatible with AirLand Battle doctrine as outlined in FM 100-5. It does not stand alone. It must be used in conjunction with FM 6-20, FM 6-20-2 FM 6-20-10, FM 6-20-30, FM 6-20-40, FM 6-20-50, FM 6-50, FM 6-121, TC 6-40, and TC 6-40A, as well as the maneuver doctrinal manuals for both heavy and light forces. Its primary focus is on the unit performing the mission of direct support. However, this manual has a more general application in that many of the concerns of a direct support battalion apply equally to the commander of a battalion assigned a general support or reinforcing mission.

During its development, FM 6-20-1 has undergone several draft revisions. Numerous individual Redlegs have helped to shape and define this manual. Representatives from a wide variety of artillery units have provided input during the development cycle. The units listed below provided representatives to a unique developmental exercise that encompassed a comprehensive review and rewrite of the draft manual. The efforts of these artillerymen resulted in this final product. It reflects a broad consensus from the field and the US Army Field Artillery School (USAFAS) concerning the tactics, techniques, and procedures for the field artillery cannon battalion. The field representatives were from—

- 1st Cavalry Division *Artillery*, Fort Hood, Texas.
- 2d Infantry Division *Artillery*, Republic of Korea.
- 3d Infantry Division *Artillery* (Mechanized), Wuerzburg, Federal Republic of Germany.
- 4th Infantry Division *Artillery* (Mechanized), Fort Carson, Colorado.
- 8th Infantry Division *Artillery* (Mechanized), Baumholder Federal Republic of Germany.
- 10th Mountain Division *Artillery*, Fort Drum, New York.

- 82d Airborne Division Artillery, Fort Bragg, North Carolina.
- National Training Center, Fort Irwin, California.

This publication implements the following North Atlantic Treaty Organization (NATO) standardization agreements (STANAGs) and queadripartite standardization agreements (QSTAGs):

- STANAG 2031, Edition 5, and QSTAG 515, Edition 1, *Profonna for Artillery Fire Plan*.
- STANAG 2129 Edition 5, and QSTAG 538, Edition 1, *Identification of Land Forces on the Battlefield*.
- STANAG 2887, Edition 3, and QSTAG 217, Edition 2, Amendment 2, *Tactical Tasks and Responsibilities for Control of Artillery*

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

CHAPTER 1

ROLE OF THE BATTALION

This chapter Implements portions of STANAG 2887 and QSTAG 217.

In combat the field artillery (FA) cannon battalion provides Indirect fire support to maneuver forces on the battlefield. To do this, it must perform seven basic tasks. A command relationship is established with a senior headquarters (HQ), and a tactical mission is assigned each battalion.

SEVEN BASIC TASKS

Coordinate Fire Support

The senior field artilleryman assigned to the force is responsible for managing the fire support effort of that force. Also, he is the principal advisor on fire support matters. Details for the total fire support effort are in FM 6-20. This publication concentrates on the cannon FA support effort.

Acquire Targets

This task represents *the eyes* of the FA fire support effort. Target acquisition (TA) is discussed at length in Chapter 5 and involves both organic and nonorganic means.

Denver Field Artillery Fires

This task represents *the muscle* of the FA fire support effort. It involves all the efforts required for the gunnery team (observer, fire direction center [FDC], firing sections) to get the proper weapons-ammunition combinations on targets. Chapter 4 discusses this function in detail.

Communicate

Communication in an FA cannon battalion is essential to efficient fire support. The communications system must satisfy combat power requirements. These include fire support, command and control, and maneuver. This task is discussed in Chapter 6.

Move

Movements of FA units must be planned and synchronized so continuous fire support can be provided to the maneuver operation. This task is discussed in Chapter 3 along with considerations in positioning the unit as a result of that move.

Maintain and Resupply

Maintaining and resupplying FA units contribute to the sustainment of the battle and the combat power of the force as a whole. This task is discussed in Chapter 7 as a part of battalion combat service support (CSS) operations.

Survive

To provide support, the battalion must survive. Chapter 3 presents movement and positioning technique that will enhance the chances of the battalion surviving in a combat environment. These techniques should be used as a guide. Units should develop their own tactics, techniques, and standing operating procedures (SOPs) to avoid detection and destruction by enemy forces. Normally, the battalion is employed in its separate entities – tiring units, trains, and a command post (CP). Therefore, the battalion commander and staff must be aware of the techniques as they affect these separate entities. These techniques are discussed throughout this manual.

COMMAND AND CONTROL

Command and control of the FA cannon battalion are established through a two-step process.

- The first step is to establish a command relationship with a senior headquarters. This relationship – either organic, assigned, attached, or operational control (OPCON) – is normally established with an FA headquarters, such as division artillery (div arty) or an FA brigade. However, it can be established with a maneuver headquarters.
- Once a command relationship is established, a tactical mission is assigned. The four standard field artillery tactical missions are direct support (DS) reinforcing (R), general support reinforcing (GSR), and general support (GS). The assignment of a tactical mission and the inherent responsibilities associated with each mission establish in detail the relationship between the supporting FA unit and the maneuver or FA headquarter being supported.

Command Relationship

Clearly defined, systematic, and positive command and control (C2) are required to ensure that the field artillery contributes to total fire support in a responsive manner and that it is adequate to support the mission. The C2 relationships that may be established between an FA battalion and a senior headquarters are discussed below.

Organic. An organic element is one that is assigned to and forms an essential part of a military organization. Normally, it is shown in the unit TOE. Examples are a Firefinder radar (An/tPQ-36) section organic to a light division DS battalion and a TA platoon (radar, survey, and meteorology [met]) organic to a DS battalion in a separate maneuver brigade.

Assigned. A unit or personnel may be placed in an organization on a relatively permanent basis. That organization controls, administers, and provides logistical support to the unit or personnel for the primary function, or the greater part of the functions, of the unit or personnel. Examples are FA battalions assigned to division artilleries.

Attached. Units or personnel may be placed in an organization temporarily. Subject to limitations imposed by the attachment order, the commander of the formation, unit, or organization receiving the attachment exercises the same degree of command and control over the attached unit as he does over units and persons organic to his command. However, the responsibility for transfer and promotion of personnel normally is retained by the parent formation, unit, or organization. The attachment order should state clearly the administrative and support responsibilities of the gaining unit to the attached unit. Examples are FA battalions assigned to the corps and attached to FA brigades of the corps.

Operational Control. OPCON is the authority delegated to a commander to direct forces assigned so that he may-

- Ž Accomplish specific missions or tasks that are usually limited by function time, or location.
- Ž Deploy units concerned.
- Ž Retain or assign tactical control of three units.

OPCON does not, of itself, include administrative or logistical control. In NATO, it does not include authority to assign separate employment of components of the units concerned. Normally, OPCON is not a command relationship given to FA units. The four tactical missions (DS, R, GSR, and GS) perform the same function yet more precisely define the relationship with the supported command.

Standard Tactical Missions

A field artillery tactical mission describes in detail the support responsibilities of an FA unit. The mission also establishes the relationship of the FA unit with a maneuver unit or another FA unit. It does not affect the organizational structure or the command relationships that result from that structure. A field artillery tactical mission is assigned by the force commander. He bases his assignment on the advice of the force artillery commander, who is the fire support coordinator (FSCOORD) for the force. See FM 6-20-2 for a detailed discussion of the considerations for assigning an FA battalion a particular tactical mission.

Field artillery battalions normally meet their FA support requirements through one of four basic standard tactical missions: **direct support**, **reinforcing**, **general support**, **reinforcing** and **general support**. Assignment of a tactical mission implies that a field artillery commander will meet each of the seven inherent responsibilities of his mission.

SEVEN INHERENT RESPONSIBILITIES OF FIELD ARTILLERY STANDARD TACTICAL MISSIONS

| AN FA UNIT WITH A MISSION OF— | DIRECT SUPPORT | REINFORCING | GENERAL SUPPORT REINFORCING | GENERAL SUPPORT |
|---|---|---|---|---|
| Answers calls for fire in priority from— | 1. Supported unit. 2. Own observers. ¹ 3. Force FA HQ. | 1. Reinforced FA. 2. Own observers. 3. Force FA HQ. | 1. Force FA HQ. 2. Reinforced unit. 3. Own observers. ¹ | 1. Force FA HQ, 2. Own observers. ¹ |
| Has as its zone of fire— | Zone of action of supported unit. | Zone of fire of reinforced FA. | Zone of action of supported unit to include zone of fired reinforced FA unit. | Zone of action of supported unit. |
| Furnishes fire support team (FIST) or fire support element (FSE) ² — | Provides temporary replacements for casualty losses as required. | No requirement. | No requirement. | No requirement. |
| Furnishes liaison officer— | No requirement. | To reinforced FA unit HQ. | To reinforced FA unit HQ. | No requirement. |
| Establishes communication with— | Company FSOs, FSOs and supported maneuver unit HQ. | Reinforced FA unit HQ. | Reinforced FA unit HQ, | No requirement. |
| Is positioned by— | DS FA unit commander or es ordered by force HQ. | Reinforced FA unit or es ordered by fores FA HQ. | Force FA HQ or reinforced FA unit if approved by force FA HQ. | Force FA HQ. |
| Has its fires planned by— | Develops own fire plan. | Reinforced FA unit HQ. | Force FA HQ. | Force FA HQ. |
| ¹ Includes all target acquisition means not deployed with supported unit (radar, aerial observers survey parties, and so on). ² An FSE for each maneuver brigade, battalion, or cavalry squadron and one FIST with each maneuver company or ground cavalry troop are trained end deployed by the FA unit authorized these assets by TOE. After deployment, FISTs end FSEs remain with the supported maneuver unit throughout the conflict. | | | | |

Direct Support. A battalion operating in direct support of a maneuver unit is primarily concerned with the FA support needs of only that unit. The DS battalion commander is the FSCoord for the supported maneuver force. Fires are planned and coordinated with the maneuver unit, and the DS battalion commander positions his unit where it can best support the scheme of maneuver. If the battalion cannot provide the support required for a planned scheme of maneuver, the FSCoord must inform the supported maneuver commander. The same battalion should support the same maneuver force habitually to enhance coordination and the training effort. Direct support is the most decentralized standard tactical mission.

Reinforcing. Reinforcing is a tactical mission that causes one FA battalion to augment the fires of another FA battalion. When a direct support FA battalion needs additional fires to meet the FA support needs of a maneuver force, the reinforcing mission may be assigned to another FA battalion.

General Support Reinforcing. The GSR mission requires the FA battalion to furnish artillery fires for the force as a whole and to reinforce the fires of another FA battalion as a second priority. A GSR battalion remains under the control of the force artillery headquarters, which has priority of fires. The GSR mission gives the force commander flexibility to meet the requirements of a variety of tactical situations.

General Support. A battalion assigned the mission of general support supports the force as a whole and stays under the immediate control of the force artillery headquarters. This mission makes artillery immediately responsive to the needs of the force commander. It is the most centralized of the standard tactical missions.

Nonstandard
Tactical Missions

If the commander’s intent for fire support cannot be accurately conveyed with one of the standard FA tactical missions, a nonstandard tactical mission may be assigned. That mission may amplify, limit, or change one or more of the seven inherent responsibilities; or it may spell out contingencies not covered by those responsibilities. A nonstandard mission is assigned if there is not enough field artillery to cover all the contingencies or if an FA battalion is assigned more than one functional mission.

If the revision of a tactical mission is so complex that the standard field artillery mission is no longer recognizable, a nonstandard mission statement will address each of the seven inherent responsibilities.

EXAMPLES

1-50 FA: GSR 1-20 FA; do not exceed 50 percent of CSR to R 1-20 FA.
1-89 FA: GS provide liaison officer to div arty TOC.

The nonstandard tactical mission is one means of adjusting to an unusual tactical situation. It is also a means by which the commander can tailor his fire support assets in anticipation of future operations. Another way the commander can prepare his fire support for future operations is to give the units contingency or on-order tactical missions. The assignment of an on-order mission lets a unit anticipate an FA support need in a future situation.

EXAMPLES

1-50 FA: R 1-20 FA; O/O DS 3 BDE.
1-89 FA: DS 1-23 Cav (div security force); after completing rearward passage, GS 52 Inf Div (Mech).

GLOSSARY FOR EXAMPLES

| | | | |
|------------|--------------------------|-------------|------------------------------|
| bde | = brigade | inf | = infantry |
| Cav | = cavalry | mech | = mechanized |
| CSR | = controlled supply rate | O/O | = on order |
| div | = division | TOC | = tactical operations center |

Operations in an
Allied Environment

As stated here, each of the four standard tactical missions has seven inherent responsibilities. However, these tactical missions and responsibilities are not viewed exactly the same by the armies of nations allied with the United States. A battalion commander may be required to operate in an environment covered by bilateral agreements. In this environment, the operation order (OPORD) will be his guide for bilateral operations. The United States and its NATO allies and its British, Canadian, and Australian allies have agreed to the terms of STANAG 2887 and QSTAG 217, respectively. When they are supporting allied troops or working with allied artillery, FA battalion commanders must know the responsibilities included in these agreements as viewed by other nations.

TACTICAL TASKS AND RESPONSIBILITIES FOR CONTROL OF ARTILLERY (NATO AND ABCA)

| ARTILLERY WITH A TACTICAL TASK OF | ANSWERS CALLS FOR FIRE IN PRIORITY FROM | ESTABLISHES LIAISON WITH | ESTABLISHES COMMUNICATION WITH | FURNISHES FORWARD OBSERVERS TO ¹ | WEAPONS MOVED AND DEPLOYED BY (POSITIONED BY) | HAS AS ITS ZONE OF FIRE | HAS ITS FIRES PLANNED BY | NATIONS TO WHICH TERMINOLOGY APPLIES |
|--|---|---|---|---|--|--|---|--------------------------------------|
| Direct Support | Directly supported formation or unit. Own observers. Force field artillery. ² | Directly supported formation or unit (battalion, regiment, or brigade). | Directly supported maneuver formation or unit. | Each maneuver company of the directly supported formation or unit. | Direct support artillery unit commander or as ordered by force field artillery HQ. ² | Zone of action of the directly supported formation or unit. | Develops own fire plans in coordination with directly supported formation or unit. | BE, DA, FR, GE, IT, NL, TU, US |
| | Directly supported formation or unit. Any other formation or unit as authorized by the controlling HQ. | Directly supported formation or unit. | Directly supported formation or unit. | Directly supported formation or unit. | Next higher artillery HQ. | Zone of action of the directly supported formation or unit or as ordered by higher artillery HQ. | Artillery formation or unit in direct support in conjunction with directly supported formation or unit. | AS, CA, NO, UK |
| In Support | Supported formation or unit. Any other formation or unit as authorized by the controlling HQ. | No inherent requirement. | No inherent requirement. | No inherent requirement. | Next higher artillery HQ. | Zone of action of the supported formation or unit or as ordered by higher artillery HQ. | Next higher artillery HQ. | AS, CA, UK |
| At Priority Call | Formation or unit to which placed at priority call. Any other supported formation or unit. Any other formation or unit as authorized by the controlling HQ. | No inherent requirement. | No inherent requirement. | No inherent requirement. | Next higher artillery HQ. | Zone of action of the formation or unit to which placed at priority call or as ordered by higher artillery HQ. | Formation or unit to which placed at priority call. | AS, CA, UK |
| General Support | Force field artillery HQ ² and target acquisition artillery. Own observers. | No inherent requirement. | No inherent requirement. | No inherent requirement. | Force field artillery HQ. ² | Zone of action of the supported formation or unit or zone prescribed. | Force field artillery HQ. ² | BE, DA, FR, GE, IT, NL, NO, TU, US |
| General Support Reinforcing | Force field artillery HQ. ² Reinforced artillery unit. Own observers. | Reinforced artillery unit. | Reinforced artillery unit. | Reinforced artillery unit if approved by force field artillery HQ. ^{2,3} | Force field artillery HQ ² or reinforced artillery unit if approved by force field artillery HQ. ² | Zone of action of the supported formation or unit to include zone of fire of the reinforced artillery unit. | Force field artillery HQ ² or as otherwise specified. | BE, DA, FR, IT, NL, TU, US |
| Reinforcing | Reinforced artillery unit. Own observers. Force field artillery HQ. ² | Reinforced artillery unit. | Reinforced field artillery HQ. | Reinforced field artillery unit. ² | Reinforced artillery unit or as ordered by force field artillery HQ. ² | Zone of fire of reinforced artillery unit or zone prescribed. | Reinforced artillery unit. | BE, DA, FR, IT, GE, NL, NO, TU, US |
| Reinforcing by Fire (Mutual Support) | Supported formation or unit and own observers. Force field artillery HQ. ² | Supported formation or unit and reinforcing artillery unit. | Supported formation or unit and reinforcing artillery unit. | No inherent requirement. | Unit commanding officer or as ordered by force artillery HQ. ² | Zone of supported formation or unit or zone prescribed by force artillery HQ. ² | Own FDC and reinforced artillery unit. | FR |
| ¹ The US will not furnish forward observers but will furnish fire support teams (on request). ² Force artillery headquarters or higher artillery headquarters. ³ Applies also to the provision of liaison officers. | | | | | LEGEND: ABCA = Australia, Britain, Canada, America AS = Australia BE = Belgium CA = Canada DA = Denmark FR = France GE = Germany IT = Italy NL = Netherlands NO = Norway TU = Turkey UK = United Kingdom US = United States | | | |

CHAPTER 2

SUPPORT OF MANEUVER OPERATIONS

For the field artillery cannon battalion to provide effective fires in support of the maneuver force, the leaders of both the FA battalion and the maneuver force must understand the maneuver commander's concept of operations and the concept for employing fire support assets in support of maneuver operations. This chapter discusses the fire support requirements for the two basic types of maneuver operations, offense and defense, and fire support for specialized missions. The focus is cannon battalion operations in direct support of the maneuver unit, normally a brigade and the operations of cannon battalions performing either reinforcing or general support reinforcing tactical missions supporting DS units. Details on overall fire support management for maneuver operations are included in FMs 6-20, 6-20-10, 6-20-30, 6-20-40, and 6-20-50.

Section I

GENERAL

As it prepares to provide fire support to the maneuver force, the FA cannon battalion is subject to the same constraints and limitations that the tactical situation has imposed on the maneuver commander the battalion supports. The friendly and enemy situations, the terrain the weather, and the availability of logistical support will determine what fire support the battalion can provide. A critical part of the role of the FSCoord is the ability to assess what the fire support system can and cannot do and to present this information to the maneuver commander in a clear and forthright manner. This assessment must be available to the supported commander throughout his planning process.

AREAS OF CONSIDERATION

In planning for the employment of fire support assets to support maneuver operations, it is useful to break the process down into five areas of consideration.

- Fire support tasks.
- Command and control.
- Positioning and displacement.
- Fire support planning and coordination.
- Additional considerations peculiar to a particular mission or tactical situation.

CONSIDERATIONS OF METT-T

In planning for maneuver operations and for fire support of maneuver operations, a number of factors must always be considered. These factors are the mission the enemy's capabilities and likely courses of action, the impact of the terrain and weather, the availability and condition of the planner's own troops, and time available for planning and execution of the mission. These factors may be recalled by

using the memory aid METT-T, for Mission, Enemy, Terrain, Troops, and Time available. The factors of METT-T must be considered in planning for field artillery support of **any** maneuver operation.

Mission

While planning, the maneuver commander considers both current and future operations for his force and the assets that will be available for each – the *who what, when, where, and why* of what is to be accomplished.

Enemy

The enemy's total overall capability must be considered. The commander must take into account **anything** the enemy is capable of doing and not just what he is most likely to do.

Terrain and Weather

The terrain and weather in the area are considered to determine how they affect the capabilities of both the attacker and the defender.

Troops

The quantity, level of training, physical condition, and morale of friendly forces (to include availability of weapon systems and critical equipment) are considered.

Time Available

For any maneuver mission to be successfully accomplished, the commander and his staff need time for planning, gathering and positioning forces, coordinating fire support and logistics and making whatever other preparations are required. The time available to accomplish these tasks has a significant impact on what the commander can do in any particular tactical situation.

Section II

OFFENSIVE OPERATIONS

The offensive is the decisive form of war—the commander's ultimate means of imposing his will on the enemy. Operational or tactical considerations may require the commander to temporarily assume a defensive posture. To win, however, he must ultimately attack. During offensive operations, maneuver forces are vulnerable as they must expose themselves as they maneuver to close with the enemy. Fire support, particularly field artillery is critical to the success or failure of an offensive operation; it prepares the way for the maneuver force by suppressing, neutralizing, or destroying the enemy as well as obscuring his vision of friendly movement.

DEFINITION OF THE OFFENSE

The offense is a combat operation designed primarily to destroy the enemy. Offensive operations are conducted to—

- Defeat enemy forces.
- Secure key or decisive terrain.
- Gain information.
- Deceive and deceive the enemy.
- Deprive the enemy of resources.
- Hold the enemy in position.
- **Disrupt an enemy.**

In the offense, the commander has the advantage of choosing the time, place, and strength of the attack. To succeed, the attacker must maneuver quickly, penetrate deeply, survive enemy direct and indirect fires and countermeasures, and maintain the momentum of the attack.

TYPES OF OFFENSIVE OPERATIONS

AirLand Battle doctrine divides offensive operations into four general phases. These are preparation, attack, exploitation and pursuit. The length and nature of each phase vary with each situation. Several major types of offensive operations are included in the four general phases. The five types of offensive operations a cannon battalion can expect to support are as follows:

1. Movement to contact.

- Hasty attack.
- Deliberate attack.
- Exploitation.
- Pursuit.

An offensive operation can progress from a movement to contact to a hasty attack then to a deliberate attack to an exploitation and finally to a pursuit. However, not all offensive operations will necessarily include each type of offensive mission.

Movement To Contact

The purpose of the movement to contact is to gain or regain contact with the enemy and to develop the situation enough to determine whether a hasty or deliberate attack is in order. Anytime the maneuver force is moving toward the enemy but is not in contact the unit is performing this type of offensive operation.

Hasty Attack

The hasty attack allows minimum planning and usually develops from a movement to contact. It can also develop from the modification of a deliberate attack or small-unit counterattacks. It must occur without hesitation and the maneuver commander must seek the enemy's weakest sector. Suppression of enemy positions and weapons is crucial, and indirect FA fires must be integrated with direct fires.

Deliberate Attack

When an enemy weakness that would allow for a hasty attack has not been found a deliberate attack is conducted. It normally is conducted by a force larger than battalion size. A deliberate attack is characterized by the following

- Thorough detailed planning.
- Rapid concentration of forces.
- Timely use of enemy weaknesses.
- Violent execution.
- Positive aggressive leadership at all echelons of command.

Deliberate attack involves overcoming strong enemy forces in established positions. It is undertaken after thorough reconnaissance acquisition, and development of targets and analysis of all other factors affecting the situation. In general terms, during a deliberate attack, the attacking force seeks to—

- Locate the enemy's weakest point.
- Suppress positions from which the enemy can use direct fire.
- Maneuver to the weakest point by use of the cover and concealment available.
- Penetrate or envelop an open flank.

Fires must be planned to soften enemy defenses before the attack. Short violent preparations targeted against frontline defenses, observation posts (OPs), command and control,

indirect fire weapons, and reserves are prearranged. During the attack fires must be provided to—

- Neutralize, destroy, or suppress forces that could impede the attack.
- Suppress the enemy on the objective.
- Neutralize resistance during the final assault.
- Isolate the objective with fires beyond and to the flanks.

Fires during the consolidation phase must protect reorganizing troops break up counterattack, and prevent enemy reinforcement, disengagement, or resupply.

Exploitation

The exploitation is undertaken to follow up success in the attack. It is a series of movements to contact and hasty attacks, all conducted with two overriding requirements – speed and violence. The attacker bypasses pockets of resistance and concentrates on destroying the more vulnerable headquarters, combat support, and combat service support units. The enemy's ability to reconstitute a defense or make an orderly withdrawal should be destroyed.

Pursuit

Pursuit follows successful attack and exploitation. It cuts off and annihilates a retreating enemy by keeping direct pressure on him and by intercepting and destroying his main force. Maneuver battalions can expect to be ordered to bypass resistance of any kind and to move relentlessly to deep objectives that serve as choke points for the retreating enemy. The considerations for movement to contact, hasty attack, and exploitation all apply to the pursuit, since it follows a successful attack and exploitation.

FIRE SUPPORT ACTIONS IN THE OFFENSE

In the offense, fire support agencies must take a number of essential actions if the maneuver commander is to successfully accomplish his mission. These actions include the following:

- Allocate responsive fire support for leading elements.
- Allocate fire support to neutralize enemy bypassed combat forces.
- Provide preparation fire, when required, to weaken enemy resistance.
- Plan targets to protect assaulting troops by neutralizing or suppressing enemy direct fire weapons.

- Plan fires beyond objectives to prevent enemy reinforcement during the attack and to support friendly consolidations once the objective has been seized.
- Use permissive fire support coordinating measures well forward to preclude endangering friendly forces.

FIELD ARTILLERY TASKS IN THE OFFENSE

Basic Tasks

To support offensive maneuver operations, the supporting FA commander should consider specific aspects of the seven basic tasks of the field artillery.

Coordinate Fire Support. Coordinate fire support as follows:

- Coordinate and synchronism all available fire support systems.
- Ž Destroy, neutralize and/or suppress enemy direct and indirect fire systems.
- Suppress and slow mobile armor formations.
- Provide fires in support of attack helicopters (AHs), tactical air (TACAIR), and joint air attack team (JAAT) operations.
- Ž Provide suppression of enemy air defense (SEAD) fires.
- Isolate the battlefield to prevent enemy withdrawal or reinforcement of forces in contact.
- Identify and engage deep targets that affect the Operation.

Acquire Targets. Acquire targets as follows:

- Ž Use all available sources to locate targets.
- Plan to rely more on division and/or corps target acquisition assets for identification of deep targets.
- Plan for frequent repositioning of TA assets to keep pace with the speed of the offense.

Deliver Field Artillery Fires. Accomplish this task as follows:

- Provide conventional nuclear and chemical fires at the time and place required by the maneuver commander.
- Provide illumination and smoke.
- Deliver precision and special munitions.
- Be prepared to receive and execute quick-fire plans.

- Plan for increased use of hasty survey as the unit capability to provide conventional survey decreases because of the speed of the advance.
- Plan for reduced accuracy of met data or more frequent movement of the met station as the advance progresses.

Communicate. Communicate as follows:

- Ž Establish retransmission (retrans) capability to cover extended lines of communication (LOC).
- Rely increasingly on radio communications, since establishing wire links becomes more difficult in mobile situations.

Move. To move, accomplish the following:

- Ž Plan to use more hasty occupations to support fluid operations.
- Plan to use map reconnaissance more often since time available for ground reconnaissance will likely decrease. Consider air reconnaissance if available.
- Position firing units well forward to range beyond objectives.
- Plan alternate routes to bypass enemy obstacles. Request engineer mobility support.
- Ž Consider repositioning light units by air.

Maintain and Resupply. Accomplish this task as follows:

- Coordinate stockpiling of ammunition for preparations.
- Plan for increasingly extended lines of resupply.
- Plan for more frequent moves of the combat trains to provide adequate support for firing batteries.
- Synchronize resupply of ammunition and petroleum oils and lubricants (POL). Ensure enough ammunition—of the right types—is pushed far enough forward to link up with advancing artillery units.
- Consider aerial resupply using Army air, container delivery system (CDS), and/or mass supply (light forces).

Survive. Accomplish this as follows:

- Plan for firing and battery defense in a 6,400-mi environment, since encountering bypassed enemy elements becomes more probable.
- Consider enemy counterpreparation capabilities.
- Ž Within the framework of the maneuver deception plan, consider deception techniques to confuse the enemy's intelligence-gathering assets.
- Consider using Firefinder zones to protect friendly units from enemy indirect fire.

Additional Field Artillery Considerations for Offensive Missions

The field artillery tasks discussed in the preceding paragraphs are general in nature and must be considered during any offensive operation. In addition to these general considerations, each type of offensive mission requires that the FSCOORD consider the unique requirements of that particular mission. Additional FA considerations for the various offensive missions include those discussed below.

Movement to Contact. Considerations for supporting this type of operation areas follows:

- Locate the enemy and provide immediately responsive fires to leading elements. Use priority of fires and quick-fire channels.
- Attack deep targets with massed fires to prevent reinforcements.
 - Plan for hasty attack contingencies.
 - Anticipate frequent moves and hip shoots.
 - Keep ammunition uploaded.
 - Plan for employment of hasty smoke and/or illumination.
 - Plan fires on the terrain to be traversed and on the flanks to protect the force.
- Place coordinated fire lines (CFLs) well forward of friendly maneuver elements. Plan on-order CFLs on phase lines to facilitate rapid shifting as the force moves.

Hasty Attack. Additional considerations for the hasty attack are as follows:

- Anticipate immediate suppression and quick smoke fire missions.
- Expect the rapid shift of massed fires to exploit the enemy's weak point.
- Use a quick-fire plan.
- Use the maximum number of firing units possible in the early moments of the attack to suppress or neutralize the objective area with massed fires.
- Be prepared to illuminate areas at night.

Deliberate Attack. Field artillery considerations for the deliberate attack include the following:

- Stockpile enough ammunition to support the operation.
- Position firing units well forward to reach deep beyond the objective.

- Expect large amounts of smoke to be expended to screen friendly movements and obscure enemy observation.
- Be prepared to fire illumination.
- Be prepared to support the deception plan by massing fires and dropping smoke on forward enemy units not in the area of the main attack before the main attack begins.

Exploitation. During the exploitation, the considerations for the movement to contact and the hasty attack will apply in addition to the following:

- Place additional emphasis on 6,400-mi capability to support units in contact with enemy located out of zone.
- Plan for frequent moves to keep pace with the target array.
- Keep ammunition upload, and provide for emergency resupply of POL and ammunition.
- Keep good perimeter security, since bypassed enemy units will be trying to break out and return to their own lines.
- Target deep to sever escape routes or to prevent reinforcements.
- Use FA-delivered scatterable mines to slow withdrawing enemy forces or reinforcements.

Pursuit. Additional considerations during the pursuit are as follows:

- Maintain pressure to demoralize the enemy with massed fires. The lack of resistance expected makes counterattack unlikely.
- Plan fires on enemy high-speed avenues of withdrawal.
- Streamline firing units to displace as quickly as possible.
- Plan for aerial resupply.
- Position well forward so effective fires can be delivered promptly.
- Be prepared for radio retransmission and/or relay, since communications capabilities decrease with distance.
- Remember that if pursuit is especially fast-moving the FA battalion maybe attached to the maneuver unit and may possibly become the force FA headquarters.
- Have a contingency plan for linkup operations. Maneuver elements may be airlifted to deep objectives to cut off the enemy at choke points.

Section III

DEFENSIVE OPERATIONS

While the offense is the decisive form of warfare, the defense is the stronger form. The advantages of the defender include cover and concealment, advance preparation, and detailed knowledge of the terrain. Defensive operations are conducted to retain ground, damage or defeat attacking enemy forces, and by time and strength to allow the maneuver commander to gain the initiative and resume the offense. Field artillery allows the defending maneuver commander to attack the enemy before he moves within range of direct fire weapons to maximize the effectiveness of combined arms kill zones and engagement areas, and to economize maneuver forces for a planned counterattack.

DEFINITION OF THE DEFENSE

The defense is a coordinated effort by a force to defeat an attacker and prevent him from obtaining his objectives. The immediate purpose of a defensive operation is to cause the enemy's attack to fail. In doing so, the defense may also achieve one or more of the following:

- Destroy enemy forces.
- Gain time.
- Economize forces for concentration elsewhere.
- Retain key terrain.

Regardless of the reason for assuming the defensive, the basic objective of the defense is regaining the tactical initiative through offensive action. Defense in the AirLand Battle is not passive. Defense by the corps or division may well involve offensive missions on the part of the subordinate brigades and task forces.

Defensive operations at the brigade and battalion task force levels require the maneuver commander to –

- Seize the tactical initiative.
- Maintain agility and flexibility in using direct fire maneuver, fire support, and combat service support to control the tempo of the battle.
- Fight the enemy throughout the depth of his formation (deep attack).
- Synchronize all available combat power.

The ability of the fire support system to do all of these tasks is critical. It is the only system that can attack the enemy follow-on echelons before they close with the friendly maneuver unit.

TYPES OF DEFENSIVE OPERATIONS

During defensive operations, the maneuver commander may assign subordinate units specific defensive missions. Typical defensive missions are discussed below.

Defend in Sector

This mission requires the defending unit to prevent enemy forces from passing beyond a line that defines the rear boundary of the sector while retaining flank security and ensuring that the unit's scheme of defense is integrated into the parent unit's overall scheme of maneuver. This mission allows the commander of the defending unit the greatest latitude in determining how he will conduct the defense. Initial positions are generally established as far forward as possible, but the commander may use any technique he believes will accomplish the mission.

Defend a Battle Position

This mission places a unit in a battle position (BP) to concentrate its fires, limit its maneuver, or place it in an advantageous position for a counterattack. The BP is a general location on the ground. The commander positions his forces on the best available terrain on or near the battle position. He may also position security forces forward of and around the BP. Combat support (CS) and CSS elements may be positioned outside of the BP. The commander can maneuver his forces freely within the BP and can maneuver outside the BP to attack enemy forces if the tactical situation permits.

Defend a Strongpoint

This mission requires that the commander retain a specific piece of ground at virtually any cost. A strongpoint is established on a piece of ground the enemy cannot safely bypass. It is fortified and manned to keep the enemy from reducing it without excessive losses of time and resources.

A strongpoint is established as a part of the parent unit's overall scheme of defense. It is usually sited on key terrain that the friendly force must retain to be successful in its overall defense. Establishing the strongpoint requires a substantial investment of resources particularly engineer assets, to fortify the position and emplace obstacles. Normally FA units are not positioned within the strongpoint; but they must be positioned so that fires can be massed in support of the position.

FIRE SUPPORT ACTIONS IN THE DEFENSE

In the defense, fire support must take several essential actions to help the maneuver unit accomplish its mission. Specifically fire support agencies must take the following actions:

- Provide **adequate fire support to the security area** forces, forces engaged in the main battle area (MBA), and forces conducting deep and rear operations.
- Plan counterpreparation fires to disrupt enemy preparations for an attack.
- Plan permissive fire support coordinating measures close enough to open up as much of the battlefield as possible yet far enough away to avoid interference with friendly operations.
- Plan for target acquisition and control of fires on all avenues of approach.
- Plan fires on avenues of approach to disrupt enemy attacks by striking the enemy during his assault. Subsequently, the fire is shifted to continue attacking the enemy until he is forced to break off the attack
- Select planned targets on the most critical avenues of approach, and allocate firing units for final protective fires.

FIELD ARTILLERY TASKS IN THE DEFENSE

Basic Tasks

To support the maneuver commander's defensive operation, the supporting FA commander should consider specific aspects of the seven basic tasks of the field artillery.

Coordinate Fire Support. Coordinate fire support as follows:

- Coordinate and synchronize all available fire support systems.

- Coordinate the use of all available fire support agencies.
- Destroy, neutralize, and/or suppress enemy direct and indirect fire systems.
- Suppress and slow mobile armor formations.
- Isolate the battlefield to prevent enemy withdrawal or reinforcement of engaged forces.
- Identify and engage deep targets with available FA systems.
- Coordinate and synchronize the use of FA special munitions.

Acquire Targets. Acquire targets as follows:

- Integrate all information sources to locate targets.
- Rely increasingly on division and corps TA assets to identify deep targets.
- Integrate organic field artillery with division and higher headquarters agencies to identify counterefire targets.
- Coordinate radar priorities and responsibilities.

Deliver Field Artillery Fires. Accomplish this task as follows:

- Provide conventional, nuclear, and chemical fires as required by the maneuver commander.
- Provide illumination and smoke.
- Deliver precision and speed munitions.
- Deliver fires in support of the maneuver commander's obstacle and deception plans.
- Coordinate for meteorological and survey.
- Deliver massed fires.
- Be prepared to support rear operations.

Communicate. Communicate as follows:

- Use wire communication when possible.
- Plan redundant communications means.

Move. To move, accomplish the following:

- Plan positions to provide for hasty displacement and survivability moves.

- Ž Conduct ground reconnaissance, selection, and occupation of position (RSOP) whenever possible.
- Ž Deconflict movement plans with the maneuver headquarters. Consider especially the obstacle plan in planning movements.
- Ž Clear successive FA positions in advance with the maneuver headquarters.
 - Prepare to support a counterattack or hasty attack to exploit tactical opportunity.

Maintain and Resupply. Accomplish this task as follows:

- Prestock ammunition for immediate consumption.
- Ž Plan for surge use of CSS. Take advantage of decreased length of supply lines.
- Ž Coordinate for forward triage of wounded personnel and forward repair of damaged equipment to return both to combat effectiveness rapidly.
 - Consider means for channeling enemy prisoners of war (EPWs) and refugees to the rear area.

Survive. Accomplish this as follows:

- Position units to protect them from enemy indirect and direct fires.
- Ž Harden positions whenever possible.
- Coordinate for engineer support and Class IV materials.
- Plan for use of direct fire in support of battery defenses.
- Consider using Firefinder zones to protect friendly units from enemy indirect fire.

Additional Field Artillery Considerations for Defensive Missions

The field artillery tasks discussed in the preceding paragraphs are general in nature and must be considered during any defensive operation. In addition to these general considerations, each type of defensive mission requires that the FSCOORD consider the unique requirements of that particular mission. Additional FA considerations for the various defensive missions include those discussed below.

Defend in Sector. This mission is characterized by an extremely fluid tactical situation in which friendly and enemy units may often be intermixed. To support the sector defense, the FA battalion must do the following:

- Ž Position batteries in depth to ensure continuous support as forward batteries displace.
- Ž Position batteries off high-speed avenues of approach.
 - Track the battle continuously and keep the batteries informed as enemy forces approach.
- Ž Plan for rearward displacement. Coordinate routes and recognition signals with the supported maneuver unit. Key leaders must know the locations of existing and planned obstacles.
- Ž Pre-position ammunition for counterpreparation and immediate consumption. Keep ammunition uploaded for rapid movement.
 - Conduct communications reconnaissance for fallback positions, and pre-position retrans if necessary.

Defend a Battle Position. The battle position defense is generally less fluid than the sector defense. Field artillery considerations for the defense of a battle position include the following:

- Ž Position batteries to ensure that fire support is available to security forces.
- Harden battery positions to the maximum extent possible. Request engineer support when it is available.
- Ž Use wire communication to the maximum extent possible.
- Ensure that the locations of all friendly obstacles and engagement areas are known and plotted in the battalion and battery FDCs.

Defend a Strongpoint. Defense of a strongpoint is seldom a stand-alone mission. Normally, the strongpoint is a part of an overall mission of defend in sector or defend a battle position. In these situation, the FA considerations for the strongpoint are in addition to those for the overall mission. Field artillery considerations for the strongpoint defense itself include the following:

- Position batteries so that all or at least a substantial majority of the available fire can be massed in support of the strongpoint.
- Consider establishing a quick-fire net for the use of the FSCOORD for the unit manning the strongpoint.
- Position observers to overwatch the strongpoint and control fires if communication is lost or the position is overrun.

Section IV

OTHER OPERATIONS

The operations discussed in this section occur often during combat. Some actions—such as passage of lines, crossing water obstacles, relief in place, and amphibious operation—are usually one phase or another of the operation. Since they are common to both the offense and the defense, they are addressed collectively here.

ENCIRCLED FORCES

In some combat situations, a commander may require a maneuver force to hold certain areas or to stay behind in enemy-held territory. For some forces, such as airborne and air assault elements, encirclements are commonplace. Field artillery weapons usually support all types of these defenses and their subsequent breakouts. Major considerations for the field artillery with the encircled force may include the following:

- Complete 6,400mi coverage is needed.
- Massing capability should be retained where practical.
- Aerial resupply of ammunition may be needed.
- The amount of SEAD fires increases.
- Target acquisition should be reorganized commensurate with the assets on hand to ensure adequate coverage.
- Fire support communications should be reorganized to ensure that overloading of fire support nets is minimal.
- Survival techniques must be stressed.
- Ž Coordination with outside fire support agencies must be effected; and appropriate fire support coordinating measures, such as a restrictive fire area (RFA) or a restrictive fire line (RFL), must be established.
- Sensor zones for weapons-locating radars (WLRs) in both the encircled force and the main force should be used to prevent fratricide.

Encircled forces must act quickly to save themselves. A supported commander assumes (or has) control of all encircled elements. He must know whether the higher commander wants a breakout or a defense of the encircled position. If breakout is the choice the force breaks out quickly before escape routes are blocked. If defense in place is the choice, plans are made for subsequent linkup with a relieving force.

Defense Encircled

The maneuver commander may decide to stay in position and defend in place. In a defense in place, the maneuver commander's responsibilities include the following:

- Reestablishing a chain of command as necessary.
- Organizing a viable all-around defense.
- Ž Establishing a reserve force (armor-heavy is preferred).
- Ž Reorganizing fire support to have centralized control where possible. Establishing a force artillery headquarters if necessary.
- Reestablishing the logistics for the force.
- Establishing security in the area.
- Reestablishing communication as needed.
- Ensuring the survivability of the force.
- Continuing to improve defenses in the area.
- Keeping up the morale of elements.

Breakout

An attack to break out of the encirclement differs from other attacks in that the force must at the same time defend in other areas of the perimeter. Considerations for the maneuver commander and his FSCOORD include the following:

- Use of deception by concealing preparations and repositioning by radio and wire traffic and by avoiding obvious egress routes.
- Exploitation of gaps or weaknesses.
- Use of periods of darkness and limited visibility.
- Ž Organization of the breakout elements.
- Ž Concentration of combat power at the breakout point.
- Ž Coordination with adjacent forces, as needed.
- Ž Exfiltration when appropriate.

The artillery should be neither the first nor the last unit out of the perimeter. If more than one firing element is within the perimeter, withdrawal should be phased to maximize the time at least some fire support is available. Unit integrity at platoon or battery level must be maintained if at all possible. All elements must maintain fire direction capability. The FA commander must keep contact with both the lead element commander and the forces remaining in the perimeter. Moving units must be prepared for hip shoots if required.

Linkup

A breakout may not be possible or desirable. If it is not, another maneuver force may attack the enemy force to effect a linkup. During such attacks, the encircled elements must understand the considerations for the linkup:

- Ž Coordination of plans for the linkup.
- Organization and conduct of the attack to relieve the encircled forces.
- Use of an RFL by the commanders of both forces. This ensures that the converging forces do not fire on each other.
- Coordination of subsequent actions.

Field artillery considerations for the linkup include the following:

- Supporting field artillery helps integrate fires with the battle plans. Fire support coordinating measures are established.
- Field artillery fires are included in linkup plans. Weapons are positioned to support the relieving force.
- Plans for subsequent actions usually include new missions for the field artillery.
- Censor zones for Firefinder radar are established and exchange.

RETROGRADE OPERATIONS

A retrograde operation is an organized movement to the rear or away from the enemy. It may be either forced or voluntary. Supported maneuver elements execute retrograde operations to harass, exhaust, resist, delay, and damage enemy formations and facilities. These operations gain time, avoid combat under unfavorable conditions, or draw the enemy into unfavorable positions. They allow supported commanders to reposition forces, shorten lines of communication, or use forces elsewhere. The FA battalion commander must –

- Start developing delay plans early.

- Arrange with supported units a withdrawal schedule for the field artillery.
- Reach out with long-range FA fires from initial positions.
- Ensure continuous and responsive FA support for all sectors.
- Reconnoiter positions to the rear and the routes to them, considering alternate routes and key terrain.
- Maintain high mobility throughout the delay.
- Ž Be constantly aware of the delaying actions in progress in adjacent sectors.
- Ž Contribute to the obstacle and deception plans with FA fires.
- Provide suppressive fires and counterfires as needed.
- Ž Consider resupply operations during the action.
- Consider resupply points along withdrawal routes (for POL and ammunition).
- Consider use of Firefinder critical friendly zones (CFZs) to cover critical points or withdrawal routes; for example, river-crossing points and bridges.

PASSAGE OF LINES

Forward Passage

During the offense, when a passage of lines is to occur, responsibility for FA fires passes from the stationary force to the passing force at the same time control is passed to the maneuver units. The passed (old) FA force may be attached to the new FA force, or it may be ordered to reinforce the new FA force from its present positions. These augmenting FA fires may be needed until the passing force has moved out of range of these weapons. Some of the main considerations for an incoming FA commander are as follows:

- Liaison with the old FA headquarters, to include communications links.
- Ž Passage plans of the supported force.
- Ž Secrecy needs in the area.
- Ž Available target lists and fire plans.
- Available position areas and routes.
- Enemy observation capabilities in the area.
- Fire support coordinating measures in effect and needed.
- Ž Resupply operations for the future.

- Elements that are needed forward.
- Exchange of survey data with the new force artillery survey planning and coordination element (SPCE).
- Exchange of Firefinder zone data, particularly call-for-fire zones (CFFZs) and artillery target intelligence zones (ATIZs).

Rearward Passage

Withdrawal actions in the defense often involve a rearward passage of lines. This action is most evident when a covering force is withdrawing behind the forward edge of the battle area (FEBA). Liaison is established early between FA commanders with each force. Information is exchanged and fire plans are coordinated to ensure that the full weight of the field artillery is exerted as necessary. Arrangements are made for the transfer of FA support responsibilities within the sector of the supported maneuver element. This transfer usually coincides with the passing of maneuver control. Some additional considerations may include the following:

- Coordination between the passing FA force and the maneuver elements in place.
- Exchange of FA fire plans.
- Ž Establishment of communications needs.
- Positions and routes for the passing field artillery, if needed.
- Mission for the passing held artillery at new positions.
- Ž Resupplies for the passing field artillery if appropriate.
- Ž Firing requirements for the incoming field artillery, if appropriate.
- Ž Exchange of survey data with the passing field artillery SPCE.

RELIEF IN PLACE

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

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

Secrecy is vital to success, as the operation must be conducted without weakening security. Normal patterns of activity must be maintained to deceive the enemy. The

relief in place must be executed at night or during periods of limited visibility.

The following principles apply to all relief operations:

- The relief sector remains under the control of the outgoing commander until all his forward elements are relieved (or as mutually agreed upon or directed).
- Normally, the CP of the incoming commander is collocated with that of the outgoing commander.
- Ž Liaison and communication are established between outgoing and incoming fire support (FS) calls.
- Ž Outgoing and incoming units exchange SOPs.
- Existing fire plans are passed to the incoming FSCOORD.
- Ž Routes and times for withdrawal of the outgoing field artillery are established.

The following are fire support tasks in a relief in place:

- Arrange for an exchange of outgoing and incoming FS cell liaison personnel.
- Provide incoming field artillery with existing fire plans.
- Determine needs for smoke and other types of ammunition.
- Establish how the outgoing field artillery will be relieved.
- Establish how the outgoing field artillery will contribute.

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

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

- Ž Prepare and disseminate plans to support the incoming force.
- Make available to all concerned fire planning SOP items of the incoming force.
- Make arrangements for the incoming force to use the target list of the outgoing force.
- Ž Ensure that fires have been planned to support or emplace a barrier or an obstacle to slow the advancing enemy.
- Plan smoke to screen friendly movements.
- Support the deception plan.

RIVER CROSSING

A river provides a natural line of defense and restricts surface movements. Depending on the situation and the nature of the river obstacle, the supported commander may decide to make either a hasty crossing or a deliberate crossing. If the river obstacle is considered minor and the enemy force is weak he may make a hasty crossing without changing battle formations. If the river is a major obstacle or the enemy force is strong he must deploy temporarily into a defense-oriented posture, build up combat power, and make a deliberate crossing. Command and control may be complicated while commands are split up with elements on both sides of the river. For more detailed information, see Appendix B and FM 90-13.

Aerial fire support observers (AFSOs) provide surveillance beyond the river. Ground visual observation may be limited because of the increased use of smoke. The WLRs should be positioned so that their sectors of search can detect fires targeted against the river-crossing site and associated assembly areas and air defenses. Careful management of CFZs is essential. Tying CFZs to authorized cueing agents will further enhance the ability of WLRs to direct fires against enemy indirect fire systems. (See FM 6-121 for a discussion of cueing agents.)

Screening and obscuring smoke is used extensively. Smoke and preparatory fires are planned on dummy sites as part of the deception effort. Fires (series and groups) are planned to neutralize the bridgehead area and then to isolate it. Deep fires are also planned to prevent reinforcements. Scatterable mines may be used to seal off the crossing site.

When practical, centralized control of field artillery is desirable to allow the commander flexibility. The GS and GSR cannon units may provide close support fires while the DS and R units are out of action and crossing the obstacle.

Positioning should facilitate rapid crossing.

Most of the field artillery crosses the river when continuous effective support can no longer be delivered from the far bank positions. Direct support units begin displacing to far bank positions when first-phase objectives on the far bank have been seized and secure positions are available for occupation by the artillery. Survey assets should be crossed as soon as possible, either ahead of or with the first FA units to cross. When a survey team equipped with the position and azimuth determining system (PADS) is crossing by river barge or boat, plans should be made to allow the battalion-level PADS to do a 10-minute zero-velocity update just before the crossing. If the crossing will take longer than 10 minutes (including loading time, the time before the boat starts to cross, and unloading time), then a conventional team will have to put in a starting control point on the far shore.

Communication is critical when units are split on the two banks of the river.

Ammunition expenditures, especially of smoke and illuminating projectiles, will be high during a deliberate crossing. Initial resupply on the far bank may be by air because of congested crossing sites.

CHAPTER 3

OPERATIONS

This chapter implements STANAG 2129 and QSTAG 538.

This chapter gives the battalion commander and his staff guidance for the conduct of tactical operations to maximize both the support of maneuver operations and the survivability of the cannon battalion.

Section II

BATTALION COMMAND POST AND RESPONSIBILITIES

Basic command and control of the cannon battalion are provided by the command post. The CP contains the personnel, communications, and automation systems that help the commander in planning, coordinating and executing the FA Port/on of the fire support plan for the supported maneuver unit.

COMMAND POST FUNCTIONS

The CP supervises operations, tactical fire control, targeting and planning for the FA system. To accomplish the fire support mission, the FSCOORD is tasked to provide close support for maneuver forces in contact or to augment the fires of supported elements, to protect the force as a whole by providing counterfire and to attack the enemy at depth. The CP is the facility that recommends and directs measures to accomplish these tasks.

Specifically, the CP performs the following functions:

- Advise the FSCOORD on the FA organization for combat, FA positioning allocation of ammunition and FA attack guidance.
- Ž Perform FA targeting-produce artillery targets which will allow the maneuver commander to attack the enemy throughout the width and depth of the battlefield.
- Ž Perform tactical fire direction – choose an FA unit to engage targets in response to the commander's attack guidance, and ensure the desired effects on these targets are achieved.
- Ž Monitor current operations– control cannon assets and FA target acquisition assets organic or attached to or reinforcing the battalion.
- Plan future FA operations-generate the FA support plan in response to the scheme of maneuver and the concept of fire support of the maneuver unit.

- Perform alternate CP functions for reinforcing or reinforced artillery battalions through mutual support unit (MSU) operations.

The battalion S3 has the staff responsibility for ensuring effective control of the battalion command post. He is helped by an assistant S3, who serves as one shift leader, and the S2, who functions as an additional shift leader and supervisor of the intelligence process.

See Appendix C for a detailed discussion of the physical layout and the organization of the command post.

COMMAND POST ORGANIZATION

There are two major subdivisions in the FA battalion CP. They are made up of TOE sections from the FA battalion headquarters and headquarters battery (HHB). These subdivisions are the operations and intelligence (O&I) element, composed of the operations and intelligence sections and the fire direction center, composed of the fire direction section. The duties of each subdivision are what its name implies. The O&I element performs all of the operational duties such as targeting and keeping track of the status of subordinate units. The FDC performs tactical fire direction by processing calls for fire, determining the type and amount of ammunition to be expended to achieve the desired effects and transmitting fire orders to the firing batteries. In addition, the battalion FDC has a limited technical fire direction capability.

Operations and Intelligence Element

The O&I element is concerned with both current and future operation it coordinates all aspects of FA support. Its specific duties include those discussed below.

Operations Section. The duties of the operations section are as follows:

- Coordinate the positioning of batteries and platoons supporting current brigade operations.
- Plan all battery movements and help the battery commander with coordination of movements. This includes assignment of routes and clearance of position areas.
- Ž Maintain current operational status of all organic and reinforcing FA units.
- Ž Prepare and disseminate all operational reports.
- Maintain current information on the tactical situation.
- Give the FDC current operational data on battery and platoon positions, both current and planned.
- Coordinate survey requirements for the supported maneuver unit sector with the reconnaissance and survey officer (RSO) and the force field artillery SPCE.
- Ž Monitor, manage, and expedite ammunition resupply and other logistics operations with the battalion CSS staff.
- Schedule all preplanned fires in coordination with the fire direction officer (FDO).
- Prepare and ensure dissemination of the FA support plan.
- Supervise ammunition management for the battalion, and oversee the activities of the battalion ammunition officer (BAO).
- Supervise battalion tactical nuclear and tactical chemical operations. (See Appendix D for detailed discussion.)
- Inform other staff sections (S1, S4, combat trains field trains) of the current status of the brigade and any changes that will require changes in FA Support.
- Ž Provide liaison to reinforced FA units.
- Be prepared to assume command and control of reinforcing or reinforced artillery battalions during MSU operations.
- Ž Coordinate communications requirements with the battalion signal officer (BSO).

Intelligence Section. The intelligence section is an integral part of O&I. It provides two major functions. The S2 serves as one of the two CP shift leaders, and the section provides the S3 with intelligence information essential to the operation and survival of the battalion. Specific duties of the intelligence section areas follows:

- Prepare an in-depth intelligence preparation of the battlefield (IPB) of the supported unit sector, in coordination with the supported maneuver S2 Ensure that LPB, essential elements of information (EEI), and information requirements (IR) for the battalion are met. The FA battalion IPB is not an independent product. It is an extension of the supported maneuver unit IPB, which focuses on specific artillery-related intelligence requirements. IPB production is a continuous process.
- Assist the S3 in positioning firing units to ensure that positioning is coordinated with IPB and survivability requirements.
- Develop the target acquisition tab to the FA support plan and the DA Form 5957-R (Radar Deployment Order) (RDO) for organic and attached radars. The RDO designates positions and establishes cueing procedures. Coordinate the use of all TA radars, organic or attached with the battalion S3. For more detailed information see FM 6-121.
- Develop targeting data based on the supported maneuver commander's high-payoff target (HPT) list and attack guidance matrix. Provide recommendations and input to the supported maneuver unit targeting team, which is developing the HPT list and attack guidance matrixes for the maneuver commander. For detailed information on the targeting process, see FM 6-20-10.
- Ž Develop enemy artillery order of battle, and predict target locations.
- Monitor enemy artillery tactics and techniques within the supported unit sector, and report to higher headquarters.
- Ž Exchange combat information and intelligence with the supported maneuver unit, and pass intelligence to subordinate and reinforcing units and to higher headquarters.
- Coordinate nuclear, biological, chemical (NBC) defense activities within the battalion.
- Coordinate with battery first sergeants to develop a ground and air defense plan for the battalion.
- Ž Coordinate external battalion security requirements.

Fire Direction Center

The FDC provides timely and effective tactical and technical fire control in support of current operations. Specific duties areas follows:

- Monitor and operate in the battalion voice and digital fire direction and fire support coordination nets.
- Schedule fire units for preplanned fires in coordination with the S3.
- Ensure that commander's attack guidance is established and applied to all fire mission requests.
- Execute preplanned fires as requested by FSEs or observers.
- Respond to immediate fire requests in the priority established by commander's criteria.
- Determine registration requirements in conjunction with the S3.
- Provide expert assistance to the firing battery and platoon FDCs as required. Coordinate for or provide technical fire direction in case of catastrophic loss of the technical fire direction capability of a firing battery.
- Ensure that all requests for fire comply with current fire support coordinating measures.
- Assist the S3 in monitoring ammunition expenditures, and recommend changes to attack criteria as deemed necessary.

If the unit is TACFIRE-equipped, further duties are as follows:

- Input into the TACFIRE computer parameters for commander's criteria.
- Conduct MSU operations as required.
- Establish and practice standard procedures for FDC operations in a degraded (manual, voice) mode. See Chapter 4 for manual backup procedures.

DUTIES OF KEY PERSONNEL

The activities of the CP are supervised by a number of key personnel in addition to the battalion commander and the executive officer (XO). These are the S3 (operations officer), the S2 (intelligence officer), the FDO, the RSO, and the BSO. The duties of each of these officers are briefly discussed below, as are the duties involved in the liaison function.

Battalion Commander

The battalion commander is responsible for the performance and operational status of his unit. He oversees

the employment of the battalion and concerns himself with the training morale, and sustainment of the unit. In this sense, his responsibilities are identical to those of any commander. However, when the battalion commander is the senior field artilleryman in support of a maneuver unit, he assumes a second set of duties—those of FSCOORD. This situation is most likely to occur when the battalion is placed in direct support of a maneuver unit, normally a brigade or an armored cavalry regiment (ACR).

As FSCOORD, the battalion commander is the maneuver commander's principal advisor for all fire support matters. As the FA battalion commander, he is responsible for planning, organizing, and directing the battalion in executing its portion of the maneuver commander's overall intent for fire support. As FSCOORD, the commander must position himself on the battlefield where he can best fulfill both sets of responsibilities and influence the battle. He may have to position himself in the FA battalion area to directly exercise his commander duties. He must have freedom of movement so he can best support the maneuver force. To this end, the commander must delegate specific duties to his XO and S3 when his FSCOORD duties require that he go forward with the maneuver commander and thus be absent from the battalion area for extended periods. Specifically, the battalion commander is responsible for the following:

- Supporting the maneuver force. The primary focus of the commander, and the battalion as a whole, must be on maximizing the ability of the unit to integrate its fires with those of all other fire support systems at the time and place and in the quantity required by the supported maneuver commander.
- Overseeing the training of the entire battalion, with particular emphasis on those elements directly concerned with fire support and delivery of fires.
- Continually assessing the needs of the battalion, in terms of both its ability to sustain its own operations and its ability to support the maneuver force.
- Providing knowledgeable, experienced officers to serve as battalion XO and S3, since they will often be called on to perform many of the duties of the commander in his absence. The S3 in particular must understand the commander's intent for the battalion and make tactical decisions accordingly.
- Establishing clear and consistent standards and guidance for current and future operations. This guidance allows the staff and battery commanders to adhere to the commander's intent without his constant personal supervision when his duties as FSCOORD require his presence elsewhere.

- Providing for the administrative and logistical support of the battalion. The commander's primary assistant in this area is the battalion XO.

Executive Officer

The XO is the second in command of the battalion. Also, he is the senior staff officer of the unit and serves as the primary logistician. In a garrison environment, these duties complement one another. However, during tactical operations when the battalion commander is forward with the maneuver commander and acting as FSCoord, the requirement to function as both second in command and senior logistician may create conflicting priorities for the XO. The conflict is due to both the nature of the duties and the locations from which each must be performed.

The battalion commander must decide to which of the two functions, second in command or senior logistician the XO will give his primary focus at any given time. This decision will be based on the immediate requirements of the battalion and the overall tactical situation. Changing situations may change the XO's focus daily, or more often. The XO must recognize that his primary function is to understand the battalion commander's intent and that he is the senior officer responsible for executing that intent. When he is functioning primarily as second in command, one or more of the primary staff officers (probably the S4) must assume a major portion of the functions of senior logistics coordinator; the XO gives as much input and assistance as possible. When the XO must concern himself primarily with the logistic support of the battalion the S3 must assume a greater portion of the commander's duties in the battalion area.

As second in command, the XO must keep fully abreast of current and anticipated operations. He must be prepared to assume the duties of the commander anytime the need arises. He must position himself forward, traveling between the battalion CP, the batteries, and the supported maneuver brigade CP to perform his duties. In the battalion commander's absence, the XO acts as mentor to the battery commanders and enforces the commander's standards throughout the unit. The duties of mentor and standards enforcer are particularly critical. The XO is the only officer with the rank, experience, and mobility to perform these functions when the commander is forward as the FSCoord.

As the senior logistician, the XO supervises the activities of the CSS staff (S1, S4, battalion maintenance officer [BMO], maintenance technician, BAO, BSO, and battalion surgeon or physician's assistant [PA]). He is primarily responsible for ensuring that the battalion is sustained. The logistician function requires that the XO position himself where he can best coordinate the logistical support of the battalion.

This may require that he spend most of his time in the rear, normally in the area between the brigade support area (BSA) and the combat trains, depending on the factors of METT-T. The XO acts primarily as a coordinator and facilitator. He makes face-to-face contact with his counterparts on the brigade, div arty, or FA brigade staff and ensures that the battalion is supported with a minimum of confusion or lost effort.

S3 (Operations Officer)

The S3 has overall responsibility for the functioning of the CP. All CP personnel work for the S3. He is the principal planner. He is responsible for developing the FA support plan. Specific duties of the S3 include the following:

- Producing the FA support plan. This includes planning for positioning, movement, and employment of all organic attached and reinforcing firing units and TA means.
- Coordinating plans with higher and subordinate fire support and maneuver units.
- Maintaining the operations map.
- Ž Managing ammunition consumption and supervising the activities of the BAO.
- Integrating operations security (OPSEC) into the overall operations of the unit.
- Issuing detailed orders to the RSO concerning requirements and priorities for survey.

The S3 is the principal advisor to the FA battalion commander in regards to the following:

- Field artillery organization for combat.
- Field artillery attack guidance.
- Firing unit and target acquisition positioning.
- Ž The field artillery estimate of the situation.
- Establishment of target selection standards.
- Ž Integration of Firefinder zones to support the maneuver commander.

S2 (Intelligence Officer)

The S2 performs a wide variety of tasks concerning intelligence, targeting, and OPSEC. In addition, he helps the S3 supervise the CP operation. Specific duties of the S2 include the following:

- Supervising the intelligence section.
- Ž Developing artillery IPB in conjunction with the supported maneuver S2.

- Expanding the supported unit IPB to focus on fire support issues and on survivability and mobility issues for the battalion.
- Developing priority intelligence requirements (PIR) related to fire support.
- Writing the enemy situation portion (paragraph 1a) of the FA support plan.
- Ž Writing the target acquisition tab of the FA support plan, to include the RDO for organic or attached radars.
- Ž Organizing and supervising in coordination with the maneuver S2 an aggressive collection effort designed to answer PIR.
- Positioning, tasking, and supervising organic and attached TA assets in conjunction with the S3.
- Coordinating with the S3 and RSO for survey support for battalion TA assets.
- Developing enemy artillery order of battle.
- Ž Predicting artillery target locations. He passes predicted locations to the maneuver FSEs and the battalion FDC.
- Ensuring all subordinate and reinforcing units are kept informed of the enemy situation. In addition to the firing batteries, this may include survey teams retransmission stations, wire teams, radars, and the battalion trains.
- Ž Monitoring enemy artillery tactics and techniques.
- Ž Coordinating the battalion ground and air defense plans with the batteries.

Fire Direction Officer

The FDO is the person primarily responsible for supervising tactical and technical fire direction in the battalion. On the basis of guidance from the FSCOORD and the S3, he decides where and how the battalion and any reinforcing units will fire. Specific duties of the FDO include the following:

- Ž Supervising the fire direction section.
- Helping the FSCOORD develop commander's criteria based on the supported maneuver commander's concept for fire support.
- Developing and supervising input of appropriate parameters into the TACFIRE computer (TACFIRE units only).
- Analyzing requested targets for attack by field artillery. He considers desired effects, method of fire and types of ammunition needed.

- Ensuring complete dissemination of the fire plan to subordinate elements.
- Conducting rehearsals of the fire plan with subordinate and reinforcing firing units.
- Processing requests for other types of fire support.
- Maintaining the current target overlay.
- Ž Keeping FA elements informed of targets.
- In TACFIRE units, establishing procedures and training personnel to accomplish tactical and technical fire direction in a degraded (manual, voice) mode.
- Ž Establishing procedures for interface between TACFIRE and non-TACFIRE units.

Reconnaissance and Survey Officer

The RSO is the FA battalion commander's principal advisor on survey operations. He is mainly concerned with providing timely survey control to the firing batteries. At the same time, he tries to satisfy the survey needs of TA assets, the supported maneuver unit, and other combat support units in the sector. Specific duties of the RSO include the following:

- Ž Coordinating and supervising survey operations within the supported maneuver unit sector.
- Ž Formulating the survey plan after receiving guidance from the battalion S3 and the force field artillery SPCE.
- Ž Providing the survey input to the FA support plan (as required). Survey information is normally included in paragraph 3 (Concept of the Operation), either as a separate subparagraph or as part of the coordinating instructions. The RSO may prepare a survey tab to the FA support plan. An example of a survey tab is in Appendix E.
- Ž Coordinating requirements for survey control directly with firing battery commanders.
- Ž Supervising, as weather conditions permit, establishment of a battalion simultaneous observation station for passing directional control.
- Ž Performing general reconnaissance and observation as required by the S3 and S2.

Battalion Signal Officer

The BSO is the cannon battalion commander's principal advisor on communications and signal operations.

Assisted by the communications platoon leader (in heavy divisions and separate maneuver brigades only), he has staff responsibility for establishing and maintaining all types of communication (radio, wire, messenger, and so forth) in the battalion area. Specific duties of the BSO include the following:

- Planning and coordinating integration of the battalion communications system into those of the supported maneuver unit and force FA headquarters.
- Writing the signal paragraph (paragraph 4a) of the FA support plan.
- Serving as communications security (COMSEC) custodian for the battalion and maintaining and issuing signal operation instructions (SOI).
- Performing communications reconnaissance (recon) and survey to assist the S3 in siting key elements of the battalion, to include retrans stations.
- Supervising operator and organizational maintenance of communications equipment.

Liaison Officer

One of the seven inherent responsibilities of a cannon battalion assigned an R or a GSR tactical mission is to provide liaison to the unit being reinforced. Corps battalions have organic liaison sections, consisting of an officer and one enlisted soldier with a wheeled vehicle and radios. Divisional battalions do not have organic liaison teams. However, when divisional battalions are assigned an R or a GSR mission, they must provide for liaison. Liaison responsibilities include the following:

- Passing information on the tactical situation to the reinforcing battalion CP.
- Ensuring that both units establish radio nets for –

- Exchanging orders, situation reports and intelligence reports.
- Passing fire missions.
- Quick-fire nets, as required.
- Passing unit locations, ammunition status, weapon strength target lists, and fire plans between the two units.
- Assisting in passing command and control during MSU operations.

Liaison is a function rather than a position. As long as the functional requirement is met to the satisfaction of the battalion commanders involve exchange of liaison officers (LOS) is not absolutely required. If the two battalions choose to collocate CPs or FDCs, the liaison requirement has been met and no liaison officer is required. If both units are automated and digital communications are adequate, a liaison officer may not be necessary.

The liaison function is particularly critical when one of the battalions involved is automated (TACFIRE-equipped) and the other is not. A liaison must be established that allows both units to take maximum advantage of the available automation. This may require establishing a nonstandard liaison relationship, such as reinforced to reinforcing. The problems associated with an interface between TACFIRE and non-TACFIRE cannon battalions are discussed in Appendix A, along with the possible options for establishing liaison between the battalions.

When a battalion of an FA brigade is assigned a tactical mission of GS, it will normally be positioned in the area of operation of a maneuver brigade. The FA battalion commander may wish to consider sending one of his liaison teams to the maneuver brigade FSE. This team can help the battalion commander in tracking the maneuver situation and in keeping the maneuver commander informed of the location and status of a sizable friendly force that is in his area but not under his control.

Section II

FIRE SUPPORT PLANNING

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

FIRE SUPPORT PLAN

The fire support plan is a document that contains the information necessary for understanding how fire support will be used to support an operation. The fire support plan may be a formal part of the operation order, as it normally is at maneuver brigade and higher; it may be in the form of a fire support execution matrix (FSEM), as it normally is at maneuver battalion and below, or it may be a combination of the two. The fire support plan is never finished—it is continually updated and refined as the tactical situation changes and more information becomes available. Close coordination between field artillerymen and supported maneuver commanders is essential throughout the planning process. The process of planning for fire support that results in the fire support plan is called fire planning.

Deliberate fire planning is conducted through a formal *top-down* process, with *bottom-up* refinement as time permits. The advantages of top-down fire planning are that the concept for fire support is developed early and the artillery battalion and maneuver forces can plan for the battle concurrently. The planning cell for the maneuver unit (normally at brigade) then relies on the most experienced field artilleryman in the force, the DS battalion commander. The top-down approach allows the company fire support officers (FSOs) to concentrate on execution of a coordinated fire support plan. Finally, in high-tempo operations, the top-down fire planning process provides a workable plan in a relatively short time. See Appendix F for a detailed discussion of the fire planning process.

The movement of FA units must be completely integrated into the movement plan of the supported maneuver unit to ensure that firing elements are positioned to support the commander's intent. This is especially true during fluid or fast-moving situations, where the artillery can quickly be left out of range or exposed to direct fire from attacking enemy forces. Planning for displacement of artillery units should consider the need to provide continuous support for the maneuver force as well as FA survivability. These are key considerations not only for fire support but also for FA support planning.

At some time before an operation begins, the FSO must finalize his plan. As part of this process, he must establish a cutoff time, after which additional input to the plan must be approved by the FSCoord on an exception basis. This cutoff time is established by the FSCoord and is published in the operation order. The FA battalion S3 has a role in establishing the cutoff time. He offers input concerning the time necessary to—

- Prepare and move ammunition.
- Position firing units to support critical elements of the plan. This includes positioning firing elements of any units reinforcing the fires of the DS battalion.

Brigade-Level Fire Planning

Brigade fire planning begins when the brigade commander, FSCoord, S2, and S3 receive the mission and begin to discuss how they will fight the battle. They develop a number of possible courses of action. For each course of action, the FSCoord develops a fire support concept and a recommendation for the maneuver commander's intent for fire support. As the courses of action are discussed, the FSCoord draws from the commander further details of both the concept for maneuver and the fire support necessary to support it. As the maneuver commander makes his decision regarding the maneuver concept of operations, the FSCoord is receiving a detailed intent for fire support. This interaction is the foundation on which the entire fire support plan is built. Once the scheme of maneuver and the commander's intent for fire support are established, the brigade FSO and the FSCoord can begin preparing the fire support plan, which becomes part of the brigade OPORD.

Top-down fire planning gives the maneuver brigade a fire support plan that focuses the fire support effort exactly where the brigade commander intends to fight the battle. It provides guidance and allocates resources to maneuver and artillery units, assigns target execution responsibility, and fully supports the brigade commander's scheme of maneuver.

The instruments used to plan and execute top-down fire planning are the fire support execution matrix, the brigade target list, and an attack guidance matrix. These are part of the brigade fire support annex. The FSEM, a one- or two-page document, is found at all levels. It states the commander's intent for fire support, assigns resources and responsibility for executing targets by phases of the battle, and presents critical fire support information. The attack guidance matrix graphically portrays when to attack targets in the 13 target categories and the desired results (that is, suppress, neutralize, or destroy). (See FM 6-20-10 for detailed discussion of the attack guidance matrix.) Top-down fire planning detail should be commensurate with the level of maneuver planning done at the brigade. If the tactical situation permits, lower-echelon FSEs should be allowed enough flexibility to plan for the detailed integration of fire support assets during their planning process. The maneuver commander's intent for fire support at the battalion and/or task force level is more detailed than that at brigade.

- Compute and disseminate firing data.

Task-For-Level Fire Planning

The task force (TF) takes the guidance and resources provided by brigade and plans fires to support the TF commander's battle. The task force planning tools and process are similar to those at the brigade. Again, the most important factor in developing a good fire support plan is the initial integrated planning by the commander, FSO, S2, S3, and engineer.

The task force fire support execution matrix is in a format similar to the brigade FSEM, but it portrays how the task force will fight the fire support battle. The most critical portion of the task force FSEM is the commander's intent for fire support. It assigns resources and responsibilities for executing targets by phases of the battle and graphically portrays critical fire support information. A task force commander's intent is more specific than the brigade commanders. It covers the task force area of responsibility and may identify specific targets and assets, especially his own organic mortars, to fire.

One difference between the brigade and task force FSEMs may be the inclusion of the scouts and mortars in the task force matrix. The scouts are treated like any other maneuver unit. The mortars may be given section firing positions, and their expected movement by phases is outlined in the matrix. The companies are assigned target execution responsibility. The assignment of a target brings with it the responsibility of the company to position observers to cover the target. The maneuver execution matrix tasks a company commander to engage specific targets during different phases of the operation. The company FSO executes these responsibilities. If a company FSO or FIST becomes a casualty, the company is not relieved of the responsibility to fire the targets assigned in the task force OPORD.

Company-Level fire Planning

The company refines the task force fire support plan to meet the company fire support requirements. Targets are added if necessary, but the company fire support teams are primarily responsible for executing the brigade or task force fire support plan. These shooters stand on the ground with their company commanders and identify trigger points to help synchronize the battle. The primary concern of the company FSOs is planning priority targets and final protective fires (FPFs) and validating target locations. They ensure that the company has primary and backup observers (that is, other key leaders in the company) able to observe the trigger points of their targets. The company fire support execution matrix is the tool that they use to execute the plan. The company FSEM is a maneuver document. It is designed so that all key leaders in the company understand and are able to execute the fire support battle.

The company FSEM executes the company fire plan. It is developed in such detail that the company commander, platoon leaders, or platoon sergeants can execute their fire plan. It establishes by whom, when where, and under what conditions each target will be fired. It provides the critical information a platoon leader would need to fight the battle.

The commander's intent for fire support outlines his concept for firing the key targets as he maneuvers the company. It is given in explicit detail. Targets, identified by target numbers, are fired as maneuver platoons pass specific points or are engaged by certain size enemy units. The commander's concept is locked into his maneuver plan.

For specific fire support planning guidance, see FM 6-20-30, FM 6-20-40, and FM 6-20-50.

FIELD ARTILLERY SUPPORT PLAN

The FA support plan is based on the fire support plan and contains information necessary for understanding how field artillery will be used to support the maneuver brigade operation. Unnecessary repetition of SOP items is avoided. The operations section of an artillery unit assigned the tactical mission of direct support is responsible for preparing the FA support plan. The inherent responsibilities for fire planning are specified in the assigned tactical mission. When assigned the DS mission, FA battalions do their own tactical fire control planning as well as that for any reinforcing artillery. The S3 issues his FA support plan to organic and reinforcing units, the supported unit, and higher headquarters. It may be in the form of a written FA support plan, an FA support matrix fragmentary orders, or oral orders, depending on the time available. See Appendix E for examples of an FA support plan and an FA support matrix.

A written FA support plan follows the five-paragraph field order format. It includes the information necessary to explain the plan and other special information on the use of FA fires in support of the operation. The heading of the plan indicates the FA headquarters publishing the plan, security classification, map reference, and time zone. The ending of the original copy bears the signature of the FA commander of the publishing headquarters. All other copies are authenticated by the field artillery S3.

The essential elements of an FA support plan are as follows:

- Allocation of all field artillery assets.
- Projected changes to the allocation of FA assets based on tactical contingencies in the OPORD (on-order missions).

- The FA battalion commander's concept of the operation. (This may be included in paragraph 3a of a written FA support plan or in the FA support matrix if no written plan is produced.)
- Requirements for positioning and movement of firing units to support the fire support plan. (An FA support matrix is recommended See Appendix E.)
- Ž The controlled supply rate for ammunition, if any (paragraph 4 of the plan).
- Ž Arrangements for command and control if they differ from unit SOPs (paragraph 5b of the plan).
- Specific instructions for attached target acquisition assets, survey, and met (paragraph 3, Coordinating Instruction or individual tabs to the FA support plan). (See Appendix E.)
- Specific instructions for combat service support, if different from normal unit SOPs (paragraph 4 of the plan).
- Ž Restrictions on ammunition expenditures, types of fires and limiting risk to friendly troops (paragraph 3 of the plan).
- Ž Current and on-order fire support coordinating measures (paragraph 3 of the plan or overlays).
- The target list developed by the supported maneuver unit.
- Schedules for preplanned fires.
- Special instructions on rules of engagement, fire support communications, and logistic support.
- Location of command posts, ammunition supply points (ASPS), and ammunition transfer points (ATPs).
- NBC coordinating instructions.
- The S2's IPB should be continuous. If it is, he can quickly develop a situation template and a collection plan.
- The plans officer or assistant S3 might be tasked to plan the battalion positioning.
- The RSO or survey chief plans survey support.
- Ž The signal officer designs a signal plan to support the operation.
- The FDO is concerned with the development of the fire plan.
- The executive officer's CSS staff works out logistical support.

EXAMPLE

The battalion is supporting an attack whose first phase is a movement to contact.

The **assistant S3** knows he must keep firing units moving close behind the brigade advance guard while others maintain a continuous firing capability. He knows he must have as many units as possible in position to support at crucial points in the operation—crossing the line of departure, assaults on objectives, and so forth. And he uses his knowledge of the friendly situation and the S2's decision support template (DST) to come up with clear trigger points for movement to support the force.

The **FDO** knows he can't count on having all units available to fire at all times and recognizes the same critical points the assistant S3 does.

The **BSO** understands he must provide for retransmission as the FSOs advance and the batteries move. He looks for terrain that provides line of sight between the TOC and his retransmission stations. He gets the FDOs and FSOs to assign observers battery computer system (BCS) relay addresses.

The **RSO** knows he must bring survey control forward as the batteries advance. In close coordination with the force artillery SPCE, he plans backup means of extending common control.

The **CBS staff** must be involved from the beginning of the planning process. The ability of the logisticians to support various courses of action may well dictate both the maneuver commander's and the FSCORD's choices. If a particular operation or course of action requires unusual types or amounts of supply support, the CSS staff needs all the reaction time possible to maximize support.

STAFF PLANNING ACTIONS

Planning time is almost always limited. However, there are several techniques that can speed the planning process. Each type of operation has characteristic requirements. (See Chapter 2 of this book FM 6-20-40, FM 6-20-50, and applicable maneuver manuals.) Therefore, the FA battalion commander and his staff can analyze the mission and anticipate the maneuver commander's requirements. The ability to anticipate requirements allows the staff to begin planning immediately on receipt of the mission.

Battalion Staff Assignments

Once the FA battalion S3 knows the area and general nature of the operation and the commander's intent, he can assign portions of the FA support plan to members of his staff:

Battalion-Battery Interface

Each staff section can identify its counterpart in the batteries. The signal officer's counterpart is the battery communications chief. The RSO's is probably the gunnery sergeant. The battalion FDO has the battery or platoon FDOs. The assistant S3 can work with the battery XO or a platoon leader.

As the battalion staff members complete their plan they should rehearse it with their counterparts, or at least have their counterparts give them a quick back-briefing. This ensures that the subplans are clear and understandable and that they are formed in time to be effective.

Role of the S2

The FA battalion S2's contribution to the planning and execution process is often overlooked. The S2 can provide intelligence products that are essential to the cannon battalion as well as to the mission of the supported maneuver unit as a whole. He has access to collection assets such as forward observers (FOs), company FSOs, FSEs, weapons-locating radars, and a survey platoon whose secondary mission is reconnaissance.

The FA battalion S2 must rely heavily, but not exclusively, on the supported maneuver unit S2's intelligence products. The battalion S2 expands intelligence products of the supported unit, particularly the IPB, to focus on fire support issues and survivability and mobility issues for the FA battalion. He coordinates not only with the maneuver S2 but also with the div arty or FA brigade S2. Through the div arty and FA brigade TOCs, he has access to the div arty and corps artillery intelligence products.

As the artillery liaison with the supported headquarters, the maneuver unit FSE provides a critical link between the FA battalion S2 and the maneuver S2. One primary duty of the targeting officer located at the maneuver TOC, is to facilitate the exchange of target-related information, information requests, and artillery-related intelligence products.

The FA battalion S2 conducts an IPB. (See FM 34-130.) He may rely heavily on the maneuver brigade S2's battlefield area evaluation, terrain analysis, and weather analysis. However, he adds his assessment of these items as they affect fire support systems and FA battalion mobility and survivability. For Threat evaluation, he continually studies the Threat fire support system. His knowledge of Threat weapon systems is critical.

The FA battalion S2 combines his knowledge of the Threat fire support system with the maneuver S2's battlefield, terrain and weather analyses to create situation templates. His templates should show, as a minimum, major fire

support units, command posts, OPs, TA assets, and deployment of air defense (AD) assets. In short, the situation templates should provide the essential elements of the enemy situation portion of the FA support plan. They can also be used to provide focus for the collection plan and to build a data base including enemy equipment strengths, personalities, supporting assets, and other information applicable to the intelligent estimate.

The analysis done by the FA battalion S2 allows him to become a major contributor to the brigade DST development. Of particular importance to the maneuver brigade S2 in developing the DST are such factors as-

- Indirect and direct fire weapon ranges.
- Where and how those systems are normally deployed on the battlefield.
- How the Threat organizes his fire support system for combat.
- Threat fire support system vulnerabilities.
- Other actions, such as massing of artillery, that may reveal the enemy's intention.

The FA battalion S2 gives information to the maneuver brigade S2 to help him in determining the enemy avenues of approach, objectives, and various courses of action. As the brigade staff begins its planning and coordination, information provided by the FA battalion S2 may be used to help in the selection of engagement areas, target areas of interest (TAIs), obstacle plans, decision points, high-payoff targets attack guidance, and preplanned fires in support of the operation.

The battalion S2 also analyzes the brigade DST and develops his own DST to support mobility and survivability decisions for the FA battalion. His analysis of terrain in three dimensions and of the brigade DST aids in the FA battalion S3's selection of position areas. The S2 also considers this analysis when he integrates the battalion internal defense. The analysis must cover the aircraft the enemy is using, the degree of air threat that exists, and probable air avenues of approach. The finished product will assist in synchronizing fire support for the operation and accounts for both air and ground threats to the battalion.

During the IPB process, the FA battalion S2 may develop PIR and IR. These may be in addition to the brigade PIR. He will be more interested in regimental artillery groups (RAGs), division artillery groups (DAGs), bypassed enemy units, OPs, and target acquisition. Therefore, the S2 must make a comprehensive collection effort that answers his PIR as well as those of the brigade S2. He does this by focusing his collection assets on named areas of interest (NAIs) (IPB event template) and by assigning collection

tasks to each asset. When the battalion has control of FA radars (WLRs and/or moving-target-locating radars [MTLRs]), the S2 must ensure that those assets are fully integrated into the intelligence collection plan. He must address and continually revise the following factors to ensure that they meet the needs of the maneuver units as the battle changes: search sectors, positioning WLR zones, cueing of radars, survivability, and communications. For additional guidance, see FM 6-121 and the example DA Form 5957-R in Appendix E of this manual.

The FA battalion S2 must develop and supervise a comprehensive reconnaissance and surveillance (R&S) effort to meet his PIR. To do this, he must take maximum advantage of the assets available to him to answer the questions posed by the PIR. Assets the S2 will normally be able to use as sources of information include the following:

- Forward observers with the maneuver (infantry) companies.

- Fire support officers at the company, battalion, and brigade levels.
- Survey parties.
- Combat observation/lasing teams (COLTS) available to the supported maneuver unit.
- Battery defense OPs and listening posts (LPs).
- Battery advance parties.
- Weapons-locating radars attached to, organic to, or otherwise supporting the battalion.

The S2 must analyze the ability of his available assets to answer his PIR and must identify any shortfalls. To aid him in this effort, the S2 can use a collection plan work sheet. The collection plan work sheet has no specific format. One possible format for the work sheet, with an explanation of its use, is shown below. The S2 may use this format or develop one of his own.

SUGGESTED COLLECTION PLAN WORK SHEET FORMAT

| PRIORITY INTELLIGENCE REQUIREMENTS AND INFORMATION REQUIREMENTS | INDICATORS | SPECIFIC INFORMATION REQUIREMENTS | COLLECTION AGENCIES | | | | | | | PLACE AND TIME TO REPORT | REMARKS |
|--|---|--|---|--|--|--|--|--|--|--|---|
| | | | | | | | | | | | |
| (List PIR and IR. Leave enough space to list Indicators for each PIR and IR in the next column.) | (List Indicators that will satisfy each PIR.) | (List specific Information required to satisfy the Indicator. Key requirements to NAIs on the event template if possible. These requirements form the basis for specific orders and requests.) | (Place an "X" under each agency that can collect the required information. Circle the X when an agency has been selected and tasked.) | | | | | | | (Place may be a headquarters or unit. Time may be specific, periodic, or as obtained.) | (include means of reporting; for example, by spot report format on by established communications (multichannel, frequency modulated, radio teletypewriter). State "by SOP if SOP criteria apply for responding to collection requirements.) |
| 1. Will the enemy attack? If so when, where, and in what strength? | Movement of mech elements, artillery, and logistic support. | Enemy movement between ridge vic 5947-5842 to SEINE River. Report size and type of unit and direction of movement and termination point. Special attention to NAIs 3, 5, and 8. | | | | | | | | | |

The FA battalion S2 also contributes to target development. Working closely with the targeting officer, the S2 helps identify the enemy's most valuable assets relating to certain phases of his operation (high-value targets). He recommends as the brigade HPTs those whose attack substantially contributes to friendly success. On the basis of his knowledge of the capabilities and limitations of sources of targeting information, the S2 contributes to the determination of target selection standards (TSSs). These standards state the reliability and accuracy of each source of targeting information. This reliability is expressed in terms of whether reports from the source are to be considered targets or merely target indicators. (Target indicators require confirmation by other sources.) Sound TSSs help prevent the S2, or any other element of the fire support system, from generating fire missions that lack the accuracy of target location to be effective. See FM 6-20-10 for detailed discussion on the targeting process and target development.

REHEARSALS

Rehearsals are an integral part of the planning process. A rehearsal should both practice and test the plan. If at all possible, the FA rehearsal should be conducted with the maneuver commander's rehearsal. A combined rehearsal will improve responsiveness of fires and the synchronization of all the maneuver commander's resources for the battle.

Units must establish procedures for rehearsals as a part of their tactical SOPs. As a minimum, the SOPs should identify the following:

- Ž Who will participate in the rehearsal.
- Ž What should be rehearsed.
- Ž What the sequence of the rehearsal will be.
- Ž What the priority of methods for rehearsals will be.

Participants

At any level, fire support participants in a maneuver commander's rehearsal should include all members of the FS cell and any subordinate FS cell members associated with participating subordinate maneuver headquarters. These members include the FSCoord and/or FSO, air liaison officer (ALO), naval gunfire liaison officer (NGLO) and/or supporting arms liaison team (SALT) officer, mortar platoon leader, chemical officer, and Army aviation liaison officer, as applicable. Also, the S2, the intelligence and electronic warfare support element (IEWSE) team leader, and the engineer officer, in particular, should be present. They should participate in the rehearsal of

significant events, such as target acquisition employment and obstacle emplacement. The FA battalion S3, S2 RSO, radar personnel, unit FDCs and COLTS are all essential participants as well. Whenever possible, the firing batteries and platoons, down to individual section level, should participate. The FA battalion benefits from the rehearsal by obtaining information for movement, schedules of fire, munitions requirements, and a more complete understanding of the operational time involved with the scheme of maneuver.

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

- Actions to occur.
- Ž Possible friendly initiatives.
- Possible reactions to enemy initiatives.
- Ž Control measures.
- Significant events that are to occur in relation to time or to phases of an operation.

The rehearsal conducted by only fire support personnel is limited in that the success of the rehearsal and benefits to be derived from it depend on how well the FSCoord and/or FSO conducting the rehearsal know the maneuver commander's concept of the operation. Within the DS artillery battalion, the commander, S3, FSO, and S2 structure the fire support rehearsal in accordance with the enemy's most likely course of action and the friendly scheme of maneuver. At the appropriate time, each participant carries out his part of the plan. The FSOs fire their assigned targets, place fire support coordinating measures into effect, and make the reports the battalion depends on for its combat information. The FOs do the same. They ensure that their assigned missions, especially high-priority ones like FPFs, are loaded in the buffers of their digital message devices (DMDs) and ready for transmission. The ALOs monitor airspace coordination procedures, clear aircraft to depart from the initial point (1P), call for target marking and request SEAD fires. The DS battalion CP monitors all of this. The battalion O&I element pays particular attention to displacements. The battalion FDC issues fire orders and passes messages to observers. If there is a mutual support unit, the two FDCs exercise transfer of controls. Attached radars work situational cues with the cueing agents. Each firing unit

FDC computes tire commands, acknowledges fire support coordinating measures, and ensures that it can fire its assigned mission. Missions are passed to the howitzer sections, which determine whether the necessary ammunition is on hand and if the mission is within traverse limits. If alternative friendly courses of action hinge on enemy actions and if time permits, the alternatives may be rehearsed.

Note the important features of the rehearsal. It presupposes the complete plan – a plan complete enough to be executed, not a final or unchangeable plan. It is designed to show whether everyone knows his responsibilities (for example, for firing a target, moving a battery, switching frequencies observing an NAI) and the cues for his action. It allows a check on whether the plan will work. For example, observers confirm that they can see their targets and FDCs confirm that they have ballistic solutions to their targets. Finally, the rehearsal as a whole is clearly under someone's direction (for example, the FSCORD or S3),

Methods of Rehearsal

There are many ways to conduct rehearsals. When time is limited, there will be no chance to rehearse everything. You must streamline your plan and focus your rehearsal on critical events.

Rehearsals may be conducted face-to-face, by wire or by radio. The first two methods have the advantage of greater security the last two test communications in the course of the rehearsal. Face-to-face rehearsals tend to be time-consuming and concentrate leaders in one place, but they are often the most secure and are usually the least ambiguous.

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

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

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

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

Wire. Wire rehearsals generally limit the number of agencies that can rehearse. They also don't test the radio communication on which execution usually depends.

Radio. Radio rehearsals are usually the most comprehensive and the easiest to conduct on short notice, but they present the greatest risk of compromise and frequently confuse participants – "Is this a real fire mission or a rehearsal?"

Tips for Successful Rehearsal

Whatever the technique, a successful rehearsal will be as close to the way you want to execute as possible. When a problem emerges during the rehearsal fix it right there. To gain the most advantage from the rehearsal, the leader should do the following:

- Personally supervise and monitor the rehearsal to ensure that it maintains its focus and direction.
- Select time for the rehearsal that allows enough time to correct problems found in the plan.
- Use actual players, not stand-ins, especially in organizations with little experience in continuous operations. Crucial players, such as FISTs, COLTs and radars, must be included.
- Ž Involve all of the elements that will be required to perform the mission, concurrently if at all possible. This means including the firing batteries, down to howitzer section level, in the rehearsal. When firing batteries are included in the rehearsal the leader must distinguish clearly between the rehearsal and the execution of the plan. Activities at the battery include-
 - Having each platoon operations center (POC) compute data to ensure that the battery can range the target and will not violate fire support coordinating measures.

