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TACTICS, TECHNIQUES, AND PROCEDURES FOR

FIRE SUPPORT FOR BRIGADE OPERATIONS (HEAVY)

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PREFACE

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

This publication describes maneuver techniques and fire support considerations at maneuver (mvr) brigade and below. It establishes responsibilities and duties of key personnel by focusing on how the fire support system can support the ground-gaining arms. Maneuver and fire support doctrine should be studied in depth to obtain a complete understanding of doctrine, tactics, and techniques, That basic understanding is a prerequisite in order to effectively apply the contents of this how-to manual.

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

In its development, FM 6-20-40 has undergone several draft revisions. Numerous individual Redlegs helped make it the authoritative fire support reference it is. Members of every heavy division artillery (div arty) have provided input at some stage in the development cycle. The units listed below provided representatives from the field to a unique exercise encompassing major input and comprehensive rewrite of the developed draft. The effort of these senior fire support officers resulted in this final product. It reflects the consensus of the field on fire support tactics, techniques, and procedures for the brigades in heavy divisions. The field representatives were from–

- 1st Armored Division Artillery, Zirndorf, Federal Republic of Germany
- 1st Cavalry Division Artillery, Fort Hood, Texas
- 5th Infantry Division Artillery (Mechanized), Fort Polk, Louisiana
- 8th Infantry Division Artillery, Baumholder, Federal Republic of Germany
- 24th Infantry Division Artillery (Mechanized), Fort Stewart Georgia
- 197th Infantry Brigade, Fort Benning, Georgia
- National Training Center, Fort Irwin, California

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

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

Ž 2014/506	Operation Orders, Annexes to Operation Orders, and Administrative and Logistics Orders
Ž 2031/515	Proforma for Atillery Fire Plan
Ž 2082	Relief of Combat Troops
Ž 2099/531	Fire Cooordination is Support of Land Forces
Ž 2147/221	Target Numbering System (Nonnuclear)
Ž 2887/217	Tactical Tasks and Responsibilities for Control of Artillery

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

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

CHAPTER 1
ORGANIZATION AND DUTIES

Section I. HEAVY FORCES ORGANIZATION

Mission

The overall design of the heavy forces structure provides mobile armor-protected firepower. Because of their mobility and survivability, heavy forces are best employed where battles are fought over wide areas. They destroy enemy armed forces and control land areas, including populations and resources. In offensive operations, heavy forces quickly concentrate overwhelming combat power to break through or envelop enemy defenses. They then strike deep to destroy fire support, command and control, and service support elements. Heavy forces can defend wide frontages. Using mobility for rapid concentrations to attack, reinforce, or block, they defeat an enemy while economizing forces in other areas. Heavy forces operate best in basically open terrain where they can use their mobility and long-range direct fire weapons to the best advantage.

Significant Features

Significant capabilities of heavy forces include the following:

- Can conduct nuclear and chemical operations with organic delivery systems.
- Can rapidly shift forces on the battlefield.
- Can cover wide frontages.
- Can conduct the entire battle – rear, close, and deep.

The more significant limitations are as follows:

- Have limited strategic mobility.
- Have restricted mobility in rugged terrain (jungle, built-up areas, and forests).
- Require significant logistical support.

Section II. THE FIRE SUPPORT SYSTEM

Components

The fire support system supporting the heavy forces is the collective body of target acquisition and battlefield surveillance assets; attack systems (both lethal and nonlethal) and munitions; command and control systems and facilities; technical support (meteorological and survey); and the personnel required to provide and manage fire support.

Target Acquisition

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

Attack Systems

The attack could be lethal or nonlethal (for example, smoke, illumination, and offensive electronic warfare). Assets normally available at brigade level and below are field artillery (FA), mortars, tactical air (TACAIR) support, communications jarnmers, and naval gunfire

(NGF). Air defense (AD) and engineer assets may also become important components of the fire support system. Fire support assets are described in Appendix A.

Command and Control

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

Technical Support

Meteorological (met) and survey support is that technical part of the fire support system that ensures accurate unobserved surprise fires, transfer of target data, and effective massed fires.

Fire Support Planning and Coordination

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

Fire support coordination is the continuous process of implementing fire support planning and managing fire support assets that are available to the maneuver force. The greatest fire support plan in the world is worthless unless it is properly coordinated with the appropriate personnel and/or agencies. In short, coordination makes the plan happen. See FM 6-20 for detailed discussion.

PRINCIPLES OF FIRE SUPPORT PLANNING AND COORDINATION

- Plan early and continuously.
- Follow the commander's targeting guidance.
- Exploit all available targeting assets.
- Consider the use of all available fire support means, both lethal and nonlethal.
- Use the lowest echelon capable of providing effective fire support.
- Use the most effective means.
- Furnish the type of support appropriate.
- Avoid unnecessary duplication.
- Consider airspace coordination.
- Provide adequate fire support.
- Provide rapid and effective coordination.
- Remain flexible.
- Provide for the safeguarding and survivability of friendly forces and/or installations.

Section III. FIRE SUPPORT ORGANIZATIONS, PERSONNEL, AND DUTIES

Role of the Direct Support Field Artillery Battalion Commander

The direct support (DS) FA battalion commander is the fire support coordinator (FSCOORD) for the supported brigade. As such, he is specifically responsible for all fire support planning and coordination for the maneuver brigade. The DS battalion commander brings, as his unique contribution to battle, his professional assessment of the current and near-term capabilities of his unit and of other fire support assets supporting the force. His duty location at any given time is

where he can best execute the maneuver commander's intent for fire support. In addition to being personally in charge of fire support coordination for the brigade, the direct support FA battalion commander is responsible for–

- Training all personnel involved in fire support to perform successfully all stated and implied missions and tasks associated with providing fire support to a maneuver force.
- Continuously articulating his assessment of the current and future capabilities and status of all fire support assets supporting the maneuver force. The FSCOORD may base this assessment on reports or on personal observation.
- Providing a knowledgeable, experienced officer as the brigade fire support officer. The FSCOORD also must establish a special mentor relationship with this officer, since the FSO, in the absence of the FSCOORD, personally represents him to the brigade commander. More than any other officer, the FSO must understand the FSCOORD's intent in supporting the maneuver plan. In addition, the FSCOORD must ensure that his brigade FSO is equally conversant on the FSCOORD's assessment of fire support assets supporting the maneuver force.
- Commanding his battalion. As the commander of the primary unit providing fire support to the force, the FSCOORD is responsible for the operational status of his unit, its morale and response to critical personnel shortages, and its current and future logistic capabilities to support the maneuver force.

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

Fire Support Team Organization

There are two types of fire support team (FIST) organizations for heavy forces. The FIST for the mechanized (mech) infantry (inf) consists of a FIST headquarters (HQ) and three forward observer (FO) parties per company. Each FO party includes one FO (SGT) and one radio operator (PFC). The FIST for the armor company or armored cavalry regiment (ACR) consists of a FIST headquarters only. The FIST headquarters for both types of FIST organizations are the same.

FIST HEADQUARTERS ORGANIZATION

TITLE	RANK	NUMBER
Company FSO	LT	1
Fire Support Sergeant	SSG	1
Fire Support Specialist		
Radiotelephone Operator (RATELO)	PFC	1

Company Fire Support Officer Duties

The company FSO is the maneuver company FSCOORD. As such, he integrates all fires to support the commander's scheme of maneuver. Although he is not the primary shooter for the company, the FSO must be an expert at locating targets and adjusting tires. His duties are as follows:

- Plan, coordinate, and execute fire support.
- Advise the maneuver commander on fire support matters.
- Keep key personnel informed of pertinent information (by spot reports and situation reports [SITREPs]).

- Train the FIST and FOs in applicable fire support matters.
- Request, adjust, and direct all types of fire support.
- Ensure that the fire support plan and/or fire support execution matrix is prepared and disseminated to key personnel.
- Allocate FOs and other observers to maintain surveillance of targets and named areas of interest.
- Provide emergency control of close air support (CAS) missions in the absence of qualified Air Force personnel (air liaison officer [ALO], enlisted terminal attack controller [ETAC], and/or airborne forward air controller [AFACJ).

Company Fire Support Sergeant Duties

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

Company Fire Support Officer Working Relationships

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

Maneuver Company Commander

The company FSO works with the company commander. The maneuver company commander is ultimately responsible for fire support. The company FSO gives recommendations and advice to the commander on all fire support matters; therefore, he is the maneuver unit fire support expert. Final decisions on company (co) fire support are made by the company commander. The company FSO must work closely with the company commander and goes with him to receive plans and orders. The FSO must understand the scheme of maneuver as well as the company commander does. (See Appendix B.) On the basis of the commander's guidance and war-gaming, the FSO devises his fire support plan, which must be presented to the commander or his approval. (See Appendix C.)

Battalion Fire Support Officer

The battalion FSO is the FSCOORD at the maneuver battalion. The company FSO works for the battalion FSO. The battalion FSO provides guidance, battlefield intelligence, information on fire support assets, fire support coordinating measures, and technical advice to the company FSO. The battalion FSO coordinates and clears FIST fire missions that fall outside the company boundaries of the requesting company FIST. The company FSO provides updated friendly and enemy battlefield information to the battalion FSO. This information includes the forward line of own troops (FLOT) location, situation reports, spot reports, and other essential elements of friendly information (EEFI) and information relating to priority intelligence requirements (PIR). The battalion FSO helps the DS battalion (bn) commander train the company FSO.

Fire Support Team Headquarters

The company FSO is responsible for supervising the training of his team in all aspects of fire support. He also ensures that his team is fully equipped and that the equipment is fully operational. In heavy forces, most operations are conducted on the move. Therefore, the company FSO should locate himself where he can best support the company; this is not necessarily at the company commander's side. Most maneuver company

headquarters have a standing operating procedure (SOP) that specifies where the company headquarters will locate, move, and provide security in tactical operations. It is very important that all members of the FIST know and comply with the SOP. Also, in most company SOPs, the immediate-action drills delineate what each member of the HQ element will do in specific circumstances, Each member of the FIST must be thoroughly trained in these drills.

Forward Observers

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

- Target numbers.
- Target lists (Appendix D).
- Known points.
- Priority of fires on targets.
- Degree of control.
- Commander's intent.
- Fire support coordinating measures (Appendix E).

As the eyes and curs of the mechanized infantry company, the FOs must report battlefield information to the company FSO. They report this information, to include FLOT location, by means of situation reports and spot reports.

Required Fire Support Actions

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

The company FSO and/or fire support sergeant must –

- Train the FOs.
- Train the company personnel to call for and adjust fires.
- Ensure that all equipment is properly maintained.
- Ensure that FIST personnel know the company tactical SOP (TSOP) thoroughly.

As the company FSCOORD, the FSO should obtain the following information from the battalion FSO:

- Status and location of fire support delivery systems that the company can use.
- Status of TACAIR missions, tactical air control party (TACP), and CAS control personnel (ALO, ETAC, and AFAC).
- Existing targets, scheduled fires, and known points.
- Fire support coordinating measures in effect.
- Verified frequencies and call signs.
- Status of combat observation/lasing teams (COLTS), if available.
- Availability of position location assets, position and azimuth determining system (PADS), or survey to accurately locate minefield or obstacles.

Also as the company FSCOORD, the FSO should obtain a mission briefing from the company commander, to include the following:

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

- Locations of platoons, crew-sewed weapons, and listening posts (LPs), and/or observation posts (OPs).
- Current enemy situation.
- Company strength (equipment and personnel).
- Status and location of obstacles.
- Location of final protective fire (FPF).
- Mission-oriented protective posture (MOPP) level.
- Air defense status.

The FSO should provide the following information, as a minimum, at the company orders briefing:

- Fire support plan for the operation, to include responsibilities for its execution.
- Existing targets, scheduled fires, and known points.
- Fire support coordinating measures for the operation.
- Status of priority fires.
- Fire support assets available to support the operation, their location, and status.
- Verified frequencies and call signs.
- Availability of position location assets.
- Status of FIST personnel and equipment (to include Classes I, III, and V).

The FSO or fire support sergeant should establish communications with the following (Appendix F):

- Fire support assets (such as artillery and mortars).
- The FOs, including COLTS, if applicable.
- The battalion FSO.
- The maneuver commander.

Battalion or Squadron Fire Support Organization.

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

BATTALION OR SQUADRON FIRE SUPPORT ELEMENT PERSONNEL

TITLE	RANK	NUMBER
Fire Support Officer	CPT	1
Fire Support Plans/ Targeting Officer	LT	1
Fire Support Sergeant	SFC	1
Fire Support Specialist	SPC	2
Amplitude Modulated (AM) Radio Operators	PFC	2

[1]ACR only until fielding of the AN/GRC-193

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

- S3 air.

- Heavy mortar platoon leader.
- Battalion chemical officer.
- Tactical air control party.
- Supporting arms liaison team (SALT).
- Air defense officer.
- Other representatives (engineer, allied forces, or Army aviation representatives).

Battalion Fire Support Officer Duties

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

- Advise the maneuver commander and his staff on fire support matters.
- Keep key personnel informed of pertinent information, such as battlefield intelligence.
- Train the battalion FSE.
- Supervise all functions of the battalion FS cell.
- Train the company FSOs.
- Recommend fire support coordinating measures.
- Write and disseminate the fire support plan and fire support execution matrix.
- Coordinate with the TACP on TACAIR missions and coordinate with CAS control personnel (ALO, ETAC, and AFAC).

Battalion Fire Support Plans/Targeting Officer Duties

The plans/targeting officer gives the FSE a 24-hour FSO capability. He helps the FSO perform his duties and acts as the FSO in his absence. Also, he interfaces with the battalion S2 and helps him and the FSO by providing information on the vulnerabilities of targets. He advises the maneuver battalion S2 on target accuracy and description requirements and evaluates dwell times for attack by fire support systems. His duties in the targeting area are as follows:

- Help the battalion S2 develop the informal target acquisition and surveillance plan.
- Help provide staff supervsion of the target acquistion (TA) assets organic to and under operational control (OPCON) of the battalion.
- Develop, recommend to the commander, and disseminate the attack guidance matrix to the FS cell, command post (CP), and subordinate elements. (See Appendix G.)
- Determine, recommend, and process time-sensitive high-payoff targets to the fire support element.
- Coordinate with the maneuver battalion S2 for target acquisition coverage and processing of battalion high-payoff targets.
- With the battalion S2, produce target selection standards matrix for TA assets working for the battalion.