- Having each howitzer section dry-fire the mission to ensure that the necessary ammunition is on hand and that there are no traverse limit or site-to-crest problems.
 - Stop and correct problems as they arise. Not all plans will be complete at the time of the rehearsal, but problems that are identified must be corrected in the plan before its execution.
 - Have built-in checks of the plan. The S2 participates, and those responsible for execution report back. These checks anchor the rehearsal in the enemy situation, the terrain and the details of the plan.
- Ž Rehearse the plan that will be executed the sequence and the execution cues are the same.
- Cover, as a minimum, the following at each rehearsal:
 - Grid locations for critical targets (as a minimum) are verified.
 - Trigger points, lines, or events are verified for each target.
 - A primary observer and a backup observer are identified for each target. Backup observers may be other fire support personnel or maybe key personnel (company commander, platoon leader, and so on) from the supported maneuver unit.
 - Primary and backup communications links are identified for each observer.
 - Target engagement criteria are established; for example, **INITIATE FIRES ON TARGET TA3014 WHEN 5 ENEMY TANKS HAVE PASSED TRIGGER POINT 2.**
 - For each target priority and purpose are established,
 - Method of engagement (for example, time on target (TOT), at my command, or when ready) is specified for each target.
 - Attack guidance, such as shell-fuze combination, number of volleys and unit(s) to fire, is specified for each target.
 - A movement plan specifying when and where units will move is prepared

LAST-MINUTE MODIFICATIONS TO THE PLAN

One of the most difficult, yet absolutely essential, steps of the planning process involves establishing a cutoff time for submission of refinements to the fire support plan or any

schedule of fires while taking full advantage of last-minute reconnaissance reports and other targeting information. The FSCOORD and his staff, in conjunction with the maneuver commander and his FSE, must have reasoned consistent procedures for modifying the fire support plan and schedules of fires in the period immediately before a maneuver operation begins. To ensure the most up-to-date information is available and executed, these procedures must be streamlined before any change is made to an approved plan or schedule.

Normally, this modification procedure is part of the unit SOPS. At a minimum, the procedure will establish who can authorize modifications to the plan what information will dictate a change to the plan and how late-developing information must be reported to affect the plan. This procedure applies also to schedules of fires which are a part of the fire support plan.

- Who can make changes to the fire support plan? Once approved, the fire support plan is part of the brigade OPORD. Normally the brigade commander is the only one who can authorize a change in the plan. However, he may delegate the authority to change the fire support plan to the FSCOORD
- Ž What type of information will cause the decision maker to direct a change in the existing approved fire support plan? The original fire support plan was based on the best information available at the time the plan was developed. Updated or refined information may become available anytime through various channels. Reconnaissance patrols, the covering force, FOs, COLTs and a wide range of other agencies may provide information that contributes to a more accurate assessment of the situation than was previously possible. The information which will affect the plan most is normally operation-specific and centers on the commander's PIR and IR. Other information that may cause a change to the plan should be identified at the rehearsals, both maneuver and fire support.
- How must late-developing information be reported? The key is accurate and timely reporting to the level at which decisions can be made. Communications means for reporting this type of information should also be identified and practiced at the rehearsals.

As new information is reported, the FS cell (including the S2 and targeting officer) and the FA battalion S3 and S2 must work together to determine the following:

- Ž What are the accuracy and reliability of the new information? If it is target information, does it meet target selection standards?

- Does the new information require a substantial change to an existing scheduled or preplanned target?
- What is the best method of attack (FA, mortars, TACAIR, and so forth)?

While the staff is considering the effect of the new information on the approved schedule of fires or preplanned target list, the FSO and FA battalion S3 should also consider the following alternatives.

- If time is available, change the schedule of fires or preplanned target list by simply substituting the higher priority target. If the change to an individual target is too great to allow shifting, a new target should be generated

rather than attempting to change the grid location of an existing target. Then disseminate the changed plan or schedule.

- If the new information confirms the absence of a target at a particular location simply delete the suspected target from the schedule of fires or target list.

- Designate targets generated by the new information as on-call targets.

All of the above actions must take place in a matter of minutes. Firmly established and well-rehearsed procedures will facilitate timely and appropriate actions based on the situation.

Section III

MOVEMENT AND POSITIONING

This section discusses the battalion operations functions of moving and positioning the FA battalion in order to accomplish its mission. Other battalion operations functions, such as tactical and technical fire direction and logistical support, are discussed in other parts of this book.

POSITION SELECTION FACTORS

The staff must plan for the following types of positions and include them in the coordination process with the maneuver headquarters:

- A **primary position** is one from which a unit will accomplish its assigned tactical mission.
- An **alternate position** is one to which a unit moves when the primary position becomes untenable or unsuitable for accomplishing the assigned mission. The alternate position must allow the unit to perform the same mission assigned to it in the primary position.
- A **supplementary position** is one to which a portion of a unit moves to perform a specific mission.

NOTE: For additional details on positions for field artillery, see FM 6-50.

A number of factors will influence the S3's choices of where and how to position the firing batteries, trains, and CP. The two key considerations areas follows:

- The battalion must be able to provide the support the maneuver forces require.

- The battalion must survive if it is to continue to provide support in the future.

Firing units should be positioned laterally and in depth. This increases their survivability and their flexibility in responding to calls for fire across the zone of action of the supported unit. When the cannon battalion S3 positions mixed calibers, he must consider carefully the capabilities and limitations of each system. If the weapons of one or more of the reinforcing units are of a different caliber than those of the DS battalion, attention must be paid to matching the range and ammunition capabilities of each system to the missions required by the maneuver plan. The 203-mm battalions lack the variety of munitions (smoke, illumination, family of scatterable mines [FASCAM], Copperhead, and so forth) to support many DS-type missions. The 105-mm units may not be able to mass or range as deeply as required.

Propellant availability is another important consideration in positioning. In positioning batteries, it is easy to fall into the habit of considering only the maximum range of a system. However, batteries cannot always achieve maximum range. For instance, the 18,100-meter maximum range of an M109A2/A3 battery can be achieved only with M119-series propellant. In most instances, M119 propellant is a relatively small portion of the unit basic load. Not all projectiles are compatible with M119. Lower charges (green bag, M3, and white bag M4) will make up at least a part of the unit combat load and may well be the only propellant available. Firing units must be positioned for range accordingly. Another propellant consideration is that maximum charges are equivalent full charge (EFC) rounds.

Firing maximum charge greatly shortens tube life and the time required between retubings.

in supporting an attack, it is useful to orient on the forward line of own troops (PLOT) rather than on the objective. Units that are content with being able to range the objective often find themselves unable to support consolidation or on-order missions to continue the attack. For example, during offensive operations, batteries should be positioned as close behind the lead maneuver elements as the terrain and tactical situation permit.

Additional specific considerations of position selection include those discussed below.

Mission

The battalion must be able to accomplish its tactical mission from the position. Priority of FA positioning goes to nuclear-capable units first, then to DS and reinforcing units, then to GSR and GS units. Brigade units have priority over division units within the brigade area: division units have priority over corps units within the division area.

Tactical Situation

The battalion should be positioned to facilitate support of the maneuver operation being conducted. For example, if the supported brigade is conducting a movement to contact, the battalion should be positioned well forward and should be prepared to move to keep pace with the brigade. An FA position should not interfere with the effectiveness of a combat unit.

Survivability

Since the unit is positioned to accomplish its assigned mission, survivability of the various elements of the battalion must be considered. Some considerations are as follows:

- The position should help the unit conduct active and passive defenses against ground and air attacks. It should provide for early warning of an enemy approach, provide for adequate camouflage, and allow for mutual artillery support.
- The position should be located in defilade to deny the enemy direct observation and fires. A defilade position also allows for communications masking and for some protection from the effects of nuclear weapons.
- The position should allow for maximum dispersion to increase survivability against enemy counterfire. Positions should be hardened as time is available and may be integrated with the obstacle plan.

- The position should allow for timely and unobserved displacement.

Future Operations

Because of the need to shift units around the battlefield to support current and future operations, the future mission of the battalion should be considered when it is positioned so that there is a smooth transition from one mission to the next.

Zone of Supported Unit

The battalion should be positioned to range the entire zone of the supported unit. Also, by positioning within the zone of its supported unit, the battalion reduces the complications of coordinating position areas and movement routes through the maneuver area.

Communications

Communications capability closely follows mission and survivability in terms of importance in selecting positions. Both artillery C2 and TACFIRE depend heavily on good communications. Without functioning communications, the maneuver operation cannot be adequately supported. Thus, positions must be selected that allow for reliable communications with the supported unit and higher headquarters. Remoting and directional antennas should be used whenever possible.

Enemy NBC Capabilities

The enemy capability for use of NBC munitions must be considered. A vulnerability analysis must be conducted. Enemy NBC capabilities favor dispersion within a position but dispersion does not negate the capability to mass fires. See FM 101-31-1 and FM 3-10-1 for nuclear and chemical vulnerability analyses, respectively.

Weather

Current and anticipated weather conditions and the effect of weather on the terrain, especially trafficability influence the selection of a position.

RECONNAISSANCE

Reconnaissance is conducted to select the best battalion and battery positions, march routes, start and release points, command posts, observation posts, and communications sites and to analyze the terrain on which the battle will be fought. Reconnaissance helps the unit move from one location to another as quickly and in as organized a manner as possible.

Planning and Coordination

Reconnaissance planning begins as a result of the commander's initiative misestimate or revised estimate of the tactical situation, or a change in orders. After considering the time available and the tactical situation the commander may decide that a ground reconnaissance will be made. If he does he should plan to include in the reconnaissance party only the personnel and equipment necessary to help formulate plans, issue orders, and select and prepare positions. Normally, the S3, BSO, RSO, and battery commanders, when available, form the reconnaissance party. In some cases, the S2 may go with the recon party to plan for radar positions, observation posts, and all-around security. Composition of the recon party is generally prescribed in unit SOPs.

Concurrently with the planning for reconnaissance to establish exact positions for occupation, the staff coordinates with the maneuver headquarters, normally through the FSO, to—

- Clarify any questions as to the ability of the battalion to support the operation from its planned positions.
- Ž Resolve any conflicts in positioning between the FA battalion and the maneuver elements.
- Ž Ensure all elements of the force understand the organization of FA within the area of operation.
- Determine how specific maneuver operations, such as the obstacle and deception plans, affect the reconnaissance, its intended routes, and the subsequent tactical movement of the unit.

Reconnaissance Techniques

There are three types of reconnaissance – map, ground, and air.

Map Reconnaissance. The map reconnaissance is made as a preliminary to ground or air reconnaissance. It is used when time is short or when the projected position is occupied by the enemy. Some things to be considered in making a map reconnaissance areas follows:

- Actual terrain conditions cannot be determined.
- Roads, towns and terrain features may have changed.
- Other units may be in the position.
- Enemy forces may be in the area.

Ground Reconnaissance. This is the best method of reconnaissance and is used whenever possible.

Air Reconnaissance . This is made in conjunction with a map and ground reconnaissance whenever possible. It is used when time is short, when air assets are available, and when air superiority exists in the area to be reconnoitered. Some considerations for the air reconnaissance are as follows:

- Ž The physical condition of the ground is difficult to determine.
- The route to be used cannot be adequately reconnoitered.
- Key staff elements cannot accompany the commander.
- The reconnaissance could give away future plans and intentions.

Reconnaissance Party

Included in the battalion recon party are the S3, BSO, RSO, and battery commanders if available. During the reconnaissance, the party makes decisions regarding the following:

- Communications sites.
- Ž Position entrances and exits.
- Concealment.
- Defilade.
- Trafficability.
- Ž Radar positions.
- Observation posts.
- Ž All-around security.
- Ž Survey requirements.
- Ž Routes of march.
- Start points.
- Release points.
- Time of movement.
- Use of route markers or traffic control points.
- Ž Order of march.
- Ž Order for displacement.
- Enemy and friendly situations.

SURVEY

Survey is the means to establish accurate locations and directional control for weapons and TA assets. Survey

establishes a common grid which permits the massing of fires, the delivery of surprise observed fires, the delivery of effective unobserved fires, and the transfer of target data from one unit to another. The FA battalion survey section is responsible for providing survey control to all of the firing elements any organic and/or attached TA assets, and any other assets as required; for example, OH-58Ds, combat electronic warfare and intelligence (CEWI) units, and mortars. The establishment of survey control is a command responsibility.

Commander's Guidance

The maneuver commander initiates the requirements for survey planning when he issues guidance to the artillery commander. He does so by stating his scheme of maneuver, the rate of movement, the anticipated enemy threat, and critical phases of the battle. The FSCOORD analyzes the commander's guidance and extracts the information that will allow him to visualize the survey requirements for the fire support assets. He can gain most of the information by reviewing the scheme of maneuver, rate of movement, effects desired on high-payoff targets, and accuracy requirements for TA sensors.

Each artillery commander is responsible for establishing a common grid throughout his area of operations. The FSCOORD or S3 must issue orders and guidance to the RSO so that detailed planning and coordination can start. Those survey requirements must be included in the FA support plan so that all fire support personnel are aware of them. The artillery commander's guidance must provide the following:

- Priorities for survey, to include survey methods.
- Accuracies required if other than SOP. Modified survey techniques may be needed as the result of METT-T.
- Times that portions of the plan are to be completed.
- Position requirements (primary, alternate, and supplementary).
- Future plans. (This information is necessary to allow the RSO to plan for future survey operations.)

The S3 is responsible for the direct supervision of the RSO. He must coordinate continuously with higher-echelon staff and commanders and be prepared to advise the artillery commander on any deviation from previous guidance. If the tactical situation or the absence of accessible survey control points (SCPs) requires the use of hasty or field-expedient methods of establishing common control the force artillery commander must be informed.

The RSO and/or chief surveyor decides how best to use the PADS and conventional survey teams. They develop a survey plan using all available assets and techniques to best meet the guidance given by the S3. The plan must be coordinated with the force artillery SPCE to get SCP data and to eliminate duplication of effort. The force artillery SPCE is ultimately responsible for the detailed coordination of the entire survey effort. Battalion RSOs through the S3, maybe tasked to do additional tasks based on the requirements of the force artillery as a whole. The RSO of a reinforced battalion must coordinate with the reinforcing battalion RSO so that all assets are provided with survey support in a timely and economical manner. Survey assets may have to be pooled on occasion without regard to unit identity to achieve the mission.

Survey Planning Factors

The FSCOORD and S3 must be aware of the basic capabilities and limitations of survey before they can issue effective guidance and/or orders to the RSO. They must be aware of the factors discussed below.

Unit Capabilities. They must know what personnel and types of equipment the survey teams have to effectively task them, that is, the number of conventional survey teams and PADS teams.

Survey Planning Times. The following times are used in planning survey:

- Conventional survey team 2,000 to 4,000 meters per hour.
- PADS survey team:
 - Cross-country 10 kilometers (km) per hour (kmph), Unimproved road 25 kmph. Improved road 50 kmph.
 - Maximum mission time: 7 hours (system shutdown and reinitialization require about 40 minutes).
 - Maximum mission radial distance 55 kilometers (system will require update data).

Employment of Conventional Survey Teams. The PADS tends to be the primary means of providing survey to the units. However, conventional teams can be used very effectively in conjunction with the PADS teams. (See FM 6-2 and ST 6-2-20 for a detailed discussion.)

Planning Guide

The F3COORD and S3 can use the following guide to ensure that most of the issues relating to survey planning are covered. It is not exhaustive and may have to be modified to meet a particular situation.

- Ž Select primary, alternate, and supplementary position areas for all assets requiring survey.
 - Set time requirements associated with providing survey.
- Ž Determine accuracy requirements for the weapon and the TA system. Standard requirements should be reduced only if time is a critical factor. An example might be providing only direction to FA units and requiring units to establish their own locations by use of hasty techniques.
 - Set a survey priority for each weapon, each TA system, and any other asset requiring survey. This is a necessary element of the planning process because of the number of assets and positions to be surveyed. This means that survey must be controlled at the highest feasible level and not be done independently by individual battalions and units.
- Ž Determine the availability of starting SCPs, PADS update points, closing points, and so forth. If they are not readily available, include the requirement to emplace them in survey priorities.
- Coordinate at all levels. The requirements from higher headquarters must be determined so that they can be included in the planning process.

DISPLACEMENT

The battalion can displace by unit, echelon, battery, or element (that is by platoon section or vehicle).

Displacement by Unit

In a displacement by unit, the battalion displaces with all elements moving at once. This method is best used when the battalion is supporting a unit not in contact or when augmenting fires are available.

The advantages of this method areas follows:

- Ž This type of displacement is most easily controlled.
- Ž It is the fastest method.
- Ž Long moves are made more easily.

The disadvantages of this method areas follows:

The battalion presents a big target.

- Ž While moving the battalion is not providing any fire support.
- Ž The traffic will further congest already crowded roads.
- Ž The commander has little flexibility once the movement has started.

Displacement by Echelon

In a displacement by echelon, the battalion displaces one or two firing batteries, a portion of the C2 element, and some headquarters and service elements in one echelon. The rest of the battalion stays in position to support the ongoing operation.

The advantages of this method areas follows:

- The maneuver operation receives continued support.
- The MSU control of the remaining elements is simpler.
- Command and control are facilitated.
- The size of moving convoys is smaller than in a displacement by unit.

The disadvantages of this method areas follows:

- Each of the moving elements is relatively large.
- Support to the operation is degraded by as much as two-thirds, depending on the technique used.
- The commander's flexibility is limited.

Displacement by Battery

In a displacement by battery, each battery of the battalion moves only after the preceding battery has completed its move and is in place. The CP and trains move by a separate schedule. This method is used primarily to support a unit in contact.

The advantages of this method areas follows:

- Support to the maneuver operation is continuous.
- By use of the mutual support unit, command and control of fires are continuous.

Ž Command and control of the movement are centralized.

The disadvantages of this method areas follows:

- Support to the operation is degraded by one-third throughout the movement of the battalion.
- Ž The movement is slow.
- Ž The movement of individual units presents a large target.
- The commander's flexibility is not maximized.

Displacement by Element

In a displacement by element, the battalion displaces by individual elements as recommended by the battery commanders. Their recommendations are based on knowledge of the level of training of the battery.

The advantages of this method areas follows:

- Flexibility of the commander is increased.
- Ž Maximum continued support to the maneuver operation is ensured.
- Ž The signature of the moving unit is very small.
- The higher the level of training of the unit, the more effective this technique becomes.
- Command and control of the movement are decentralized. The C2 elements are released to concentrate on the conduct of the battle.
- Ž Flexibility in selection of movement routes is unlimited.

The disadvantages of this method areas follows:

- Considerable time is required to complete the move.
- Ž Control by the mutual support unit is not facilitated.
- Command and control problems are increased.
- Information flow must be rapid and accurate.

NOTE: Units should use a standard interpretation of the order **PREPARE TO MARCH-ORDER** (PTMO). Batteries are unready to move when they are directed to march-order and displace if they have not been given PTMO. The CP should always give as much warning as possible to the firing battery before requiring it to displaced. There must be a mutual understanding of 'whet tasks the battery will do and the extant to which its functions are degraded while in a PTMO status.

MOVEMENT

Although other types of movement, such as rail and airlift will occasionally be used the normal means by which the cannon battalion moves from one position to the next is the road march. The characteristics of a road march as opposed to any other type of tactical movement are a follows:

- Ž The purpose is relocation of the unit.
- Ž It is done at a set rate of speed.
- Ž A specific interval is maintained between vehicles and packets.
- The prime consideration is the rapid movement of the unit.

Planning

As in the conduct of all operations, an estimate must be made to determine the most viable course of action. The planner considers the factors of METT-T in determining the best way to move the unit.

The road march should be planned in as much detail as possible. Detailed planning consists of three steps:

- Determine requirements for the move.
- Analyze movement capabilities.
- Ž Establish movement priorities.

Standing Operating Procedures

The unit SOPs are a key element in conducting successful unit movement. The movement portion of the SOPs should address all of the following considerations and procedures:

- Vehicle load plans.
- Composition of serials.
- Ž Control measures (such as start points, checkpoints, and release points).
- Ž Rates of march under different conditions.
- Communications arrangements.
- Security measures. Include emergency action measures. such as actions in case of air attack or ambush.
- Time intervals and distance.
- Halt procedures.
- Reporting instructions.

Planning Sequence

As time permits, the following sequence for movement planning is recommended:

- Issue warning order as soon as possible.
- Review and finalize estimate to determine and confirm routes and organization of the march elements.
- Organize and send reconnaissance and quartering parties.
- Prepare detailed movement plans.
- Organize the march.
- Review reconnaissance information.
- Ž Compute march data and develop a movement table.
- Prepare and issue march order.

Reconnaissance

Reconnaissance is essential if the battalion is to conduct a successful road march. As a minimum, the S3 must make a map reconnaissance of the routes and the destination area. If at all possible, a ground reconnaissance should be performed. Assets available to the S3 for conducting this reconnaissance are the RSO and his surveyors, the HHB and firing battery commanders, and the BSO. Reconnaissance is invaluable in determining the following

- Travel times.
- Bridge capacities.
- Identification of critical points and checkpoints.
- Location of friendly obstacles.
- Road conditions.
- Actual distances.

March Techniques

Three march techniques can be used during tactical road marches: close column, open column, and infiltration.

Close Column. Vehicles are spaced about 25 to 50 meters apart during daylight, during periods of limited visibility, or when moving through built-up or congested areas. Vehicle density is about 30 vehicles per kilometer.

Open Column. Distance between vehicles is increased to provide greater dispersion. In a close column, the length of a 155-mm self-propelled battalion is 3 km; in a 100-meter open column it is 10 km. An open column is less prone to ambush and lessens accident probability.

Infiltration. Vehicles are sent one at a time, in small packets, or at irregular intervals. Infiltration makes control difficult. It is slow and should be used only when the threat dictates.

March Organization

A march column includes all elements using the same route for a single movement under the command of a single commander. A march column consists of the following:

- The **head** is the first vehicle of the column. It sets the column pace.
- The **main body** is composed of serials and march units. A serial is organized under one commander for planning, regulation, and control. A battalion usually forms one serial of a large march column. A march unit is a subdivision of a serial. Its movement is controlled by a single commander using voice, visual signs, or radio, if allowed.

- The trail party follows the march column and is responsible for emergency repair and recovery, medical aid evacuation and emergency refueling.

Control

Movement control is enhanced by using the control measures and means discussed below.

Start Point. Each movement has a start point (SP). This is an easily recognized point for starting the move. It should be far enough from assembly areas that units are organized and moving at the detailed rate by the time it is reached. Each unit should have a separate route to the start point. Each unit is responsible for reconnoitering its route to the SP and determining times of arrival and clearance of the SP. If the unit is displacing as a part of a battalion move, the SP is also the point at which control of the marching element is normally assumed by battalion.

Release Point. The release point (RP) gives the march column a common point for reverting to parent unit control. It should be on the route and recognizable on both the ground and the map. It is important that units disperse quickly from the RP. Again, separate routes should be used from the RP to the new area of each unit.

Critical Points. Critical points are points used for reference in giving instructions, places where interference with movement may occur, or places where timing maybe critical. Movement should continue uninterrupted through these critical points. Guides or signs may have to be used.

Checkpoints. Checkpoints are features identifiable on the ground and on the map. They are used in reporting progress along the route of march. They may be used as targets when planning fires for the defense of the convoy.

Restrictions. These are points along the route, such as bridges or intersections, where movement maybe limited or obstructed for specified periods of time. The planner must consider these restrictions and try to organize the move so that minimal interference occurs at these points.

Communications. Personal contact and visual signals are the usual methods of communicating on a road march. Radios should be used only in an emergency.

Traffic Control. Traffic control (TC) is the responsibility of the controlling headquarters. The military police (MPs) are usually employed at critical points along the route to give directions and minimize the delay caused by other columns civilian traffic, congested areas, or rough terrain. Road guides, posted by the quartering party, can help the MPs control traffic.

Speed Control. It is critical that the head of the column not exceed the authorized speed of the slowest vehicle in the column in order to reduce column whipping. All people involved must maintain the correct interval both between vehicles and between march units.

Halts. Halts must be made for rest, personal comfort, messing, refueling, maintenance, checking of equipment, allowing other traffic to pass, and getting back on schedule. The time and length of halts are detailed in the movement order or in unit SOPS. There are two types of halts:

- A **short halt** is usually taken for 15 minutes after the first hour and for 10 minutes every 2 hours from then on. March elements should stop at the same time, but it may be necessary to halt at a certain part of the route rather than at a fixed time.
- A **long halt** is planned in advance. Additional time must be allocated and added to the total travel time for a long halt. Locations are selected to allow all vehicles to clear the road and disperse. The area must be large enough to conduct all necessary activities such as refueling and maintenance and it must be defensible.

Planning Factors

Distance, rate of march and time factors form the basis for planning.

Distance. Distance factors include the following:

- **Vehicle distance** is the distance between two consecutive vehicles.
- **Column gap** is the space between two elements. It is calculated in length or time units measured from the rear of one element to the front of the next.
- **Traffic density** is the average number of vehicles in 1 mile or 1 kilometer of road. It is expressed in terms of vehicles per mile or kilometer.
- **Column length** is the length including gaps, of a column from front to rear.

Rate (Speed). Speed factors are as follows:

- **Speed** is the actual rate of speed of a vehicle at a specific moment. It is expressed in miles or kilometers per hour.
- **Pace** is the speed of a column set by the head vehicle to maintain the average speed prescribed in orders.
- The rate of march is the average distance traveled in a period of time. It includes short halts.

Time. Time factors include the following:

- **Arrival time** is defined as the time the head of a column arrives at a certain point.
- **Clearance time** is when the tail of the column passes a certain point.
- **Completion time** occurs when the last vehicle in a column passes the release point.
- An **extra time allowance (EXTAL)** of 1 minute per 25 vehicles is allotted over and above the calculated pass time. If there are fewer than 25 vehicles in total EXTAL is not added. If there are over 600 vehicles, 2 minutes per 2.5 vehicles is allotted.
- The **pass time (PST)** is the actual time between when the lead vehicle (veh) passes a given point and when the last vehicle passes the same point.
- **Time distance (TDIS)** is the time needed to move a certain distance at a given rate of march.
- **Road clearance time (RCT)** is the total time a column needs to clear a section of road (RCT = time distance + pass time.)
- A **time gap** is the time aspect of the column gap.

Planning Formulas

The basic factors used in movement planning are distance, rate of march (speed), and time. If the planner knows two of these factors, he can deduce the third by using simple mathematics. Suppose the planner wants to determine the rate of march. He would use the formula $R = D/I$, in which R is rate, D is distance, and T is time. To find distance, the formula is $D = R \times T$; to find time, it is $T = D/R$. These formulas give us information about the basic factors of rate, distance, and time. The march planner needs to know additional information. As the composition of each column is different, the march planner must determine pass time, time distance, arrival time, and completion time.

Pass time can be determined by using the formula:

$$PST = \frac{\text{number of veh} \times 60}{\text{density} \times \text{speed}} + \frac{\text{number of veh}}{25} + \text{time gaps}$$

Time distance is found by using the formula:

$$TDIS = \frac{\text{Distance (miles or km)}}{\text{Rate of march (mph or kmph)}}$$

The release point is normally the terminal point of movement. Arrival time at the RP is computed by adding time distance and long halts to the start time. If the unit

passes the SP at 1000 and its time distance was 6 hours and 30 minutes and there was one long halt of 1-hour duration, the planner would add these and derive an arrival time of 1730.

Completion time is calculated by adding pass time to arrival time or by adding time distance pass time, and halts to the start point time.

Dissemination of Movement Plan

Once planning for the road march is complete, the plan must be disseminated and briefed. This is achieved through the use of a movement order, which is a type of OPORD. The order covers the friendly and enemy situations, destination routes, rate of march maximum speed details of air and ground alert guard halts, vehicle distance, time gap, start point, release point, critical point, service support, and command and control. Other data such as route markers may be included as necessary. Many of the items could be covered in unit SOPs and need not be repeated in the movement order.

A **strip map** or sketch of the route is usually included as an annex to the movement order. All key personnel, to include each driver, should receive a strip map. It should show the start and release points, restrictions, and critical points with the distance shown between each.

A **road movement table** is another annex to the movement order. It is a convenient way of sending essential information to subordinate units. It consists of two parts. One part, the data paragraphs, shows information pertaining to two or more march elements, a list of march units, and all other information arranged in tabular form. The other part breaks information into specific march units and could include number of vehicles, load class of the heaviest vehicle, points of departure and destination route, route to SP, critical point, and route to the destination from the RP. A remarks column is included to cover any details not shown elsewhere.

OCCUPATION

The following actions should be considered in occupation of a position:

- Site weapons and equipment to make use of the natural cover and concealment provided by the terrain and man-made features. See FM 5-103 for additional information on using terrain to enhance survivability.
- Camouflage vehicles and installations to deny the enemy direct observation of the locations and activities of friendly units.
- Maintain camouflage, noise, and light discipline.

Ž Select weapon locations behind hill masses or near buildings or trees to preclude direct observation and to reduce the signature effect of firing.

Ž Use remote radios and sensors.

Ž Ensure wide dispersion between and within units.

Dispersion

Battalion and battery commanders should disperse their units during mid- to high-intensity warfare or anytime the primary threat to the unit is indirect fire or air attack. Dispersed units are less likely to be squired and are more likely to survive air or indirect fire attack if they are dispersed. Automated fire control (TACFIRE) allows commanders to quickly mass fires of widely dispersed firing units. In low- to mid-intensity conflict, or anytime dismounted ground attack is the primary threat, consolidation of units or elements of units into tight defensive perimeters is indicated. See FM 6-50 for further discussion.

Occupation of Built-Up Areas

Digging in to harden a position is limited by equipment and personnel available to the commander. The existing terrain structures, cover, and concealment should be used whenever possible. In this regard, use of urban terrain becomes critical.

Advantages. Some of the advantages of occupying built-up areas are discussed below.

A built-up area provides fortified positions and overhead protection. Urban positions provide some measure of ready-made protection in the form of concrete and brick buildings and structures. Through intelligent and innovative positioning of equipment, the existing terrain can provide a measure of protection without significant preparation or resource expenditure. Some degree of protection against indirect fires is afforded by the buildings themselves (indirect fire dead space) and by the use of cellars, basements, large buildings, and underground structures to provide overhead cover without expending manpower or resources. Supplies vehicles, and maintenance facilities may be positioned in buildings not suitable for TOCs and howitzers. This enhances the unit capabilities and provides camouflage and concealment for down-loaded unit equipment and supplies. Cellars may be used to provide crew quarters for rest and meals. However, great care must be taken in an NBC environment because cellars may become traps for certain chemical agents, such as phosgene, mustard gas, and thickened nerve agents, which are heavier than air. This also applies to sewers and subways.

Enemy target-locating capabilities are degraded. The enemy's TA capabilities are significantly degraded because of the effects of terrain masking on observation. The inherent heat and noise signatures of the cities mask sound ranging and infrared (IR) detection systems. The inherent frequency modulated (FM) emissions make radio direction finding (RDF) difficult. Conventional photographic reconnaissance is more difficult because there is a greater demand on image interpretation with the clutter of an urban landscape. It is easier to hide in an environment where the unit equipment is less out of place than in a rural and more natural environment.

The use of existing support facilities in the urban environment relieves some of the pressure on the unit to provide these services itself. Facilities such as electrical power, building materials (Class IV), plot maps (civilian survey), underground sewers, communications, and water (if potable) are valuable assets to a firing unit.

The existing telephone system underground tunnels, and local authorities (police and local defense or government) can be used to enhance the ability of the unit to communicate. This alleviates some of the reliance on FM communication, which may be significantly degraded by the buildings. Also, reduced use of FM radio may allow the unit to operate undetected for a longer period of time. Roads, canals, railways, subways, and airfields can be used to enhance mobility and to resupply units.

Competition for key terrain is reduced. Where there is a choice between occupying rural and urban terrain, maneuver normally prefers the open ground. There it can use fields of fire at the maximum range of its organic small arms. Artillery can occupy urban terrain without significant reduction in its range capabilities. Firing units occupying urban terrain leave more open terrain for another unit to occupy.

Disadvantages. Some of the disadvantages of occupying built-up areas are discussed below.

Usually these areas are on likely avenues of approach. To enhance survivability artillery normally avoids positioning along likely enemy avenues of approach. In urban combat, this may often not be possible because every road or alley is a possible avenue of approach. This fact must be considered in positioning of firing units. All available obstacles, such as overturned cars, buses, trucks, railway cars, and demolished structures, must be used to delay any enemy approaches into the area. This must be closely coordinated with maneuver so as not to impede friendly movement.

Any unit deployed in urban terrain is vulnerable to human intelligence (HUMINT) and sabotage activities. It is more

susceptible to sabotage and observation by civilians and spetsnaz forces because of the difficulty in securing a firing unit location due to the lack of a contagious perimeter.

Survey is more difficult. A unit not equipped with PADS will have difficulty with magnetic interference as a result of metallic structures. There is an increased requirement for M2A2 aiming circles because of line-of-sight problems. There also are line-of-sight problems from the aiming circle to guns and other aiming circles.

Communication with higher and supported units by FM radio is significantly degraded because of line-of-sight problems. Careful siting of antennas and retrans stations may be required to overcome the problem. Also, use of high-frequency (HP) backup sets may be necessary.

Artillery firing units may find themselves surrounded by enemy forces as the result of the nonlinear nature of urban combat. The firing unit must be prepared to defend itself against enemy assault while performing its primary role of delivering fire support. Depending on availability, a maneuver squad or platoon not committed elsewhere may be required to provide local security for a firing unit. However, it is likely that an artillery battery must be prepared to prevent a breach in the line by defending its own position against enemy ground assault. The German army found these tactics necessary on the Eastern Front during World War II, with thinly spread forces and fluid FLOTs. This means that firing batteries must be trained and equipped to build barricades to prepare demolition to lay minefield, and to prepare Claymores and booby traps.

Positioning artillery units near urban structures may create site-to-crest problems. The height of some of the buildings along the gun-target line directly in front of the battery position may have to be reduced to avoid the use of high-angle fires. Otherwise, the XO or platoon leader must plan to fire with fewer than the normally required number of guns on some missions, since some howitzers may be masked for some targets. In this case, the remaining guns must make up the shortfall in rounds required.

Lay and occupation times are increased as a result of movement, construction, spade emplacement, and the ability to see aiming circles. Multiple aiming circles may be required to lay a battery or platoon. Furthermore, the use of other lay techniques, such as referring between pieces, will be difficult because howitzers may not be able to see each other.

Displacement may be difficult because of the rumbling effect and the width of roads in the urban area.

In addition to site-to-crest problems, individual sections may have difficulty traversing and elevating tubes because of interference of buildings.

Location of the Battalion Tactical Operations Center

The FA battalion TOC within the CP should consist of those sections the battalion commander needs to adequately control his battalion and to maintain proper coordination and communications links with the supported units. The battalion commander may not be physically located at the TOC consistently, since his duties as the senior FSCoord often may require his presence elsewhere. The HHB commander and first sergeant (1SG) are responsible for the security and logistical support of the TOC as part of the CP. For this reason, the TOC is normally located near the combat trains, and these two facilities may be collocated. The battalion TOC may consist of but is not limited to the following:

- S3.
- Ž S2.
- Ž Operations and intelligence sections.
- Fire direction section (that is, FDC).
- Ž RSO and survey section.
- Communications (BS) and a radio repairman).

Options for the positioning of the TOC are discussed below.

Option 1 – Forward. Position the TOC to provide accessibility to both the batteries of the FA battalion and the supported maneuver unit TOC. Movements would be based on the C2 requirements of the FA battalion and the movement of the maneuver TOC.

Option 2 – Vicinity of the Supported Unit Command Post. Position near the maneuver TOC with selected elements (S2, targeting officer) collocated with the brigade FSO. The headquarters element normally would be no more than 5 km from the maneuver TOC. To maintain this positioning posture, the FA battalion commander must consider the requirement to move when the maneuver TOC moves.

Location of Battalion Trains

Battalion trains consist of the following facilities:

- Ž Mess.
- Administration.
- Supply.
- Ammunition.

Ž Medical.

Ž Maintenance.

The battalion trains may be organized as field and combat trains or as unit trains. Field or unit trains are generally collocated in the brigade support area, and the combat trains are positioned as far forward as possible. For further discussion of trains organization and positioning see Chapter 7.

SURVIVABILITY

If the cannon battalion is to provide support in both present and future operations, it and its subordinate elements must survive. The planners and executors within the battalion must consider a number of factors when seeking to enhance the survivability of the unit while providing support to the maneuver unit. Some of those factors are discussed below.

Positioning

When positioning, units should occupy locations off high-speed avenues of approach. Artillery units are ill-suited to direct fire battles and should seek to avoid them.

Mutual Defense

Battalions must integrate their defenses to provide early warning and mutual defense. Battery defenses are successful when they are organized to provide—

- Ž Early warning.
- A reaction force.
- Fighting positions around work areas.
- Assigned sectors of fire integrated to cover the area and to avoid fratricide.

The battalion S2 has staff responsibility for supervising and integrating battery defenses into a battalion scheme of defense. The battery 1SG is the responsible individual at battery level.

Position Improvement

Position improvement must be continuous and to standard. No relaxation of standards should be permitted. Position improvement begins on occupation and continues until the unit receives the order to displace. Soldiers should prepare individual and crew-served weapon fighting positions with at least 18 inches of overhead cover. All vehicles and equipment, to include tents, should be camouflaged. Noise and light discipline must be rigidly enforced.

Immediate-Action Status

Immediate-action status should be specified. This status gives battery commanders clear guidance on the flexibility they have to respond to enemy activity. There are two immediate-action states remain in position and displace to alternate positions. One of these two states should be specified for each type of threat—ground attack (dismounted), ground attack (mounted), air attack and counterfire. Unit SOPs should clearly state battery and platoon actions for hasty displacement and survivability movements. The SOPs must address procedures for movement, reports, and requests for permission to displace. In automated units, TACFIRE procedures should be emphasized to ensure the battalion FDC is aware when a unit displaces and is not available for massing of fires.

Air Defense

Enemy aircraft represent a major threat to the survivability of the cannon battalion. The battalion has little air defense capability beyond its organic small arms. The actions discussed below can aid the unit in countering the air threat.

S2s must prepare IPB in three dimensions. Air avenues of approach and the type of aircraft the enemy is likely to use must be identified and briefed to the commanders.

Units must take advantage of incidental coverage. Few cannon battalions have organic air defense sections. They must rely on incidental coverage from AD units deployed in the area. Maneuver FSEs must keep the battalion informed of the location and type of AD units in the supported unit sector.

Air defense warnings and weapons control status must be disseminated within the battalion.

Battalions must rely on good passive defenses supplemented by organized small-arms air defense. A good camouflage plan, rigidly enforced by the chain of command is the best defense a unit has against acquisition and engagement by hostile aircraft. Active air defense (small-arms engagement) is a self-defense measure only. Artillery units should not call attention to themselves by engaging aircraft not actively attacking them.

Soldiers must know the capabilities of their weapons and the techniques for successful small-arms air defense. Massed small-arms fire is effective in deterring an enemy aircraft from aggressively pressing an attack.

CONSIDERATIONS FOR COMMAND AND CONTROL OF BATTERIES

The mission of the cannon battalion is to provide responsive fire support to the maneuver commander. To do this, an efficient, flexible, and positive C2 system must be established for the basic firing unit of the cannon battalion the cannon battery. The internal structure of the batteries, combined with an extended communications network allows positive command and control at all times, regardless of whether the battalion is organized under the battery-based or platoon-based concept.

In a battery-based unit, command and control of the firing battery are provided through the battery commander and the battery operations center (BOC). The BOC is the battery focal point for operations.

In a platoon-based unit, the requirement for functional C2 exists at both battery and platoon levels. In the platoon, this requirement is met by the platoon operations center. The POC is nothing more than the FDC with added operational responsibilities. The commander of the platoon-based unit must also provide for a single point of contact for C2 of the battery. However, since this battery has neither the personnel nor the equipment to establish a separate BOC, the commander normally does this by designating an element within the firing battery, normally one of the POCs, to perform the battery operations function. This designated POC handles all the tactical and logistical information and personnel and maintenance reports for the battery as a whole.

Positioning and displacement will vary between units on the basis of METT-T and the structure under which the battalion is organized. When the battalion positions batteries by platoon, the platoons normally remain close to each other, that is, within 400 to 1,600 meters. This makes control of the firing battery easier for its commander, promotes mutual defense for the two position areas, and eases the resupply of all classes of supply from the battery or battalion trains. Under normal operations, the battalion continues to recommend areas for positioning or goose eggs, for each firing battery rather than for each platoon. However, such goose eggs should be large enough to provide primary and alternate positions for both platoons.

For a detailed discussion of command and control and positioning of the cannon battery, see FM 6-50.

CHAPTER 4

DELIVERY OF FIRES

This chapter addresses those functions of the FA battalions that are directly associated with the delivery of fires. Specifically, it encompasses tactical and technical fire direction.

The delivery of field artillery fires depends on—

- *Locating an appropriate target*
- *Analyzing that target to determine the proper method of attack (tactical fire direction).*
- *Converting the call for fires into gun data (technical fire direction).*
- Ž *Delivering the required ordnance on the target to meet the needs of the supported maneuver commander.*

Whether this is done manually or through an automated system (TACFIRE), the process is the same. Automating tactical and technical fire direction does not change what we do but how we do it.

TACTICAL FIRE DIRECTION

Tactical fire direction is the process that results in a fire order. A fire order is the fire direction officer's decision on whether and how a target will be attacked. Specifically, it answers these questions

- Ž Location of the target. Is it safe to fire? Is it within range? Are there intervening crests? Can the target be attacked?
- Ž Nature of the target. How large is it? What is its degree of protection?
- Ž Ammunition available. What do the batteries have on hand to fire?
- Firing units available. Who is in range and ready to fire?
- Commander's guidance and/or SOP. What do we want to do to the target?
- Ž Request for fire. What did the observer ask for? Can the battalion give it to him? Should the battalion give it to him?
- Munitions effects. Given the ammunition available, nature of the target and commander's guidance, how should the target be attacked?
- Tactical situation. When should the battalion fire? Are special instructions required?

The objectives of tactical fire direction areas follows:

- Ž Provide continuous accurate and responsive fire support under all conditions.

Ž Maintain the flexibility to engage all types of targets over wide frontages.

Ž Mass the fires of all available units quickly.

Ž Engage a number and variety of targets simultaneously.

TARGET ANALYSIS

Target analysis is the examination of a potential surface target to determine the most suitable weapon, firing unit, ammunition, and method for attacking the target.

As they are received in the FDC, targets should be analyzed and tactical fire direction should be initiated. The analysis of a target is valid only for the level at which it is performed. For example, a battalion FDO might consider an automatic weapon an insignificant threat to the brigade mission. However, the same weapon might be of critical importance to the battery or platoon FDO of a firing battery whose priority of fire is to a maneuver company team in contact.

The amount of time devoted to target analysis and the thoroughness of the analysis depend on the following:

- Ž Amount of target information.
- Ž Availability of weapons to attack the target.
- Urgency of the engagement.

Precedence of Attack

When an FDO receives a fire mission, he has the following options:

- Attack the target immediately.
- Defer attacking the target until an existing fire mission is complete.
- Pass the fire mission to another fire direction center.
- Cancel the mission.

An FDO selects a particular precedence of attack after considering the following:

- Target Characteristics.
- Target location.
- Terrain.
- Weather.
- Commander's criteria.

Target Characteristics. Targets vary considerably in composition, degree of protection, shape, mobility, and recuperability. Targets can be divided into four categories as shown below. These categories simplify the comparison of effectiveness of particular weapons and rounds. Examples are listed for each category. Under certain conditions, some examples could be listed in more than one category. For example, a motorized rifle battalion could be listed under the first category and the third category.

CATEGORIES OF TARGETS

| CATEGORY | EXAMPLE |
|--------------------------|--|
| Area (personnel) | Squad Platoon Battery Company |
| Small (personnel) | Observation post Small patrol Command post |
| Area (materiel) | Armored formation Truck park Ammunition dump |
| Small (materiel) (point) | Tank Armored personnel carrier Bunker, machine gun |

For personnel targets in particular, the posture of the target is extremely important. Normally, target postures used to describe personnel targets are standing, prone, and in fighting positions. In describing the posture of a target, consideration must be given to the protection afforded by the terrain. For example, an infantry platoon may be attacking in a standing posture. However, irregular terrain may provide protection equivalent to the prone position.

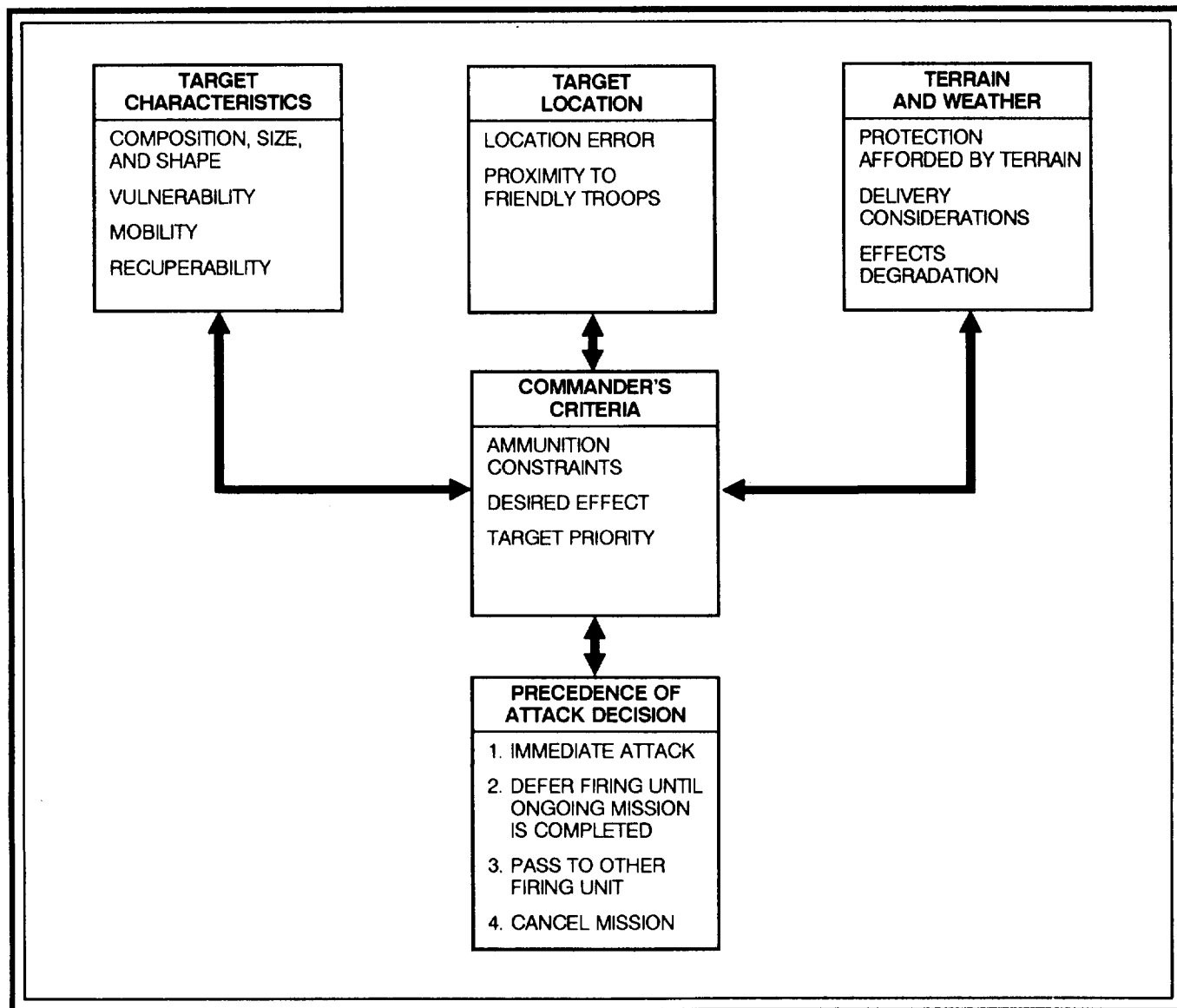
Normally, personnel targets will seek a more protective posture during an engagement, for example, from a standing to a prone position. This change is called posture sequencing. Posture sequencing causes considerable degradation of effects as additional volleys are fired. This is the reason for the continual emphasis on surprise or first-round fire-for-effect (FFE) missions. For the purposes of analysis, personnel targets in the offense are considered to be one-half standing and one-half prone during the first volley of fire and all prone for subsequent volleys. In a defensive configuration, personnel targets are considered to be one-half prone and one-half in fighting positions during the initial volley and all in fighting positions for subsequent volleys.

A target must be analyzed to determine its weak points. Where the target is most vulnerable and what fires will best exploit its weaknesses are influenced by the degree of damage desired. Often there is a tendency to overkill the target when less combat power would suffice. On the basis of the commander's criteria the FDO must ascertain the degree of effects needed (destruction, neutralization, suppression) to support the tactical plan. The acceptable degree of damage is the level that yields a significant military advantage. For example, fire from a heavily protected machine gun emplacement may be silenced by obscuration through smoke and subsequent engagement by direct fire as opposed to the expenditure of an excessive number of high-explosive (HE) rounds required for destruction.

Target Location. The proximity of the target to friendly troops and the accuracy of the target location must be weighted. The importance of certain targets that are not accurately located may justify the fire of several units to ensure coverage. Danger close (nearer than 600 meters to friendly positions) missions may preclude the use of a specific weapon or caliber.

Terrain. The terrain in the target area has a direct effect on the vulnerability of the target. Rugged terrain affords considerable natural cover and makes target location difficult. Certain terrain provides complete protection from some angles of approach but not from others. Thus it influences the unit and munitions to be employed. The type of vegetation in the target area should be considered in the selection of ammunition.

DETERMINING THE PRECEDENCE OF ATTACK



Weather. Weather is of little consequence in evaluating a target to be attacked with fuze quick. However, precipitation and wind are of particular importance in evaluating a target to be attacked with improved conventional munitions (ICM), smoke, or FASCAM or when illuminating projectiles are used. Low clouds, thick fog surface water, and rain degrade the effectiveness of variable time (VT) fuze M513/M514.

Commander's Criteria. All phases of target analysis are conducted within constraints established by the commander. In determining the precedence for attacking a

target, primary consideration should be given to the commander's target priorities. On the basis of ammunition constraints, a commander will also specify the type of effects he desires against specific target categories. The three target effects categories – suppression, neutralization, and destruction – are described below.

Suppression. Suppression of a target limits the ability of enemy personnel to perform their mission. Firing HE, fuze VT reduces the combat effectiveness of personnel and armored targets by creating apprehension or surprise and causing tanks to button up. Smoke is used to blind or

confuse. The effect of suppressive fires usually lasts only as long as the fires are continued. This type of fire is used against likely, suspect, or inaccurately located enemy firing units. It can be delivered by small delivery units or means and requires little ammunition.

Neutralization. Neutralization of a target knocks the target out of the battle temporarily. Casualties of 10 percent or more will neutralize a unit. The unit will become effective again when the casualties are replaced and damage is repaired. Neutralization fires are delivered against targets located by accurate map inspection, by indirect fire adjustment, or by a target acquisition device. The assets required to neutralize a target vary according to the type and size of the target and the weapon-ammunition combination used.

Destruction. Destruction puts the target out of action permanently. Thirty percent casualties or materiel damage inflicted during a short time span normally renders a unit permanently ineffective. Direct hits are required to destroy hard materiel targets. Targets must be located by accurate map inspection, by indirect fire adjustment, or by a target acquisition device. Destruction usually requires a large amount of ammunition from many units. Use of artillery weapons for destruction of armored or dug-in targets is not economical.

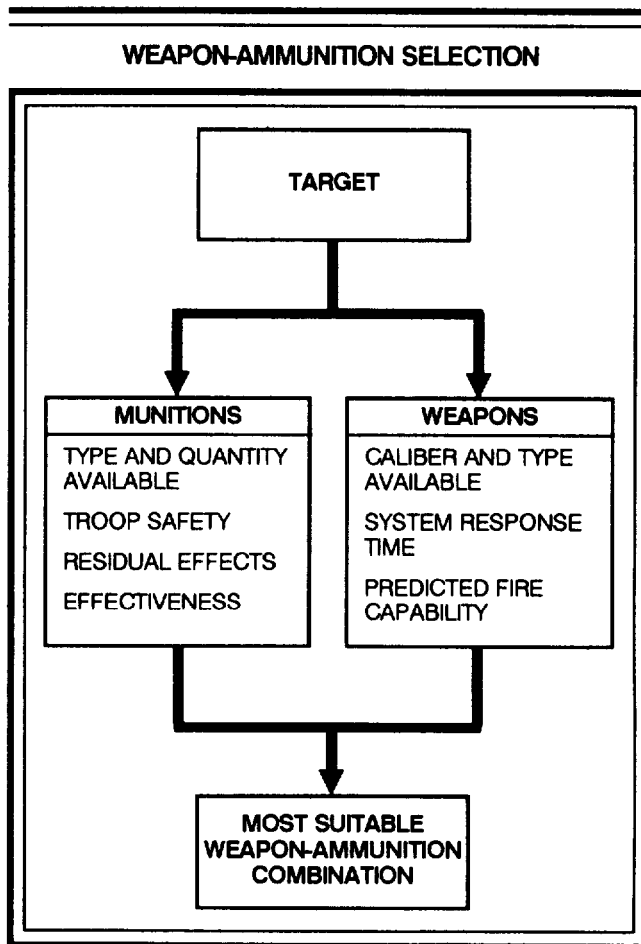
Most Suitable Weapon and Ammunition

When an FDO decides to attack a target, he must select a weapon-ammunition combination that can achieve a desired effect with a minimum expenditure of available ammunition stocks.

Munitions. The following are considerations in determining the most suitable ammunition.

Type and Quantity Available. The nature of the target and its surroundings and the desired effects dictate the type and amount of ammunition to be used. For a detailed discussion of ammunition and fuzes, refer to FM 6-141-1 and (C) FM 6-141-2. The ammunition resupply system may sometimes rule out the best ammunition selection. For example, extensive smoke fires may be needed to screen maneuver movement, but such fires would probably cause a resupply problem. Some types of fires require more ammunition than others. Suppression and neutralization fires usually use less ammunition than destruction fires.

Troop Safety. Troop safety is a major concern in considering the weapon-ammunition selection for firing close-in targets. The FDO must ensure that fires do not endanger friendly troops, equipment, and facilities.



Residual Effects. Residual effects from special ammunition may influence whether a friendly unit can occupy an area. Use of FASCAM may change the direction of movement of supported elements. Conditions may be hazardous for supported troops occupying an area immediately after an attack with certain munitions. The incendiary effects of munitions may make areas untenable for supported forces. These effects can also deny the enemy use of selected terrain.

Effectiveness. When properly delivered against appropriate targets, artillery fire support can be the decisive factor in a battle. The FDO must ensure that maximum effectiveness is attained from every mission fired. To match a munition to a target, the FDO must know what damage a munition can produce and the damage required to defeat a target. The lethality of a munition must be matched to the specific vulnerability of the target. Thus, the FDO must understand the damage potential (blast, cratering, fragmentation, incendiary, and penetration) of specific munitions. Weather changes may change choices of certain munitions (for example, smoke, illuminating, or Copperhead). Specific

information regarding the effects of various munitions is in the appropriate joint munitions effectiveness manual (JMEM), FM 6-141-1, and (C)FM 6-141-2.

Weapons. The following are considerations in determining the most suitable weapons.

Caliber and Type Available. In certain instances, an FDO may control the fires of reinforcing or GSR units that are firing a different caliber. The FDO must have a thorough knowledge of the characteristics, capabilities, and vulnerabilities of each weapon system. Weapons that have slow rates of fire or poor delivery accuracy are suited for long-range fires. Weapons that have rapid rates of fire and/or good delivery accuracy are suited for close fires.

System Response Time. An FDO must ascertain the urgency of each fire mission his FDC receives. Small and medium weapons have a quicker firing response time than heavy weapons. Fire missions sent by the DS battalion to reinforcing or GSR units require more processing time than those sent directly to the firing batteries of the battalion.

Predicted Fire Capability. The FDO must know the current survey, registration, and met status of all firing units under his control. The FFE missions should be assigned to units that have the best predicted fire capability.

Method of Attack

The next step in the FDO's target analysis is the selection of a method of attack. The FDO must select a method of

attack that ensures target area coverage and desired target effects. To determine the best method of attack, the FDO must consider aiming points and density and duration of fires.

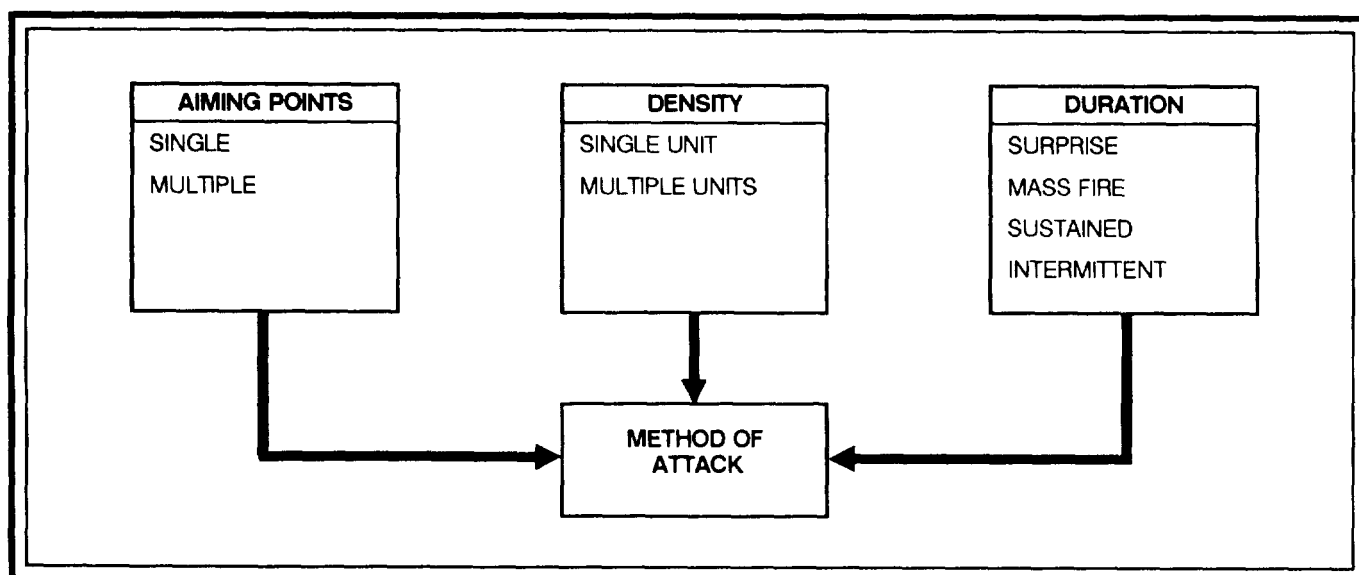
Aiming Points. Normally, the size of the area to be attacked depends on the size of the target or the size of the area in which the target is known or suspected to be located. A single aiming point in the center of the target is used to attack small targets. For attacking large targets, multiple aiming points must be designated to distribute the fires and ensure adequate coverage. TC 6-40 gives procedures for establishing multiple aiming points.

Density and Duration of Fires. Intense fires of short duration generally produce the best effects on a target. However, the tactical situation may require that fires be continued over a longer period of time. Some examples are screening smoke fires, continuous illumination fires, and suppressive fires supporting a maneuver final assault on an objective.

Weapons Effects

The most important step in performing a target analysis is determining the number and type of rounds required to produce the desired effects on a target. The battalion or battery FDO determines attack data by referring to the appropriate JMEM, by using the graphical munitions effectiveness tables (GMET), or by relying on experience.

CONSIDERATIONS IN SELECTING A METHOD OF ATTACK



Joint Munitions Effectiveness Manuals. Effectiveness tables published in JMEMs for surface-to-surface weapons (JMEM/SS) provide guidance for determining the expected fraction of casualties to personnel targets or damage to materiel targets. The JMEM/SS are published as field manuals. The manuals currently available for all systems are listed in FM 6-141-1. The basic data for these manuals were obtained from test firings actual combat performance, and mathematical modeling. Using JMEMs to determine attack data requires considerable time. Because of time constraints, use of JMEMs at battalion and battery FDC levels for engaging targets of opportunity is not recommended. The effects data included in these manuals incorporate reliability, delivery accuracy, and munitions lethality against a representative spectrum of targets. The computational assumptions, defeat criteria, and instructions for use are included in each manual.

CAUTION

There is no assurance that the expected fraction of damage or casualties will be provided by any number of volleys in a given situation. Although not precisely within the mathematical definition, the method of averaging data used for the tables will result in less damage being realized for approximately 50 percent of the rounds and, conversely, greater damage for the other 50 percent of the rounds.

Graphical Munitions Effects Tables. FM 6-141-1 and (C) FM 6-141-2 provide doctrine for target analysis procedures and the employment of weapons systems. The JMEMs provide excellent effectiveness data. However, the usefulness of these publications to the FDO during tactical operations is limited by their volume, the lack of accessibility (FM 6-141-2 is classified), and the difficulty in comparing ammunition and weapon systems. The GMETs overcome these limitations by providing quick access to average comparative values for selected situations. The FDO may use these as a guideline in making engagement decisions. Using GMETs in making manual tactical fire direction decisions is highly recommended. The following GMETs are available:

- NSN 1220-01-121-7278(C), Scale, Graphical Munitions Effects (GMET-JMEM) for M102(U).
- NSN 1220-01-021-7279(C), Scale, Graphical Munitions Effects (GMET-JMEM) for M109A1(U).
- NSN 1220-01-021-7277, Scale, Graphical Munitions Effects, Training (GMET-JMEM).

NOTE: These tables are expendable items authorized by common table of allowances (CTA) 50-970.

The unclassified GMET (training edition for medium artillery) generally requires slightly greater expenditures of ammunition than the M109A1 GMET in a given situation.

NOTE: A detailed discussion of target analysis and use of the JMEMs and GMETs is in TC 6-40.

AUTOMATED TACTICAL FIRE DIRECTION

The delivery of field artillery fires is significantly enhanced through the use of TACFIRE. The TACFIRE links the FA battalions with the supported or reinforced unit, automates tactical fire direction functions, automates fire planning and has a technical fire direction capability. TACFIRE can process and disseminate the following:

- Conventional, chemical, and nuclear fire plans.
- Target information.
- Fire missions generated from incoming target intelligence.
- Fire support coordinating measures and other forms of battlefield geometry.
- Ammunition and fire unit data.
- Comprehensive and timely analysis of fire support capabilities.
- Safety parameters for key installations, critical terrain, and exposed friendly units.
- Messages of interest of selected computer actions to elements equipped with variable format message entry devices (VFMEDs).
- Firefinder WLR zones.

Although TACFIRE can perform all of the above functions, only tactical fire direction is discussed here. In a unit equipped with TACFIRE, tactical fire direction is highly centralized while technical fire direction is decentralized. In light units, light TACFIRE (LTACFIRE) will provide many of the same capabilities.

Parameters

The first step in tactical fire direction involves establishing parameters in the TACFIRE computer. These parameters are input during initialization of the computer and include the general area of operations (map data) and the tactical

data base. The tactical data base includes information from unit contingency plans such as fire support coordinating measures (geometry), ammunition status (basic load), and fire unit locations. Commander's criteria regarding attack methods, percentage of effects desired, priority of selection of fire units, and exclusion of any fire unit and/or shell-fuze combination are also included.

Files

The TACFIRE computer is simply a device that produces a fire order. For the computer to do so in a manner consistent with the maneuver commander's intent for fire support, four files in the computer must be kept current and accurate:

- Support geometry (SPRT;GEOM).
- Ammunition and fire unit (AFU).
- Fire mission modification (FM;MOD).
- Attack methods (FM;ATTACK).

Support Geometry. The support geometry file must be set up so that it is complete down to task-force level. Airspace coordination areas (ACAs) and air corridors should be included. No-fire areas (NFAs) and free-fire areas (FFAs) must be kept current and are deleted when no longer effective. Coordinated fire lines are important permissive measures, and must be included in the file. The O&I section should help the FDC obtain and input these measures.

Ammunition and Fire Unit. The importance of the AFU file cannot be overstated. Fire unit locations, weapon strength, and ammunition counts are critical factors in making the decisions involved in tactical fire direction. The O&I section must take the lead in making certain the firing units keep current information in the AFU file.

Commander's Criteria. The two other files (FM;MOD and FM;ATTACK) that are critical to the tactical fire direction process are included in commander's criteria. Commander's criteria are crucial to the effective implementation of automatic data processing with TACFIRE. Through commander's criteria, TACFIRE conforms to the commander's desires of how things should be done. Commander's criteria are not just established during initialization and then forgotten. They must be carefully and thoughtfully derived because of the effect they will have on tactical fire direction decisions. The parameters of the commander's criteria must be continuously reviewed as the battle develops. The master tape contains all the information available in the JMEMs concerning the amount and type of ammunition and the optimum number of units to fire (massed fires) for a

particular target. This information enables the computer to select the best ammunition for a particular target. If the commander wants to reserve a certain ammunition for future use or to vary the JMEM data, that guidance should be converted into commander's criteria statements and input into the computer. Once they have been established, the computer implements the criteria without delay in mission processing. As the situation changes, guidance changes and the commander's criteria should be changed. Moreover, commander's criteria may be overridden manually anytime an urgent situation warrants it.

Commander's criteria can be very specific. When a target of a given type is received, the computer determines whether the target should be defeated on the basis of multiple volleys from one or more firing units or on the basis of the percentage of effects desired. A hardened target, such as an OP in a bunker, normally will be selected for attack on the basis of volleys. A soft target, such as personnel in the open, normally will be selected for attack on the basis of percentage of casualties desired. The maximum number of volleys the computer should use in analysis before considering another firing unit can be specified in the commander's criteria. Commander's criteria can also specify the percentage of effects desired. The commander may influence the priority of fire mission processing by specifying his desires. If he wants priority of fires to a specific maneuver battalion during an operation that parameter may be specified by identifying the unit's zone of operation. Then whenever a request for fire is received by TACFIRE and the target location is within the zone of the specified battalion, that fire request is moved to the front of the fire mission queue in the computer for the FDO's immediate review. Similar priority maybe set for a zone, a shell-fuze combination, or a target type. TACFIRE takes into account the various parameters, effectively controlling up to 15 fire units.

The two critical files specifically concerned with commander's criteria are the FM; MOD and FM;ATTACK files. Neither of these files should be fixed by unit SOP; rather, they must be developed for each operation or phase of an operation. The maneuver commander will probably be unable to establish the specific parameters for his supporting artillery. The FSCOORD and his staff must analyze the guidance they receive from the maneuver commander and develop the appropriate entries.

The PZONE field captures the priority of fires. The PTYPE captures high-payoff targets. The PSHEL captures high priority munitions, such as illumination for a night defense or smoke for a movement to contact. These fields will change from operation to operation or even from phase to phase in a single operation. Attack guidance is

determined for each individual target type and is based on the effects the maneuver commander wishes to achieve and the availability of firing units and ammunition,

In addition to automating tactical fire direction, TACFIRE automatically prepares a request for additional fires (RFAF) whenever the volume of fire (volleys or effects) specified by commander's criteria cannot be met. This RFAF is sent to a reinforcing artillery battalion, if available, or to division artillery. Also, an initial request for fire can be handed off to the reinforcing battalion.

It is essential that the FDO continually assess and adjust commander's criteria during the course of tactical operations. Changes in the tactical situation may make assumptions and guidance that were valid earlier inadequate or even dangerously wrong. If anticipated ammunition fails to arrive, firing units are lost, or new. Threat units or equipment arrives in the supported unit's sector, the parameters in the TACFIRE computer must be adjusted. In a manual environment, this process is no less important, but it is much less easily overlooked. The FDO must aggressively seek new guidance from the FSCoord and adjust the commander's criteria to reflect current reality.

MANUAL BACKUP FOR TACFIRE

The backup to automated tactical fire direction procedures with TACFIRE is manual fire direction. However, a battalion TACFIRE shelter is not designed to accommodate a manual FDC, and the battalion has neither the personnel nor the equipment to maintain a fully capable backup manual FDC. If the battalion either elects or is forced to go manual, this situation must have been carefully planned and prepared for long before the requirement. A battalion FDC can establish manual operations more easily if it keeps the following tools on hand:

- A current fire order standard. Issuing a correct fire order will greatly reduce confusion and errors.
- Written attack guidance. The JMEMs and GMETs are too cumbersome to be useful in a fluid tactical situation.
- A current ammunition count for the firing units. This includes projectiles, propellants, and fuzes by lot.
- A current situation map. As a minimum, the following information must be clearly and accurately displayed:
 - Maneuver boundaries.
 - Firing unit locations.
 - Fire support coordinating measures.
 - The FLOT.

- Observer locations

• Range fans or the range-deflection protractor (Graphical Training Aid [GTA]6-5-1) for checking ranges.

NOTE: A detailed discussion of TACFIRE operations is in TC 6-40A,

CONTROLLING FIRES

Massing all available fires enables the artillery to inflict maximum damage on the enemy with a minimum expenditure of ammunition. It also reduces the vulnerability of the firing unit to the enemy's target acquisition capabilities. Failure to mass fires gives the enemy time to react and seek protection. A clear understanding of the maneuver commander's intent for fire support and an accurate commander's criteria input into the TACFIRE computer are key to determining how much mass is enough. Every mission received must be evaluated in the light of the commander's criteria, and sufficient mass fire should be employed to achieve the effects required. If the FDO consults the JMEMs or accepts the TACFIRE-generated gunnery solution he will discover that most targets worth engaging should be engaged with volleys from one or more battalions. In most cases, engaging a target with a single battery or platoon results in piecemealing the artillery. More individual targets are fired, but the desired effects are achieved on few, if any, of them.

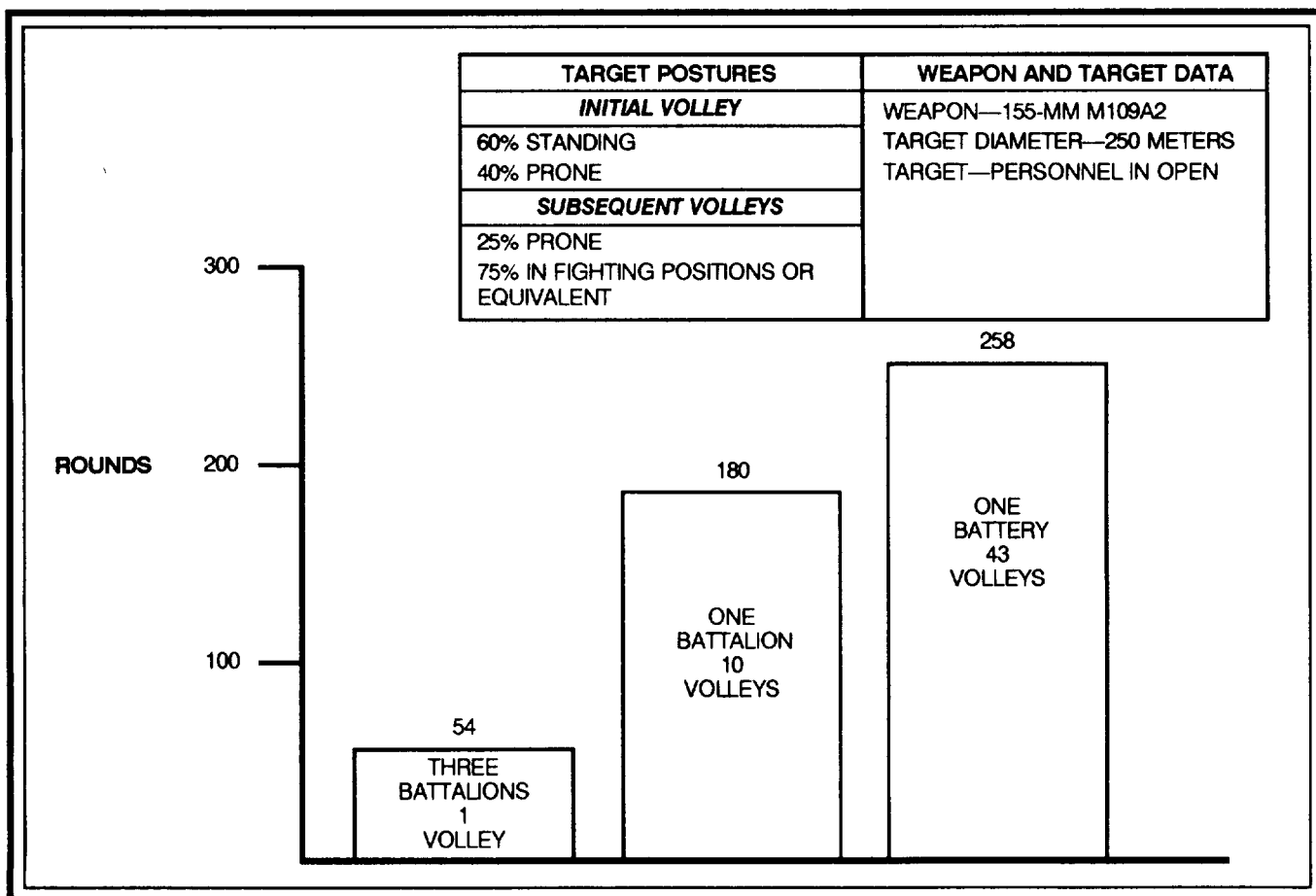
Maintaining control of the fires of the battalion requires that the FSCoord maintain the maximum feasible degree of centralized control over the system. There will very likely be many more calls for fire than there will be assets available to fire them and still achieve the effects specified by the commander. The maneuver commander or his FSCoord must be the one to decide which missions are critical to the success of the unit and which missions either will not be executed or will be delayed. Commander's criteria are the critical element in managing the fires of the battalion. If good commander's criteria are developed and accurately input into the TACFIRE, the computer can assume much of the burden of sorting the missions as they are received and assigning them the appropriate priority. To facilitate this process the S3 and FDO must ensure that they fully understand the commander's intent for fire support and must continually revise and update commander's criteria to reflect the changing tactical situation.

One of the best techniques available to the FDO for massing fires is the use of TOT. Also, the FDO can effectively mass fire for effect on mobile targets through use of **AT MY COMMAND** (AMC) in his fire order. With

these techniques the element of surprise is not lost, since the delivery of fires is controlled. Survivability of firing units is enhanced, both because mass fire techniques require fewer rounds to achieve the desired effects and because massed fires temporarily saturate enemy target acquisition devices. The figure below graphically shows the number of volleys necessary to achieve equivalent effects against a typical target. These two techniques for massing fires when properly applied against appropriate targets, can be the decisive factor in the battle.

The key to effective massed fires when more than one battery is to be fired for effect is the efficient use of voice as well as digital fire orders. By using voice fire orders, the battalion FDO can ensure that targets are engaged with the required number of firing units in a synchronized manner. Unit SOPs should address the procedures for both digital and voice fire orders. Training should emphasize those procedures in all combined arms and live-fire exercises. Procedures for voice fire orders are in TC 6-40.

NUMBER OF ROUNDS REQUIRED FOR EQUIVALENT EFFECTS



TECHNICAL FIRE DIRECTION

Technical fire direction is the process of converting weapon and ammunition characteristics (muzzle velocities, propellant temperature, and projectile weight), weapon and target locations, and met information to firing data. The results of this process are commands that are sent to the individual howitzer section for firing. The battery or platoon FDC is still the control center for the gunnery team, even in TACFIRE-equipped units. It is the responsibility of the individual firing battery and platoon FDCs to conduct technical fire direction by using the BCS, the backup computer system (BUCS), or manual computations. Targeting agencies, such as FOs and radars, transmit targeting information to the FDC by using the DMD or voice communications. In BCS-equipped units, fire commands are generated by the BCS and passed to the howitzer sections through the gun display unit (GDU). Units using BUCS or manual gunnery must pass fire commands to the guns by voice.

In non-TACFIRE units, battalion-level technical fire direction is conducted by using BUCS and/or manual

computations. Normally, a non-TACFIRE unit will send fire commands by voice, since no digital communication is available.

NOTE: A detailed discussion of technical fire direction is in TC 6-40 and TC 6-40A.

TACFIRE AND NON-TACFIRE OPERATIONS

In many tactical situations, integration of the fires of TACFIRE and non-TACFIRE units is a problem the FSCOORD must address. The heart of this problem is the different primary communications systems used by the different units. Non-TACFIRE artillery units use voice communication for command and control. In TACFIRE units, while voice is still used for many command functions, digital communication is the primary means of conducting tactical and technical fire direction.

A detailed discussion of TACFIRE and non-TACFIRE operations and techniques is in Appendix A.

CHAPTER 5

TARGET ACQUISITION

The purpose of field artillery target acquisition is to provide timely and accurate location of targets to permit attack. To effectively perform their missions, artillery units must be able to acquire targets within the supported maneuver unit's area of operations. To succeed on a highly lethal battlefield, the cannon artillery battalion must maximize the use of target acquisition assets to acquire enemy forces and attack them.

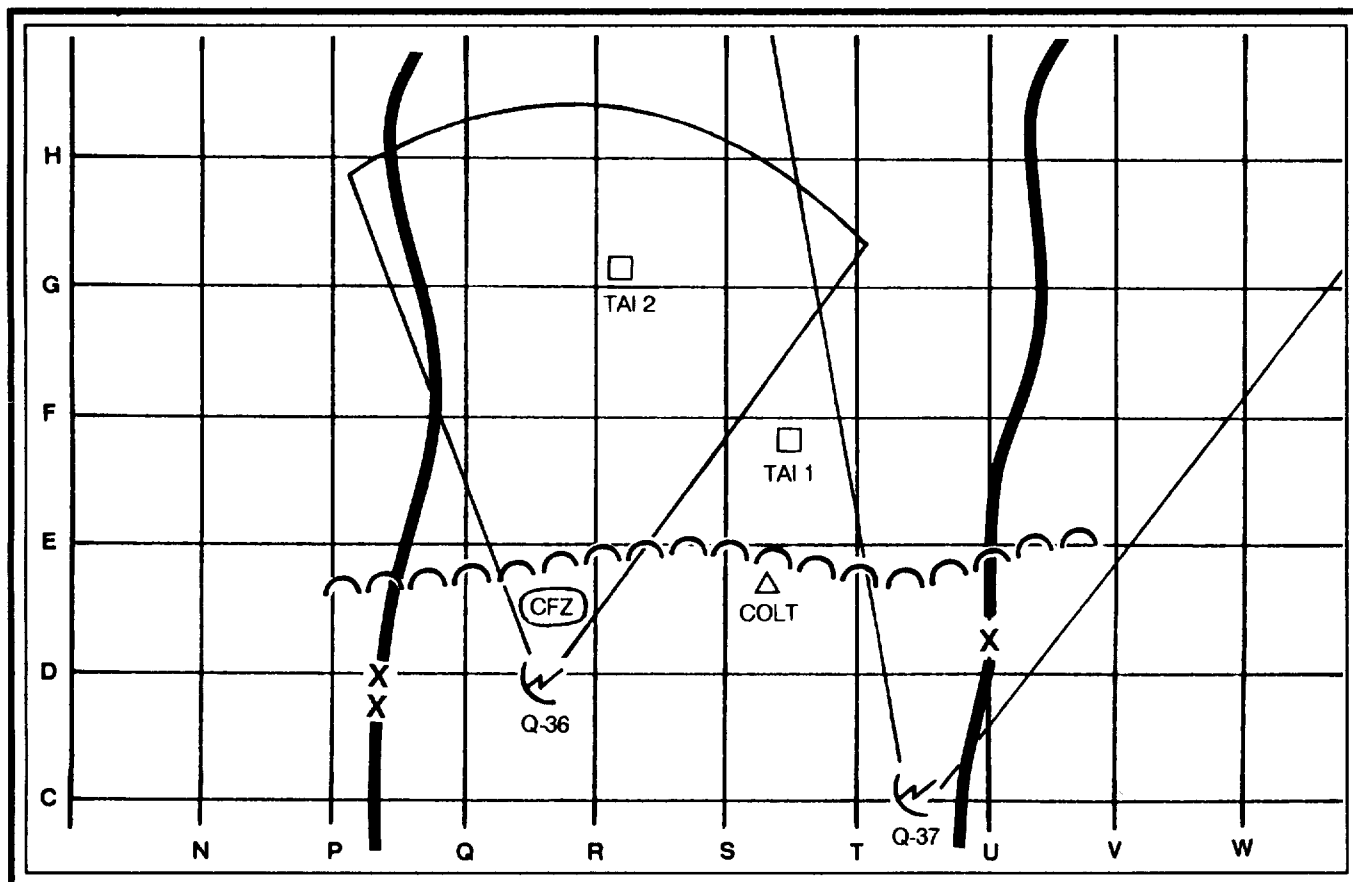
TARGETING PERSONNEL

Field Artillery Battalion S2

The target acquisition coordinator for the FA battalion is the FA battalion S2. He advises the S3 on the employment of any TA resources organic or attached to the battalion and recommends sectors of search. Once TA assets are

deployed, the S2 supervises their operations. He formulates the radar deployment order as described in FM 6-121 to control radar coverage and operations. He includes it in the TA tab to the FA support plan. Using information provided by the TA assets organic or attached to the battalion, he prepares and maintains the TA capabilities overlay to help him in his duties. An example TA overlay is shown below. (See FM 6-121 and FM 6-20-10 for additional details.)

EXAMPLE TARGET ACQUISITION OVERLAY



The S2 works closely with the FSOs and targeting officers to provide TA support for maneuver operations. Depending on the mission assigned to the FA battalion, he may work with any or all of the following agencies:

- Fire support officers.
- Ž Fire support teams.
- Ž Liaison sections.
- Ž Maneuver unit S2s.
- Adjacent units.
- Battery and battalion fire direction officers.
- The targeting element of the div arty TOC.
- Other targeting information sources.

The FA battalion S2 is important to the collection and targeting effort of the supported maneuver brigade S2. The FA battalion S2 develops his own collection plan. He relies on the maneuver unit to help him answer questions posed by his PIR when his own assets are unable to provide the necessary support. In turn the information gathered by the FA battalion S2 is of significant value to the brigade S2, who uses it in the brigade's situation development and targeting effort. The flow of information between the artillery and maneuver S2s must be a two-way street, and the artillery S2 must be conscientious in pushing information upward as well as down to the batteries. A detailed discussion of the duties of the S2 as they relate to the intelligence collection and targeting effort is found in Chapter 3.

Targeting Officer

The targeting officer is from the direct support FA battalion habitually associated with the supported maneuver brigade. He is most usefully employed in the maneuver brigade TOC, performing functions similar to those of the field artillery intelligence officer (FAIO) at higher levels. He assists the brigade S2 and the FSO regarding specific target vulnerabilities. The targeting officer gives the FSE a 24-hour FSO capability. He acts as the FSO in his absence and helps the FSO perform his duties. Also, he works with the brigade S2 and helps him and the FSO by providing information on the vulnerabilities of targets. He advises the brigade S2 on target accuracy and description requirements and evaluates dwell times for attack by fire support systems. His duties in the targeting area include the following:

- Ž Help the brigade S2 write the target acquisition and surveillance plan.

Ž Help provide staff supervision of the TA assets attached or organic to and under the operational control of the brigade.

- Develop, recommend to the commander, and disseminate the attack guidance matrix to the fire support element, command post, and subordinate elements. (See FM (X20-40, Appendix G.)

Ž Determine, recommend, and process time-sensitive high-payoff targets to the FSE.

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

- Coordinate with the DS field artillery battalion S2 for maneuver unit assistance in covering IR and PIR identified by the artillery S2 but which he lacks assets to cover.

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

FIRE SUPPORT TEAM

Fire support teams with the supported companies are important parts of the TA effort. They are principal sources of visually sighted targets for the battalion and have direct access to targeting information from other personnel of the company. Normally, the company FSO reports information directly to the FSO at the maneuver battalion. The maneuver battalion FSO passes this information to the brigade FSE, which in turn passes it to the direct support battalion S2, brigade S2, S3, targeting officer, and other FS cell personnel as required. The company FSO can be an invaluable source of information. For example, the results of a crater analysis reported by a company FSO may be used to reorient or cue weapons-locating radars. (See FM 6-20-40 or FM 6-20-50 for a detailed discussion of FIST operations.)

AERIAL FIRE SUPPORT OBSERVERS AND OH-58D HELICOPTER

The OH-58D is a division and/or corps aerial platform for conducting multiple tactical missions in a relatively short period of time. Because of its mobility and target acquisition systems, this helicopter gives the commander a powerful TA asset.

The OH-58D helicopter consists of a modified OH-58 airframe, a mast-mounted sight, an airborne target hand-over system (ATHS), an attitude and heading reference system (AHRS) and an advance avionics cockpit,

The pilot, an army aviator with aeroscout training and an AFSSO are the flight crew of the OH-58D. The pilot is the primary operator of the aircraft. The AFSSO –

- Performs navigation assistance.
- Provides tactical coordination between the supported maneuver element and the supporting artillery units by using digital or voice communications.
- Lases and designates.
- Performs hasty fire planning.
- Reports to higher headquarters.
- Is the secondary operator of the aircraft in an emergency.

Because of its limited numbers, its multipurpose utility, and the requirement for target attack and TA system support, use of the OH-58D systems involves detailed planning and execution at all echelons within the fire support structure. Its use should be based on the factors of METT-T and the commander's intent. The OH-58D AHRS requires updating over survey control points every 15 minutes of flight or a flight distance of 15 kilometers to ensure maximum navigational accuracy. (See TM 55-1520-248-20 for specific requirements.) The AFSSO can also be designated as a cueing agent for WLRs, since he can provide real-time information on indirect fire systems. (See FM 6-20-2 for a detailed discussion on OH-58D and AFSSOs.)

COMBAT OBSERVATION/LASING TEAM

The COLT is a high-technology observer designed to maximize the use of smart munitions. Although originally conceived to interface with the Copperhead, a COLT can be used with any munition that requires reflected laser energy for final ballistic guidance. Thus, at present, the team can also lase for smart munitions delivered by Air Force and Army aircraft. Within the heavy force structure, the team is composed of three soldiers. In the light forces, it consists of two soldiers. Both heavy and light force COLTs are equipped with ground/vehicular laser locator designators (G/VLLDs) and the necessary mobility and communication assets to do their mission.

The COLT (with its G/VLLD) can be used for target location, ranging and/or designation, and target area survey. (To accurately perform target area survey, the COLT's location must be surveyed.)

COLTs are positioned by the brigade FSO or his representative to support the maneuver commander's overall plan. Consider employing COLTs in pairs to

provide the best coverage and increased survivability. This also allows for continuous COLT coverage during an operation. (See FM 6-20-40 or FM 6-20-50 for a detailed discussion on COLTs.)

SURVEY PLATOON

Because of their primary mission surveyors will rarely, if ever, be able to continuously man observation posts. However, their mobility increases the likelihood that they will acquire hostile targets that merit indirect fire engagement.

The survey teams must also help the battalion S2 and S3 in acquiring combat information as they perform their normal mission or reconnaissance. They are particularly useful in gathering information about the terrain.

WEAPONS-LOCATING RADAR

The weapons-locating radars AN/TPQ-36 and AN/TPQ-37, commonly referred to as Firefinder radars, automatically provide fast and accurate locations of indirect fire weapons. They can handle simultaneous fires from more than one location and can detect and locate firing positions from the first round. Target locations are sent either to the targeting element of the div arty or FA brigade TOC or directly to a firing unit for engagement.

The Firefinder system is an organic element of the target acquisition battery in the heavy division. Each TAB has three AN/TPQ-36 radars and two AN/TPQ-37 radars. In light divisions, each DS battalion has an organic AN/TPQ-36. Two AN/TPQ-37 radars are provided as part of the corps target acquisition detachment (CTAD) that a light division receives as augmentation when deployed. Each radar section is functionally organized to provide independent weapons-locating support to a designated FA headquarters.

Normally, the AN/TPQ-36 radars are attached for support to the direct support FA battalions of the div arty and are positioned 3 to 6 km behind the FLOT. The AN/TPQ-37 radars may be attached for support by the div arty to subordinate units in a GS role. In this case, they are positioned 8 to 12 km behind the FLOT. These subordinate units may include attached FA brigades and GS and GSR battalions.

Both the design and the complementary nature of the system coverage argue for a degree of centralized control. Div arty retains the authority to establish either directly or through a subordinate unit headquarters, the specific sector of search for each radar section and cueing guidance. Div arty further retains positioning authority for radar sections under its control, and it influences

positioning of sections attached to FA battalions to ensure adequate coverage of the entire division sector or zone. This process is inherent to the superior-subordinate relationship but is highlighted here to emphasize the unique role of the div arty TOC in providing responsive radar coverage for the entire division. The RDO gives specific guidance to the WLRs on authorized cueing agents, location of zones, and sectors of search. Using Threat information obtained from the DS battalion S2 and the survivability flowchart in FM 6-121, the radar warrant officer and/or section chief will determine how long the radar will be able to radiate from a position before having to reposition for survivability.

The AN/TPQ-37 WLR sections normally are retained under control of the div arty TOC. The sections normally pass targeting information to the target production section of the targeting element. However, depending on the requirements of the tactical situation, they may be directed by the div arty TOC to pass information to a designated FA battalion or brigade. If an FA brigade is designated to receive targets located by WLRs, consideration should be given to providing at least a part of the div arty targeting element (target production section order-of-battle section) to the FA brigade, since the brigade has a very limited target production capability. FM 6-121 describes using the FA brigade in this manner.

The AN/TPQ-36 radar sections may be organic to, attached to, or habitually associated with a specific DS artillery battalion. When the section is organic or attached, the DS artillery battalion may retain control of the section. Div arty guidance applies on positioning sectors of search zones, and cueing guidance. Also, the DS battalion commander must consider the following:

- Ž The additional signature presented by the AN/TPQ-36.
- Ž The additional requirement placed on battalion and/or battery personnel to secure the radar position as part of the defensive plan.
- Ž The additional terrain management and coordination necessary with the maneuver unit.
- The requirement placed on battalion and/or battery personnel to LOGISTICALLY support the radar section.

- The requirement to have WLRs and firing units on a common grid.

Radar sections organic or attached to the FA battalion of a separate brigade involved in an independent operation are employed as directed by the FA battalion commander. If a separate brigade is attached to a division, the organic radars remain associated with their parent unit. However, div arty coordinates their operations the same as it does for divisional radars.

MOVING-TARGET-LOCATING RADAR

The mission of the MTLR AN/TPS-2SA or AN/TPS-58 is to detect, locate, and identify moving ground targets with sufficient accuracy for attack by friendly weapon systems. The radar also can vector friendly patrols to specified areas. The MTLRs are usually employed by div arty in general support of the division and are therefore seldom directly controlled by cannon battalions. However, they may be attached to battalions for support only, such as security, survey, and Classes I and III.

If the radar is attached to a battalion for employment, the considerations for the MTLR are similar to those for other TA radars; they must be taken into account to ensure effective operation of the system. (For a detailed discussion of tactics, techniques, and procedures for employment of FA target acquisition assets, see FM 6-121.)