Battalion Fire Support Sergeant Duties

The battalion fire support sergeant is the senior enlisted assistant to the battalion FSO. He acts as the FSO in his absence. He is responsible for training the enlisted personnel of the battalion FSE and four maneuver FISTs. He supervises the maintenance of all equipment assigned to these sections. The battalion fire support sergeant must be able to perform all the duties of his FSO.

Battalion Fire Support Officer Working Relationships

The battalion FSO interacts and coordinates with many personnel within a maneuver organization.

Maneuver Battalion Commander

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

- Ž States his intentions through his concept of the operation and the commander's intent.
- Ž Specifies priority of fires, including allocation of FPFs and priority targets.
- Ž Specifies fire support coordinating measures required.
- Ž Specifies special munitions required (smoke, illumination, lethal chemicals, riot control agents, family of scatterable mines [FASCAM]) (See Appendix H),

Maneuver Battalion S3

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

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

Brigade Fire Support Officer

The brigade FSO is responsible for training the battalion FSOs. He is the assistant FSCOORD and is responsible for all fire support. The brigade FSO –

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

Maneuver Battalion S3 Air

The battalion S3 air –

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

Maneuver Battalion S2

The battalion S2 is responsible for conducting terrain and weather analyses and for enemy situation templating. He then integrates the rest of the intelligence preparation of the battlefield (IPB) process and the creation of the decision support template as overseen by the S3. Through the intelligence preparation of the battlefield, he develops named areas of

interest (NAIs) and target areas of interest (TAIs) which the FSO uses in the development of the fire support plan.

Maneuver Battalion Signal Officer

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

- Advises the commander and/or S3 on all communications and electronics matters including positioning command and control elements.
- Is the FSO's point of contact for signal operation instructions (S0I) issue during operations and for communications troubleshooting.
- Is responsible for repair, turn-in, and exchange of communications equipment of attached fire support assets. Coordinates for batteries and communications supplies.
- Has a retransmission capability that permits radio communications 'on one net over a greater distance.

Task Force Engineer

The coordination between the task force engineer and the FSO is critical to the success of the obstacle plan. Fires such as antibreaching team fires, smoke to silhouette targets emerging from a breach, and illumination fires for night breaching are essential.

Field Artillery Battalion S3

The FA battalion S3 may coordinate with the battalion FSO during quick fire planning and to disseminate the scheme of maneuver, as required.

Battalion Chemical Officer

The battalion chemical officer is responsible for advising the commander or S3 of the effects of friendly and enemy nuclear, biological, chemical (NBC) attacks. When brigade has asked for nominations of chemical targets for friendly attack, the FSO coordinates with the chemical officer for the location of contaminated areas and NBC defense measures. The battalion chemical officer is also responsible for advising the commander on the use of riot control agents and obscurants.

Mortar Platoon Leader

The mortar platoon leader –

- Advises the S3 or FSO) of mortar positions and ammunition.
- Seeks survey and/or met support from the FSO.

Tactical Air Control Party

The tactical air control party –

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

Supporting Arm Liaison Team

The supporting arms liaison team –

- Advises the commander and/or S3 of naval gunfire matters.
- Provides the battalion FSO with NGF information and characteristics.
- Monitors the firepower control team and requests for fire support.

Company Fire Support Officers

The company FSOs work for the battalion FSO, and they work with their respective company commanders.

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

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

Brigade Fire Support Organization

The brigade or regimental fire support element is organized with the personnel shown below.

BRIGADE OR REGIMENT FIRE SUPPORT ELEMENT ORGANIZATION

TITLE	RANK	NUMBER
Fire Support Officer	MAJ	1
Fire Support Plans/ Targeting Officer	1 LT[1]	1
Fire Support Sergeant	SFC	1
Fire Support Specialist	SPC	2
AM Radio Operator[2]	PFC	2

[1]ACR is authorized a captain.

[2]ACR only until fielding of the AN/GRC-1 93.

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

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

In addition to the staff officers described above and at battalion level, a few other staff members may be in the brigade tactical CP. The FSO should have a working knowledge of their duties. They are as follows:

- The brigade air defense officer manages the air defense assets in support of the brigade. He may have valuable information on airspace coordination, the enemy air situation, and the location of enemy air defense targets.
- The brigade engineer manages the engineer assets that are placed in support of the

brigade. He is the person with whom to coordinate the coverage of obstacles, the use of FASCAM, and requirements for general battlefield mobility and countermobility.

Ž The IEW representative from the divisional combat electronic warfare intelligence (CEWI) assets controls and supervises the IEW assets that are in support of the brigade. He can provide some targets and information and is the tie-in for the offensive use of jamming. The FSO needs a working knowledge of the IEW assets available from this source to effectively coordinate their use in the attack of targets.

Brigade Fire Support Officer Duties

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

Ž Keep the brigade commander informed of the fire support assets, their capabilities and limitations, and their tactical missions.

Ž Keep the commander informed of enemy indirect fire capabilities and limitations.

Ž Help the commander develop his estimate of the situation and war-game possible courses of action, resulting in the creation of the decision support template.

Ž Develop the brigade fire support plan on the basis of the commander's intent, and brief the commander.

Ž Ensure battalion FS0s plan fires in accordance with the brigade commander's guidance, and establish priority of fires.

Ž Consolidate target lists from the battalion FSOs, and resolve duplications.

Ž Plan targets in depth and other targets that were not planned by subordinate FSOs but are within the brigade zone of action.

Ž Coordinate requests for additional fire support from battalion FSOs when the fire support means available at company or battalion level are inadequate.

Ž Recommend and adhere to fire support coordinating measures.

Ž Use commander's guidance (See Appendix B) as a checklist in preparing fire support plans and briefings.

Ž Coordinate with the ALO on brigade use of TACAIR assets.

Brigade Fire Support Plans/Targeting Officer Duties

The plans/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 interfaces 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 are as follows:

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

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

- Develop, recommend to the commander, and disseminate the attack guidance matrix to the FS cell, CP, and subordinate elements. (See Appendix G.)
- Determine, recommend, and process time-sensitive high-payoff targets to the fire support element.
- Coordinate with the maneuver brigade S2 for target acquisition coverage and processing of brigade high-payoff targets.
- With the brigade S2, produce a target selection standards matrix for TA assets working for the brigade.

Brigade Fire Support Sergeant Duties

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

Brigade Fire Support Officer Working Relationships

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

Maneuver Brigade Commander and/or S3

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

Direct Support Battalion Commander

The DS battalion commander is the brigade FSCOORD. He is accountable to the maneuver brigade commander for the quality of fire support provided to the maneuver brigade. As the brigade FSCOORD, he advises and assists the brigade commander in all aspects of fire support planning and coordination. He is responsible for the training of all fire support personnel supporting the brigade.

Direct Support Battalion S3

The DS battalion S3 prepares the FA support plan and is responsible for ensuring that the plan is executed in concert with the maneuver plan. He continuously coordinates with the brigade FSO and the brigade S3 for position areas, movements, future operations, needs for additional fire support, and status of fire support systems.

Division Fire Support Cell

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

Battalion Fire Support Offieers

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

CHAPTER 2
THE "WHAT" OF FIRE SUPPORT PLANNING AND COORDINATION

Fire Support Planning

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

- Commander's intent and/or scheme of maneuver.
- Mission, enemy, terrain and weather, and troops and time available (METT-T).
- Guidance from higher FA headquarters.

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

Commander's Intent

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

Considerations of METT-T

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

CONSIDERATIONS OF METT-T

FACTOR	CONSIDERATIONS
Mission	What is the mission? What are the commander's concept of the operation and scheme of maneuver? What is the commander's intent? What is the objective of the operation? What route is the unit using?

CONSIDERATIONS OF METT-T (CONTINUED)

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

Guidance From Higher Headquarters

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

Ž The commander's intent at that level.

Ž Fire Support assets available.

Ž Fire support coordinating measures.

Ž Target lists.

Ž Schedules of fires.

Ž Constraints on FA Class V consumption, stated in terms of a controlled supply rate (CSR).

Ž Technical advice on fire support matters.

Decision-Making Process

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

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

Ž Fire support asset allocation and status.

Ž Commander's target attack guidance.

Ž Fires in the zone planned by higher headquarters.

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

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

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

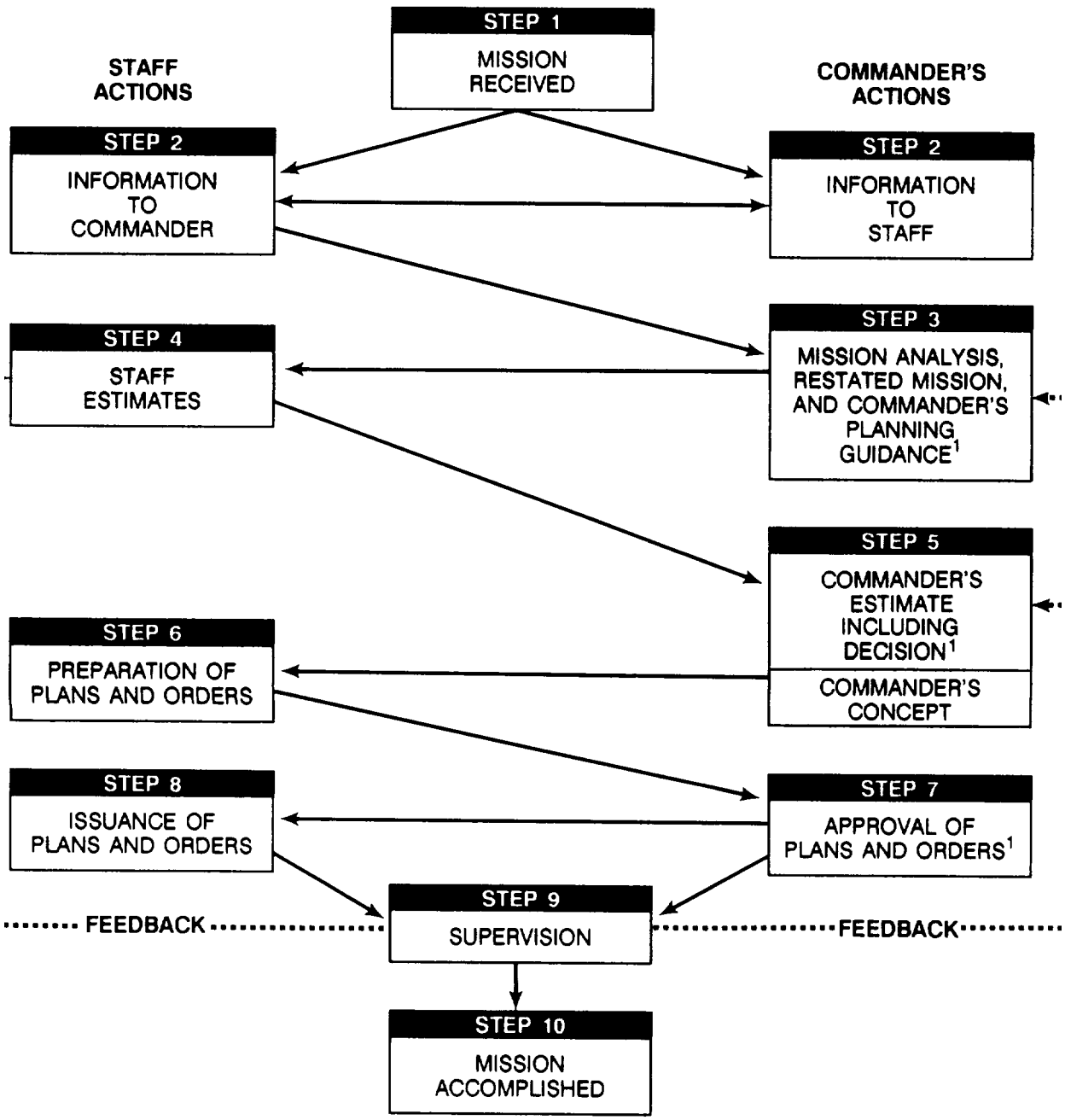
Staff members prepare and brief their estimates to the commander. The FSO must be able to brief the fire support requirements for each course of action and recommend the best one from a fire support perspective. The requirements he should be prepared to discuss include the following:

Ž Assets available to support the operation.

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

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

MILITARY DECISION-MAKING PROCESS



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

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

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

The commander approves the plan or order **(step 7).** The written plan is disseminated to the subordinate units **(step 8).** The FSO at each level should accompany his maneuver commander when he receives briefings from higher headquarters on plans or orders.

Before execution, plans are refined as follows:

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

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

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

Fire Support Plan Rehearsal

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

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

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

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

Ž Actions to occur.

Ž Possible friendly initiatives.

Ž Possible reactions to enemy initiatives.

Ž Control measures.

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

The rehearsal conducted by only fire support personnel is limited in that the success of the rehearsal and benefits to be derived from it depend on how well the FSCOORD and/or FSO conducting the rehearsal know the maneuver commander's concept of the operation. Within the DS artillery battalion, the commander, S3, FSO, and S2 structure the fire support rehearsal in accordance with the enemy's most likely course of action and the friendly scheme of maneuver. At the appropriate time, each participant executes 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 (IP), call for target marking, and request fires for suppression of enemy air defenses (SEAD). The DS battalion CP monitors all of this. The battalion operations and intelligence (O&I) section pays particular attention to displacements. The battalion fire direction center (FDC) issues fire orders and passes messages to observers. If there is a mutual support unit, the two FDCs exercise transfer of control. Attached radars work situational cues with the cueing agents. Each fire unit FDC computes fire commands, acknowledges fire support coordinating measures, and ensures that it can fire its assigned mission. Where alternative friendly courses of action hinge on enemy actions and when time permits, the alternatives may be rehearsed.

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

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

Suitable or Actual Terrain

Because of its increased realism, a rehearsal using a suitable maneuver area or the actual area in which the operation is to be conducted is the best method. Communications lines of sight, clutter on specific communications nets, trigger points and/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. Use of this method depends on operational or signal security considerations.