ELECTRONIC WARFARE

Electronic warfare (EW) systems can acquire targets by analysis of electronic emissions and message traffic or by direction finding. Battalion survey sections may be tasked to furnish survey support for these systems.

To improve responsiveness to high-payoff targets, the div arty TOC may arrange through the G3 for certain kinds of target information to be sent directly from the military intelligence (MI) (CEWI) battalion operation center to a GS or GSR battalion. These arrangements would include guidance for the attack of targets (attack guidance matrix, HPT list). The engagement of these targets would be reported immediately to the div arty TOC.

CHAPTER 6

COMMUNICATIONS

One of the seven basic tasks of the field artillery battalion is to communicate. The ability of the FA cannon battalion to communicate with its subordinate elements and with the maneuver force it supports is perhaps the greatest single factor in determining whether or not the unit will accomplish its mission. Communication must be considered as a critical factor in the planning and execution of any tactical operation.

Section I

GENERAL

Communication (comm) in a FA cannon battalion is essential to efficient fire support and is a command responsibility. The commander's estimate of communications requirements should provide adequate communications assets with all elements of his command and with supported, reinforced, and adjacent units. To establish a responsive and dependable communications system, the cannon battalion must overcome several limitations:

- *The battalion is authorized a limited number of combat net radios to support multiple requirements.*
- *The battalion monitors multiple radio networks while maintaining continuity of operations during displacement.*
- Ž *The battalion communicates over long distances to many diverse elements, such as FISTs, FSOs, reinforcing units, and higher headquarters.*
- Ž *The battalion relies heavily on radio communication, as the speed of battle may prohibit the efficient use of wire and messengers.*

REQUIREMENTS

A communications system must satisfy one or more of the following requirements, but it may not necessarily satisfy them all:

- **Reliability** is the ability to function with the desired accuracy and dependability at all times. Elements of a reliable system are robustness, resiliency, and a sufficient capacity to meet all communications requirements.
- **Flexibility** is the ability to support widely dispersed forces under adverse conditions. Some indicators of a flexible system are multiaxial (more than one line or net), mobility (to move with the supported force), and modular construction for ease of repair and replacement.
- Ž **Security** is the ability to protect messages from unauthorized exposure and usage. Also, security is protection to the user from exposure to electronic warfare.

- **Speed** of the system must be sufficient to ensure timeliness of the message.

Ž **Economy** ensures timely communications with a minimum amount of personnel and equipment:

When planning communications systems, consider both internal and external requirements to communicate:

- **Internal** communications requirements include the facilities for control and coordination of the activities of the unit. The installation and maintenance of internal communications systems are the responsibility of the unit commander. In a higher headquarters, such as a battalion or division, the internal communications system serves as part of the external communications system of the subordinate unit.
- Ž **External** communications requirements include the facilities by which a unit maintains communication with its next higher headquarters, adjacent units (as required),

and supported or reinforced units. These allow the unit to receive data and information necessary to do its mission. The commander of any unit is responsible for the integration of his communications assets into the communications system of the next higher headquarters.

MEANS

Communications systems differ according to the various means of communication – messenger, visual sound radio, and wire.

The communications means in a unit depend on the personnel, equipment, and transportation provided by the MTOE. The various means of communication have different capabilities and limitations. The means employed in any situation are generally those that provide the reliability, flexibility, security, and speed that meet or exceed the minimum required by the situation. Means should be employed so that they complement each other to provide the flexibility needed for communicating. Reliable communication can be greatly increased by using all the means available.

Messenger System

Messenger systems are the most flexible, reliable, and secure of the communications systems. They can handle all types of messages, including the bulky messages other systems cannot handle. The major disadvantages include nonavailability of personnel and equipment to support the system, the impersonality of the system, and the relative slowness of the system. Also, messenger service is affected by weather, terrain, and combat situations,

Visual and Sound Systems

Visual and sound systems have similar advantages and disadvantages. They are used extensively in almost all situations and are readily available to everyone. They must be preplanned and coordinated to ensure comprehension. Advantages include limited electronic signature in creating either visual or sound signals. They do not emit radio frequency (RF) signals, so EW is not a threat. Disadvantages are the noise, confusion, dust, and smoke of the battle, which can obscure many of the signals. Also enemy forces can mimic and deceive by the use of similar signals. Signal operation instructions include a section that lists some visual and sound signals. SOPs list the remainder for a specific unit operation.

Radio System

Radio has advantages when compared to the other means. It does not require a physical link; therefore, radio transmissions can span great distances very quickly. It is easily installed and requires a minimum of manpower to

operate. When required, it can be remoted away from operations centers, retransmitted to achieve even greater distances, and combined with wire systems as a result of net radio interface (NRI) to allow commanders to communicate over wire and radio. Another advantage—the ability to scramble our transmissions – while providing security, may lead to a disadvantage. When conversations cannot be overheard, operators tend to talk too long and too often which can make the unit susceptible to enemy electronic warfare. Radio direction finding can target the transmitter; and interference, jamming, and intrusion can render radio communication relatively useless. Radio is also susceptible to co-site interference (antennas located too close to one another); mutual interference (bleed-over caused by radios operating on adjacent frequencies); and electronic noise created by placing antennas near power lines, generators, and other emitters such as radar and microwave sites.

Wire System

Wire also has advantages when compared to the other means. It is more secure than radio, visual, and sound systems; but it is never to be considered completely secure without cryptographic devices. Wire systems are not particularly vulnerable to EW, but they are extremely susceptible to damage from enemy artillery and our own tracked vehicles. Because of its limited vulnerability to EW, wire is almost always the system of choice in a defensive operation. It is also valuable in offensive operations when the situation and time permit its installation. Surprise may be obtained by using a wire system in preference to radio to prevent giving away positions. While wire systems have some distinct advantages over radio, they also have offsetting disadvantages. They are not mobile, with the exception of the mobile stations in the mobile subscriber equipment (MSE) system. They must be carefully planned before installation; and their installation requires more time, personnel, and equipment than the other systems. While they are mostly secure, they can be tapped; and not all taps require a physical connection to the wire.

COMMUNICATIONS RESPONSIBILITIES

General responsibilities for communication are discussed below.

Echelons of Command

The senior unit is responsible for establishing communication with its subordinate units, whether organic or attached. This responsibility is primarily one of planning and directing the establishment of the linking communications systems, since assets belonging to either the senior headquarters or the subordinate unit may be used (senior-to-subordinate relationship).

Tactical Missions

Each of the four standard tactical missions has an inherent communications responsibility. (See the chart on page 1-3.)

Direct Support. An artillery unit with the mission of direct support must establish communication with the supported maneuver unit headquarters (supporting-to-supported relationship).

Reinforcing. An artillery unit with the mission of reinforcing must establish communication with the reinforced artillery unit headquarters (reinforcing-to-reinforced relationship).

General Support Reinforcing. An artillery unit with the mission of general support reinforcing must establish communication with the reinforced artillery unit headquarters (reinforcing-to-reinforced relationship). Communication must also be established between the artillery unit with the GSR mission and the senior artillery headquarters to which the battalion is providing support. The senior artillery headquarters must establish communication with the GSR unit (senior-to-subordinate relationship).

General Support. An artillery unit with the mission of general support does not have an inherent responsibility for establishing external communication with any other unit. However, the senior artillery unit must establish communication with its subordinate artillery units (senior-to-subordinate relationship).

Battle Area

Adjacent commands must maintain communication with each other to ensure coordination of the combat effort. The command on the left establishes communication with the command on its right, as facing the FEBA or FLOT (left-to-right relationship).

Joint Maintenance

Regardless of which unit is responsible for establishing communication, all units served by the system must help restore any communications system outage.

STAFF RESPONSIBILITIES

Individual responsibilities for the communications system are discussed below.

Commander

The commander is responsible for the adequacy and proper use of the communications system within his

command. He is also responsible for its efficient operation in the system of the next higher command. The authority to establish, maintain, control, and coordinate the various communications means within the command may be exercised by a subordinate in the name of the commander when such authority is properly delegated.

Battalion S3

The S3 establishes priorities for communication in support of tactical operations. In coordination with the battalion signal officer, the S3 selects the general locations of the command posts and affiliated installations with communication as a major consideration. The rest of the staff submits requirements to the S3 for signal communication.

Battalion S2

The S2 assesses the enemy's capability to interfere with signal communication. He is also responsible for the counterintelligence aspects of signal operations within the battalion.

Battalion Signal Officer

The BSO works under the staff supervision of the S3 but is directly responsible to the commander for the battalion communications systems. The BSO advises the commander and staff on electronic counter-countermeasures (ECCM), signals security, communications training, communications planning, and selection of CP sites from a communications standpoint. He prepares the command and signal paragraph of the FA support plan. He coordinates with signal units for communications support. He supervises the communications activities in the battalion, to include the installation, operation, and maintenance of the battalion communications system and equipment. He is responsible for the COMSEC equipment and serves as the battalion COMSEC custodian for the unit. He issues and accounts for COMSEC equipment key lists codes, ciphers, SOI, and authentication systems.

Battalion Communications Platoon

The communications platoon is organized with a platoon headquarters, a wire section, and a radio section. This platoon installs, operates, and maintains the communications system for cannon battalion command and control. The organizational maintenance mechanic (MOS 31V) assigned to the platoon performs organizational maintenance on battalion headquarters communications equipment. He also provides organizational maintenance and assistance for the subordinate units of the battalion.

All elements of the battalion evacuate communications equipment for repair through the communications platoon. The platoon installs and operates the battalion wire system. This system includes lines within the headquarters and CP for the commander, staff, and elements of the HHB and lines to subordinate batteries and attached units when time and conditions permit. Priorities for installation of lines normally are established by SOP or are as directed by the battalion commander or S3. The platoon operates single-sideband (SSB) radio teletypewriter (RATT) equipment in the div arty or FA brigade RATT net(s) (when available). The exact composition of the platoon headquarters varies with each type of battalion. Two key personnel are the platoon leader (heavy divisions only) and the battalion communications chief. Their responsibilities are outlined in FM 11-50.

PLANNING CONSIDERATIONS

Plans

The communications plan is designed to fulfill the requirements of a tactical mission. Planners use communications responsibilities, communications requirements, and the unit TOE (which provides the communications means) to produce a standardized system. To meet specific requirements, commanders may have to modify their systems on the basis of METT-T.

Standard Radio Nets. The field artillery uses a set of standard radio nets for all of the standard tactical missions. This net standardization enables units to quickly and accurately interface in a combat environment. Standard net structures and purposes should not be arbitrarily changed except to tailor them to a modified mission. Such modifications should be kept to a minimum. Standard net structures (net titles, purposes, users, and equipment) are defined in this manual. They should be amplified in unit SOP and kept current as changes occur.

Voice and Digital Nets. The radio net architecture should change, depending on whether the unit has predominately voice or digital communication. Automated (TACFIRE-equipped) battalions operate in two voice nets (one for command and control and one for fire support coordination) and four digital nets (three fire direction and one fire support coordination). This architecture is designed to support a system that relies primarily on digital communication. If digital capability is lost by the battalion or by one or more of the batteries, the voice nets quickly become overburdened. A plan must be developed for converting some digital nets to voice while continuing to support the remaining digital stations and for reconverting to digital nets as that capability is restored. It is extremely important to keep voice traffic off digital nets and vice

versa, so a specific sequence for conversion must be developed for various contingencies. This procedure should be included in unit SOP and practiced during training.

System Mixes. The factors of METT-T affect the use of wire, visual, sound, and messenger systems to a greater extent than they do the radio nets. Any system or mixture of systems that will communicate the information with the least exposure to enemy EW and not place total reliance on radio is preferred. To describe any one system as "primary" is no longer appropriate.

Electronic Counter-Countermeasures. ECCM should be part of each battalion SOP. They can improve OPSEC and preserve communications. ECCM techniques that have been found to be effective include the following:

- Ž Require authentication on nonsecure nets. Proper authentication procedures can eliminate intrusion and imitative deception.
- Ž Do not mix plain and encrypted traffic on the same net. Doing so compromises the nature of the net, which makes interception and analysis easier for the enemy.
- Ž Use secure equipment whenever possible. If the battalion is supporting a unit without secure capability, specify nets that will be unsecured and enforce secure discipline on all remaining nets.
- Limit transmissions to less than 20 seconds. This makes interception and direction finding more difficult.
- Ž Work through jamming if at all possible. Jumping nets should be a last resort. Remember that if jamming is bad enough to keep a unit from operating on a particular net it will also keep many of the stations from receiving the signal to change frequencies. If antijam frequencies are to be used, they must be disseminated well in advance, so that subscriber stations can move to the alternate frequencies in sequence as communication becomes impossible on the primary frequency.
- Ž Use only authorized call signs from the SOI and change them on schedule. Use of permanent call signs (for example, **REDLEG 6**) makes analysis easier for the enemy.

Operations

Communications operations must take advantage of all available techniques to facilitate accomplishment of the mission. Techniques such as remoting transmitters, radio retransmission, antenna multiplexer, and the use of directional antennas help the cannon battalion to provide timely fires and to survive to fight again.

Remoted Transmitters. Remoting transmitters allows for the separation of the RF emitter from the personnel and equipment of the CP or other critical facilities. Also, remoting radios allows the transmitter to be sited for optimized communication while allowing the user to position in locations better suited to survivability. Remoting also minimizes on-site or mutual interference while dissipating and reducing electronic signature. For additional information concerning remoting, see FM 24-18.

Retransmission. Retrans operations may be used to extend the area of coverage of a specific radio net or to reduce the electronic signature of a position. By use of a retrans site, RF power output can be reduced at the CP or other location. Overall net ranges can be doubled by the effective use of retransmission.

Frequency modulated very high frequency (VHF) transmission distances are restricted by terrain and obstacles. The siting of radio equipment is often critical. The following are helpful hints for using FM retransmission:

- As a minimum, make a map recon of the area of operation. Coordinate with the S2 and S3 during the planning phase.
- Analyze the terrain for optimum communications to support the scheme of maneuver.
- Select primary and alternate locations for retrans. Consider accessibility, defense, and logistical support.
- Arrange the timetable for site occupation and net operation. Don't wait until retrans vehicle is needed before sending it out.
- Ensure operators are well trained. They must be able to provide manual relay if they have equipment failures.
- Ensure operators are aware of the tactical situation.
- Ensure users understand how retrans works.
- If retransmitting digital traffic program additional key and/or delay time to allow radios to key up.
- If using a forward entry device (FED), plan to use nearby BCSs to relay messages to TACFIRE. This capability is useful when direct communication with TACFIRE is not possible. Relay addressing should be established per SOP or as identified in the appropriate SOI.

NOTE: Additional information on retransmission operations is in FM 24-18.

FM 6-20-1

Antenna Multiplexers. Using antenna multiplexer, such as the TD-1288 or TD-1289, reduces the number of ground plane antennas required to operate multiple radios. The time required to align and tune these devices is considerably less than the time required to install multiple antennas. More information on antenna multiplexer is in TM 11-5820-880-12.

Directional Antennas. Directional antennas reduce electronic signature in two directions while extending the range of the radio along the long axis of the antenna. Techniques concerning antenna construction and siting are included in ECAC-CR-83-200.

Reestablishment. Communication is essential for fire support. If communication with a station is lost, everything possible must be done to reestablish the link. The operator should—

- Troubleshoot the radio.
- Erect omnidirectional or unidirectional antennas.

Digital nets are backed up by voice nets and vice versa. If digital communication is lost, resolve the problem on the voice net. If a station cannot be contacted on any fire support net, coordinate with maneuver counterparts to use their nets and/or stations to reestablish communication. Unit SOP must prescribe exact actions to be taken to reestablish communication, and all personnel must be intimately familiar with those actions.

Communications Planning Ranges

The table below can be used in communications planning. The ranges presented here were determined under ideal conditions; weather and terrain may have drastic degrading influences.

COMMUNICATIONS TIPS

The following tips will help in establishing and operating a responsive and dependable communications system:

Do—

Ž Use the lowest power setting for effective transmission.

- Make transmissions as short as possible.
- Use proper radiotelephone procedures.
- Use the proper antenna (directional antenna if possible).
- Use masking if possible to hide your signal.
- Use only authorized codes.
- Remote radios if possible.
- Enforce net discipline.
- Authenticate.
- Try to work through jamming.
- Plan for the use of retrans.

Ž Keep radios aligned and tuned.

PLANNING RANGES FOR COMBAT NET RADIOS

| VRC-12 FAMILY RADIOS | | SINGARS-FAMILY RADIOS | |
|--|-------------------------|---|-------------------------|
| RADIO | RANGE (KM) ¹ | RADIO | RANGE (KM) ¹ |
| AN/PRC-77 with whip antenna | 8 | AN/PRC-119 (manpack) | 16 |
| AN/PRC-77 with long-wire antenna (AT-984/G) | 28 | AN/VRC-87 (short range) (vehicle mount) | 16 |
| AN/GRC-160 with whip antenna | 8 | AN/VRC-88 (short range) (dismount) | 16 |
| AN/GRC-160 with RC-292, OE-254, or OE-303 antenna | 19 | AN/VRC-89 (long or short range) (vehicle mount) | 35 or 16 |
| AN/GRC-160 with long-wire antenna (AT-984/G) | 28 | AN/VRC-90 (long range) (vehicle mount) | 35 |
| AN/VRC-46 with whip antenna | 40 | AN/VRC-91 (long range or vehicle mount, short range or dismount) | 35 or 16 |
| AN/VRC-46 with RC-292, OE-254, OE-303 | 58 | AN/VRC-92 (dual long range) (vehicle mount) | 35 or 35 |
| ¹ The normal planning range for the AN/GRC-160 series is 8 km; for the AN/VRC-46 series, it is 40 km. The above extended ranges were achieved by use of various antenna arrays. | | LEGEND: SINGARS = single-channel ground and airborne radio system | |

Don't—

- Use homemade codes.
- Ž Use homemade call signs.
- Start vehicles with radios on.
- Ž Try to talk around sensitive information.
- Display frequencies or call signs.
- Make antenna "farms."

Section II

RADIO COMMUNICATIONS SYSTEMS

Radio systems have some advantages over other means of communication. They can be used to quickly communicate over great distances with a minimum of personnel from either fixed or mobile stations. They can be estebiiashad with COMSEC devices to provide on-line cryptographic security for all transmissions. Because of these advantages, the field artillery uses radio systems most often. The major disadvantages of radio systems are that they are extremely vulnerable to electronic warfare and that the enemy may use radio direction finding to locate end target transmitter positions.

NET TITLES

Radio communications systems are divided into separate groupings, called nets. This division is based on the purposes for which the nets are used. Each net is titled, and each title has been standardized to consist of four elements:

- Ž Controlling headquarter (division artillery, battalion, and so forth).
- Ž Designated purpose of the nets (command [cmd], fire direction, intelligence [intel], and so forth).
- Ž Frequency spectrum (HF, VHF, ultrahigh frequency [UHF], and so forth) and/or modulation (FM, amplitude modulated [AM], or SSB, a form of amplitude modulation).
- Ž The type, whether the net is a voice (V), a voice and facsimile (fax), a RATT, or a digital (D) net.

For example, the battalion operations/fire (VHF-FM) (digital) net is abbreviated as bn ops/F (VHF-FM) (D) net.

NET DESCRIPTION

A radio net is a channel, frequency, or subfrequency with more than one subscriber for the purpose of transmitting information related to the mission requirements. Each net has a controlling station called the net control station (NCS). The net maybe a "free" net, in which all stations are

free to contact one another at any time, or a "directed" net, in which all stations must contact the NCS for permission to contact other subscribers.

In general, eight primary nets (six internal and two external) are required for a cannon battalion to operate and perform its mission. In non-TACFIRE units, all six internal nets are FM voice. In TACFIRE units, four of the nets are FM digital, with three dedicated primarily to fire direction and one to fire support planning and coordination. Four of the nets are FM voice and are used for internal command of the battalion; administration and logistics; survey planning and coordination; and voice fire support planning, coordination, and execution. The voice fire support and survey nets are the external nets. They are in the SOI of the supported maneuver unit and the force field artillery headquarters. "Force FA" headquarters is the headquarters that assigned the battalion its tactical mission and/or the headquarters authorized to change the battalion's mission. This headquarters will normally be a div arty or an FA brigade but may also be a corps artillery.

Radio nets require fully mission-capable equipment. SOPs should be developed for the use of operational equipment and the exchange or substitution of operational equipment for non-mission-capable equipment when in a field environment. Field artillery radio nets, listed in order of priority to receive backup radio equipment resources, are fire direction, fire support, command and control, and administrative and logistics nets.

FIELD ARTILLERY CANNON BATTALION RADIO NETS

A cannon battalion combat radio net matrix is shown below. According to the battalion's tactical mission (DS, R,

GSR, or GS), the matrix depicts what net(s) the unit should enter and at what level of communication.

The next four graphics show subscribers to the internal and external radio nets for each tactical mission.

LEGEND FOR COMMUNICATIONS GRAPHICS

| | |
|--|--|
| A = as-required subscriber | MSRT = mobile subscriber radiotelephone terminal |
| admin/log = administration/logistics | mvr = maneuver |
| ALOC = administration and logistics operations center | N = net control station |
| BC = battery commander | ops/F = operations/fire (net) |
| bn = battalion | ops/intel = operations/intelligence (net) |
| BSOC = battalion supply operations center | plt = platoon |
| btry = battery | W = wire connection (O&I VFMED to FDC TACFIRE) |
| cdr = commander | X = subscriber |
| CF = command/fire direction | ———— = doctrinal connectivity (may be either a directed or a free net) |
| DNVT = digital nonsecure voice terminal | ----- = as-required net |
| DSVT = digital secure voice terminal | O = identifies subscriber within the net (center circle is the NCS) |
| F = full-time subscriber | ⊖⊖⊖⊖ = cable or hard wire link |
| FD = fire direction | |
| FS = fire support | |

CANNON BATTALION COMBAT RADIO NET MATRIX

| NETS | MISSION | | | |
|--|----------------|-------------------|-------------------|----------------|
| | DS | R | GSR | GS |
| Internal | | | | |
| Bn Cmd (VHF-FM)(V) | F | F | F | F |
| Bn Ops/F (VHF-FM)(D or V) | F | F | F | A |
| Bn FD 1 (VHF-FM)(D or V) | F | F | F | F |
| Bn FD 2 (VHF-FM)(D or V) | F | A | A | A |
| Bn FD 3 (VHF-FM)(D or V) | F | A | A | A |
| Bn Admin/Log (VHF-FM)(V) | F | F | F | F |
| External | | | | |
| Force FA Cmd (VHF-FM)(V) | F | | F | F |
| Force FA Ops/F 1,2,3 (VHF-FM)(D or V) | F | F | F | F |
| Force FA CF (HF-SSB)(V/Fax/RATT) | F | F | F | F |
| Force FA TA/Intel (VHF-FM)(V) | | | | F |
| Force FA Survey (VHF-FM)(V) | F ² | F ^{1, 2} | F ^{1, 2} | F ² |
| Force FA Admin/Log (VHF-FM)(V) | | | | A |
| Supporting Unit Admin/Log (VHF-FM)(V) | A | A | A | |
| Mvr Unit Ops/Intel (VHF-FM)(V) | F | F | | |
| Mvr Unit FS (VHF-FM)(V) | F ² | F ² | F ² | A |
| Reinforced Bn Cmd (VHF-FM)(V) | | F | F | |
| Reinforced Bn Ops/F (VHF-FM)(D or V) | | F | F | |
| ¹ Reinforced unit force FA survey net ² Primary external net | | | | |

DIRECT SUPPORT MISSION RADIO NET MATRIX

| | INTERNAL NETS | | | | EXTERNAL NETS | | | | | | | | | | |
|--|---------------|----------|----------------|--------------|---------------|----------------------|-------------|-------------------|-----------------|--------------------|---------------------------|------------|-----------|------------------|--------------------|
| | Bn Cmd | Bn Ops/F | Bn FD 1,2,3 | Bn Admin/Log | Force FA Cmd | Force FA Ops/F 1,2,3 | Force FA CF | Force FA TA/Intel | Force FA Survey | Force FA Admin/Log | Supporting Unit Admin/Log | Mvr Bde FS | Mvr Bn FS | Mvr Bn Mortar FD | Mvr Unit Ops/Intel |
| Bn Ops/TOC | N | | | A | X | | X | | A | | | X | | | A |
| Bn Cdr | X | | | | X | | | | | | | A | | | |
| Bn XO | X | | | A | | | | | | | | | | | |
| S3 | X | | | | | | | | | | | | | | |
| S2 | | | | | | | | A | | | | | | | X |
| BSO | X | | | | | | | | | | | | | | |
| RSO | X | | | | | | | | X | | | | | | |
| Btry Commanders | X | | | A | | | | | | | | | | | |
| Bn FDC | | N | N | | | X | | | | | | | | | |
| Bn O&I Sec | | W | | | | | | | | | | | | | |
| Reinforcing Bn FDC | | X | | | A | | | | | | | | | | |
| Maneuver Bde FSE | | X | A | | | | | | | | | X | | | |
| Maneuver Bn FSE | | A | X | | | | | | | | | A | X | | |
| Firing Plt | | | X | A | | | | | | | | | | | |
| FIST HQ | | | X | | | | | | | | | | A | A | |
| Forward Observer | | | A ¹ | | | | | | | | | | A | X | |
| Radar (Atch or Organic) | X | A | A | | | | | A | | | | | | | |
| COLT | | | A | | | | | | | | | A | | | |
| ALOC | | | | N | | | | | | A | A | | | | |
| BAO | | | | X | | | | | | | | | | | |
| BMO | | | | X | | | | | | | | | | | |
| Wrecker | | | | X | | | | | | | | | | | |
| Recovery Vehicle | | | | X | | | | | | | | | | | |
| Medical Officer | | | | X | | | | | | | | | | | |
| BSOC | | | | X | | | | | | | A | | | | |
| ¹ As directed by company or battalion FSO | | | | | | | | | | | | | | | |

¹ As directed by company or battalion FSO

REINFORCING MISSION RADIO NET MATRIX

| | INTERNAL NETS | | | | EXTERNAL NETS | | | | | | | | | | |
|-------------------------|---------------|----------|-------------|--------------|---------------|----------------------|-------------|-------------------|-----------------|--------------------|---------------------------|------------|-----------|------------------|--------------------|
| | Bn Cmd | Bn Ops/F | Bn FD 1,2,3 | Bn Admin/Log | Force FA Cmd | Force FA Ops/F 1,2,3 | Force FA CF | Force FA TA/Intel | Force FA Survey | Force FA Admin/Log | Supporting Unit Admin/Log | Mvr Bde FS | Mvr Bn FS | Mvr Bn Mortar FD | Mvr Unit Ops/Intel |
| Bn Ops/TOC | N | | | A | X | | X | | A | | | X | | | |
| Bn Cdr | X | | | | X | | | | | | | | | | |
| Bn XO | X | | | A | | | | | | | | | | | |
| S3 | X | | | | | | | | | | | | | | |
| S2 | | | | | | | | A | | | | | | | A |
| BSO | X | | | | | | | | | | | | | | |
| RSO | X | | | | | | | | X | | | | | | |
| Btry Commanders | X | | | A | | | | | | | | | | | |
| Bn FDC | | N | N | | | X | | | | | | | | | |
| Bn O&I Sec | | W | | | | | | | | | | | | | |
| Reinforcing Bn FDC | | | | | | | | | | | | | | | |
| Maneuver Bde FSE | | | | | | | | | | | | | | | |
| Maneuver Bn FSE | | | | | | | | | | | | | | | |
| Firing Plt | | | X | A | | | | | | | | | | | |
| FIST HQ | | | | | | | | | | | | | | | |
| Forward Observer | | | | | | | | | | | | | | | |
| Radar (Atch or Organic) | X | A | A | | | | | A | | | | | | | |
| COLT | | | | | | | | | | | | | | | |
| ALOC | | | | N | | | | | | A | A | | | | |
| BAO | | | | X | | | | | | | | | | | |
| BMO | | | | X | | | | | | | | | | | |
| Wrecker | | | | X | | | | | | | | | | | |
| Recovery Vehicle | | | | X | | | | | | | | | | | |
| Medical Officer | | | | X | | | | | | | | | | | |
| BSOC | | | | X | | | | | | | A | | | | |

GENERAL SUPPORT REINFORCING MISSION RADIO NET MATRIX

| | INTERNAL NETS | | | | EXTERNAL NETS | | | | | | | | | | |
|-------------------------|---------------|----------|-------------|--------------|---------------|----------------------|-------------|-------------------|-----------------|--------------------|---------------------------|------------|-----------|------------------|--------------------|
| | Bn Cmd | Bn Ops/F | Bn FD 1,2,3 | Bn Admin/Log | Force FA Cmd | Force FA Ops/F 1,2,3 | Force FA CF | Force FA TA/Intel | Force FA Survey | Force FA Admin/Log | Supporting Unit Admin/Log | Mvr Bde FS | Mvr Bn FS | Mvr Bn Mortar FD | Mvr Unit Ops/Intel |
| Bn Ops/TOC | N | | | A | X | | X | | A | | | X | | | |
| Bn Cdr | X | | | | X | | | | | | | | | | |
| Bn XO | X | | | A | | | | | | | | | | | |
| S3 | X | | | | | | | | | | | | | | |
| S2 | | | | | | | | A | | | | | | | A |
| BSO | X | | | | | | | | | | | | | | |
| RSO | X | | | | | | | | X | | | | | | |
| Btry Commanders | X | | | A | | | | | | | | | | | |
| Bn FDC | | N | N | | | X | | | | | | | | | |
| Bn O&I Sec | | W | | | | | | | | | | | | | |
| Reinforcing Bn FDC | | | | | | | | | | | | | | | |
| Maneuver Bde FSE | | | | | | | | | | | | | | | |
| Maneuver Bn FSE | | | | | | | | | | | | | | | |
| Firing Plt | | | X | A | | | | | | | | | | | |
| FIST HQ | | | | | | | | | | | | | | | |
| Forward Observer | | | | | | | | | | | | | | | |
| Radar (Atch or Organic) | X | A | A | | | | | A | | | | | | | |
| COLT | | | | | | | | | | | | | | | |
| ALOC | | | | N | | | | | | A | A | | | | |
| BAO | | | | X | | | | | | | | | | | |
| BMO | | | | X | | | | | | | | | | | |
| Wrecker | | | | X | | | | | | | | | | | |
| Recovery Vehicle | | | | X | | | | | | | | | | | |
| Medical Officer | | | | X | | | | | | | | | | | |
| BSOC | | | | X | | | | | | | A | | | | |

GENERAL SUPPORT MISSION RADIO NET MATRIX

| | INTERNAL NETS | | | | EXTERNAL NETS | | | | | | | | | | |
|-------------------------|---------------|----------|-------------|--------------|---------------|----------------------|-------------|-------------------|-----------------|--------------------|---------------------------|------------|-----------|------------------|--------------------|
| | Bn Cmd | Bn Ops/F | Bn FD 1,2,3 | Bn Admin/Log | Force FA Cmd | Force FA Ops/F 1,2,3 | Force FA CF | Force FA TA/Intel | Force FA Survey | Force FA Admin/Log | Supporting Unit Admin/Log | Mvr Bde FS | Mvr Bn FS | Mvr Bn Mortar FD | Mvr Unit Ops/Intel |
| Bn Ops/TOC | N | | | A | X | | X | | A | | | | | | |
| Bn Cdr | X | | | | X | | | | | | | | | | |
| Bn XO | X | | | A | | | | | | | | | | | |
| S3 | X | | | | | | | | | | | | | | |
| S2 | | | | | | | | X | | | | | | | |
| BSO | X | | | | | | | | | | | | | | |
| RSO | X | | | | | | | | X | | | | | | |
| Btry Commanders | X | | | A | | | | | | | | | | | |
| Bn FDC | | N | N | | | X | | | | | | | | | |
| Bn O&I Sec | | W | | | | | | | | | | | | | |
| Reinforcing Bn FDC | | | | | | | | | | | | | | | |
| Maneuver Bde FSE | | | | | | | | | | | | | | | |
| Maneuver Bn FSE | | | | | | | | | | | | | | | |
| Firing Plt | | | X | A | | | | | | | | | | | |
| FIST HQ | | | | | | | | | | | | | | | |
| Forward Observer | | | | | | | | | | | | | | | |
| Radar (Atch or Organic) | X | A | A | | A | A | | A | | | | | | | |
| COLT | | | | | | | | | | | | | | | |
| ALOC | | | | N | | | | | | A | | | | | |
| BAO | | | | X | | | | | | | | | | | |
| BMO | | | | X | | | | | | | | | | | |
| Wrecker | | | | X | | | | | | | | | | | |
| Recovery Vehicle | | | | X | | | | | | | | | | | |
| Medical Officer | | | | X | | | | | | | | | | | |
| BSOC | | | | X | | | | | | A | | | | | |

The radio nets of the artillery cannon battalion must meet the requirements of the tactical mission assigned—direct support, general support reinforcing, or general support reinforcing. The organization of the artillery cannon battalions may differ.

Some battalions are organized with organic sections that support FISTs, maneuver battalion FSEs and maneuver brigade FSEs; other battalions do not have these elements.

Apart from these differences in organization, the fire direction, operations, and intelligence sections are identical. This similarity forms the basis of the radio networks discussed in the following paragraphs. These networks are grouped according to the FA cannon battalion mission.

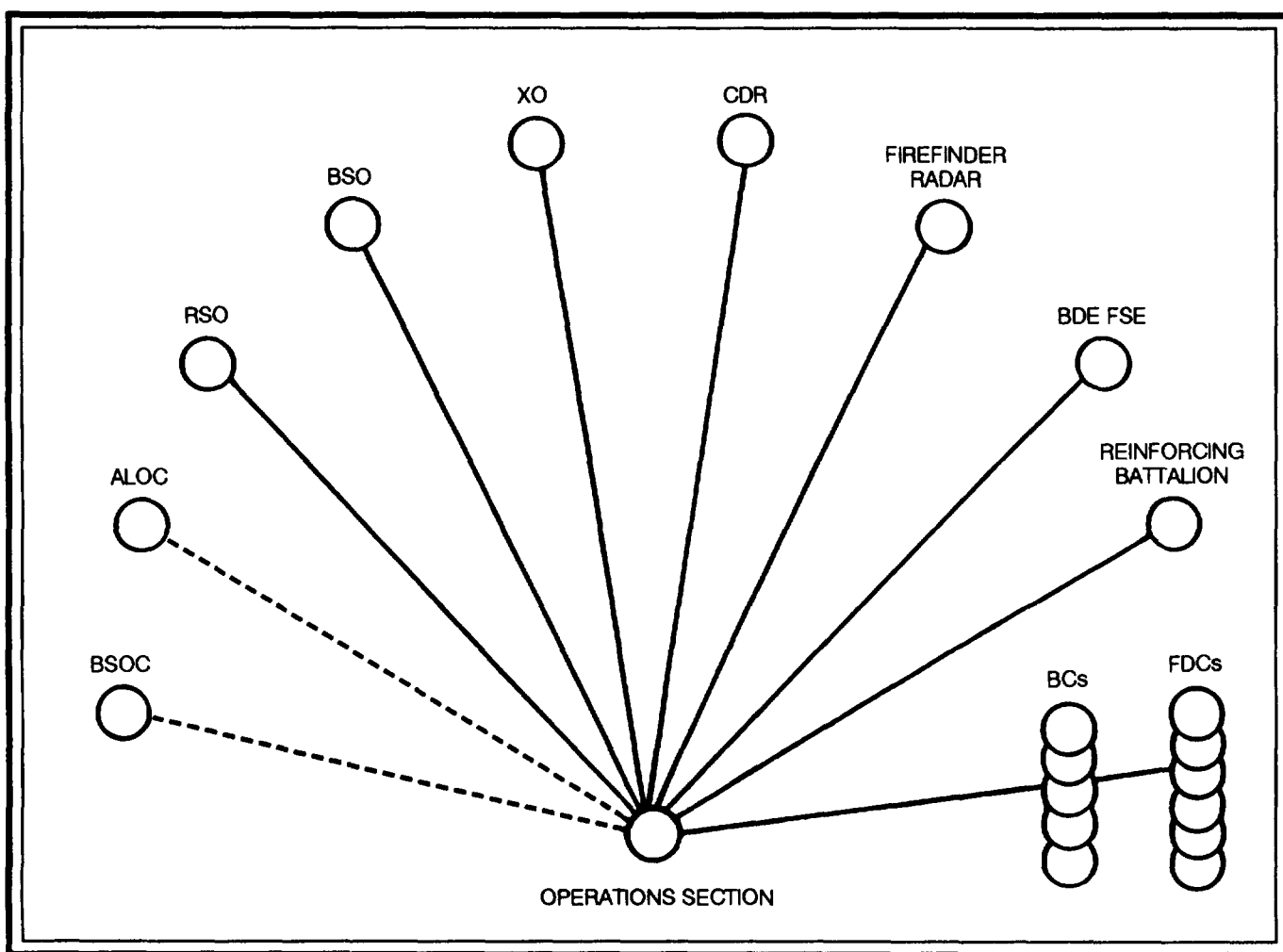
Direct Support Mission

The DS battalion nerve center is the command post. The DS battalion may be equipped to support a heavy maneuver brigade with self-propelled howitzers or a light infantry brigade with towed howitzers. The requirements are the same, but the equipment configurations are different. Nets indicated as digital maybe voice nets until units field the necessary equipment to use digital methods and means of communication.

Internal Nets. The DS battalion operates on six internal nets.

The direct **support battalion command (VHF-FM)(voice) net** is used for command and control and collection and dissemination of tactical information and intelligence. The DS battalion operations section is the NCS.

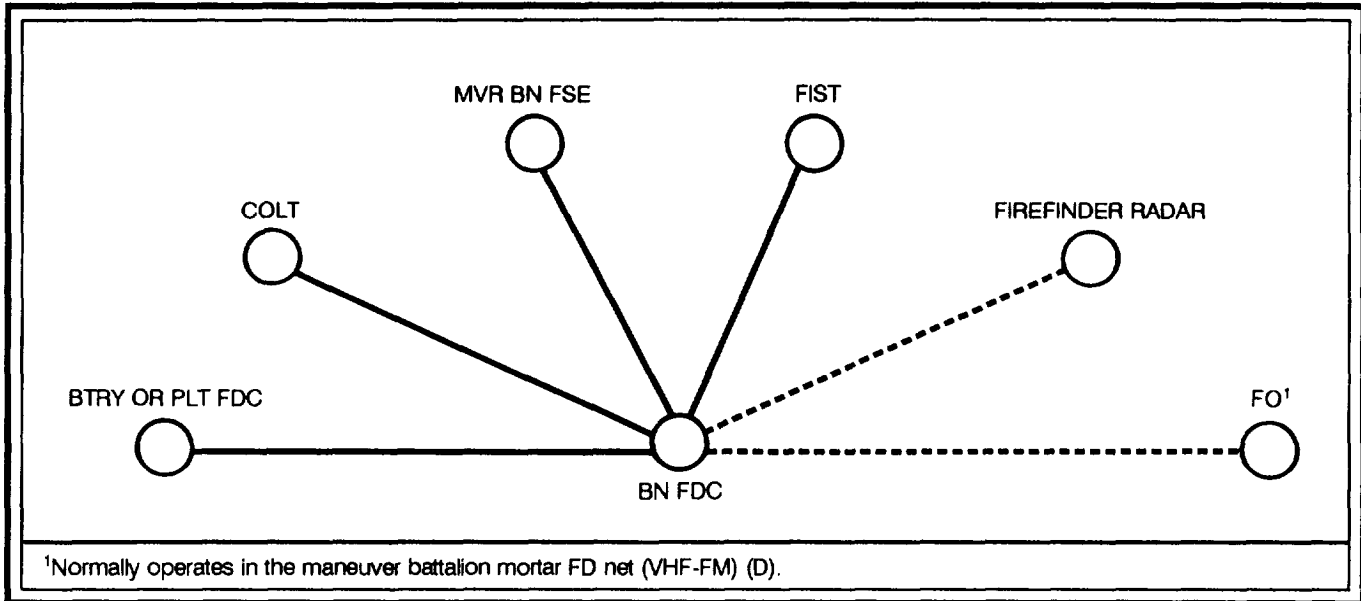
BATTALION COMMAND NET



The **battalion fire direction 1, 2, and 3 (VHF-FM) (digital) nets** are identical. They are used for tactical and technical fire direction from FOs through the DS battalion FDC to the controlling FDC. The fire direction nets (FD 1, FD 2,

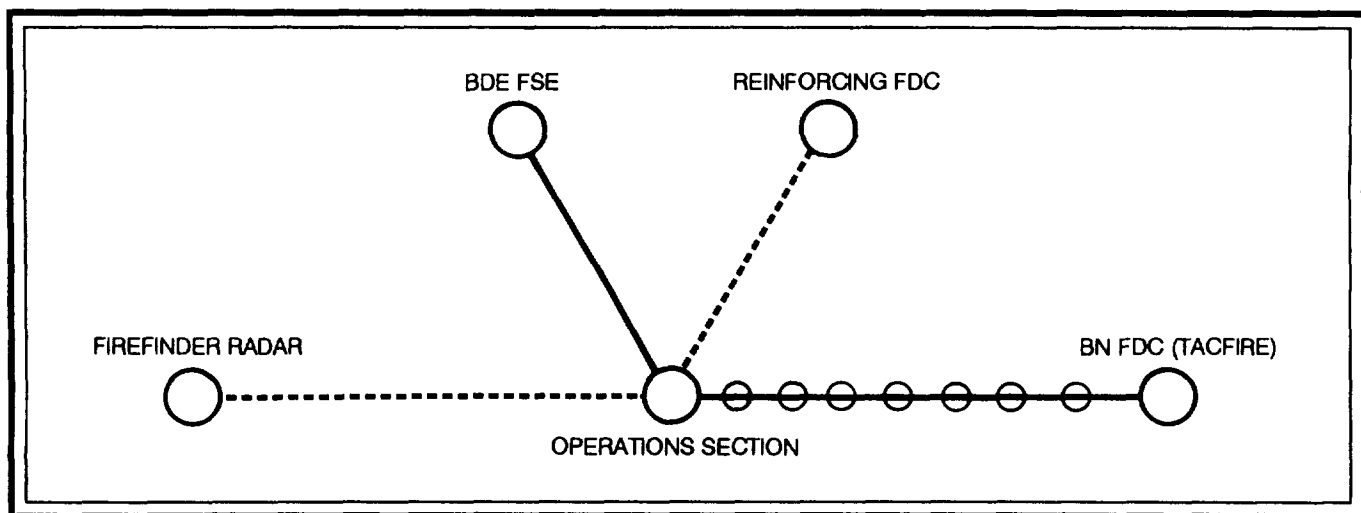
and FD 3) should be assigned according to the mission, not necessarily one per battery (for example, FD 1 to Btry A, FD 2 to Btry B, and FD 3 to Btry C). The NCS for all three FD nets is the battalion FDC.

BATTALION FIRE DIRECTION 1, 2, OR 3 NET



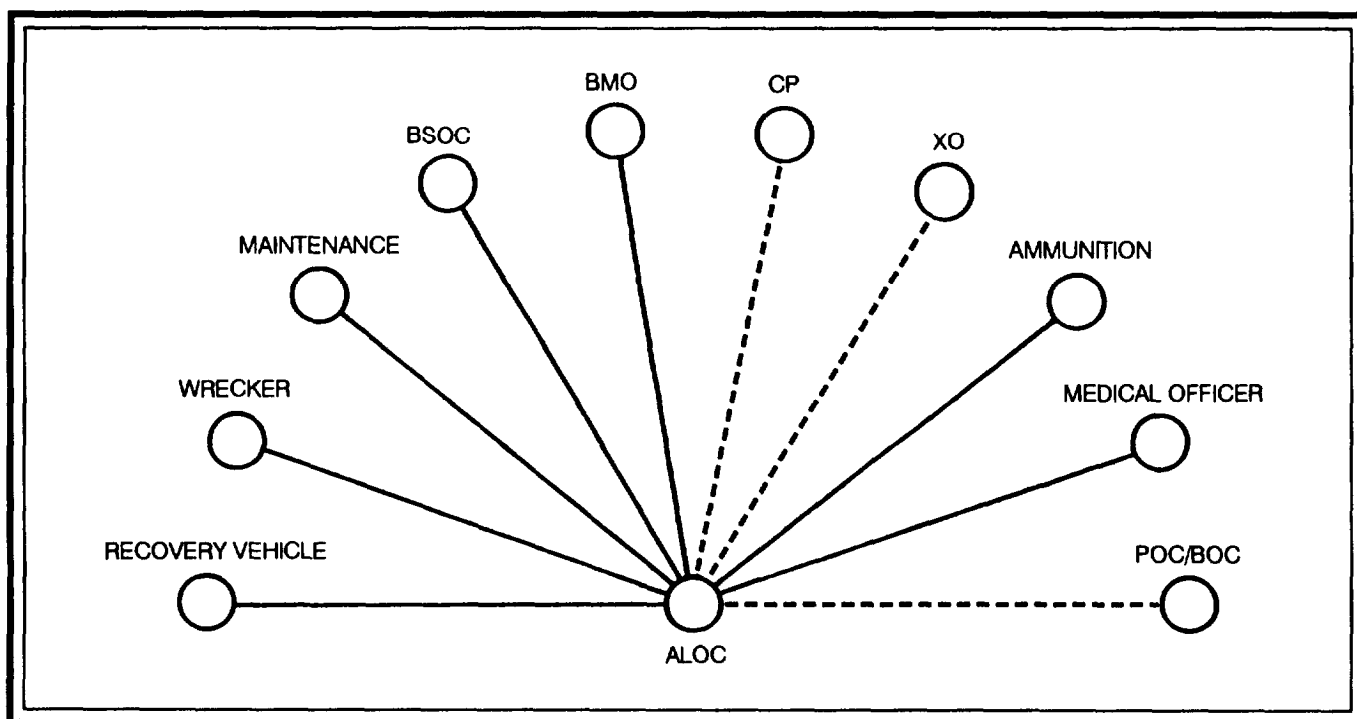
The **battalion operations/fire (VHF-FM) (digital) net** is used for fire support planning and coordination between FA elements, for mutual support operations, and for tactical and technical fire direction to reinforcing artillery units. The NCS is the battalion operations section.

BATTALION OPERATIONS/FIRE NET



The **battalion administration/logistics (VHF-FM) (voice) net** is used for coordinating all battalion administrative and logistical matters. The battalion administration and logistics operations center is the NCS.

BATTALION ADMIN/LOG NET



External Nets. The DS battalion operates on five external nets (and possibly two as-required nets). Additional information on these external nets is in FM 6-20-2, FM 6-20-40, FM 6-20-50, and TC 6-40A. In addition, the battalion RSO operates as a full-time subscriber in the force FA (normally div arty) survey (VHF-FM) (V) net.

The **force field artillery command (VHF-FM) (voice) net** is used for command and control, tactical operations, intelligence, and voice coordination with all artillery elements and units (organic, attached, and reinforcing). The force FA operations section is the NCS.

The **force field artillery operations/fire 1, 2, and 3 (VHF-FM) (digital) nets** are identical. They are used for tactical fire direction, fire support planning and coordination, mutual support operations, and met data. Normally, each of the DS battalions will be in one of the

nets. Other artillery elements, such as the AN/TPQ-36 radar, the AN/TPQ-37 radar, and the MTLR, may also be in one of these nets depending on the task organization. The FSEs at the division tactical CP and the division main CP, if not collocated with force FA CP, will also be in one of these nets. The force FA fire control element is the NCS.

The **force field artillery command/fire (HF-SSB) (V-fax/RATT) net** is a multipurpose long distance net used for command and control and fire support coordination with subordinate units out of VHF range. If required, it can be used to pass digital data. The fielding of mobile subscriber equipment, an area common-user communications and telephone system, will eliminate the requirement for RATT networks linking most combat units. The RATT nets will be replaced with a voice-facsimile net. The operations section at the force FA command post is the NCS.

The **supported maneuver unit operations/intelligence (VHF-FM) (voice) net** is a maneuver net used for operational and intelligence traffic. The maneuver unit CP is the NCS. The DS battalion CP operates in this net to transmit and receive operational and intelligence information. Non-FA observers may call for fire in this net. The maneuver unit operations section is the NCS.

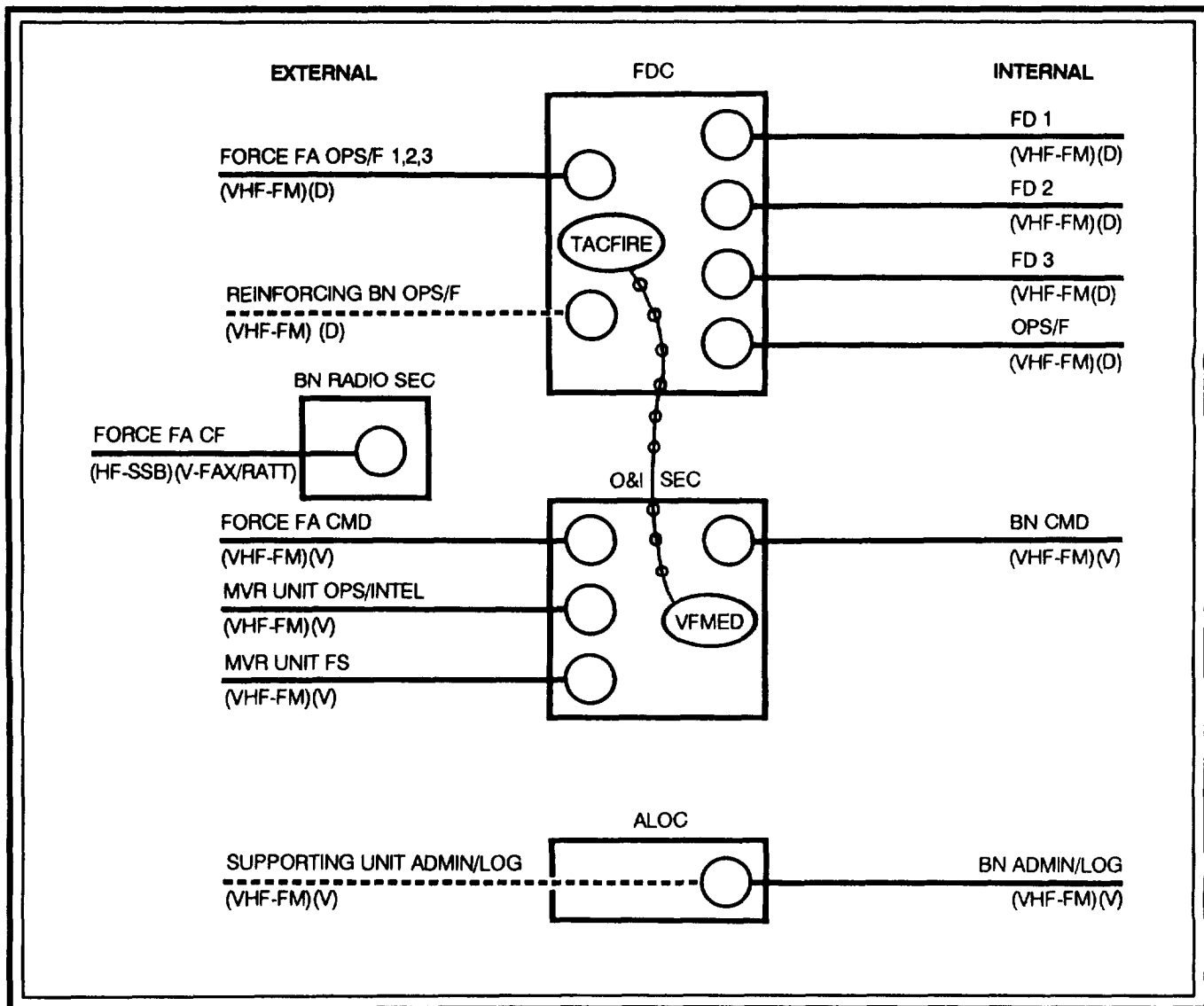
The **supported maneuver unit fire support (VHF-FM) (voice) net** is used for voice fire support coordination and planning. It is also used to request and coordinate close air support and naval gunfire (NGF)

operations. Non-FA observers may call for fire in this net. The maneuver unit FSE is the NCS. The DS battalion CP operates in this net to provide immediate reaction to the maneuver commander's fire support requirements.

The **reinforcing battalion operations/fire (VHF-FM) (digital) net** is used, as required, if the DS battalion receives a reinforcing battalion.

The **higher headquarters administration/logistics (VHF-FM) (voice) net** is used, as required, for coordination of administrative and logistical matters. The higher headquarters ALOC is the NCS.

BATTALION CP NETS (DS MISSION)



Reinforcing Mission

Internal Nets. When assigned to the reinforcing mission, the internal nets are the same as those required for the DS mission.

External Nets. External nets change to reflect the responsibility of reinforcing to reinforced.

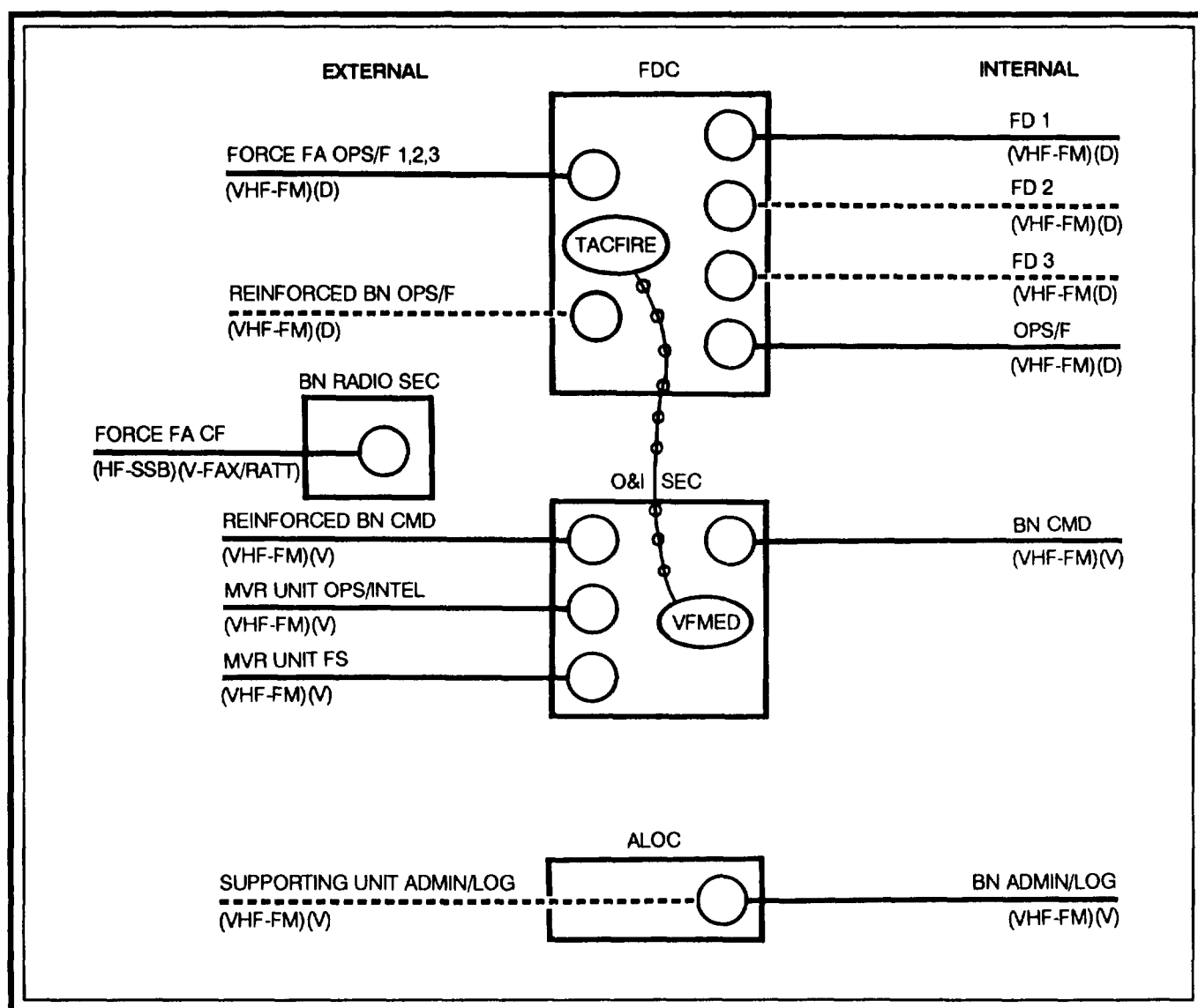
The battalion enters the **reinforced battalion command (VHF-FM) (voice) net**. The purpose is to be immediately responsive to the needs of the reinforced artillery unit.

The battalion enters the **reinforced battalion operations/tire (VHF-FM) (digital) net**. The purpose is to receive tactical tire direction from the reinforced artillery unit.

The battalion continues to monitor the **force FA headquarters command/fire direction (HF-SSB) (V-fax/RATT) net** to remain responsive to the force FA headquarters when directed to assume a different tactical mission.

The RSO monitors the **survey (VHF-FM) (voice) net** in which the reinforced unit survey platoon operates.

BATTALION CP RADIO NETS (REINFORCING MISSION)



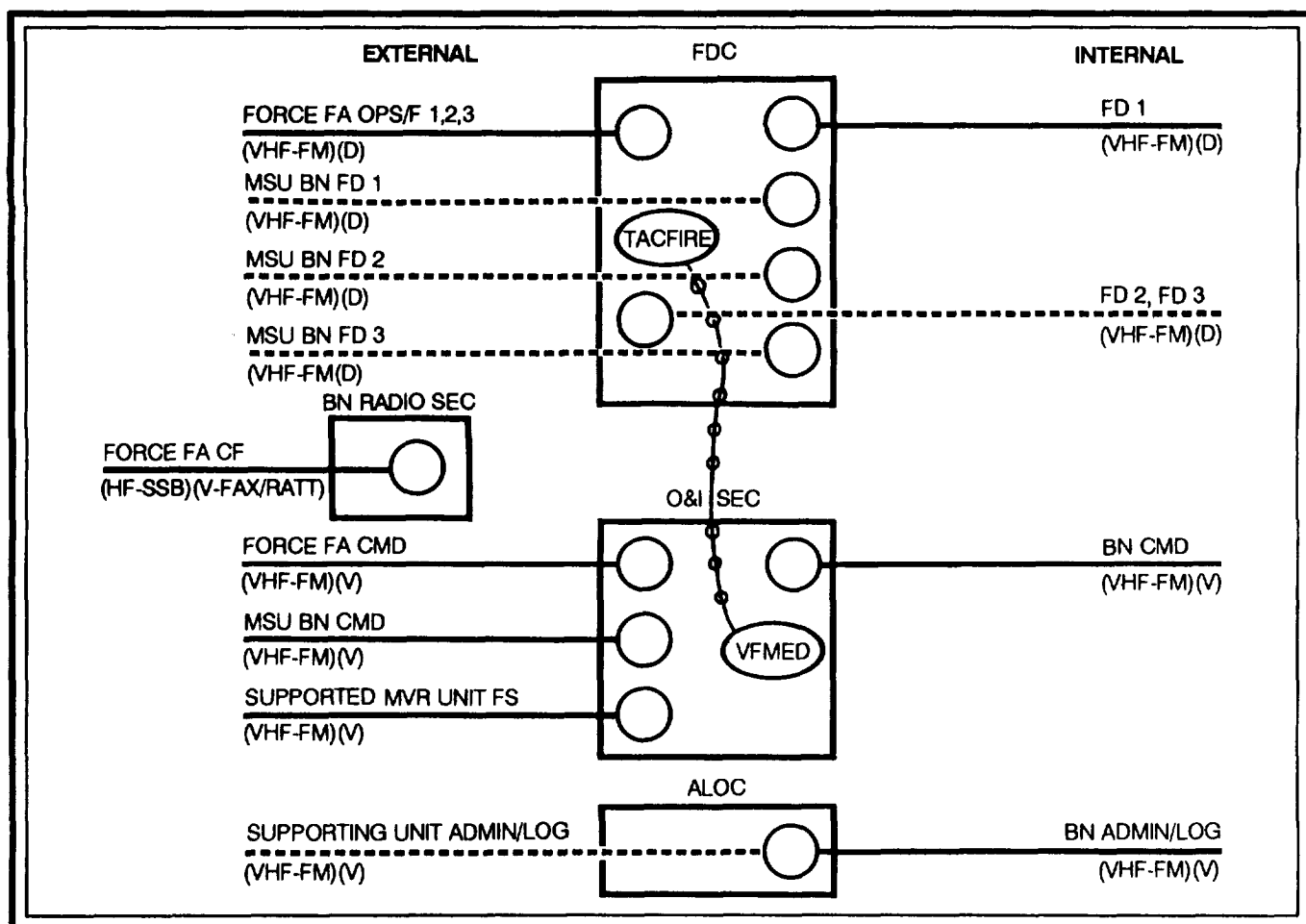
Mutual Support Unit. Mutual support between two battalions means that the TACFIRE computer of one provides tactical fire direction for the other when that unit must displace or has equipment failure. Mutual support may be conducted between any two TACFIRE-equipped artillery battalions, but it is normally performed between a direct support and a reinforcing battalion.

When the reinforcing battalion must take control of the DS battalion firing batteries for tactical fire direction, it will operate on the DS battalion's three fire direction nets.

When the DS battalion must provide tactical fire direction to the reinforcing battalion's firing batteries, it will do so on the reinforcing battalion's operations/fire net.

To link each battalion TACFIRE computer, either the higher headquarters operations/fire (1, 2, or 3) net or one of the two battalion ops/F nets will provide the computer-to-computer link between the units.

BATTALION CP RADIO NETS (MSU OPERATIONS)



General Support Reinforcing Mission

Internal Nets. The cannon battalion may be assigned the tactical mission of general support reinforcing. The internal nets are the same as for the DS mission.

External Nets. External nets change to reflect the responsibility of reinforcing to reinforced.

The battalion enters the **force FA command (VHF-FM) (voice) net** to continue to be responsive to force FA headquarters (general support).

The battalion enters **the force FA operations/fire 1, 2, or 3 (VHF-FM) (digital) net** to continue to be responsive to force FA headquarters (general support).

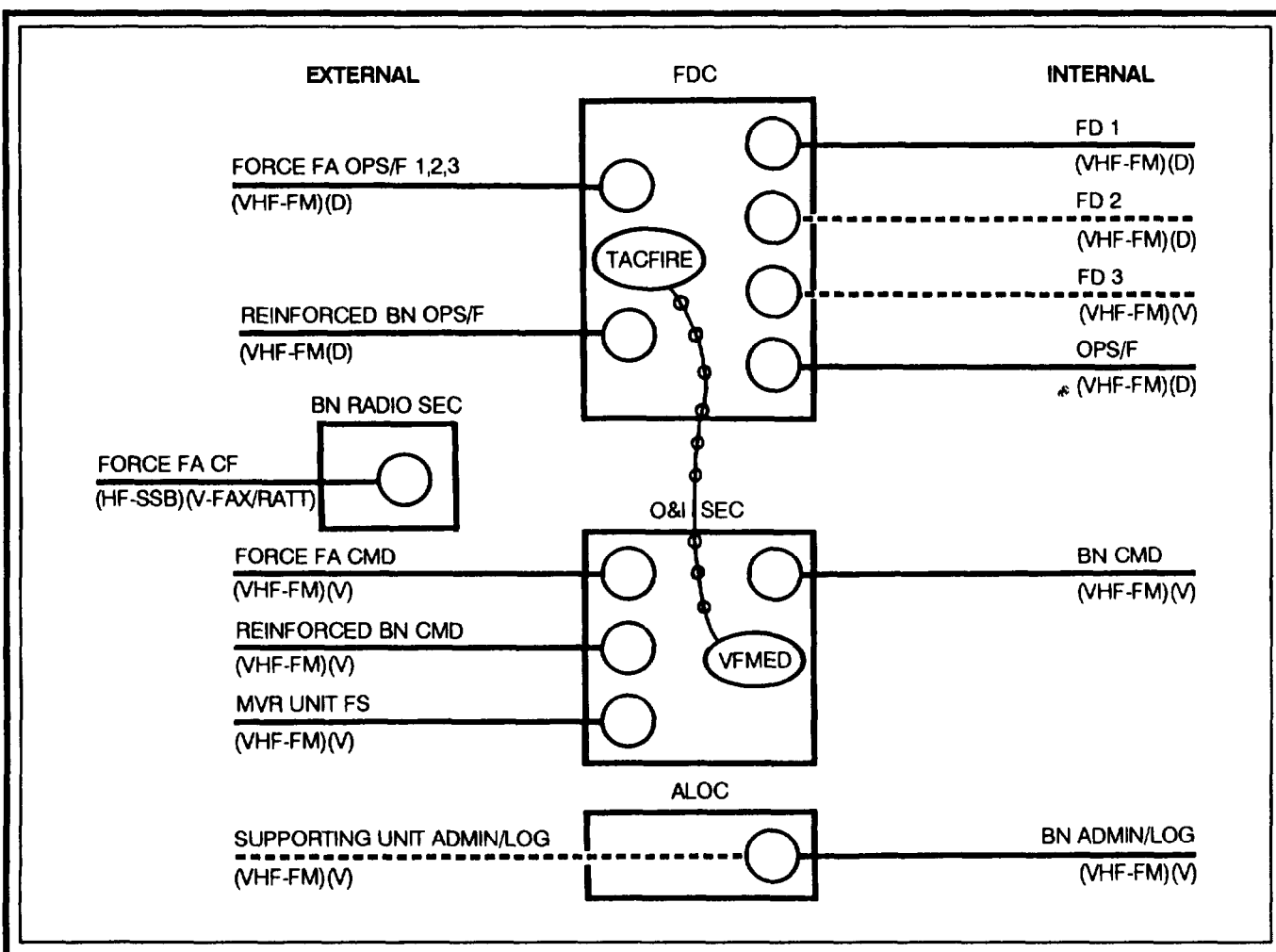
The battalion enters the **reinforced battalion command (VHF-FM) (voice) net** to be immediately responsive to the needs of the reinforced artillery unit.

The battalion enters the **reinforced battalion operations/tire (VHF-FM) (digital) net** to receive tactical fire direction from the reinforced artillery unit.

The RSO monitors the **force FA survey (VHF-FM) (voice) net**. If the reinforced unit operates in a different survey net (such as when a battalion of an FA brigade is GSR to a div arty DS battalion), the RSO must monitor the supported unit survey net full time while monitoring his parent unit survey net as much as possible with his available radios.

The battalion remains on the **force FA command/fire direction (HF-SSB) (voice-facsimile/RATT) net**.

BATTALION CP RADIO NETS (GSR MISSION)



General Support Mission

Internal Nets. The cannon battalion with a GS mission operates three internal nets (and three as-required nets).

The **battalion command (VHF-FM) (voice) net** serves the same purpose as that net for a battalion with a DS mission. It has similar subscribers.

If fire direction is done in the voice mode, the **battalion fire direction 1 (VHF-FM) (digital) net** may become overburdened. This creates the need for additional fire direction nets. Units must open and allocate additional FD nets (FD 2 and FD 3) as required.

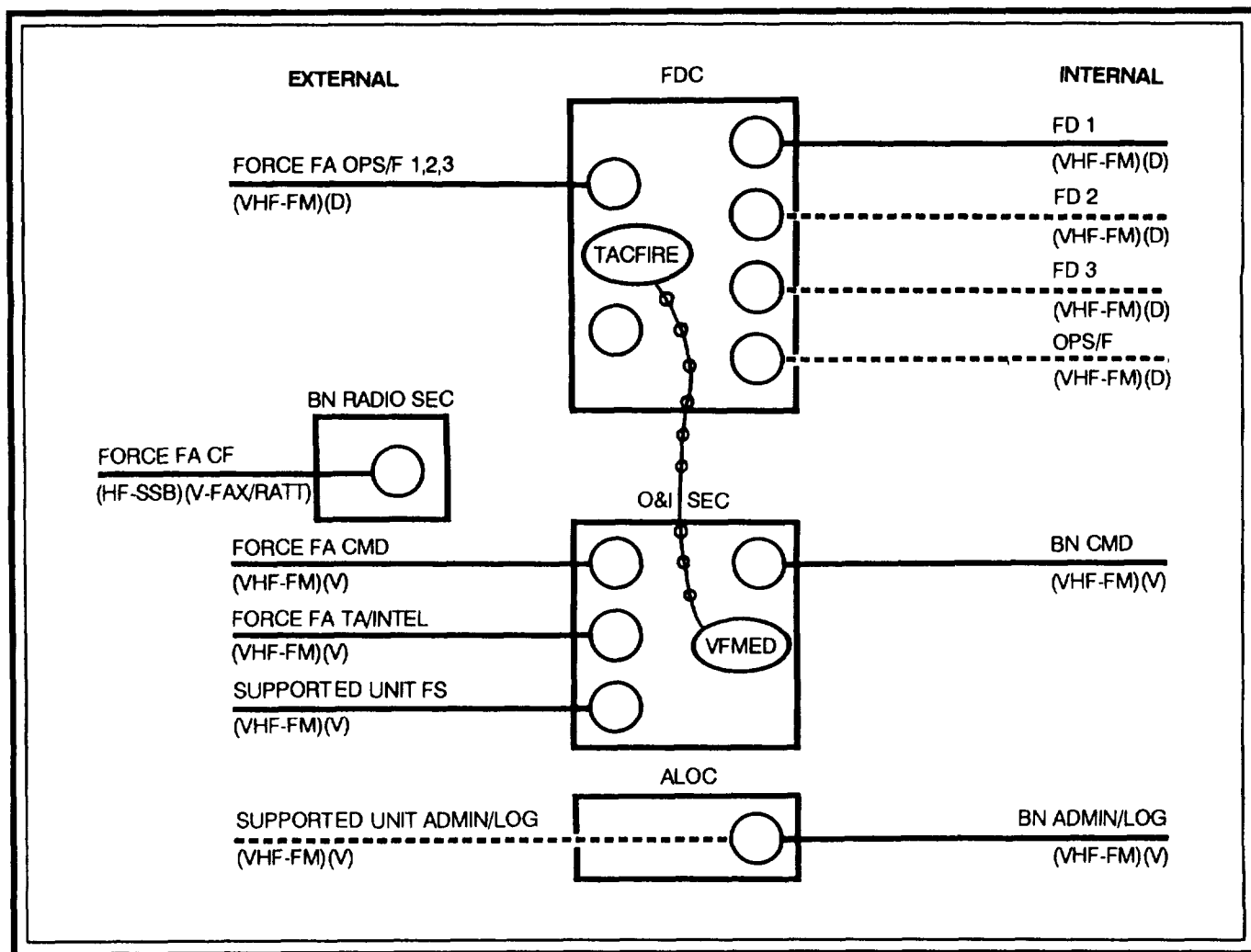
The **battalion administration/logistics (VHF-FM) (voice) net** serves the same purpose as the DS battalion admin/log (VHF-FM)(V) net and has similar subscribers.

External Nets. When providing general support to a maneuver force as a part of a field artillery brigade or a div arty, the battalion operates on four external nets and one as-required net.

The **force FA command (VHF-FM) (voice) net** is used for command and control, tactical operations, intelligence, and voice coordination by all force FA elements. The force FA operations section is the NCS.

The **force FA operations/fire 1, 2, and 3 (VHF-FM) (digital) nets** are identical. They are used for tactical fire direction, fire support coordination target acquisition, and met data. The force FA fire control element (FCE) is the NCS.

BATTALION CP RADIO NETS (GS MISSION)



The force **FA command/fire direction (HF-SSB) (voice-facsimile/RATT net)** is a multipurpose long distance net. It is used for command and control, fire support coordination, and fire direction with subordinate units out of VHF range. If required, this net can be used to pass digital data. The force FA operations section is the NCS.

The force **FA survey (VHF-FM) (voice) net** is used by the RSO for coordination and control of survey assets,

As required, the **force FA administration/logistics (VHF-FM) (voice) net** is used for coordination of all administrative and logistical matters. The force FA ALOC is the NCS.

General Support to a Light Infantry Division. When supporting a light infantry division (LID), the cannon

battalion operates on three external nets and three as-required nets.

Ž Division artillery command (VHF-FM) (voice) net.

Ž Division artillery operations/fire 1, 2, or 3 (VHF-FM)(digital) net.

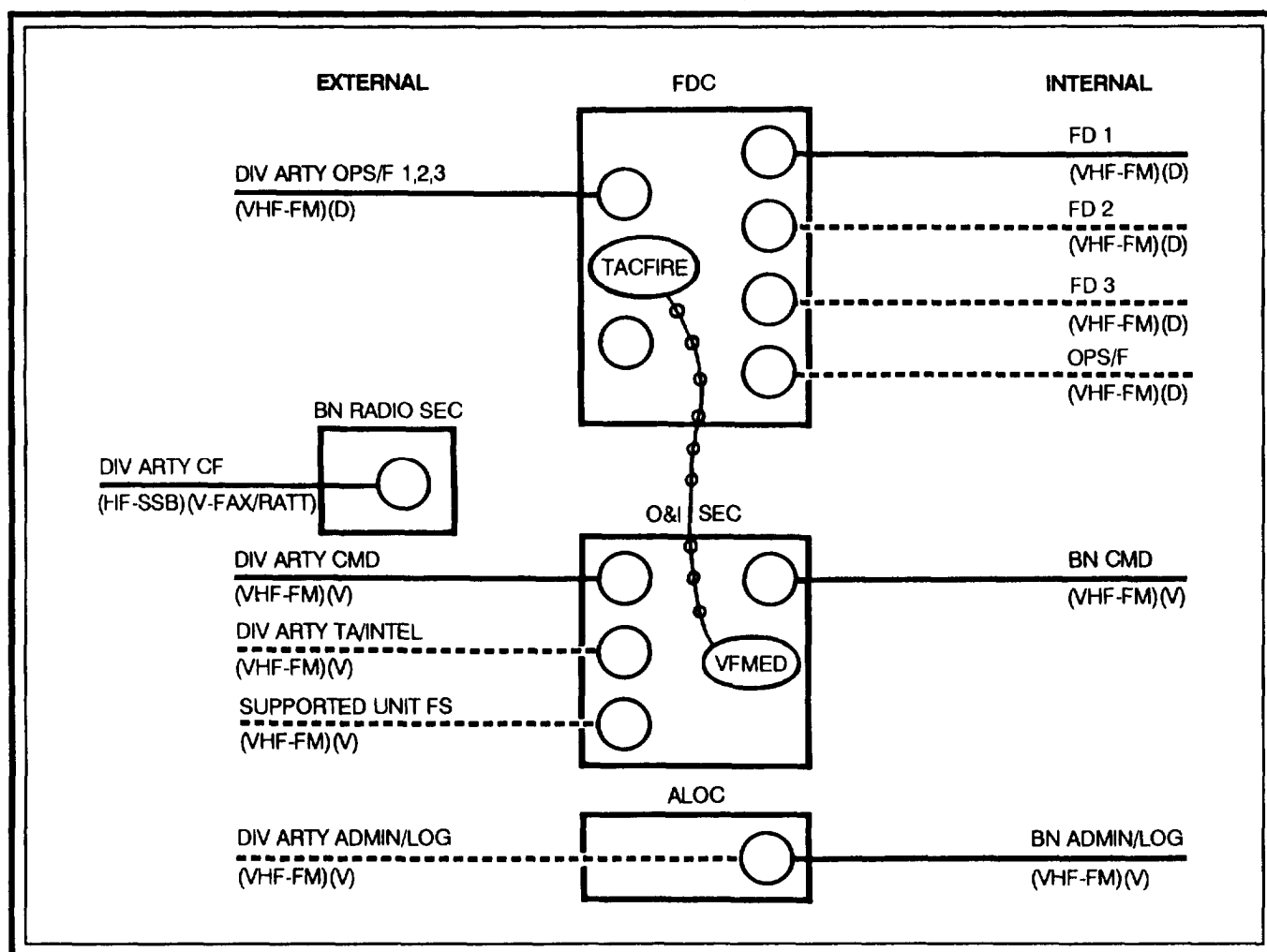
- Division artillery command/fire direction (HF-SSB)(voice-facsimile/RATT) net.

- As required, the maneuver fire support (VHF-FM)(voice) net.

- As required the div arty target acquisition/intelligence (VHF-FM)(voice) net.

Ž As required, the division artillery administration/logistics (VHF-FM) (voice) net.

BATTALION CP RADIO NETS (GS TO LID)



Section III

WIRE COMMUNICATIONS SYSTEMS

Wire systems are more secure than radio, visual, or sound systems; but they can never be considered completely secure without on-line cryptographic equipment. They are not particularly vulnerable to EW but are extremely susceptible to damage from tracked vehicles and enemy artillery. Both voice and digital data can be communicated by wire. Wire communications systems are divided into networks called circuits. These circuits are based on the purpose of their use.

WIRE CIRCUITS DESCRIPTION

Wire circuits parallel combat net radio (CNR) systems. That is a wire circuit will be installed whenever possible to back up radio. Wire is not used extensively in offensive operations, but it is often the preferred communications means in defensive operations.

Wire circuits require extensive planning and coordination. Battalion signal officers must coordinate with signal battalion and/or brigade for access into the area common-user system, SOPs should further explain the planning, installation, and retrieval of wire systems. Priorities for installing FA wire circuits are fire direction network, fire support network, command and control network and administrative and logistics network.

Wire communications systems should be relatively free of splices. Digital data will not be usable if signal quality is

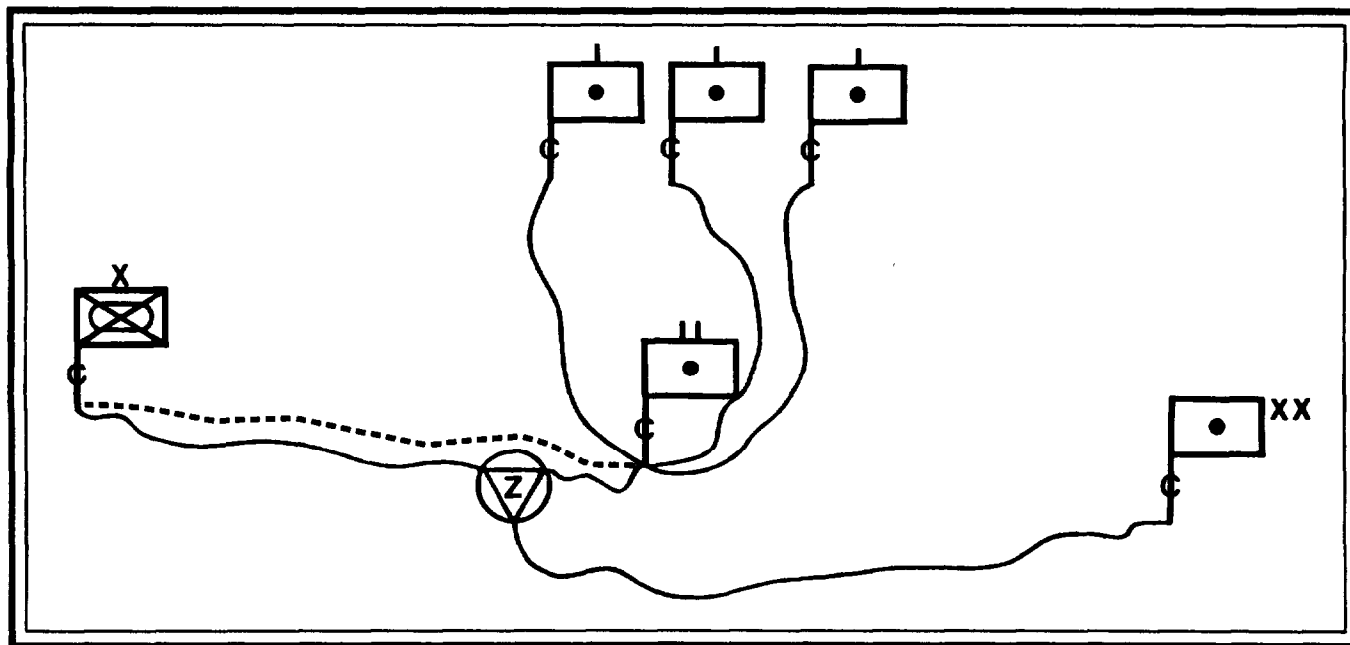
degraded due to excessive splices. Whenever possible, terminal boards should be used instead of manual switchboards to connect digital wire lines.

FIELD ARTILLERY CANNON BATTALION WIRE CIRCUITS

The various wire circuits are discussed below according to battalion tactical missions.

Direct Support Mission

The DS battalion has four wire teams and a switchboard section to install wire. The battalion gains access into the area common-user communications system, whether it is multichannel or MSE, to complete the DS battalion wire system.

BATTALION WIRE CIRCUITS (DS MISSION)

Consistent with the tactical situation, battalion wire teams install tire circuits in a predetermined sequence. SOPs should indicate wire team composition and responsibilities.

The responsible wire team installs a wire line from the DS battalion FDC to the brigade area common-user signal node. This is a digital circuit to connect the DS battalion FDC to the division artillery FDC. While returning from the signal node, the same team installs a wire line from the common user node to the battalion switchboard. This is a voice circuit to the maneuver brigade, division artillery, and other battalions. It uses the area common-user communications system. It maybe necessary to install more than one line each way to meet all mission responsibilities. These circuits parallel the force FA ops/F 1, 2, or 3 (VHF-FM)(D); force FA command (VHF-FM)(V); maneuver unit ops/intel (VHF-FM)(V); and maneuver unit FS (VHF-FM)(V) radio nets.

At the same time, the other three wire teams install wire lines from the DS battalion FDC to the wire heads at the cannon batteries. These are digital circuits to connect the DS battalion FDC to the platoon FDCs. While returning from the cannon batteries, the wire teams install wire lines for voice circuits from the battery wire heads to the battalion switchboard.

While the wire teams are installing the long lines (from battalion to battery), the switchboard section installs the

DS battalion CP internal wire circuits and provides a test station to help the wire teams. The battery wire section gives technical assistance to the battery in the installation, operation, and maintenance of the intrabattery wire net, (See FM 6-50, Chapter 9.)

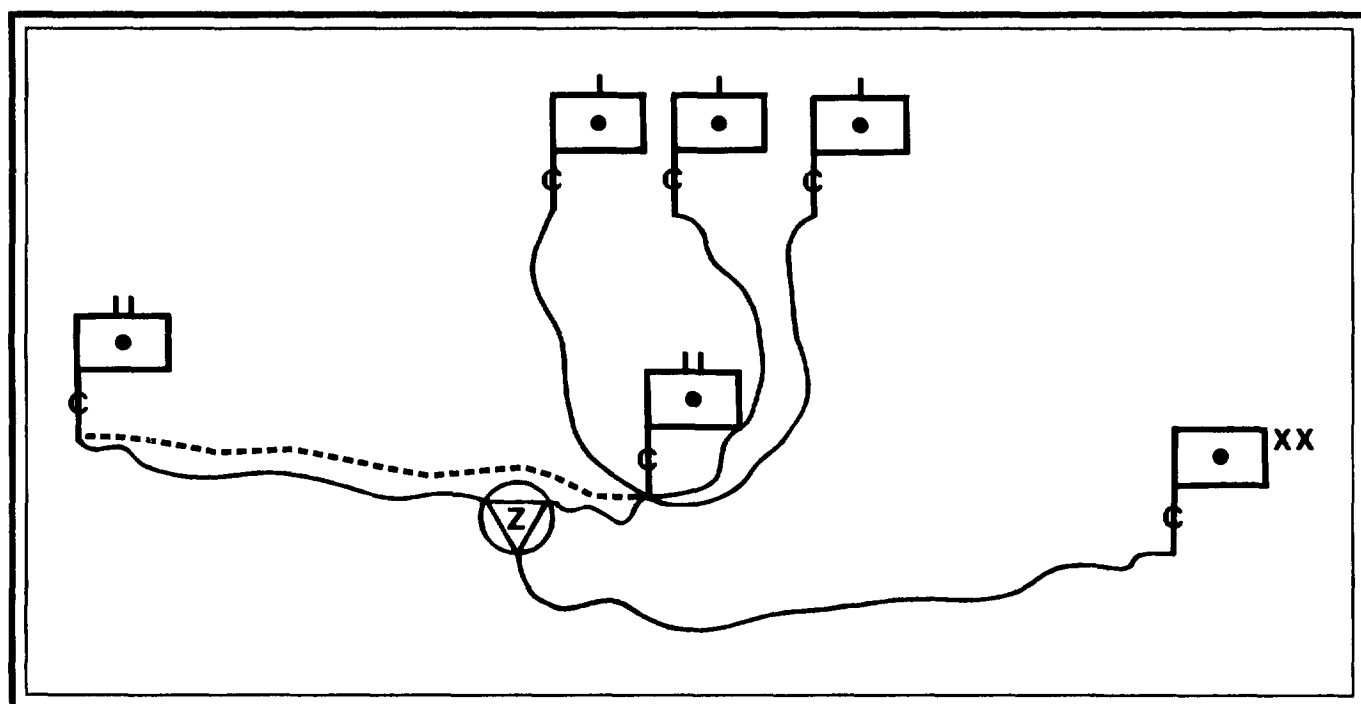
If time and situation permit, a wire team should install a direct wire line for a digital circuit to the maneuver brigade FSE and as it returns, another wire line for a voice circuit from the supported maneuver brigade switchboard to the DS battalion switchboard. These circuits parallel DS battalion ops/F (VHF-FM)(D), maneuver unit ops/intel (VHF-FM)(V), and maneuver unit FS (VHF-FM)(V) nets.

MSE users will be required to run their own lines from their terminal devices to the nearest extension node. MSE circuits will not support the tire support digital networks at the battalion level.

Reinforcing or General Support Reinforcing Mission

The FA battalion with the mission of R or GSR installs a wire line for the digital circuit to the reinforced battalion FDC. On the wire team's return, it installs a wire line for a voice circuit to connect the switchboards of the two battalions.

BATTALION WIRE CIRCUITS (R OR GSR MISSION)

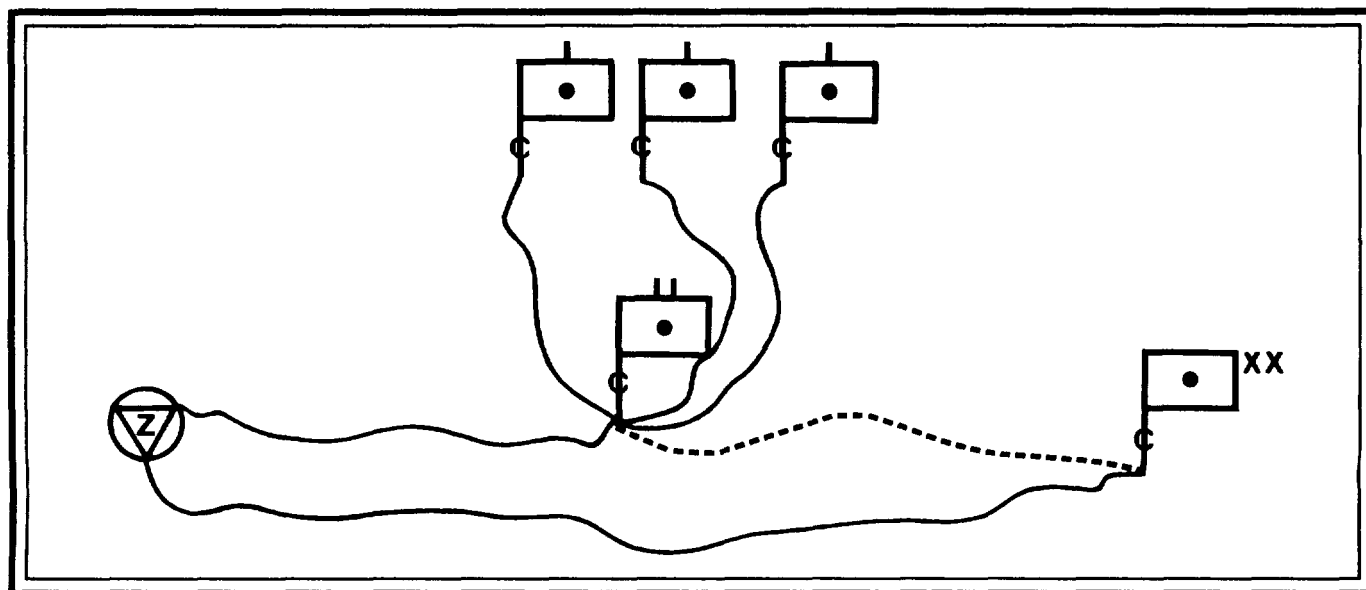


General Support Mission

Wire circuit installation for a battalion with a GS mission is the same as that for a DS battalion, with the following exceptions:

- Ž There is no requirement to establish a wire link to a maneuver brigade CP or FSE.
- Ž The link between the battalion FDC and the force FA headquarters is of even greater importance. Wire can be laid to the area common-user signal node or directly to the force FA CP, or both.

BATTALION WIRE CIRCUITS (GS MISSION)



Section IV

NEW COMMUNICATIONS SYSTEMS

Changing technology is altering the face of the AirLand Battlefield. In no area are these changes as widespread and profound as in the communications field. Equipment either currently being fielded or to be fielded in the near future will significantly improve the ability of the FA cannon battalion to communicate, both internally and with the maneuver and artillery units it supports.

MOBILE SUBSCRIBER EQUIPMENT

The MSE provides secure, automatic digitized voice, data, and fax communications to the user, whether static or mobile. It will replace the existing area common-user multichannel communications system and many of the RATT nets. It is an area communications system extended

by mobile telephone. The MSE can be used for data (digital) transmission; however, its primary purposes are for voice telephone and facsimile communications.

The division and corps signal units will establish the MSE system by positioning signal nodes throughout the division and corps area of operations. Extension nodes will be

placed near maneuver brigade and div arty CPs as well as throughout the rear areas. Cannon battalions will access the MSE system either by wiring into the extension nodes or by using cellular-type radiotelephones through the signal nodes.

When in place, the MSE net functions similarly to a civilian telephone system. Subscribers are assigned individual telephone numbers, which can be dialed directly. Text and graphics can be transmitted in hard copy via the fax capability of the system.

The cannon battalion uses three key pieces of equipment when it operates in the MSE net. These are as follows:

Ž The **digital nonsecure voice telephone TA-1035/U** is the conventional telephone of the MSE system. It converts voice signals into digital signals and transmits these converted data at 16,000 bits per second. The DNVT must be wired into the junction box J-1077/U which is located at the area signal node, normally located near the brigade CP. The user is responsible for laying the wire to the junction box. The battalion will have DNVTs in the CP, in combat and field trains, and at the firing batteries. The DNVTs cannot operate with the older wire telephones, such as the TA-312.

Ž The mobile subscriber radiotelephone terminal AN/VRC-97 is the cellular telephone of the MSE system. The MSRT links into the MSE net through one of the

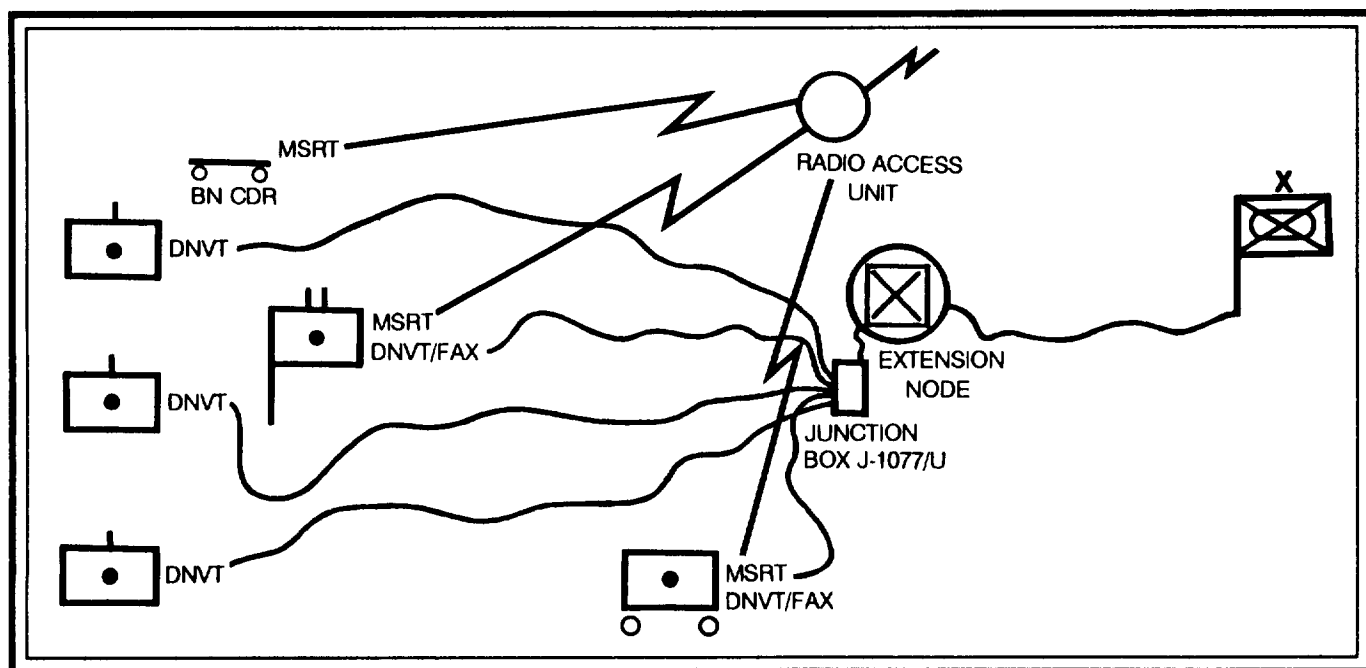
radio access units (RAUs) positioned throughout the area of operations by the signal unit. The RAU picks up the signal from the MSRT and switches it into the nearest signal node. The cannon battalion will have four MSRTs) mounted on the vehicles of the battalion commander, executive officer, S3, and service battery commander. In addition, the battalion will have two stand-alone installation kits (SAIKs), which will allow the S3's and service battery commander's MSRTs to be dismounted for use in the CP and trains.

Ž The **lightweight digital facsimile (LDF) AN/UXC-7**, when connected to the MSE net through the DNVT or digital secure voice terminal, will allow the battalion to send and receive text and graphics in hard copy.

The MSE will eliminate the RATT service that was previously provided by the signal battalion assets. Those RATT nets that are internal to the artillery will also disappear; however, they will be replaced by the improved high-frequency radio (IHFR) with a digital device, either a smart terminal or a facsimile, or the traffic will be passed over MSE facsimile.

The dedicated, sole-user (multichannel) circuit that provided a computer-to-computer link between some battalions and their higher headquarters will also disappear. These digital requirements will be met by the addition of an MSE-TACFIRE interface device, allocated to select units. Not all battalions will receive this device.

CANNON BATTALION MSE NET



COMBAT NET RADIOS

The combat net radio is, and will continue to be, the major means for passing fire direction and coordination data, command and control, around the AirLand Battlefield. The new SINCGARS will replace the AN/PRC-77 and AN/VRC-12 series for short- and intermediate-range communication (up to 50 km). The new IHFR will replace the AN/GRC-106-based radio sets for longer ranges (up to 80 km and farther with proper antenna and frequency selection). As stated above, the RATT will be severely reduced and ultimately eliminated by the MSE and IHFR communications systems.

The CNRs will be used for voice and data communication throughout the corps sector, but they will be relied on more heavily forward of the maneuver brigade headquarters.

The single-channel ground-airborne radio system is the new generation CNR designed to provide a major means of command and control. Its main features are its resistance to jamming through frequency hopping and its

increased capacity of 2,320 channels. The basic radio is designed on a modular basis to achieve commonality among various systems configurations. It can be used in the manpack or vehicular package. It is interoperable with the AN/VRC-12-series radios. The present radio net structure will not change in terms of mission capability, net size, assignment of net stations, or distance covered. Planning considerations, however, require frequency management on a decentralized basis. This means frequency management will be done at the battalion level and will require intensive management by staff and supervisors at all levels of command.

The battlefield electronic signal operation instructions system is a decentralized system for frequency management and the publication of unit SOIs. The electronic SOI is designed to provide more responsiveness to rapidly changing and highly mobile battlefield conditions. The system consists of a basic generation unit (BGU) and an electronic notebook (EN). Any radio operator who normally carries a paper SOI will have an electronic notebook instead. Distribution channels are the same as those now used for the paper SOI.

RADIO SET COMPARISON

| NOMENCLATURE | REPLACES | COMPONENTS (BASIC ISSUE ITEMS) | | | | NSN | LIN |
|--|------------------------------|--------------------------------|--|------------------------------|----------------|------------------|--------|
| | | RT | VEH ADAPT | DISMOUNT KIT ¹ | PWR AMP | | |
| Manpack AN/PRC-119 | AN/PRC-25/77 | 1 | | 1 | | 5820-01-151-9915 | R55268 |
| Vehicular short-range AN/VRC-87 | AN/VRC-53/64 | 1 | 1 | | | 5820-01-151-9916 | R44659 |
| Vehicular short-range dismount AN/VRC-88 | AN/GRC-125/160 | 1 | 1 | 1 | | 5820-01-151-9917 | R44727 |
| Vehicular long-range or vehicular short-range AN/VRC-89 | AN/VRC-12/47 | 2 | 1 | | 1 | 5820-01-151-9918 | R44795 |
| Vehicular long-range AN/VRC-90 | AN/VRC-43/46 | 1 | 1 | | 1 | 5820-01-151-9919 | R45283 |
| Vehicular long-range or vehicular short-range dismount AN/VRC-91 | AN/GRC-160 plus AN/VRC-46 | 2 | 1 | 1 | 1 | 5820-01-151-9920 | R45271 |
| Dual vehicular long-range AN/VRC-92 | AN/VRC-45/49 | 2 | 1 | | 2 ² | 5820-01-151-9921 | R45339 |
| ¹ Dismount kit includes manpack antenna, battery case/ interconnecting box, and handset. ² Requires a power amplifier mount for second power amplifier. | | | LEGEND: adapt = adapter NSN = national stock number amp = amplifier pwr = power LIN = line item number RT = receiver-transmitter | | | | |

CHAPTER 7

COMBAT SERVICE SUPPORT

The term "combat service support" describes the full range of health services and personnel services functions as well as the traditional logistical support of supply, maintenance, field services, and transportation. It includes the requirement to men, arm, fuel, fix, and move the force during combat operations.

Section I

ORGANIZATION AND FUNCTIONS

Combat service support is a critical but often neglected component of the war-fighting equation. If the cannon battalion is to provide sustained fire support to the maneuver units, it must be resupplied with food, fuel, and ammunition; wounded soldiers must be cared for and evacuated; personnel and equipment lost in combat must be replaced; and equipment must be maintained. A shortfall in any of these areas can quickly render a unit combat ineffective. This section outlines the organizations within the FA cannon battalion that are tasked to provide CSS. Also addressed are the agencies of higher-level units with which the CSS staff and sections of the battalion coordinate for logistic support.

MISSION

The basic mission of combat service support is to sustain the force. The sole purpose of the CSS system is to maintain and support our soldiers and their weapon systems. CSS planning must focus on sustaining the force as it executes the commander's intent while conducting deep, close, and rear combat operations.

RESPONSIBILITIES

The execution of CSS functions is removed from the fire support commander, as much as possible, and is placed under the control of the battalion. The fire support commander concentrates on the timely and accurate execution of the fire support mission. The CSS responsibility at fire support or platoon level is to report requirement request support, and ensure that CSS is properly executed once it arrives in the unit area.

The battalion XO is responsible for coordinating all CSS within the battalion. The S4 is responsible for the logistical support of the battalion and for the preparation of paragraph 4 of the FA support plan. The S1 is responsible for personnel service support within the battalion, and he coordinates the actions of the medical section. The S3 considers logistical support as he develops the FA support plan he must ensure that the plan is feasible from the support perspective. Also, in conjunction with the S4, the

S3 recommends to the battalion commander CSS priorities for subordinate elements when resources are constrained.

The **maintenance officer** supervises maintenance activities for the battalion except maintenance on communications and medical equipment.

The **battalion signal officer** supervises the maintenance of communications-electronics (C-E) items and communications platoon operations.

The **medical section leader** supervises the maintenance of medical items and the evacuation of wounded personnel.

S1 SECTION

The S1 section is responsible for personnel services and the general administration of the battalion. The S1 is assisted by the personnel and administration center (PAC) supervisor and the personnel staff NCO (PSNCO). The S1 and his staff primarily perform the critical tasks of strength accountability, casualty reporting replacement operations, administrative services, personnel actions, legal services, finance services, and command post functions. The S1 also has primary staff responsibility for EPW operations and medical planning. He coordinates with the S2 for interrogation of prisoners and with the S4 for processing of captured equipment and transportation requirements. The S1 coordinates with the medical section leader to ensure

that patient treatment and evacuation are planned and coordinated throughout the battalion area.

MEDICAL SECTION

The battalion aid station (BAS) sorts, treats, and evacuates casualties or returns them to duty. It stocks medical supplies for the battalion and manages all Class VIII support. It is also responsible for maintaining and evacuating battalion medical equipment.

The medical section (treatment team) officer in charge (OIC), a field surgeon or a physician's assistant, operates the battalion aid station. He coordinates the operations, administration, and logistics of the medical section. This includes coordinating patient evacuation to the supporting medical company and providing support to batteries.

S4 SECTION

The S4 section is responsible for supply, transportation, and field service functions. It coordinates requisition of supplies and their distribution to battery supply sections; it turns in captured supplies and equipment as directed. Personnel in the S4 and S1 sections are cross-trained in critical tasks so they can provide continuous operations. The S4 section is supervised by the S4, who is assisted by the battalion supply sergeant.

In combat, the S4 concentrates on seven classes of supply Classes I, II, HI, IV, V, VII, and IX. The battalion ammunition officer, working with the S3 and S4, coordinates the requisition, receipt, preparation, and delivery of Class V.

The S4 section is responsible for obtaining water and maps. Battalion transportation is used to get water from the water supply point in or near the BSA or from forward sources tested and approved by the medical section noncommissioned officer in charge (NCOIC). Maps are stocked by the supply and service company of the main support battalion; they are requested through the supply company of the forward support battalion (FSB). The S2 is responsible for distributing maps as required. Classified maps are obtained through G2 or S2 channels.

MAINTENANCE SECTION

Maintenance operations are executed as far forward as feasible. The battalion maintenance section is responsible for unit maintenance on all battalion equipment except COMSEC and medical equipment. The OIC is the battalion maintenance officer. He is assisted by the maintenance technician and the senior maintenance supervisor.

Some TOEs have consolidated maintenance activities; however, the responsibility for operator and crew maintenance remains with the battery commanders. During maintenance operations, the maintenance elements of the battalion are task-organized to maximize forward support to the batteries.

The administration section maintains Class IX (repair parts) and the Army Maintenance Management System (TAMMS) records. The prescribed load list (PLL) stocks are maintained for each battery and are managed by the PLL clerks located forward with the appropriate battery maintenance team.

The recovery section provides recovery and lift capability to the battalion maintenance section as well as to each firing battery. Also, a wheeled vehicle recovery asset is based in the field trains to help in repairs and the movement of major assemblies and components.

AMMUNITION SECTION

The battalion ammunition section is an element of the service battery (or headquarters and service battery in light units). It is supervised by, and receives orders from, the battalion ammunition officer. He performs the ammunition resupply functions for the battalion. Usually, battery ammunition sections are consolidated under battalion control.

BATTERIES

Each battery in the battalion has a limited CSS capability. Normally, a battery headquarters has its own supply and communications sections. Because of operational considerations, some or all of these elements may have to be centralized at battalion level. This concept, task organization, involves taking much of the administrative and service support elements out of the batteries and consolidating them at battalion level. The battalion commander then task-organizes these elements to provide the needed CSS to the firing batteries on a user basis. This centralization may include any or all of the following elements:

- **Supply administration center** – consolidation of supply activities and personnel at battalion level.
- Ž **Dining facility administration center** – consolidation of cooks and mess operations at battalion level.
- Ž **Ammunition administration center** – consolidation of ammunition personnel and vehicles at battalion level under the control of the BAO.

When determining how much centralization will be required, the battalion commander must consider many factors, some of which are as follows:

- The threat.
- The tactical situation.
- The terrain.
- The personnel status of these sections.
- The availability of equipment.
- The availability of external support.
- The capability of the battalion staff to adequately supervise these sections.

BRIGADE TRAINS

To understand how the cannon battalion organizes its CSS elements to support combat operations, it is necessary to understand the brigade trains concept. The brigade trains is located in the BSA and is generally beyond the range of enemy cannon artillery. It is located about 20 to 25 kilometers behind the FLOT. The BSA is that portion of the brigade rear area occupied by the brigade rear CP, the FSB, and the task force field trains.

A brigade does not have CSS elements of its own to support battalions under its control. The CSS assets in the BSA include elements from the FSB and/or forward area support team (FAST), maneuver and combat support unit field trains, and selected corps support command (COSCOM) and division support command (DISCOM) resources, as required. Normally, the support consists of the following:

- Ž A Class I ration breakdown point.
- Ž A bulk fuel (Class III) distribution point.
- Classes II, III (package petroleum), IV, and VII distribution points.
- Ž An ammunition (Class V) transfer point.
- A graves registration collection point.
- A clothing exchange and bath point.

A DS maintenance company with contact teams for forward maintenance functions, limited recovery and evacuation, and a repair parts (Class IX) supply point is also in the brigade support area. Also in this area is a medical company that provides a clearing station, an evacuation capability and limited Class VIII supplies.

The divisional cannon battalion receives CSS from the DISCOM. The division materiel management center

(DMMC) provides centralized and integrated materiel management of all classes of supply and maintenance except medical, cryptographic and maps for units assigned to the division. Maintenance, supply, and transportation support is provided by the maintenance, supply, and transportation battalions in the DISCOM. The divisional cannon battalion coordinates its CSS through the DISCOM forward area support coordinator (FASCO) in light divisions and through the FSB commander in heavy divisions. These individuals are usually located in the BSA and are responsive to the brigade S4.

Nondivisional cannon battalions may receive CSS from units in the COSCOM. The COSCOM is specifically tailored to support the units assigned to the corps. Normally, COSCOM units are formed into area support groups, which provide CSS on an area basis. Combat service support is managed by the COSCOM materiel management center. This center should ensure that the battalion receives required CSS even though the battalion may move from one support group area to another. However, nondivisional FA battalions operating in a brigade or division main area may be supported by DISCOM units when the situation dictates. The DISCOM will require COSCOM augmentation to provide this support. Proper planning forecasting of requirements, and thorough coordination between DISCOM and COSCOM are essential for adequate support.

The cannon battalion in a separate maneuver brigade receives CSS from the brigade support battalion. This battalion supports the separate brigade just as the DISCOM supports the division.

It is into this organization that the cannon battalion must mesh to obtain the necessary CSS provided by higher headquarters.

BATTALION TRAINS

The battalion trains is a grouping of equipment and vehicles to provide logistical support to the batteries. The organization of the cannon battalion trains varies with the mission and tactical situation and such other factors as terrain, weather, time, and space. Generally, trains can be organized for combat in one of the following two ways:

- Ž Single location - All support operating under direct control of the unit is termed "unit trains."
- Ž Dual location - Elements providing critical battlefield support forward with the batteries are called "combat trains." Elements operating farther back with or near support units of the next higher headquarters are termed "field trains."

Unit Trains

If logistical resources are centralized in one location, they are called unit trains. This option provides the following

- Ž Centralized coordination and control of logistical personnel and equipment.
- Ž Enhanced security and capability for ground defense.
- Ž A single base for CSS activities

Unit trains may be appropriate in slow-moving or static situations, when firing batteries have organic or attached support, or when the tactical situation forces the trains to be a self-contained operation. A unit trains setup would consist of the entire service battery or the logistical elements of the headquarters and service battery and those headquarters elements not located with the battalion CP. A unit trains is commanded by the service battery commander. It may be formed in an assembly area and during an extended tactical march.

The CSS in a light unit differs from that in a heavy unit in that the light unit TOE lacks adequate resources to allow echeloning of trains. Light FA battalions usually operate under a unit trains organization. The unit trains is normally collocated with the FAST in the BSA. The CP in the unit

trains is the ALOC. The planning considerations for trains, logistics package (LOGPAC), and other CSS operations for heavy units are generally relevant to light units as well.

Dual (Combat and Field) Trains

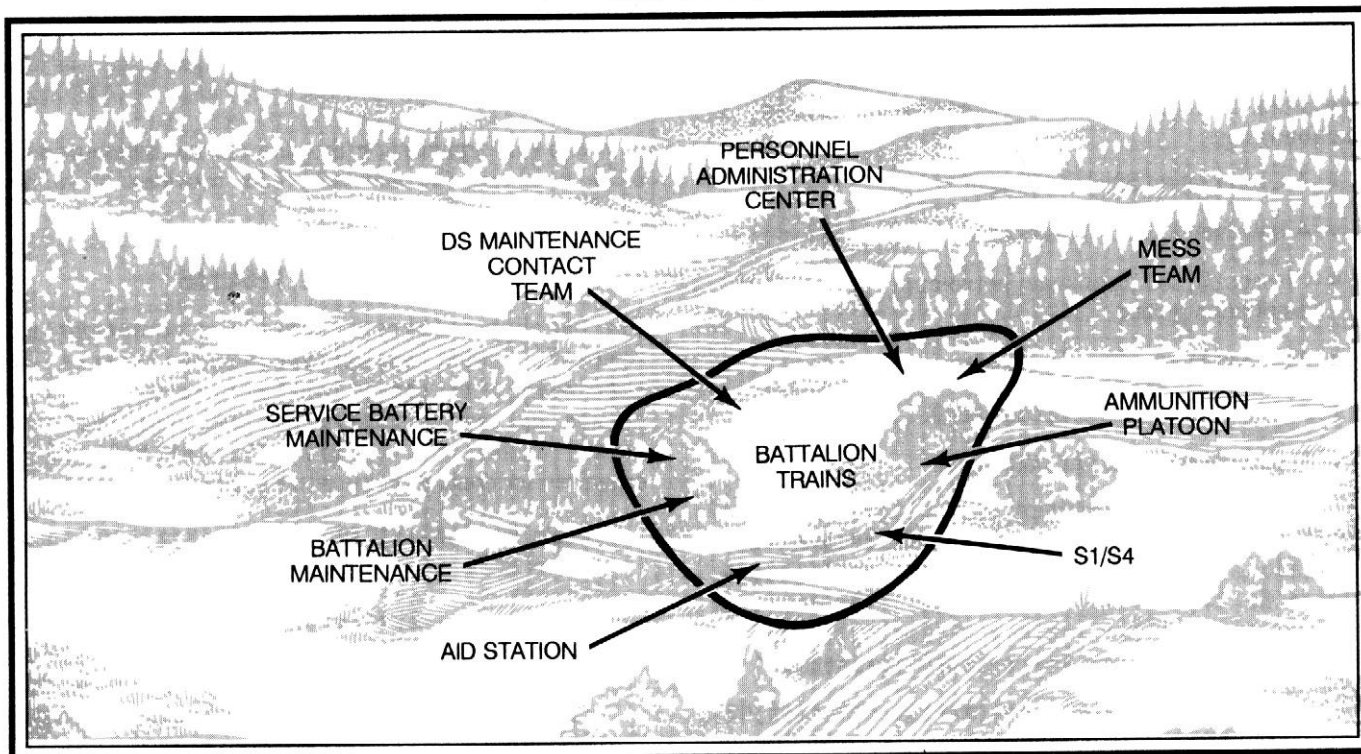
The **preferred** method of supporting the battalion is through echeloned trains. The battalion trains is normally made up of battalion CSS assets and elements of the FSB, Echeloning trains into combat (forward) and field (rear) trains provides the following:

- Immediately responsive forward support tailored to the tactical situation.
- Flexible resource usage.
- Ž Increased resource survivability.
- Ž Enhanced responsiveness when the tactical situation is very fluid or the supported unit is operating over extended distances.

Combat Trains. The battalion combat trains is organized to provide immediate critical CSS. It can include the following:

- Ž POL (awaiting distribution to the batteries).
- Ammunition sections (awaiting distribution).

UNIT TRAINS



Ž Maintenance contact teams with a recovery capability.

- A battalion aid station.
- The combat trains ALOC.

Ž Decontamination assets.

- Up-loaded Classes III and V vehicles.

Ž Elements of the communications platoon.

- The nearby unit maintenance collection point (UMCP).

Ž Some supporting elements from the FSB or FAST.

The combat trains is commanded by the HHB commander; the ALOC is supervised by the S4, assisted by the PSNCO. Elements of the combat trains are linked to the combat trains ALOC by landline.

The battalion combat trains should be close enough to the FLOT to be responsive to the forward units; but, if possible, it should not be within range of enemy indirect fire. It generally occupies an area between the BSA and about 5 to 8 km behind the forward battery or platoon position areas. The combat trains can expect to move often to stay in supporting distance of the firing units.

The UMCP is established, when necessary, to provide forward maintenance support to the battalion. It is supervised by the battalion maintenance technician. It is normally located in or near the battalion combat trains. The combat trains and UMCP, if normally located separately, may be combined to form a base cluster for defense.

Field Trains. The field trains is organized from elements not included in the combat trains and not required for immediate support of the batteries. It is usually in the BSA and is commanded by the service battery commander. The elements there include the following:

- The personnel and administration center.

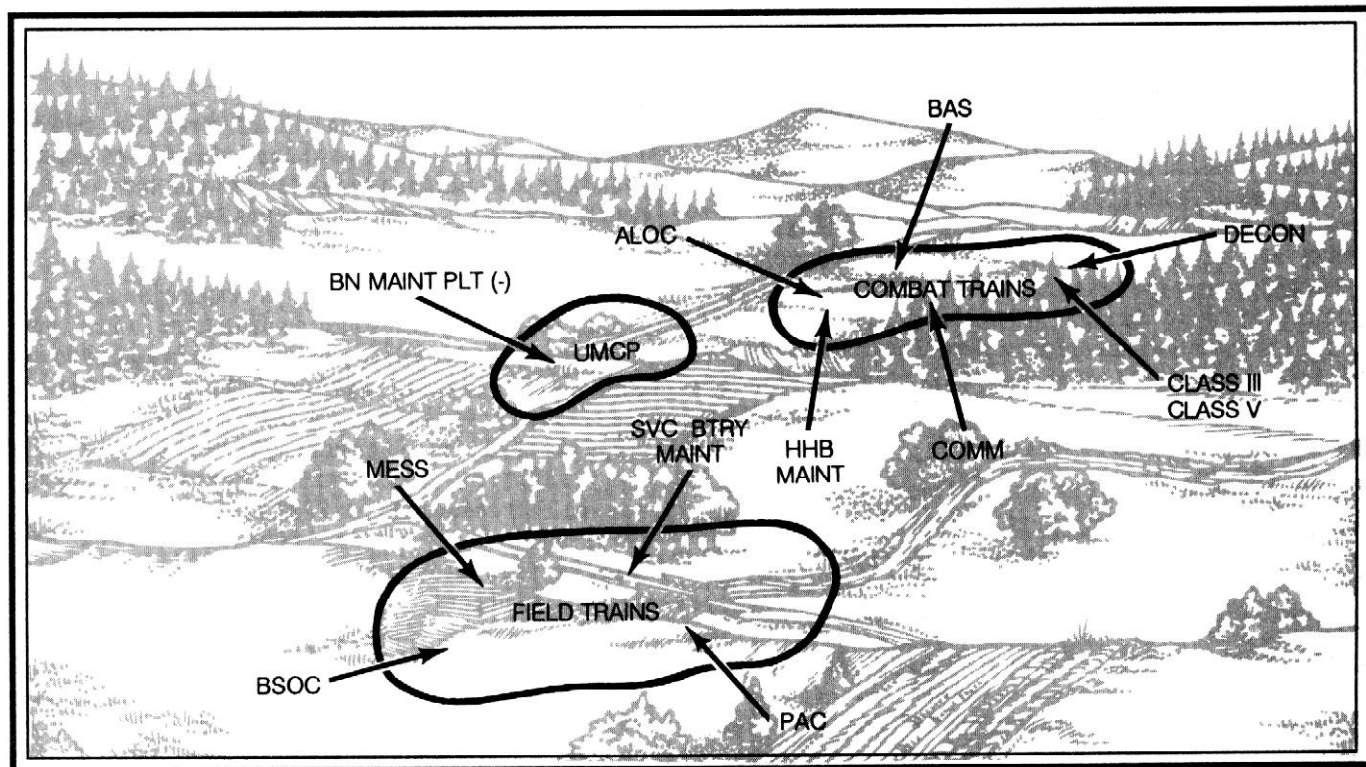
Ž The remaining maintenance sections (to perform scheduled maintenance and maintenance for trains elements).

Ž The remaining battalion ammunition trains.

- Supply and food Service sections.

The field trains CP is referred to as the battalion support operations center. The BSOC is supervised by the S1, assisted by the battalion S4 NCOIC.

DUAL (COMBAT AND FIELD) TRAINS



PERSONNEL DISTRIBUTION

| BATTALION EXECUTIVE OFFICER | |
|--|-------------------------------|
| COMBAT TRAINS | FIELD TRAINS |
| S4 | S1 |
| PSNCO | S4 NCOIC |
| Battalion maintenance technician | Battalion maintenance officer |
| Ammunition officer | Ammunition NCO |
| Field surgeon or physician's assistant | |

Determining Trains Organization

A commander must consider several factors when determining the trains organization. It is not just a simple decision of one trains location versus two.

Status of Unit Personnel and Equipment. The commander always considers the unit personnel and equipment in determining the trains organization. This factor alone could dictate a single trains location.

Phase of Combat. Just as the offense or defense affects the organization of field artillery for combat, it also affects the trains organization. In the defense, the battalion can afford to be more centralized, since friendly forces "own" the ground. Routes have been reconnoitered, supplies and ammunition are stockpiled, and communications lines are laid and ready. In the offense, the situation is more fluid and the terrain is likely to be unfamiliar. Communication is mostly by radio, routes have not been reconnoitered, and there are no stockpiles for the firing batteries. Responsiveness is the key to maintaining the offense. In the offense, the dual location would be preferred. In the defense, a single location might suffice. Even then, the type of defense must be considered. A highly mobile, fast-moving situation such as exists in the covering force area might dictate a dual trains location.

Survivability. The threat may influence the trains organization. If the threat of ground attack is great, unit trains may increase the ground defense capability. If air attack or indirect fire is the primary threat, dual locations increase the dispersion and afford smaller targets.

Location of the Brigade Support Area. The distance the BSA is from the FLOT also is a factor. If this distance is fairly short, responsive support could be provided to the batteries from a single location. As the distance increases,

responsiveness from a single location decreases. This is because much of the support provided by battalion depends on those elements from higher headquarters located in the BSA. Although splitting into two locations does not decrease that distance, it decreases the turnaround time between battery and battalion locations.

Terrain. The availability of terrain in the brigade sector may dictate the use of single rather than dual locations. Terrain also may affect the turnaround time for support. An area with paved, well-marked supply routes between elements is conducive to a single location, while restrictive terrain slows the support effort. Thus, terrain can be just as important a determinant as the distance itself.

Amount of Centralization. The amount of centralization is also a deciding factor in determining trains organization. The more independent the batteries remain (maintaining their own mess, maintenance, and supply), the easier it is for the battalion to support from a single location. That is not to say that a battalion with a completely decentralized CSS effort cannot have dual locations. It certainly may. In fact, that aids in the dispersal of units and may even increase the responsiveness to the batteries. A battalion that does run a centralized CSS effort, however, may be forced into dual locations to stay responsive.

Responsiveness. However the commander organizes his CSS effort, the idea behind the entire operation is to maintain maximum responsiveness of the entire CSS effort.

Trains Security

The CSS elements behind the FLOT form base clusters. They must be prepared to defend themselves against guerrillas and partisans and forces that have broken through friendly defenses or that were bypassed in offensive operations.

The service battery commander is responsible for trains security when in a unit trains configuration. When trains are echeloned, the HHB commander is responsible for securing the combat trains and the service battery commander is responsible for securing the field trains. When the battalion commander collocates his field trains with the BSA, the service battery commander coordinates with the FSB commander or FASCO and the brigade rear CP to integrate the battalion field trains into the BSA defensive plan. In all trains areas, a perimeter defense is planned. Elements in the trains are assigned a specific sector to defend. Mutually supporting positions that dominate likely avenues of approach are selected for vehicles armed with heavy machine guns. Reaction forces and OPs are established. These are based on the unit SOP. To enhance security, an alarm or warning system is

arranged. Sector sketches, fire plans, and obstacle plans should be prepared. Rehearsals are conducted to ensure that all personnel know the parts they play in the defensive scheme. The OIC at each location establishes a shift schedule for operations and security on a 24-hour basis.

Command and Control of Trains

Command and control of CSS are the responsibility of the battalion XO. The S4 routinely coordinates all logistics operations, and the S1 coordinates all personnel and administrative operations. Both follow the XO's guidance. C2 facilities are the combat trains ALOC and the field trains BSOC.

The combat trains ALOC includes enough S1 and S4 personnel cross-trained to ensure continuous operation and the communications platoon equipment and personnel. The combat trains must—

- Stay abreast of the tactical situation.
- Monitor the battalion command net to identify CSS requirements.
- Receive requests, reports, and requirements from subordinate elements.

Subordinate requirements are analyzed, consolidated, and forwarded to the field trains BSOC or to the appropriate supporting agency. The S1 or battalion S4 NCOIC coordinates and directs elements in the field trains to take action to meet the requirements of the forward units.

The field trains BSOC is the coordination and control center for the battalion S4 section, PAC, maintenance platoon(-), and battalion supply section. Personnel from these sections operate the field trains BSOC under supervision of the battalion S1. The battalion S1 coordinates all requirements for battalion organic and attached elements with all units in the BSA and with parent units as necessary.

Trains Communication

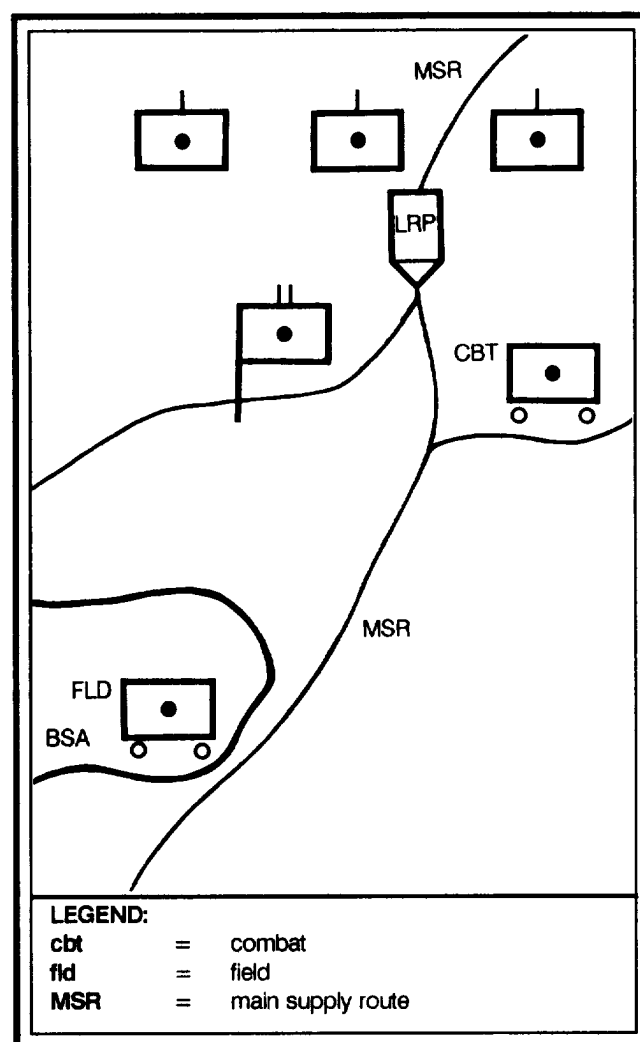
At battalion level, CSS communication may be by any combination of FM radio, MSE, messenger, or wire. The admin/log radio net is used for most CSS traffic. For lengthy reports, messenger, wire, RATT or facsimile is used.

The combat trains ALOC is the NCS for the admin/log net. The S4, S1, HHB and service battery commanders, BMO, BAO, medical section OIC, and others (as required) operate in the battalion admin/log net. The combat trains ALOC also operates in the brigade admin/log net and in the battalion command net.

Procedures for submission of routine reports (such as the personnel daily summary and the DA Form 2406 [Materiel Condition Status Report]) should be established by SOP and included as a part of LOGPAC operations. These reports should be consolidated by battery and delivered in a standard packet for update in both the ALOC and the BSOC.

Communication is critical to expedite the CSS effort. Batteries must report their losses and requirements as soon as practical. When use of radio is not possible, messages are sent with resupply or evacuation vehicles. The combat trains ALOC and field trains BSOC maintain control of vehicles moving forward to the logistics release points (LRPs). Battalion SOP establishes procedures for resupply without request in case communications fail.

LOGISTICS RELEASE POINT



Trains Positioning

The battalion S4 coordinates with the XO, S3, and HHB and service battery commanders when selecting the trains location. Just as with cannon battery positions, the trains position must be coordinated with the maneuver commander who owns the ground.

On occasion, the field trains location may be selected by someone other than the S4 if the field trains is to be located with another element, such as a maneuver brigade trains. Such a location facilitates coordination between the battalion and the representatives from forward DS units. It also enhances security for battalion elements. However, turnaround time, communications requirements, or other mission-related considerations may require that the field trains be located elsewhere. When the field trains is located in the BSA, the exact location is selected by the brigade S4.

A good trains location will have the following:

- Ž Defensible terrain— to allow the selective use of limited personnel assets.
- Ž Sufficient space – to permit the dispersion of both vehicles and activities.
- Ž Firm ground – to support the heavy ammunition and POL vehicles.
- Ž Landing pad – for both aerial resupply and medical evacuation.
- Ž Road network—to the batteries and back to higher-level CSS elements; also, a suitable network within the position.
- Communications— both forward to the batteries and to the rear to farther CSS elements.
- Water –if possible.

- No undesirable terrain feature — to avoid obstacles to CSS operations (such as a river) and targeting sources for the enemy.

Built-up areas are good locations for trains because they provide cover and concealment for vehicles and sheltered areas for maintenance operations at night. When built-up areas are used, trains elements should occupy buildings near the edge of the area to reduce the chance of being trapped.

Seldom will a site be found that has all of the desirable traits. Those most important to the mission and tactical situation should be given priority.

Trains Operations

The battalion S4 is also responsible for selection of battalion supply routes for resupply, evacuation, and maintenance support. The proposed routes should extend forward from the support elements in the brigade or division area to the batteries. Primary and alternate routes should be planned and coordinated with the FA S3 and the maneuver commander to avoid interference with maneuver elements. Coordination with adjacent combat, combat support, and combat service support units is necessary to ensure adequate movement of support resources forward and to the rear.

Trains Displacement

Proper positioning of trains can minimize displacements and increase the quantity and quality of support. In repositioning the technique used to displace the trains will be in direct relation to that used by the battalion. The trains can be displaced as a whole along with the battalion or by echelon to permit continuous CSS, or it may infiltrate in modular form to its next position.

Section II

PLANNING

CSS planning is conducted to ensure support during all phases of an operation. The CSS plan is developed concurrently with the tactical plan. Supporting CSS plans are as detailed as planning time permits. Use of SOPs and planning for contingencies greatly help the CSS staff officer in the planning effort. The FA support plan addresses only deviations from the routine procedures established in the SOPs.

PLANNING FOR CHANGING MISSIONS

Flexibility and innovation must characterize CSS planning and execution for any tactical plan. Not every brigade is

always committed to the close battle. Operations of the covering force, rear area operations, and contingency missions also require resources. Close support battalions are not always assigned a DS mission. They are likely to

have R, GSR, or GS missions at some point in the battle. Logistical support for the transition from GSR or GS to DS and vice versa requires detailed planning and thorough coordination. Similar transition planning must occur when nondivisional cannon battalions operate in one brigade or division area during one phase of the operation and in another area during subsequent phases.

Transition from one area of operation to another normally results in a change in support battalions (heavy forces) or companies (light forces). Therefore, units must forecast future needs with the gaining FSB. They must relentlessly coordinate to complete the transfer of logistical responsibilities and to ensure all classes of supply are forwarded through the gaining FSB or company to the unit. Of particular interest are the unique planning requirements for Classes V and IX supplies and maintenance support.

Each ATP is normally designed to handle a three- or four-battalion maneuver brigade with a DS artillery battalion. However, the addition of one or more GS or GSR artillery unit(s) (often of different caliber than the DS unit) may quickly cause the capacity of the forward support battalion ATP to be exceeded. Realistic positioning of ATPs to support the main effort, as well as identifying additional transportation assets needed to support the ATPs, is imperative.

It may be necessary to identify authorized stockage list (ASL) push packages and maintenance support teams from the losing FSB to augment the gaining FSB in support of additional FA units. It is critical to identify ASL and maintenance support team requirements for nondivisional units. These assets must be thoroughly coordinated with corps support units and provided to the supporting divisional forward or main support battalion or company.

PRINCIPLES

The CSS functions are anticipative in nature; they are performed as far forward as the tactical situation permits. Support must be continuous, and immediately available assets must be used. Ammunition, fuel, repair parts and items, maintenance personnel, and replacements are pushed as far forward as possible.

CSS planning is a continuous function. Coordination among tactical planners and those planning CSS is essential. It should address all factors that can have a significant effect on the tactical mission.

The CSS staff officers and commanders must act rather than react to support requirements. Personal involvement, remaining abreast of the tactical situation, and on-the-scene appraisal of the situation by CSS personnel are critical to mission accomplishment.

SUPPORT OF COMBAT Operations

To ensure effective support, CSS operators and planners must understand the commander's tactical plans and intent. They must know the following:

- Ž **What** each of the supported elements will be doing.
- Ž **When** they will do it.
- Ž **How** they will do it.
- Ž **Where** the current and proposed locations of the supported units are.
- Ž **What** the tactical situation is.

After analyzing the concept of operations, CSS planners must be able to accurately predict support requirements. They determine the following:

- Ž What **type** of support is required.
- Ž What **quantities** of support are required.
- Ž The **priority** of support by time, type, and unit.

Support capabilities are assessed as follows:

- Ž **What** CSS resources are available (organic, lateral, and higher headquarters).
- Ž **Where** the CSS resources are.
- Ž **When** CSS resources can be available.
- Ž **How** they can be made available.

On the basis of this analysis, CSS plans are developed that apply resources against requirements.

Support of the Offense

If offensive momentum is not maintained, the enemy may recover from the shock of the first assault, gain the initiative, and mount a successful counterattack. Therefore, the CSS priority must be to maintain the momentum of the attack.

A successful attack may develop into an exploitation or a pursuit. The CSS planners must be flexible enough to support either type of operation. The following techniques and considerations apply to CSS offensive planning.

- Ž Position essential CSS assets, such as ammunition, POL, and maintenance, well forward in the combat trains; and ensure that basic loads remain replenished. If preparation or other large-scale fires are planned to support the initial phase of the attack, consider prestocking firing batteries with ammunition for immediate consumption.

- Ž Establish maintenance priorities based on the commander's guidance or intent and the factors of METT-T. Priorities may change as different phases of an operation are completed.
- Ž Plan for increased POL consumption.
- Ž Push planned and preconfigured LOGPACS of essential CSS items.
- Ž Plan for increased vehicle maintenance, especially in rough terrain.
- Ž Make maximum use of unit maintenance personnel in forward areas.
- Ž Request unit distribution at forward locations.
- Ž Increase use of meals, ready to eat (MREs).
- Ž Use captured enemy supplies and equipment, particularly support vehicles and POL (Before use, test them for contamination.)
- Ž Suspend most field service functions except graves registration.
- Ž Prepare for increased casualties and additional evacuation requirements.
- Ž Select supply routes, logistics release points, and subsequent trains locations based on map reconnaissance.
- Ž Plan and coordinate EPW operations; expect more EPWs.
- Ž Plan replacement operations on the basis of known and projected losses.
- Ž Consider the increasing distances and longer travel times to ASPs and ATPs.
- Ž Ensure that CSS preparations for the attack do not compromise tactical plans.

These considerations apply to some degree to all offensive operations. The change from one type of operation to another, such as from a hasty attack to a pursuit, does not require a major shift in CSS plans and procedures. However, the priorities and requirements for support may change. The XO, assisted primarily by the S4, organizes the battalion CSS assets to permit uninterrupted support. The main purpose of CSS in the offense is to allow the force to maintain the momentum of the attack.

Support of the Defense

The immediate purpose of the defense is to cause an enemy attack to fail or, in contrast to offensive operations, to break the momentum of the attack.

As in offensive operations, perhaps the most critical time in the defense is the preparation stage. General considerations in preparing for defensive operations include the following:

- Ž Pre-position limited amounts of ammunition and POL in a centrally located position in the forward area. Make plans to destroy those stocks if necessary.
- Ž Resupply during limited visibility to reduce the chance of enemy interference.
- Ž Plan to reorganize or reconstitute lost CSS capability. Identify personnel from the field trains as potential replacements to reestablish the lost capability.
- Ž Consider the additional requirements for obtaining and moving Class IV reinforcement material and pre-positioned ammunition.

Continuous Support

The CSS elements conduct sustainment operations continuously. When batteries are not firing, battalion CSS elements may take advantage of the lull to prepare the elements for the next operation.

Maintenance, repair work, and normal services are done whenever possible. Repairing damaged equipment and returning it to the fight require early diagnosis and identification of faults. These repairs are made as far forward as possible.

Emergency resupply is conducted when needed routine resupply is usually conducted daily. Vulnerability and limited cross-country mobility of CSS vehicles dictate that LOGPACs use existing roads.

Continuous CSS operations require careful personnel management. A carefully planned and strictly enforced rest-work schedule or sleep plan is necessary to ensure continuous capability. Also, CSS personnel must not be overly burdened with administrative housekeeping tasks (guard, details, and so forth) to the point that they are unable to do their primary mission.

BATTALION LOGISTICS ESTIMATE

The decision-making process involved in a logistics estimate is as simple or as complex as the time available and the tactical situation allow. When the commander receives the mission, the estimate process begins. The XO, S1, S3, S4, motor officer, ammunition officer, and other logisticians in the battalion gather and analyze information, prepare an estimate, and brief the commander. Emphasis is on how the status of CSS will impact on a proposed course of action. A logistics estimate is a continuous

analysis of logistics factors affecting mission accomplishment. Logistics planners use these estimates to recommend courses of action and to develop plans to support the selected course of action. The key concerns of battalion logistics planners are the status of supply Classes III, IV, and V and the operational status of howitzers and fire direction equipment. For more information, see FM 101-5.

Logistics estimates at the battalion level are rarely written. They are often formulated in terms that answer the following questions

- Ž What are the current and projected statuses of personnel, maintenance, supply, and transportation?
- Ž How much of what is needed to support the operation?
- Ž How will it get to where it is needed?
- Ž What external (FSB or FAST) support is needed?
- Ž Can the requirements be met by using LOGPAC operations, or are other techniques necessary?
- Ž What are the shortfalls and negative impacts?
- Ž What courses of action can be supported?

Section III

LOGISTICAL SUPPORT

The following are the four functional areas of battalion logistics:

- Ž *Supply.*
- Ž *Maintenance.*
- Ž *Field services.*
- Ž *Transportation.*

SUPPLY

Methods Of Supply

The battalion always maintains some combat-essential supplies and repair parts. These are called basic loads and prescribed load lists. The minimum stockage level is normally directed by division or higher. The purpose of these loads is to allow a unit to sustain itself in combat for a limited period should there be an interruption in the resupply system.

The battalion has three methods by which to replenish its stocks:

- Ž Supply point distribution.
- Ž Unit distribution.
- Ž Ream, refuel, resupply point (R3P) distribution.

Supply Point Distribution. The battalion, using organic transportation, goes to the supply point to pick up supplies. This is the normal method used by the battalion S4 section to pickup supplies.

Unit Distribution. Supplies are delivered to a unit by transportation assets other than its own. The battalion uses unit distribution to resupply its subordinate elements. When feasible, supplies are shipped directly from the issuing agency as far forward as possible if the receiving unit has the materials handling equipment necessary. This means that some supplies may be issued directly to the battalion from COSCOM or even theater Army level, especially Classes III and VII. This issue usually occurs no farther forward than the field trains.

The most efficient resupply of forward units is done by use of logistics packages. The LOGPACs are organized in the field trains under the supervision of the service battery commander and the battalion S4 NCOIC. The LOGPACs are organized for each battery and separate element in the battalion. They are moved forward to the LRPs at least daily for routine resupply. When possible, all LOGPACs are moved forward in a march unit under the control of an OIC or NCOIC. Special LOGPACs are organized and dispatched as required by the tactical situation and logistical demands.

The battalion S4 must plan and coordinate LOGPAC operations to ensure that they fully support the commander's tactical plans.

Battalion SOPs establish the standard LOGPAC. Normally, a battery LOGPAC includes the following:

- Ž **Cargo trucks** carry the Class I requirements based on the ration cycle. The cargo truck may tow a water trailer and carry some full water cans for direct exchange. In addition, the truck carries any supplies requested by the unit, incoming mail, and other items required by the unit. The truck may also carry replacement personnel. The most readily available vehicles for this purpose are the trucks of the mess sections.
- Ž **POL trucks** carry bulk fuel and packaged POL products.
- Ž **Vehicles carrying additional supplies and replacements** join the LOGPAC as coordinated by the battalion S4 NCOIC and supply sergeant.

When the battery LOGPAC has been formed, it is ready to move forward under the control of an S4 representative. The OIC or NCOIC organizes a convoy for movement of all battery LOGPACs under his control. The convoy may contain additional vehicles, such as a maintenance vehicle with Class IX supplies to move to the UMCP or an additional ammunition or fuel vehicle for the combat trains. The LOGPACs move along the MSR to an LRP, where the unit supply sergeant or a unit guide takes control of the battery LOGPAC.

From the LRP, the battery supply sergeant or guide controls the LOGPAC and conducts resupply. The supply sergeant informs the S4 representative of requirements for the next LOGPAC. The S4 representative collects outgoing mail, personnel, and equipment for movement to the rear. The LOGPAC then follows unit SOP and returns to the LRP.

The LRP locations are determined by the S4 in coordination with the S3 and are based on the tactical situation. They should be well forward and easily located. Normally, two to four LRPs are planned. The LRPs, as well as the MSR, combat trains, and field trains locations, are included on the operation overlay, if possible. The combat trains ALOC notifies subordinates and the BSOC well in advance which LRP will be used. The LOGPAC convoy arrival time at the LRP and the length of time it remains are normally established by SOP. If the tactical situation dictates otherwise, the S4 must determine the time and notify units accordingly. If the LOGPAC cannot be completed on schedule, the combat trains ALOC must be notified.

At least one senior representative from the combat trains (S4, HHB commander, or senior NCO) should be present at the LRP while the LOGPAC is in effect. His purpose is to meet with the supply sergeants for coordination of logistical requirements and to ensure that the LOGPAC is

released and returned efficiently. A brief meeting is normally held immediately before the supply sergeant picks up his LOGPAC. Coordination may include the following:

- Ž Changes in logistical requirements reflecting any last-minute changes to the plan.
- Ž Reports on personnel logistics, and maintenance from the first sergeants.
- Ž First-hand updates on the tactical situation and logistical status.
- Ž Delivery, receipt, and distribution of unit mail.

The S4 representative moves the LOGPAC convoy from the LRP back to the field trains. The battalion S4 NCOIC then begins organizing the next LOGPAC.

Resupply of the CP, combat trains, and attached elements must be planned and coordinated. The HHB first sergeant coordinates and supervises resupply of these elements; he operates from the combat trains. The platoon sergeant of these elements or the senior NCO at a facility must report his requirements to the HHB first sergeant or to the combat trains ALOC. The following are methods of resupply.

- Ž The most desirable method is to form small LOGPACs for these elements. The platoon sergeant picks them up at the LRP as would a battery supply sergeant.
- Ž The HHB first sergeant may deliver the LOGPAC to the CP, combat trains, and attached elements.
- Ž Attached elements may be resupplied from a nearby battery LOGPAC. The S4 coordinates this resupply **before** the LOGPACs are dispatched.

While the LOGPACs are the preferred methods of resupply, there will be times when other methods of resupply are required. These methods include the following:

- Ž **Resupply from the combat trains (emergency resupply).** The combat trains has a limited amount of Classes III and V supplies for emergency resupply. The S4 coordinates emergency resupply from the combat trains and then refills or replaces the combat trains assets.
- Ž **Prestocking.** This is the placing and concealing of supplies on the battlefield. It is normally done during defensive operations when supplies are placed in subsequent positions (for example, ammunition for immediate consumption).
- Ž **Mobile pre-positioning.** This is similar to prestocking except that the supplies remain on the truck, which is positioned forward on the battlefield.

Rearm, Refuel, Resupply Point Distribution. This technique combines features of supply point and unit distribution. It usually emphasizes Class III and V resupply requirements, typically along the route of an extended battalion road march. Close coordination between the S3 and S4 is essential to ensure the proper selection of the location and timing of this supply action. The battalion S4 is responsible for the preparation of the R3P site; the battalion XO oversees the movement of units through this position.

While R3P distribution is rapid and often convenient, it does require that the unit take itself out of action to accomplish the resupply function. However, since the unit will normally perform R3P distribution in conjunction with











a scheduled move, the overall loss of support capability should be minimal.

Distribution priorities for critical items are determined by the battalion S3 on the basis of recommendations from the S4 and the battalion operational requirements. Normal supply priority is Class III, Class V, and Class IX.

Classes of Supplies

The division of supplies into classes improves logistics planning and operations, which helps speed requisitioning and distribution procedures. Battalion commanders and their staffs need to be aware of supply accountability procedures as presented in AR 710-2.

CLASSES OF SUPPLIES

| SYMBOL | CLASS | COMPOSITION |
|---|------------|--|
|  | Class I | Subsistence items (beef, sundry packs, vegetables, bread, and so forth) |
|  | Class II | Individual equipment and general supplies (jackets, boots, shovels, tools, and so forth) |
|  | Class III | POL (grease, oil, gasoline, and so forth) |
|  | Class IV | Construction materials (wire, lumber, cement, and so forth) |
|  | Class V | Ammunition (grenades, 7.62-mm, mines, explosives, and so forth) |
|  | Class VI | Personal demand items (candy, cigarettes, soap, cameras, and so forth) |
|  | Class VII | Major end items (trucks, rifles, and so forth) |
|  | Class VIII | Medical supplies (bandages, syringes, stretchers, drugs, and so forth) |
|  | Class IX | Repair parts (batteries, spark plugs, axles, cotter pins, and so forth) |
|  | Class X | Material to support nonmilitary programs (tools and so forth) |

The FA battalion normally deals directly with the FSB, FAST, or DISCOM supply activity. However, the div arty or FA brigade (as appropriate) monitors those items of command interest. This is done by means of SOP-directed reporting requirements. The following paragraphs briefly describe each class of supplies as it impacts on the FA battalion.

Class I: Rations. Brigade automatically requests Class I on the basis of daily strength reports for its supporting FA units. The combat trains ALOC forwards the strength report to the field trains BSOC. The mess section gets subsistence from the FAST or FSB supply company Class I point in the BSA. A- or B-rations are prepared in the field trains and delivered to the batteries and attached elements as part of the LOGPAC. T-rations maybe prepared in the field trains and sent forward, or they may be pushed forward to the batteries and then prepared (heated) on site. The MREs stored on combat vehicles are eaten only when daily Class I resupply cannot be accomplished.

Often it is better to centralize preparation, supervised by the senior food service sergeant, in the trains location. The S4 or his designated representative, in conjunction with the battery commanders, develops a feeding plan with instructions concerning how and when to feed.

Water is not a Class I supply item, but it is normally delivered with Class I. The service battery commander or battalion S4 NCOIC coordinates with the FAST or FSB to pick up water from the main support battalion (MSB) water supply point. Water can be delivered to the units by use of water trailers or blivets. Also, forward water points can be tested and approved by the battalion surgeon. Each vehicle in the battalion should carry water cans to be refilled or exchanged during Class I resupply and LOGPAC operations.

Class II: Supplies and Equipment. This class applies to all supplies and equipment (except cryptographic) prescribed by TOE, CTAs, and PLLs. Class II supplies include clothing, individual equipment, tentage, organizational tool sets and kits, hand tools, and administrative and housekeeping supplies and equipment (including mission-oriented protective posture [MOPP] suits and decontamination items). The S4 section coordinates for pickup of Class II items from the FAST or FSB supply company in the BSA before normal LOGPAC operations. Expendable items, such as soap, toilet tissue, insecticide, clothing, and TA-50 items, are provided during the LOGPAC operations.

Class III: Petroleum, Oil and Lubricants. The brigade S4's POL forecasts form the basis for division and corps stockage levels. POL are normally obtained by the battalion S4 section from the supply company Class III supply point

in the BSA. A formal request is not needed to obtain bulk fuel at a supply point. The DISCOM fuel vehicles may be directed to deliver fuel to the combat trains area.

Requests from batteries are not required for POL and packaged products resupply. POL tankers move forward with each LOGPAC; POL packaged products are carried on each tanker. Requests for unusual supplies are submitted to the combat trains ALOC. Battery refueling operations may be carried out in one of three ways:

- Ž The fuel truck is taken to howitzer and vehicle positions.
- Ž Howitzers and vehicles are moved to a centrally located fuel truck.
- Ž All vehicles refuel during movement from one battery position to another (R3P).

Combat refueling (the use of 5-gallon cans) is an alternative to the above three methods. It is slower; however, it may be required in some circumstances when bulk refueling is not available or feasible. The battalion SOPs should prescribe procedures for all types of refueling, and these procedures should be practiced during field training.

Class IV: Construction Materials. This class of supply includes consumable items such as construction and fortification material and the lightweight camouflage support system. Requisitions for regulated Class IV items (fortification and barrier material) are submitted through command channels. Nonregulated items (small quantities of nails and common electrical, plumbing, and similar hardware items) are requested or obtained from the FAST, FSB, or DISCOM.

Class V: Ammunition. The S4 plans for Class V operations, and the ammunition officer supervises resupply operations. The S3, S4, and ammunition officer must continually coordinate and exchange information concerning ammunition. Each must know the required supply rate (RSR) submitted to higher headquarters, the controlled supply rate established by higher headquarters, and the authorized basic load. This information must also be provided to the battalion and battery commanders so they can plan resupply operations and set priorities. When the commander positions additional artillery units to add weight to a particular area of the operation, the S4 should request periodic updates on ammunition availability. The brigade ATP has a limited haul capability.

The tactical situation may warrant requesting extra ammunition for scheduled tires. With higher headquarters approval, the ammunition on hand in a unit may temporarily exceed that authorized (CSR). This approval is explicitly for ammunition for immediate consumption.

Such ammunition is drawn on the premise that it will be expended within the next 24 hours. Higher headquarters considers this ammunition expended when issued. If circumstances beyond unit control preclude expenditure within that time frame, excess ammunition must be reported to higher headquarters during each 24-hour period until that excess is expended or redistributed to other units. Class V supplies may be obtained from ATPs in the brigade area as well as from corps ammunition supply points located in the corps or division area. On occasion, the COSCOM may establish ASPs farther forward in the division area. The DISCOM, working with the COSCOM may establish ATPs in the brigade support area. Normally, corps transportation vehicles deliver ammunition to designated ATP locations. Each ATP includes corps and division personnel and ammunition resupply vehicles from the FA battalions while being resupplied. Also, ammunition may be delivered by surface or by air by corps or division aviation assets directly to the battalion area. Finally, ammunition may also be delivered by United States Air Force (USAF) air through the container delivery system or through mass supply airdrop or air landing into a division area of operations.

Class VI: Personal Demand Items. Class VI includes personal items sold through COSCOM post exchanges (PXs). Requests for support are submitted by the S1 through administrative channels when no PX is available. In some cases, ration supplementary sundry packs are issued along with normal ration distribution.

Class VII: Major End Items. The issuing of major end items (howitzers and ammunition carriers) is closely controlled through command channels. Issue priorities for the replacement of battle or other losses are based on item availability, unit mission, and the tactical situation. The DMMC processes requests (usually in the form of battle loss reports) from divisional units. Class VII items may not be available in the early periods of a conflict because of limited prestocks and the lack of a supply line. These items may be delivered to the battalion, or the battalion may be required to pick up the items from a designated support unit. In some cases, weapon system replacement items (howitzers) may be provided to the battalion with crew, fuel, and ammunition, preferably during routine LOGPAC operations. Weapon system replacement operations (WSRO) are discussed in detail later in this chapter.

Class VIII: Medical Supplies. Medical supplies are obtained through medical channels. For divisional battalions, the battalion medical section gets supplies from the divisional clearing station in the BSA. The battalion medical section provides organizational maintenance for medical items in the battalion. Maintenance above this

level is obtained by evacuation through medical channels to the medical company in the BSA or to a comparable COSCOM element. For organizational maintenance, the medical section also stocks medical repair parts.

Class IX: Repair Parts. The FA battalion stocks repair parts based on a prescribed load list. High-demand and combat-essential repair parts for vehicles, weapons (artillery and small arms), NBC equipment, and mess equipment are ordered and stocked by the battalion equipment maintenance clerk. Repair parts for C-E equipment are stocked by the battalion communications platoon. Other repair parts are stocked by battalion maintenance.

Repair parts are issued in response to a specific request or by repairable (direct) exchange. The battalion gets repair parts from the Class IX supply point in the BSA. Parts are moved forward during routine LOGPAC operations or as required to the UMCP. The maintenance section requests Class IX items (less repairable exchange) and major Class IX subassemblies, such as engines and transmissions. It submits requests to the maintenance platoon of the FAST or the maintenance company of the FSB. Repairable exchange for selected items (including components and subassemblies) is handled as a simple exchange with the DS maintenance unit of the unserviceable item (with an attached request for issue or turn-in) for a serviceable item. In combat, exchange and cannibalization are the norm to obtain critical Class IX supplies.

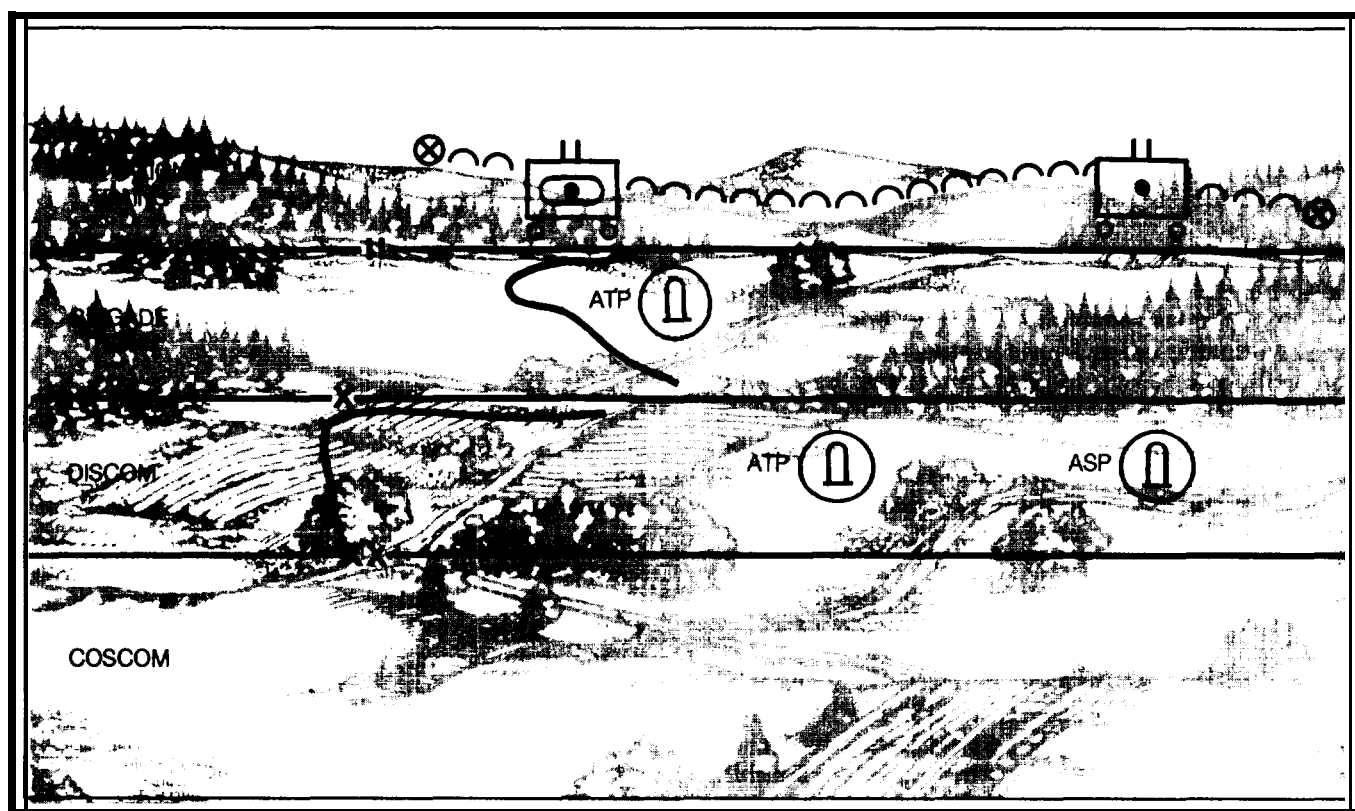
Class X: Material to Support Nonmilitary Programs. Material to support nonmilitary programs such as agriculture and economic development, is not included in Classes I through IX. Class X items are requested and obtained by the S4 on the basis of civil-military requirements. Specific instructions for request and issue of Class X supplies are provided by division or higher.

Ammunition

The following discussion of the ammunition system will give the BAO a guide to which he can refer. It will help standardize ammunition resupply operations within FA battalions.

The FA ammunition system involves the supply and expenditure of all ammunition that FA battalions are equipped to free. Small-arms ammunition constitutes an insignificant portion of FA battalion daily tonnage requirements. It can be handled routinely with normal ammunition resupply. For nuclear and chemical ammunition resupply, see FM 100-10.

AMMUNITION RESUPPLY



Ammunition Resupply Terms. Some common ammunition terms are described below.

The basic load is that quantity of nonnuclear ammunition authorized and required to be on hand in a unit to meet combat needs until resupply can be accomplished. The basic load is specified by the theater army and is expressed in rounds, units, or units of weight as appropriate.

The required supply rate is the amount of ammunition a tactical commander estimates will be needed to sustain operations for a specified time. It is expressed in rounds per weapon per day.

The controlled supply rate is the rate of consumption of ammunition that can be allocated, considering the supplies and facilities available, for a given period. It is also expressed in rounds per weapon per day. Each tactical commander announces a CSR to the next subordinate tactical commander. The CSRs may be published in the OPORD or as a fragmentary order. They may be included in the fire support annex and the FA support plan. Permission for a unit to exceed its CSR must be obtained from the next higher commander except in an emergency. The commander granting permission for one unit to

exceed the CSR must cut back on issues to his other units to make up the difference, or he must get an increase in his CSR from his next higher commander.

Ammunition for immediate consumption is ammunition drawn for a specific purpose, such as a preparation. This ammunition is drawn in addition to the unit CSR. It is drawn to be expended within the next 24 hours and is considered to have been expended when issued. If circumstances preclude expenditure as planned, the battalion must report this ammunition as excess daily until it is expended or reallocated.

Ammunition Supply Points. Corps establishes ASPs within each division zone. These are located between 45 and 60 km from the FLOT. The number established is determined by demand and by the number of DS ordnance companies available to the corps.

The ASPs must handle all of the division ammunition requirements not filled by the ATPs and must satisfy up to 20 percent of the demands of the ATPs. As compared to the ATP, this means more customers, a more spread-out location, greater congestion longer turnaround time within the supply point itself, and greater distances to travel.

Ammunition Transfer Points. Division operates three or four ATPs in its area. These are located between 15 and 30 km from the FLOT. If there are three, one supports each DS battalion from its supported brigade's rear area and GS units are resupplied at the ASPs. If there are four, three are used as above and the fourth resupplies the GS units from the division rear area.

Each ATP is equipped to handle as much as 450 to 600 short tons (STs) of ammunition per day in heavy units. This is its total lift capability but since all ammunition is transloaded rather than downloaded and reloaded, it also represents its issue capability.

The ATPs are constrained in both quantities and types of ammunition they can handle. The ATPs handle field artillery; armor; antitank Hellfire; and tube-launched, optically tracked, wire-guided missile (TOW) ammunition. The exact mixes and quantities to be handled by each ATP are determined by the division ammunition officer (DAO). They are based on consultation with the division G3 and the div arty S3.

The ASP and ATP capabilities are limited by the following:

- Ž Materials handling equipment.
- Ž Personnel available.
- Ž Number of different types of ammunition to be handled.
- Ž Number of users to be serviced.
- Ž Surge demands.
- Ž Space.
- Ž Routes in and out.
- Ž Hostile action.

According to the preceding discussion, the ASPs and ATPs supporting a division should be able to issue about 4,000 STs of ammunition per day in support of above-average demands for limited periods of time.

Battalion Ammunition Resupply. Normally, the BAO of each FA battalion is responsible for the resupply of the firing batteries of the battalion. He must be current in his knowledge of what ammunition is available at the ATP and/or ASP, what his CSR is, the current and anticipated expenditure rates, and locations (present and future) of the firing batteries and resupply points. This information can be obtained from OPORDs, fire support plans, and close and frequent coordination with his battalion S3 and/or operations section. The BAO can best perform his coordination and management functions from the combat

trains. The battalion XO or service battery commander must coordinate with the brigade S4 and the DAO representative at the ATP to ensure that ATP organization and operations meet the battalion requirements.

The BAO must plan the use of the battalion's ammunition-carrying assets. He plans how to most effectively use the battery's ammunition-hauling assets and how to use and control convoys for ammunition pickup and delivery. He must plan the loads for each vehicle to allow for the delivery of complete rounds and to make maximum use of its carrying capacity. In coordination with the S3, the BAO must carefully plan for the delivery of the appropriate **types** and **lots** of ammunition. The capability of the battalion to mass fires must not be compromised by Class V incompatibility. Other aspects that must be considered include the following:

- Ž The size of the convoy depends on the tactical situation and the level of training of ammunition personnel. If the unit is in heavy contact or the enemy has a good moving-target-acquisition capability, infiltration by groups of two or three vehicles might be best. Other situations (darkness or surge or peak requirements) may dictate the use of larger convoys.

Each tommy, regardless of size, must have one person in charge and a designated succession of control.

- Ž The man most recently returned from a firing battery could be pulled from the convoy and sent with the next convoy to that battery to ease the problem of unit location. However, all personnel must be able to read a map.

Battery assets must be used and controlled consistent with the resupply option selected.

- Ž Each firing battery should report the arrival of an ammunition convoy to the battalion operations section.

- Ž Ammunition carrier loads must be configured to carry complete rounds of ammunition.

- Ž If possible, a series of standardized preconfigured ammunition loads should be developed and the ammunition sections trained to use them. This allows flexibility and saves time when briefing crews and uploading carriers.

On demand, ammunition is sent to a firing battery. There the XO, platoon leader, FDO, chief of firing battery, or platoon sergeant signs a hand-receipt for ammunition received.

The battery is responsible for supervising and directing issue of ammunition to the firing sections.

MAINTENANCE

Maintenance involves inspecting, testing, servicing, repairing, requisitioning, and recovering. Repair and recovery are completed as far forward as possible, at the lowest capable echelon. When equipment cannot be repaired on site, it is moved only as far as necessary for repair. When all maintenance requirements of the battalion cannot be met, the XO determine-s maintenance support priorities for subordinate units. These priorities are based on operational requirements of the battalion and on recommendations of the S3, S4, and BMO.

Maintenance Terms

Some common maintenance terms are discussed below.

A **maintenance support team (MST)** is a mobile team from the FSB maintenance company or FAST maintenance platoon organized and equipped to provide forward support.

A **unit maintenance collection point** is a facility established by the battalion maintenance section to collect equipment awaiting repair, evacuation, controlled exchange, or cannibalization. It is the first point to which battery maintenance teams recover equipment and at which some DS maintenance is performed. It is located next to the combat trains.

Controlled exchange is the removal of serviceable parts, components, or assemblies from unserviceable, economically repairable equipment and their immediate reuse in restoring a like item to combat-operable or serviceable condition.

Cannibalization is the authorized removal of parts or components from uneconomically repairable or disposable end items or assemblies and making them available for reuse.

Battlefield damage assessment and repair (BDAR) is the act of inspecting battle damage to determine its extent, classifying the type of repairs required, and determining the procedure best suited to make the equipment mission-capable. BDAR may involve the immediate repair of equipment by field-expedient methods; however, BDAR procedures shall be used only in combat, at the direction of the commander.

The **battery maintenance team** is a team from the maintenance platoon that is organized and equipped by MTOE to provide forward unit maintenance support. Normally, the team deploys a recovery vehicle and a maintenance truck forward with the battery, split between each platoon (when applicable).

Categories of Maintenance

The Army maintenance system consists of three levels of maintenance unit, intermediate, and depot.

Unit Maintenance. Unit maintenance consists of preventive maintenance tasks performed by the operator and crew and those performed by unit mechanics. Unit mechanics –

- Ž Isolate faults by use of test equipment.
- Ž Make visual inspections.
- Ž Make minor adjustments.
- Ž Repair end items by exchanging faulty modules and components.

These actions can be performed on site or in the UMCP. Unit mechanics also perform recovery tasks.

Intermediate Maintenance. Intermediate maintenance can be either direct support or general support.

Direct Support. The DS mechanics –

- Ž Diagnose and isolate equipment or module failure.
- Ž Adjust and align modules and components.
- Ž Repair defective end items.

Maintenance support teams from the FAST or FSB operate from the UMCP. If equipment cannot be repaired in the UMCP because of time constrain workload, or the tactical situation, it is recovered to the FSB maintenance company or the FAST maintenance platoon in the BSA for repair.

General Support. GS maintenance is provided by division and corps in support of the maintenance system. It involves the following:

- Ž Repair of modules and components by replacement of internal pieces or parts.
- Ž Repair of end items involving time-consuming tasks.

Depot Maintenance. Depot maintenance personnel–

- Ž Rebuild end items, modules, components, and assemblies.
- Ž Perform cyclic overhaul.
- Ž Perform inspections.
- Ž Complete modifications requiring extensive disassembly or elaborate testing.

Maintenance Forward

Combat power is maximized when disabled equipment is repaired as far forward and as quickly as possible. The BMO, in coordination with the XO, directs the maintenance effort for the battalion. He uses established time guidelines and coordinates maintenance actions.

Battle damage assessment and diagnosis indicate repair time. An item is repaired on site or recovered directly to the appropriate maintenance echelon in the appropriate support area. The location is based on the following:

- Ž Tactical situation.
- Ž Echelon of work required.
- Ž Availability of required repair parts.
- Ž Current workload in each area.
- Ž Maintenance time guidelines.

Maintenance time guidelines establish the maximum time that unserviceable equipment will remain in various support areas. The decision to repair, recover, or evacuate is made at all levels and is based on the time required to repair. Those times are based on command policy and the factors of METT-T. They do not include evacuation, preparation, and movement time. The maintenance times shown below are flexible and should not be considered restrictive.

MAINTENANCE TIME GUIDELINES

| TIME FOR REPAIRS (HOURS) | LOCATION |
|---|--|
| Less than 2 | On site |
| 2 to 6 (and can be towed until repaired) | UMCP |
| 6 to 24 (or less than 6 if vehicle cannot be towed) | Field trains or FSB, maintenance company or FAST, or maintenance platoon (BSA) |
| 24 to 36 | Division support area |

Maintenance Concepts

The following discussion of battlefield maintenance concepts places the various maintenance echelons into proper perspective. The discussion illustrates how echelons overlap to provide continuous maintenance support to the batteries.

The BMO task-organizes the maintenance platoon according to his analysis of current and anticipated requirements. He is concerned with providing the appropriate support at each of three locations the battery, the UMCP, and the field trains.

Normally, the battalion provides each battery its habitually associated maintenance team. Usually, the battalion's three vehicles, tracked, recovery (VTRs) (heavy divisions only) are positioned forward with each firing battery but remain under battalion control. This provides a quick-fix capability for those items that can be repaired in less than 2 hours and a recovery capability for those items requiring more extensive repairs.

The UMCP is normally established next to the combat trains. It includes the maintenance platoon headquarters (-), HHB maintenance team and PLL, number 2 common tool kit and welding equipment, and the DS MST (-). The task organization of the UMCP is modified according to the BMO's analysis of the maintenance requirements and the tactical situation. The UMCP cannot become a collection point for nonoperational vehicles to the extent that it cannot move with an hour's notice. Anything that cannot be repaired in the UMCP or that cannot be towed by UMCP assets is recovered to the field trains or directly to the FSB maintenance company or FAST maintenance platoon in the BSA. The UMCP is supervised by the battalion maintenance technician (BMT) and the senior maintenance supervisor.

The rest of the maintenance platoon is in the field trains under the control of the BMO and the battalion motor sergeant.

The battalion maintenance platoon organizes to support six elements – three line batteries, the CP, the combat trains, and the field trains – as follows:

- Ž The three line battery maintenance trucks and PLL trailers provide tools and repair parts to support one battery each. These vehicles also transport enough packaged POL to Support repair operations. The HHB maintenance truck with PLL items is configured to carry tools and PLL to support the vehicles habitually located in the combat trains and at the CP. Finally, the service battery maintenance truck with PLL items is configured to support the density of vehicles and equipment generally housed in the field trains.
- Ž Some high-demand, low-volume parts are carried by the battery maintenance team. The selection of these parts as well as the breakout of parts to be carried on each PLL trailer should be addressed in the battalion maintenance SOP.

Ž Direct support maintenance element priorities are set by the BMO. Since the maintenance elements are equipped and trained to support the unit, task-organizing DS maintenance assets is not routine. The PLL parts, special tools, and test sets are not easily split.

NOTE: Direct support FA battalions organic to light divisions do not have the personnel or equipment assets to implement as described. However, the concept is valid for light units and must be adjusted on the basis of the unit's organic capabilities.

The battery maintenance vehicles are in the forward platoon locations. These vehicles carry the tool boxes, some unit-level technical manuals, and a limited number of special tools and repair parts. This team usually repairs the damage on site if the repair can be made within 2 hours.

If a damaged vehicle cannot be repaired within 2 hours, it is recovered to the UMCP or the field trains. The forward-positioned VTRs are used for this purpose. They can be directed by battalion maintenance to support recovery operations regardless of battery affiliation.

The damaged vehicles recovered to the UMCP are repaired by maintenance platoon elements or MSTs from the FSB maintenance company or FAST maintenance platoon. When not involved in on-site repairs, the battery maintenance teams may also repair vehicles in the UMCP. This is especially true of work requiring diagnostic test equipment that cannot be taken into the forward positions.

Some vehicles cannot be repaired within 6 hours, or their repair would otherwise overload the capability of the UMCP. They are recovered to the field trains or directly to the FSB maintenance company or FAST maintenance platoon collection point for repair. This recovery may be done by the battery or battalion maintenance team VTR, by a 5-ton wrecker, or by a combination of the above and heavy equipment transporters (HETs). The use of HETs applies to FA units equipped with tracked vehicles. The BMT coordinates and directs the method to be used. The use of HETs is preferred but they are restricted by road requirements and availability. The HETs are requested through the FSB maintenance company. Some crew members go with the vehicle to the rear to help mechanics repair the vehicle and to return it to the unit when repaired. They also man operational weapon systems on the vehicle to provide additional security to rear areas. C-E equipment installed in the vehicle is evacuated with the vehicle. Crewmen not going with the vehicle remove personal equipment and any special equipment before the vehicle leaves the area.

The UMCP usually displaces with the other elements of the combat trains. During periods of frequent displacement, the BMT may direct that the UMCP displace by echelon. In this case, some personnel of the maintenance platoon including the BMT, complete repair on vehicles at the old UMCP before displacing forward to the new location. Maintenance platoon assets not involved in repairs move with the rest of the combat trains and establish the forward UMCP.

During rapid forward moves, such as in the exploitation, the UMCP conducts only essential repairs and simple recovery. Other disabled vehicles are taken to collection points on the MSR. There they remain to be repaired or evacuated. Field trains and the maintenance element of the FSB or FAST displace forward to subsequent locations. The BMT coordinates the repair or evacuation with the battalion motor sergeant in the field trains.

In the field trains, remaining elements of the battalion maintenance platoon perform other tracked and wheeled vehicle maintenance and Class IX resupply. The battalion motor sergeant coordinates requirements with the service battery commander or S4 and with the maintenance element of the FSB or FAST. He also coordinates maintenance requirements with the parent headquarters of any attached or supporting elements working with the battalion.

FIELD SERVICES

Graves Registration

Graves registration services are provided by the MSB supply and service company. Graves registration at battalion level consists of three functions: collection, identification, and evacuation. DA Forms 1156 (Casualty Feeder Reports) and DA Form 1155 (Witness Statement on Individual) are completed by the soldier who has knowledge of the casualty. The forms are sent to the field trains with the returning LOGPAC. Military equipment is collected and turned over to the supply sergeant to be forwarded during LOGPAC operations. Remains are placed in a human remains pouch, along with personal effects, and evacuated with returning LOGPAC vehicles to the field trains. A collection point may be established, if necessary, at the combat trains under the control of the S4. In any case, remains are evacuated as quickly as possible to the brigade collection point in the BSA, (See FM 10-63-1.)

Clothing Exchange and Bath

Clothing exchange and bath (CEB) services are provided by the MSB supply and service company or the supply and transport battalion in the DISCOM of an LID. Clothing

exchange (or gratuitous issue) and bath service are requested from the MSB through the brigade S4. A request for CEB service must specify the following:

- Ž The location of the unit making the request.
- Ž The desired time for service.
- Ž The range of clothing sizes for unit members.

The requesting unit must be prepared to furnish soldiers to help set up the CEB operation. Normally, there is one CEB point per BSA.

Salvage

Salvage services are provided by the FSB supply company or FAST supply section. A salvage collection point is established in the BSA by the FSB supply company or FAST supply section. It receives serviceable, unserviceable (repairable), discarded, abandoned, and captured supplies and equipment. The salvage point will not accept COMSEC or medical supplies, toxic agents, radioactive

materials, contaminated equipment, aircraft, ammunition, and explosives.

Laundry and Renovation

Laundry and renovation services are provided by corps (COSCOM) when the tactical situation permits. This service is coordinated through the brigade S4.

TRANSPORTATION

Transportation is the means of distributing supplies, evacuating damaged equipment, and moving personnel to where they are needed. Without adequate transportation% the successful support of combat operations would be impossible.

Should the cannon battalion require transportation support beyond its organic capabilities, the S4 forwards a request to the brigade, div arty, or FA brigade S4. He in turn forwards it to the movement control officer (MCO) at the DISCOM or COSCOM. The MCO makes a determination based on requirements and existing priorities.

Section IV

PERSONNEL AND HEALTH SERVICES SUPPORT

Personnel and health services support functions sustain the morale and welfare of the soldier. At battalion level, these include personnel and administrative (P&A) services, chaplain activities, legal services, finance services, postal services, EPW support, and health services support.

PERSONNEL AND ADMINISTRATIVE SERVICES

S1 Functions

The P&A services are the responsibility of the battalion S1. They are discussed below.

Strength Accounting. Batteries and attached elements submit a personnel daily summary report to the S1 representative in the combat trains ALOC. The S1 forwards a battalion consolidated report through brigade S1 to the division G1 and/or adjutant general (AG) at the division main CP. The PAC in the field trains is given an information copy. These reports are the basis for individual replacements and Class I resupply. Accurate strength reports also give the commander and staff information to plan operations. Daily reports are included in the battalion SOPs.

Casualty Reporting. The S1 ensures that both strength and casualty reporting are timely and accurate. Initial reports are usually verbal. Written reporting occurs as soon as possible after the event. It is initiated by the section chief or any individual having knowledge of the incident. The DA Form 1156 is carried by all small-unit leaders and is used to report battle and nonbattle casualties. It provides initial information for notifying next of kin and for paying benefits. When a soldier is reported missing or missing in action or when the remains are not under US control, a DA Form 1155 goes with the DA Form 1156. The first sergeant collects the reports and forwards them to the combat trains ALOC. The S1 cross-checks the reports, requests any needed clarification, adjusts unit strength reports, and forwards the reports through the PAC to the brigade S4.

Replacement Operations. Replacement flow is monitored by the PAC in the field trains. The service

battery commander establishes a replacement receiving point (RRP) in the field trains and notifies the brigade S1 of its location. All replacements or hospital returnees are brought to the RRP for initial processing. The division AG is normally responsible for delivering replacements to the RRP. Replacements are briefed on SOPs and equipped with weapons and field gear before leaving the field trains. They move forward to their unit with the LOGPAC.

Other Administrative Services. During lulls in the battle, the S1 and PAC complete all other P&A actions necessary. Special consideration is given to timely processing of awards and decorations.

Chaplain Activities

Chaplain activities are provided by the unit ministry team (one chaplain and one chaplain's assistant) operating from the combat trains. This team is dedicated to serving the spiritual needs of soldiers. Chaplain activities include the following:

- Ž Providing worship opportunities.
- Ž Administering sacraments, rites, and ordinances.
- Ž Providing pastoral care and counseling.
- Ž Advising the commander and staff on matters of religion, morals, and morale.
- Ž Ministering to those suffering battle fatigue.
- Ž Providing religious support to enhance soldier morale and unit cohesion.
- Routinely visiting unit soldiers in nearby hospitals. The activities of the chaplain are coordinated through the S1 and are published in paragraph 4 of the FA support plan.

Legal Services

Legal services support is coordinated by the S1 section. It is provided to the battalion on a GS basis by the staff judge advocate of the division. It includes the following:

- Ž Legal advice to commanders on all matters involving military law, domestic law, foreign law, international law, and administrative proceedings.
- Ž Representation to soldiers accused and/or suspected in military justice matters and to personnel pending adverse military personnel action.

Ž Advice to soldiers on complaints reports of survey, and the right to silence in administrative proceedings.

Ž Legal assistance to soldiers on personal civil legal matters.

Finance Services

Finance support to the battalion is usually provided by mobile pay teams (MPTs) from the corps area finance support unit. During low-intensity operations, the MPTs make combat payments to soldiers in amounts established by the theater army commander or in lesser amounts if the soldier so desires. The div arty commander may establish an amount less than the maximum for personnel of the div arty according to the tactical situation and the needs of the soldier. When and where the soldier is paid are determined by the commander and coordinated by the S1.

Postal Services

A postal element, assigned by the corps DS postal company, receives and separates mail by battalion and then turns it over to the brigade S1. The battalion mail clerk receives and sorts the mail by task organization. He distributes it to the unit supply sergeant (assistant mail clerk), who delivers it to the first sergeant or to the soldier himself (accountable mail) during LOGPAC resupply.

Prisoners of War

The S1 plans and coordinates EPW operations, collection points, and evacuation procedures. Prisoners of war are evacuated from the battalion area as rapidly as possible. The capturing battery is responsible for the following:

- Ž Guarding prisoners until relieved by proper authority.
- Ž Recovering weapons and equipment.
- Ž Removing documents with intelligence value.
- Ž Reporting to the CP and combat trains ALOC.

Prisoners may be evacuated to the vicinity of the combat trains or UMCP for processing and initial interrogation. Crews of vehicles undergoing repair or unoccupied mechanics act as guards. Prisoners are then moved to the brigade EPW collection point on returning LOGPAC vehicles or by transportation coordinated by the S4. As necessary, the S2 reviews and reports any documents or information of immediate value. The S4 coordinates evacuation of large amounts of enemy equipment. Wounded prisoners are treated through normal medical channels but are kept separated from US and allied patients. For additional information on treatment and handling of EPWs, see FM 27-10.

HEALTH SERVICES SUPPORT

Planning

Battalion health services support is planned by the medical section OIC (battalion field surgeon or PA) and the S1. It is provided by the battalion medical section. Backup support is provided by the FSB medical company or FAST medical platoon. To support battalion operations, the field surgeon or PA and the medical operations officer of the FSB or FAST medical element must understand the scheme of maneuver as well as the medical support plan.

Organization

The medical section is organized with a treatment team, an ambulance team, and a combat medic section. This organization allows quick evacuation of wounded soldiers so that they may be treated by trained medical personnel within 30 minutes of the time they are wounded. The medical section in light units consists of the medical treatment team and a combat medic section.

The medical treatment team establishes the battalion aid station, which operates from the combat trains.

The ambulance team also operates from the BAS. Combat medics habitually work with the same battery. It is necessary to augment the medics with soldiers who have been given intense medical training; they are called combat lifesavers. The goal is to train one combat lifesaver per section throughout the battalion.

Functions

The functions of the platoon medic areas follows:

- Ž Provide emergency medical treatment and protection for the sick and wounded.
- Ž Help section crews evacuate injured crewmen from their vehicles.
- Ž Provide medical evacuation.
- Ž Initiate a field medical card for the sick and wounded, and, time permitting, complete this card for deceased personnel.
- Ž Screen, evaluate, and treat patients suffering from minor illnesses and injuries; return to duty patients requiring no further attention; and notify the first sergeant of those requiring evacuation to the BAS.
- Ž Keep abreast of the tactical situation.

Ž Ensure that the battery commander and the battalion surgeon are informed of the status of patients seen and the overall status of health and welfare of the platoon.

Ž Train unit personnel to enable them to perform self-aid and buddy aid.

Ž Provide trained combat lifesavers with medical supplies as required.

The **battalion aid station** has medically trained personnel to stabilize patients for further evacuation, to perform immediate lifesaving or limb-saving techniques, and to treat minor wounds or illnesses and return the patients to duty. Other functions of the BAS include the following:

- Ž Receive and record patients.
- Ž Notify the S1 of all patients processed and the disposition of casualties as directed by SOP.
- Ž Prepare field medical records and verify information on field medical cards.
- Ž Request and monitor aeromedical evacuation.
- Ž Monitor personnel when necessary, for radiological contamination before medical treatment.
- Ž Decontaminate and treat small numbers of chemical casualties.

Casualty Reporting and Evacuation

Medical evacuation must be planned in detail. Too often, units rely unreasonably on aeromedical evacuation. If these limited assets are available, units must have standard procedures for their use. However, units must plan to care for and evacuate their soldiers by use of organic equipment.

Individual Casualties. Medics in forward platoon or battery locations treat casualties immediately after appropriate triage. Appropriate documentation (such as DA Form 1156 and DD Form 1380 [US Field Medical Card]) is prepared by the unit. The ALOC is notified to prepare to receive casualties, to include preparation of litter teams, and the unit transports the patients to the BAS in the combat trains.

Mass Casualties. Casualties in this category are beyond the capability of the unit to handle with organic assets. To initiate an appropriate response, the CP and the ALOC are notified immediately. Support for this unit is coordinated and supervised by the battalion XO. Medical and transportation assets are augmented by battalion assets in the combat trains. Once casualties are cared for and evacuated, the remnants of the unit are consolidated under battery control.

NBC-Contaminated Casualties. These casualties fall into two categories:

- Ž Soldiers suffering the effects of an NBC attack.
- Ž Soldiers, although fully protected in MOPP 4, suffering a conventional wound.

For both circumstances, the casualty must be decontaminated before he is entered into the unit's casualty evacuation system. The initial procedures include taking appropriate protective measures as well as notifying the CP and the ALOC.

A hasty decontamination site, organized under battalion control, is established and augmented by battery personnel as appropriate. The focus of this initial effort is on the decontamination of casualties. Decontamination of the rest of the unit personnel and equipment follows, when appropriate, after coordination by the battalion S3.

Medical Supply and Property Exchange

The medical section maintains a 2-day stock of medical supplies. To prevent unnecessary depletion of blankets, litters, splints, and the like, the receiving medical facility exchanges like property with the transferring agency. Medical property accompanying patients of allied nations is disposed of in accordance with STANAG 2128, Appendix C.

Preventive Measures

Experience in World War II, Korea, and Vietnam indicates that most hospital admissions were for disease and nonbattle injury. Commanders can reduce disease and nonbattle injury by emphasizing preventive medicine, safety, and personal hygiene, (See FM 27-10.)

Section V

RECONSTITUTION

Planners must be prepared for mess casualties, mess destruction of equipment, and the destruction or loss of effectiveness of entire units. Battalion units that have been catastrophically depleted or rendered ineffective are returned to combat effectiveness through reconstitution.

Reconstitution consists of the actions to restore units to a desired level of combat effectiveness commensurate with mission requirements and availability of resources. Reconstitution differs from sustaining operations in that it is undertaken only when a unit is at an unacceptable level of combat readiness; sustainment operations are routine actions to maintain combat readiness. Commanders reconstitute by either reorganization or regeneration. See FM 100-10.

REORGANIZATION

Reorganization is the action taken to shift resources within a degraded unit to increase its combat power. Measures taken include the following:

- Ž Cross-leveling equipment and personnel.
- Ž Matching operational weapon systems with crews.
- Ž Forming composite units.

Immediate battlefield reorganization is the quick and often temporary restoration of units conducted during an operation.

Deliberate reorganization is a permanent restructuring of the unit. It is the type of reorganization considered during reconstitution planning. Deliberate reorganization is supported with higher echelon resources (such as

maintenance and transportation). Additional replacements and other resources may be made available. Deliberate reorganization must be approved by the parent-unit commander one echelon higher than that reorganized.

REGENERATION

Regeneration is not a battalion commander's prerogative. It consists of the following:

- Ž Incremental or whole-unit rebuilding through large-scale replacement of personnel, equipment, and supplies.
- Ž Reestablishing or replacing essential command, control, and communications.
- Ž Conducting the necessary training for the rebuilt unit.

The intensive nature of regeneration requires that a unit be pulled out of combat for this purpose.