Model Rehearsal

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

Map Rehearsal

This rehearsal may be conducted by using a 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. Participants verbally describe actions to be taken.

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.

Radio Rehearsal and/or Communications Exercise

This type of rehearsal is conducted on fire support nets by using the brigade or battalion fire support plan or execution matrix when available time and situation do not permit assembly of key personnel.

Fire Planning

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

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

Process

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

Offensive Fire Planning

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

Defensive Fire Planning

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

Analysis

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

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

OFFENSIVE FIRE PLANNING

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

DEFENSIVE FIRE PLANNING

FOCUS	ACTIONS TO BE TAKEN
In Front of the Positon	On avenues of approach – Ž Target enemy avenues of approach and/or choke points. Ž If COLTs are available, position them to cover avenues of approach (where high-value targets will appear). Ž If available, plan FASCAM to slow the enemy, (See Appendix H.) Ž Integrate fire support with direct fire weapons. Ž Plan trigger points for possible moving targets. On key terrain – Ž Place an FO or a COLT on terrain where he can provide early warning, target location, and laser designation and/or overwatch of the battle. Ž Plan to obscure enemy observation of friendly movements. On obstacles– Ž Coordinate coverage of obstacles with the engineers. Ž Plan fires behind, in front of, and adjacent to obstacles to hinder enemy breaching operations. Ž Consider the use of smoke or riot control agents to hinder breaching operations. Ž If available and in conjunction with the engineer, plan FASCAM to reseed minefield that the enemy has breached. Ž Plan fires to dose gaps and lanes in barrier or obstacle plans. Ž Plan fires to help canalize the enemy. Ž Integrate fire support with obstacles to complement direct fire weapons. Ž Accurately locate obstacles and preplanned targets.
On the Position	Consider– Ž Using groups or series to assist in withdrawal. Ž Using smoke to facilitate disengagement. Ž Planning fires on top of your battle position to help in the disengagement, to deny the enemy access to the position, and to support a counterattack. Plan FPFs (a prearranged bawler of fire designed to protect friendly troops). Use the following sequence in planning FPFs; but remember that the maneuver commander selects FPF locations. Ž Select the fire support asset to fire the FPF. Ž Adjust fire Onto the FPF to determine actual firing data to be used In firing the FPF. (The tactical situation, the, or ammunition supply may not allow the FPF to be adjusted.) Ž Determine the FPF time of flight. Ž Select the FPF reference point (a permanent visible point on terrain to the front that is used to determine when the FPF will be requested). Ž Consider time of flight (TOF) and the estimated rate of enemy movement. Ž Integrate the FPF into the final protective lines of the company direct fire weapons. Ž Determine how the FPF call for fire will be initiated. **NOTE:** The length of an FPF is the number of elements (tubes) multiplied by the projectile bursting diameter. The sizes of the FPFs for given systems are sown below.

DEFENSIVE FIRE PLANNING (CONTINUED)

FOCUS	ACTIONS TO BE TAKEN

System	Elements	Size of FPF
60-mm mortar	2 tubes	70 by 35 meters
81-mm mortar	4 tubes	140 by 35 meters
81-mm mortar (improved)	4 tubes	140 by 35 meters
107-mm mortar	3 tubes	120 by 40 meters
105-mm howitzer	3 guns	105 by 35 meters
105-mm howitzer	6 guns	210 by 35 meters
155-mm howitzer	4 guns	200 by 50 meters
155-mm howitzer	6 guns	300 by 50 meters
155-mm howitzer	8 guns	400 by 50 meters
203-mm howitzer	4 guns	320 by 80 meters
203-mm howitzer	8 guns	840 by 80 meters

Behind the Position	**Consider planning fires –** Ž To support alternate battle positions. Ž To support a counterattack. Ž To delay the enemy as the company withdraws. Ž To prevent reinforcement by the enemy.

Target Acquisition Assets in a Brigade

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

Field Artillery Systems

The direct support FA battalion may have aerial fire support observers (AFSOs) and/or an AN/TPQ-36 radar attached.

The direct support FA battalion S2 has access to information on Threat FA assets.

Forward and aerial observers are available (Appendix K).

Fire Support Cell Systems

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

Three COLTS are organic to each direct support FA battalion. They are under the control of the brigade FSO to provide target acquisition capabilities critical to the operation beyond those of the FIST.

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

Maneuver Systems

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

The brigade headquarters does not have organic TA assets. Those available to the maneuver battalions are:

Ž Scouts from the battalion scout platoon.

Ž Patrols.

Military Intelligence Systems

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

IEWSE (Liaison Team). This element is headed by an EW officer from the MI battalion S3 and is habitually placed in support of a forward brigade, It is designed to reinforce the brigade staff and coordinate all MI operations in support of the brigade.

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

Counterintelligence Team. This team identifies hostile collection and rear operations threat; recommends the EEFI; nominates enemy TA systems for suppression, neutralization, or destruction; and screens enemy prisoners of war (EPW) and refugees for persons of counterintelligence (CI) interest (such as low-level collection agents and provocation agents).

Ground Surveliance Radar and/or Remotely Employed Sensor Teams. Ground surveillance radar and remotely employed sensor (REMS) teams give the brigade a highly mobile, near-all-weather, 24-hour capability for battlefield surveillance. They may be employed on patrols and at observation posts. Normally, most of the teams provided to the brigade are attached to subordinate battalions and may be deployed to company level.

Electronic Warfare Platoon. This platoon provides voice communications intercept and communications jamming support to the brigade. The platoon can interface with the MI battalion tactical operations center (Toc) and IEWSE, scan and summarize voice interceptions, and jam enemy communications receivers.

Target List Work Sheet

The FSO records targets on DA Form 4655-R (Target List Work Sheet). Instructions for completing DA Form 4655-R and an example target list work sheet are in Appendix D, A reproducible copy of this form is in Appendix L. Essential data recorded on this form are the target number, target description target location and specific guidance on the attack of the target. Specific information in the remarks column may include the following:

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

Deliberate Fire Planning

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

interest and/or schedules of fire come from the top down to the brigade FSE or targeting officer. The brigade S2 and FSO must refine this division guidance for the brigade area and concept of operation.

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

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

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

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

Quick Fire Planning

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

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

The following paragraphs delineate the quick fire planning sequence.

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

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

Find out what assets are available for the operation, Concurrently, send a warning order to all attack agencies. These include the FA battalion S3, mortar platoon leader, ALO, NGLO or SALT officer, and brigade aviation liaison officer (LO) (if any are applicable). An example warning order is given on page 2-15. Information to be obtained is as follows:

- From the FA direct support battalion — the firing units that will be designated to fire in the quick fire plan schedule.
- From the maneuver commander–the availability of the mortar platoon (company FSO to battalion FSO for the mortars if a company operation) for inclusion as firing units into the schedule of fires.
- From the FS cell–TACAIR mission information. Coordinate CAS requirements with the ALO (for example, aircraft type, ordnance, time on station, laser codes, and control procedures).
- From the firepower control team (FCT), SALT officer, or NGLO -the availability of naval aircraft and/or naval gunfire.

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

- Asset to be used.
- Munitions mix.
- shell-fuze combinations.
- Duration of fire for each target.
- Time to fire.

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

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

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

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

Inform the commander when the fire support plan is ready.

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

EXAMPLE QUICK FIRE PLAN

First transmission (warning order):

J3B THIS IS D7T, QUICK FIRE PLAN, OVER.

A2Y TO CONDUCT A HASTY ATTACK, OVER.

FIRE PLAN NICKNAME MARK.
TIMINGS FROM H MINUS 6 TO H PLUS 7.
H-HOUR 0525, OVER.

(If shell-fuze combination other than standard is needed, report as part of target list: for example,

30 ROUNDS HE AND VT, OVER.)

Second transmission (target information):

J3B THIS IS D7T, TARGET LIST FOLLOWS:

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

SAMPLE QUICK FIRE PLAN

QUICK FIRE PLAN

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

FIRE PLAN MARK	SUPPORTING A2Y	ORIGINATOR J3B	MODIFICATIONS BY D7T
H-HOUR 0525	SHEET 1	OF 1	DATE TIME GROUP 260413Z

TARGET INFORMATION

LINE	TARGET NUMBER (a)	DESCRIPTION (b)	LOCATION (c)	ALTITUDE (d)	REMARKS (e)
1	301	PLT w/PT 76	225490	280	
2	302	POL SITE	234567	252	50% WP
3	303	ROAD JUNCTION	2928666	306	ON CALL
4					

LEGEND: plt = platoon POL = petroleum, oil and lubricants WP = white phosphorus

Fire Support Execution Matrix

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

Company-Level Matrix

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

- priorities of indirect fire support to a platoon, indicated by an abbreviation of that fire support asset, will appear in the upper left corner of the appropriate matrix box.
- The acronym FPF, preceded by the type of indirect fire means responsible for firing that FPF, will appear in the center of the box.
- priority targets allocated to a platoon will appear in the box as PRI TGT, preceded by the means of fire support responsible for engaging the target and followed by the target number.

EXAMPLE COMPANY FIRE SUPPORT EXECUTION MATRIX

The illustration below shows an example of a completed fire support execution matrix for a company deliberate attack. In the assembly area (AA), a field artillery FPF is allocated for 1st and 2d Platoons. 2d Platoon has priority of mortar (mort) fires from the LD/LC to Phase Line (PL) WELLINGTON. From PL WELLINGTON to PL JACKIE, 1st Platoon has been allocated a mortar priority target designated AC1212. 3d Platoon has been allocated an artillery priority target, AC1234. On the objective, Serbs PIANO is to be fired by the artillery for 3d Platoon.

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

SAMPLE COMPANY FIRE SUPPORT EXECUTION MATRIX

	AA	LD/LC	PL WELLINGTON	PL JACKIE	OBJECTIVE	
1ST PLT	155 FPF		MORT PRI TGT AC1212			3
2d PLT	155 FPF	MORT	X			2
3d PLT			FA PRI TGT AC1234		SERIES PIANO	1
	A	B	C	D	E	

- If FIST elements are responsible for initiating specific fires, the target number, group (gp), or series designation will be listed in the box for that FIST element. Specific guidelines concerning fires not included on the target list work sheet will be included in that box.
- Each fire support coordinating measure to be placed in 'effect, followed by a word designated for that measure, will be shown in the box. For airspace coordination areas (ACAs), the time the planned CAS or attack helicopters are due on station is listed.
- Other factors that apply to a certain platoon during a specific time frame may be included in the appropriate box. General guidance is issued in the written portion of the OPORD.

Battalion-Level Matrix

At battalion level, the matrix is used as follows:

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

EXAMPLE BATTALION FIRE SUPPORT EXECUTION MATRIX

The illustration below shows an example of a completed fire support execution matrix for a deliberate attack, in the assembly area, field artillery FPFs are allocated to Teams Tank and B, while Team C is allocated a mortar FPF.

As the units depart the assembly area toward the LD/LC, priority of FA fires is picked up by the task force (TF) FSO. Group A4C and Series JOE are initiated in accordance with the guidance of the TF commander. If communication with the FSO is lost, unit SOP specifies that the lead team may initiate these fires. The allocation of priorities of fire from the mortar sections remains the same (as shown in the matrix).

As the TF crosses the LD/LC, Team Tank (still In the lead) assumes priority of FA fires and is responsible for firing priority target Group A3C. Team B still has priority of Section B mortars with a priority target, AC3008. Priority of fires for Team C is from Section A mortars, with a priority target AC3010. Under TF control is the close air support due in the area at 0800. The TF FSO will place ACA ORANGE in effect before the aircraft attack on the target.

EXAMPLE BATTALION FIRE SUPPORT EXECUTION MATRIX (CONTINUED)

When the lead element crosses Phase Line RED, Team B assumes priority of fires from mortar sections, with each mortar section responsible for a priority target. Priority for FA fires changes to Team C, and the field artillery is responsible for firing Group A6C. Once again, CAS is due in the area. This time, the TOT is 0815 and the ACA is APPLE.

As the TF crosses PL BLUE and begins its final assault on the objective, Team Tank, with priority of mortar fires, initiates Series FINISH.

The TF FSO, with priority of FA fires, initiates Groups A7C, A8C and A9C, designed to suppress the objective. Also, CAS is due in at 0900 and the TF FSO will initiate ACA RAISIN as appropriate.

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

SAMPLE BATTALION FIRE SUPPORT EXECUTION MATRIX

	AA		LD/LC	PL RED	PL BLUE	PL GREEN	
TEAM TANK	155 FPF	FA PRI TGT AC3002	FA GP A3C		MORT SERIES FINISH	MORT FPF	4
TEAM B	155 FPF	MORT B	MORT B MORT PRI TGT AC3008	MORT MORT A PRI TGT AC 3125 MORT B PRI TGT AC 3225		FA FPF	3
TEAM C	MORT FPF	MORT A	MORT A MORT PRI TGT AC3010	FA GP A6C		FA FPF	2
BN CONTROL		FA GP A4C SERIES JOE	ACA ORANGE CAS TOT 0800	ACA APPLE TOT 0815	FA GROUP A7C, A8C, A9C ACA RAISIN TOT 0900		1
A	B	C	D	E	F	G	

Fire Support Coordination

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

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

Ž MI representative.

Ž Military police (MP) representative.

Maneuver Commander Responsibilities

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

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

Priorities of positioning are as follows:

Ž Direct support FA battalion.

• Reinforcing battalions.

Ž Divisional general support reinforcing (GSR) and general support (GS) units.

Ž Corps units (GSR before GS).

Fire Support Officer Responsibilities

Specific FSO responsibilities for coordination are as follows:

Ž Establish and maintain communications with key personnel, to include adjacent units.

Ž Prepare and disseminate fire support documents, records, and reports.

Ž Execute the fire support plan.

Ž Supervise the target acquisition effort of the FS cell, and ensure that tje S2 is aware of the intelligence needs of the FS cell.

Ž Keep higher and lower FS cells informed of supported forces situation.

Ž Exchange battlefield information with the field artillery and the supported force.

Ž Task the most effective fire support means to attack targets.

Ž Coordinate all fire support in the commander's zone or sector.