WEAPON SYSTEM REPLACEMENT OPERATIONS

Weapon system replacement operations is a method to supply the combat commander with fully operational replacement weapon systems. Three terms which are often used in describing WSRO are discussed below.

- Ž A **ready-for-issue weapon** is a weapon that is mechanically operable according to current standards and has all ancillary equipment (fire control, machine guns, radio mounts, and radios) installed. The vehicle has been fully fueled, and basic issue items are on board in boxes. There is no ammunition on board, and the gaining unit must provide the crew.
- Ž A **ready-to-fight weapon system** is a crewed, ready-for-issue weapon with ammunition stored on board. The weapon has been boresighted, and boresight has been verified.
- Ž **Linkup** is the process of joining a ready-for-issue weapon with a trained crew.

WSRO is simply a procedure for bringing a weapon system to a ready-to-fight condition and handing it off to the combat unit. It involves making a vehicle ready to issue and marrying it to a complete crew, which makes it ready to fight. WSRO is an intensively managed process for giving the commander usable weapon systems in the shortest possible time.

To manage weapon systems, a common weapon system manager (WSM) is required. A WSM is designated at each level of command. The mission of the WSM is to maximize the number of operational weapon systems in accordance with the commander's priorities. The WSMs at all levels

are charged with quick-fix responsibility; they match serviceable vehicles and surviving crews.

The primary linkup points for weapon systems (howitzer with crew) are in the division support area or in assembly areas for formations in reserve. The DISCOM or support group commander organizes the linkup point and provides personnel to make the weapon system ready for issue. The crew, working with division elements, makes the weapon system ready to fight.

Conditions permitting, some familiarization training may be provided to crews in the linkup area. Such training should include the following:

- Ž Refresher gunnery.
- Ž Tactical driving.
- Ž Enemy and allied vehicle identification.
- Ž Passive air defense procedures.
- Ž Local SOPs.
- Ž Any other subjects appropriate to the operational area.

It is not intended that such wartime training should be elaborate or should substitute for crew qualification. The intent is to familiarize crews with operating conditions in the combat area.

Whenever possible, experienced soldiers should be mixed with replacement soldiers to form complete crews. New crewmen can join a partial howitzer crew (those whose howitzers have been destroyed or evacuated) at linkup points to form complete crews. There they pick up a replacement howitzer, make it ready to fight, and rejoin their unit.

APPENDIX A

TACFIRE-NON-TACFIRE OPERATIONS

The mote of the TACFIRE-non-TACFIRE pblem are the different primary communications systems used by the force. Non-TACFIRE artillery units use voice communication for command and control. in TACFIRE units, while voice is still used, digital communication is the primary means of conducting control functions.

DIGITAL COMMUNICATION

Digital communication offers tactical advantages high speed and less vulnerability to radio direction finding, intercept, and jamming. However, it does not allow simultaneous distribution of information. This is an important consideration for commanders concerned with synchronization of combat power.

TACFIRE digital communication is point-to-point in nature. TACFIRE sends separate messages to each destination. It offers information sharing by message of interest (MOI) processing. This allows TACFIRE to receive a message, automatically generate a copy, and transmit the copy to an appointed agency (MOI subscriber). This works well within TACFIRE-equipped organizations. However, units that use solely voice communication lack the digital communications terminals required to receive and action MOI information.

The task then is to develop a plan to distribute a limited number of digital terminals to key positions. This will support the information-sharing requirements of both units. This plan should be as simple as possible and should cause no disruption of either unit's SOPs. The plan must also address the training problem raised by the non-TACFIRE unit's lack of familiarity with TACFIRE. There are various techniques for achieving interoperability. The operator's skill and attention to detail under stress will become even more important. Equipment faults will become even more critical than for normal TACFIRE operations.

Maintaining a level of commonality between the units under these conditions will be difficult, but it is essential for success. There are two basic situations presented in this appendix: a non-TACFIRE unit reinforced by a TACFIRE unit and vice versa.

CONSIDERATIONS

There are three major considerations in planning for TACFIRE-non-TACFIRE operations.

Tactical Missions

The first consideration is the tactical missions of the two organizations. Each unit will retain its assigned tactical mission. The need to interoperate in no way negates each battalion's inherent mission responsibilities.

Attack Guidance

The second consideration is the attack guidance of the supported maneuver commander, which must translate into commander's criteria. This term refers to a wide range of parameters an operator can input into the TACFIRE computer so that commander's guidance and the tactical situation are considered during processing. An order of precedence must be established for commander's criteria. The commander having the higher priority mission will establish the commander's criteria.

NOTE: The dud-purpose mission of the GSR battalion is taken into consideration in the order of precedence. When the div arty or FA brigade transmits a fire order to the battalion, commander's criteria will have already been applied.

Equipment and Personnel Distribution

The third consideration is how to distribute digital communications equipment and TACFIRE personnel. The sole criteria for the options discussed in this appendix are mission and digital equipment available.

INTERFACE TECHNIQUES

The techniques involved in facilitating TACFIRE-non-TACFIRE unit interface vary with the tactical situation. However, they can be reduced to two general options, one of which contains two alternatives.

TACFIRE-NON-TACFIRE TECHNIQUES
AND ALTERNATIVES

| OPTION 1 | OPTION 2 |
|---|---|
| Collocate FA battalion CPs and/or FDCs. | Establish digital-capable Won. Z Alternative 1—TACFIRE battalion controls the fires of the non-TACFIRE battalion via BCS. Z Alternative 2—Fire missions and fire support coordinating measures are sent to non-TACFIRE battalion via digital liaison (VFMED or FIST DMD). Each battalion controls its own fires internally. |

Option 1

Merge or collocate the command posts (or at least the FDCs) of the non-TACFIRE and TACFIRE units.

Option 2

Maintain separate CPs and establish full-time, digitally capable (that is, with a VFMED or a PSG-2 DMD) liaison between the two battalions. The responsibility to provide liaison inherent in the tactical mission does not change. However, the liaison requirement may influence the commander's choice of options or alternatives. If the battalion must provide liaison as an inherent part of its mission, the commander may choose to expand the role of the liaison team to include facilitating the TACFIRE-non-TACFIRE interface. In determining whether to use Option 2, the commander must realize that, regardless of tactical mission, the TACFIRE-equipped unit must provide digitally-equipped

liaison to the non-TACFIRE unit. In the case of a TACFIRE DS battalion being reinforced by a non-TACFIRE battalion, each unit must provide liaison to the other. Within Option 2, there are two alternatives.

Alternative 1. When the non-TACFIRE battalion is equipped with the battery computer system, maintain separate fire direction centers. The non-TACFIRE batteries are put into the TACFIRE battalion computer. Fire orders are sent from the TACFIRE unit to the non-TACFIRE unit's batteries digitally. The non-TACFIRE unit is kept informed via the liaison team.

Alternative 2. The TACFIRE unit gives up a VFMED with trained operators to create a liaison team "out of hide" to send to the non-TACFIRE unit. One possible source for the liaison digital device is the O&I element's VFMED. (Sending a liaison team is already an inherent mission if the TACFIRE unit has an R or a GSR mission.)

NOTE: Fielding of the FIST DMD PSG-2 will greatly enhance TACFIRE-non-TACFIRE operations. DMDs will be particularly advantageous when a TACFIRE unit reinforces a non-TACFIRE unit. The non-TACFIRE unit will be able to send fire missions digitally to TACFIRE or directly to the battery BCSs as required.

OPTION ADVANTAGES AND
DISADVANTAGES

Each of the two options has advantages and disadvantages relative to the tactical missions of both the TACFIRE and the non-TACFIRE battalion. The supported FA commander will decide which option (or combination of options) to employ to best accomplish the missions of both units.

INTERFACE OPTION COMPARISON

| TACFIRE BATTALION REINFORCED BY A NON-TACFIRE BATTALION | | | |
|---|--|---|---|
| OPTION | DESCRIPTION | ADVANTAGES | DISADVANTAGES |
| Option 1 | Unit CPs and FDCs are collocated. Batteries of the non-TACFIRE battalion are linked digitally to TACFIRE via BCS. | Fire requests, fire support coordinating measures, and fire orders can be sent digitally. Liaison team is not required. | Collocated CPs and FDCs are a lucrative target. Poor communication may result if non-TACFIRE unit batteries are untrained in maintaining digital communication with a TACFIRE computer. |
| Option 2, Alternative 1 | Non-TACFIRE battalion maintains a separate FDC; but its batteries are input into the TACFIRE subscriber table, and a digital link is established from the TACFIRE to all BCSs. | All requests for fire and fire support coordination and fire order transmissions can be sent digitally. | The liaison team from the non-TACFIRE unit may not be able to keep its unit properly informed of the situation or fire mission processing. |

INTERFACE OPTION COMPARISON (Continued)

TACFIRE BATTALION REINFORCED BY A NON-TACFIRE BATTALION (Continued)

| OPTION | DESCRIPTION | ADVANTAGES | DISADVANTAGES |
|---|---|--|--|
| Option 2, Alternative 2 | The non-TACFIRE battalion receives digitalty-equipped liaison from the TACFIRE battalion. Fire missions and fire plans are sent digitalty to the FDC of the non-TACFIRE unit, which controls its own batteries. | The non-TACFIRE unit can take maximum advantage of the capabilities of the TACFIRE computer while retaining overall C2 at the non-TACFIRE battalion CP. | The TACFIRE battalion must provide liaison not normally required by the DS mission. It must provide a digital device "out of hide." This is particularly critical if the only digital device available is the O&I element's VFMED. |
| NON-TACFIRE BATTALION REINFORCED BY A TACFIRE BATTALION | | | |
| OPTION | DESCRIPTION | ADVANTAGES | DISADVANTAGES |
| Option 1 | Unit CPs and FDCs are collocated. Batteries of the non-TACFIRE battalion are linked to the TACFIRE via BCS. | Fire plans, fire support coordinating measures, and fire orders can be sent digitalty. No liaison team is required. | Collocated CPs and FDCs are a lucrative target. Poor communication may result if the non-TACFIRE batteries are untrained in maintaining digital communication with a TACFIRE computer. |
| Option 2, Alternative 1 | The TACFIRE battalion establishes liaison with the non-TACFIRE battalion as required by the R or GSR mission. The non-TACFIRE battalion maintains a separate FDC; but the non-TACFIRE batteries are entered into the TACFIRE subscriber table, and a digital link is established between the TACFIRE computer and the BCSs in the batteries. The TACFIRE computer of the R or GSR battalion controls the fires of the batteries of the non-TACFIRE battalion. | Fire plans, fire support coordinating measures, and fire orders can be sent digitalty. | The DS battalion in effect relinquishes tactical fire control to the R or GSR unit. Few FSCOORDs will find this acceptable. |
| Option 2, Alternative 2 | The non-TACFIRE battalion receives digitalty-equipped liaison from the R or GSR TACFIRE battalion. Separate FDCs are maintained. The non-TACFIRE battalion controls its own batteries by voice radio. Missions for the TACFIRE battalion are passed to the liaison team, which sends them digitalty to the TACFIRE battalion. | Habitual C2 relationships are maintained between the battalions, their batteries, and fire support personnel. | This alternative does not take maximum advantage of the capabilities of TACFIRE. |
| TACFIRE BATTALION SUPPORTING A NON-TACFIRE DIV ARTY OR FA BRIGADE | | | |
| OPTION | DESCRIPTION | ADVANTAGES | DISADVANTAGES |
| Option 1 | TACFIRE battalion CP is merged or collocated with the non-TACFIRE div arty or FA brigade CP. | Maximum use is made of TACFIRE capabilities for both the battalion and the supported headquarters. This increases the responsiveness of the TACFIRE battalion. | Battalion TACFIRE cannot provide div arty automatic data processing. Unfamiliar C2 relationships are introduced. This option also creates a lucrative target for the enemy. |
| Option 2 | The TACFIRE battalion sends a liaison team with VFMED or DMD to div arty or brigade. | Impact on operations of either unit is minimum. This option provides a digital link between units. | A digital device with a liaison team must come "out of hide." |

BATTALION-LEVEL SITUATIONS

Situation 1 – Non-TACFIRE DS Battalion Reinforced by a TACFIRE Battalion

Planning - Organization of Units.

Option 1-Collocated Command Posts. This option gets the non-TACFIRE battalion into the digital arena. The resulting physical and electronic signatures can be reduced by deploying the TACFIRE shelter and the non-TACFIRE battalion HHB (minus battalion commander and staff) as a support CP. The main CP then consists of the TACFIRE battalion O&I element and the non-TACFIRE battalion commander and staff. Wire communication links the support CP to the main CP.

The collocation of command groups raises the question of combined staff functions. A combined staff supports the 24-hour mission with two teams. Each team must have a mixture of members qualified in TACFIRE and manual methods. An example is shown below.

TEAM COMPOSITION-24-HOUR MISSION

| POSITION | TEAM 1 | TEAM 2 |
|------------------|-----------------------|-----------------------|
| S3 | TACFIRE battalion | Non-TACFIRE battalion |
| S2 | Non-TACFIRE battalion | TACFIRE battalion |
| Intelligence NCO | TACFIRE battalion | Non-TACFIRE battalion |
| Operations NCO | Non-TACFIRE battalion | TACFIRE battalion |

Option 2—Separate Communal Posts. Under this option, the TACFIRE unit sends a liaison team to the non-TACFIRE unit. The team carries the O&I element's VFMED or a PSG-2 DMD if it is available. This creates a degraded O&I element at the TACFIRE unit. However, the liaison team can enter information into TACFIRE digitally.

Fire Mission Processing. Fire mission processing depends largely on which option the commander decides to use. The responsibilities inherent in the tactical mission do not change.

Option 1. Fire missions are called in to the FA battalion FDC by voice and are processed by TACFIRE. TACFIRE can then send the fire orders to BCS-equipped batteries digitally. The batteries still must be ready to receive voice fire orders. TC 6-40 gives excellent guidance on how to send voice fire orders. A thorough knowledge

of how to send voice fire orders is essential to continuing the fire support mission when digital communication is not possible.

Option 2. The units operate the way they normally train. The liaison team sends the call for reinforcing fires to the TACFIRE battalion FDC. If the liaison team has a DMD or VFMED, fire requests can be transmitted digitally. The liaison team uses a voice call for fire if it is not digitally equipped. A good liaison team should keep both the supported and supporting units abreast of the situation. This means the liaison officer must be sure that both units have the following data:

- Ž Ammunition and tire unit data.
- Ž Battlefield graphics (control measures and geometry).
- Ž Commander's criteria (attack guidance).
- Ž Fire planning information (as required).
- Ž Situation reports.

Fire Support Planning. The TACFIRE computer assists the DS battalion in its fire support planning effort. Using TACFIRE to conduct fire support planning requires assistance from the R battalion TACFIRE personnel. Fire planners must apply the maneuver commander's criteria to the data base for the fire plan. These criteria are input and stored in the R battalion TACFIRE. Fire planners then determine the fire support assets and the fire support coordinating measures to be put into the TACFIRE data base.

The targeting effort of the DS battalion remains the same. Fire support personnel submit their target lists by voice up through the fire support chain for processing. The battalion FDC or the liaison team, if equipped with VFMED, enters these targets into the preliminary target list. Using the div arty TACFIRE artillery target intelligence files, fire planners can develop additional targets for this list. The liaison team, using the maneuver commander's guidance, applies fire planning criteria to the plan and gives the computer scheduling instructions. The TACFIRE unit now computes the plan and sends it to the non-TACFIRE unit for action. During the execution phase, the plan is disseminated to the firing batteries digitally, by use of NNFP;FCs or voice communication. Voice communication may prove to be a better method for sending the fire plan data to the batteries.

Net Structure. The DS non-TACFIRE communications net structure is almost unchanged. The single required change is that the battalion ops/F net becomes a digital net. This net supports the data link between the R

battalion TACFIRE, the DS battalion BCSs, and the liaison team. The TACFIRE battalion FDC should be the NCS for this net. The supporting battalion monitors the DS battalion FD voice nets.

Situation 2–TACFIRE DS Battalion Reinforced by Non-TACFIRE Battalion

Planning – Organization of Units. This interoperability configuration is somewhat easier to execute than that discussed in Situation 1. The DS TACFIRE battalion has digital devices for the fire support and target acquisition devices (AFSOs, radars, and so forth).

Planning considerations are the same as in the first situation. The TACFIRE operator must input the maneuver commander's criteria to establish mission priorities. The two options have the same advantages and disadvantages as before. The DS battalion may send a VFMED-equipped liaison team to the R or GSR unit. If a VFMED is not available for this purpose, the supporting unit sends liaison to the supported unit. In either case, this liaison team has the mission of helping the non-TACFIRE unit integrate into the TACFIRE operation.

NOTE: The force artillery headquarters programs the GS criteria into its computer. The computer then applies this guidance to missions fired by the GS units when supporting the force. Commanders and their staffs must then determine the sources and requirements for information needed to support the scheme of maneuver and how to place input-output devices to support these requirements. If the team is VFMED-equipped, the force artillery TACFIRE can address the GS mission by relaying through the DS TACFIRE unit to the GSR unit.

Fire Mission Processing. Fire mission processing is the same as in normal operations. If the liaison team sent to the non-TACFIRE battalion has the O&I element's VFMED or a FIST DMD, the liaison team receives requests for reinforcing fires digitally. The liaison team then gives the supporting unit the request.

All observers must be able to call for fires by voice. Thus, when the TACFIRE-equipped unit FDC moves, the non-TACFIRE unit can take command and control of both units by using voice communication. The basic concept is to keep procedures simple and in accordance with those in the FM 6-20 series, FM 6-30, and TC 6-40. A good way to tell observers to use voice calls for fire is to use a code word obtained from the brevity list in the SOI. When fire support and firing battery personnel hear the code, they know that it is time to use voice calls for fire and voice fire orders.

Fire Support Planning. The TACFIRE automated fire planning capability should be used as much as possible. All printouts generated during the fire planning process should be saved. This allows the fire planners to continue fire planning efficiently even if TACFIRE becomes inoperative. The TACFIRE operator will enter any plans generated in the O&I element if that element does not have its VFMED, which may have been sent with the liaison team. The operator in the TACFIRE FDC will be doing many tasks normally done in the O&I element; therefore, he may experience more stress, and his performance may be degraded over time. This situation has the same fire plan execution method as Situation 1.

Net Structure. The DS battalion communications net structure remains almost intact. The single required change is that the DS battalion TACFIRE FDC, the R or GSR FDC, and the liaison team now use the battalion ops/F net for the digital data link. The TACFIRE battalion FDC will be the NCS for this net. The R or GSR battalion will not monitor the DS battalion FD nets, since these are primarily digital. The R or GSR unit will monitor the established voice fire net, normally the supported maneuver unit FS net.

EXECUTION

The recommendations below concern techniques and procedures for executing fire support in a TACFIRE-non-TACFIRE environment.

Planning

The main consideration for C2 relationships between the two battalions is developing a mutually acceptable scheme of control that avoids unusual or unfamiliar procedures. During execution, C2 procedures must be as simple as possible and consistent with the way the unit normally operates.

Conduct a coordination meeting between the commanders and operational staffs of the two battalions. Using the maneuver commander's concept, develop commander's criteria for programming into TACFIRE to accomplish the mission. Develop unit assignment ordering (ASGORD) numbers to be used. Ensure that all units involved are completely informed about the plan and are able to execute.

The S3s and FDOs of the two units trying to interoperate develop information requirements and then determine sources of information to support these requirements between the units. During the execution of the plan, the S3 gets feedback on how well the plan is working and makes adjustments as necessary. The best plan poorly executed will not accomplish the mission. Because there

is a limited amount of digital equipment in this type of operation, the main requirement is to ensure that personnel in either unit can function without digital communication.

Net Structure

The primary communications consideration is establishing a digital link between the TACFIRE and non-TACFIRE units. This link will normally be the DS battalion ops/F net. All other nets in each battalion are unchanged.

Fire Support Planning

Implement procedures to make the maximum use of TACFIRE. Make certain the maneuver commander's concept is used to develop criteria for the fire plan. These criteria or guidance must be programmed into the TACFIRE data base.

Fire Control Coordination

Determine the right mix of manual versus automated control. Agree on procedures to handle requests from supported to supporting units.

Fire Orders

As previously discussed, FM:FCs (fire orders) can be sent from the TACFIRE unit to the BCS-equipped batteries of a non-TACFIRE battalion either digitally or by voice.

If all batteries are to receive digital fire orders, the non-TACFIRE units must be entered into the TACFIRE communications data base. This data base can be checked with a SYS;1201 report. Communication must then be established with the non-TACFIRE unit BCSs. (The non-TACFIRE battalion commander relinquishes a degree of tactical fire control over his unit when using this method.)

The TACFIRE battalion may send requests for fire to the non-TACFIRE battalion FDC digitally via the liaison team's VFMED or DMD or by voice. The non-TACFIRE battalion FDC then sends fire orders to its batteries by voice. The following are procedures to effectively issue voice fire orders:

- Ž Develop fire order standards for both battalions, DA Form 5338-R (Computer Checklist) can be used as a work sheet. The units should develop identical fire order standards if possible. This will allow for rapid voice dissemination of fire orders with a minimum of confusion.
- Ž Use call signs from the SOI when announcing units to fire.

EXAMPLE

Instead of saying **BATTALION**, use the first letter of the unit's abbreviated call sign.
Battalion FDC says **TANGO 6 ROUNDS**.
(Unit's abbreviated call sign is T68.)

Ž Modify the voice fire order. These modifications are as follows:

- Give target location and altitude.
- Use actual times for time-on-target missions as opposed to, for example, **5 MINUTES FROM NOW**.
- Give the target number with the fire order.

EXAMPLE

This is an example of how the FDC can quickly issue a fire order for a battery to fire six volleys of duet-purpose improved conventional munitions (DPICM). (DPICM has been specified as standard.)

TANGO THIS IS TANGO 14, FIRE FOR EFFECT, OVER.

(The battery designated by the unit SOP reads back the fire order.)

**FIRE FOR EFFECT, OUT,
GRID 416352, ALTITUDE 345, OVER.
GRID 416352, ALTITUDE 345, OUT.
TANGO 6 ROUNDS, OVER.
TANGO 6 ROUNDS, OUT.**

A battalion time on target can be called for just as easily.

EXAMPLE

TANGO THIS IS TANGO 14, FIRE FOR EFFECT, OVER.

**GRID 416352, ALTITUDE 345, OVER.
TANGO 2 ROUNDS, OVER.
TIME ON TARGET 1645, OVER.
TARGET NUMBER AB0003, OVER.**

Again, this method gets the critical information to the firing units with a minimum of transmission because of good fire order standards and clear and simple procedures.

TACFIRE-INPUT PARAMETERS TO THE FIELD ARTILLERY SUPPORT PLAN

The FA support plan must include additional paragraphs for TACFIRE-non-TACFIRE operations. This information will be included in the TACFIRE tab to the

FA support appendix to the fire support annex to the maneuver OPORD. (See also the example in Appendix E.)

| EXAMPLE | | | | | | | |
|--|---|---|----------------------|---|---|---|---|
| * | * | * | * | * | * | * | * |
| 1. MUTUAL SUPPORT. | | | | | | | |
| DA -- BDE | | | | | | | |
| BN1 -- BN4 | | | | | | | |
| * | * | * | * | * | * | * | * |
| 2. FSO AND FO/RADAR ASSIGNMENTS. | | | | | | | |
| 1 BDE -- FSO1 | | | FIS __, FO __, FO __ | | | | |
| FSO2 | | | | | | | |
| * | * | * | * | * | * | * | * |
| BN1 -- CBR/CMR __ | | | | | | | |
| 3. COMMANDER'S CRITERIA. | | | | | | | |
| a. MOD -- ECOF: | | | | | | | |
| PZONE: | | | | | | | |
| PTYPE: | | | | | | | |
| PSHELL: | | | | | | | |
| b. FUSEL -- WPN: ;MAXVOL: | | | | | | | |
| c. XCLUDE -- | | | | | | | |
| d. ATTACK -- | | | | | | | |
| 4. MAPMOD. | | | | | | | |
| 5. MATRIX/CAV CHANGEOVER. | | | | | | | |
| 6. SITREP:X INTERVALS. | | | | | | | |
| 7. ASR LEVEL. | | | | | | | |
| 8. AMOL LEVEL. | | | | | | | |
| 9. ADDITIONAL INSTRUCTIONS: | | | | | | | |
| (Fire plan guidance, on-order missions, and so forth.) | | | | | | | |
| 10. GEOMETRY. | | | | | | | |
| * | * | * | * | * | * | * | * |

APPENDIX B

SPECIAL ENVIRONMENTS AND OPERATIONS

The FA cannon battalion commander who operates in special environments or whose unit supports special operations should be aware of the problems associated with each particular environment or situation. The battalion may be faced with extreme conditions of weather and terrain, darkness or limited visibility, and complexities of special combat. The conditions can combine to degrade weapon system capabilities, personnel performance levels, and equipment durability. Special tactics, techniques, and procedures will be necessary to overcome or mitigate adverse conditions. The battalion's tactical mission will not change; but the tactics, techniques, and procedures of employment must be tailored to the particular environment to attain and sustain total combat effectiveness.

This appendix presents some special environments and operations in which the FA cannon battalion may participate. Discussions of each focus on considerations involving the seven basic FA tasks.

NIGHT OPERATIONS

Effective operations during hours of darkness are essential in combat. The basic ingredient of successful night operations, offensive or defensive, is the confidence of the individual soldier in his ability and his equipment in the night environment. This confidence stems from detailed planning and painstaking, successful training. The adverse effects of darkness require a change in techniques and procedures. However, it is important to note that darkness imposes limitations equally on friendly and enemy forces.

The objectives of night operations areas follows:

- Ž To achieve surprise and avoid losses which might be incurred in daylight over the same terrain.
- Ž To compensate for advantages held by a numerically superior Threat or one who has air superiority.
- Ž To retain the initiative by defeating Threat night operations.
- Ž To exploit our technological advantage at night over a less sophisticated enemy.

Coordinate Fire Support

The specific area in which the commander desires to use smoke and illumination must be determined.

Smoke must be planned to degrade enemy night vision capabilities.

The FSO, the maneuver S3 or G3 air, and the ALO coordinate to integrate sorties and to plan illumination for close air support (CAS) or attack helicopters.

Illuminating fires may not be fired, but they should be planned.

Illuminating fires should be placed on several locations over a wide area. These fires confuse the enemy as to the exact place of the attack.

Fire support coordinating measures should be placed on positively identifiable terrain.

Acquire Targets

Target acquisition is limited by the capabilities of night vision devices (NVDs).

Ground surveillance radars can be used for early target acquisition.

Target acquisition assets must be allocated for adjustment of fires.

The weapons-locating radar is one of the most effective means of acquiring targets at night.

Deliver Field Artillery Fires

Fires, especially FPFs, should be adjusted during daylight, if possible.

Illuminating fires over the objective should be timed to burn out just above the ground.

Illuminating fires beyond the objective should be allowed to burn on the ground to silhouette the defenders on the objective.

Illumination can greatly enhance the effectiveness of NVDs. However, care must be exercised to avoid damaging passive NVDs or degrading the individual soldier's night vision by firing the illumination in the immediate vicinity of the target or objective when passive devices are in use.

On-call fires should be used to engage enemy forces as they attack or probe the defense.

FASCAM maybe more effective because of poor visibility.

Exact procedures for marking the end of the orienting line (EOL) should be identified in unit SOPs.

Hasty survey techniques are degraded.

Communicate

Prearranged visual signals, such as hand-held flares, can be used to initiate or cancel fires.

Effective communication is necessary to ensure engagement of the correct targets.

Move

RSOP procedures for night occupation must be thoroughly planned, rehearsed, and incorporated in unit SOPs.

Movement is much more difficult at night because of problems with terrain recognition.

Procedures for repositioning at night must be planned.

Maintaining the correct direction of travel during movement is extremely difficult.

Plans must be made for increased use of traffic control points.

A position track plan is necessary. Every vehicle must be guided into position.

Tentage should be erected before darkness and checked for light leaks.

Generators and light sets should be installed before darkness.

Extra time must be allowed for planned unit movements.

Maintain and Resupply

Resupply operations at night should be planned to lessen vulnerability to the Threat.

Adequate amounts of illuminating and smoke projectiles must be on hand. Any shortfalls must be alleviated well in advance.

Noisy operations should be performed while the unit is firing. The firing will mask the noise of heavy vehicular traffic and materials handling equipment.

Survive

At night, during periods of reduced communication, small distances between individuals, crews, or units seem exaggerated.

Control of direct fires is critical.

Night intensifies the emotion of fear.

Light and noise discipline must be stressed.

Self-illumination must be included in the unit defense plan.

NORTHERN REGION OPERATIONS

Operations in northern regions are affected by extreme cold weather conditions. Summer has long periods of daylight; while winter has long nights, deep snow, and extreme cold. Spring thaws turn low-lying areas into a morass of mud, which severely degrades surface mobility. Weather phenomena such as whiteouts and greyouts cause loss of depth perception, which increases the hazards of driving. Ice fogs often form over troop concentrations and disclose their location. In extreme cold, metal becomes brittle, hydraulics thicken and parts breakage rates increase. Rates of fire for indirect fire weapons decrease as a result of heavily clothed gun crews, cold weapons, and fogged lenses on fire control devices. The enemy force is equally affected by these extreme conditions of subzero weather and snow.

Winterization of equipment is critical for sustaining combat effectiveness. Indoctrination training and acclimatization of individual soldiers in northern region environments are essential first steps to overcoming these adversities. Thorough planning and detailed preparation for combat operations in northern regions will help the unit fulfill its fire support mission while facing the extremes of this environment.

Coordinate Fire Support

Target detection is difficult.

Ice fogs and snow clouds created by moving enemy formations reveal targets.

Tracks in the snow may indicate enemy positions.

Fire planning for cold weather operations is no different than that required for operations in more temperate regions.

Limited ground mobility of artillery weapons and ammunition supply vehicles and increased time of operation must be considered.

Frequent poor weather reduces the availability of CAS.

The sameness of the terrain makes the marking of targets critical.

Panels or pyrotechnics must be used to mark friendly locations.

Acquire Targets

Forward observers should be equipped with snowshoes or skis to allow them to move quickly.

Extreme cold requires that observers in static positions be relieved often.

Visibility diagrams may have to be upgraded because drifting snow changes visibility.

Bright sunlight reflecting off a snow-covered landscape causes snow blindness. Amber filters on binoculars and observation devices reduce the incidence of snow blindness.

Aerial observers can see deep and are not as prone to disorientation as are ground observers.

Weather conditions may reduce the availability of aircraft.

Extremely cold weather may degrade the operation of TA radar because of stiff moving parts and heavily clothed crews.

Ground surveillance and weapons-locating radars are effective.

Remote sensors are not effective when used in deep snow.

Abrupt changes in temperature affect ballistics. The need for current met data increases.

Lack of survey control in some areas may severely degrade the accuracy of unobserved fires.

In certain areas, magnetic direction is unreliable.

Map spotting may be ineffective because of a lack of prominent terrain features.

Deliver Field Artillery Fires

Maximum use must be made of airburst munitions.

HE-point detonating (PD), HE-delay, ICM, and FASCAM are ineffective in deep snow and frozen muskeg.

At least 40 percent of the blast from these munitions is smothered by the snow.

Smoke (HC) is not effective because canisters are smothered in the deep snow.

White phosphorus (WP) is effective; however, phosphorus may burn undetected in the snow for up to 3 to 4 days and may be a hazard to friendly troops moving through the area later.

Overall VT is a good fuze for cold weather operations. However, snow and ice may cause it to detonate prematurely. Also, extreme cold causes a higher number of duds among VI fuzes. The new improved VT fuze (M732) has reduced this problem.

Rates of fire for indirect fire weapons decrease considerably as a result of heavily clothed gun crews, cold weapons, and fogged lenses on fire control devices.

Additional emphasis on monitoring propellant temperature is required.

There may be no terrain features on which to register. Thus, there may be an increase in the use of high-burst or radar registrations and met plus velocity error (VE).

Communicate

Effective communication is hampered by electronic interference.

Conventional dry-cell batteries are 40 percent effective below 0°F, 20 percent effective below -10°F, and 8 percent effective below -30°F. A similar problem exists for nickel-cadmium (NICAD) and lithium batteries.

Frost from human respiration forms in the mouthpieces of microphones. They should be covered with standard covers if available or with rayon or nylon cloth.

Radio sets for tactical operations should be installed in vehicles. This reduces the problem of translocation and provides shelters for operators.

Good electrical ground is difficult to establish in permafrost and deep snow. A counterpoise must be used.

Antennas must be kept free of snow and ice to avoid the typical high-pitched static roar.

Technical manuals (TMs) for radios and power sources must be checked to see if there are special precautions for operation in extremely cold climates.

Move

Route reconnaissance by both ground and air must be considered.

Ice thickness and load-bearing capacity must always be determined before the field artillery crosses frozen lakes and rivers.

Frozen, snow-covered terrain may limit the number of available positions for battery emplacement.

Mobility is slowed, as wheeled vehicles and trailers are generally not suited for cold weather operations.

Air assets may be required to position artillery weapons.

Blowing snow may decrease visibility and thus drastically slow convoy speeds.

Convoys should travel in close columns during whiteout conditions and prolonged darkness.

Soldiers must be trained to operate equipment on ice and snow.

Careful enforcement of track plans is essential.

Maintain and Resupply

Logistical resupply is hampered by reduced mobility and difficulty in determining grid locations.

Supply convoys should travel in close columns during whiteout conditions and prolonged darkness.

Extremely cold temperatures cause metal to become brittle, and parts breakage rates are increased.

Maximum use of aerial resupply should be planned.

The POL requirements are greater because of an increased use of personnel heaters and vehicle warm-up.

Vehicle winterization should be checked often to ensure continued protection.

Weapon recoil systems should be exercised often when weapons are not engaged in fire missions.

General maintenance schedules (preventive maintenance checks and services [PMCS]) must be adhered to as prescribed for cold weather operations.

Survive

Firing areas must provide firing platform stability.

Emplacement in avalanche-prone areas must be avoided. The sound produced by a firing battery can result in an avalanche.

Camouflage takes on an increasing importance, since weapons, units, and occupied areas must be seasonally camouflaged and maintained.

Cold weather injury prevention training must be ongoing.

Soldiers must be trained to construct fighting positions and shelters out of snow.

All levels of command must aggressively act to provide heated shelters and vehicles for their units.

| |
|--|
| NOTE More information on northern region operations is in FM 31-71. |
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MILITARY OPERATIONS ON URBANIZED TERRAIN

Military operations on urbanized terrain (MOUT) are characterized by extreme limitations on freedom to maneuver. Both attacking and defending forces take advantage of cover and concealment offered by urban areas, but both are equally hampered by reduced visibility. Operations in this environment may be conducted by both armored or mechanized and light infantry forces. While the defender normally has the advantage, operations are slow and deliberate and small-unit operations predominate. The defender enjoys superior protection as well as concealment and covered routes of movement. The attacker can isolate and bypass certain areas; but he is forced to fight into other, well-defended areas.

Field artillery units can position in villages and small towns to great advantage. Barns and other large buildings can be occupied for complete concealment of weapons and equipment. Decentralization to the maximum feasible extent may be required. The reduced ability to communicate and extended frontages for firing units necessitate more detailed orders and SOPs. The special artillery techniques of assault fire and direct fire may be required more often on urban terrain than elsewhere. The FA cannon battalion commander, and commanders at all levels, must be aware of the unique advantages and disadvantages associated with combat operations conducted in and around cities, towns, villages, and other built-up areas.

Coordinate Fire Support

Road intersections, likely enemy positions, and rooftops must be targeted.

Collateral damage to civilian population must be avoided if possible.

Copperhead should be used against point targets and enemy vehicles moving on restricted roads.

Barriers may be created by rubble buildings near key roads. However, indirect fires may sometimes create unwanted rubble.

Smoke should be used to obscure enemy observation.

The proximity of friendly and enemy units necessitates careful coordination of fire support.

Field artillery may not be the most appropriate weapon system for a particular mission. The rules of engagement (ROE) and the maneuver commander must specify the amount of collateral damage to the area surrounding the target that is acceptable.

Acquire Targets

Ground observation is limited.

Aerial observers should be used.

FOs should be placed on upper floors of buildings to improve visibility. They are vulnerable if positioned on rooftops.

Adjustment of fires is difficult.

FOs must identify size and location of dead space (area in which indirect fires cannot fall). Dead space is generally five times the height of buildings for low-angle fire and one-half the height of buildings for high-angle fire.

Radars are effective because of the increased use of high-angle fires.

Radars lose effectiveness if sited too close behind tall buildings.

Deliver Field Artillery Fires

Careful use of VT is required to avoid premature detonation.

WP may create unwanted fires and smoke.

Fuze delay should be used to penetrate fortifications and buildings.

Illuminating rounds can be effective if friendly positions remain in shadows.

Airbursts and ICM are effective for clearing antennas and enemy observers from rooftops.

Swirling winds may degrade smoke operations.

FASCAM may be used but must be covered by fires, since they can be easily seen on road surfaces.

Use of high-angle fire should be increased.

Ammunition expenditure may be heavy, especially if other fire support assets (such as AC-130, attack helicopter, and CAS) are not available.

Precision guided munitions can be used to minimize rubble.

Considerations for use of laser designators in urban terrain include the following:

- Tall structures may degrade the effectiveness of the designator.

- Maintaining a continuous laser track on moving targets is difficult.

- The presence of highly reflective surfaces such as windows may refract laser energy and/or pose a hazard to friendly troops.

- The presence of highly absorptive surfaces such as open windows or tunnels may degrade designator effectiveness.

- Because of fluid FLOTs, Angle T may often be in excess of 800 mils. Thus designators would have to reposition more often.

Accurate met and survey are required, as most targets are point targets.

Conventional survey is hampered by decreased line of sight.

Map spotting is difficult in large cities.

Establishment of multiple survey control points must be anticipated.

Field artillery units may be called upon to engage targets with direct fire by using assault fire techniques.

Artillery may be used in the direct fire role for precision operations.

Communicate

Structures reduce radio ranges.

Use of wire, messenger, and visual signals should be increased.

Antennas should be removed on upper floors to increase their range. They are vulnerable if positioned on rooftops.

Existing civilian telephone systems should be used for unsecure communication.

Wire should be routed through sewers and buildings for protection.

Generators should be placed near existing walls outside occupied buildings.

Move

Positioning is difficult because of the predominance of concrete surfaces.

Movement may be hampered by street rubble.

Howitzer positions in buildings must allow for high-angle firing.

Masking must be minimized.

Artillery should be positioned outside of town on the edge of the urban area, if possible.

Multiple routes of escape from the position must be provided.

Spades can be emplaced against a curb or baseplates can be sandbagged if ground is not suitable for normal emplacement.

Gun positions can be created by use of direct fire.

Reconnaissance is more difficult. Armed recon parties that can physically clear an area before occupation are required.

Displacement by element maybe required.

Maintain and Resupply

Increased use of certain munitions (delay fuze, HE, smoke, and so forth) must be anticipated.

Several smaller resupply convoys must be used because of restricted movement.

Difficulty in moving large logistics vehicles into firing positions must be anticipated.

Existing power sources and locally available supplies must be used.

Increased time for resupply actions must be planned.

Increased use of prestocked supplies should be considered.

Survive

Existing structures should be used to harden positions.

Use of OPs and LPs is more important, as terrain allows the enemy to infiltrate and get closer to artillery positions.

Personnel in the open are exposed to fires from snipers in tall buildings.

Increased use of high-angle fire makes artillery more vulnerable to counterfire.

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| NOTE: More information on MOUT is in FM 90-10. |
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DESERT OPERATIONS

Military operations in desert regions are characterized by rapid, highly mobile warfare conducted over great distances. These fast-moving battles with long-range visibility are more suited to mechanized rather than light forces. The desert offers little life support. High winds, limited availability of water, and rapid changes in weather conditions, coupled with extreme temperature ranges (30°F to 130°F) and difficult terrain (sandy, rocky plateau, and/or mountainous), make combat operations among the most demanding on both equipment and personnel.

Security takes on added importance. Active deception techniques play key roles in the concentration and dispersal of FA units. Because of these conditions, engagements are often fought at long ranges. The open terrain and clear weather generally afford excellent observation and fields of fire. However, ground observation can be hampered by heat waves, mirages, and sandstorms. Depth perception can be distorted by heat waves. This calls for the increased use of AFSOs. Usually, air observation is highly effective. However, the absence of prominent landmarks in some areas degrades this capability, and lack of trees and hills makes aircraft more vulnerable to enemy air defenses.

Coordinate Fire Support

Redundancy of observers for high-payoff targets should be planned.

Choke points and likely enemy locations must be targeted.

Rapid enemy movement must be anticipated.

SEAD fires must be provided in support of CAS and attack helicopters.

Unit must be prepared to support forces dispersed over wide expanses of terrain.

Acquire Targets

Observation often exceeds range, yet it is degraded by heat waves and blowing sand.

Difficulty in terrain association and navigation increases target location error.

G/VLLDs should be used to perform target area survey.

Target acquisition radars and equipment should be emplaced at night, if possible, and camouflaged thoroughly.

Use of OH-58Ds should be maximized because of their –

- Ž Stand-off capability.
- Ž Night vision and thermal imagery capabilities.
- Ž Increased Copperhead designation range.
- Ž Target location accuracy.

Radars should be oriented on templated enemy artillery locations.

Situational cueing must be exploited.

The PADS should be used to establish OP location and directional reference.

Deliver Field Artillery Fires

Use of special munitions should be optimized as follows:

- Ž FASCAM should be used on restricted terrain.
- Ž Copperhead should be used on high-payoff targets.
- Ž Smoke should be used for screening, observation, silhouetting, and deception.
- Ž Illumination should be used for night Silhouetting and land navigation.
- Ž White phosphorus should be used for CAS target identification.

Met support must be increased for transitional periods and because of abrupt weather changes (especially temperature) in the morning and evening.

Range requirements for met support must be considered.

Survey must be provided over extended distances.

The following hasty survey requirements are increased:

- Ž Graphic resection if maps are available and accurate.
- Ž Simultaneous observation.
- Ž P-2 reticle and Polaris-Kochab use as result of night visibility.

Survey control points are few and far between. Astronomic observations may be needed to establish a common azimuth.

High surface temperatures have a profound effect on propellant temperatures. Uniform storage and frequent measuring of propellant temperature must be stressed.

Communicate

Usually, radio communication is excellent.

Wire is easy to install in most places.

Early emplacement of retrans assets should be planned.

Radio equipment failure increases because of blowing sand and large temperature variances.

Comm survey must be conducted to provide reliable communication to selected positions, such as the CP.

For short ranges, visual and sound signals must be relied on.

Move

Radars must be positioned to provide the maximum screening crest.

Alternate and supplementary positions must be selected for every primary position.

Immediate-action status must be established.

RSOP must be early and in depth.

Blowing sand and convoy dust reduce visibility and speed during movements.

Contour lines should be used to position cannons in defilade.

Stereotyped battery and/or battalion positions must be avoided.

Maintain and Resupply

Supply lines will probably be extended.

Water consumption is increased.

The environment causes increased vehicle overheating and electrical component breakdown and faster tire wear-out.

Requirements increase for filters, coolants, lubricants, cleaning materials, and tires.

Training is necessary to prevent heat and cold weather injuries.

Night am/or aerial resupply must be planned. However, dust clouds from helicopters must not give away position areas.

Electrolyte in wet-cell batteries evaporates quickly. Batteries must be checked often, and extra containers of distilled water must be carried in vehicles.

Preventive maintenance checks of vehicles, equipment, and weapons must be made frequently. If sand mixes with lubricants, moving parts may be damaged.

Survive

Medics should be prepared to treat more heat and bum cases and snake and insect bite victims.

Terrain affords wide depth and dispersion.

Positions should be off enemy avenues of approach.

The use of wadis for concealment should be maximized.

Desert camouflage nets must be used.

Crew-served weapons can be employed at maximum effective range.

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| NOTE: More information on desert operations is in FM 90-3. |
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JUNGLE OPERATIONS

Combat operations in a jungle environment are characterized by a greater, but not exclusive, reliance on air assets for mobility, observation, and resupply of engaged forces. Surface mobility often is limited for both wheeled and tracked vehicles. Thus, most combat operations in the jungle are carried out by light forces who can be inserted and extracted by helicopter. High temperature, coupled with high humidity, takes its toll on equipment and soldiers alike. The types of combat operations most effective in the jungle are ambushes, raids, and patrols by small units. They seek to attack and destroy enemy forces, their bases, and their supplies.

In jungle terrain, most contact with the enemy is at close range. Fire support may be limited to high-angle, indirect fires and close air support. If the friendly force has a substantial advantage in fire support, the enemy will most likely try to establish and maintain extremely close contact. This tends to limit the effectiveness of our fire support advantage because of the danger of inflicting casualties on friendly forces. For the FA battalion commander, the challenges are varied and many. His greatest frustration may be in trying to mass the weapons of the battalion; because more times than not, the batteries will be dispersed over large areas in order to support small-unit operations.

Coordinate Fire Support

Fire support may be limited to high-angle, indirect fires and air support.

Targeting is very difficult because of the triple canopy of the jungle and the fluid nature of the conflict.

Control of fire support must be monitored closely to avoid injuring friendly personnel.

Targets should be planned—

- Ž To support the scheme of maneuver.

- Ž Along roads and trails.

- Ž At likely ambush sites.

- Ž At river and stream crossings.

- Ž Around built-up areas.

Increased use of aircraft increases the need for SEAD tires.

Hasty fire planning increases to keep up with the changing situation.

Acquire Targets

Map reading, self-location, target location, and friendly unit location are difficult.

Forward observers must be able to adjust fires on targets by sound.

Aerial observation becomes more important.

Radars are extremely effective, since most indirect fires are high-angle fires.

Ground surveillance radars and remote sensors must be used.

The value of information obtained from shelling reports (SHELREPs) deteriorates quickly, as the enemy will likely displace immediately after firing.

Deliver Field Artillery Fires

Knowledge of types of munitions and how to employ them is vital:

- Ž HE-delay penetrates the treetops and splinters the trees, creating additional fragmentation.

- Ž Smoke has limited effectiveness.

Ž WP is effective as a marking round and in initial adjustments. An airburst WP round maybe used as the initial round in adjustment.

Illumination effects may be reduced because of vegetation.

High-angle fires increase.

The use of hasty survey increases because SCPs are scarce and difficult to establish.

The ICM are often not effective because of canopy.

Use of creeping fires increases.

The FOs must be proficient in adjusting fires by sound. (For specific techniques, see FM 6-20-40, Appendix J.)

Communicate

Communication in a triple-canopy jungle is severely degraded.

Antenna cables and connectors, as well as power and telephone cables, should be kept off the ground. This lessens the effects of moisture, fungus, and insects.

Antennas should be elevated above the canopy when possible.

Antennas should be located in clearings on the edge farthest from the distant station and as high as possible.

Aerial observers or airborne C2 platforms should be used as relay stations.

Use of directional antennas should be considered.

Use of retrans assets should be planned.

Move

Positions may be inaccessible by roads.

Several air movements a day maybe required.

Surface mobility is often difficult for wheeled and tracked vehicles.

Rainy seasons compound mobility problems.

Airmobility is a key to success.

Equipment loads must be well planned and kept to a minimum.

Maintain and Resupply

Maintenance problems increase as a result of moisture and rust.

Ammunition expenditure can be expected to be high.

Land lines of communication are difficult to maintain.

Resupply is more difficult. Air resupply is recommended, but it should not be the sole method of resupply.

Equipment wears out faster.

Survive

Thick vegetation increases vulnerability to ground attack.

Units should be positioned to support one another.

FPFs must be planned and actually adjusted in by fire to mutually support positions.

Antipersonnel (AP) (Beehive) rounds must be prepared for immediate use while in position.

Local all-around security must be established.

Units should be proficient in the Killer Junior techniques of close-in, defensive fires.

Positions occupied too long are subject to attack by indirect fire and to ground attack.

Health hazards, disease, snake bites, and insect bites increase.

NOTE: More information on jungle operation is in FM 90-5.

MOUNTAIN OPERATIONS

Combat operations in mountainous areas are characterized by many of the same problems found in northern or cold weather regions. Mountainous areas have typically rugged, compartmented terrain with steep slopes and treacherous mobility. The weather may span the entire spectrum from extreme cold with ice and snow in winter to extreme heat in some areas during the summer. In mountain operations, the advantages favor the defender. His goal is to try to fight down from the top. Therefore, the focal point of mountain operations is usually the battle to control the heights. Light infantry (airmobile) is the most suitable force for this type of combat, particularly when properly supported. Also, the configuration of the terrain promotes isolated battles that are difficult for higher commanders to control. Small-unit commanders can expect to operate semi-independently.

These extremes of terrain and weather can pose significant problems and are important planning considerations for both maneuver and fire support operations. For example,

it is important to position mortars and field artillery in defilade to increase their survivability. Yet, such terrain is often subject to snow slides, rock slides, or avalanches which can fall on their positions with devastating results. Of course, these same types of positions are sought by enemy units, and our fires on them will impede mobility or destroy those enemy units in defilade positions.

Coordinate Fire Support

Fire support for small and isolated unit actions must be adequate.

Fires must be planned on prominent terrain features.

FASCAM must be planned to close routes to the enemy.

Mortars are very effective in mountainous terrain.

High-angle fires with airburst munitions must be planned on reverse slopes of hills and mountains.

Acquire Targets

The FOs should be positioned on high ground and dispersed to avoid masking.

Airlift or special equipment and/or skills must be planned to place FOs on high ground.

Terrain sketches and visibility diagrams are essential and must be consolidated.

Poor visibility due to clouds or fog and snow blindness must be anticipated.

Special observation techniques should be used if applicable. Sound-on-sound adjustments are difficult. Observers looking up tend to underestimate range; those looking down tend to overestimate range.

Aerial observers must cover ground observation dead space. They must be positioned to complement ground FOs.

The AFSOs can detect deep targets.

Air assets may be confined to lower altitudes and to aircraft service ceiling limits.

Because of high-angle fire requirements, radars are very effective against enemy indirect fire systems.

Terrain masking degrades the effective use of radar.

Use of additional ground surveillance radars and remote sensors must be planned.

SHELREPs and crater analysis may be used to orient radars more effectively.

Deliver Field Artillery Fires

FASCAM may sink into the snow off vertical at temperatures above -15°C. This will cause premature detonation.

HE-PD, HE-delay, and ICM are 40 percent ineffective in snow, but they are highly effective in rocky terrain.

Use of WP must be controlled, as it may burn for up to 4 days if covered by snow.

Time and VT fuzes are most effective.

Smoke, ICM, and illuminating fires are hard to adjust and maintain. They are more effective along valley floors.

HE-PD causes extreme fragmentation as the result of rock splinters.

Effectiveness of FASCAM and Copperhead is enhanced when they are fired into narrow defies, valleys, and roads.

High-angle fires, to include high-angle registration, are the norm.

Accurate transfer of firing data is difficult because of the wide variance in altitude of firing units.

Rapidly changing weather conditions require more frequent mets.

Survey using PADS is difficult. Conventional methods may have to be used with special emphasis on accurate altitude.

Airlift of PADS must be considered.

Large gunnery solution differences (graphical firing table [GFT] settings) are possible.

Slope or unevenness of the terrain may have an adverse impact on both FASCAM and ICM effectiveness:

- Ž Remote antiarmor mine system (RAAMS) and area denial artillery munitions (ADAM) must come to rest and stabilize within 30 seconds of impact or the submunitions will not arm.
- Ž Very uneven terrain (plowed ground, jumbled rocks, and so forth) may keep the ADAM hip wires from deploying properly.
- Ž The DPCIM do not function if the angle of impact is greater than 60°.

Communicate

Maximum use of wire enhances security and reliability.

Wire can be laid by helicopter if assets are available.

Radios should be placed on sides of mountains or hills.

Maximum use should be made of directional antennas.

Radio emplacement can maximize line-of-sight communication.

Use of retransmission capabilities, to include helicopter radio relay, should be planned. Helicopters can airlift retrans units onto hilltops.

Move

Use of SP artillery is limited to certain areas. Occupation by SP units must be given priority.

Airmobile and/or air assault techniques must be maximized.

A defense against ambushes during ground movement should be planned.

Recon should be by air when assets are available.

After map reconnaissance, a ground follow-up should be made before moving the main body. This is to ensure trafficability.

Maintain and Resupply

Soldier physical conditioning is critical because of increased physical demands, thin air, injury, and illness.

Vehicles and equipment are subject to increased strain as a result of terrain and weather.

Aerial resupply should be used when assets are available.

Additional cold weather contingency items may be required for sustained unit operations in mountainous terrain.

Survive

Units should be in defilade, but there should be no danger from rock slides or avalanches.

Helicopters can be used to emplace and resupply units.

Units should not be emplaced in dry river beds because of the danger of flash flooding.

Air insertion into firing positions may disclose unit locations. False insertions should be considered.

Maximum use of terrain for cover and concealment can compensate for limited hardening potential.

Rocky or snow-covered terrain limits digging in and limits effectiveness of Class IV materials. However, valley floors

and natural choke points may enhance effectiveness of Class IV materials.

Proper positioning of OPs, LPs, and crew-sewed weapons enhances survivability.

NOTE: More information on mountain operations is in FM 90-6.

AMPHIBIOUS OPERATIONS

An amphibious operation is an attack launched from the sea by naval and landing forces embarked in ships or other craft for the purpose of landing on a hostile shore. A successful amphibious assault achieves surprise and concentrates an overwhelming force at a point of enemy weakness. The assaulting force must build up combat power from an initial zero to full striking power as it drives toward objectives. The amphibious operation requires detailed planning precise timing in air, naval gunfire, and FA support and effective command relationships. A naval officer is normally the commander amphibious task force (CATF). Troop components, ground and air, are called the landing force. They are commanded by the landing force commander. The CATF exercises the degree of authority over the entire force necessary to ensure success. Subject to his overall authority, the responsibility for conduct of operations ashore lies with the landing force commander. Planning and execution of the landing and assault are his concern. An amphibious operation is conducted in five phases: planning, embarkation, rehearsal, movement, and assault.

Close coordination between supporting and supported arms is always critical. However, the need for continuing, close coordination and cooperation between Army and Navy commanders and fire support coordination agencies takes on a new importance during planning and execution of amphibious operations. The FA cannon battalion is not simply a passenger on a ship-to-shore transport; it is an active component of that operation. Its active involvement before, during and after the movement and assault is essential to the success of the amphibious force. In fact, when coastal topography permits, FA can be positioned on offshore islands to provide fire support for the assault element. If in the landing party, DS artillery ashore provides close support with direct and indirect fires during the most critical phase of the amphibious operation. Finally, when the situation dictates, FA supports the landing force assault phase by tire from floating platform (ships; landing ships, track [LSTs]; and so forth). These requirements present the FA cannon battalion commander with unique challenges and require much initiative.

Coordinate Fire Support

Movement plans should provide for early landing of artillery units and their entry into action.

All available fire support systems (such as artillery, naval gunfire, and TACAIR) must be coordinated and Synchronized.

At first, the supporting arms coordination center (SACC) plans and coordinates all fires for the landing force.

Once ashore, the landing force commander assumes responsibility for coordinating all fires.

Because of the heavy use of air support, SEAD fires must be planned and implemented.

Initial fire planning is for naval gunfire and CAS, because the artillery is moving ashore.

Hasty fire planning may be relied on initially because of lack of intelligence.

Logistical support is an integral part of the fire support plan.

Acquire Targets

Initial targeting data come from naval sources.

Aerial observers are used extensively.

During ship-to-shore movement, aerial observers in ship-based aircraft may provide the only observation capability.

Once troops have landed and gained a foothold, ground observers and TA assets are used as normal.

Deliver Field Artillery Fires

Ballistic met support should be obtained from Navy shipboard met stations in NATO format.

Prior coordination with landing force headquarters for available survey information is vital.

Hasty survey techniques are used until organic survey assets are ashore and operational. Survey assets should be sent ashore as soon as possible to establish and extend a common grid.

A greater degree of decentralization of both tactical and technical fire direction may be necessary to allow for flexibility at first. Interservice calls for fire are common,

Engineer assets may be used to help stabilize gun positions. This maybe necessary because of the terrain (for example, sandy beaches).

Communicate

Radio is the primary communications means during ship-to-shore movement.

Interservice exchange of SOI is imperative.

Wire should be laid as soon as practical after landing.

Move

Initial recon is by map and possibly air.

Advance parties should arrive with assault elements to prepare positions.

The FA units must occupy firing positions quickly because assault troops are so vulnerable during the early stage of beachhead operation.

Recovery and/or engineer assets must be deployed early to facilitate occupation of gun positions.

Once units are ashore, coordination for land is made with the landing force commander.

Personnel and equipment may be cross-loaded.

Maintain and Resupply

Ammunition resupply is critical during the early stages of battle because of high expenditures.

Equipment and ammunition must be protected from salt water.

Resupply and evacuation are by ship, plane, or helicopter.

Vehicle recovery assets must be allocated as necessary to help in resupply operations commensurate with terrain.

Interservice coordination is necessary to ensure adequate supply and/or logistic activities.

Cross-loading is critical.

Survive

During movement ashore, field artillery should be dispersed throughout the assault elements.

Decentralization is key in order to facilitate this phase of the operations.

Personnel must be equipped with life vests and other appropriate life support equipment.

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| NOTE: More information on amphibious operations is in FM 31-11. |
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AIR ASSAULT Operations

The formation of an air assault task force (AATF) is directed by division (or higher) headquarters because that echelon controls the aviation assets. The task force is designed for a specific mission; and it consists of an infantry battalion, an aviation company, and normally an FA cannon battery. Overall command goes to the infantry commander (AATF commander), who directs the operation and coordinates required support. Command and control are accomplished from a helicopter or from a ground CP. Air assault operations increase the mobility of the combined arms; thus, the commander can significantly extend his area of influence. Air assault forces are particularly well suited when speed is essential, distances are great, and terrain is restrictive. These forces are used to seize deep objectives and to conduct penetration, covering force, denial, or surveillance operations. They can operate in urban areas, jungles, and mountains. They can be used to reinforce threatened sectors or to exploit the effects of nuclear detonations.

Field artillery participation in air assault operations is characterized by maximum decentralization of command and control. Firing batteries are moved to quickly launch FA fire support into a battle area, to attack deep targets, to bypass enemy concentrations or untrafficable terrain, and thereby to help facilitate future operations. The FA cannon battalion commander recognizes that detailed planning and coordination, aggressive execution, and speed of emplacement are essential to mission success. For example, one type of air assault operation is the air assault artillery raid. This involves the rapid movement of artillery assets by air into a position to attack a high-priority target with artillery fire. It could require operations across the FLOT. Normally, the raid is short in duration and does not involve sustained operations. But detailed planning, surprise, and speed of execution remain key factors for success.

Coordinate Fire Support

Fires are planned to cover primary and alternate pickup zones (PZs) and landing zones (LZs).

Fires are planned on known or suspected enemy forces regardless of size.

Fires are planned in support of the deception plan. Units must be prepared to execute fires on LZs not being used in order to deceive the enemy as to which LZs are used.

SEAD fires are planned along the flight route(s) to aid aircraft flying past areas of known or suspected enemy positions. These fires should be intense and of short duration. SEAD fires and smoke protect and obscure friendly movements. Fires must not obscure pilot vision.

In planning SEAD, all fire support assets must be considered:

- Ž EW and jamming assets.
- Ž Chaff air-dropped by USAF planes to confuse enemy AD radars.
- Ž Artillery, CAS, and attack helicopters for suppression by fires.

NOTE: CAS and/or attack helicopters may be the only assets that can range targets along flight routes and on LZs.

Once the unit is landed, direct and close-in fires should be anticipated.

On-cdl fires are planned along the flight route to ensure rapid adjustment on targets of opportunity.

Groups, series, or programs of targets are scheduled.

Fires are planned that are short in duration and intense in volume.

Obstacles to landing and maneuver must not be created.

Fires are lifted and shifted to coincide with arrival times of the aircraft formations.

Acquire Targets

Air assault operations generally require TA assets organic to higher echelons to provide deep targeting information.

AFSOs provide excellent targeting information.

The air assault force is most vulnerable to enemy indirect fires immediately after landing. Coverage by WLRs is planned to help in the counterfire effort.

Deliver Field Artillery Fires

Fires to support the air movement plan are executed under procedural control or positive control:

- Ž Procedural control – fires are initiated and terminated according to a strict time schedule.
- Ž positive control – fires are executed with phase lines, air control points, and/or other control measures to initiate, shift, and terminate fires.

Munitions should be carefully selected to provide the best SEAD. Smoke, WP, VT, and ICM are used to maximize the effect of fires.

A rehearsal of the H-hour sequence should include the FDO executing the sequence of fires.

Initial fire direction upon insertion may be manual or by BUCS.

At first, met may not be available.

Hasty survey techniques are used for air assault artillery after the initial insertion.

Army aviation assets are used to provide position data.

Communicate

Retrans assets are used to ensure continuous communication between the FSO controlling the fires during the movement and the assets providing those fires.

Use of visual signals (flares and colored smoke) is planned.

The SOI are coordinated for air assault forces and supporting forces.

Move

Appropriate load planning is critical. (Units may not be able to deploy as a whole.)

Reconnaissance is made by map or air.

Key leaders must follow the progress on maps while en route.

Displacement can be by air or ground.

Maintain and Resupply

Assault force artillery may have limited ammunition.

Subsequent resupply of all CSS, but primarily Class V, must be planned, prioritized, and synchronized with the maneuver plan.

Evacuation is most likely by air.

Survive

Units are most vulnerable on PZs, on LZs, and immediately after insertion. Enemy air, ground, and artillery threats are considered. Positions are selected accordingly.

Fires are planned for false insertions in support of the deception plan.

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| NOTE: More information on air assault operations is in FM 90-4. |
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AIRBORNE OPERATIONS

Airborne operations are usually joint operations conducted with the Air Force. It provides airlift, CAS, and aerial resupply for the airborne ground forces. Normally, units participating in an airborne operation are assigned to a joint task force (JTF). The senior Army commander (division or higher) is designated the Army forces (ARFOR) commander. Airborne units represent a contingency force that can be deployed worldwide on extremely short notice. Strategic surprise often can be achieved by a rapid shift of airborne forces across great distances. Tactical surprise is gained by the sudden unexpected mass delivery of forces into an objective area. Airborne forces are used as a significant combat force, or they can provide a show of force in furthering national interests.

Airborne forces are particularly well suited for envelopments or turning movements, attacks to exploit fires on distant objectives, seizure of critical terrain and facilities, mobile reserves, raids, and diversion. Like their air assault counterparts, airborne units can assault or defend in urban areas; can operate in jungle, desert, or mountainous terrain; and can exploit the effects of nuclear detonations. These and other tactical and strategic operations are conducted with the support of their organic FA battalions.

Coordinate Fire Support

Initial targeting intelligence is through national assets.

After long-range surveillance unit (LRSU) insertion, targeting is refined.

Lack of maps requires greater reliance on aerial photography.

Preassault fires will probably be delivered through TACAIR or naval gunfire and probably will be controlled from an airborne platform.

During initial stages of airborne operations, because of the amount of air assets in the area, commanders may require positive clearance of all fires (that is, silence is **not** consent).

Acquire Targets

Once on the ground, FO considerations are generally the same as in other operations. They are tailored to the mission and are affected by the particular environment of the operation.

During initial stages of airborne operations, aerial observers (Army aviation and Air Force AC-130) may be critical TA assets.

Radars may not be deployed during the initial stages of an airborne operation, however, they will be deployed in follow-on air-land operations. Priority is based on the enemy counterfire and/or artillery threat.

Deliver Field Artillery Fires

Cratering munitions are not planned on airfields.

Often, mortars are attached to the artillery battery during the initial seizure of the airhead or airfield. This allows massing of the limited ground indirect fire assets available to the airborne commander.

A 6,400-mil capability is required of all firing batteries.

Because airborne forces are deployed anywhere in the world, firing without maps is a real possibility.

Survey is generally not available on the drop zone (DZ). Hasty survey must be relied on.

The FA and mortars should be placed on a common grid as soon as possible.

Generally, met is not available at first.

Attached pilot balloon teams can provide early ballistic and computer mets.

Survey control may be nonexistent or at least difficult.

Communicate

The primary means of communication is FM radio.

The tactical satellite (TACSAT), though present, is generally not used in FA operations. It may, however, provide critical fire support information.

AM radios may be used over long distances.

Visual signals and messengers must be prescribed and used for short-distance communications.

Move

Elements are extremely vulnerable during the initial landing at the DZ or airhead.

Initial reconnaissance is by map or air.

Normally, displacement is by air.

Control of battery movement is decentralized.

Maintain and Resupply

Ammunition is very limited in the first stages of the operation.

In resupply, supplies are air-dropped or air-landed (CDS or mass supply).

After an airdrop, weapons and equipment are thoroughly inspected for damages and are repaired as needed.

Medical evacuation is by air.

Survive

Positioning is based on the enemy ground, air, and artillery threat as well as on the amount of space provided by the expanding airhead.

6,400-mil defenses are mandatory.

Batteries must be positioned for mutual defense.

Units take maximum advantage of intelligence and aerial photographs in preparing for unit defense.

NOTE: More information on airborne operations is in FM 7-8.

COUNTERGUERRILLA OPERATIONS

The conditions involved in counter guerrilla operations differ from those most soldiers expect to face in combat. The guerrillas' objectives, tactics, and concepts are usually different from those of regular army units. Most US forces conducting counter guerrilla operations will be part of a foreign internal defense (FID) force. Under current policies, a US force could be deployed to conduct FID operations for a limited period of time to accomplish a specific purpose. Counter guerrilla operations are primarily concerned with neutralizing insurgencies that use armed elements to carry out violence. Therefore, host country military forces are involved. Since national policy restricts the size of US forces commensurate with the immediate need, it is imperative that the capabilities of maneuver and fire support means be maximized.

The use of field artillery in counter guerrilla operations may be extremely limited because of restrictions on the use of firepower. In all cases, the application of firepower must reflect the principle of minimum essential force. These restrictions do not hinge on the amount of firepower used but rather on collateral damage and coordination and control measures. The commander must determine the physical, psychological, and political impact of applying firepower that produces collateral damage. In all cases, the use of firepower must fall within any restrictions stated in the ROE. The use of excessive force by fire might result in the perception that the government of the host country is losing control and becoming ineffective. Thus, the US forces commander integrates his fire support into his tactical plan in accordance with prevailing restriction

however, he always ensures he has adequate fire support for likely contingencies.

When the situation permits the use of FA fire support, FA units must be responsive and flexible. Timely and effective fire support in response to guerrilla activity may discourage subsequent guerrilla activity within artillery range. Quick reaction times and the capability to shift artillery fires over wide areas require a responsive and effective means of communication. To provide effective fire support, artillery is employed to obtain maximum area coverage with available weapons while retaining the capability to mass fires as well as to mutually support positions. In addition to supporting tactical operations, artillery may be positioned to provide area fire support to defend depots, logistical complexes, population centers, and other critical installations. Fires may be requested by (in addition to the supported force) host nation self-defense forces, police, security elements protecting logistical complexes, and other support units. Thus, fires must be closely coordinated not only with tactical operations in the area but also with civilian activities. Many times, maneuver CPs are collocated with artillery CPs and TA elements in operational support bases (OSBs). These bases are normally set up quickly with minimum resources and move often.

The FA cannon battalion may be assigned any one of the four standard tactical missions. Normally, FA battalions provided to light infantry divisions have 105-mm howitzers. Artillery of larger calibers may be provided by GS units from corps artillery or division artillery. If the US force is not light infantry, its organic capability may consist of 155-mm howitzers.

Coordinate Fire Support

Lack of time may preclude the preparation of a formal, coordinated, and integrated fire support plan for every contingency. SOPs must provide for these contingencies.

Close liaison between supported commanders or agencies, including host country officials in the operational area, and the FSCoord or FSO provides the required tactical and/or political coordination.

In operations invoking extensive employment of maneuver and support forces, such as the final phase of an encirclement, fire support coordinating measures must be used to ensure that converging friendly units do not fire on one another.

Fire support for local defense forces and static security posts is planned.

Fire support is used discriminately. Noncombatant casualties that would alienate the population and produce hostile attitudes toward the host government must be avoided.

Accurate location of friendly units is essential; locations must be updated often.

Defensive fires are integrated into the fire support plan.

Maximum use is made of CAS and other external fire support means, but ROE are rigidly enforced.

Adequate fire support is planned for small-unit and isolated operations.

Acquire Targets

Effective use of WLRs can quickly identify enemy mortars for immediate counterfire.

Most targets are identified by forward observers and are fleeting in nature.

Ground surveillance radar, the remotely monitored battlefield sensor system (REMBASS), and other intelligence acquisition systems (aerial observers) are used to the maximum.

Deliver Field Artillery Fires

The FDCs must have current fire support coordinating measures, ROE, and friendly troop locations to effectively support operations.

Requests for illumination missions may increase.

Survey control may be difficult to obtain. If necessary, the RSO must establish his own control and extend it to place the battalion on a common grid.

Registrations may have to be conducted by radar.

Beehive ammunition is prepared for immediate use. Killer Junior procedures are reviewed and rehearsed. See FM 6-50 for further discussion.

6,400-mil coverage is provided.

Communicate

Secure radio must be used as the primary means of communication.

Use of external wire is limited.

Enemy use of radio direction finding is limited.

Move

Ambush during ground movements is probable.

Air movement provides greater security and mobility.

Reconnaissance parties must have self-defense capabilities.

Planning range for patrols is the maximum effective range of enemy mortars. Experience has shown this to be the most likely area from which guerrillas attack friendly bases with mortar fire and stage ground attacks against our bases.

Maintain and Resupply

The CSS assets may be limited because of the size of the force.

Lack of security, particularly at night, hampers resupply activities.

Aerial resupply and evacuation must be maximized. Pickup and landing zones must be arranged for near the position.

Survive

When a unit is supporting an OSB, concealment is not a primary concern.

The enemy will try to overrun the unit positioned in an OSB.

Units are positioned for mutual support when possible.

The FA units are collocated with maneuver units when possible.

The OSBs are positioned in an open field, possibly on a hilltop, with good fields of fire.

Howitzers are positioned in a star formation with 6,400-mil fire support and defense capability.

Positions are hardened to withstand ground attack.

Available engineer support and Class IV are used to harden positions.

Close liaison is maintained with maneuver forces in the area.

Ammunition racks are covered.

Personnel bunkers must be built.

The OPs and/or LPs and crew-served weapons should be positioned for all-around defense.

A detailed defensive fire plan should be prepared for all positions.

If vehicles are present, tires and engine compartments should be sandbagged.

Fire bases must have tight defensible perimeters.

NOTE: More information on counter guerrilla operations is in FM 90-8. More information on low-intensity conflict (UC) is in FM 100-20.

APPENDIX C

FIELD ARTILLERY BATTALION ORGANIZATION AND STANDARDIZED COMMAND POST

The purpose of this appendix is twofold:

- To provide summary descriptions of five basic types of cannon artillery battalions. Diagrams show the base TOE organization for the following:

Light infantry division 105-mm (towed) battalion.

Heavy division 155-mm (SP) battalion.








Corps artillery or FA brigade 155-mm (towed) battalion.

Corps artillery or FA brigade 155-mm (SP) battalion.

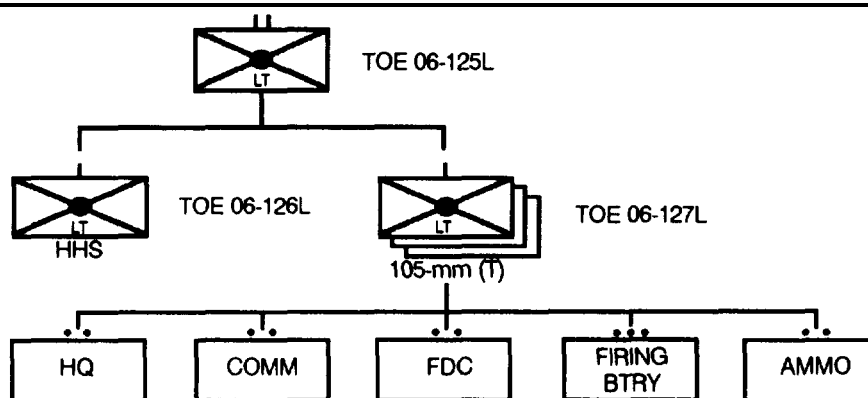
Corps artillery or FA brigade 203-mm (SP) battalion.

- To provide information concerning standardized CP configurations for each type of battalion. This information is to be amplified and expanded in the guide for command post standardization undergoing development at Department of the Army.

LEGEND FOR DIAGRAMS AND TABLES

| | | | | | |
|--------------|---|--|---|---|---------------------------------------|
| ACC | = | artillery control console | op | = | operator |
| ammo | = | ammunition | para | = | paragraph |
| asst | = | assistant | PCG | = | power converter group |
| auth | = | authorization | PFC | = | private first class |
| BCT | = | briefcase terminal | PLU | = | program load unit |
| CCU | = | communications control unit | RCMU | = | remote communications monitoring unit |
| cml | = | chemical | sec | = | section |
| cmpt | = | computer | SFC | = | sergeant first class |
| CPT | = | captain | SGT | = | sergeant |
| DPM | = | digital plotter map | SP | = | specialist, self-propelled |
| ELP | = | electronic line printer | SPC | = | specialist (rank) |
| equip | = | equipment | sr | = | senior |
| FD | = | fire direction | SSG | = | staff sergeant |
| 1LT | = | first lieutenant | svc | = | service |
| HHS | = | headquarters, headquarters and service | T | = | towed |
| HMMWV | = | high-mobility multipurpose wheeled vehicle |  | = | radio |
| LBE | = | load-bearing equipment |  | = | standardized integrated CP table |
| LTC | = | lieutenant colonel |  | = | map or status chart |
| MAJ | = | major |  | = | TA-312 telephone |
| MOS | = | military occupational specialty |  | = | TA-1035/U telephone |
| MSG | = | master sergeant |  | = | KY-68 |
| NCO | = | noncommissioned officer |  | = | remote radio |
| off | = | officer | | | |

105-MM (T) BATTALION, LIGHT INFANTRY DIVISION (DS) ORGANIZATION CHART



Ž Battalion is organized, trained, and equipped to provide FA fires and fire support Coordination in direct support of a light infantry brigade.

Ž Battalion can reinforce the fires of other artillery battalions or fire in general support of the force.

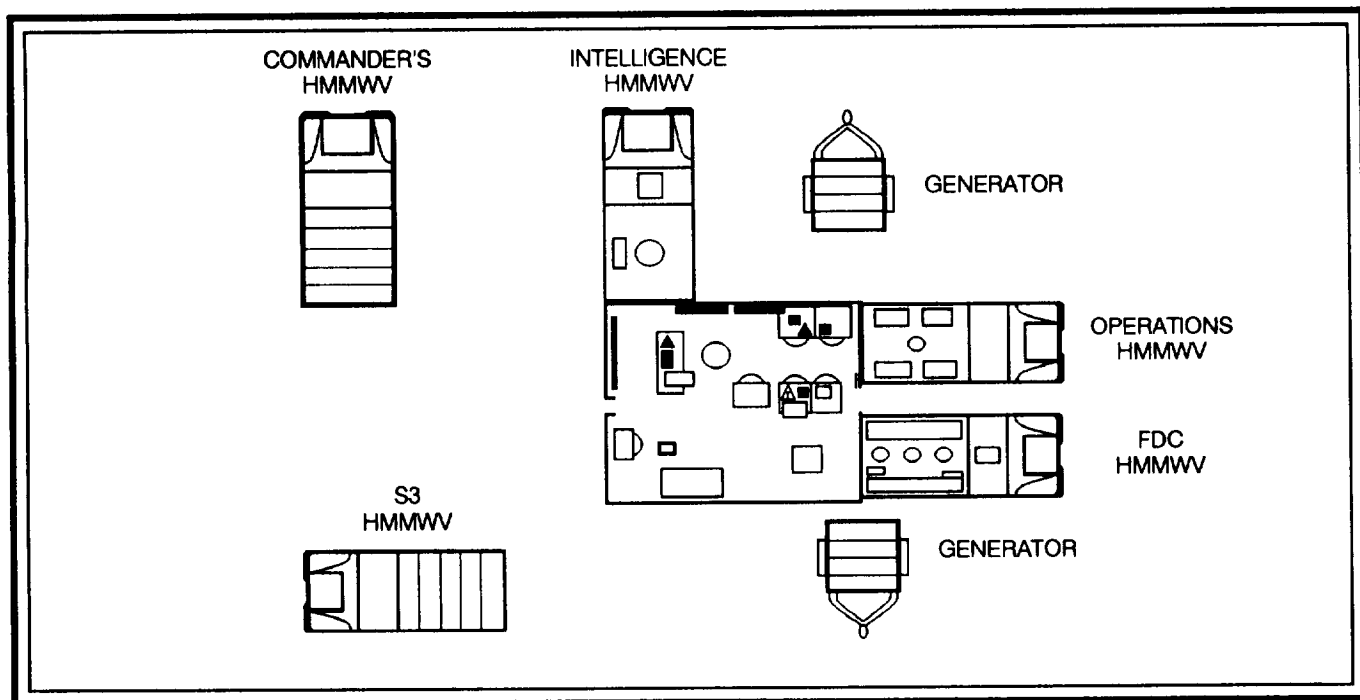
Ž Battalion provides fire support coordination and observation by providing fire support sections to the maneuver brigade and battalion task force headquarters. Provides for coordination, observation, and target designation for the maneuver company teams.

Ž Indirect fire weapons are 18 105-mm (T) howitzers (M102/m119).

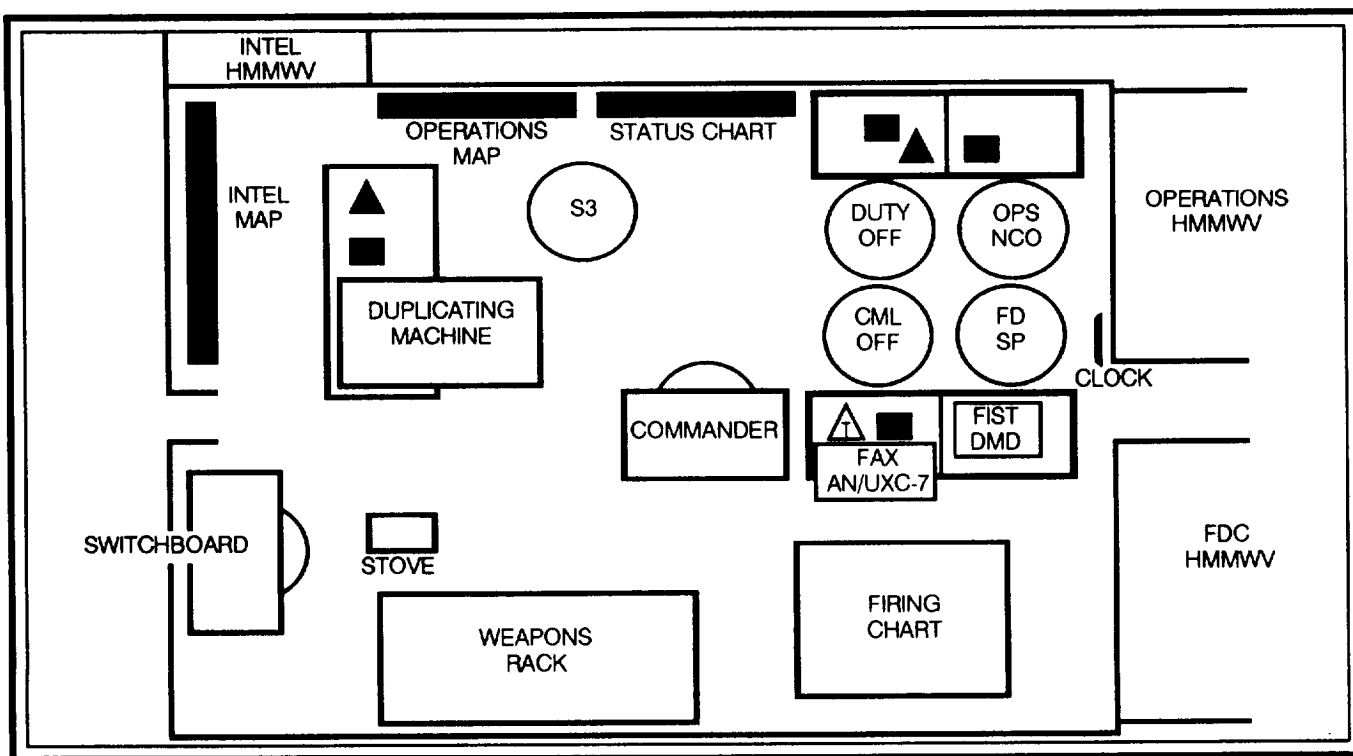
105-MM (T) BATTALION, LIGHT INFANTRY DIVISION (DS) (TOE 06126L) COMMAND POST PERSONNEL

| PARA | LINE | DESCRIPTION | RANK | MOS | BASE TOE AUTH |
|------|------|---|------|-------|---------------|
| 01 | 01 | Commander | LTC | 13A00 | 1 |
| | 03 | S3 | MAJ | 13E00 | 1 |
| | 06 | S2 | CPT | 13E00 | 1 |
| | 09 | Vehicle Driver | PFC | 13B10 | 1 |
| 03 | 01 | Plans Officer | CPT | 13E00 | 1 |
| | 02 | Chemical officer | 1 LT | 74B00 | 1 |
| | 03 | Operations SGT | MSG | 13Z50 | 1 |
| | 04 | Fire Control NCO | SFC | 13C40 | 1 |
| | 05 | NBC NCO | SSG | 54B30 | 1 |
| | 06 | CLerk-Typist | SPC | 71L10 | 1 |
| | 07 | Fire Direction Specialist | SPC | 13E10 | 1 |
| | 08 | Fire Direction Specialist | PFC | 13E10 | 1 |
| 04 | 01 | Fire Direction Officer | CPT | 13E00 | 1 |
| | 02 | Fire Control NCO | SFC | 13C40 | 1 |
| | 03 | Assistant Chief Fire Direction Computer | SSG | 13E30 | 1 |
| | 04 | Senior Fire Direction Specialist | SGT | 13E20 | 4 |
| 05 | 02 | Intelligence SGT | MSG | 13250 | 1 |
| | 03 | Intelligence Analyst | SGT | 96B20 | 1 |

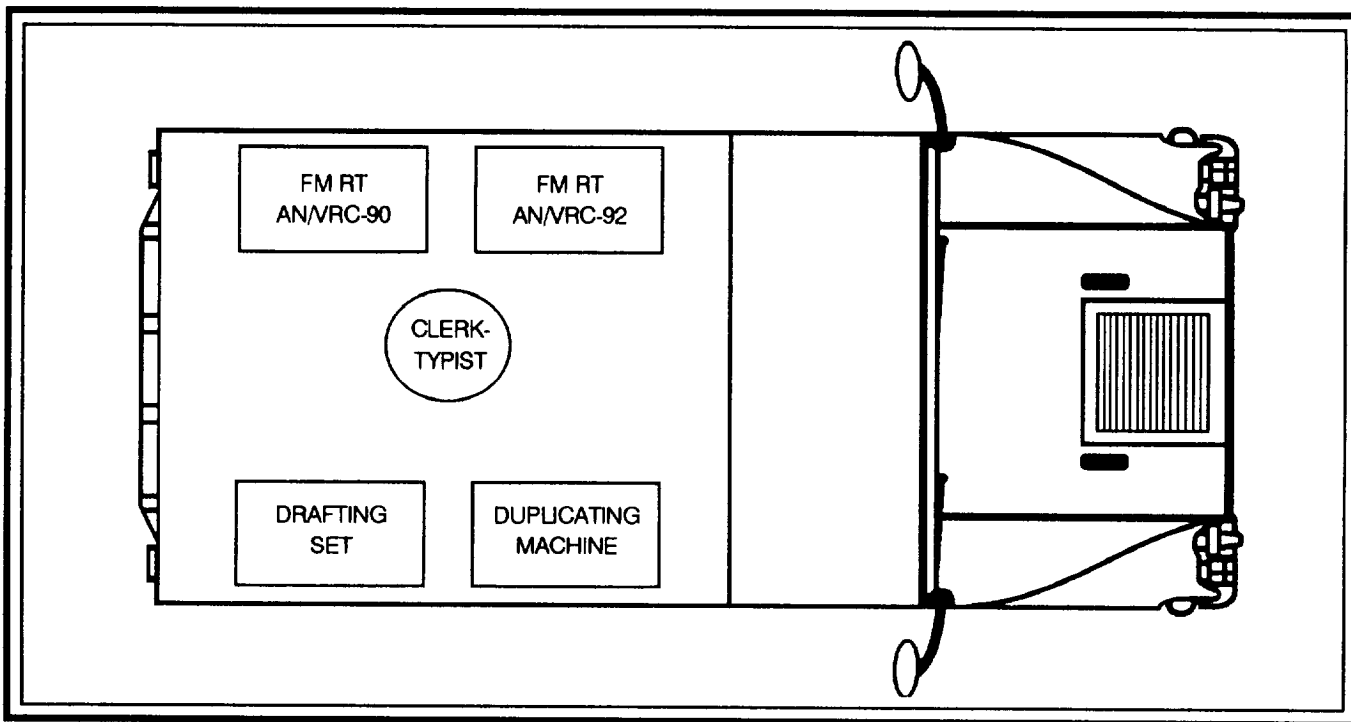
105-MM (T) BATTALION, LIGHT INFANTRY DIVISION (DS) (TOE 06126L) OVERALL COMMAND POST LAYOUT



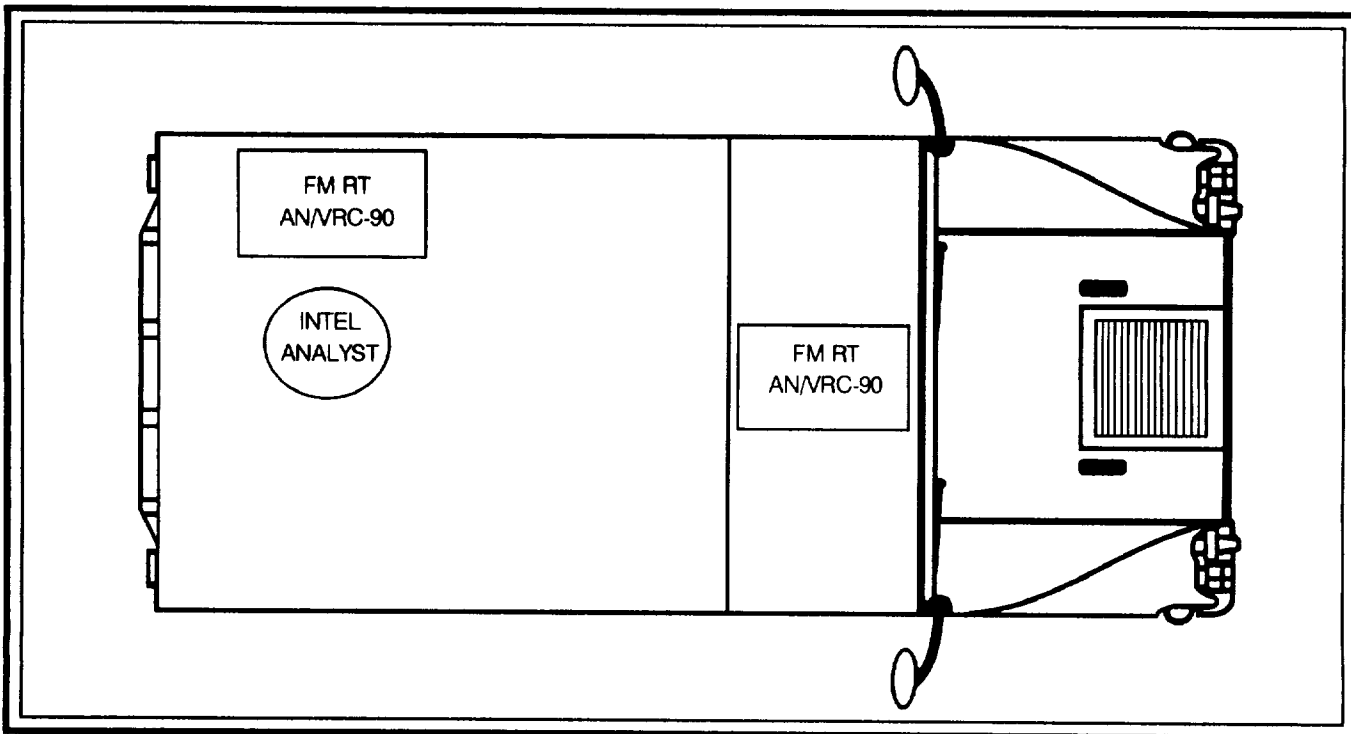
105-MM (T) BATTALION, LIGHT INFANTRY DIVISION (DS) (TOE 06126L) COMMAND POST COMMON AREA LAYOUT



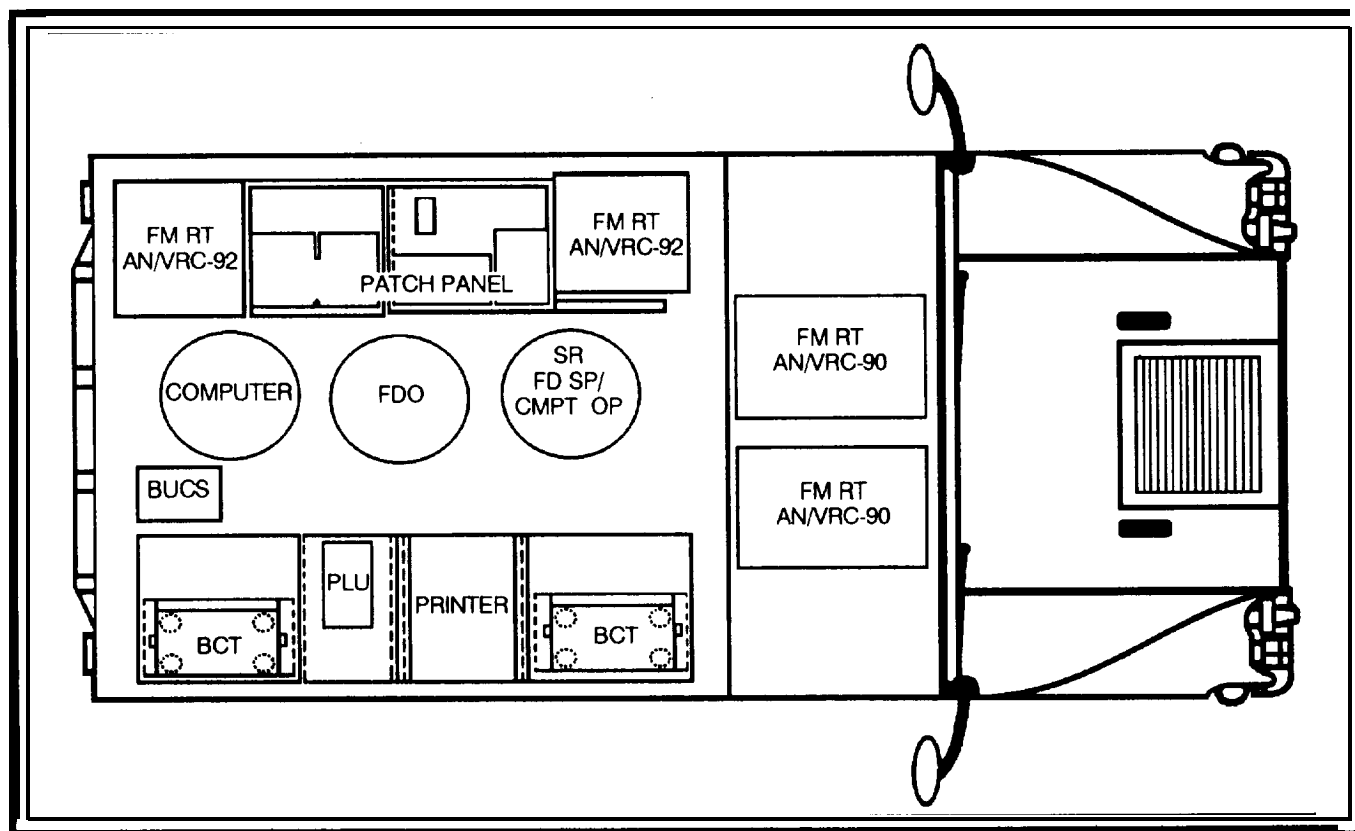
105-MM (T) BATTALION, LIGHT INFANTRY DIVISION (DS) (TOE 06126L) OPERATIONS HMMWV LAYOUT



105-MM (T) BATTALION, LIGHT INFANTRY DIVISION (DS) (TOE 06126L) INTELLIGENCE HMMWV LAYOUT



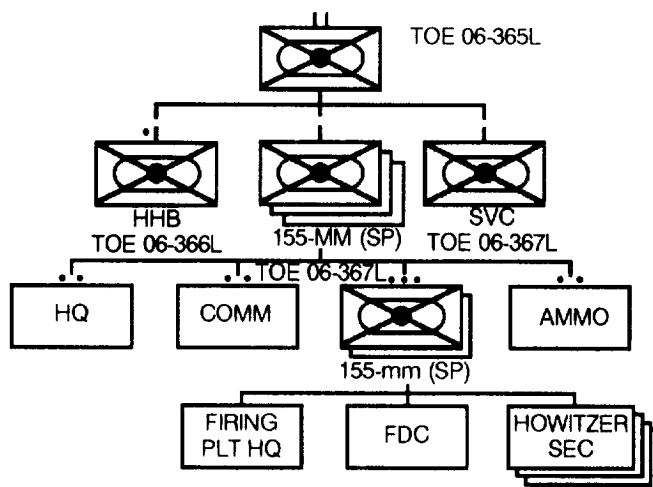
105-MM (T) BATTALION, LIGHT INFANTRY DIVISION (DS) (TOE 06126L) FIRE DIRECTION CENTER HMMWV LAYOUT



105-MM (T) BATTALION, LIGHT INFANTRY DIVISION (DS) (TOE 06126L) COMMAND POST SHIFTS

| OPERATIONS & INTELLIGENCE SECTION | | |
|---|--|---|
| DUTY POSITION | FIRST SHIFT | SECOND SHIFT |
| Operations or Duty Officer Chemical Officer Operations NCO Intelligence Analyst Fire Direction Specialist Clerk-Typist | S2 (CPT) Chemical Officer (1LT) Operations SGT (MSG) Intelligence Analyst (SGT) Fire Direction Specialist (SPC) | Plans Officer (CPT) NBC NCO (SSG) Fire Control NCO (SFC) Intelligence SGT (MSG) Fire Direction Specialist (PFC) Clerk-Typist (SPC) |
| FIRE DIRECTION CENTER | | |
| DUTY POSITION | FIRST SHIFT | SECOND SHIFT |
| Fire Direction Officer Computer Fire Direction Specialist/Computer Operator Fire Direction Specialist | Fire Direction Officer (CPT) Asst Chief Fire Direction Computer (SSG) Senior Fire Direction Specialist (SGT) Senior Fire Direction Specialist (SGT) | Fire Control NCO (SFC) Senior Fire Direction Specialist (SGT) Senior Fire Direction Specialist (SGT) |
| NOTE: The FA battalion S3 is the overall supervisor of the CP. | | |

155-MM (SP) BATTALION, HEAVY DIVISION (DS) ORGANIZATION CHART



Ž Battalion is organized, trained, and equipped to provide FA fires and fire support coordination in direct support of a heavy maneuver brigade.