Ž Ensure the safeguarding of friendly elements.

Ž Ensure continued flow of targeting information.

Ž Anticipate changes dictated by the developing battle, and recommend revision of the fire support plan.

Ž Direct the fire support attack of targets in the priority established by the commander.

Ž Generate fire support missions against targets of interest.

Ž Override requests for fire, or direct that another system provide the requested fire support as necessary.

Ž Coordinate with the ALO on the use of TACAIR assets.

Clearance of Fires

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

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

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

EXAMPLES OF FIRE SUPPORT COORDINATION

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

- **In whose zone is the target?** A/1-40 inf.
- **Is coordination necessary?** Yes, because it is outside the B/1-40 Inf zone but stlill In the battalion zone.
- **Which FSE is responsible for the zone in which the target lies?** 1-40 inf FSE.
- **How may the 1-40 Inf FSO contact the A/1-40 Inf FIST?** Options areas follows:
  - 1-40 Inf FSO tails A/1-40 Inf FIST.
  - Use landline ((if Installed) from the battailon FSE to the A1 -40 Inf FIST.

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

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

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

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

EXAMPLES OF FIRE SUPPORT COORDINATION (CONTINUED)

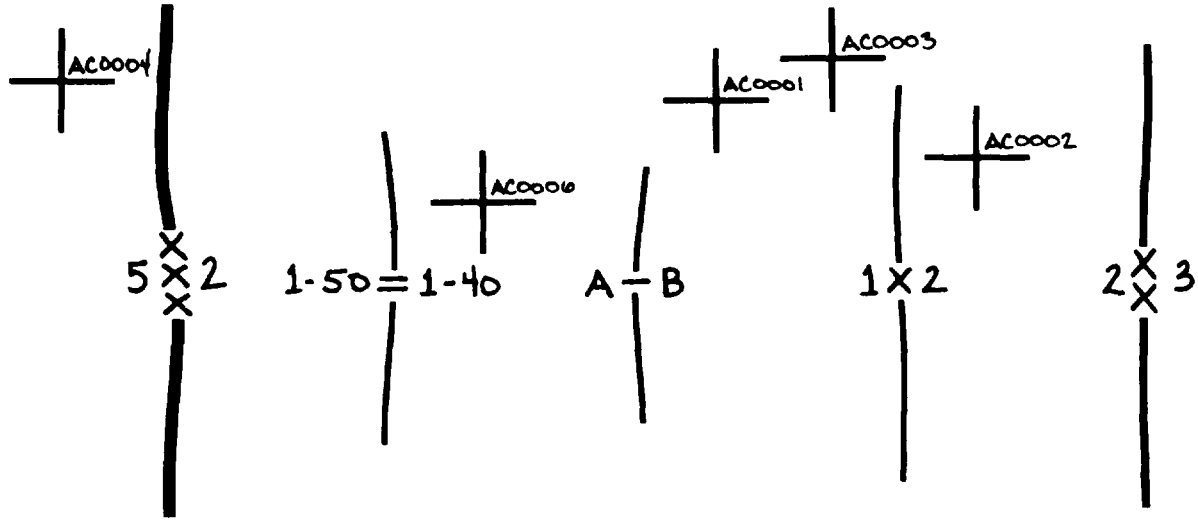
Example 4. Request for fire by 6/1-40 Inf on Target AC0003 (monitored by 1-40 Inf FSO).

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

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

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

SAMPLE SITUATION



Brigade Fire Support Coordination Checklist

The brigade FSO must effect coordination with personnel as indicated below. He or the FSCOORD may actually accomplish the coordination.

COORDINATION REQUIRED BY THE BRIGADE FIRE SUPPORT OFFICER

POINT OF COORDINATION	ACTION TO BE TAKEN
Brigade Commander and S3	**Determine –** Ž Mission. Ž Scheme of maneuver. Ž Commander's Intent. Ž Zone of action. Ž Future plans. Ž Which organizations have priorities of fire and when. Ž Established maneuver control measures. Ž Availability of fire support assets. Recommend– Ž capabilities and limitations of fire support for the operation *(can support* versus *cannot support* the course of action). Ž Fire support required beyond that currently available to the brigade. Ž Employment of COLTs. Place COLTs forward in the area considered to be most active, on key terrain, and on avenues of approach. Consider employing COLTS with scouts and reconnaissance elements. Ž Preparation fires. Are they necessary or desired for the operation? Will series and groups do the job? Ž Fire support coordinating measures.
Brigade S2 and Targeting Officer	Determine the following from the IPB: Ž Known and suspected enemy locations. Ž Enemy order of battle. Ž Size, type, and strength of enemy force expected to be encountered. Ž Terrain analysis of mobility corridors. Ž Friendly reconnaissance and patrol activity. Ž All target acquistion and surveillance plans (organic and attached). Provide– Ž Status of COLTs and AN/TPQ-36 radars. Ž List of priority targets.
Division FS Cell	Determine - Ž FA assets available and tactical missions. Ž CAS allocations. Ž Division-level fire support coordinating measures likely to be in effect. Request additional assets as necessary to support the operation. Provide brigade-level fire support coordinating measures likely to be in effect.

COORDINATION REQUIRED BY THE BRIGADE FIRE SUPPORT OFFICER (CONTINUED)

POINT OF COORDINATION	ACTION TO BE TAKEN
Direct Support Battalion S3	Determine – Ž Locations of units. Ž Proposed locations. Ž Ammunition status. Ž FA commander's intent for support of the plan. Ž Unit weapons status. Provide a thorough briefing on the operation to allow adequate planning.
Battalion FSOs	Determine – Ž Final protective fires. Request additional support as necessary. Ž Fire support coordinating measures recommended. Ž Alternate radio nets to be used In case of jamming. Ž Fires requiring positive control. Normally, these include illumination and will vary from mission to mission. Know who has control, the conditions under which the fires are employed, and how they are to be controlled. Provide the target list, fire support execution matrix, and schedules that support the operation.

In addition to coordination listed above, during the operation, the FSCOORD or brigade FSO must do the following:

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

Spilt Command Post Operations

The maneuver commander may temporarily command from a tactical (tac) command post. He will take key personnel forward to form a command group. The FSO should be part of this command group to execute fire support. The fire support sergeant and/or targeting officer should remain at the main command post to plan, coordinate, and execute fire support. Effective communications must be established to link fire support personnel who have gone forward with those at the main CP.

Before moving forward with his command group, the FSO will ensure that the duties of the FSO and the FS cell are clearly understood by those who are to remain at the main CP. The FSO must also ensure that the FS cell members understand the maneuver unit scheme of maneuver and the current fire support plan. Communications nets and contingencies for breaks in contact should also be determined and fully understood. In addition, the FSO will determine what information he wants the FS cell to forward to him and will issue instructions for handling the data that he relays. If possible, the FSO informs the FS cell of the duration of the split CP (whether for a set period of time or for the duration of the operation).

The portion of the FS cell that remains at the main CP is primarily concerned with the planning and coordination of fire plans. In addition, the FS cell keeps the FSO informed of the assets available, ammunition status (if it may affect the operation), guidance from higher headquarters, and other pertinent information to which the FSO does not have access.