Ž Battalion can reinforce the fires of other artillery battalions or fire in general support of the force.

Ž Battalion provides fire support coordination and observation by providing fire support sections to the maneuver brigade and battalion task force headquarters. Provides FIST for coordination, observation, and target designation for the maneuver company teams.

Ž Battalion provides COLTs to augment the brigade commanders observation and/or designation capability.

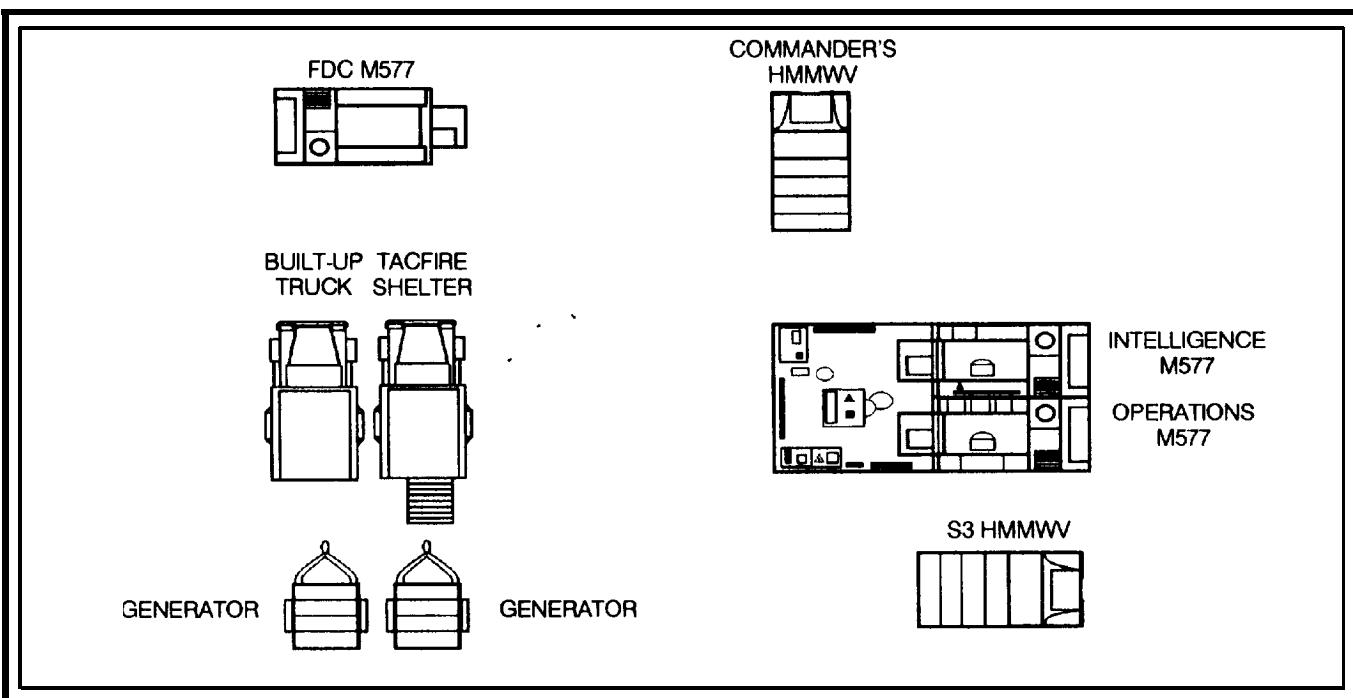
Ž Indirect fire weapons are 18 to 24 155-mm (SP) howitzers (M109 series).

155-MM (SP) BATTALION, HEAVY DIVISION (DS) (TOE 06366L) COMMAND POST PERSONNEL

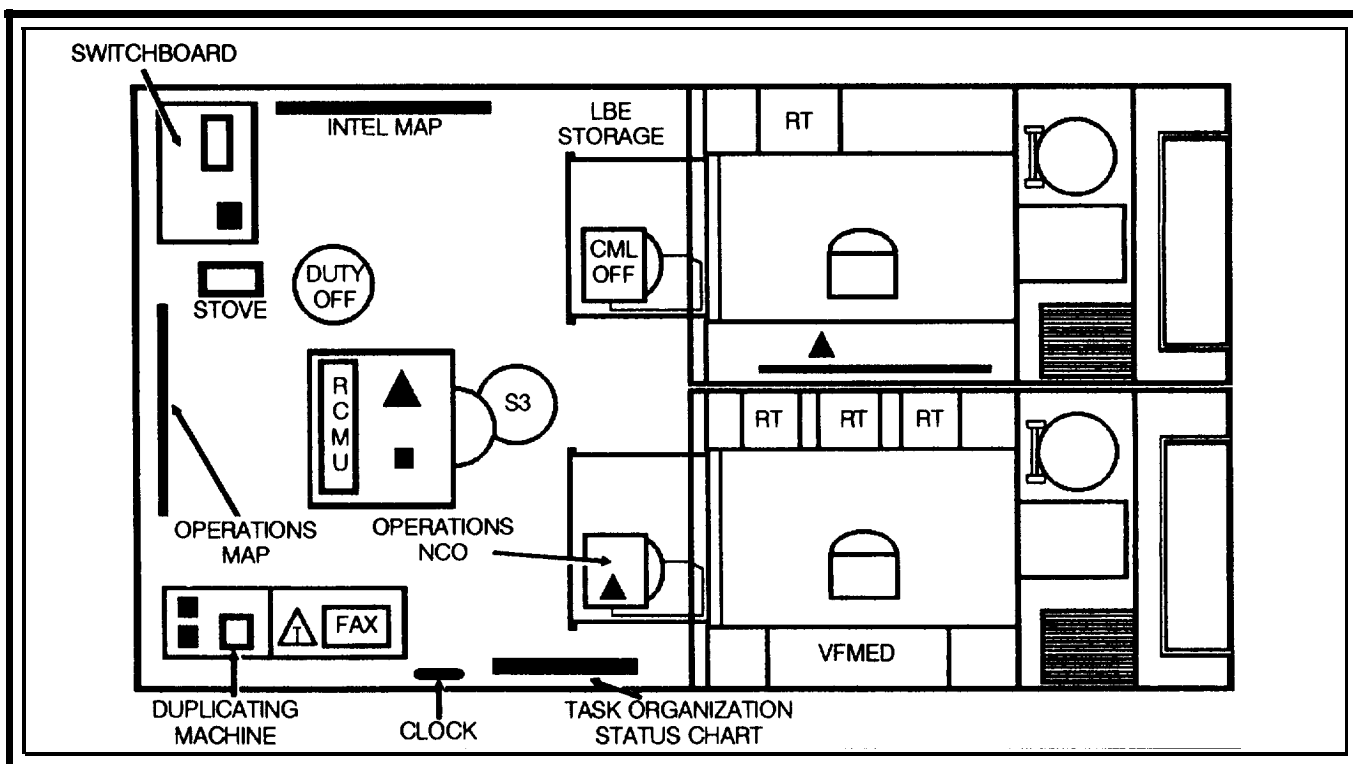
| PARA | LINE | DESCRIPTION | RANK | MOS | BASE TOE AUTH |
|------|------|-------------------------------|------|-------|---------------|
| 01 | 01 | Commander | LTC | 13A00 | 1 |
| | 03 | S3 | MAJ | 13E00 | 1 |
| | 08 | S2 | CPT | 13E00 | 1 |
| | 11 | Vehicle Driver | PFC | 13B10 | 1 |
| 03 | 01 | Assistant S3 | CPT | 13E00 | 1 |
| | 02 | Chemical Officer | 1 LT | 74B00 | 1 |
| | 03 | Operations SGT | MSG | 13Z50 | 1 |
| | 05 | NBC NCO | SSG | 54B30 | 1 |
| | 07 | Vehicle Driver | PFC | 13610 | 1 |
| | 08 | Fire Control NCO | SFC | 13C40 | 1 |
| | 09 | TACFIRE Operations Specialist | SPC | 13C10 | 2 |
| 04 | 01 | Fire Direction Officer | CPT | 13E00 | 2 |
| | 07 | TACFIRE Computer Operator | SSG | 13C30 | 2 |
| | 08 | TACFIRE Equipment Specialist | SGT | 13C20 | 2 |
| | 09 | TACFIRE Operations Specialist | SPC | 13C10 | 1 |
| | 10 | TACFIRE Operations Specialist | PFC | 13C10 | 2 |
| 05 | 01 | Targeting Officer | CPT | 13D00 | 1 |
| | 02 | Intelligence SGT | MSG | 13Z50 | 1 |
| | 03 | Target Processing Specialist | SPC | 13F10 | 1 |

¹In a DS battalion, the FA battalion targeting officer's duty position is at the maneuver brigade FS cell.

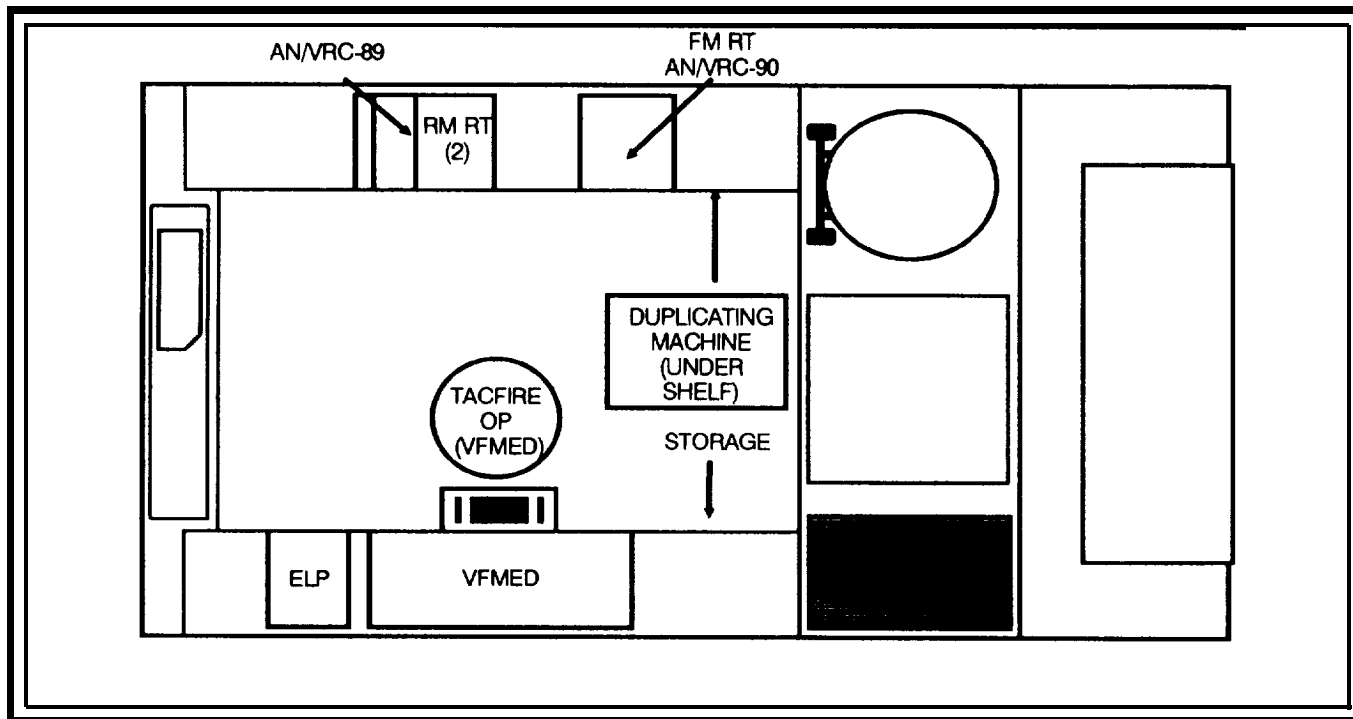
155-MM (SP) BATTALION, HEAVY DIVISION (DS) (TOE 06366L) OVERALL COMMAND POST LAYOUT



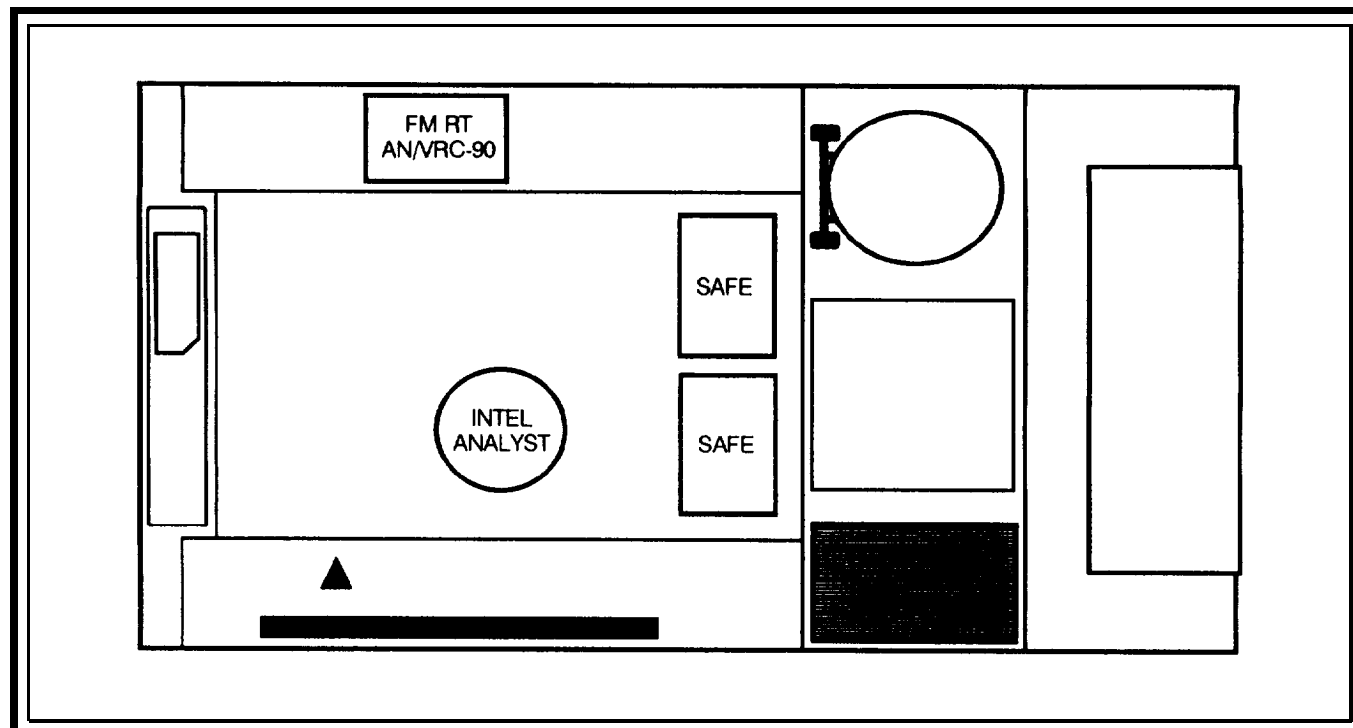
155-MM (SP) BATTALION, HEAVY DIVISION (DS) (TOE 06366L) COMMAND POST COMMON AREA LAYOUT



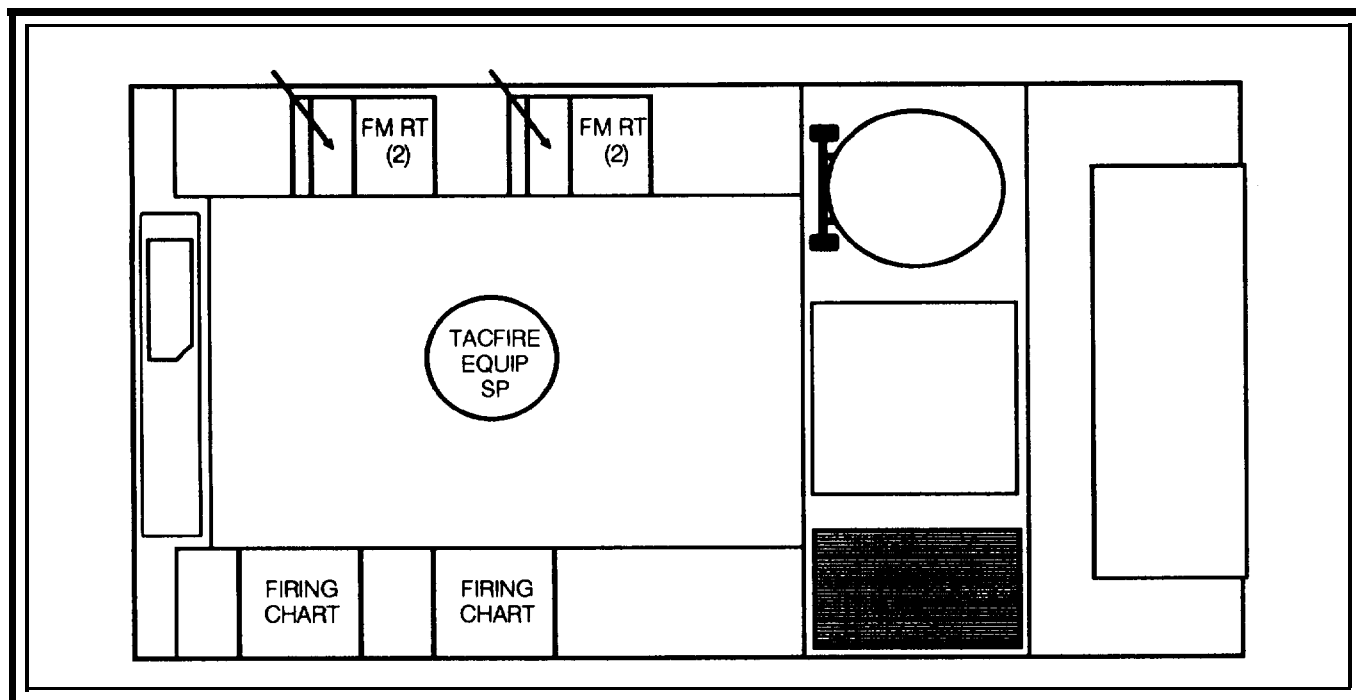
155-MM (SP) BATTALION, HEAVY DIVISION (DS) (TOE 06366L) OPERATIONS M577 LAYOUT



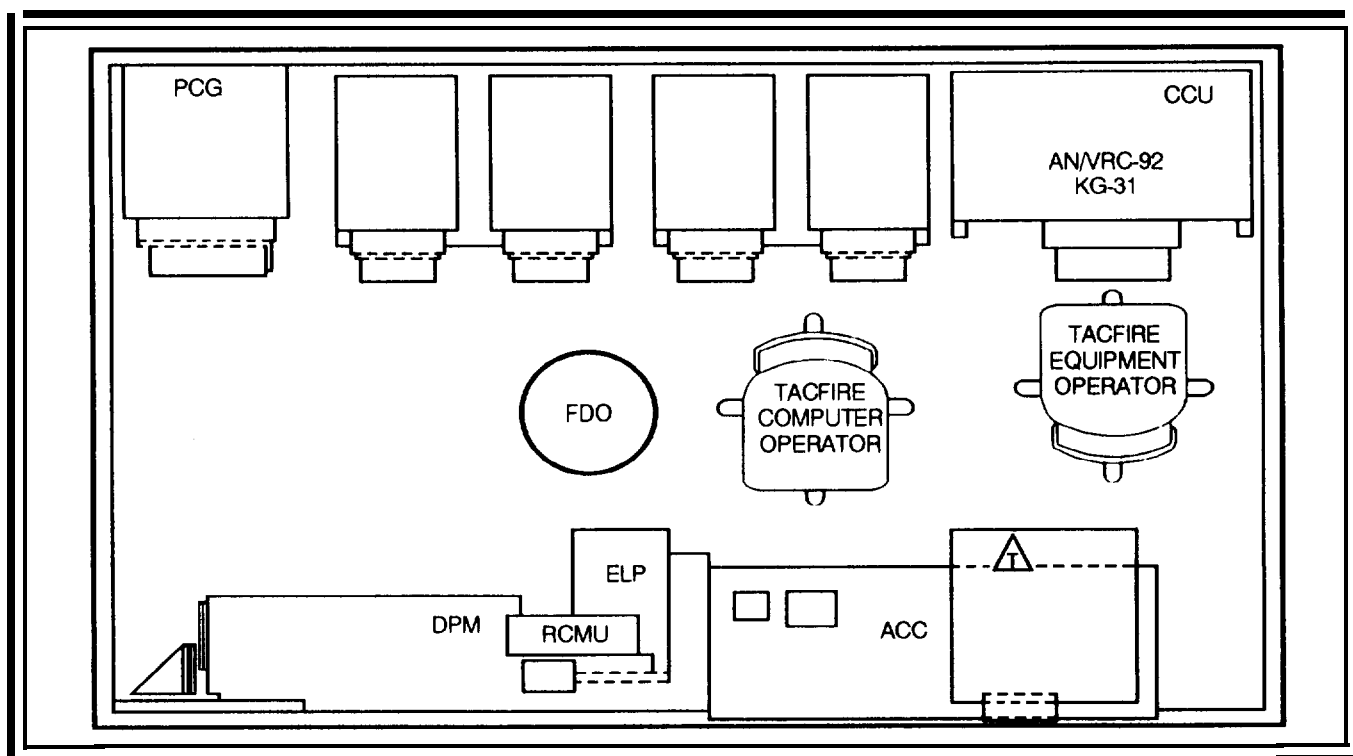
155-MM (SP) BATTALION, HEAVY DIVISION (DS) (TOE 06366L) INTELLIGENCE M577 LAYOUT



155-MM (SP) BATTALION, HEAVY DIVISION (DS) (TOE 06366L) FIRE DIRECTION CENTER M577 LAYOUT



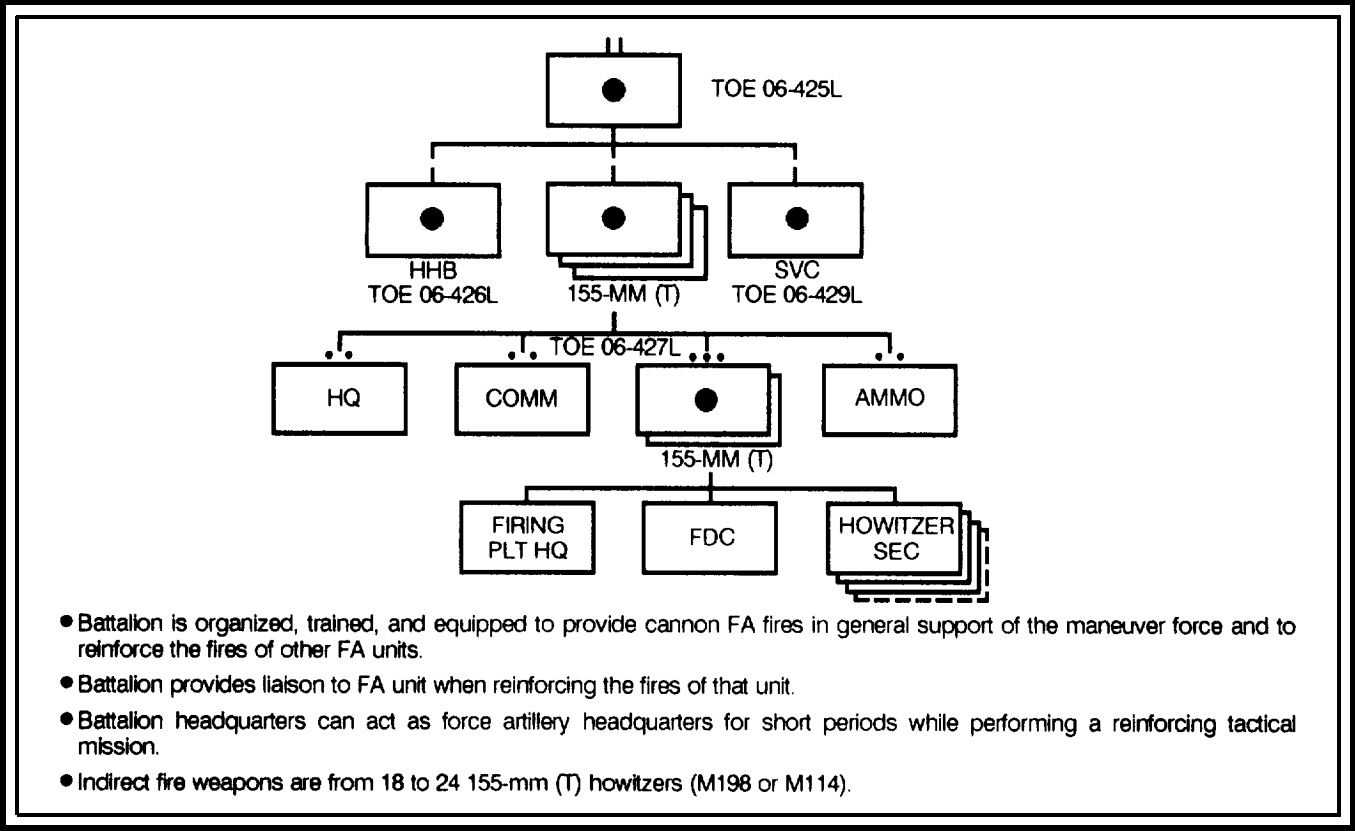
155-MM (SP) BATTALION, HEAVY DIVISION (DS) (TOE 06368L) TACFIRE SHELTER LAYOUT



155-MM (SP) BATTALION, HEAVY DIVISION (DS) (TOE 06366L) COMMAND POST SHIFTS

| OPERATIONS & INTELLIGENCE SECTION | | |
|---|---|--|
| DUTY POSITION | FIRST SHIFT | SECOND SHIFT |
| Operations/Duty Officer Chemical Officer Operations NCO Intelligence Analyst TACFIRE Operator (VFMED) Vehicle Driver | S2 (CPT) Chemical Officer (1LT) Operations SGT (MSG) Target Processing Specialist (SPC) TACFIRE Operations Specialist (SPC) Vehicle Driver (PFC) | Assistant S3 (CPT) NBC NCO (SSG) Fire Control NCO (SFC) Intelligence SGT (MSG) TACFIRE Operations Specialist (SPC) |
| FIRE DIRECTION CENTER | | |
| DUTY POSITION | FIRST SHIFT | SECOND SHIFT |
| Fire Direction Officer TACFIRE Computer Operator TACFIRE Equipment Operator TACFIRE Equipment Specialist TACFIRE Equipment Specialist | Fire Direction Officer (CPT) TACFIRE Computer Operator (SSG) TACFIRE Equipment Specialist (SGT) TACFIRE Operations Specialist (PFC) TACFIRE Operations Specialist (SPC) | Fire Direction Officer (CPT) TACFIRE Computer Operator (SSG) TACFIRE Equipment Specialist (SGT) TACFIRE Operations Specialist (PFC) |
| NOTE: The FA battalion commander is where he can best execute the maneuver commander's intent for fire support. The FA battalion S3 is the overall supervisor of the CP. | | |

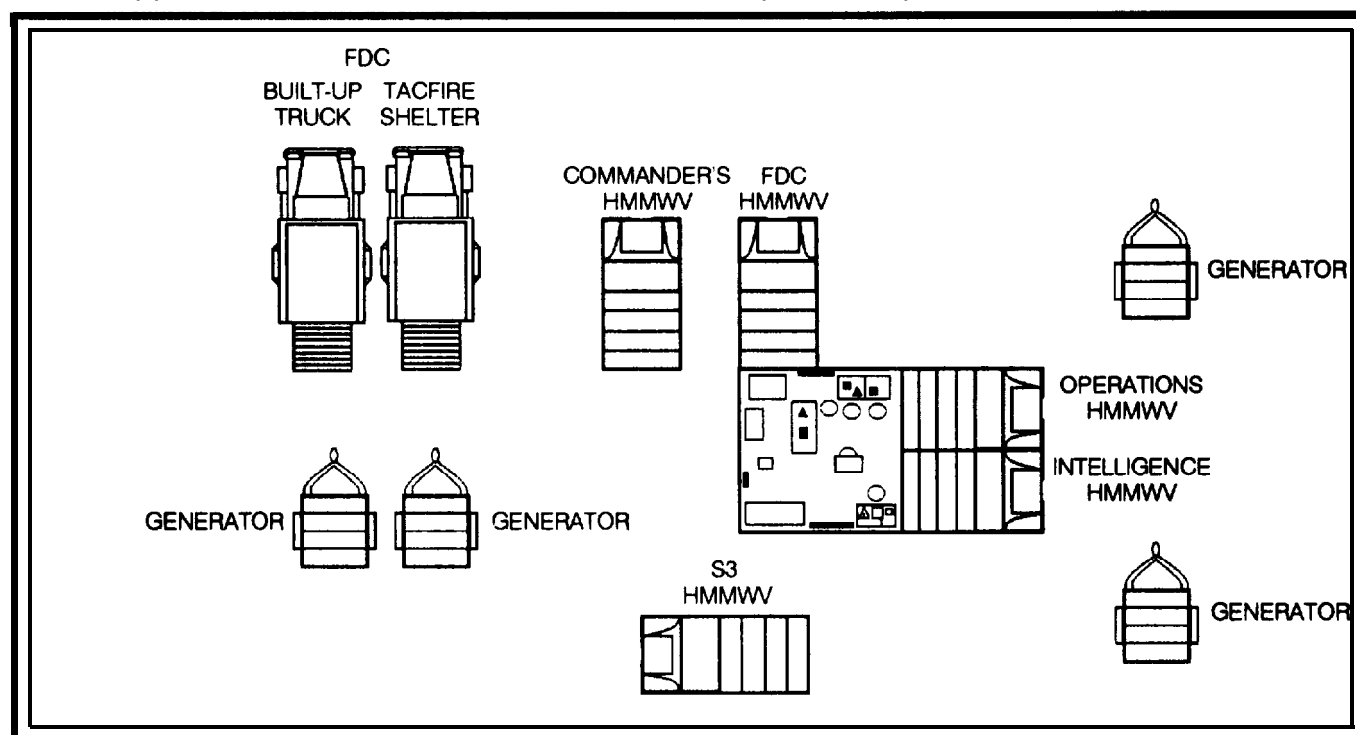
155-MM (T) BATTALION, CORPS ARTILLERY OR FA BRIGADE ORGANIZATION CHART



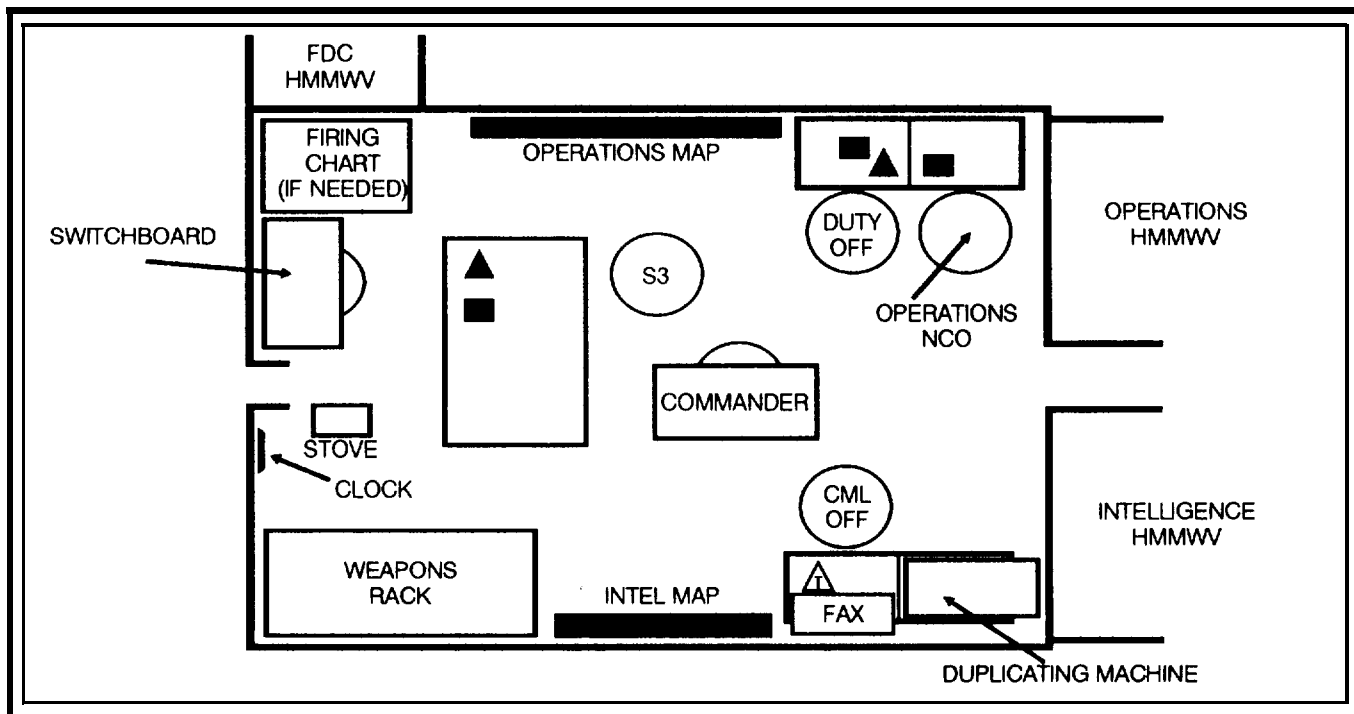
155-MM (T) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06426L) COMMAND POST PERSONNEL

| PARA | LINE | DESCRIPTION | RANK | MOS | BASE TOE AUTH |
|------|------|-------------------------------|------|-------|---------------|
| 01 | 01 | Commander | LTC | 13A00 | 1 |
| | 03 | S3 | MAJ | 13E00 | 1 |
| | 09 | S2 | CPT | 13E00 | 1 |
| | 12 | Vehicle Driver | PFC | 13B10 | 1 |
| 03 | 01 | Operations Officer | CPT | 13E00 | 1 |
| | 02 | Chemical Officer | 1 LT | 74B00 | 1 |
| | 03 | Operations SGT | MSG | 13Z50 | 1 |
| | 04 | Fire Control NCO | SFC | 13C40 | 1 |
| | 05 | NBC NCO | SSG | 54B30 | 1 |
| | 06 | Clerk-Typist | SPC | 71L10 | 1 |
| | 08 | Vehicle Driver | PFC | 13B10 | 1 |
| | 09 | TACFIRE Operations Specialist | SPC | 13C10 | 2 |
| 04 | 01 | Fire Direction Officer | CPT | 13E00 | 1 |
| | 07 | TACFIRE Computer Operator | SSG | 13C30 | 2 |
| | 08 | TACFIRE Equipment Specialist | SGT | 13C20 | 2 |
| | 09 | TACFIRE Operations Specialist | SPC | 13C10 | 2 |
| | 10 | TACFIRE Operations Specialist | PFC | 13C10 | 2 |
| 05 | 01 | Targeting Officer | CPT | 13D00 | 1 |
| | 02 | Intelligence SGT | MSG | 13Z50 | 1 |
| | 03 | Target Processing Specialist | SPC | 13F10 | 1 |

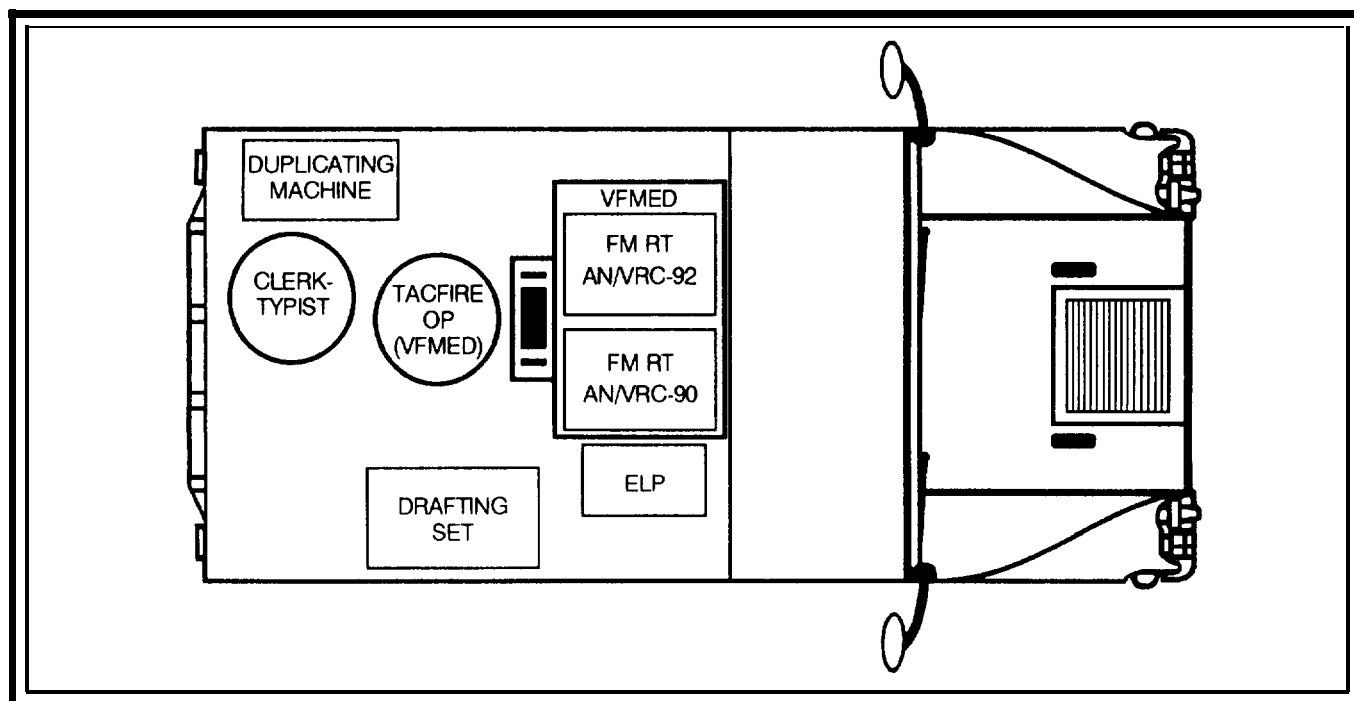
155-MM (T) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06426L) OVERALL COMMAND POST LAYOUT



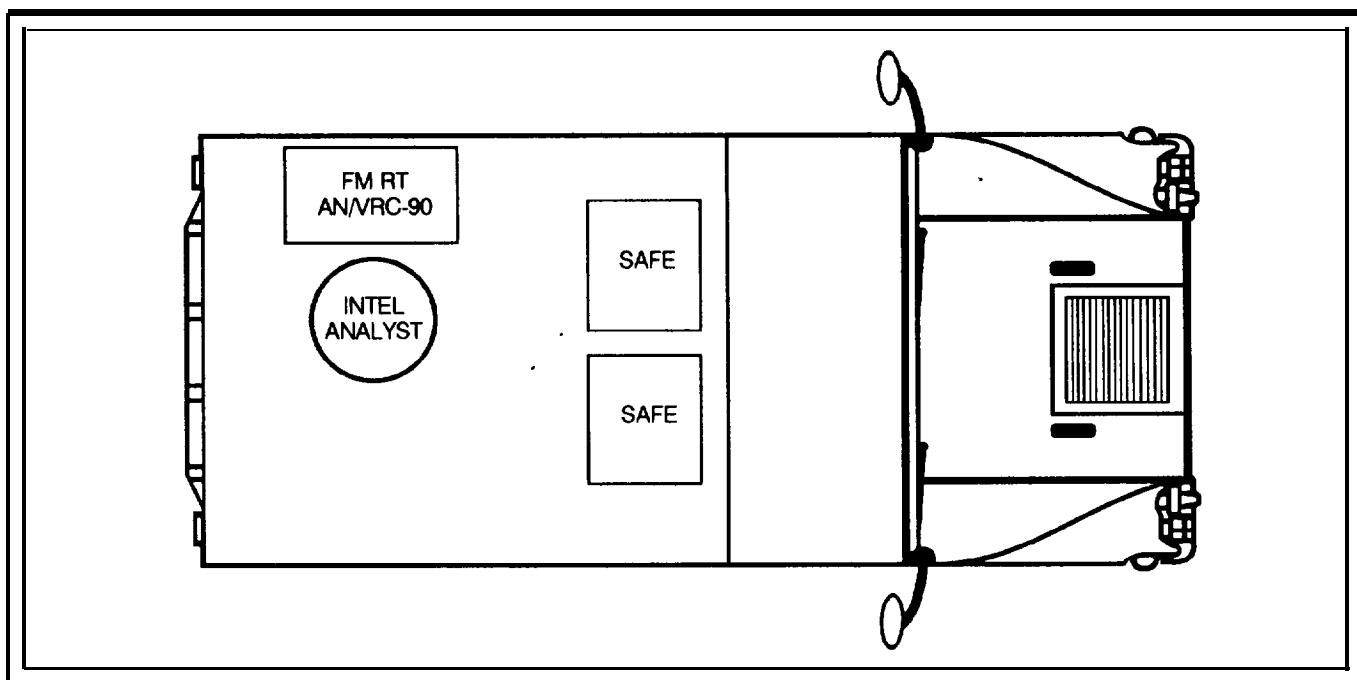
155-MM (T) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06426L)
COMMAND POST COMMON AREA LAYOUT



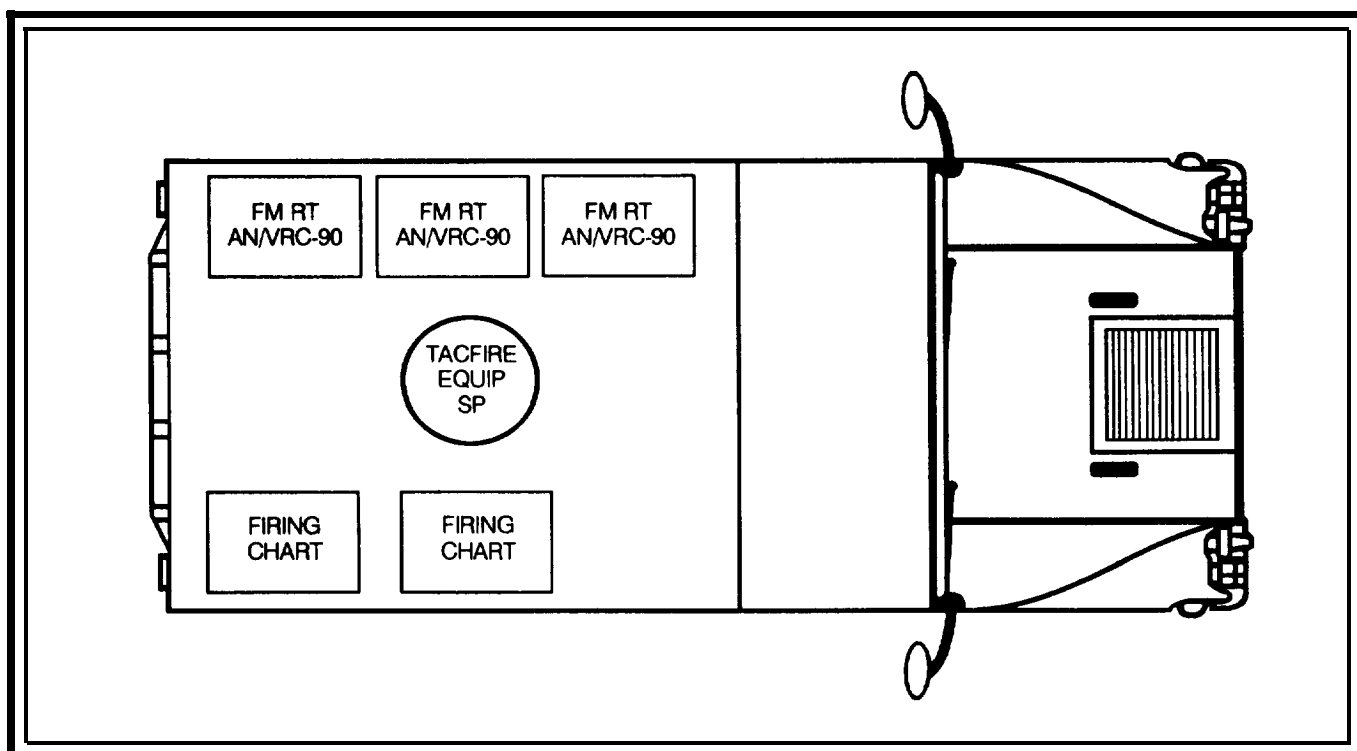
155-MM (T) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06426L) OPERATIONS HMMWV LAYOUT



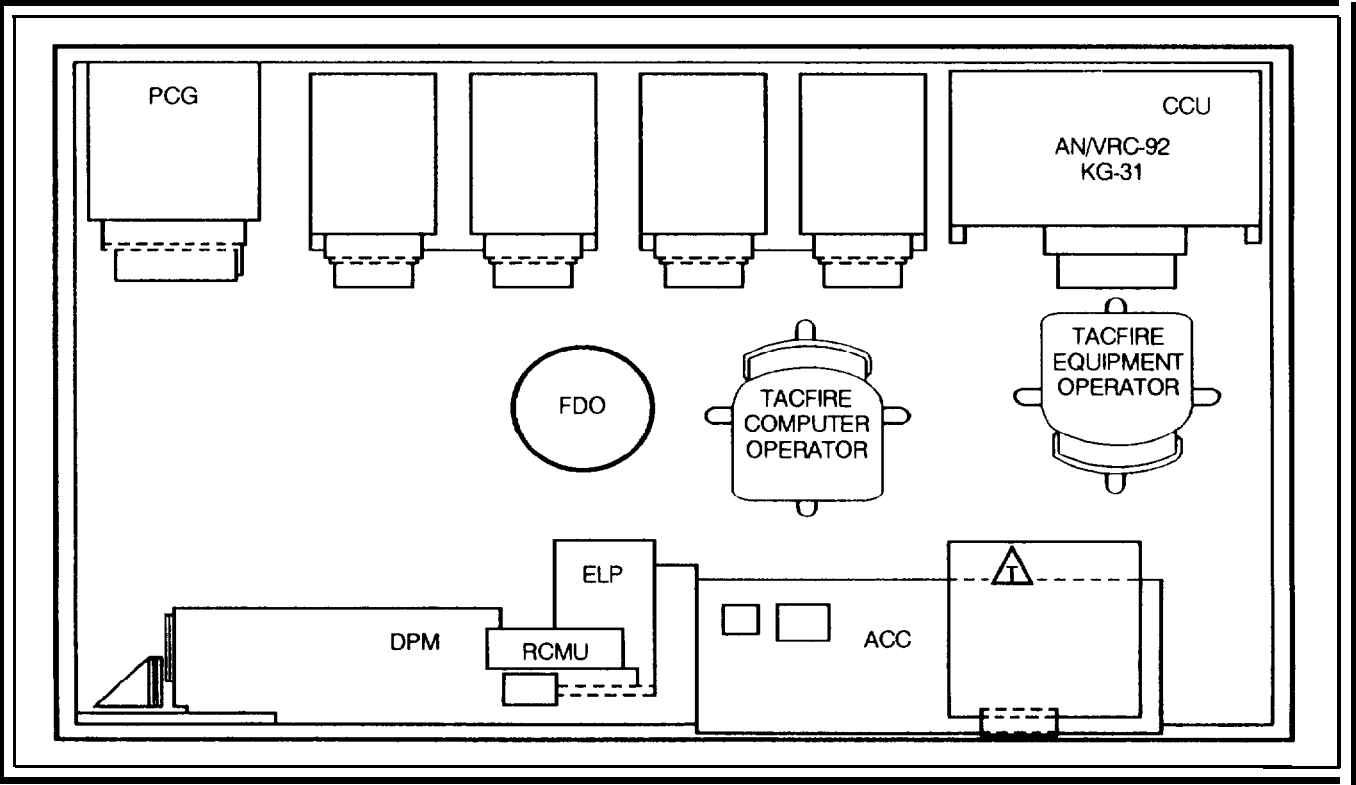
155-MM (T) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06426L) INTELLIGENCE HMMWV LAYOUT



155-MM (T) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06426L)
FIRE DIRECTION CENTER HMMW LAYOUT



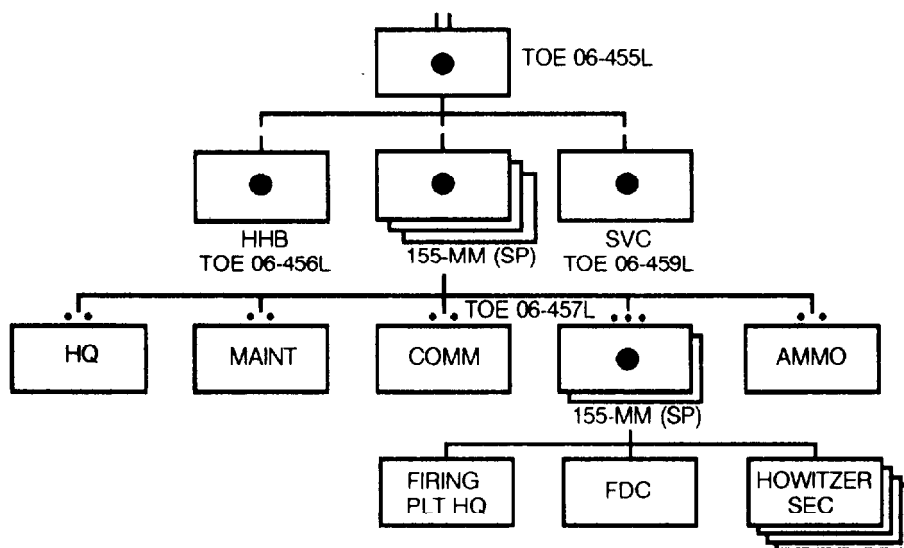
155-MM (T) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06426L) TACFIRE SHELTER LAYOUT



155-MM (T) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06426L) COMMAND POST SHIFTS

| OPERATIONS & INTELLIGENCE SECTION | | |
|---|---|---|
| DUTY POSITION | FIRST SHIFT | SECOND SHIFT |
| Operations/Duty Officer Chemical Officer Operations NCO Intelligence Analyst TACFIRE Operator (VFMED) Vehicle Driver Clerk-Typist | S2 (CPT) Chemical Officer (1LT) Operations SGT (MSG) Targeting Officer (CPT) TACFIRE Operations Specialist (SPC) Vehicle Driver (PFC) | Operations Officer (CPT) NBC NCO (SSG) Intelligence SGT (MSG) Target Processing Specialist (SPC) TACFIRE Operation Specialist (SPC) Clerk-Typist (SPC) |
| FIRE DIRECTION CENTER | | |
| DUTY POSITION | FIRST SHIFT | SECOND SHIFT |
| Fire Direction Officer TACFIRE Computer Operator TACFIRE Equipment Operator TACFIRE Equipment Specialist TACFIRE Equipment Specialist | Fire Direction Officer (CPT) TACFIRE Computer Operator (SSG) TACFIRE Equipment Specialist (SGT) TACFIRE Operations Specialist (SPC) TACFIRE Operations Specialist (SPC) | Fire Control NCO (SFC) TACFIRE Computer Operator (SSG) TACFIRE Equipment Specialist (SGT) TACFIRE Operations Specialist (SPC) TACFIRE Operations Specialist (PFC) |
| NOTE: The FA battalion S3 is the overall supervisor of the CP. | | |

155-MM (SP) BATTALION, CORPS ARTILLERY OR FA BRIGADE ORGANIZATION CHART

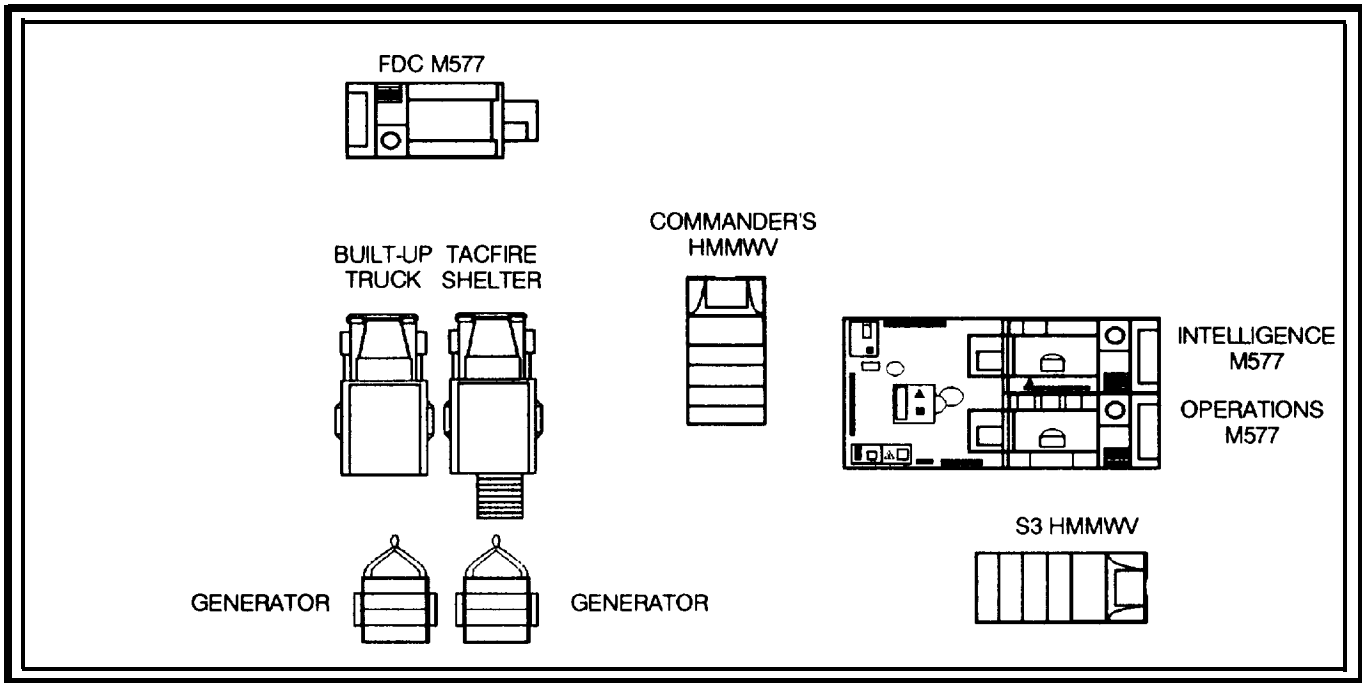


- Battalion is organized, trained, and equipped to provide cannon FA fires in general support of the maneuver force and to reinforce the fires of other FA units.
- Battalion provides liaison to FA unit when reinforcing the fires of that unit.
- Battalion headquarters can act as force artillery headquarters for short periods while performing a reinforcing tactical mission.
- Indirect fire weapons are from 18 to 24 155-mm (SP) howitzers (M109 series).

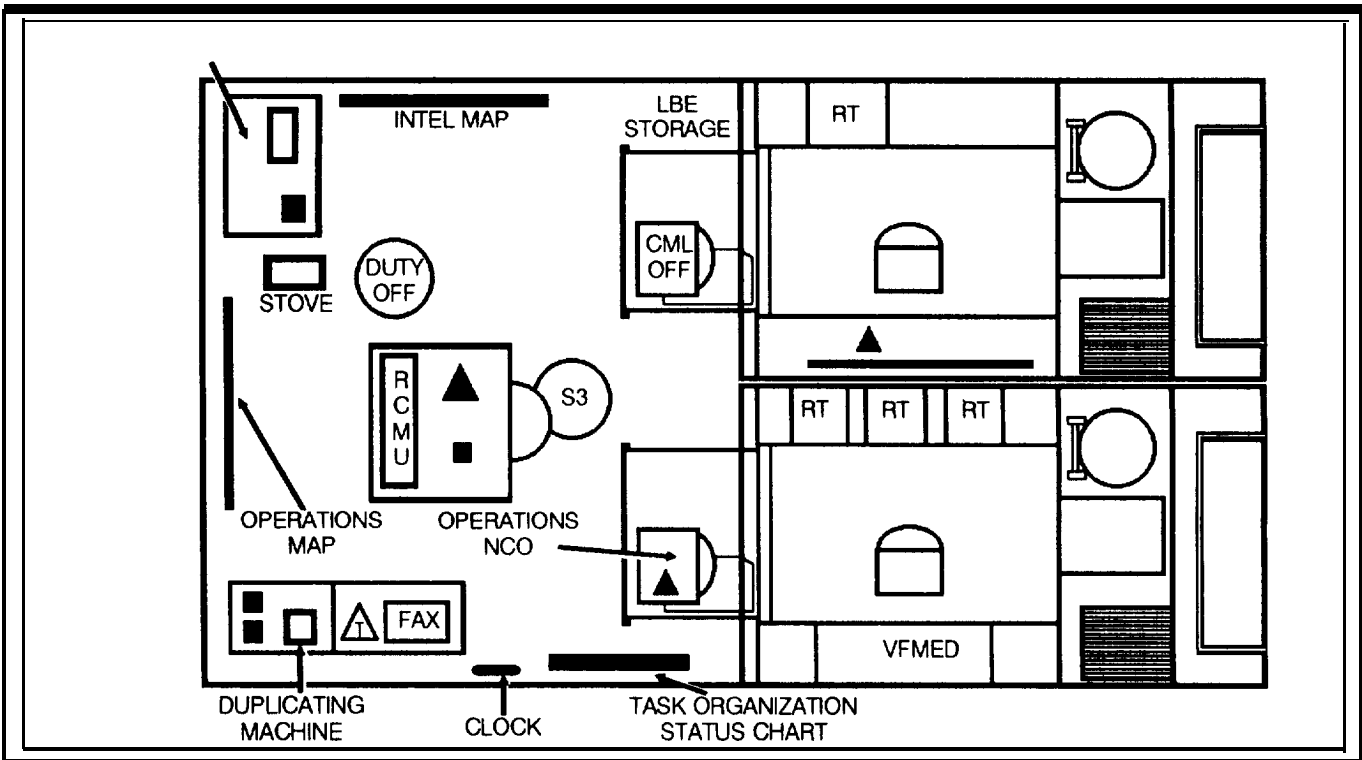
155-MM (SP) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06456L) COMMAND POST PERSONNEL

| PARA | LINE | DESCRIPTION | RANK | MOS | BASE TOE AUTH |
|------|------|-------------------------------|------|-------|---------------|
| 01 | 01 | Commander | LTC | 13A00 | 1 |
| | 03 | S3 | MAJ | 13E00 | 1 |
| | 09 | S2 | CPT | 13E00 | 1 |
| | 12 | Vehicle Driver | PFC | 13B10 | 1 |
| 03 | 01 | Operations Officer | CPT | 13E00 | 1 |
| | 02 | Chemical Officer | 1LT | 74B00 | 1 |
| | 03 | Operation SGT | MSG | 13Z50 | 1 |
| | 04 | Fire Control NCO | SFC | 13C40 | 1 |
| | 05 | NBC NCO | SSG | 54B30 | 1 |
| | 06 | Clerk-Typist | SPC | 71L10 | 1 |
| | 08 | Vehicle Driver | PFC | 13B10 | 1 |
| | 09 | TACFIRE Operations Specialist | SPC | 13C10 | 1 |
| 04 | 01 | Fire Direction Officer | CPT | 13E00 | 1 |
| | 07 | TACFIRE Computer Operator | SSG | 13C30 | 2 |
| | 08 | TACFIRE Equipment Specialist | SGT | 13C20 | 2 |
| | 09 | TACFIRE Operations Specialist | SPC | 13C10 | 2 |
| | 10 | TACFIRE Operations Specialist | PFC | 13C10 | 2 |
| 05 | 01 | Targeting Officer | CPT | 13D00 | 1 |
| | 02 | Intelligence SGT | MSG | 13Z50 | 1 |
| | 03 | Target Processing Specialist | SPC | 13F10 | 1 |

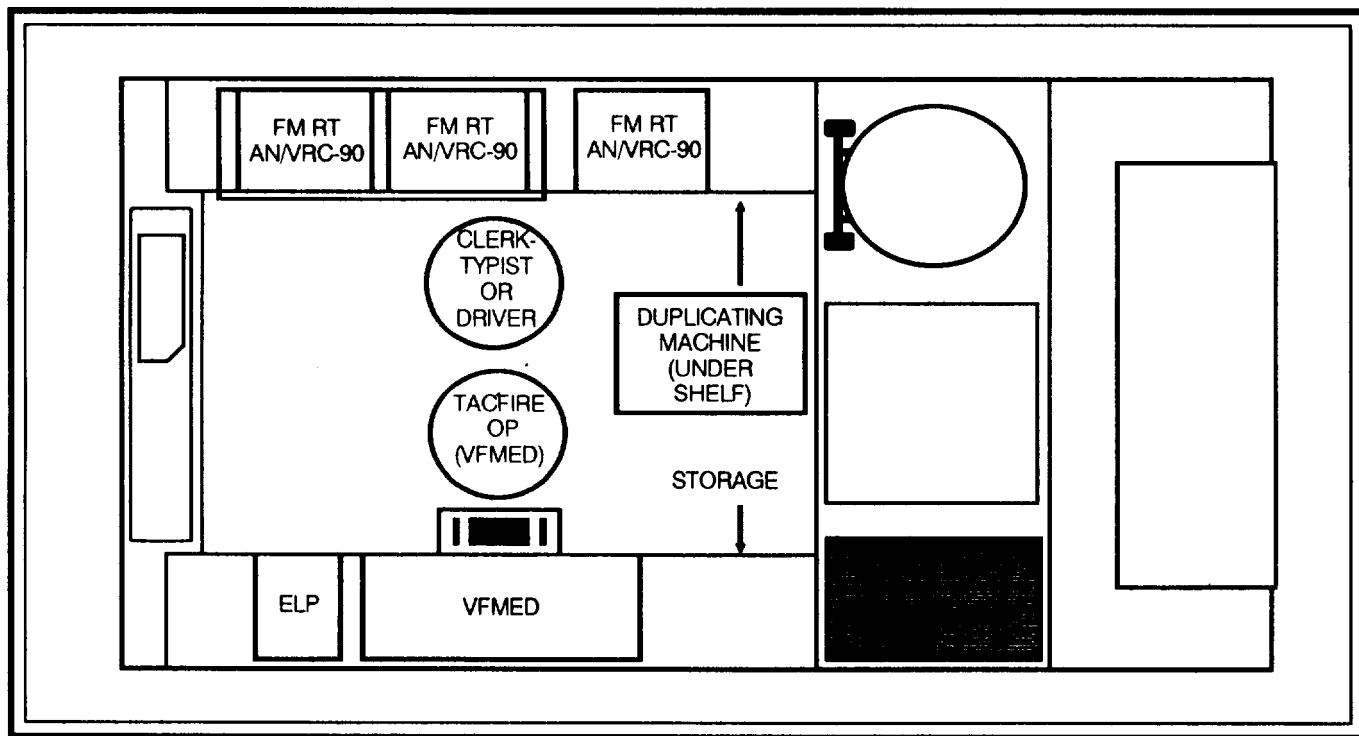
155-MM (SP) BATTALION, CORPS ARTILLERY FA BRIGADE (TOE 06456L) OVERALL COMMAND POST LAYOUT



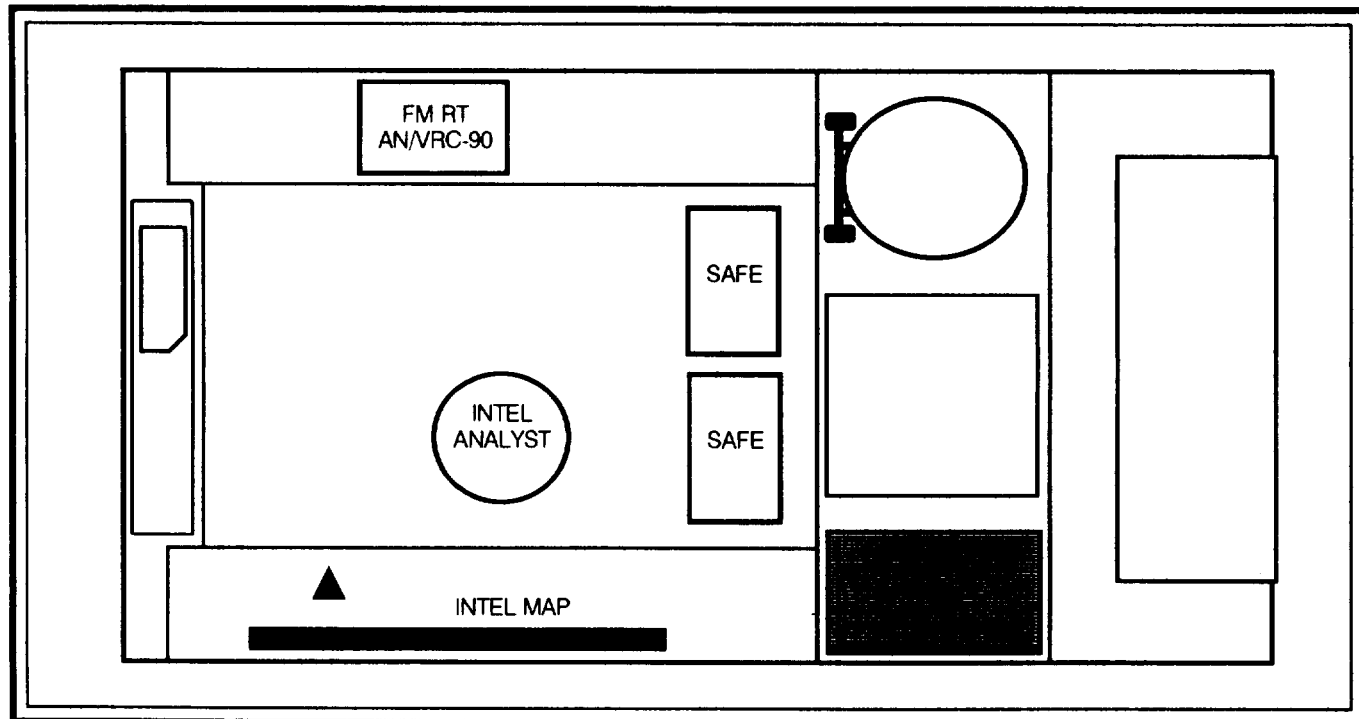
155-MM (SP) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06456L)
COMMAND POST COMMON AREA LAYOUT



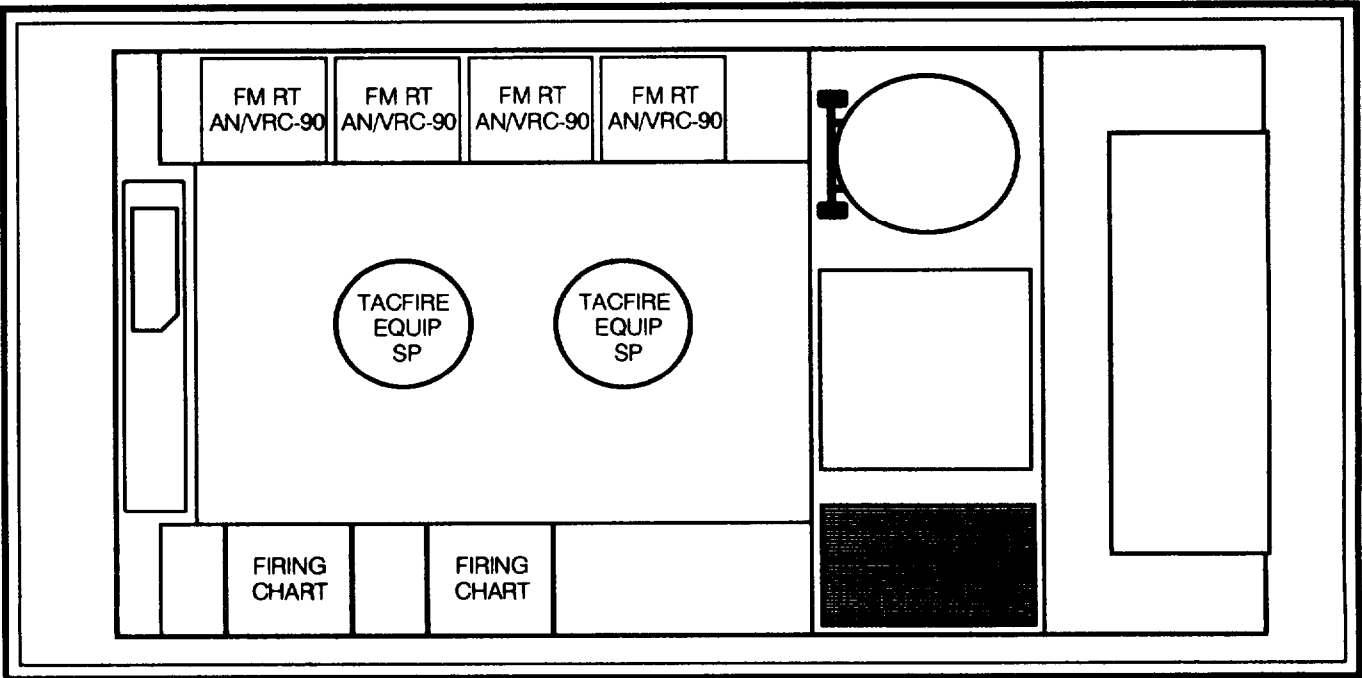
155-MM (SP) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06456L) OPERATIONS M577 LAYOUT



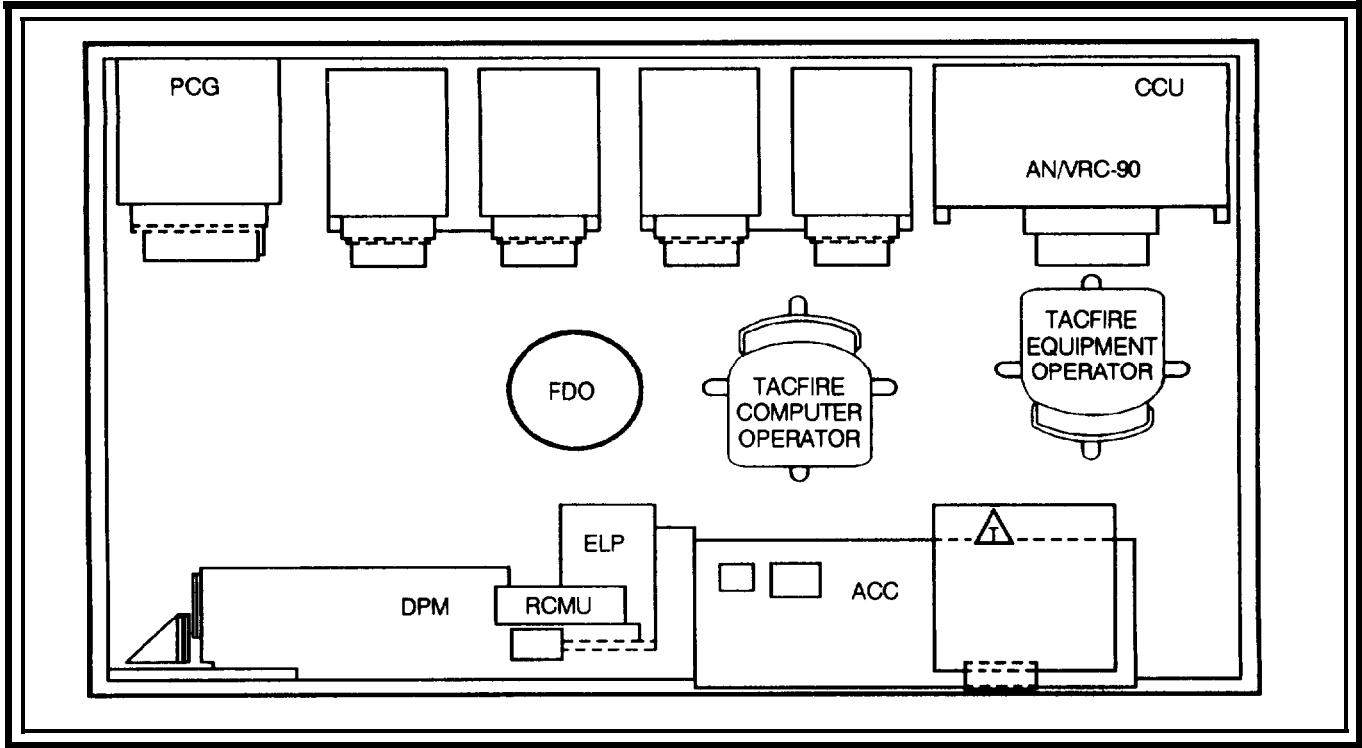
155-MM (BP) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06456L) INTELLIGENCE M577 LAYOUT



155-MM (SP) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06456L)
FIRE DIRECTION CENTER M577 LAYOUT



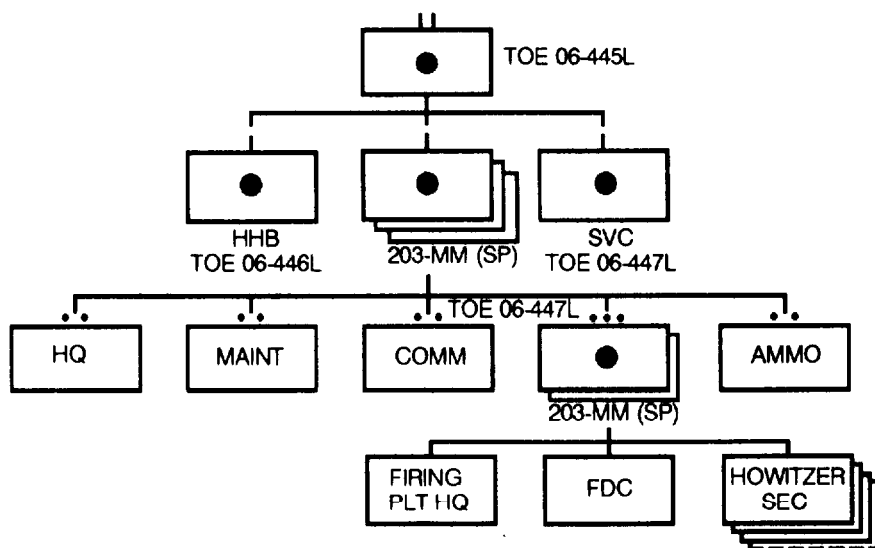
155-MM (SP) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06456L) TACFIRE SHELTER LAYOUT



155-MM (SP) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06456L) COMMAND POST SHIFTS

| OPERATIONS & INTELLIGENCE SECTION | | |
|---|---|---|
| DUTY POSITION | FIRST SHIFT | SECOND SHIFT |
| Operations/Duty Officer Chemical Officer Operations NCO Intelligence Analyst TACFIRE Operator (VFMED) Vehicle Driver Clerk-Typist | S2 (CPT) Chemical Officer (1LT) Operations SGT (MSG) Targeting Officer (CPT) TACFIRE Operations Specialist (SPC) Vehicle Driver (PFC) | Operations Officer (CPT) NBC NCO (SSG) Intelligence SGT (MSG) Target Processing Specialist (SPC) TACFIRE Operations Specialist (SPC) Clerk-Typist (SPC) |
| FIRE DIRECTION CENTER | | |
| DUTY POSITION | FIRST SHIFT | SECOND SHIFT |
| Fire Direction Officer TACFIRE Computer Operator TACFIRE Equipment Operator TACFIRE Equipment Specialist TACFIRE Equipment Specialist | Fire Direction Officer (CPT) TACFIRE Computer Operator (SSG) TACFIRE Equipment Specialist (SGT) TACFIRE Operations Specialist (SPC) TACFIRE Operations Specialist (PFC) | Fire Control NCO (SFC) TACFIRE Computer Operator (SSG) TACFIRE Equipment Specialist (SGT) TACFIRE Operations Specialist (SPC) TACFIRE Operations Specialist (PFC) |
| NOTE: The FA battalion S3 is the overall supervisor of the CP. | | |

203-MM (SP) BATTALION, CORPS ARTILLERY OR FA BRIGADE ORGANIZATION CHART

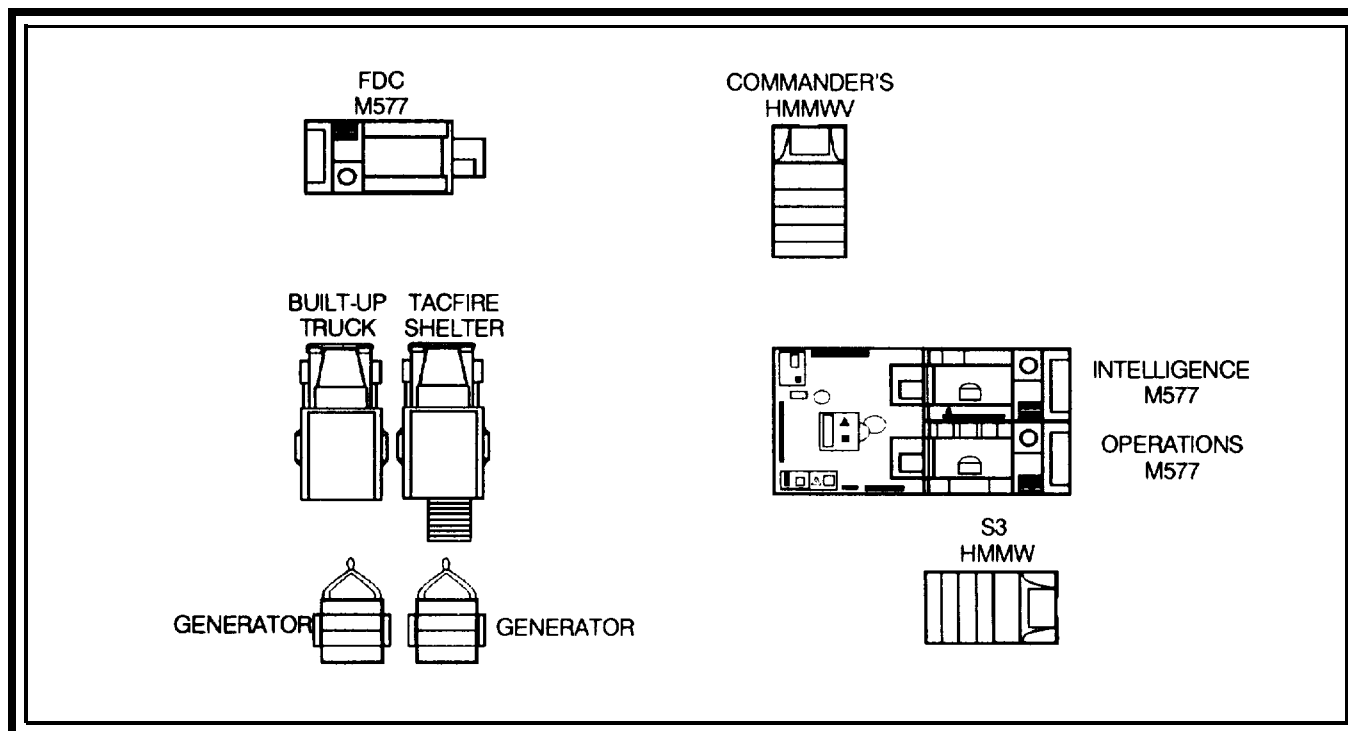


- Battalion is organized, trained, and equipped to provide cannon FA fires in general support of the maneuver force and to reinforce the fires of other FA units.
- Battalion provides liaison to FA unit when reinforcing the fires of that unit.
- Battalion headquarters can act as force artillery headquarters for short periods while performing a reinforcing tactical mission.
- Indirect fire weapons are from 18 to 24 203-mm (SP) howitzers (M110 series).

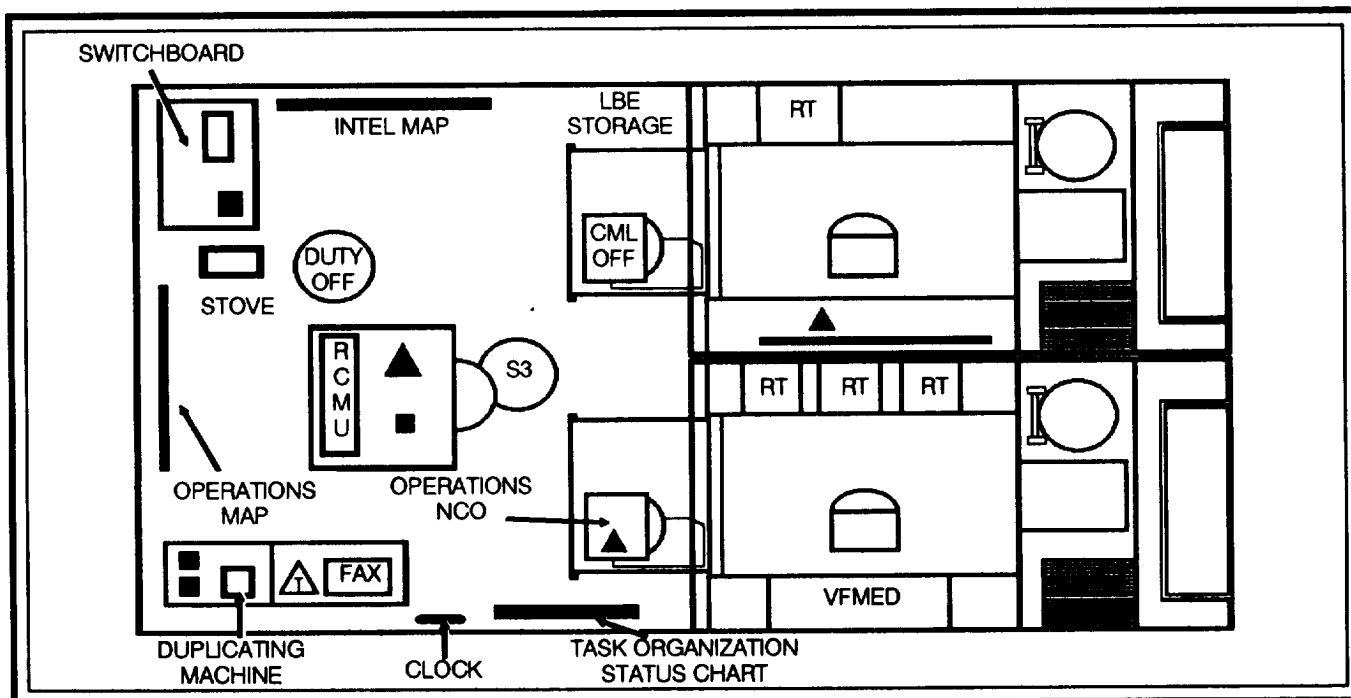
203-MM (SP) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06446L) COMMAND POST PERSONNEL

| PARA | LINE | DESCRIPTION | RANK | MOS | BASE TOE AUTH |
|------|------|-------------------------------|------|-------|---------------|
| 01 | 01 | Commander | LTC | 13A00 | 1 |
| | 03 | S3 | MAJ | 13E00 | 1 |
| | 09 | S2 | CPT | 13E00 | 1 |
| | 12 | Vehicle Driver | PFC | 13B10 | 1 |
| 03 | 01 | Operations Officer | CPT | 13E00 | 1 |
| | 02 | Chemical Officer | 1LT | 74B00 | 1 |
| | 03 | Operations SGT | MSG | 13Z50 | 1 |
| | 04 | Fire Control NCO | SFC | 13C40 | 1 |
| | 05 | NBC NCO | SSG | 54B30 | 1 |
| | 06 | Clerk-Typist | SPC | 71L10 | 1 |
| | 08 | Vehicle Driver | PFC | 13B10 | 1 |
| | 09 | TACFIRE Operations Specialist | SPC | 13C10 | 2 |
| 04 | 01 | Fire Direction Officer | CPT | 13E00 | 2 |
| | 07 | TACFIRE Computer Operator | SSG | 13C30 | 2 |
| | 08 | TACFIRE Equipment Specialist | SGT | 13C20 | 2 |
| | 09 | TACFIRE Operations Specialist | SPC | 13C10 | 1 |
| | 10 | TACFIRE Operations Specialist | PFC | 13C10 | 1 |
| 05 | 01 | Targeting Officer | CPT | 13D00 | 1 |
| | 02 | Intelligence SGT | MSG | 13Z50 | 1 |
| | 03 | Target Processing Specialist | SPC | 13F10 | 1 |

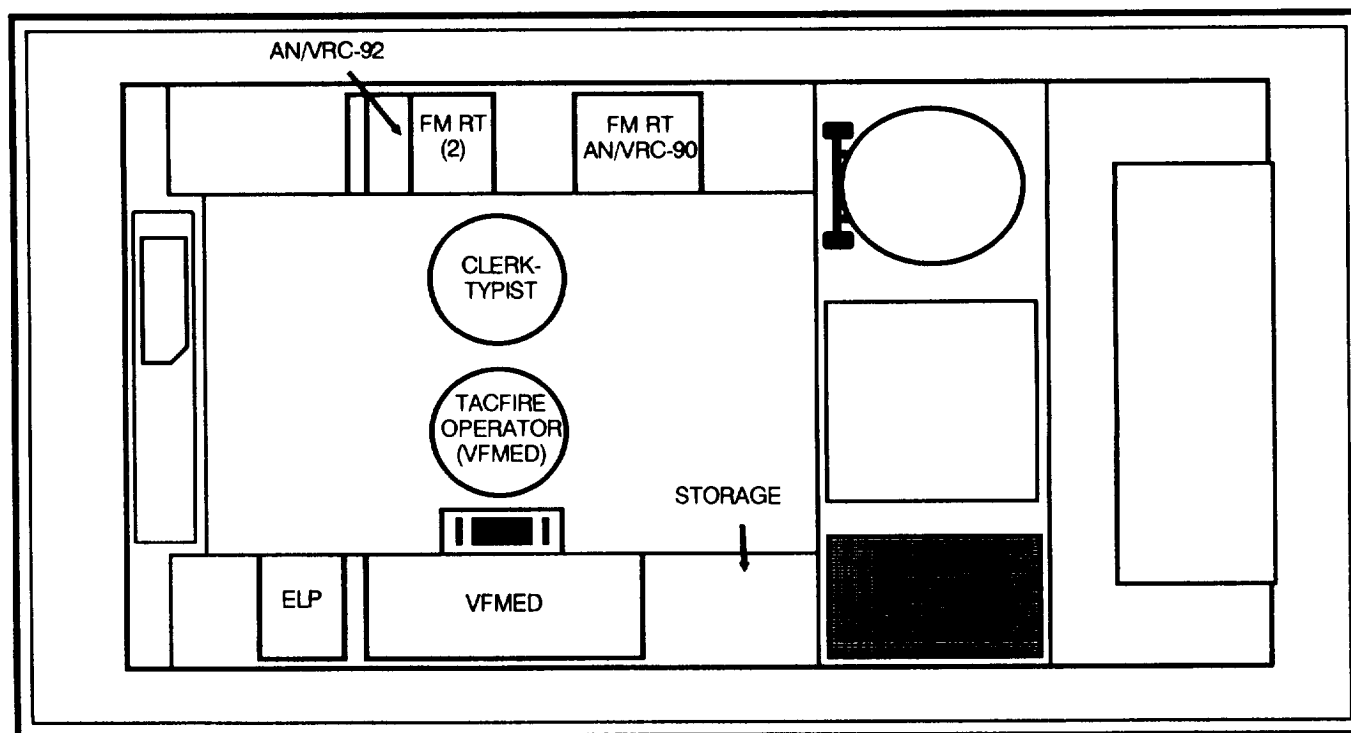
203-MM (SP) BATTALION CORPS ARTILLERY OR FA BRIGADE (TOE 06446L) OVERALL COMMAND POST LAYOUT



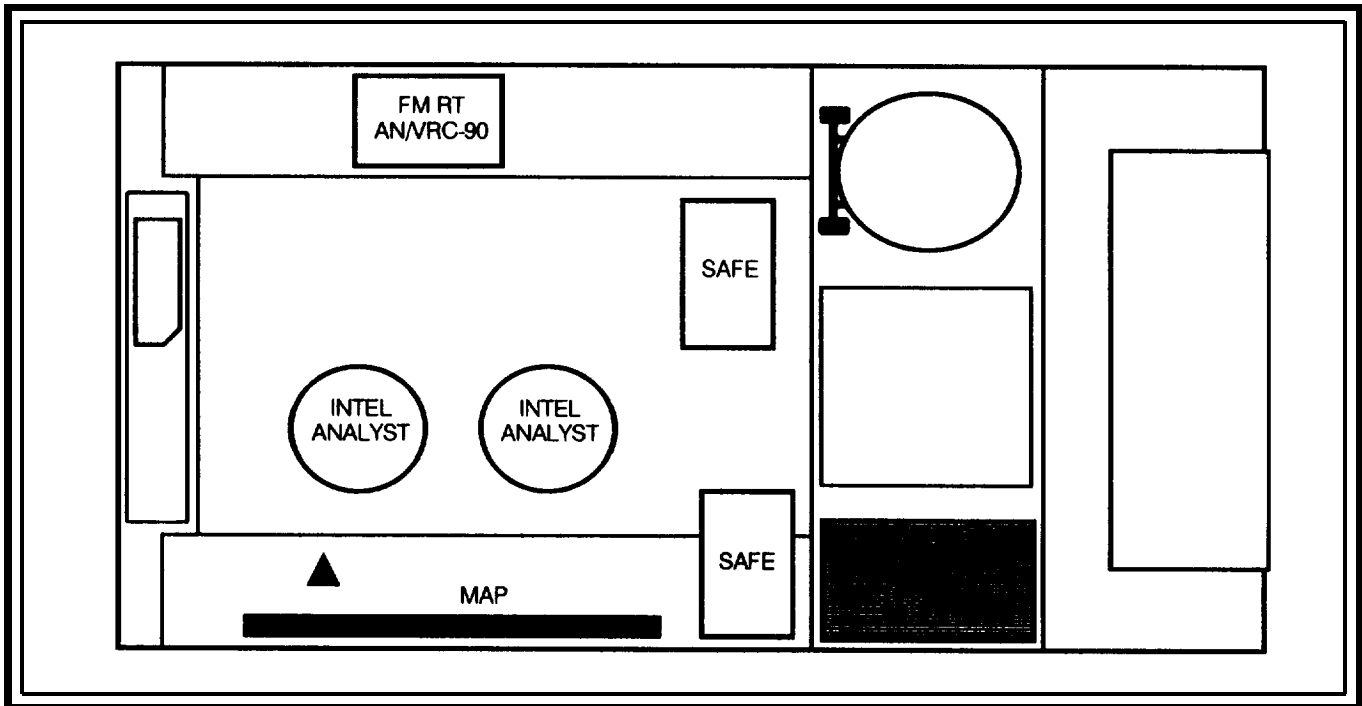
203-MM (SP) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06446L)
COMMAND POST COMMON AREA LAYOUT



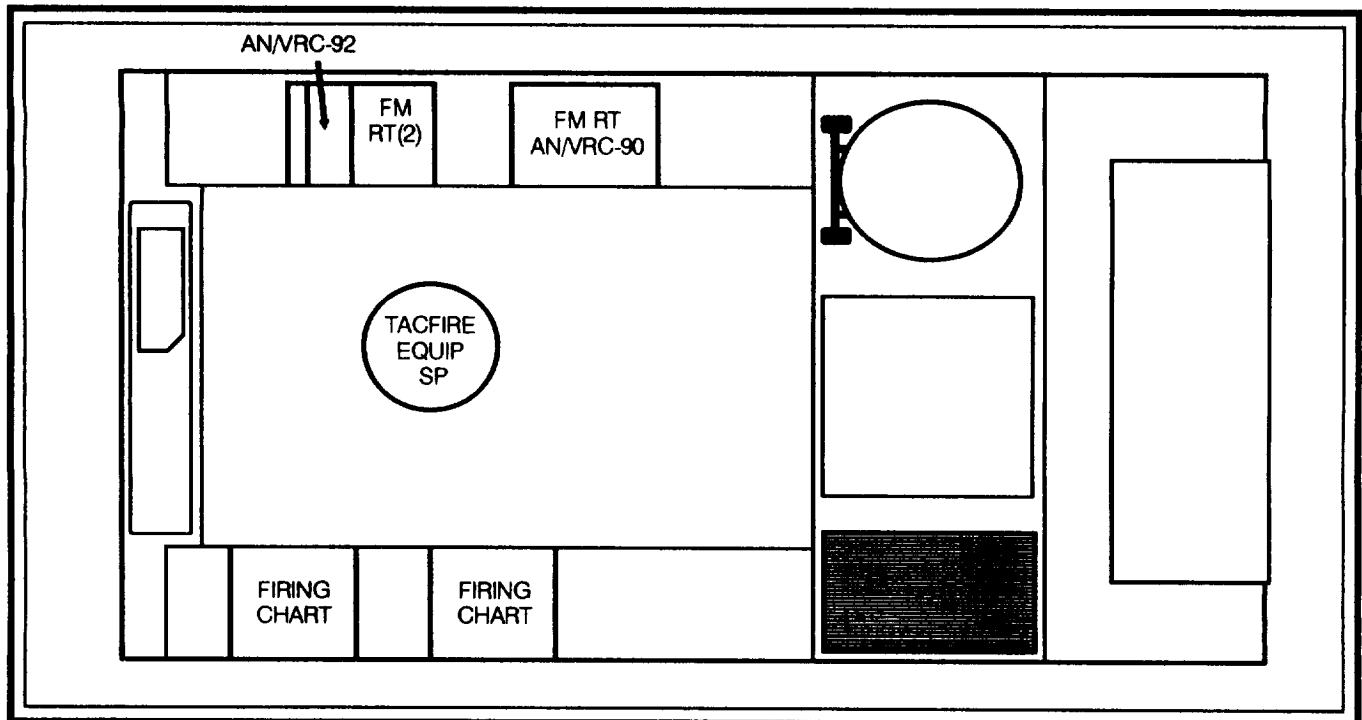
203-MM (SP) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06446L) OPERATIONS M577 LAYOUT



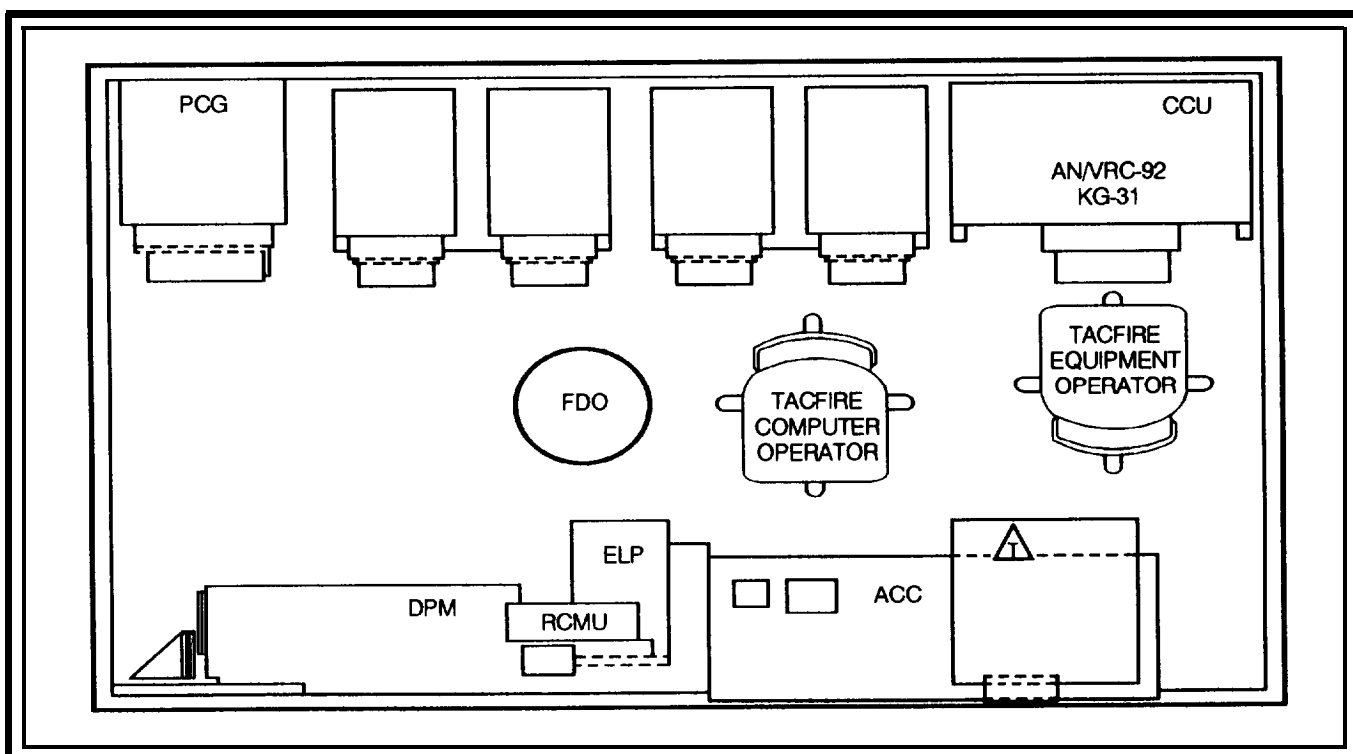
203-MM (SP) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06446L) INTELLIGENCE M577 LAYOUT



203-MM (SP) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06446L)
FIRE DIRECTION CENTER M577 LAYOUT



203-MM (SP) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06446L) TACFIRE SHELTER LAYOUT



203-MM (BP) BATTALION, CORPS ARTILLERY OR FA BRIGADE (TOE 06446L) COMMAND POST SHIFTS

| OPERATIONS & INTELLIGENCE SECTION | | |
|---|--|--|
| DUTY POSITION | FIRST SHIFT | SECOND SHIFT |
| Operation Officer Chemical Officer Operations NCO Intelligence Analyst Intelligence Analyst TACFIRE Operator (VFMED) Vehicle Driver Clerk-Typist | S2 (CPT) Chemical Officer (1LT) Operations SGT (MSG) Targeting Officer (CPT) Target Processing Specialist (SPC) TACFIRE Operations Specialist (SPC) Vehicle Driver (PFC) | Operations Officer (CPT) NBC NCO (SSG) Fire Control NCO (SFC) Intelligence SGT (MSG) TACFIRE Operations Specialist (SPC) Clerk-Typist (SPC) |
| FIRE DIRECTION CENTER | | |
| DUTY POSITION | FIRST SHIFT | SECOND SHIFT |
| Fire Direction Officer TACFIRE Computer Operator TACFIRE Equipment Operator TACFIRE Equipment Specialist | Fire Direction Officer (CPT) TACFIRE Computer Operator (SSG) TACFIRE Equipment Specialist (SGT) TACFIRE Operations Specialist (PFC) | Fire Direction Officer (CPT) TACFIRE Computer Operator (SSG) TACFIRE Equipment Specialist (SGT) TACFIRE Operations Specialist (PFC) |
| NOTE: The FA battalion S3 is the overall supervisor of the CP. | | |

APPENDIX D

NUCLEAR AND CHEMICAL OPERATIONS

Nuclear and chemical operations require detailed planning and specialized procedures. Both cause the FA battalion to plan and train to operate in a extremely stressful environment while continuing the basic mission of providing fire support to the maneuver force. This is particularly true of offensive nuclear and chemical operations. This appendix provides a general framework for nuclear and chemical planning and operations, but it is by no means exhaustive. Units with a nuclear and/or chemical mission must acquire and maintain a wide variety of references as well as special tools and equipment. Nuclear and chemical operations must be fully integrated into the battalion's tactical SOPs and must be practiced on a continual basis.

Section I

TACTICAL NUCLEAR OPERATIONS

The mission of the nuclear-capable US field artillery battalion is to receive nuclear weapons, maintain them in a safe and secure environment, and deliver them against specific targets when authorized. Battalion commanders must plan and train for nuclear operations and integrate them into all training and contingency plans. Nuclear operations can be broken down into three phases:

- 1. Transition to war.
- 2. Battalion operations.
- 3. Battery operations.

TRANSITION TO WAR

Nuclear operations begin well before the initial use of nuclear weapons. Each battalion commander must decide how to transport, store, and safeguard his allocated nuclear weapons.

Most theaters do not require artillery units to pick up stocks from peacetime storage sites. The ordnance companies assigned to these sites do that. Rendezvous points are established at which custody is transferred from the ordnance company personnel to the artillery battalions when use is required. The timing of this transfer depends on requests for release and actual authorization to release. The earlier the notification, the more responsive the system.

In those theaters or commands where the artillery is responsible to pick up the stocks, the artillery battalion must plan and execute this mission. Plans must be well coordinated with the ordnance company that has custody; they must include the proper equipment and personnel to conduct a ground or air convoy. Normally, this mission is assigned to the service battery personnel. These personnel

must maintain proficiency in a number of tasks. The tasks include receipt inspection, tie-down procedures, convoy operations, security emergency destruction (ED) requirement and custody transfer requirements.

Battalions must be capable of transporting nuclear weapons by both ground and air as a part of normal operations. They must be careful to avoid a distinctive convoy signature. The equipment assigned to the nuclear weapons convoy must resemble the equipment in a standard headquarters battery or service battery convoy.

Planning must allow for the availability of the equipment and personnel – including security personnel – required to move the weapons by ground or air. Routes to and from the transfer point and the firing batteries must be known, reconnoitered and updated to ensure timely pickup and delivery.

Initial issue and resupply of the nuclear weapons may be done by air. Units down to battery level must maintain the capability of transporting and receiving weapons by air. Loading and unloading procedures vary according to the weapon system and type of aircraft used.

BATTALION OPERATIONS

To maintain the capability to perform nuclear operations, a battalion should have at least three special weapons teams – one per firing battery. Team members must be completely trained in all aspects of their requirements and duties. A fourth team may be formed from within the service battery for battalion-level operations. The service battery special weapons team should be trained in receipt loading and tie-down, security, transportation, and emergency actions. Firing batteries can augment the service battery special weapons team to form a battalion-level team. The use of the firing battery’s dedicated vehicles as transport vehicles facilitates operations of the battalion field storage location (FSL).

Service or headquarters battery should provide the courier, custodian, and security force vehicles for battalion-level convoy operations.

Field Storage Locations

A number of factors must be considered in determining the location of the FSL. Commanders should refer to FM 100-50 when making any decision concerning the FSL. Two possible methods of location are:

- Ž Centralization of the FSL at battalion.
- Ž Decentralization of the FSL or battery FSLs.

The advantages and disadvantages are shown below.

IMPACT OF CENTRALIZED—DECENTRALIZED FIELD STORAGE LOCATIONS
ON SELECTED TACTICAL CONSIDERATIONS

| TACTICAL CONSIDERATIONS | BATTERY | BATTALION |
|---|-----------------------------|-----------------------------|
| Degree of control ¹ | Decentralized | Centralized |
| Vulnerability to counterfire ² | High | Low |
| Vulnerability to other hostile action ² | Depends on the enemy threat | Depends on the enemy threat |
| Signature ³ | Low | High |
| Fire mission responsiveness ⁴ | High | Low |
| Ability to shift or redistribute allocated nuclear weapons | Low | High |
| <div>¹Degree of control refers to control by battalion and higher headquarters.</div> <div>²Vulnerability of the weapons depends on the threat. They are most vulnerable to counterfire at the battery level. Vulnerably to enemy air and guerrilla special teams increases the weapons are consolidated rearward.</div> <div>³The signature effect on the FSL becomes larger and harder to offset as rearward consolidation occurs.</div> <div>⁴The battery is most responsive to fire missions when the rounds are in the battery area. However, this makes If harder for the battalion to redistribute the weapons internally or externally.</div> | | |

FIELD STORAGE LOCATIONS

| CENTRALIZATION | | DECENTRALIZATION | |
|---|---|---|--|
| ADVANTAGES | DISADVANTAGES | ADVANTAGES | DISADVANTAGES |
| Control of nuclear weapons is increased. Less security support from the firing batteries is required. Nuclear weapons are at less risk from direct and indirect fire engagements than they would be in a more forward battery position. | Signature of the FSL is increased se weapons are added to the FSL. Response time is increased. A convoy is required to transport the weapon to a firing unit. | Execution is more responsive. All weapons are not in one location. Signature of the battalion FSL is decreased. Batteries retain control of their own special weapons teams. | The battery must provide the security force for the FSL. The battery must move the weapon each time the battery moves. Weapons are closer to the direct fire battle, and the risk of loss or destruction is increased. |

Firing Units

Nuclear operations at the battalion begin when the corps commander decides that the use of tactical nuclear weapons may be required. At this point, a number of actions take place:

- Ž Firing units are selected (primary and alternate).
- Ž Firing positions are planned as directed by div arty or corps arty.

The battalion should give the battery as much warning time as possible to respond to a nuclear mission. The warning time depends on when the battalion receives warning from div arty or corps arty. In any case, the battalion and its batteries must be prepared at all times to execute a nuclear mission.

When the FSL is centralized, the battalion normally delivers the nuclear weapons to the designated firing battery. Of course, this depends on METT-T and unit SOPs. In some organizations, the battery picks up the weapon from the battalion FSL. Weapons should be distributed to battery level only if use is expected. Extended storage time should not be required at the battery but each battery must be prepared for storage, security, convoy, and emergency actions, if necessary.

It is preferable to fire the nuclear mission from an existing firing unit position. If the unit must displace because of the gun-target (GT) range, it is better to displace the entire battery or platoon.

Redistribution

A command may have to redistribute nuclear weapons to execute a nuclear mission. Planning and allocation of nuclear weapons focus on precluding this requirement. However, if necessary, the weapons are usually redistributed directly from one FSL to another by organic

personnel and equipment. The headquarters directing the redistribution specifies the following:

- Ž Who provides the transportation and security.
- Ž Where the linkup points are.
- Ž What headquarters is responsible.
- Ž When personnel and equipment will be released back to the parent unit.

Release

Nuclear weapons are under national command authority (NCA) control. A system is required by which to relay control orders from the NCA through intermediate headquarters to the nuclear delivery units. This system is governed by regulations peculiar to the theater of operations. As a delivery unit, the field artillery unit is the end operator in this system. It must be able to operate in this system at all times. Reliable and trained personnel must be available to receive and act on messages down to battery level. Commanders should ensure that they have enough personnel trained to maintain a 24-hour capability in the emergency action procedure (EAP) system.

Communications

Within the corps there are no nuclear-unique communications systems. Each headquarters uses existing communications nets. There is no requirement that any one specific net be used. However, once a nuclear mission is begun communication must be maintained between the delivery unit, the controlling headquarters of the delivery unit, and the headquarters assigning the mission. This ensures that changes and/or mission cancellations can be actioned immediately.

BATTERY OPERATIONS

See FM 6-50 for battery-level tactical nuclear operations.

Section II

TACTICAL CHEMICAL OPERATIONS

Chemical agents are chemical substances intended for use in military operations to kill, injure, or incapacitate humans through their physiological effects. This definition excludes riot control agents, herbicides, smoke, and flame-producing agents. Chemical agents are classified according to type (liquid or vapor), duration (persistent or nonpersistent), rate of action (immediate or delayed), and effects they produce on the body (nerve, choking, blister, or blood agents). The US currently has persistent and nonpersistent nerve agents (VX and GB). For more details, see FM 3-100.

The FA cannon battalion must be prepared both to defend itself from the effects of enemy chemical weapons and to deliver offensive chemical fires in support of the maneuver commander. Both offensive and defensive chemical operations require detailed planning and extensive training if the battalion is to be successful.

CHEMICAL DEFENSE

The FA units are likely to be near the top of the enemy's priority target list for chemical agent strikes. Commanders must anticipate chemical attacks and develop procedures for surviving them and minimizing their impact on the ability of the battalion to accomplish its mission. These procedures must be incorporated into unit SOPs and must be thoroughly integrated into all phases of individual and unit training.

During tactical operations, chemical defense will impact on the planning and execution of the battalion mission in a number of ways. The battalion commander and S3 must incorporate chemical defense considerations into the planning process any time the enemy has, or is thought to have, offensive chemical capability, regardless of whether it is believed that he intends to use it. The chemical officer is the primary advisor to the commander and S3 on chemical defense matters as well as on all other NBC-related topics.

Planning considerations for chemical defense include those discussed below.

Dispersion

Elements of the battalion should be dispersed as much as possible to minimize the number of units affected by a single chemical strike.

Mission-Oriented Protective Posture

The commander must determine both what the normal level of MOPP will be and what circumstances will cause him to raise or lower that level.

In determining the standard MOPP level the commander must balance the chemical threat against the negative effects of MOPP on individual and unit performance. Weather is a primary factor in this decision. Do the winds favor the enemy's use of chemicals? Will high temperatures create a substantial threat of heat casualties? The commander must also consider that dirty or wet MOPP suits offer greatly degraded protection.

The commander must determine and disseminate what actions or events will automatically trigger an increase in MOPP status. Will the unit increase MOPP whenever engaged by indirect fire or only after confirmed first use of chemicals by the enemy? What circumstances will cause the commander to lower the MOPP status?

Decontamination

Decontamination (decon) procedures must be thoroughly planned in advance. Decon planning considerations include those discussed below.

This list of considerations is by no means complete. Chemical defense is an extremely complex area, and specific defensive measures are beyond the scope of this book. For detailed information concerning chemical defensive measures, refer to FM 3-100 and other NBC-related publications (FM 3 series).

Facilities. For cannon battalions supporting maneuver brigades, decon support is provided by the brigade chemical platoon. General support units receive decon support from either division or corps chemical units. Exactly what unit will provide decon support and the location of decon sites must be determined before decontamination is required.

Routes. Routes contaminated vehicles can travel without further spreading contamination must be identified.

Casualty Evacuation. Where and how contaminated casualties will be evacuated must be determined.

Avoidance of Contaminated Areas. Persistent chemicals are more likely to be used to deny terrain than to directly attack units. Care should be taken to keep uncontaminated units from entering known contaminated areas. The battalion chemical officer must –

- Ž Carefully monitor NBC-5 reports sent by the supported maneuver unit and/or the force FA headquarters.

- Ž Plot the information.

- Ž Ensure that the S3 is aware of contaminated areas when routing units.

Information concerning contaminated areas must be disseminated to the batteries. If an element of the battalion encounters a contaminated area this information should be immediately sent to higher headquarters.

Chemical Reconnaissance

In a high chemical threat environment, reconnaissance is essential. Chemical reconnaissance includes both activities performed as a part of the larger overall mission (such as M8 chemical agent alarms and M256 chemical detection kits deployed with advance parties) and dedicated

reconnaissance performed by specifically designated and trained chemical survey teams.

OFFENSIVE CHEMICAL EMPLOYMENT

US policy renounces the first use of lethal or incapacitating chemical agents. However, it retains the right to retaliate if deterrence fails to prevent the enemy's first use of chemicals. As is the case with nuclear weapons, the President of the United States must approve the initial use of chemical weapons. This approval procedure is known as chemical release.

At the cannon battalion level the unit must receive three things before firing a chemical mission:

Ž Chemical projectiles.

Ž A release message.

Ž An authenticated chemical fire mission.

Chemical Projectiles

Before chemical release, chemical rounds are stored at a corps chemical ammunition supply point (CASP) under the control of ordnance personnel. Once release is received and the commander directs that missions be fired the chemical rounds are either pushed forward to a division ATP or are delivered by air directly to the unit scheduled to fire them. Binary chemical rounds are assembled by ordnance personnel before delivery, and the battalion receives complete rounds (projectile, propellant, and fuze). Upon receipt of the rounds by battalion personnel either at the ATP or at a landing site selected by the unit, personnel in MOPP 4 must inspect the rounds for damage or leakage. Rounds found to be damaged or leaking at the ATP should be refused and replaced. If air-delivered rounds are found to be unserviceable, they should be placed in a dud pit at least 450 meters downwind of the unit, and ATP or explosive ordnance disposal (EOD) personnel should be notified. Specific procedures for handling damaged or leaking chemical rounds are in FM 6-50, Appendix P.

Once the chemical rounds have reached the firing unit, they should be inspected again by personnel in MOPP 4. If possible, they should be left on the transport vehicle to minimize handling. The vehicle should be parked on the

furthest downwind side of the battery area or ammunition storage area. An M8A1 chemical agent alarm should be placed in the immediate vicinity of the storage site. Rounds not fired immediately should be periodically inspected for leakage or damage.

Chemical cannon projectiles currently in the US inventory include the following:

Ž 105-mm: M360 (GB) (unitary).

Ž 155-mm: M121A1 (GB or VX) (unitary).
M687 (GB) (binary).

Ž 203-mm: M426 (GB or VX) (unitary).

Release Message

The battalion may receive release in a number of ways. A message may be received via the emergency action system. However, unlike in nuclear release, an authenticated emergency action message (EAM) is not required at the battalion or battery level. A properly authenticated voice or digital message from the div arty or corps arty commander or face-to-face authorization by the div arty or higher level artillery or maneuver commander is enough for the battalion or battery to action a chemical mission. Refer to local SOPs and directives to determine authorized chemical weapons release procedures.

Chemical Fire Mission

A chemical mission is not substantially different from any other fire mission. However, the initiating agency (observer) normally is the div arty or a higher level unit. Authorization for chemical employment seldom if ever, is delegated below the division level. At the battalion level the primary concern is making certain that the unit selected to fire a mission is given the appropriate chemical rounds.

At the battery level a chemical mission is actioned like any other mission except that personnel who actually handle the rounds should wear protective clothing. Current firing procedures do not require any increase in MOPP level for howitzer section personnel firing binary or undamaged unitary chemical projectiles. However, this does not keep the battery commander or platoon leader from raising the MOPP level if he deems it prudent to do so.

APPENDIX E

FIELD ARTILLERY SUPPORT PLAN

The written FA support plan is an appendix to the fire support annex to a maneuver OPORD. The FA support plan provides for coordinated action to carry out the decisions of the FA unit commander in support of the maneuver operation.

FIELD ARTILLERY SUPPORT PLAN FORMAT

The FA support plan follows the format of the five-paragraph OPORD and refers to both the basic maneuver OPORD and the fire support annex. However, not all of the commanders and staffs of the units supporting the cannon battalion preparing the FA support plan will receive copies of the basic maneuver OPORD or the fire support plan. Therefore, the FA support plan may have to repeat critical items of information from these

documents to ensure that all commanders and their staffs receive the information. The FA support plan should not include information already available in unit SOPs. The purpose of the written plan is to inform subordinate and supporting units of tasks and requirements that are peculiar to a particular operation.

Starting on the next page is an outline of the format for an FA support plan. Explanations are given for the various paragraphs and subparagraph in the relevant portions of the order.

ACRONYMS AND ABBREVIATIONS USED IN THE EXAMPLE FIELD ARTILLERY SUPPORT PLAN

| | | | |
|---------------|--|---------------|--|
| AAG | = army artillery group (Threat) | HVT | = high-value target |
| ACP | = air control point | IAW | = in accordance with |
| ADA | = air defense artillery | ICE | = individual chemical equipment |
| AIRCOR | = air corridor | ID (M) | = infantry division (mechanized) |
| alt | = altitude | LOC | = lines of communication |
| app | = appendix | man | = maneuver (attack guidance matrix) |
| etch | = attached | max | = maximum |
| avn | = aviation | mod | = modification |
| az | = azimuth | MRL | = multiple rocket launcher |
| C3 | = command, control, and communications | msn | = mission |
| CAA | = combined arms army (Threat) | NLT | = not later than |
| cat | = category | PA | = position area |
| CCCP | = chemical casualty collection point | PL | = phase line |
| CCP | = casualty collection point | RAP | = rocket-assisted projectile |
| cGy | = centigray | REC | = radio-electronic combat |
| coord | = coordinate | RSTA | = reconnaissance, surveillance, and target acquisition |
| COP | = command observation post | SIMO | = simultaneous observation |
| Cphd | = Copperhead | SITREP | = situation report |
| CRP | = combat reconnaissance patrol | spt | = Support |
| CSB | = common sensor boundary | Survl | = surveillance |
| DNE | = do not engage | TBP | = to be published |
| EA | = engagement area | TD | = tank division (Threat) |
| FSCM | = fire support coordinating measure | TDA | = target damage assessment |
| GTD | = guards tank division (Threat) | TLE | = target location error |
| HA | = hide area | TVA | = target value analysis |
| HEMTT | = heavy expanded-mobility tactical truck | w | = with |

FIELD ARTILLERY SUPPORT PLAN FORMAT

(CLASSIFICATION)

The classification is placed at the top and bottom of each page of the document.

Copy of copies
Unit preparing the order
Geographic location
Date-time group (DTG) of order

APPENDIX (FA SUPPORT PLAN) TO ANNEX (FIRE SUPPORT) TO OPORD Supported Maneuver Unit

Reference: Maps to be used during the operation.

Time Zone Used Throughout Order TIME ZONE.

1. SITUATION.

Paragraph 1 includes items of information affecting FA operations that mayor may not be inducted in paragraph 1 or in the Fires paragraph of the OPORD or in the fire support annex. It gives an overview of the general situation so subordinate commanders can understand the environment in which they will be operating. This paragraph is used exclusively to provide information. If all organic, attached, or supporting commanders do not receive complete copies of the maneuver OPORD and the fire support plan, then the FA support plan must repeat those items critical to the execution of their missions.

a. Enemy Forces. Subparagraph a provides enemy information vital to the FA unit. This includes enemy indirect fire capabilities which may influence fire support activities, the ground threat, the air threat, and any other enemy information of particular relevance to the FA units. Reference may be made to an intelligence annex, an overlay, a periodic intelligence report, or an intelligence summary (INTSUM).

b. Friendly Forces. Subparagraph b shows the missions of higher headquarters and/or of supported maneuver elements. Missions of adjacent, supporting, and reinforcing units may also be outlined here. Information should be limited to that which subordinate commanders need to know to accomplish their missions. The supported maneuver commander's intent for fire support is also included in this subparagraph as well as the force FA commander's intent during GS and GSR missions.

c. Attachments and Detachments. Subparagraph c should list units attached to and detached from the FA unit, including the terms of attachment and effective DTGs if appropriate.

2. MISSION.

Paragraph 2 is a clear, concise statement of the task the FA unit is to accomplish. As a minimum, it should answer the questions who, what, when, where, and why. It includes essential tasks determined by the commander as a result of his mission analysis.

3. EXECUTION.

Paragraph 3 contains the how-to information needed for mission accomplishment.

a. Concept of Operation. Subparagraph 3a is a statement of the commander's visualization of the conduct of the operation through to the desired end state. The concept clarifies the purpose of the operation and is stated in enough detail to ensure appropriate action by subordinates in the absence of additional specific instructions. The FSCoord or FA battalion commander's intent is included in this subparagraph.

(CLASSIFICATION)

FIELD ARTILLERY SUPPORT PLAN FORMAT (Continued)

(CLASSIFICATION)

b. Organization for Combat. Subparagraph 3b gives a clear statement of the organization and tactical missions of the subordinate elements of the FA headquarters. Anticipated on-order changes to organization or tactical missions are included in this subparagraph.

c. ***.

d. ***.

e. ***.

Subsequent subparagraphs in paragraph 3 build on the concept of the operation. They should provide the artillery organization for combat, priority of fires, priority of special munitions, positioning and movement instructions, and specific tasks to be accomplished by specific subelements.

f. Coordinating Instructions. The last subparagraph in paragraph 3 includes instructions and details of coordination applicable to two or more subelements of the FA unit. This paragraph should include instructions concerning the following:

- Ž Target acquisition (includes counterfire reference grid and instruction to or about specific observers).
- Ž Survey (includes priorities for survey, accuracies required [if other than SOP], timing, position requirements, and future plans).
- Ž High-payoff target list.
- Ž Attack guidance matrix.
- Ž NBC defense (includes MOPP, operation exposure guidance, and decon instructions).
- Ž Mets (includes source, type, and times of met messages).
- Ž Fire plan (includes target list and schedules of fires).
- Ž Fire support coordinating measures.
- Ž PIR and/or IR.
- Ž Intelligence acquisition tasks.
- Ž Nuclear/chemical (includes arrangements and/or controls for initiation, authority, prescribed nuclear load [PNL], and prescribed chemical load [PCL]).
- Ž Ammo restrictions includes expenditure restrictions, approval requirements, and risk limitations).

Many issues included in coordinating instructions may also be addressed in tabs to the FA support plan. If a separate tab is used, include only items of general interest in the coordinating instructions paragraph. Details of interest only to a particular element are placed in the tab. If a tab is prepared, reference it (See Tab .) in the body of the support plan.

4. SERVICE SUPPORT.

Paragraph 4 includes specific service support instructions and arrangements supporting the operation. The commander's direction regarding CSS will be here. Supply, maintenance, medical, and personnel information are included in this paragraph. As a minimum, the CSR and the CSS locations (combat trains, field trains, casualty collection points, LRP, ATP, ASP, and special ammunition supply point [SASP] and/or CASP if applicable) should be given.

(CLASSIFICATION)

FIELD ARTILLERY SUPPORT PLAN FORMAT (Continued)

(CLASSIFICATION)

5. COMMAND AND SIGNAL

Paragraph 5 includes two subparagraphs.

a. Command. The first subparagraph should list the locations of the unit TOC and higher, supporting, and supported unit TOCs. The commander's planned location during the operation can be in this paragraph. Designation of an alternate TOC is written here.

b. Signal. The second subparagraph contains the index of the effective SOI. Instructions on the use of radio and instructions for wire and retrans elements are written here.

Acknowledge:

ISSUING COMMANDER'S NAME
RANK

OFFICIAL:

/Signed/

S3's NAME

S3

TABS: A-

B-

C-

D-

E-

Tabs should be prepared for portions of the plan that are better explained in a different format (for example, as an overlay or a matrix), that are too extensive to be in the plan, that are expected to change or lengthen, or that are submitted too late to be included in the FA support plan. Common tabs include the following:

- Ž FA support matrix.
- Ž Target lists.
- Ž Fire plan (schedules).
- Ž Survey tab (RSO's plan).
- Ž Target acquisition tab.
- Ž TACFIRE tab.
- Ž FA positioning and/or movement overlay.

(CLASSIFICATION)

EXAMPLE FIELD ARTILLERY SUPPORT PLAN

An example of a battalion FA support plan (an appendix to the fire support annex) is shown below.

EXAMPLE FIELD ARTILLERY SUPPORT PLAN

SECRET FOR TRAINING
(OTHERWISE UNCLASSIFIED)

Copy ____ of 20 copies
1st Bn, 51st FA
Kharasan, Tawaq District
061200 Nov 89

APPENDIX 3 (FA SUPPORT PLAN) TO ANNEX E (FIRE SUPPORT) TO OPORD
90-2-- 2d Bde, 52d Inf Div (Mech)

Reference: Map, series 1501; TAWAQ; sheets LJ 11-1, 11-2,
11-3, 11-5, and 11-6; edition 1982, 1:250,000.

Time Zone Used Throughout Order: LOCAL.

1. SITUATION.

a. Enemy Forces.

(1) 16th CAA continues to defend. The bulk of the 19th CAA remains in assembly areas vicinity DARAN Lake. Recon elements of the 19th CAA are reported moving east into the 10th (US) Corps covering force area. 19th CAA is capable of attacking with all supporting artillery and frontal air along three divisional avenues of approach. Expect the 19th CAA to attack through the 16th CAA in 12 to 36 hours. The main attack in the 52d ID (M) sector is expected in the MAHALLAT Valley (19th TD and 2d GTD) approach. Initially, the primary threat to FA units is fixed-wing air, with up to 12 FROGFOOT sorties per day in the division sector. Before the main enemy ground effort, units behind the FLOT must be alert for dismounted forces and light armor air-dropped or helicopter-inserted in company or battalion strength. The enemy second-echelon division will push its artillery forward to support the main effort. Expect 12 to 15 122-mm and 152-mm battalions and 2 to 3 122-mm MRL battalions to be employed in the division sector as 3 or 4 RAGs and a DAG. In addition, elements of the 19th CAA AAG may be positioned and employed in the division sector.

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EXAMPLE FIELD ARTILLERY SUPPORT PLAN (Continued)

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(2) Intelligence estimate: See Intelligence Annex to OPORD 90-2, 2d Bde, 52d ID (M).

b. Friendly Forces.

(1) 2d Bde, 52d ID (M) moves to and occupies defensive positions from LJ234282 to LJ145185 NLT 061200 Nov 89 and defends in sector with two task forces abreast to destroy attacking enemy forces forward of PL VEGAS. TF 1-17 Armor and TF 1-81 Mech will defend in the north and south, respectively. TF 2-81 Mech will be the brigade reserve initially, then will counterattack along Axis LEE if enemy forces reach PL VEGAS.

(2) Brigade commander's intent: The brigade will conduct a mobile defense in sector. Fires and obstacles will be used to canalize the enemy into the southern part of the brigade sector (TF 1-81). TF 1-81 will conduct a fighting withdrawal to prepared positions east of PL VEGAS, while TF 1-17 in the north holds its position in BP 3 and prepares to meet the second-echelon regiment. TF 2-81, the brigade reserve, counterattacks from positions in the north of the brigade sector into the flank of the first-echelon regiment. Artillery fires will be used to slow and confuse the enemy and attack his command and control as he comes into range at PL LANCE by concentrating Copperhead and DPICM fires in TAIs 1 and 2. Copperhead fires will be controlled by COLTs and OH-58Ds. Three OH-58Ds will be DS to the brigade. One OH-58D will be operational and in position to observe the TAIs continuously. I am concerned about the ability of the enemy's fire support system to limit our ability to maneuver. I want a proactive counterfire effort, using the Firefinder radar and any other available assets to locate the enemy's indirect fire systems. Plan a counterprep based on the best available intelligence to be executed on my order. Once the enemy first echelon exits TAIs 1 and 2, priority of the fire support effort shifts to EA FISH, where I want to stop the enemy and destroy his first-echelon battalions with direct and indirect fire. As TF 1-81 breaks contact and begins to move to its alternate positions, a smoke program will be fired to assist in disengagement and screen their movement. When I order the counterattack, priority of fire will shift to TF 2-81. Artillery fires will be employed ahead of the counterattack to fix the enemy and hinder his ability to shift his force to meet the attack into his flank.

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EXAMPLE FIELD ARTILLERY SUPPORT PLAN (Continued)

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(3) 1-78 FA (203-mm, SP) (GS) is positioned in the brigade sector. 52d Div Arty will coordinate with 2d Bde FSE to clear position areas and movement routes.

c. Attachments. Sec 2 (AN/TPQ-36), Btry A (TA), 23d FA remains attached to 1-51 FA for positioning, employment, and support.

2. MISSION.

1-51 FA provides conventional artillery fires in direct support of 2d Bde, 52d ID (M) defense in sector NLT 061800 Nov 89.

3. EXECUTION.

a. Concept of Operation. Field artillery fires will engage the enemy deep as he enters the brigade sector. COLT 2 will be located vicinity LJ1723; it will be able to observe both TAIs 1 and 2 and will be able to initiate Copperhead fires in TAI 2. An OH-58D will be operating forward vicinity LJ1526 and will be able to initiate Copperhead and other fires in both TAI 1 and TAI 2 with priority of effort in TAI 1. COLT 2 will use 1-51 FA FD 3 as a quick-fire channel to C/2-636, which will provide Copperhead support. The OH-58D will call all missions directly to 1-51 FA FDC on the battalion ops/F net. Artillery will engage the first echelon of the lead division in both TAI 1 and TAI 2 to attrit the enemy and disrupt his command and control with Copperhead and conventional fires. A counterprep will be fired on order of the brigade commander. As the lead echelon exits TAI 2, the two planned FASCAM targets (AB0031, AB0032) will be fired in that TAI to slow and disrupt the second echelon. CAS, supported by SEAD, will then attack the second echelon in TAI 2 under control of the AFSO (brigade backup control). Artillery fires continue to attrit the first echelon. The main enemy attack is expected to be in 1-81 sector. Once Group A30B has been executed on the first echelon, the FASCAM (AB0017) in TF 1-81 sector will be emplaced. Artillery fires will then concentrate on the first echelon as it attempts to breach the TF obstacles. When the first echelon enters EA CAT, artillery fires will concentrate

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EXAMPLE FIELD ARTILLERY SUPPORT PLAN (Continued)

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on the second echelon and provide smoke or illumination to silhouette the first echelon for the maneuver forces. Three batteries will be capable of firing throughout the battle, and three batteries must be capable of ranging beyond PL SPEAR to support the deep battle initially. Priority targets will initially be the targets in Group A2B, then will shift to Group A30B, and then to Target AB0015 and Group A31B. Priority of fires will then shift to the FPFs of both task forces. Priority for Copperhead fires will be C2 vehicles throughout the battle and then to engineer vehicles during breaching operations. Artillery must be prepared to support the counterattack by TF 2-81 along Axis LEE to hit the flank of the lead echelon with both DPICM and Copperhead fires as well as smoke. Be prepared to move batteries forward by echelon on order of the FSCoord.

b. Organization for Combat.

1-51 FA (155, SP): DS 2d Bde
Sec 2 (AN/TPQ-36), Btry A (TA), 23 FA: Attached
1-51 FA
Sec 1, 2, 3 (OH-58D), Div Arty Spt Plt, Cmd Avn Co,
52d Cbt Avn Bde: DS 1-51 FA
2-636 FA (155, SP): R 1-51 FA

c. Priority of Fires. Priority of fires to TF 1-81, on order to TF 2-81 when committed.

d. Positioning and Movement. Initial firing battery positions are shown below. Subsequent movement and positions will be IAW Tab A. See the movement overlay for PA locations.

- (1) A/1-51 FA: PA 1 (az 5000)
- (2) B/1-51 FA: PA 15 (az 5000)
- (3) C/1-51 FA: PA 9 (az 4900)
- (4) A/2-636 FA: PA 5 (az 5100)
- (5) B/2-636 FA: PA 3 (az 5000)
- (6) C/2-636 FA: PA 2 (az 4900)

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EXAMPLE FIELD ARTILLERY SUPPORT PLAN (Continued)

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e. Coordinating Instructions.

(1) Target Acquisition.

(a) Counterfire Reference Grid. Lower left corner is AA at grid LJ000900.

(b) See Tab C.

(2) Survey.

(a) Priority of survey is, in order, to firing batteries (A, C, B, 1-51 FA; A, B, C, 2-636 FA), Q-36 radar, COLTs, OH-58D control points, and mortars.

(b) Survey sections will establish starting control at the following survey control points:

| SCP NAME | EASTING | NORTHING | ALTITUDE |
|----------|-----------|------------|----------|
| MARY | 525422.97 | 3919175.39 | 935.2 |
| HELEN | 531642.91 | 3922964.29 | 1054.5 |

(c) Control points will be marked per SOP. OH-58D control points will be established on prominent terrain and marked with a target cloth panel 6 feet by 6 feet with a 4-foot-diameter circle spray-painted in black and an identifying number painted in numerals 2 1/2 feet tall in the center of the circle.

(d) See Tab D (Survey).

(3) High-Payoff Target List.

| PRIORITY | CATEGORY | DESCRIPTION |
|----------|----------|---|
| 1 | 6 (RSTA) | Recon patrol, division recon company |
| 2 | 3 MAN) | Armor heavy (company size or larger) |
| 3 | 7 REC) | Radar intercept and DF site (POLE DISH) |

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EXAMPLE FIELD ARTILLERY SUPPORT PLAN (Continued)

SECRET FOR TRAINING
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| PRIORITY | CATEGORY | DESCRIPTION |
|----------|----------|-----------------------------|
| 4 | 7 (REC) | Radio intercept and DF site |
| 5 | 2 (FS) | RAG COP |
| 6 | 2 (FS) | Battalion COP |
| 7 | 2 (FS) | Sound ranging site |

(4) Attack Guidance Matrix.

| | CAT | HP | WHEN | HOW | RESTRICTIONS |
|---------|-----|----|------|-------|------------------|
| (C3) | 1 | | A | N/EW | Coord w EW |
| (FS) | 2 | | A | N | DNE MRL > 10 min |
| (MAN) | 3 | | A | S | |
| (ADA) | 4 | | P | S/ALO | |
| (ENG) | 5 | | P | N | |
| (RSTA) | 6 | | I | N | |
| (REC) | 7 | | A | D/EW | |
| (N/CH) | 8 | | A | D | TLE < 200 m/TDA |
| (POL) | 9 | | A | N | |
| (AMMO) | 10 | | A | N | |
| (MAINT) | 11 | | P | N | Not HVT/HPT |
| (LIFT) | 12 | | P | N | Not HVT/HPT |
| (LOC) | 13 | | P | N | Not HVT/HPT |

Legend:

CAT = Target category from TVA.

HP = Designated high-payoff targets. Target numbers from TVA sheets or target description.

WHEN = When the target should be attacked.

I: Immediately. Interrupt other nonimmediate attacks.

A: As acquired. Attack as assets are available.

P: Plan. Schedule or file for later attack.

HOW = How target is to be attacked.

S: Suppress

N: Neutralize. (10% effects)

D: Destroy. (30% effects)

EW: Offensive EW.

DNE: Do not engage.

ALO: Coordinate attack with ALO.

TLE: Target location error.

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EXAMPLE FIELD ARTILLERY SUPPORT PLAN (Continued)

SECRET FOR TRAINING
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(5) NBC Defense.

(a) MOPP 2 when 2S1s (122-mm, SP) reported at PL LANCE .

(b) Troop safety criteria: Negligible risk to warned, exposed personnel.

(c) Operational exposure guidance: Do not exceed 50 cGy. Begin continuous monitoring after first use of nuclear weapons.

(d) Decontamination. Service battery decontamination team will prepare unsupported decon site at grid LJ445094. Two battery sets of ICE packs will be pre-positioned at this point to facilitate MOPP gear exchange. Firing battery decon teams will report to this site on order. Contaminated vehicles will travel Route GREEN (LJ294164 to LJ327144 to LJ373125 to LJ408114 to LJ429094 to LJ445094). Contaminated casualties will be evacuated to collection point at grid LJ438090.

(6) Meteorology. Computer met sent by 52d Inf Div Arty every 2 hours on battalion cmd net (voice) and ops/F net (digital).

(7) Fire Plan. See Tab B.

(8) Fire Support Coordinating Measures. See Tab B.

(9) Priority Intelligence Requirements.

(a) When will the enemy attack?

What avenues will be used?

What is the 19th TD's state of readiness?

What are the 19th TD's objectives?

(b) Will the 2d GTD reinforce the 19th TD? If so, will reinforcements be committed to the MAHALLAT Valley approach? When will reinforcements be committed?

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EXAMPLE FIELD ARTILLERY SUPPORT PLAN (Continued)

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(c) Will the enemy lead his attack with forward detachments?

(d) What are the strength, disposition, and composition of the enemy's supporting artillery? Where are the DAG and RAGs? Where are the enemy's MRLs?

(e) When will enemy artillery reach PL LANCE?

(f) Where are enemy OPs located?

(g) What TA assets are available to the enemy, and where are they located?

(10) Information Requirements.

(a) Will the enemy use NBC weapons? If so, where and to what extent? Where is persistent agent placed?

(b) What are location and activity of enemy engineer units, especially mobile obstacle detachments?

(c) Where are possible LZs and DZs? Will the enemy conduct airmobile operations?

(11) Intelligence Acquisition Tasks. Batteries will report as obtained.

(a) All chemical activity and locations of enemy chemical-capable units, especially smoke operations vicinity LJ2324, LJ1820, and LJ1915.

(b) All indirect fires. Include SHELREPs and friendly battle damage assessment.

(c) Lanes cleared through enemy controlled or emplaced obstacles.

(d) Enemy patrols. Number, size, composition, and time observed.

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EXAMPLE FIELD ARTILLERY SUPPORT PLAN (Continued)

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(e) All direct fire engagements, including, enemy battle damage assessment when available.

(f) Enemy rotary-wing activity.

(12) Ammo Restrictions. Batteries will expend no more than 70% of DPICM and 50% of HC and/or WP CSR supporting the defense. Short-duration FASCAM must be approved by the brigade commander. Illumination and HC smoke will be approved by the TF commanders.

(13) Nuclear Fire Support. SASP is located at grid LJ631115. Nuclear release is not anticipated.

(14) Chemical Fire Support. Chemical ASP is located at grid LJ587148. Chemical release is not anticipated.

(15) Plan rehearsal will be conducted at the 1-51 FA CP at 061900 Nov 89. 1-51 FA XO, S3, S2, FDO, BSO, RSO, firing battery commanders, HHB and svc btry commanders, AFSO representative, 2-636 S3 and LO, and 2d Bde FSO and ALO will participate in person. TF FSOs, COLTs, and battery FDOs will participate via wire or FM radio.

4. SERVICE SUPPORT.

a. Personnel. The battalion is currently at 82% strength. 83d Medical Group reports that nine soldiers will be returned to 1-51 FA within the next 36 hours.

b. Medical. 1-51 FA BAS is located in the combat trains (LJ363158). 1-51 will establish a chemical casualty collection point (CCCP) for 1-51 FA and 2-636 FA. Casualty collection points are as follows:

| | | | |
|-------|----|------|----------|
| 1-51 | FA | CCP | LJ304162 |
| 1-51 | FA | CCCP | LJ438090 |
| 2-636 | FA | CCP | LJ321155 |

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EXAMPLE FIELD ARTILLERY SUPPORT PLAN (Continued)

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c. Locations.

1-51 FA:
 Combat trains LJ363158
 Field trains LJ473097
 LRP LJ306159

2-636 FA: TBP

d. CSR effective upon implementation of OPORD 90-2.

| | HE | APICM | DPICM | WP | HC | ILLUM | RAP | CPHD | ADAM | RAAMS |
|--------|----|-------|-------|----|----|-------|-----|------|------|-------|
| 155-mm | 37 | 3 | 90 | 6 | 6 | 3 | 5 | 5 | 2 | 7 |

e. Resupply Criteria. Batteries will request resupply when CSR drops to these levels.

| | | | |
|----------|-----|---------|-----|
| HE | 50% | RAAMS | 10% |
| DPICM | 25% | ADAM | 10% |
| APICM | 50% | M3A1 | 50% |
| RAP | 25% | M4A1 | 30% |
| Illum | 50% | M119A1 | 20% |
| WP | 25% | Viper | 50% |
| Smk (HC) | 25% | .50 cal | 30% |
| 5.56-mm | 50% | 7.62-mm | 50% |

f. ASP is located at grid LJ562235. ATP will remain operational at grid LJ398128 until 062000 Nov 89, at which time it will begin to displace.

g. Recovery. One M578 each will be attached to Batteries A and C NLT 061500 Nov 89. One HEMTT wrecker will be available on call in the combat trains.

5. COMMAND AND SIGNAL.

a. Command.

- (1) 2d Bde TOC located grid LJ336147.
- (2) Div Arty TOC located grid LJ588012.
- (3) 1-51 FA TOC located grid LJ366163.
- (4) 2-636 FA TOC located grid LJ412174.

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EXAMPLE FIELD ARTILLERY SUPPORT PLAN (Continued)

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(5) 2-636 FA TOC will assume DS TOC responsibilities on order.

b. Signal.

(1) SOI KTV 1062, Edition BB in effect.

(2) Retrans located at grid LJ363177. Priority of retrans will be to bde fire support net. Local station will switch to RT frequency; remote stations will remain on bde fire support net.

(3) Wire. Priority of work, in order, to the following external circuits.

1-51 FA:

- (a) 1-51 FA TOC to 2d Bde TOC.
- (b) 1-51 FA TOC to Btry B, 1-51 FA.
- (c) 1-51 FA TOC to Btry A, 1-51 FA.
- (d) 1-51 FA TOC to Btry C, 1-51 FA.

2-636 FA:

- (a) 2-636 FA TOC to 1-51 FA TOC.
- (b) Per unit SOP.

Wire teams will start to recover wire when the enemy's regimental CRP reaches PL LANCE.

Acknowledge:

BLACK
LTC

OFFICIAL:

/s/

HENDERSON
S3

TABS: A - FA Support Matrix
B - Fire Plan
C - Target Acquisition
D - Survey Plan
E - TACFIRE
F - Positioning Overlay

**SECRET FOR TRAINING
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EXAMPLE FIELD ARTILLERY SUPPORT MATRIX

The FA support matrix is a concise planning and execution tool that graphically depicts the FA unit's essential tasks in support of maneuver operations. Like paragraph 3 of the written FA support plan, the matrix should answer the questions who, what, when, and where. It assigns tasks to the subordinate elements of the FA battalion and ties accomplishment of those tasks to the requirements of the maneuver plan and the fire support plan.

The matrix is setup with the operational elements (such as firing batteries survey sections, radar sections, and CPs) along the left side and with significant maneuver phases and/or artillery tasks along the top (for example, phase lines, events, times, series, groups, or programs). Maneuver phases should correspond to phases established on the maneuver execution matrix.

At the battalion level the information to go in each box may include the following:

- Ž The acronym PTMO for prepare to march-order.
- Ž Move to position area, followed by azimuth of fire (AOF) (for example, move to PA 11, AOF 5400).
- Ž Priority targets to be fire by the unit. These will appear as PRI TGT, followed by the target number.
- Ž Final protective fires to be fired by the unit. They will appear as FPF.
- Ž Participation in preparations or counterpreparations. This will appear as PREP or CPREP.
- Ž Participation in a series or group. This will appear as SERIES or GROUP, followed by the name or number, respectively.
- Ž FA priority of fires (POF). This will appear with the unit designation (that is the unit receiving priority of fires), followed by the acronym FA POF (for example 2-77 Inf FA POF).
- Ž An airspace coordination area if one is to be put into effect during the specific time frame. The acronym ACA followed by the code word designated for that ACA and the time the planned TACAIR or attack helicopters are due in the area, is shown (for example, ACA TOP, TOT 1530Z).
- Ž If a mutual support unit operation is to be conducted during a specific time frame, the acronym MSU, followed by the unit designation (for example, MSU, 2-631 FA).
- Ž Any other task that applies to the specific time frame.

The example below shows a portion of an FA support matrix. It also shows a way to label the FA support matrix for easy reference. Columns are identified by letter, and lines are identified by number. For example, block C-5 in the following example reads "PA 12." This matrix reference system allows the S3 to easily disseminate the original or updated matrix data by radio or wire to all appropriate agencies.

EXAMPLE FIELD ARTILLERY SUPPORT MATRIX

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TAB A (FA SUPPORT MATRIX) TO APPENDIX 3 (FA SUPPORT PLAN) TO ANNEX E (FIRE SUPPORT) TO OPORD 90-2--2d Bale, 52d Inf Div (Mech)

Reference: Map, Series 1501; TAWAQ, sheets LJ 11-1, 11-2, 11-3, 11-5, and 11-6; edition 1982; 1:250,000.

Time Zone Used Throughout Order: LOCAL.

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EXAMPLE FIELD ARTILLERY SUPPORT MATRIX (Continued)

SECRET FOR TRAINING
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| UNIT | FORWARD OF PL LANCE | PL LANCE- PL VEGAS | COUNTERATTACK | |
|--------------------|--|--|--|----|
| 1-51 CP | LJ 366163 | | | 14 |
| A/1-51 | OCCUPY PA 7 AOF 5200 TF 1-81 FA POF | RECON PA 1 AB3002 (A30B) AB3005 (A31B) PRI TGT AB0015 CPHD MSN TF 1-81 FA POF | OCCUPY PA 1 AOF 5000 Q/O TF 2-81 FA POF | 13 |
| B/1-51 | OCCUPY PA 4 AOF 5000 TF 1-81 FA POF | RECON PA 10 AB3003 (A30B) AB3006 (A31B) AB0017 (FASCAM) FPF C/1-81 TF 1-81 FA POF | OCCUPY PA 10 AOF 5200 Q/O TF 2-81 FA POF | 12 |
| C/1-51 | OCCUPY PA 6 AOF 5000 TF 1-81 FA POF | RECON PA 14 AB3001 (A30B) AB3007 (A31B) AB0018 (FASCAM) FPF A/1-17 TF 1-81 FA POF | OCCUPY PA 14 AOF 5300 Q/O TF 2-81 FA POF | 11 |
| 2-636 CP | LJ 412174 MSU O/O | | | 10 |
| A/2-636 | RECON PA 19 AB0007 (A2B) AB0004 (A1B) AB0031 (FASCAM) TF 1-81 FA POF | OCCUPY PA 19 AOF 4600 TF 1-81 FA POF | RECON PA 5 Q/O TF 2-81 FA POF | 9 |
| B/2-636 | RECON PA 17 AB0008 (A2B) AB0003 (A1B) AB0032 (FASCAM) TF 1-81 FA POF | OCCUPY PA 17 AOF 5000 TF 1-81 FA FPF | RECON PA 15 Q/O TF 2-81 FA POF | 8 |
| C/2-636 | RECON PA 18 AB0009 (A2B) AB0005 (A1B) CPHD MSN TF 1-81 FA POF | OCCUPY PA 18 AOF 5000 TF 1-81 FA FPF | RECON PA 9 Q/O TF 2-81 FA POF | 7 |
| Q-36 | RECON PA 20 | | OCCUPY PA 21 AZ 4400 | 6 |
| PADS #1 (1-51) | PA's 6,20,4,17,18 | PA 12 | PA 9 | 5 |
| PADS #2 (1-51) | PA's 1,5,7,19 | | PA's 5,15 | 4 |
| PADS #1 (2-636) | RADAR, COLTs | | PA's 14, 21 | 3 |
| PADS #2 (2-636) | PA's 2,3,15 | | PA's 1,10 | 2 |
| FSCMs | CFL PL MACE ACA JOE (O/O) | CFL O/O PL LANCE ACA BOB (O/O) | CFL O/O PL MACE | 1 |
| A | B | C | D | |

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EXAMPLE FIRE PLAN

An example of a fire plan (a tab to the fire support plan) is shown below.

EXAMPLE FIRE PLAN

**SECRET FOR TRAINING
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TAB B (FIRE PLAN) TO APPENDIX 3 (FA SUPPORT PLAN) TO ANNEX E (FIRE SUPPORT) TO OFORD 90-2--2d Bde, 52d Inf Div (Mech).

Reference: Map, series 1501; TAWAQ, sheets LJ 11-1, 11-2, 11-3, 11-5, and 11-6; edition 1982; 1:250,000.

Time Zone Used Throughout Order: LOCAL.

1. TARGET LIST.

a. Brigade cutoff time for target list submissions or changes is 070100 Nov 89.

b. Shell-fuze standard is DPICM-M577 unless otherwise indicated.

| Line | (a) Target | (b) Description | (c) Location/Alt | (d) Remarks |
|------|---------------|---------------------|---------------------|----------------|
| 1 | AB0001 | Wadi complex | LJ039200/980 | |
| 2 | AB0002 | Road intersection | LJ061203/960 | |
| 3 | AB0003 | Road intersection | LJ097195/976 | A1B |
| 4 | AB0004 | Abandoned buildings | LJ101200/1000 | A1B |
| 5 | AB0005 | Potential OP | LJ099209/1100 | A1B |
| 6 | AB0006 | Road intersection | LJ115241/1070 | |
| 7 | AB0007 | Road intersection | LJ151235/1070 | A2B |
| 8 | AB0008 | Road intersection | LJ144223/1025 | A2B |
| 9 | AB0009 | Road intersection | LJ139218/1030 | A2B |
| 10 | AB0010 | Choke point | LJ129302/1180 | |
| 11 | AB0011 | Wadi complex | LJ175285/1030 | A3B |
| 12 | AB0012 | Road intersection | LJ183275/1030 | A3B |
| 13 | AB0013 | Wadi complex | LJ189283/990 | A3B |
| 14 | AB0014 | Road intersection | LJ223241/950 | |
| 15 | AB0015 | Road intersection | LJ197197/931 | |
| 16 | AB0016 | Potential OP | LJ201219/985 | |
| 17 | AB0017 | FASCAM | LJ224193/950 | 400 x 400 |
| 18 | AB0018 | FASCAM | LJ226214/930 | 400 x 400 |
| 19 | AB0019 | FASCAM | LJ239237/970 | 400 x 400 |

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EXAMPLE FIRE PLAN (Continued)

SECRET FOR TRAINING
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| Line | (a) Target | (b) Description | (c) Location/Alt | (d) Remarks |
|------|---------------|--------------------|---------------------|----------------|
| 20 | AB0020 | Road intersection | LJ314215/966 | 50% smk |
| 21 | AB0021 | Road intersection | LJ258202/970 | 50% smk |
| 22 | AB0022 | Road intersection | LJ272185/930 | 50% smk |
| 23 | AB0023 | Choke point | LJ296154/890 | |
| 24 | AB0024 | Road intersection | LJ304158/910 | |
| 25 | AB0025 | Road intersection | LJ345168/990 | |
| 26 | AB0026 | Choke point | LJ357177/1100 | |
| 27 | AB0027 | Potential OP | LJ254212/1030 | 50% Smk |
| 28 | AB0028 | Choke point | LJ249153/1000 | |
| 29 | AB0029 | Road intersection | LJ224165/1020 | |
| 30 | AB0030 | Road intersection | LJ303110/880 | |
| 31 | AB0031 | FASCAM | LJ142216/1030 | 400 x 400 |
| 32 | AB0032 | FASCAM | LJ147221/1030 | 400 x 400 |
| 33 | AB3001 | Road intersection | LJ184212/950 | A30B |
| 34 | AB3002 | Road intersection | LJ184201/940 | A30B |
| 35 | AB3003 | Road intersection | LJ187185/951 | A30B |
| 36 | AB3004 | Potential OP | LJ189147/1230 | |
| 37 | AB3005 | Road intersection | LJ218196/930 | A31B |
| 38 | AB3006 | Road | LJ218185/970 | A31B |
| 39 | AB3007 | Road | LJ219190/950 | A31B |
| 40 | AB3008 | Road intersection | LJ216178/990 | A32B |
| 41 | AB3009 | Road intersection | LJ215174/990 | A32B |
| 42 | AB3010 | | LJ251180/970 | FPF |
| 43 | AB3011 | | LJ246173/970 | FPF |
| 44 | AB3012 | | LJ242159/990 | FPF |
| 45 | AB3013 | Road intersection | LJ199194/930 | Illum |
| 46 | AB2001 | Road intersection | LJ210259/950 | A20B |
| 47 | AB2002 | Road intersection | LJ201257/970 | A20B |
| 48 | AB2003 | Road intersection | LJ197256/970 | A20B |
| 49 | AB2004 | Wadi | LJ232227/950 | A21B |
| 50 | AB2005 | Wadi | LJ227223/950 | A21B |
| 51 | AB2006 | Wadi | LJ227216/930 | A21B |
| 52 | AB2007 | Road | LJ239245/990 | |
| 53 | AB2008 | Wadi | LJ236239/970 | |
| 54 | AB2009 | | LJ256235/990 | FPF |
| 55 | AB2010 | | LJ253222/970 | FPF |
| 56 | AB2011 | | LJ256228/980 | FPF |
| 57 | AB2012 | Road intersection | LJ270225/980 | 50% smk |
| 58 | AB2013 | Road or Wadi | LJ273207/960 | 50% smk |
| 59 | AB2014 | Road intersection | LJ218229/950 | Illum |

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EXAMPLE FIRE PLAN (Continued)

**SECRET FOR TRAINING
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2. SCHEDULES.

| Line | Target | Firing Unit | Rounds | Remarks |
|------------|--------|-------------|--------|-------------|
| Group A1B | | | | |
| 3 | AB0003 | B/2-636 FA | 54 | Counterprep |
| 4 | AB0004 | A/2-636 FA | 54 | Counterprep |
| 5 | AB0005 | C/2-636 AF | 54 | Counterprep |
| Group A2B | | | | |
| 7 | AB0007 | A/2-636 FA | 54 | Counterprep |
| 8 | AB0008 | B/2-636 FA | 54 | Counterprep |
| 9 | AB0009 | C/2-636 FA | 54 | Counterprep |
| Group A3B | | | | |
| 11 | AB0011 | B/2-636 FA | 36 | |
| 12 | AB0012 | A/2-636 FA | 36 | |
| 13 | AB0013 | C/2-636 FA | 36 | |
| Group A20B | | | | |
| 46 | AB2001 | A/1-51 FA | 36 | |
| 47 | AB2002 | C/1-51 FA | 36 | |
| 48 | AB2003 | B/1-51 FA | 36 | |
| Group A21B | | | | |
| 49 | AB2004 | A/1-51 FA | 36 | |
| 50 | AB2005 | B/1051 FA | 36 | |
| 51 | AB2006 | C/1-51 FA | 36 | |
| Group A30B | | | | |
| 33 | AB3001 | C/1-51 FA | 36 | |
| 34 | AB3002 | A/1-51 FA | 36 | |
| 35 | AB3003 | B/1-51 FA | 36 | |
| Group A31B | | | | |
| 37 | AB3005 | A/1-51 FA | 36 | |
| 38 | AB3006 | B/1-51 FA | 36 | |
| 39 | AB3007 | C/1-51 FA | 36 | |
| Group A32B | | | | |
| 40 | AB3008 | B/1-51 FA | 36 | |
| 41 | AB3009 | C/1-51 FA | 36 | |

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EXAMPLE FIRE PLAN(Continued)

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3. FIRE SUPPORT COORDINATING MEASURES. Cutoff time for submission or deletion of FSCMs is 070100 Nov 89.

a. RFA 1: LJ286300-LJ296321-LJ308331-LJ324332-LJ329325-LJ327308-LJ319299-LJ315289-LJ301289.

b. NFA 1: LJ125164-LJ130170-LJ144157-LJ127159.

c. NFA 3 (COLT #1): LJ170234, radius 1000.

d. NFA 2: LJ106127, radius 1100.

e. FFA 1: LJ213275, radius 1000.

f. ACA JOE: LJ130328-LJ096235-LJ083181-LJ124169-LJ169274-LJ169312, max alt 4500.

g. ACA TED: LJ130328-LJ133271-LJ169273-LJ274243-LJ340214-LJ450193-LJ450235-LJ390237-LJ192300, max alt 5200.

h. ACA BILL: LJ078201-LJ261165-LJ321140-LJ401121-LJ440121-LJ440060- LJ351080- LJ252133- LJ073163, max alt 4100.

i. ACA BOB: LJ195290-LJ253267-LJ216207-LJ195146-LJ159153, max alt 3800.

AIRCOR TANGO: HA (LJ349221) to ACP 1 (LJ320229) to ACP 2 (LJ243258) to ACP 3 (LJ162281) to ACP 4 (LJ156265).

k. CFL is PL MACE; on order, PL LANCE; on order, PL MACE.

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EXAMPLE TARGET ACQUISITION TAB

An example of a target acquisition tab to the fire support plan is shown below.

EXAMPLE TARGET ACQUISITION TAB**SECRET FOR TRAINING
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TAB C (TGT ACQUISITION I TO APPENDIX 3 (FA SUPPORT PLAN) TO ANNEX E (FIRE SUPPORT) TO OPORD 90-2--2d Bde, 52d Inf Div (Mech).

Reference: Map , series 1501; TAWAQ; sheets LJ 11-1, 11-2, 11-3, 11-5, and 11-6; edition 1982; 1:250,000.

Time Zone Used Throughout Order: LOCAL.

1. SITUATION.

Enemy Forces. See App 3, para 1, and Intel Annex to OPORD 90-2--2d Bde, 52d Inf Div (Mech).

b. Friendly Forces. 1-51 FA (155, SP) is DS to 2d Bde. 2-636 FA (155, SP) is R 1-51 FA. See 2 (Q-36) , Btry A (TA), 23d FA is attached to 1-51 FA. Sec 4 (Q-37), Btry A (TA), 23d FA is operating in 2d Bde sector. 2d Bde has three COLTs. Three OH-58Ds are DS to 2d Bde.

2. MISSION.

Tgt acquisition assets (See 2 [AN/TPQ-36], Btry A [TA], 23d FA; Sec 1, 2, and 3 [OH-58D], Div Arty Spt Pit, Cmd Avn Co, 52d Cbt Avn Bde; COLTs 1, 2, and 3) acquire targets, initiate fire missions, and report combat and/or targeting information commencing NLT 061600 Nov 89 in support of 2d Bde defense in sector.

3. EXECUTION.

a. Concept of Operation. The Q-36 will provide coverage of the 2d Bde sector at the FLOT out to PL SPEAR. The Q-36 will also ensure coverage of CFFZs 1 and 2 and CFZs 1, 2, and 3 (see RDO, enclosure 1). Cueing agents will be the bde FSO, TF 1-17 FSO, TF 1-81 FSO, and 1-51 FA S2.

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EXAMPLE TARGET ACQUISITION TAB (Continued)

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b. Processing. All enemy artillery locations will be sent to 1-51 FA TOC and the div arty TOC. AFSOs (OH-58Ds) report targets and targeting information to 1-51 FA CP and 2d Bde FSE.

c. Visual Observation.

(1) Ground Observation. COLTs will report location and zone of observation through the bde FSO to 1-51 FA TOC.

(2) Air Observation.

(a) Sec 1, 2, and 3 (OH-58D) maintain continuous observation (at least one section on station at all times) of EA SNAKE. Report PIR and IR in NAIs 1, 2, and 8.

(b) Initiate Copperhead fires to C/2-636 FA on 1-51 FA FD 3 net when HPTs enter EA SNAKE.

(c) Report lead elements of second-echelon regiments in NAI 13 [trigger point for CAS mission).

(d) Initial position will be vicinity AIRCOR TANGO ACP 4 (LJ1626) NLT 070001 Nov 89.

(e) Coordinate with 1-51 FA RSO for location and marking of survey update points. Contact RSO on div arty survey (VHF-FM) (V) net.

d. Radar. Sec 2 (Q-36) , Btry A (TA) , 23d FA mission: Attached 1-51 FA (see RDO, enclosure 1).

e. Coordinating Instructions.

(1) Zones.

(a) Critical Friendly Zones. Bde TOC, TF 1-81 (BP 6), TF 1-17 (BP 3). (See RDO, enclosure 1.)

(b) Call-for-Fire Zones. See RDO, enclosure 1.

(c) Artillery Target Intelligence Zones. See RDO, enclosure 1.

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EXAMPLE TARGET ACQUISITION TAB (Continued)

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(2) Common Sensor Boundary. Grid LJ1137 to LJ1938 to LJ2736 to LJ3735.

(3) Cueing Instructions. Q-36 radiates on order of 1-51 FA S2 and designated cueing agents. Other friendly elements request radar coverage through the 1-51 FA TOC on the FA battalion command net. Radar section chief reports to 1-51 FA S2 30 minutes prior to making survivability moves due to excessive radiation time from current location. Cueing agents will request cueing only if their elements are receiving continuous or massive (greater than 100 rounds) incoming artillery. (See RDO, enclosure 1).

(4) Survivability Moves. Radar will report to 1-51 FA S2 before initiating routine survivability moves.

(5) Survey. 1-51 FA will provide survey for Sec 2 (Q-36), Btry A (TA), 23d FA. Radar section chief will coordinate with 1-51 FA RSO for survey as required.

(6) Visibility Diagrams. All observers will submit visibility diagrams through FSO channels to the DS FA battalion S2 NLT 061100 NOV 89.

4. SERVICE SUPPORT.

Q-36 will coordinate Class I and 111 support from Btry C, 1-51 FA. All other logistic support will be provided through 1-51 FA combat trains.

5. COMMAND AND SIGNAL.

a. Command. Btry A (TA), 23d FA TOC located LJ588012. 1-51 FA TOC located LJ366163.

b. Signal. SOI KTV 1062, Edition BB in effect.

Enclosure 1. Radar Deployment Order.
Enclosure 2. Capabilities Overlay.

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EXAMPLE RADAR DEPLOYMENT ORDER

An example radar deployment order (an enclosure to the target acquisition tab to the FA support plan) is shown below.

EXAMPLE RADAR DEPLOYMENT ORDER

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ENCLOSURE 1 (RADAR DEPLOYMENT ORDER) TO TAB C (TGT ACQUISITION)
TO APPENDIX 3 (FA SUPPORT PLAN) TO ANNEX E (FIRE SUPPORT) TO
OPORD 90-2- -2d Bde, 52d Inf Div (Mech).

(CLASSIFICATION WHEN FILLED IN)

| RADAR DEPLOYMENT ORDER | | | | | | | |
|--|-------------------------------------|--|-----------------|--------------------------------|--------|--------|--|
| For use of this form, see FM 6-121. The proponent agency is TRADOC. | | | | | | | |
| SECTION 2 | | 25A 58B 36 37 | | MISSION ATCH 1-51 FA | | | |
| LOCATION | Primary PA 21 | | Alternate PA 7 | | | | |
| SEARCH SECTOR | | | | | | | |
| | Left Edge | Right Edge | Minimum Range | Maximum Range | | | |
| Primary Azimuth 4700 | -800 mls | +700 mls | 75 km meters | 24 km meters | | | |
| Alternate Azimuth | mls | mls | meters | meters | | | |
| EW THREAT ASSESSMENT | | | | | | | |
| EW Threat (Yes or No) | | Affecting Friendly Assets (Yes or No) | | Type of Threat (Air or Ground) | | | |
| NOTE: Use the Firefinder survivability flowchart in FM 6-121 to determine emission limits. | | | | | | | |
| CUEING AGENTS (CALL SIGN AND DESIGNATION) IN PRIORITY | | | | | | | |
| 2 BDE FSO | | 1-17 FSO | | 1-81 FSO | | | |
| 1-51 FA S2 | | | | | | | |
| REPORTING CHANNELS | | | | | | | |
| FA BN CMD (V) | | | FA BN OPS/F (D) | | | | |
| ZONE DATA | | | | | | | |
| Type and Number | Description and/or Command Priority | Grid Coordinates of Zone Corner Points | | | | | |
| CFZ 1 | TF 1-17 | 273090 | 273122 | 281122 | 281090 | | |
| CFZ 2 | TF 1-81 | 167111 | 167136 | 181136 | 181111 | | |
| CFZ 3 | TF 2-81 | 171072 | 171089 | 193089 | 193072 | | |
| CFZ 4 | BDE TOC | 235041 | 235063 | 262063 | 262041 | | |
| CFFZ 1 | DAG PRI 1 | 270280 | 270300 | 300300 | 300280 | | |
| CFFZ 2 | RAG PRI 2 | 175345 | 175365 | 210365 | 210345 | | |
| CFFZ 3 | HVY MTR BTRY PRI 3 | 210240 | 210260 | 240260 | 240240 | | |
| ATIZ 1 | RAG | 221343 | 221359 | 239359 | 247355 | 247343 | |
| ATIZ 2 | AAG | 265430 | 265460 | 310460 | 310430 | | |

DA FORM 5957-R SEP 1990

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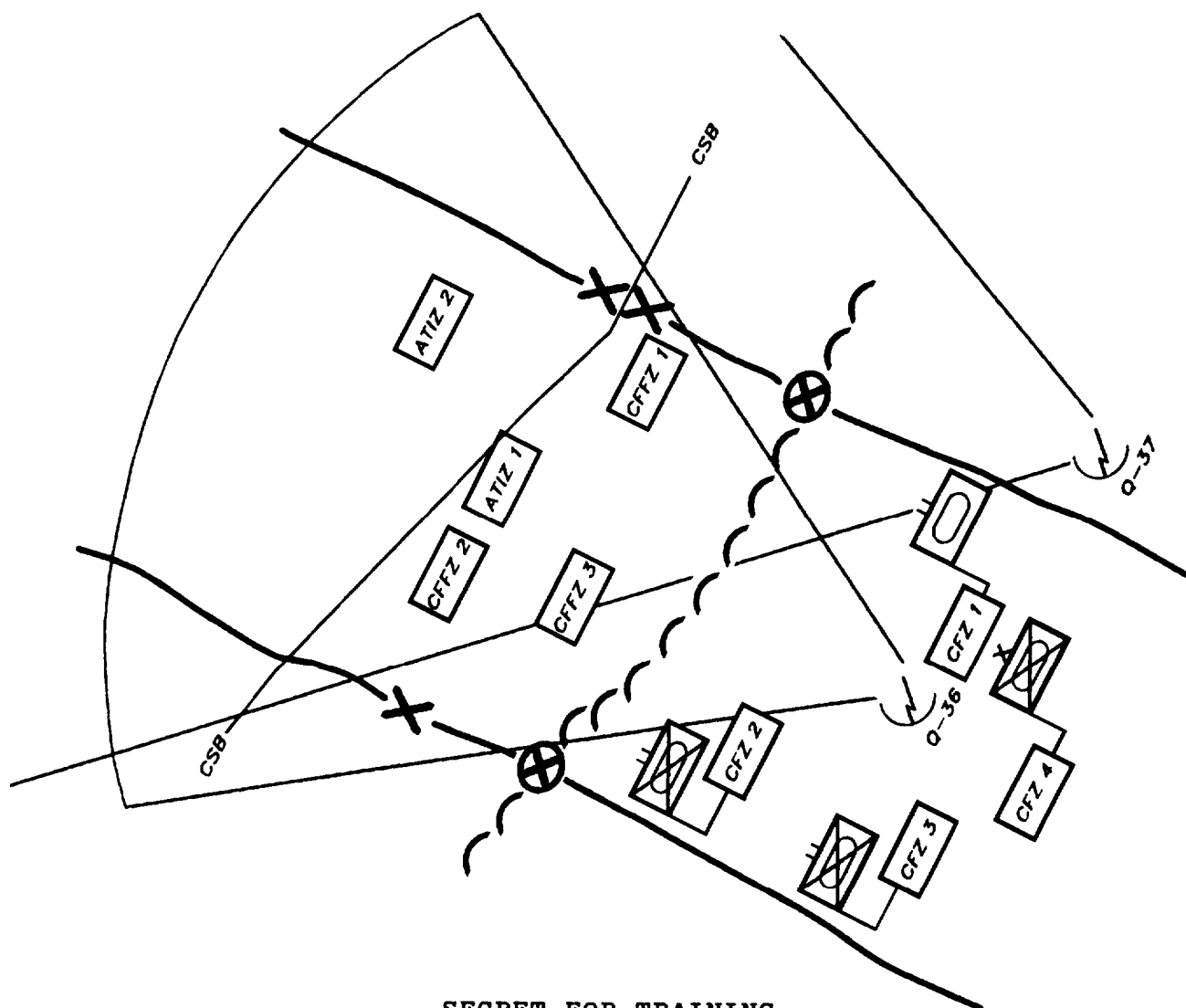
EXAMPLE CAPABILITIES OVERLAY

An example capabilities overlay (an enclosure to the target acquisition tab to the FA support plan) is shown below.

EXAMPLE CAPABILITIES OVERLAY

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ENCLOSURE 2 (CAPABILITIES OVERLAY) TO TAB C (TGT ACQUISITION)
TO APPENDIX 3 (FA SUPPORT PLAN) TO ANNEX E (FIRE SUPPORT) TO
OPORD 90-2--2d Bde, 52d Inf Div (Mech).



**SECRET FOR TRAINING
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EXAMPLE SURVEY PLAN

An example survey plan (a tab to the fire support plan) is shown below.

EXAMPLE SURVEY PLAN

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TAB D (SURVEY PLAN) TO APPENDIX 3 (FA SUPPORT PLAN) TO ANNEX E (FIRE SUPPORT) TO OPOD 90-2--2d Bde, 52d Inf Div (Mech).

Reference: Map, series 1501; TAWAQ; sheets LJ 11-1, 11-2, 11-3, 11-5, and 11-6; edition 1982; 1:250,000.

Time Used Throughout Order: LOCAL.

1. SITUATION.

a. Enemy Forces. See App 3, para 1 and Intel Annex to OPOD 90-2--2d Bde, 52d Inf Div (Mech).

b. Friendly Forces. 1-51 FA (155, SP) is DS to 2d Bde. 2-636 FA (155, SP) is R 1-51 FA. Sec 2 (Q-36), Btry A (TA), 23d FA is attached to 1-51 FA. 2d Bde has three COLTs. Three OH-58Ds are DS to 1-51 FA.

2. MISSION.

The survey sections of 1-51 FA and 2-636 FA provide conventional and PADS survey support to 1-51 FA, to 2-636 FA, to AN/TPQ-36 radar, and to COLTs, OH-58Ds, and mortars supporting the 2d Bde in sector.

3. EXECUTION.

a. Concept of Operation. Survey support will be a team effort by survey sections from both 1-51 FA and 2-636 FA. PADS teams will accompany firing battery recons to provide survey data for all battery primary and alternate positions. PADS teams will provide survey data for the attached Q-36. The Q-37 will receive PADS support upon coordinating for that support with 1-51 FA TOC when needed. Survey will be available for COLTs, OH-58Ds, and mortars.

(1) PADS #1, 1-51 FA will provide survey to Btry C, 1-51 FA and ensure their primary and alternate positions in PA 9 have survey NLT 070001 Nov 89. PADS #1 will then accompany

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EXAMPLE SURVEY PLAN (Continued)

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Btry C, 1-51 FA recon to prepare PA 6. Upon completion of PA 6, PADS #1 will survey the Q-36 primary and alternate positions in PA 20. Then, they will provide survey to Btry B, 1-51 FA in PA 4. Be prepared to provide survey to Btry B, 2-636 FA and Btry C, 2-636 FA in PAs 17 and 18, respectively, and to survey PA 12 for Btry C, 1-51 FA.

(2) PADS #1, 2-636 FA will provide survey for primary and alternate positions in PA 2 NLT 07001 Nov 89 for Btry C, 2-636 FA. PADS #1, 2-636 will then move forward to link up with the FSE, TF 1-17 to survey COLTs and mortars in the northern portion of the brigade sector. Be prepared to provide survey in PA 21 for the Q-36 and in PA 14 for Btry C, 1-51 FA. Be prepared to assist PADS #1, 1-51 FA in completing its survey requirements.

(3) PADS #2, 1-51 FA will provide survey in PA 1 for Btry A, 1-51 FA and in PA 5 for Btry A, 2-636 FA for both primary and alternate positions in both PAs NLT 070001 Nov 89. Then PADS #2 will survey PA 7 for Btry A, 1-51 FA and PA 19 for Btry A, 2-636 FA. Be prepared to provide survey in PAs 11 and 16 for Batteries A and B, 1-51 FA, respectively.

(4) PADS #2, 2-636 FA will provide survey in PA 3 for Btry B, 2-636 FA and in PA 15 for Btry B, 1-51 FA for both primary and alternate positions in both PAs NLT 070001 Nov 89. PADS #2, 2-636 FA will then move forward to link up with the FSE, TF 1-81 to survey COLT positions and mortars in the southern portion of the brigade sector. Be prepared to assist PADS #2, 1-51 FA in completing its requirements. Be prepared to provide survey in PA 10 for Btry B, 1-51 FA.

(5) Conventional survey team, 1-51 FA will provide PADS update points in the TF 1-17 sector and the northern portion of the brigade sector. It will also provide OH-58D initialization points vicinity grids LJ3817 and LJ3121. Initialization points will be marked with a 6- X 6-foot target cloth panel with a 4-foot-diameter circle spray-painted in black. An identifying number with numerals 2 1/2 feet tall will be painted in the center of the circle. The team will also assist PADS #1, 1-51 FA and PADS #1, 2-636 FA in accomplishing their assigned survey tasks if necessary.

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EXAMPLE SURVEY PLAN (Continued)

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(6) Conventional survey team, 2-636 FA will provide PADS update points in the TF 1-81 sector and the southern portion of the brigade sector. It will assist PADS #2, 1-51 FA and PADS #2, 2-636 FA in accomplishing their assigned survey tasks if necessary.

(7) Survey Sec HQ, 2-636 FA will establish a SIMO station vicinity LJ366163 (1-51 FA CP). Station will be established NLT 061600 Nov 89 and will remain operational as long as weather conditions permit SIMO operations. Contact SIMO station with 2-636 RSO call sign in 2-636 FA survey net.

b. Coordinating Instructions.

(1) Priority of survey is, in order, to firing battery positions (A, C, and B, 1-51 FA; C, A, and B, 2-636 FA), radars, COLTs, OH-58D control points, and mortars.

(2) Survey sections will establish starting control at the following survey control points.

| <u>SCP NAME</u> | <u>EASTING</u> | <u>NORTHING</u> | <u>ALTITUDE</u> |
|-----------------|----------------|-----------------|-----------------|
| MARY | 525422.97 | 3919175.39 | 935.2 |
| HELEN | 531642.91 | 3922964.29 | 1054.5 |

(3) All surveys will be closed. Parties will report completion of surveys to 1-51 FA TOC over ops/F (D) using SURV.SCPST format.

4. SERVICE SUPPORT.

Service support for 1-51 FA survey section will be provided at 1-51 FA combat trains. Service support for 2-636 FA survey section will be provided at 2-636 FA combat trains. Inoperable PADS equipment will be brought immediately to the field trains.

5. COMMAND AND SIGNAL.

a. Command. 1-51 FA RSO will direct all survey operations. He will operate from the 1-51 FA CP.

b. Signal. SOI KTV 1062, Edition BB in effect.

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EXAMPLE TACFIRE TAB

An example TACFIRE tab to the FA support plan is shown below.

EXAMPLE TACFIRE TAB

**SECRET FOR TRAINING
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TAB E (TACFIRE) TO APPENDIX 3 (FA SUPPORT PLAN) TO ANNEX E
(FIRE SUPPORT) TO OPORD 90-2--2d Bde, 52d Inf Div Mech).

Reference: Map series 1501; TAWAQ; sheets LJ 11-1 11-2,
11-3, 11-5, and 11-6; edition 1982; 1:250:000.

Time Zone Used Throughout Order: LOCAL.

1. MUTUAL SUPPORT.

1-51 FA - 2-636 FA.

2. FSO-FO/AFSO/RADAR ASSIGNMENTS

FSO 1-17: FIS 01, 02, 03, 04

FSO 1-81: FIS 05, 06, 07, 08

FSO 2-81: FIS 23, 24, 25, 26

1-51 FA: CMR 97

2-636 FA: CMR 98

Q-36: 95

3. COMMANDER'S CRITERIA.

a. Commander's MODs.

(1) FM; MOD

(2) NNFP;MOD

PZONE: 1-81

ECOF: 03

PTYPE: ARMOR/MDM

PSHEL: CPH

(3) FSE;CRITER

IGRANG:X

WPN: 155MM;MAXVOL:4

IGSFTY:X

EFF:30

CHMEFF: 5/10/20

EFFP:80

MAXYLD:500

**SECRET FOR TRAINING
(OTHERWISE UNCLASSIFIED)**

EXAMPLE TACFIRE TAB (Continued)

SECRET FOR TRAINING
(OTHERWISE UNCLASSIFIED)

b. Exclusions.

FM; XCLUDE - SMB, ILA, APS, AMS.
NNFP;XCLUDE - HEC/HEF from all preparations/
counterpreparations (except five target or less
antiarmor programs/groups/series)

c. Attack Methods.

| | |
|------------|-----|
| FM; ATTACK | VOL |
| ARMOR/MDC | 4 |
| ARMOR/APC | 3 |
| ARTY/ | 3 |
| MORT/ | 3 |

d. Fire Unit Selection.

FM;FUSEL
WPN: 155MM:MAXVOL: 4

e. MAPMOD.

SPRT;MAP - 580000, 480001, 5660000, 5560001;
GZ:24;SPHERE:2;

f. Artillery SITREP.

AFU;COMD: Transmit SITREP:X to DA/BDE at 200 and 2400
hours daily.

AFU;SR: Submit as changes occur.

g. Available Supply Rate.

AFU;ASR: 1312

SECRET FOR TRAINING
(OTHERWISE UNCLASSIFIED)

EXAMPLE TACFIRE TAB (Continued)

SECRET FOR TRAINING
(OTHERWISE UNCLASSIFIED)

h. Critical Ammunition Level.

AFU;AMOL: Do not violate AMOL without authority of 1-51 FA commander.

| | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| HEA | HEC | HEF | SMA | SMB | ILA | HER | APS | AMS | CPH |
| 18 | 10 | 30 | 3 | 3 | 3 | 10 | 1 | 3 | 3 |
| PDA | TIA | TIB | TIC | VTE | | | | | |
| 5 | 10 | 30 | 10 | 15 | | | | | |

i. Special Instructions. Ensure continuous update of friendly file and battlefield geometry.

j. Geometry.

(1) Zones.

(a) Brigade Zone: 2BDE

| | | |
|-----------|------------|----------------------|
| 1. 114193 | 6. 352085 | 11. 393207 |
| 2. 145185 | 7. 383063 | 12. 306248 |
| 3. 183153 | 8. 458069 | 13. 234283 |
| 4. 259131 | 9. 498093 | 14. 159295 |
| 5. 306110 | 10. 494194 | BDRY:4/1X2,12/52XX54 |
| | | ADJC:1BDE,52ID |

(b) Battalion Zones

:TF1-81

:TF1-17

| | |
|-----------|-----------|
| 1. 183153 | 1. 220207 |
| 2. 259131 | 2. 255203 |
| 3. 306110 | 3. 303191 |
| 4. 341170 | 4. 341170 |
| 5. 303191 | 5. 383212 |
| 6. 255203 | 6. 306248 |
| 7. 220207 | 7. 234283 |
| | 8. 159295 |

BDRY:2/1X2,5/11117
 ADJC:1BDE,TF1-17

:4/11181,6/52XX54
 :TF1-81,52ID

SECRET FOR TRAINING
(OTHERWISE UNCLASSIFIED)

EXAMPLE TACFIRE TAB (Continued)

**SECRET FOR TRAINING
(OTHERWISE UNCLASSIFIED)**

(2) Maneuver Coordinating Measures.

| | | | | | |
|-------|------|---------|---------|---------|---------|
| PLAN: | MACE | : SPEAR | : LANCE | : CHIGO | : VEGAS |
| NAME: | MACE | : SPEAR | : LANCE | : CHIGO | : VEGAS |

| | | | | |
|-----------|-----------|-----------|-----------|-----------|
| 1. 050354 | 1. 126341 | 1. 161330 | 1. 246306 | 1. 246306 |
| 2. 050210 | 2. 086291 | 2. 156273 | 2. 234283 | 2. 252211 |
| 3. 035190 | 3. 075194 | 3. 103171 | 3. 196235 | 3. 250158 |
| 4. 030110 | 4. 073140 | 4. 103120 | 4. 145186 | 4. 223122 |
| | | | 5. 135150 | 5. 215095 |

(3) Fire Coordination Areas.

(a) No-Fire Areas.

| | | | |
|---------|--------|---------|---------|
| NAME: | NFAO 1 | : NFA02 | : NFA03 |
| APPL: | AL | : AL | : AL |
| FACORD: | 10COR | : 10COR | : 2BDE |

| | | |
|-----------|-----------------|-----------------|
| 1. 125164 | 106127 RAD 1100 | 170234 RAD 1000 |
| 2. 130170 | | |
| 3. 144157 | | |
| 4. 127159 | | |

(b) Restrictive Fire Areas.

| | |
|--------|-------|
| NAME: | RFA23 |
| APPL: | AL |
| FCORD: | 10COR |

| | |
|-----------|-----------|
| 1. 286300 | 6. 327308 |
| 2. 296321 | 7. 319299 |
| 3. 308331 | 8. 315289 |
| 4. 324332 | 9. 301289 |
| 5. 329325 | |

[c) Free-Fire Areas (for registration only).

| | |
|--------|------|
| NAME: | FFA1 |
| APPL: | HE |
| FCORD: | 52DA |

| | |
|--------|----------|
| 213275 | RAD 1000 |
|--------|----------|

**SECRET FOR TRAINING
(OTHERWISE UNCLASSIFIED)**

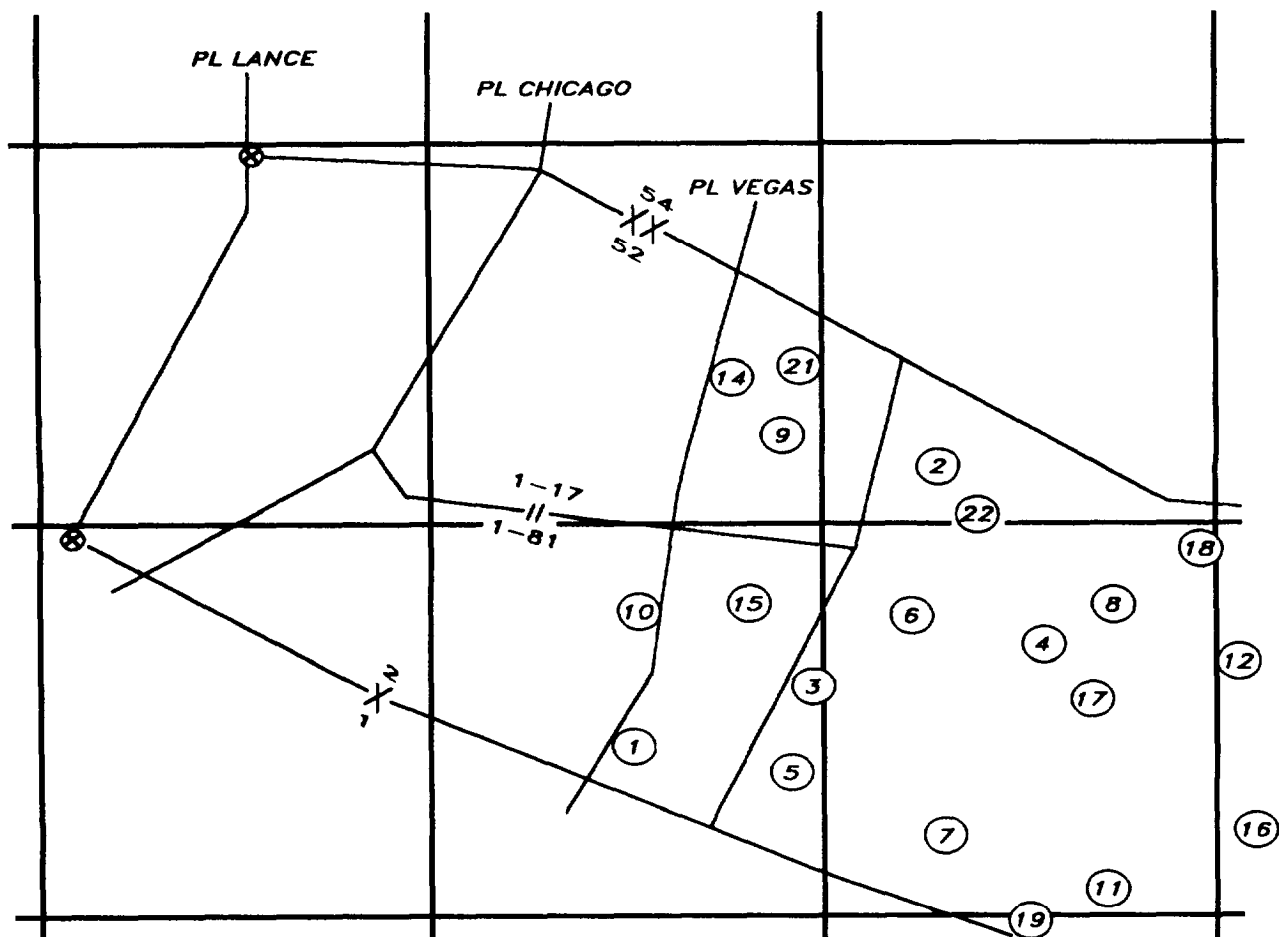
EXAMPLE POSITIONING OVERLAY

An example positioning overlay (a tab to the FA support plan) is shown below.

EXAMPLE POSITIONING OVERLAY

**SECRET FOR TRAINING
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TAB F (POSITIONING OVERLAY) TO APPENDIX 3 (FA SUPPORT PLAN) TO ANNEX E (FIRE SUPPORT) TO OPORD 90-2--2d Bde, 52d Inf Div (Mech).



**SECRET OF TRAINING
(OTHERWISE UNCLASSIFIED)**

PREPRINTED FORMATS

Many FA battalions find it convenient to use preprinted formats in preparing FA support plans. The printed format simplifies preparation and is a memory aid to remind planners of details that might otherwise be overlooked.

Example FA Support Plan Format

There are as many possibilities for formats as there are units, and there is no one right way to develop a format. On pages E-36 through E-40 is an example of a formatted order developed by a unit in the field. It does not precisely follow the five-paragraph order sequence, as it has been developed to allow individual staff officers to work simultaneously on different pages. The first page is given to the S2. The second page is completed by the S3, who may also do the top portion of page 3. The assistant S3 or FDO can complete the top of page 3 as well. The bottom of page 3 is filled out by the BSO. Page 4 is completed by the executive officer or S4. The S3 falls out the FA support matrix.

After staff planning and coordination are completed, the S3 issues each staff officer his assigned page; and then he gathers them, upon completion for reproduction. This system is particularly useful if the battalion has reproduction facilities in the CP. If this is the case, the battalion can publish a complete FA support plan in less than an hour.

Example FRAGO or Warning Order Format

Following the basic FA support plan format is an abbreviated fragmentary order (FRAGO) or warning order format (pages E-41 and E-42). This format can also be used to simplify preparation of FRAGOs or warning orders.

Again, it is emphasized that these formats are not presented as the only, or even the best, way to prepare an order. They are suggestions that the user may adopt or adapt as he wishes or choose not to use at all.

ACRONYMS AND ABBREVIATIONS USED IN FORMATS

BMNT = beginning (of) morning nautical twilight
cl = class
EENT = end (of) evening nautical twilight
FSOP = field SOP
HEAT = high-explosive antitank
MR = moonrise
MS = moonset

MTSQ = mechanical time superquick (fuze)
precip = precipitation
reinf = reinforcement
SR = sunrise
SS = sunset
temp = temperature
visib = visibility

EXAMPLE FA SUPPORT PLAN FORMAT, PAGE 1

| | | | | | | | | | | | | | | | |
|--|---|--|--|--|--|--|--|---|-------|--|--|--|--|----------------------------|--|
| _____ FA SPT PLAN TO _____ | | | | | | | | | | | | | | COPY _____ OF _____ COPIES | |
| REF: MAP SERIES _____ EDITION _____ | | | | | | | | | | | | | | HQ, _____ | |
| SCALE _ : _____, SHEETS: _____ | | | | | | | | | | | | | | DTG: _____ | |
| TIME ZONE USED IN PLAN: _____ | | | | | | | | | | | | | | AUTH: _____ | |
| T E R R A I N | KEY TERRAIN, OBSTACLES: | | | | | | | | | | | | | | |
| | AVENUES OF APPROACH: | | | | | | | | | | | | | | |
| W E A T H E R | DATE | | | | | | | L | DATE | | | | | | |
| | TEMP | | | | | | | I | BMNT | | | | | | |
| | PRECIP | | | | | | | G | SR | | | | | | |
| | WINDS | | | | | | | H | SS | | | | | | |
| | VISIB | | | | | | | T | EENT | | | | | | |
| | | | | | | | | | MR | | | | | | |
| | | | | | | | | | MS | | | | | | |
| | | | | | | | | | ILLUM | | | | | | |
| G E N E R A L E N E M Y | MVR FORCES: | | | | | | | | | | | | | | |
| | INDIRECT FIRES: | | | | | | | | | | | | | | |
| | ADA: | | | | | | | | | | | | | | |
| | AIR: | | | | | | | | | | | | | | |
| | CAPABILITIES (EW, TA, NBC, LOG, REINF): | | | | | | | | | | | | | | |
| SIGNIFICANT ACTIVITIES: | | | | | | | | | | | | | | | |

EXAMPLE FA SUPPORT PLAN FORMAT, PAGE 2

| | | | |
|---|---------------------------|---------------------|------------------------|
| FA SPT PLAN TO _____ | | P A G E O F _ PAGES | |
| M I S S I O N | | | |
| | PHASE/UNIT/MISSION | | INTENT |
| O R G A N I Z A T I O N | | | |
| | HIGH-PAYOFF TARGET MATRIX | | ATTACK GUIDANCE MATRIX |
| T A R G E T A C Q U I S I T I O N | PRI | CAT | DESCRIPTION |
| | CAT | HIGH PAY-OFF | WHEN |
| | HOW | RESTRICTIONS | |
| | | | |
| COUNTERFIRE REFERENCE GRID __ AT __ | | | |
| F S C O O R D I N A T E S | TYPE | CONTROL HQ | GRID (RADIUS) |
| | TERRAIN FEATURE | EFFECTIVE DTG | |
| | | | |

EXAMPLE FA SUPPORT PLAN FORMAT, PAGE 3

| | | | | | |
|--|--|---|--|-----------------|--|
| | | FA SPT PLAN TO | | PAGE _OF_ PAGES | |
| F A E X E C U T I O N | COORDINATING INSTRUCTIONS: | | | | |
| | SURVEY: | | | | |
| | MET: | | | | |
| | DIV ARTY FSOP IN EFFECT WITH FOLLOWING NOTES AND/OR CHANGES: | | | | |
| C O M M U N I C A T I O N S | C R Y P T O | NET/TIME VINSON RATT KG-84 RATT KW-7 COMPUTER | | | |
| | | HF VOICE RATT NAVAL/AIR | | | |
| | COORDINATING INSTRUCTIONS: | | | | |
| S A F E T Y | MEDEVAC FM: | | | | |

EXAMPLE FA SUPPORT PLAN FORMAT, PAGE 4

| | | | | | | | |
|---|---------------------------------|--|--|--|--|--|--|
| FA SPT PLAN TO _____ | | PAGE__ OF__ PAGES | | | | | |
| S E R V I C E S A N D S U P P L Y | G E N E R A L | | | | | | |
| | CL I | | | | | | |
| | CL II IV VII | | | | | | |
| | CL III | | | | | | |
| | CL V | GENERAL: | | | | | |
| | | HE HE-RAP WP HC ILLUM HEAT APICM DPICM ADAM RAAMS CPHD AP MTSQ VT PD | | | | | |
| | CL VI VIII IX | | | | | | |
| | TRANSPORTATION: | | | | | | |
| | RESUPPLY: | | | | | | |
| | SERVICES: | | | | | | |
| WATER: | | | | | | | |
| LOCATIONS UNITS SUPPORTED | | | | | | | |

EFF DTG: _____
PAGE _____ OF _____ PAGES

TAB _____ TO FRAGO/FA SPT PLAN _____

FIELD ARTILLERY SUPPORT MATRIX

[illegible]

EXAMPLE FRAGO OR WARNING ORDER FORMAT, PAGE 1

| | | | |
|---|-----------------------|---------------------------------|-----------------|
| FRAGOWARNING ORDER _____ | | PAGE__ OF__ PAGES | |
| TIME ZONE USED IN ORDER _____ | | HQ, _____ | |
| AUTH, _____ | | DTG: _____ | |
| S I T U A T I O N | E N E M Y | G E N E R A L | MVR FORCES: |
| | | | INDIRECT FIRES: |
| | | | ADA: |
| | | | AIR: |
| | | SIGNIFICANT ACTIVITIES: | |
| F R I E N D L Y | GENERAL | | |
| | | | |
| M I S S I O N | | | |
| O R G O R C O M B A T | UNIT/MISSION | | INTENT |
| | | | |

EXAMPLE FRAGO OR WARNING ORDER FORMAT, PAGE 2

FRAGO/WARNING ORDER:_____

PAGE__ OF__ PAGES

| | | | | | | | | |
|---|---|---------------------------|-----|-------------|------------------------|--------------|------|-----|
| S I T U A T I O N | | | | | | | | |
| | T A R G E T A C Q U I S I T I O N | HIGH-PAYOFF TARGET MATRIX | | | ATTACK GUIDANCE MATRIX | | | |
| | | PRI | CAT | DESCRIPTION | CAT | HIGH PAY-OFF | WHEN | HOW |
| | | | | | | | | |
| S V C S P T | CSR, CLASSES OF SUPPLY, TRANSPORTATION, CDS, FAST LOCATIONS: | | | | | | | |
| C M D & S I G | | | | | | | | |

APPENDIX F

FIRE PLANNING PROCEDURES

This appendix implements STANAG 2031 and QSTAG 515.

For the fires of the FA cannon battalion to be effectively massed and employed in support of maneuver operations, those fires must be carefully planned and the fires of the various firing elements must be scheduled. This process of planning and scheduling fires can take place in any of several locations, such as the div arty CP or the division or brigade FSEs. The lowest level headquarters at which fire planning occurs is the cannon battalion assigned the tactical mission of direct support.

In most instances, the maneuver commander determines what he wishes his field artillery to accomplish and the FSCoord and his staff at the artillery battalion determine the specifics of how to achieve the results the commander desires. The FSEs, on the basis of the maneuver commander's intent for fire support nominate targets to be fired as groups or series or direct the timing, location, and desired effects of a preparation. The cannon battalion S3 then selects and schedules the units to fire. This process in turn drives the positioning and other tactical operations of the battalion.

The fundamentals of fire planning are identical in both TACFIRE and non-TACFIRE battalions. However, the specific techniques involved in automated fire planning differ considerably from those used in manual fire planning. Section I of this appendix presents manual techniques, while Section II discusses automated fire planning procedures.

Section I

MANUAL FIRE PLANNING

Many cannon battalions, particularly those in the Reserve Components, do not have and are not scheduled to receive TACFIRE. Units that are equipped with TACFIRE may lose automated fire planning capability in the battalion FDC because of combat loss or maintenance problems. All artillery battalion O&I elements and FDCs, as well as the FSEs they support, must be capable of planning fires to meet the commander's intent for fire support without the aid of automation. This section outlines the procedures necessary for manual fire planning.

PLANNED FIRES

Fire planning like fire support planning is a continuous process conducted by FSCOODs at all levels to ensure that fires support the maneuver commander's operation plan. As part of the fire planning process, the FSCoord nominates targets that support a phase of the commander's plan. On these targets, fire is prearranged to ensure responsive engagement when requested. Although some of the planned fires apply to offensive or defensive actions only, others are appropriate to all types of operations and levels of combat. When operating as a part of a multinational force, the US will implement STANAG 2031 and QSTAG 515. The provisions of these ratified agreements have been incorporated throughout the

discussions of target lists, target overlays, artillery fire plans, and artillery quick-fire plans in this appendix and elsewhere in this publication.

Procedures for fire planning vary depending on whether the supporting unit is equipped with automated equipment. The manual fire planning techniques for final protective fires, fires using smoke, and schedules of fires are described in the following paragraphs.

Final Protective Fires

Final protective fires are immediately available fires designed to create a barrier to impede enemy movements across defensive lines or areas. They are integrated with the

commander’s defensive plans and are intended for use primarily against dismounted infantry. Maneuver brigade commanders allocate FPFs to maneuver battalions, which in turn allocate them to their companies. The FPFs are allocated one per firing unit (field artillery), one per section (81-mm mortars), or one per platoon (107-mm mortars). When they are not engaged in another tire mission, weapons are laid on firing data for FPFs. This ensures immediate responses to calls for final protective fires. The shape and pattern of these fires may be varied to suit the tactical situation on the basis of the supported company commander’s desires. Authority to call for the FPFs is vested in the supported company commander or platoon leader in whose area they are located. On the target list work sheet, a target is designated as the (or an) FPF target by placing the letters “FPF” in the REMARKS column spats for that particular target. The FPF targets are designated by target number.

Fires Using Smoke

Smoke is used to obscure the enemy’s view and to screen friendly operations.

Obscuration Fires. Obscuration fires use smoke (HC) and WP shells to suppress the enemy by obscuring his view of the battlefield HE ammunition may have an obscuration effect due to secondary explosions, dust, and fires. This effect should not be relied on. Since smoke is susceptible to changes in wind conditions and the configuration of the terrain, its use must be coordinated with the maneuver comander and all other friendly units that maybe affected. Used properly, obscuration fires can do the following:

- Ž Slow enemy vehicles to blackout speeds.
- Ž Obscure the vision of direct fire gunners.
- Ž Reduce the accuracy of enemy observed fires by obscuring OPs and/or COPs.
- Ž Cause confusion and apprehension among enemy soldiers.
- Ž Limit the effectiveness of the enemy’s visual command and control signals.

Screening Fires. These fires also involve the use of smoke and WP munitions. They are used to mask friendly maneuver elements and to conceal the nature of their operations. For example, they are used to screen river crossings or an enveloping force. Moreover, screening fire may be used as follows:

- Ž To help isolate an objective by placing smoke in areas beyond the objective.
- Ž To make the enemy believe that a unit is maneuvering when in fact it is not.

Generally, screening fires require the same precautions as obscuration frees. Smoke screens, however, must be large enough that random enemy firing into them does not produce excessive casualties. Moreover, the establishment of a pattern in the use of smoke and maneuver (such as habitually firing smoke 2 km in front of troops) should be avoided.

Schedules of Fires

Preparation. Preparation fire is fire delivered on targets preparatory to an assault. The preparation is planned by a DS field artillery battalion or higher echelon. It is an intense volume of fire delivered in accordance with a time schedule. The fires normally commence before H-hour and may extend beyond it. They may start at a prescribed time or may be held on call. The duration of the preparation is influenced by factors such as the tire support needs of the entire force, the number of targets and firing assets, and the available ammunition.

The preparation may include a single fire support means (FA only) or multiple means (FA, mortars, CAS, NGF). There is no absolute requirement that the targets in a preparation be phased by target type. Light units may find that they lack the ammunition and the range to fire a phased prep; and heavy units may not have the firing assets, time, or targeting information to do so. However, the process of phasing targets is of substantial value, in terms of both improving the quality of the targeting and maximizing the positive impact of the prep on friendly maneuver operations.

POSSIBLE PREPARATION TARGETS

| PHASE I | PHASE II | PHASE III |
|--|--|------------------|
| Indirect fire systems Field artillery mortar positions Operations and/of FA headquarters | Command, control, and communications facilities Reserves and logistical sites Assembly areas | Forward elements |

A preparation maybe phased to allow successive attacks of certain types of targets:

Ž **Phase I** should provide for the early attack of enemy fire support means and observation capabilities, including FA headquarters and command posts. Such an attack degrades the enemy's ability to react with long-range indirect fires and to gain intelligence about the operation.

Ž In **Phase II**, other CPs, communications facilities, assembly areas, and reserves should be attacked. The goal is degradation of the enemy's ability to reinforce his defense and shift forces to counter our main effort.

The **final phase** should include defensive areas in the forward portions of the enemy position areas and targets that pose an immediate threat to attacking troops. The purpose of this phase is to suppress enemy direct fire systems until our maneuver forces have closed with them.

Provisions must be made to keep hostile fire support means and other critical targets neutralized throughout the preparation, time and ammunition permitting.

When assigning fire support systems to targets in the preparation planners should if possible, ensure that some firing units remain available to attack targets of opportunity. During the firing of a preparation a target of opportunity may pose such a threat to the supported force that some fire support units may have to leave the preparation to attack it. If field artillery is directed to do so, the S3 assigns the units to fire on the target of opportunity.

If fire support units are diverted from the preparation they rejoin the preparation at the current point in time – not at the time they left it. For example, if a unit firing a preparation is diverted to a target of opportunity at H – 5 and takes 4 minutes to attack that target, the unit would reenter the preparation at H – 1. This means that some targets may not be attacked at all or maybe attacked by fire support assets not originally planned for the preparation. The firing unit diverted from the preparation must report to the appropriate FSE those targets that were not fired or were not fired with the scheduled amount of ammunition. This information lets the FSCOORD and the supported maneuver commander make sound decisions for the attack of those targets while ensuring the safety of the attacking force.

Preparation schedules are continually updated to purge old targets and add new ones. The agency preparing the schedule must set a time after which no other changes can be made. This cutoff time varies among units and is based on training, communication, and scheduling capabilities. The schedule planner must ensure that there is enough time for changes to be sent to firing units, for technical fire

direction to be performed, and for ammunition to be prepared and fired. The maneuver force commander, with the advice of his FSCOORD, makes the final decision as to whether a preparation should be fired. This decision is based on such considerations as the following:

- Ž Will the loss of surprise from the preparation be offset by the damage done to the enemy?
- Ž Are there enough targets and means to warrant a preparation?
- Ž Can the enemy recover before the preparation fires can be exploited?

The preparation should begin and end with all firing units that are used in the preparation. Gaps in scheduling (that is, two or more consecutive shift times) should be avoided if possible. Shift time is the interval between the time a cannon unit can have rounds impacting on one target and the time it

can have rounds impacting on a new target. Shift time is affected by many variables (such as state of training amount of shift, and type of munition to be fired). For planning and scheduling purpose a shift time of 1 minute is established for light and medium (105-mm and 155-mm) artillery and a shift time of 2 minutes is used for heavy (203-mm) artillery. Any gaps that do occur can be filled by refiring Phase I targets or targets the maneuver commander has designated as priority targets. Units participating in the preparation should not begin firing on targets in a subsequent phase until all units have begun firing on the last target of the current phase or have completed firing the current phase. This may not always be possible, because some weapons may not have adequate range to fire at targets in all phases. In that case, the weapons are scheduled into the phase that is within their capabilities rather than being excluded altogether from the preparation. Fires are planned on the basis of the sustained rate of fire for each weapon system.

ARTILLERY CANNON AND ROCKET CHARACTERISTICS

| ASSET | MAXIMUM RANGE(METERS) a. WITH RAP b. WITHOUT RAP | MAXIMUM RATE OF FIRE | SUSTAINED RATE OF FIRE | AMMUNITION AVAILABLE |
|--|--|-------------------------|--|--|
| SP 155-mm howitzer M109A1/A2/A3 | b. 18,100 | 4 rounds per minute | 1 round per minute | HE, RAP, ICM, HC, illum, DPICM, ADAM, nuc, WP, chemical, RAAMS, Cphd |
| SP 203-mm howitzer M110A2 | a. 30,000 b. 22,900 | 1.5 rounds per minute | 0.5 round per minute | HE, ICM, nuc, chemical, DPICM, RAP |
| SP 227-mm MLRS M270 | a. NA b. 30,000 | 1 round per 1.5 seconds | 1 round per 4.5 seconds | DPICM, TGW ¹ , chemical ¹ |
| Towed 105-mm howitzer M119 | a. 19,500 (IRAP) 15,400 (RAP) b. 14,300 | 10 rounds per minute | 3 rounds per minute | HE, WP, HESH, illum |
| Towed 105-mm howitzer M101A1 | a. 14,930 b. 11,800 | 10 rounds per minute | 3 rounds per minute | AP, gas ² , HE, ICM, RAP, HEP-T, illum, HC, WP |
| Towed 105-mm howitzer M102 | a. 15,100 b. 12,400 | 10 rounds per minute | 3 rounds per minute | AP, gas ² , HE, ICM, RAP, HEP-T, illum, HC, WP |
| Towed 155-mm howitzer M14A1 | a. NA b. 14,600 | 4 rounds per minute | 1 round per minute | HE, ICM, illum, nut, HC, WP, chemical |
| Towed 155-mm howitzer M114A2 | a. 19,300 b. 14,600 | 4 rounds per minute | 1 round per minute | HE, RAP, ICM, illum, DPICM, ADAM, HC, WP, nut, chemical, RAAMS, Cphd |
| Towed 155-mm howitzer M198 | a. 30,000 b. 22,400 | 4 rounds per minute | As indicated by thermal warning device | HE, RAP, ICM, illum, DPICM, ADAM, nut, WP, chemical, RAAMS, Cphd |
| ¹ Both the TGW and binary chemical warheads are under development. Neither is currently fielded. | | | | |
| ² Includes CS (riot control agent), nonpersistent nerve agent (GB), and mustard (H). | | | | |
| LEGEND: HEP-T = high-explosive plastic-tracer HESH = high-explosive squash head (antitank, UK) illum = illuminating IRAP = improved rocket-assisted projectile MLRS = multiple launch rocket system NA = not applicable nuc = nuclear TGW = terminally guided warhead | | | | |

Counterpreparation. Counterpreparation fire is intensive prearranged fire delivered when the threat of an enemy attack is discovered. Usually, a counterpreparation is planned by a direct support FA battalion or higher echelon each time the supported force makes an extended halt. These intensive fires are delivered just before the start of an enemy attack. They are designed to –

- Ž Breakup the enemy's attack formations.
- Ž Disorganize his command, control and communications.
- Ž Impair his target acquisition efforts.
- Ž Decrease the effectiveness of his fire and maneuver.
- Ž Destroy his personnel and equipment.
- Ž Reduce his offensive spirit.

The maneuver commander, on advice from his FSCORD, decides when to fire the counterpreparation. Premature firing should be avoided to prevent disclosing targets for enemy counterfires. Counterpreparations are scheduled as on call, since the firing normally depends on enemy initiative.

Like preparation, counterpreps do not have to be phased if availability of time, intelligence, or assets precludes phasing. However, also like preparation phasing should improve the quality of the counterprep and should be done when possible.

Counterpreparations maybe planned in two phases. Initial fires (Phase I) should provide for early and simultaneous attack of enemy forward elements, indirect fire systems, and observation posts. In Phase II, the enemy command posts, communications, and reserves should be attacked while neutralization of his indirect fire systems continues. Fires from participating units should begin and end together when possible, and gaps should be avoided. When targets are scheduled in a counterpreparation, it is important that firing begin on the last targets of one phase at the same time or before firing begins on the first targets of the succeeding phase. Shift times and sustained rates of fire discussed above for a preparation also apply for the counterpreparation.

POSSIBLE COUNTERPREPARATION TARGETS

| PHASE I | PHASE II |
|---|--|
| Indirect fire systems Forward elements | Command and control facilities Logistical sites Reserves and assembly areas Communications facilities |

Groups, Programs, and Series. Several fire planning techniques are useful when fire is desired on multiple targets. Groups, programs, or series of targets can be established in these situations. The manner in which each of these is graphically shown, the level at which it is established, and its purpose are discussed below.

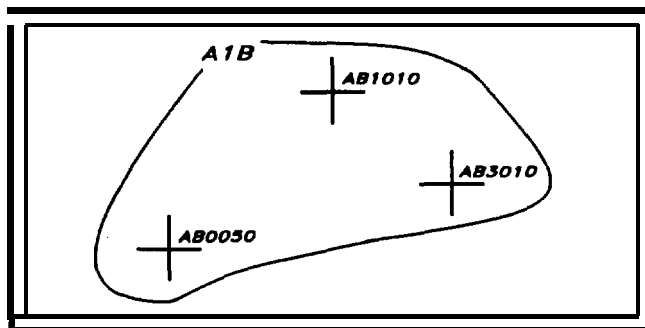
Groups. A group of targets consists of two or more targets on which simultaneous fires are desired. For FA fires, the DS battalion FDC is the lowest echelon that can plan and implement a group of targets. The FSO determining the need for a group of targets requests the group be planned by the DS battalion FDC. The planning of groups of targets can be a time-consuming process, and the groups can require considerable firing assets. If the FDC does not have the assets available to fire the groups it may pass the request to the force artillery TOC for planning.

A group of targets is graphically shown by circling the targets and identifying the group with a group designator. The designator consists of the two letters assigned to the block of target numbers allocated to a unit (for example, maneuver brigade or div arty TOC) with a number inserted between the two letters. For example, if a brigade is assigned the letters AB, its first group of targets is designated A1B, the second is A2B, and so on.

The fact that targets are included in a group does not preclude the attack of individual targets within the group.

A group of targets is listed on the scheduling work sheet. Groups of targets normally are fired on call of the supported unit. Groups are scheduled so that initial fires strike the targets simultaneously. On the top line of the scheduling work sheet, enter the group number. Below the group number, list the targets of the group opposite the firing unit assigned the targets. Below each target number how the number of rounds to be fired. No line or dot is drawn between the target number and the ammunition. More than one group for a given operation may be scheduled on the same scheduling work sheet.

GROUP OF TARGETS



A firing unit can be scheduled for only one target in each group, and more than one firing unit can be scheduled against a single target if needed.

Programs. A program of targets is a number of planned targets of a similar nature. All targets in a particular program are of the same type (for example all AD targets all OPs, or all mortar targets). A program may be initiated on call at a specific time, or when a particular event occurs.

Each type of program is scheduled starting at 0 and extending as long as needed. Once a program is begun, targets within the program are fired in a predetermined sequence as shown in the schedule. Normally, the lowest echelon that designates and plans programs of targets is the DS field artillery battalion. There are no special graphics associated with a program of targets. Programs appear on scheduling work sheets and schedules of fires.

EXAMPLE SCHEDULING WORK SHEET-GROUPS OF TARGETS

| (GROUPS FOR 16 INF DIV) OPORD 20 | | | SCHEDULING WORK SHEET | | | | | | | | | | SHEET <u>1</u> OF <u>1</u> | |
|--|--------------------------|--------------|-----------------------|-------------------|--|--|--|--|--|--|--|--|----------------------------|--|
| For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC. | | | | | | | | | | | | | | |
| LINE NO | ORGANIZATION AND CALIBER | FIRING UNITS | | | | | | | | | | | REMARKS | |
| | | | (A1Y) | (A2Y) | | | | | | | | | | |
| 1. | 3-47 FA | A | AB 4074 24 (a) | AB 4108 48 (a) | | | | | | | | | | |
| 2. | (105, T) | B | AB 4083 30 (a) | AA 3251 48 (a) | | | | | | | | | | |
| 3. | | C | AZ 4123 30 (a) | | | | | | | | | | (a) 50% VT | |

EXAMPLE SCHEDULING WORK SHEET-COUNTER-OP PROGRAM

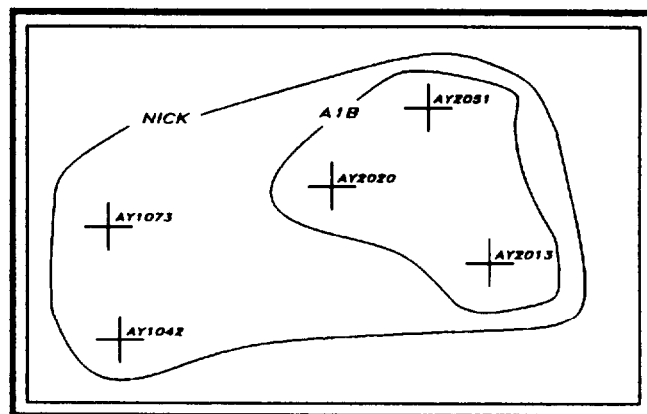
| (COUNTER-OP PROGRAM) FOR 16 INF DIV OPORD 20 | | | SCHEDULING WORK SHEET | | | | | | | | | | SHEET <u>1</u> OF <u>1</u> | |
|--|--------------------------|--------------|-----------------------|------------------|---|--|--|--|--|--|--|--|----------------------------|--|
| For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC. | | | | | | | | | | | | | | |
| LINE NO | ORGANIZATION AND CALIBER | FIRING UNITS | | | | | | | | | | | REMARKS | |
| | | | 0 | 1 | 2 | | | | | | | | | |
| 1. | 3-47 FA | A | AA 3232 24 (a) | AY 0074 6 (a) | | | | | | | | | | |
| 2. | (105, T) | B | AB 4022 24 (a) | AY 0074 6 (a) | | | | | | | | | | |
| 3. | | C | AY 0063 24 (a) | AY 0074 6 (a) | | | | | | | | | (a) 50% SMK | |

Series. A series of targets consists of a number of targets and/or groups of targets planned to be fired in a specific sequence to support a maneuver phase. The DS battalion FDC is the lowest planning echelon authorized to form and designate a series of targets. The series may be planned to support a limited attack, a final assault, a counterattack or a phased withdrawal. It should be planned to complement the supported commander's scheme of maneuver. It may be executed on call at a specific time, or when a certain event occurs. It is scheduled to start at 0.

Once a series is begun, targets and groups within the series are fired in a predetermined time sequence. Simultaneous attack of targets in a group within a series is as requested by the initiator or as determined by the FA fire planner. Attack is based on the nature of the targets and the desires of the force commander. Groups need not be fired as groups when fired as part of a series unless that is requested.

Graphically, a series is shown as individual and/or groups of targets within a prescribed area. The series is assigned a code name or a nickname.

SERIES OF TARGETS



The fact that a series of targets has been formed does not preclude the attack of individual targets and/or groups of targets within the series. A scheduling work sheet is prepared for each series of targets requested.

EXAMPLE SCHEDULING WORK SHEET-SERIES OF TARGETS

| (SERIES PAUL FOR 53 DIV OPORD 20) | | | SCHEDULING WORK SHEET | | | | | | | | | | | | | SHEET <u>1</u> OF <u>1</u> | | |
|--------------------------------------|--------------------------|--------------|--|---------|---|---|---|---|---|--|--|--|--|--|--|----------------------------|-------------|---------|
| | | | For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC. | | | | | | | | | | | | | | | |
| LINE NO | ORGANIZATION AND CALIBER | FIRING UNITS | 0 | 1 | 2 | 3 | 4 | 5 | 6 | | | | | | | | | REMARKS |
| 1. | 3-42 FA | A | DA 3251 | DA 3246 | | | | | | | | | | | | | | |
| | | | 29 (a) | 8 (b) | | | | | | | | | | | | | | |
| 2. | (155 SP) | B | DB 3251 | DA 3246 | | | | | | | | | | | | | | |
| | | | 29 (a) | 8 (b) | | | | | | | | | | | | | | |
| 3. | | C | DY 3251 | DA 3246 | | | | | | | | | | | | | | |
| | | | 29 (a) | 8 (b) | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | (a) 50% VT | |
| | | | | | | | | | | | | | | | | | (b) 50% SMK | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

Illumination and/or Smoke. Some targets have a specified duration of fire, but the ammunition requirements are unknown; for example, smoke and illumination targets on which the expenditures are affected by wind speed and direction. Fire planners complete the illumination and/or smoke schedule as follows:

Ž Indicate, by a horizontal line, the time on target and duration of fire (or desired effect).

Ž Place the target number above this line.

Ž Below the line, center a letter in parentheses keyed to a remark in the REMARKS column that shows the method of engagement (for example, two-gun

illumination; lateral or range spread first rounds WP and HC, succeeding rounds HC).

Ž When scheduling smoke, back off 1 minute to allow for buildup time (if using HC only and not WP for initial rounds). Buildup time is not to be used when firing on the same target. The maneuver commander must realize that because of weather, smoke fires cannot have guaranteed effects. When asking for smoke, the commander must be explicit in his intention. The FSCoord must specifically look at alternative methods of achieving the intention if the smoke is not effective. This can be done by planning on-call HE targets to suppress selected areas.

EXAMPLE SCHEDULING WORK SHEETS-SMOKE AND ILLUMINATION

| (SMOKE FOR 53 DIV OPORD 20) | | | SCHEDULING WORK SHEET | | | | | | | | | | | | | SHEET <u>1</u> OF <u>1</u> | |
|--------------------------------|--------------------------|--------------|--|---|---------|---|---|---|--|--|--|--|--|--|--|----------------------------|--|
| | | | For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC. | | | | | | | | | | | | | | |
| LINE NO | ORGANIZATION AND CALIBER | FIRING UNITS | 0 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | REMARKS |
| 1. | 3-42 FA | A | | | DA 3246 | | | | | | | | | | | | |
| | | | | | (a) | | | | | | | | | | | | |
| 2. | (155 SP) | B | | | DA 4092 | | | | | | | | | | | | |
| | | | | | (a) | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | (a) 1ST RDS WP & HC, SUCCEEDING RDS HC |

| (ILLUMINATION FOR 53 DIV OPORD 20) | | | SCHEDULING WORK SHEET | | | | | | | | | | | | | SHEET <u>1</u> OF <u>1</u> | |
|---------------------------------------|--------------------------|--------------|--|---|---------|---|---|---|--|--|--|--|--|--|--|----------------------------|--|
| | | | For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC. | | | | | | | | | | | | | | |
| LINE NO | ORGANIZATION AND CALIBER | FIRING UNITS | 0 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | REMARKS |
| 1. | 3-42 FA | A | | | DA 3251 | | | | | | | | | | | | |
| | | | | | (a) | | | | | | | | | | | | |
| 2. | (155 SP) | B | | | DB 4108 | | | | | | | | | | | | |
| | | | | | (b) | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | (a) 4-GUN ILLUM RANGE AND LATERAL SPREAD (b) 2-GUN ILLUM LATERAL SPREAD |

Nuclear Schedules. The preparation of a nuclear schedule differs in several ways from that of a conventional schedule. The nuclear schedule is normally developed by a target analyst in the FSE (corps, division, or sometimes brigade). A summary of the nuclear target analysis is produced. It indicates all units that can achieve adequate coverage on each target (unit is within range, and coverage meets commander's guidance). The summary of analysis is then used to select the best combination of units and weapons and/or yields to fire on each target in the target complex. The range to target may be based on actual range or on a planning range (normally two-thirds of the maximum range of the weapon system). To ensure that the target analysis remains valid, the range to target used to develop the schedule is fired. This may be done by sending a warning order to the delivery unit indicating the target and a not-greater-than (NGT) range. The NGT range serves notice to the delivery unit or controlling headquarters that only those firing points at a range to the target less than the NGT range will be used to fire the missions. Thus, the delivery unit has complete flexibility and control in designating firing points while ensuring no degradation of desired effects on the target and no increases in minimum safe distances (MSDs) or collateral damage distances (CDDs). After firing units are assigned to targets, the sequence in which the targets will be fired in the schedule is determined. The effects that the environment of a nuclear battlefield (blast, thermal radiation, nuclear radiation, and electromagnetic pulse [EMP]) may have on friendly nuclear weapons are considered. One of the problems in scheduling nuclear weapons is preventing preinitiation. Preinitiation can be avoided by separating nuclear detonations in space and time and avoiding firing through the nuclear cloud of a previous burst. The detailed procedures for scheduling nuclear targets are explained in FM 101-31-2. The distances and waiting times that must separate nuclear bursts can be determined by using FM 101-31-2. Once total time is determined, it is subtracted from the time that the fires are to be completed. This indicates the time the nuclear targets will be fired.

MLRS FIRE PLANNING

Since MLRS fire planning procedures deviate in some ways from the traditional fire planning methods, MLRS fire planning is discussed separately. The different procedures are required because of the characteristics of the MLRS; its munitions, range capability, and volume of fire; and the MLRS employment doctrine (shoot-and-scoot tactics and the use of hide positions).

The MLRS can deliver a high volume of fire, in a short time over a large area to ranges of 30 kilometers. Therefore, MLRS fires are best used against targets that are one or more of the following:

- Large targets.
- Targets located with a large target location error.
- Targets to which a high percentage of damage is desired.
- Targets located beyond the range of cannon artillery.

The wide dispersion of the submunitions from the ICM warhead makes the MLRS an excellent weapon for attacking large or inaccurately located targets. The destructiveness of MLRS munitions makes MLRS well-suited for use against targets to which a high percentage of damage is desired. Because of its long range, MLRS can hit targets that are beyond the range of cannon artillery.

Ammunition resupply is a problem for all weapon systems, but it is a particularly important consideration for MLRS. Vast quantities of ammunition would be required to attack all targets of the types addressed above. Therefore, MLRS must be limited primarily to the attack of high-payoff targets.

The characteristics of high-payoff targets differ from operation to operation, depending on both enemy and friendly force postures; and targets will be determined through the targeting process. Targeting priorities for the MLRS should be as follows:

- High-payoff targets 15 to 30 km from the FLOT.
- High-payoff targets 0 to 15 km from the FLOT that cannon artillery cannot effectively engage.
- Other targets 15 to 30 km from the FLOT.
- Other targets 0 to 15 km from the FLOT that cannon artillery cannot effectively engage.

To plan MLRS fires, the fire planner must understand the response posture system used for reporting the status of the MLRS unit's self-propelled launcher-loaders (SPLLS). They are designated as being in a hot, cool, or cold status by the MLRS battery FDC. Definitions and response times for the various response postures are shown on the next page. This system helps the FDO select the MLRS launcher (or launchers) to fire a mission and helps the fire planner know the availability of MLRS fires.

MLRS RESPONSE POSTURES

| RESPONSE POSTURE | DEFINITION | TIME FROM RECEIPT OF MISSION TO FIRING |
|---|---|---|
| Hot | Fully operational, ready for a fire mission | 3 minutes plus travel time from hide area to firing position ¹ |
| Cool | Fully operational except that the stabilization reference package is turned off; requires time for the gyro to stabilize before it can fire | Hot response time plus 7 1/2 minutes ¹ |
| Cold | Out of action | 30 minutes if the launcher is mission capable |
| ¹ This assumes a zero response time by the crew. | | |

The headquarters doing the fire planning for an MLRS unit must know how many launchers are currently in a hot status, how many launchers can be brought to a hot status, and how long it will take to bring them to a hot status.

When the fires of an MLRS unit are scheduled, each MLRS launcher is considered a firing unit. If all nine launchers in a battery were hot, then the scheduling work sheet would have nine lines for MLRS – one for each launcher. The FIRING UNITS column of the scheduling work sheet is left blank for MLRS units. The MLRS battery FDC selects the launcher to fire.

When scheduling the fires of MLRS units, fire planners should never plan more targets than the total number of launchers that can be brought to a hot status by the time the targets must be fired even if those targets use less than a full launcher load of rockets. Since a launcher can fire no more than 12 rockets per mission targets requiring more than 12 rockets must be scheduled for two or more launchers.

Because of the difficulty in accurately determining the amount of time required for an MLRS launcher to move from one firing position to another, each launcher is normally scheduled only once in a schedule of fires. If the schedule is long (more than 30 minutes) and the MLRS unit commander can give the fire planner an accurate estimate of the time it will take the launcher to move to a new firing position and be ready to fire (including time for ammunition resupply), a launcher may be scheduled to fire on more than one target. However, this situation is not expected to occur often.

When scheduling the fires of MLRS units, the fire planner should assume that a launcher in a cool status can be brought to a hot status, move to a firing position and be ready to fire within 10 1/2 minutes of being sent a fire mission. A launcher that is already in a hot status can be ready to fire within 3 minutes after it moves to the firing position.

There must be continuous coordination between fire planners and MLRS units to ensure that there are enough launchers in a hot or cool status to fire scheduled fires.

When a scheduling work sheet is prepared for the MLRS, lines are not used to show the duration of firing. Instead of lines, a dot is used between the target number and the number of rockets to be fired, regardless of how many rockets are fired or the duration of firing. The only exception to this rule is in the scheduling of groups when neither dots nor lines are used. Examples of remarks that might appear on a scheduling work sheet for MLRS are shown in the example scheduling work sheet for a preparation on page F-13.

The designation of an NLT time on target gives the MLRS unit greater flexibility and eases its firing of the targets on the schedule. The time interval between rocket firings can be specified. This interval can be between 4.5 and 99.9 seconds. Even though the interval between rockets can be as long as 99.9 seconds, for reasons of survivability, the interval should be short enough that all rockets are fired within 2 minutes. If no interval is stated, the rockets will be fired at the maximum rate of fire, approximately 5 seconds between rockets.

Use of MLRS can be planned in the following schedules:

- Ž Counterpreparations.
- Ž Programs.
- Ž Series.
- Ž Groups.
- Ž Preparations.

Counterpreparations, Programs, and Series

These schedules are not normally fired at specific times. Instead they are fired on call and are usually keyed to a specific event or maneuver phase. (See the example scheduling work sheet for groups on page F-12.)

Groups

Groups may at times be scheduled for fire by MLRS units. (See the groups scheduling work sheet below.) Groups must be planned with one or more launchers firing on each target. Also, MLRS and cannon units maybe scheduled on targets in the same group; however, close coordination must be made between the cannon unit FDC and the MLRS unit FDC to ensure that the targets in the group are fired simultaneously. When given the order to fire the group, the MLRS FDC will fire the mission as a TOT mission, causing the fires to fall on all targets in the group at the same time. Only hot launchers should be scheduled to fire on a group of targets.

Preparations

Because preparations are keyed to a specific H-hour, MLRS units can fire at any predesignated time during the preparation. This also applies to programs and series. (See the preparation scheduling work sheet on page F-13.)

Close coordination with the MLRS unit is necessary to ensure that enough launchers are in position to meet the TOTs specified in the preparation schedule. As with counterpreparations, all scheduling rules apply except those concerning gaps and starting and ending with all units firing.

Other Schedules

Programs of interdiction fires will normally be a series of TOT missions given to the MLRS battery. The not-before and not-after times discussed earlier can also be used.

The MLRS normally will not be assigned a mission that would cause its involvement in a quick-fire plan. Therefore, MLRS units rarely are included in a quick-fire plan. An additional limitation to involving the MLRS in a quick-fire plan is its inability to operate on more than one voice net and one digital external radio net. If MLRS is included in a quick-fire plan, the same techniques used to schedule a series should be used.

EXAMPLE SCHEDULING WORK SHEET-MLRS GROUPS OF TARGETS

[illegible]

EXAMPLE SCHEDULING WORK SHEET- MLRS PREPARATION

| (PREPARATION FOR 53 DIV OPORD 20) | | | SCHEDULING WORK SHEET | | | | | | | | | | | | SHEET <u>1</u> OF <u>1</u> | |
|--|--------------------------|--------------|-----------------------|-----------------|----------------|-------------|---|-------------|--|--|--|--|--|--|----------------------------|--|
| For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC. | | | | | | | | | | | | | | | | |
| LINE NO | ORGANIZATION AND CALIBER | FIRING UNITS | | | | | | | | | | | | | REMARKS | |
| | | | -4 | -3 | -2 | -1 | H | | | | | | | | | |
| 1. | 6-10 FA | A | | AY2001 12 | | | | AY2005 6 | | | | | | | | |
| 2. | (203 SP) | B | | AY2001 12 | | | | 6 | | | | | | | | |
| 3. | C/1-13 FA | | | AY2010 12(a) | | | | | | | | | | | | |
| 4. | (MLRS) | | | | AY2011 3(b) | | | | | | | | | | | |
| 5. | | | | | AY2015 12 | | | | | | | | | | | |
| 6. | | | | | | AY2006 6 | | | | | | | | | | |
| | | | | | | | | | | | | | | | FINISH FIRING | |
| | | | | | | | | | | | | | | | (a) NLT H-1 | |
| | | | | | | | | | | | | | | | (b) 10 SEC BETWEEN ROCKETS | |

Section II

AUTOMATED FIRE PLANNING

The FA commander (as the FSCoord) has the ultimate responsibility for responsive fire support. Therefore, he must be given the flexibility to manage the resources under his command. During fire planning operations, he manages his resources by specifying the fire units (FUs) that are to be used in the operation and the control under which they are to operate.

NONNUCLEAR FIRE PLAN COMMANDER'S CRITERIA

The successful execution of responsive fire support is the direct responsibility of the FA commander. He fulfills this responsibility through firepower and resource management. Since the available firepower and resources

vary with the situation, the commander and his staff must be able to modify the standard computer solution as required. This is done by means of the nonnuclear fire plan (NNFP) modification file. Criteria manually entered in the NNFP MOD file are used by the computer in all NNFP processing. The file may be built from current or existing plans by use of the NNFP;COMD message.

Separate criteria files are established for each fire plan. If no MOD file is built for a specific plan, the current modification file established for tactical and technical fire control (TTFC) will be used. The NNFP MOD file criteria take precedence over the permanent criteria of the computer program. These criteria may be superseded in specific fire planning cases by means of the NNFP;INST input message. There are primarily five NNFP input messages used to enter the commander's criteria.

NNFP;MOD Message

The commander's criteria modification (NNFP;MOD) input message is used to establish criteria for all fire units in all fire planning functions. The modification and criteria are for planning purposes and will have no effect until the computation of the plan is initiated. For planning purposes, the message maybe used as follows:

- Ž To ignore availability and type of ammunition.
- Ž To authorize use of standard met data during computations.
- Ž To designate the maximum number of battalions to attack a single target (div arty only).
- Ž To establish an effects cutoff factor.

It also allows the operator to associate the name of the battalion or div arty zone of responsibility with the fire plan.

NNFP;XCLUD Message

The commander's fire unit exclusion (NNFP;XCLUD) input message is used to exclude tire units by name or weapon type from planning consideration. The message can also be used to exclude specific types of ammunition (shell and/or fuze) by either weapon type or fire unit.

NNFP;ATTACK Message

The commander's attack method (NNFP;ATTACK) input message permits manual specification of desired effects or standard volleys to be fired against specific target types and degrees of protection.

NNFP;FUSEL Message

The commander's fire unit selection criteria (NNFP;FUSEL) input message is used as follows:

- Ž To associate fire units with a battalion.
- Ž To specify the maximum number of alleys to be fired by fire units with specified weapons.

- Ž To specify the ordering (FU selection) of fire units within a battalion.

At div arty, it is also used to specify the battalion assignment ordering number (BAON) to be used during computation of the fire plan.

NNFP;RESFU Message

The reserve fire units or interval (NNFP;RESFU) input message is used to reserve a designated fire unit for a specific time interval during a fire plan or to reserve all fire units for specific intervals of the fire plan period.

RELATED FILES

The commander's guidance for resource management is implemented by the establishment of appropriate computer files for each fire plan. The selected fire units and associated ammunition are provided by the ammunition and fire unit program and the fire support coordinating measures are provided by the support (SPRT) program. NNFP also accesses the artillery target intelligence (ATI), tactical fire control (TFC), and tactical and technical fire control (TTFC) programs for specific data and criteria.

Ammunition and Fire Unit Program

The AFU program provides for the maintenance of current information pertaining to the status, locations, strength, capabilities missions, and ammunition inventories of all associated fire units. This program provides supporting information for tire planning and for tactical fire control and technical fire control processing.

AFU;BUILD Message

The AFU;BUILD input message provides the means of associating AFU data with a tire plan. The data may be retrieved from either the current AFU file or from an existing fire plan file. Additions, modifications, and deletions can also be incorporated by using the AFU input messages (UPDATE, AMOUPD or BAMOUP, ASR, and so forth). There are four methods by which AFU data can be selected for fire planning:

- Ž The entire AFU file.
- Ž Individual fire units by name.
- Ž Weapons by type.
- Ž Fire units by ammunition type.

Regardless of the method used the existing AFU data will remain in both files until deletion.

Support Program

The SPRT program provides for the maintenance of current information pertaining to the status and location of all fire support coordinating measures. Generally, these measures are recommended by the FSCoord and established by the force commander. Once developed, these measures are entered in the support routine and, when required, are associated with fire plans.

SPRT;BUILD Message

The SPRT;BUILD input message is used to construct a support planning file from either the current file or an existing planning file. Data to be included in the new plan can be designated by type (frontline trace [FRLT], no-fire line [NFL], final coordination line [FCL], and so forth) or by transferring all existing fire support coordinating measures to the new plan. Additions, modifications, and deletions can be incorporated by using the support program input messages (ZNE, GEOM, AIRCO, and COMD).

Artillery Target Intelligence Program

The ATI program is used by the div arty operations center and supported units to process target information received from all sources. The program correlates all target reports, combines reports when appropriate, and provides the most probable location of each target. The div arty computer can store 1,364 targets in the ATI file. Because the file contains all the gathered battlefield intelligence, it is the logical source for target data to be used for nonnuclear fire planning.

Tactical Fire Control Program

The TFC function at div arty provides automatic volume-of-fire computations for each target of the fire plan. For criteria not specified or established for a fire plan the data used are identical to those used for current TFC processing.

Tactical and Technical Fire Control Program

The TTFC program at battalion provides automatic computer processing of tactical fire control by determining the volume of fire necessary for defeating a target. Technical fire control computes the ballistic and firing solution. The TTFC program at battalion also controls the battalion target file that can contain up to 300 targets and is used for NNFP processing. For criteria not specifically established for a fire plan the data used are identical to those used for current TTFC processing.

TARGET LISTS

TACFIRE target lists are developed initially as described in the following paragraphs. They consist of the preliminary target list, fire plan target list, on-call target list, and targets in the schedule of fires.

Preliminary Target LIST

The preliminary target list is prepared from an accumulation of individually entered targets or from selected target data available from the ATI files at the div arty computer and individual targets entered with the NNFP;FPTU input message. When the div arty computer is available, FA battalions can get data from the ATI files. They request specific target types or designate a search area by using the ATI prepare fire plan (ATI;PREFP) input message and the ATI standing request for information (ATI;SRI). The FSO retrieval criteria should be obtained and consolidated before the ATI;PREFP message is submitted to div arty.

Once the preliminary target list has been coordinated with the maneuver commander and members of his staff, the FSO notifies the DS battalion operations element. Any special targeting instructions are forwarded along with the target number by means of the NNFP;INST message.

ATI;PREFP. The ATI;PREFP input message is the preferred means of developing a preliminary target list when the div arty computer is available. Details concerning this message are in TM 11-7440-240(241)-10-7. After computer processing at div arty, the preliminary target list is transmitted to the requesting battalion and a copy is automatically distributed to each FSO according to MOI techniques. Target information retrieved from the ATI file is automatically stored, under the fire plan name, in the receiving unit's battalion target file. The entire target list is immediately available to the O&I personnel as well as to the FSOs at maneuver battalions and brigade. The FSOs then coordinate with the maneuver battalions and the brigade. By use of the NNFP;FPTU message, each FSO adds to or deletes from the list, as required to support his portion of the operation.

ATI;SRI. The ATI;SRI input message is used to establish criteria to be used by the div arty computer to retrieve targets that meet specific criteria. This ensures that the most recently squired targets are available for addition to a specific fire plan. When possible, the submitted ATI;SRI should contain the identical criteria as those used in the ATI;PREFP input message. Targets retrieved can then be reviewed and, if desired, entered in the fire plan by use of the NNFP;FPTU message. Details concerning the ATI;SRI are in TM 11-7440-240(241)-10-8.

Fire Plan Target List

A fire plain target list is a selection of targets from the preliminary target list that are designated as targets to be used in the fire plan schedule. Targets are moved from the preliminary target list to the fire plan target list by means of the NNFP;INST message. Scheduling instructions such as target priority, phasing and time to be fired are applied by using the NNFP;INST message. For each target listed in the fire plan target list the location type and/or subtype, degree of protection size, and scheduling instructions are identified and stored.

On-Call Target List

An on-call target list is a selection of targets from the preliminary target list that are designated as on call. Targets are designated as on call in order to reduce the reaction time between the actual request for fire and the delivery of fires in the target area. Targets are designated as ONCALL by means of the NNFP;INST message.

Targets in the Schedule of Fires

Targets in the schedule of fires (TISF) are those fire plan targets that have been scheduled to be fired on in accordance with a time sequence or have been designated as on-call targets. Fire plan and on-call targets make up the TISF once the scheduling computations are completed. All the data that identified the target when it was in the fire plan target list remain with the target. In addition, all scheduling data to include firing unit, ammunition, specific H-hour, effects or volleys, and angle of fire, are identified with the target. The TISF make up the final target list established before execution of the fire plan.

Transmission of Target Lists

Any existing target list can be transmitted to any TACFIRE subscriber (except the DMD) by means of the NNFP;COMD input message.

SCHEDULING

The primary purpose of fire planning is to reduce reaction time and to establish a schedule of fires that will optimize the use of available fire units, the expenditure of ammunition, and the fire support provided to the maneuver forces. The nonnuclear fire planning function of TACFIRE provides a printed and detailed recommended solution to the target scheduling problem.

Primarily, there are two messages for controlling the fire plan scheduling solution: the nonnuclear fire plan target instruction (NNFP;INST) input message and the nonnuclear

fire planning compute fire plan (NNFP;COMFP) input message. The NNFP;INST message deals with individual target instructions, such as when the target is to be fired and with what type of ammunition. The NNFP;COMFP message controls the overall fire plan parameters such as the duration and phasing. Each message affects the other, and together they determine the eventual fire plan solution.

NNFP;INST Message

The NNFP;INST input message permits scheduling instructions to be applied to each target in the preliminary target list. When target instructions are entered, the target then becomes a portion of either the fire plan target list or the on-call target list, depending on the instructions entered. Target instructions may be entered at any time after the target has been entered in the planning file for the specified plan. When the instruction message is entered the plan name must be entered in the PLAN field and the number of each target to which the instructions pertain must be entered in the TGTS field. Instructions for up to nine targets may be entered with one input message if the same instructions apply to all the targets specified.

Instructions that may be applied to specific targets include the following:

- Ž Designation as targets in the FPTGT or ONCALL lists.
- Ž Priority and phase to be applied to the target during scheduling.
- Ž Designation of time the target is to be engaged relative to H-hour.
- Ž The fire unit to engage the target if H-time is not specified (for more than one target).
- Ž The desired effects or volleys to be used against the target.
- Ž The shell, fuze, and angle of fire with which the target is to be engaged.

NNFP;COMFP Message

The NNFP;COMFP input message is used to control manually the conditions to be used in scheduling. These include the start time and length of phases for the fire plan and the target priorities to be considered in the computations.

BATTALION SCHEDULING PROCEDURES

Phase Start Time and Length

The NNFP function uses a variable interval scheduling technique to achieve a compact schedule. The time at

which a target is scheduled is a function of fire unit availability. The duration of the attack on that target is a function of the number of volleys required to defeat the target, the fire unit reaction time, and the sustained rate of fire. If phase data are not entered in the NNFP;COMFP message, NNFP defaults to a one-phase fire plan with a maximum duration of 120 minutes. When phase data are entered, the duration is calculated from the phase start time and length information. Phase times, when specified, must not overlap, and combined they cannot exceed 120 minutes. If more than one phase is specified no phase can exceed 60 minutes.

Target Ordering

Before the scheduling portion of NNFP is entered, all fire plan and preliminary targets are ordered in accordance with the following consideration:

- Ž Priority.
- Ž H-time specified
- Ž Repeat targets.
- Ž Phase.

Targets From the Preliminary Target List

These targets are scheduled after all fire plan targets have been tried. Targets from the preliminary target list are included in the computation if the FPLST field of the NNFP;COMFP message has been specified. Using the FPLST field is also a means of computing a hasty fire plan. These targets, considered the lowest priority targets in the fire plan use default instruction data (lowest priority, any phase, and so on). On-call targets are ordered last because they are not subject to the scheduling criteria.

Fire Unit Selection

Eligible fire units are obtained from the planning file. If a fire unit is mission essential data if its ready status is out, or if it is excluded by the NNFP MOD file, it is excluded from consideration.

Targets are retrieved from the ordered target list one at a time and are processed. The first (or next) target is compared with the fire unit list after the interval in which to begin scheduling of the target is established.

The eligible fire units for the plan are then selected for each target. If units to fire are specified for the target in the fire plan instructions, these fire units are considered first. If a fire unit is reserved or busy during an interval, it is excluded from consideration for the target for that interval. If the target is in a dead space area (DSA) or is out of

range of the fire unit, that unit is excluded from the target. An ordering is then established for each fire unit for each target as follows:

- Ž Zone of responsibility within which the target lies.
- Ž Fire unit ordering in accordance with the NNFP;FUSEL entries.

Variable Interval Scheduling

Scheduling begins when ordering has been completed for all targets. Use of the variable interval scheduling allows the computer to consider targets for scheduling on a 1-minute basis, with multiple fire units to initiate fire at the same time. Once a target has been scheduled, the fire unit is identified as busy until the time required to shoot the assigned volleys is elapsed. Time required is a function of the fire unit's sustained rate of fire plus its reaction time. This action allows fire units with a small volume of fire, or with a high sustained rate of fire, to engage other targets sooner than fire units firing on the same target with a larger volume of fire or a lower sustained rate of fire.

Minimum-Time Criteria

As soon as times are chosen for scheduling a given target, the fire units available at those times will be selected if they meet the minimum-time criteria. These criteria state that the fire unit must have time to fire one volley at the sustained rate of fire plus its reaction time. When a fire unit meets the minimum-time criteria, the maximum number of volleys (based on the sustained rate) that can be fired during the allowed time is calculated (the reaction time is taken into consideration). The duration allowed for a fire unit to fire is based on one of the following:

- Ž The interval between targets already scheduled for this fire unit.
- Ž The time from the start of the plan to the first scheduled target.
- Ž The time from the last scheduled target within a phase to the end of that phase.
- Ž The time from the last scheduled target within a plan to the end of that plan.

If this value is less than the maximum volleys value entered in the MOD file for the fire unit weapon, the calculated maximum volleys will be passed on to calculate the volume of fire. If it is not less, the maximum volleys listed in the MOD files will be used. Once a target has been scheduled, the fire units engaged are excluded from further consideration during the interval required to fire the assigned volleys. By use of the sustained rate of fire, the

time to fire the assigned volleys is calculated. This time is then rounded up to the next higher minute, and the reaction time is added.

Repeat Targets

Repeat fire is indicated by the entry of more than one phase in the NNFP;INST message. The target is then scheduled in each specified phase with any combination of fire units. If the target cannot be scheduled in any of the specified phases, it is considered a scheduling exception.

H-Hour

An H-hour for the plan should be designated for computation since the scheduling is constructed relative to H-hour. Before final computations of the plan the actual H-hour may be specified to allow final printed output reports to include the actual H-hour.

Checks and Tests

Certain checks and tests are made on each target. The support function determines if the target location falls within the zone of fire of any artillery units. That function also will furnish the name of the zone (or adjacent zone at div arty) to the NNFP program. If the target is not within the battalion zone, or if it violates the NFL, the CFL, or an ACA the target will be scheduled; but a warning message will be generated.

RECOMMENDED COMPUTATION PROCEDURES

To attain maximum use of automated functions available for fire planning, at least two computations should be made when time is available. The first establishes the timing required. It also resolves any conflicts or exceptions that can be corrected through modification of target instructions, the modification file, reservations, available fire units, or computation instructions. The second computation can then obtain a realistic schedule that can be implemented.

First Computation

Generally, the only critical elements to be provided in the NNFP;COMFP message for the first computation are the plan and phase fields, which are temporary instructions. Fire plan computations should not be initiated until all the instructions for all the phases and priorities have been entered. The suggested approach for the initial computation is as follows:

- Ž Enter the plan name in the PLAN field and enter H-hour.

- Ž Enter the length of each phase established for the plan in the PHASE field. Phase lengths should reflect the percentage of total targets in each phase. Unless considered necessary, do not allow computation to default to 120 minutes (output will contain all 120 minutes).

The following information can be obtained as a result of the initial computation: (Output reports include NNFP;4214, 4215,4216,4217,4218, and 4219.)

- Ž Length of time required to perform each phase of the plan.
- Ž Conflicts in the scheduling of individual targets as related to the relative time the target should be attacked.
- Ž Exceptions resulting from scheduling, capability, or ammunition limitations. Targets may be exceptions for more than one of the above reasons. However, only one exception will be listed with the order of listing as ammunition, capability, and scheduling.
- Ž Fire units assigned to each target and the effects achieved.
- Ž Ammunition used against each target.

From the available data many of the problems identified from the initial scheduling can be resolved through changes made in the target instructions by means of the NNFP;INST message. Other means by which to resolve the problems are:

- Ž Adding or deleting fire units or targets.
- Ž Changing fire unit reservations.
- Ž Changing the modification files.
- Ž Assigning specific times for targets to be engaged.

The output reports identify the time required to complete each phase of the fire plan. From this information the time to start each phase can be computed relative to H-hour.

Subsequent Computation

When all problems identified by the first computation have been resolved, a subsequent computation is initiated by use of the NNFP;COMFP message. The output reports derived from the subsequent request may be adequate, or they may require further modification.

NONNUCLEAR FIRE PLAN ALTERATION

After the fire plan has been computed and the schedule of fires reviewed changes may be required before execution. Major changes, such as adding targets or changing the

duration of the phase lengths of a fire plan, require recomputation. Minor changes involve adding new fire units to targets, altering the time for firing on certain targets, or changing the method of attack. These minor changes can be incorporated without recomputing the fire plan. These changes can be made by use of the NNFP;FPA (fire plan alteration) input message.

EXECUTION

At battalion level, the term “execution,” when used in TACFIRE fire planning means determination of the ballistic solution for firing on each target. It does not imply that the weapons are actually fired.

The execute a fire plan (NNFP;EXECFP) input message allows battalions to execute a fire plan as a whole or by phases. Single phases or a combination of phases may be specified. Execution is accomplished only for those fire units associated with the executing battalion. After the fire commands have been computed, the fire command summary must be reviewed and screened for any air corridor or fire unit mask violations. When approved, the fire command summary is transmitted to the appropriate fire units. The time firing will begin is based on the H-time, as announced by the force commander. Each unit will start its portion of the schedule and attack each target at the time specified.

NONNUCLEAR FIRE PLANNING AUTOMATED RECORDS AND REPORTS

The nonnuclear fire planning program provides for a series of fire planning related reports. These reports are periodically printed on completion of a processing step or are printed on demand of fire planning personnel. The reports are immediately available to TACFIRE-equipped artillery units and fire support elements. The information in these reports will help the commander and his staff in conducting current operations and in planning for future operations. The reports and their sources are identified below.

NNFP;4211 Preliminary Target List

The preliminary target list is the initial target list acquired from the ATI files or by input of an NNFP;FPTU message. For each target listed the list provides target location, target type and/or subtype, degree of protection, target size, and target number. It also contains any other information available from the ATI files. The list is obtained as a result of input of an ATI;PREFP message, as a result of a request using the NNFP;COMD input message, or upon receipt from another computer center. Targets in the preliminary target list are received in the NNFP;XTGT format (TM 11-7440-240(241)-10-7).

NNFP;4212 Fire Plan Target List

The fire plan target list is a selection of targets from the preliminary target list that are to be part of the fire plan solution. In addition to the data obtained from the preliminary target list the fire plan target list contains all scheduling instructions that have been applied to the target. The list is a result of receipt from another computer or a request using the NNFP;COMD message.

NNFP;4213 On-Call Target List

The on-call target list is a list of targets that have been designated as on call. This list shows the same information for each target as that shown in the fire plan target list. The list can be printed as a result of receipt from another computer center or by use of the NNFP;COMD message.

NNFP;4214 Schedule of Fires Report

The schedule of fires report provides scheduling results for each target in the fire plan. It also provides the status of each unit in the fire plan for the duration of the plan. A legend is printed at the start of each report defining the entries used in the report. The legend includes the following information;

- Ž Fire unit is idle.
- Ž Unit is firing.
- Ž Fire unit reaction time.
- Ž Nuclear target.
- Ž Unit is in a reserve status.
- Ž Number of volleys to be fired.

The output gives data by phase, by H-hour, and by fire unit. The report can be derived upon receipt from another computer center, by request using the NNFP;COMD message, or as a result of the NNFP;COMFP input message.

NNFP;4215 Groups of Fires Report

The groups of fires report is provided for each group of fires in a fire plan. It contains the following:

- Ž The plan name.
- Ž H-hour if specified.
- Ž Target number.
- Ž Fire unit for each target.
- Ž Number of rounds for each target.
- Ž The scheduled time to repeat targets if applicable.
- Ž An on-call designator.

This report may be received from another computer center, may be requested by using the NNFP;COMD message, or may be printed as a result of input of an NNFP;COMFP message (div arty only).

NNFP;4216 Series of Fires Report

The series of fires report lists all series contained in a fire plan. It lists the following information:

- Ž Plan and series names.
- Ž Time relative to H-hour.
- Ž Phase and priority.
- Ž On-call status.
- Ž Target number and its order in the series.
- Ž Group name and order number of group in the series.
- Ž Fire unit.
- Ž Number of rounds to be expended.

This report may be received from another computer center, may be requested by using the NNFP;COMD message, or may be printed as a result of an NNFP;COMFP input message (div arty only).

NNFP;4217 NNFP Ammo Report

The ammunition report summarizes the ammunition to be expended during the fire plan. At div arty, the report shows a battalion total by type. At battalion, the report shows total by fire unit. The report may be printed by using the NNFP;COMD message and will be printed upon completion of computations requested by using an NNFP;COMFP message.

NNFP;4218 Targets in the Schedule of Fires Report

The TISF report presents associated data for all targets in the fire plan. The scheduled fire plan targets are listed first and then all on-call targets. The data provided for each target include the following:

- Ž Location and description.
- Ž Zone in which the target is located.
- Ž Mission fired date (if previously engaged).
- Ž Any geometry, available supply rate (ASR), or ammunition level warnings.
- Ž H-hour, priority, and phase.
- Ž Group or series data (specified).
- Ž Desired and achieved effects or volleys.
- Ž Fire unit(s) assigned to the target.

Ž Shell and fuze to be used by each tire unit.

The report can be received from another computer center or requested by using the NNFP;COMD message. It will be printed upon completion of fire plan computations requested by using the NNFP;COMFP message.

NNFP;4219 Fire Plan Summary Report

The fire plan summary report identifies the warnings and exceptions generated during the processing of a fire plan. It also provides a summary identifying the total number of targets in the fire plan, the number of scheduled and unscheduled targets, and the total number of targets with warnings. Each target is listed along with any warnings and – if there are warnings – the type of exception. The report can be printed by entry of the NNFP;COMD message. It is always printed upon completion of computations (NNFP;COMFP).

NNFP;4221 NNFP MOD List

The MOD list provides the contents of the MOD file associated with a specific plan name. It includes the following:

- Ž Data specified for ignoring ammunition.
- Ž The effects cutoff factor.
- Ž The maximum battalions to engage a target (div arty only).
- Ž The zone specified for use with the plan.
- Ž Fire unit selection criteria.
- Ž Maximum volleys by weapon type.
- Ž Fire unit, weapon and ammunition exclusions.
- Ž Any modifications to the standard attack table.

The MOD file is printed when a specific file is built with the NNFP;MOD message, and it can be printed by use of the NNFP;COMD message.

NNFP;4222 NNFP Count Report

The NNFP count report provides a count of the number of targets to be sent to a subscriber (or subscribers) when a fire plan list is sect. It is printed as a result of an operator request when an NNFP;COMD input message is entered.

NNFP;4223 Fire Command Summary

The tire command summary provides fire unit, H-hour, shell, lot, charge, fuze, volleys, deflection, time, and quadrant for each scheduled target and the appropriate

data for on-call targets. It is printed or transmitted as a result of entry of an NNFP;EXECFP message.

NNFP;4224 Nuclear TISF Report

The nuclear TISF report lists the following data for each nuclear target scheduled to be fired:

- Ž Target number, location and description.
- Ž Phase and time (relative to H-hour) target is to be fired.
- Ž Zone(s) of target location.
- Ž Fire unit to engage target (launcher when applicable).
- Ž Weapon, shell, fuze, mark number, and yield of munition.
- Ž The number of rounds to be expended.

The report is output as a result of computation of a fire plan containing nuclear targets, or it may be printed by request using the NNFP;COMD message.

NNFP;4225 Mark Yield Summary

The mark yield summary lists, in addition to the plan name and H-hour, all fire units, by weapon type, mark, and yield, that are scheduled to fire nuclear munitions during the fire plan period. It is output as a result of computation of a fire plan that contains nuclear targets, or it may be printed by request using the NNFP;COMD message.

NNFP;4226 Nuclear Schedule of Fires Report

The nuclear schedule of fires report lists all nuclear targets to be engaged during the fire plan. Targets are listed by time relative to H-hour, firing unit, and target number. It is output as a result of computation of a fire plan that contains nuclear targets, or it may be requested by use of the NNFP;COMD message.

NNFP;4227 Fire Unit Reservation Report

This report lists fire unit reservations by fire unit, weapon, reservation type (nuclear or nonnuclear), and start and end times of reservation. It can be obtained by request using the NNFP;COMD message.

FILE MAINTENANCE

Although the storage capability of TACFIRE is extensive, it is possible to totally inundate the memories to a point that system functions become degraded. To preclude overextending the memory capabilities of the system, continual and thorough file maintenance must be performed.

Operations During Nonnuclear Fire Planning

When time permits, a count of the number of targets meeting fire plan criteria should be requested before submission of the target list request (ATI;PREFP). If target count is excessive, more stringent search criteria can be entered. The retrieval of an excessive number of targets meeting search criteria will do the following:

- Ž Cause critical planning time to be wasted due to the necessity for review before selection of the targets for inclusion in the plan.
- Ž Result in tying up communications nets for an excessive amount of time. This allows the enemy additional time for the conduct of electronic warfare (jamming, intrusion, and so forth).
- Ž Cause targets to be printed only (not stored) at the receiving computer center if the ribbon exceeds 150 (maximum targets in a fire plan). If any of the targets not stored are to be included in the fire plan, they must be associated with the fire plan by a separate entry of an NNFP;FFTU message for each target.

Targets in the preliminary target list that are not to be included in the fire plan are deleted. This is done by entering the NNFP;FPTU message with the DELETE and TGTS mnemonics specified. Targets that should be deleted are those that –

- Ž Are duplicated.
- Ž Are out of range of all available fire units.
- Ž Are no longer appropriate for attack (for example, behind friendly forces).
- Ž For some other reason, do not meet the criteria for attack during conduct of the fire plan.

Once instructions have been applied to targets selected for the fire plan, the complete preliminary target list can be deleted by initiating an NNFP;COMD message with the PLAN, DELETE, and FPLST mnemonics specified.

Specific data (on-call targets, targets in the schedule of fires, and so on) can be selectively deleted from a fire plan by entry of the data and the DELETE mnemonic in the FFPF;COMD message.

Rescinding, Superseding, or Modifying an OPORD or OPLAN

If an OPORD or OPLAN is rescinded, superseded or modified before execution by the maneuver force, the following actions should be taken at the FCE or FDC:

- Ž Delete that portion of the fire plan no longer needed by specifying the appropriate entries (as in the preceding paragraphs) in the NNFP;COMD input message.
- Ž If the plan is cancelled, delete the entire plan (including related files) by entry of the PLAN and PURGE mnemonics in the NNFP;COMD input message.
- Ž If abort (halting a computer action before completion of a task) is initiated during a search or computation verify the files to ensure that unnecessary data are eliminated. This may entail the deletion of individual targets, lists of targets, and/or files related to a specific fire plan.

Actions After Completion (Firing) of a Specific Plan

After a plan has been fired, all data, including related files, should be deleted from the computer files by entry of the PLAN and PURGE mnemonics of the NNFP;COMD input message.

VERIFICATION

To ensure that computer files exist for active fire plans only, a copy of the master plan list (MPLIST) can be obtained by use of the system miscellaneous input message (SYS;MISC) with the MPLIST mnemonic specified. The output message will list all the plans that exist within the computer and will also include the related files for each plan (AFU, SPRT, NNFP, and FSE).

GLOSSARY

| | | | |
|------------------|--|---------------|--|
| A | as-required subscriber (communications graphics) | AR | Army regulation |
| AAG | army artillery group (Threat) | ARFOR | Army forces |
| AATF | air assault task force | ARTEP | Army training and evaluation program |
| ABCA | Australia, Britian, Canada, Americia | arty | artillery |
| ACA | airspace coordination area | AS | Australia |
| ACC | artillery control console | ASGORD | assignment ordering |
| ACP | air control point | ASL | authorized stockage list |
| ACR | armored cavalry regiment | ASP | ammunition supply point |
| AD | air defense | ASR | available supply rate |
| ADA | air defense artillery | asst | assistant |
| ADAM | area denial artillery munitions | atch | attached |
| adapt | adapter | ATI | artillery target intelligence |
| admin/log | administration/logistics (net) | ATIZ | artillery target intelligence zone |
| AFSO | aerial fire support observer | ATHS | airborne target hand-over system |
| AFU | ammunition and fire unit (TACFIRE) | ATP | ammunition transfer point |
| AG | adjutant general | auth | authorization |
| AH | attack helicopter | avn | aviation |
| AHRS | attitude and heading reference system | az | azimuth |
| AIRCOR | air corridor | BAO | battalion ammunition officer |
| ALO | air liaison officer | BAON | battalion assignment ordering number |
| ALOC | administration and logistics operations center | BAS | battalion aid station |
| alt | altitude | BC | battery commander |
| AM | amplitude modulated | BCS | battery computer system |
| AMC | at my command | BCT | briefcase terminal |
| ammo | ammunition | BDAR | battlefield damage assessment and repair |
| amp | amplifier | bde | brigade |
| AMTP | ARTEP mission training plan | BE | Belgium |
| AOF | azimuth of fire | BGU | basic generation unit |
| AP | antipersonnel | BMNT | beginning (of) morning nautical twilight |
| app | appendix | BMO | battalion maintenance officer |

| | | | |
|----------------|--|-----------------|--------------------------------------|
| BMT | battalion maintenance technician | cGy | centigray |
| bn | battalion | cl | class |
| BOC | battery operations center | and | command (net) |
| BP | battle position | cml | chemical |
| BSA | brigade support area | empt | computer |
| BSO | battalion signal officer | CNR | combat net radio |
| BSOC | battalion supply operations center | COLT | combat observation/lasing team |
| btry | battery | c o m m | communication |
| BUCS | backup computer system | COMSEC | communications security |
| | | coord | coordinate |
| C2 | command and control | COP | command observation post |
| C3 | command, control, and communications | COSCOM | corps support command |
| CA | Canada | CP | command post |
| CAA | combined arms army (Threat) | Cphd | Copperhead |
| CAS | close air support | CPREP | counterpreparation |
| CASP | chemical ammunition supply point | CPT | captain |
| cat | category | CRP | combat reconnaissance patrol |
| CATF | commander amphibious task force | CRTA | chief of rocket troops and artillery |
| cav | cavalry | CS | combat support; riot control agent |
| cbt | combat | CSB | common sensor boundary |
| (C) CCP | chemical casualty collection point | CSR | controlled supply rate |
| CCP | casualty collection point | CSS | combat service support |
| CCU | communications control unit | CTA | common table of allowances |
| cdr | commander | CTAD | corps target acquisition detachment |
| CDD | collateral damage distance | | |
| CDS | container delivery system | D | digital (net) |
| C-E | communications-electronics | DA | Department of the Army; Denmark |
| CEB | clothing exchange and bath | DAG | division artillery group |
| CESO | communications-electronics staff officer | DAO | division ammunition officer |
| CEWI | combat electronic warfare and intelligence | decon | decontamination |
| CF | command/fire direction (net) | DISCOM | division support command |
| CFL | coordinated fire line | div | division |
| CFZ | critical friendly zone | div arty | division artillery |
| CFFZ | call-for-fire zone | DMD | digital message device |

| | | | |
|--------------|--|----------------|--------------------------------------|
| DMMC | division materiel management center | FAIO | field artillery intelligence officer |
| DNE | do not engage | FASCAM | family of scatterable mines |
| DNVT | digital nonsecure voice terminal | FASCO | forward area support coordinator |
| DPICM | dual-purpose improved conventional munitions | FAST | forward area support team |
| DPM | digital plotter map | fax | facsimile |
| DS | direct support | FCE | fire control element |
| DSA | dead space area (TACFIRE) | FCL | final coordination line |
| DST | decision support template | FD | fire direction |
| DSVT | digital secure voice terminal | FDC | fire direction center |
| DTG | date-time group | FDO | fire direction officer |
| DZ | drop zone | FEBA | forward edge of the battle area |
| EA | emergency action engagement area | FED | forward entry device |
| EAM | emergency action message | FFA | free-fire area |
| E A P | emergency action procedure | FFE | fire for effect |
| ECCM | electronic counter-countermeasures | FID | foreign internal defense |
| ED | emergency destruction | 1LT | first lieutenant |
| EEI | essential elements of information | 1SG | first sergeant |
| EENT | end (of) evening nautical twilight | FIST | fire support team |
| EFC | equivalent full charge | fld | field |
| eff | effective | FLOT | forward line of own troops |
| ELP | electronic line printer | FM | frequency modulated; field manual |
| EMP | electromagnetic pulse | FO | forward observer |
| EN | electronic notebook | FPF | final protective fire |
| EOD | explosive ordnance disposal | FR | France |
| EOL | end of the orienting live | FRAGO | fragmentary order |
| EPW | enemy prisoner of war | FRLT | frontline trace (TACFIRE) |
| equip | equipment | FS | fire support |
| E W | electronic warfare | FSB | forward support battalion |
| EXTAL | extra time allowance | FS cell | fire support cell |
| F | full-time subscriber (communications graphics) | FSCM | fire support coordinating measure |
| FA | field artillery | FSCOORD | fire support coordinator |
| | | FSE | fire support element |
| | | FSEM | fire support execution matrix |
| | | FSL | field storage location |
| | | FSO | fire support officer |

| | | | |
|---------------|--|----------------|---|
| FSOP | field standing operating procedure | ICE | individual chemical equipment |
| FU | fire unit | ICM | improved conventional munitions |
| | | ID(M) | infantry division (mechanized) |
| GB | nonpersistent nerve casualty agent | IEWSE | intelligence and electronic warfare support element |
| GDU | gun display unit | IHFR | improved high-frequency radio |
| GE | Germany | illum | illuminating |
| gen | generator | inf | infantry |
| GFT | graphical firing table | intel | intelligence (net) |
| GMET | graphical munitions effectiveness table | INTSUM | intelligence summary |
| GS | general support | IP | initial point |
| GSR | general support reinforcing | IPB | intelligence preparation of the battlefield |
| GT | gun-target | IR | infrared, information requirements |
| GTA | graphical training aid | IRAP | improved rocket-assisted projectile |
| GTD | guards tank division (Threat) | IT | Italy |
| G/VLLD | ground/vehicular laser locator designator | | |
| | | JAAT | joint air attack team |
| H | blister agent (mustard) | JMEM | joint munitions effectiveness manual |
| HA | hide area | JMEM/SS | joint munitions effectiveness manual for surface-to-surface weapons |
| HC | smoke | JTF | joint task force |
| HE | high explosive | | |
| HEAT | high-explosive antitank | km | kilometer |
| HEMTT | heavy expanded-mobility tactical truck | kmph | kilometers per hour |
| HEP-T | high-explosive plastic-tracer | | |
| HESH | high-explosive squash head (antitank UK) | LBE | load-bearing equipment |
| HET | heavy equipment transporter | LDF | lightweight digital facsimile |
| HF | high frequency | LIC | low-intensity conflict |
| HHB | headquarters and headquarters battery | LID | light infantry division |
| HHS | headquarters, headquarters and service | LIN | line item number |
| HMMWV | high-mobility multipurpose wheeled vehicle | LO | liaison officer |
| HPT | high-payoff target | LOC | lines of communication |
| H Q | headquarters | LOGPAC | logistics package |
| HUMINT | human intelligence | LP | listening post |
| HVT | high-value target | LRP | logistics release point |
| IAW | in accordance with | | |

| | | | |
|-----------------|---|--------------|---|
| LRSU | long-range surveillance unit | MSR | main supply route |
| LST | landing ship, track | MSRT | mobile subscriber radiotelephone terminal |
| LSU | logistics support unit | MST | maintenance support team |
| LTACFIRE | light tactical fire direction system | MSU | mutual support unit |
| LTC | lieutenant colonel | MTLR | moving-target-locating radar |
| LZ | landing zone | MTOE | modification tables of organization and equipment |
| MAJ | major | MTSQ | mechanical time superquick (fuze) |
| man | maneuver (attack guidance matrix) | mvr | maneuver |
| max | maximum | | |
| MBA | main battle area | N | net control station (communications graphics) |
| MCO | movement control officer | NA | not applicable |
| mech | mechanized | NAI | named area of interest |
| met | meteorology | NATO | North Atlantic Treaty Organization |
| METT-T | mission, enemy, terrain, troops, and time available | NBC | nuclear, biological, chemical |
| MI | military intelligence | NCA | National Command Authority |
| MLRS | multiple launch rocket system | NCO | noncommissioned officer |
| mod | modification | NCOIC | noncommissioned officer in charge |
| MOI | message of interest | NCS | net control station |
| MOPP | mission-oriented protective posture | NFA | no-fire area |
| MOS | military occupational specialty | NFL | no-fire line |
| MOUT | military operations on urbanized terrain | NGF | naval gunfire |
| MP | military police | NGLO | naval gunfire liaison officer |
| MPLIST | master plan list (TACFIRE) | NGT | not greater than |
| MPT | mobile pay team | NICAD | nickel-cadmium |
| MR | moonrise | NL | Netherlands |
| MRE | meal, ready to eat | NLT | not later than |
| MRL | multiple rocket launcher | NNFP | nonnuclear fire plan |
| MS | moonset | NO | Norway |
| MSB | main support battalion | NRI | net radio interface |
| MSD | minimum safe distance | NSN | national stock number |
| MSE | mobile subscriber equipment | nuc | nuclear |
| MSG | master sergeant | NVD | night vision device |
| msn | mission | | |

| | | | |
|------------------|--|----------------|--|
| O&I | operations and intelligent | POL | petroleum, oils and lubricants |
| off | officer | precip | precipitation |
| OIC | officer in charge | prep | preparation |
| O/O | on order | PRI TGT | priority target |
| op | operator | PSNCO | personnel staff NCO |
| OP | observation post | PST | pass time |
| OPCON | operational control | PTMO | prepare to march-order |
| ops/F | operations/fire (net) | pwr | power |
| ops/intel | operations/intelligence (net) | PX | post exchange |
| OPLAN | operation plan | PZ | pickup zone |
| OPORD | operation order | | |
| OPSEC | operations security | QSTAG | quadrapartite standardization agreement |
| org | organization | | |
| OSB | operational support base | R | reinforcing |
| | | R3P | rearm, refuel, resupply point |
| PA | physician's assistant; position area | RAAMS | remote antiarmor mine system |
| P&A | personnel and administrative | RAG | regimental artillery group |
| PAC | personnel and administration center | RAP | rocket-assisted projectile |
| PADS | position and azimuth determining system | R&S | reconnaissance and surveillance |
| pam | pamphlet | RATT | radio teletypewriter |
| para | paragraph | RAU | radio access unit |
| PCG | power converter group | RCMU | remote communications monitoring unit |
| PCL | prescribed chemical load | RCT | road clearance time |
| PD | point detonating | RDF | radio direction finding |
| PFC | private first class | RDO | radar deployment order |
| PIR | priority intelligence requirements | REC | radio-electronic combat |
| PL | phase line | recon | reconnaissance |
| PLL | prescribed load list | ref | reference |
| plt | platoon | reinf | reinforcement |
| PLU | program load unit | REMBASS | remotely monitored battlefield surveillance system |
| PMCS | preventive maintenance checks and services | retrans | retransmission |
| PNL | prescribed nuclear load | RF | radio frequency |
| POC | platoon operations center | RFA | restrictive fire area |
| POF | priority of fires | RFAF | request for additional fires |

| | | | |
|-----------------|---|----------------|---|
| RFL | restrictive fire line | SR | sunrise |
| ROE | rules of engagement | SS | sunset |
| RP | release point | SSB | single sideband |
| RRP | replacement receiving point | SSG | staff sergeant |
| RSO | reconnaissance and survey officer | ST | short ton |
| RSOP | reconnaissance, selection, and occupation of position | STANAG | standardization agreement |
| RSR | required supply rate | survl | surveillance |
| RSTA | reconnaissance, surveillance, and target acquisition | svc | service |
| RT | receiver-transmitter | T | towed |
| SACC | supporting arms coordination ureter | TA | target acquisition |
| SAIK | stand-alone installation kit | TACAIR | tactical air |
| SALT | supporting arms liaison team | TACFIRE | tactical fire direction system |
| SASP | special ammunition supply point | TACSAT | tactical satellite |
| SCP | survey control point | TAI | target area of interest |
| SEAD | suppression of enemy air defenses | TAMMS | the Army Maintenance Management System |
| sec | section | TBP | to be published |
| SFC | sergeant first class | TC | traffic control; training circular |
| SGT | sergeant | TD | tank division (Threat) |
| SHELREP | shelling report | TDA | target damage assessment |
| SIGSEC | signals security | TDIS | time distance |
| SIMO | simultaneous observation | temp | temperature |
| SINCGARS | single-channel ground and airborne radio system | TF | task force |
| SITREP | situation report | TFC | tactical fire control (TACFIRE) |
| SOI | signal operation instructions | TGW | terminally guided warhead |
| SOP | standing operating procedure | TISF | targets in the schedule of fires (TACFIRE) |
| SP | self-propelled; start point; specialist | TLE | target location error |
| SPC | specialist (rank) | TM | technical manual |
| SPCE | survey planning and coordination element | TOC | tactical operations center |
| SPLL | self-propelled launcher-loader | TOE | tables of organization and equipment |
| SPRT | support (TACFIRE) | TOT | time on target |
| spt | support | TOW | tube-launched, optically tracked, wire-guided missile |
| sr | senior | TRP | target reference point |

| | | | |
|---------------|---|--------------|--|
| TSS | target selection standard | VHF | very high frequency |
| TTFC | tactical and technical fire control (TACFLRE) | visib | visibility |
| TU | Turkey | VT | variable time |
| TVA | target value analysis | VTR | vehicle, tracked, recovery |
| | | V X | nerve agent (persistent) |
| UHF | ultrahigh frequency | | |
| UK | United Kingdom | W | wire connection (O&I VFMED to FDC TACFIRE) (communications graphics) |
| UMCP | unit maintenance collection point | w | with |
| US | United States | WLR | weapons-locating radar |
| USAF | United States Air Force | WP | white phosphorus |
| USAFAS | US Army Field Artillery School | WSM | weapon system manager |
| | | WSRO | weapon system replacement operations |
| V | voice (net) | | |
| VE | velocity error | | |
| veh | vehicle | X | subscriber (communications graphics) |
| VMED | variable format message entry device | XO | executive officer |

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