From his forward position, the FSO will dictate to the FS cell instructions based on the commander's guidance and knowledge of the changing tactical situation. For example, fragmentary (frag) orders and warning orders issued by the commander may cause the FSO to direct reallocation of fire support or TA assets.

CHAPTER 3

THE "HOW" OF FIRE SUPPORT PLANNING

Section I. INTRODUCTION

General

The goal of fire support planning is to know the maneuver commander's guidance, intent, and scheme of maneuver and to coordinate fire support assets to support the operation. This chapter offers considerations to use in planning offensive and defensive operations. It does not address the commander's intent or factors of METT-T. Therefore, each FSO from company through brigade must add those two items to the considerations to adequately plan and coordinate fire support for an operation. The product of fire support planning is the fire support plan, a key component of the commander's operation plan. The plan must be simple flexible, and descriptive. It must support the scheme of maneuver and the commander's intent.

Maneuver Tactics and Fire Support

In the process of integrating fire support into opperations, the most important considerations are adequacy, flexibility, and continuity. The FSO ensures that these primary considerations are observed by carefully weighing the fire support tasks required for each maneuver operation.

Offense

The primary purpose of the offense is to destroy the enemy. The fire support tasks associated with offensive operations are as follows:

- Provide responsive fires to maneuver.
- Attack deep targets with massed indirect fires and TACAIR.
- Use aggressive counterfire.

Before the attack, soften enemy defenses by attacking–

- Indirect fire systems.
- Reserves and command and control facilities.
- Logistical centers.
- Assembly areas.
- Communication centers.
- Frontline troops.

During the attack, provide support by using all available fire support (including TACAIR) to destroy, neutralize, or suppress high-payoff targets that could slow or react to the attack.

During consolidation, plan fires (including TACAIR)–

- To protect friendly units as they reorganize.
- To break up enemy counterattacks.
- To prevent enemy reinforcement, disengagement, or resupply.

Defense

The primary purpose of the defense is to defeat an enemy attack and destroy enemy forces. Other objectives may be to retain a piece of terrain, to gain time, to concenrate elsewhere, and to wear the enemy down before offensive operations. The main fire support tasks to support the defense are as follows:

- Integrate indirect and direct fires in support of the operation.
- Disorganize, delay, and weaken the enemy before the attack begins.
- Strip away enemy AD and reconnaissance (recon) elements.
- Strike the enemy as he attacks.
- Deny the enemy avenues of approach.
- Canalize the enemy.
- Suppress the enemy fire support system.

Section II. FIRE SUPPORT PLANNING FOR THE OFFENSE

Offensive Operations

The primary purpose of an offensive operation is to destroy the enemy. Critical to the success of offensive operations are gaining and retaining the initiative and forcing the enemy to tight and react at a time and place not of his choosing. This section describes fire support considerations for the following offensive operations and techniques:

- Movement to contact.
- Hasty attack.
- Deliberate attack.
- Exploitation.
- Pursuit.

Movement to Contact

Description

A movement to contact is an offensive operation designed to gain initial ground contact with the enemy or to regain lost contact. It is used to develop the situation early to provide an advantage before decisive engagement. The primary consideration in preparing for a movement to contact is anticipating enemy actions during the movement. Such anticipation provides for friendly deployment in a manner that affords the greatest possible security to the main body while facilitating quick strong reaction when the contact is made.

Fire Support Considerations

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

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

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

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

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

- An **exclusive net** is a fire direction net to be designated (as a field expedient) for exclusive use for a limited period of time by the observer and the appropriate FDC. No other subscriber will enter the net except in an emergency. This procedure will be used only for special situations. The commander, considering the factors of METT-T, must determine that absolute responsiveness to a specific unit is mandatory. This procedure requires frequencies

and radio equipment that are normally not readily available. For example, the FDC may not be able to monitor a normally required net for the limited period of time designated, but it will always monitor its normal fire direction net.

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

Plan fires on the terrain to be traversed and on the flanks to protect the force. As maneuver forces move, fire immediate suppression missions to help the maneuver forces get within range of the enemy direct fire weapon systems. Fire immediate smoke to obscure OPs, screen friendly movement, and help maneuver forces breach obstacles. COLTs may be positioned forward near the advance guard in an overwatch position (pm) to provide responsive fires when contact is made. Once contact with the enemy is made, the FSO must be prepared for either a hasty attack or a defense.

Place coordinated fire lines (CFLs) well forward of friendly maneuver forces. Plan on-order (O/O) CFLs on phase lines so that CFLs can be quickly lifted and shifted.

Hasty Attack

Description

The main goal of a hasty attack is to seize the initiative. A hasty attack is usually conducted after a movement to contact, during a counterattack, or when unexpected enemy contact is made. The commander attacks quickly from his existing dispositions to gain the upper hand or to keep the enemy from organizing resistance. Planning time is extremely limited.

Fire Support Considerations

Develop fire plans to concentrate fires on forward enemy elements. If time permits, use quick fire planning techniques to plan fires. Fires should be massed on the forward units and are continuous until the final coordination line is crossed or as directed by the commander.

Suppress direct fire weapon systems to allow friendly maneuver forces to get within range of the enemy direct fire weapon systems for engagement.

Use screening smoke to provide an artificial camouflage for friendly forces moving to the enemy. Use obscuring smoke to obscure enemy OPs and direct fire weapon systems.

Isolate the enemy force being attacked by the use of deep fires. FASCAM may be used around enemy reinforcements and logistic sites and on approaches leading into the immediate battle area Dual-purpose improved conventional munitions (DPICM) may be used to inflict damage on soft-skinned vehicles in assembly areas and logistic sites.

Deliberate Attack

Description

A deliberate attack is characterized by thorough detailed planning, rapid concentration of forces, timely exploitation of enemy weaknesses, violent execution, and positive aggressive leadership at all echelons of command. It involves overcoming strong enemy forces in established positions and is undertaken after thorough reconnaissance acquisition and development of targets, and analysis of all other factors affecting the situation.

Fire Support Considerations

During the attack, provide immediately responsive fires to the lead company by assigning priority of fire support. COLTS may be placed forward on prominent terrain to engage targets early.

Throughout the operation, plan for the attack of deep targets to block movements of reserves and follow-on forces into the close-in battle area. Plan FASCAM to limit enemy movement but not to interfere with friendly maneuver. As targets are acquired, forward

them to the higher FS cell for engagement, if necessary. The brigade FSO will inform the FS cell of the current FLOT and radiation exposure state (RES) status to expedite the employment of a division nuclear subpackage to support deliberate attack. Additional nuclear considerations are in Appendix H.

Plan fires to support maneuver phases of the operation. When determining the number of targets to be planned, balance the need for fires with the reality of time and resources available. Plan groups and series to support the movement. Plan fires –

- On the flanks to protect the force.
- On the way to the objective to engage enemy OPs, enemy direct fire systems, and enemy elements that might be bypassed.
- To screen friendly movement and support minefield breaching.
- On the objective to suppress, neutralize, and destroy targets.
- Beyond the objective to prevent counterattacks, help consolidate the objective, and prevent reinforcement of the objective area by the enemy.

Support consolidation on the objective. Plan fires to prevent reinforcement of the enemy on the objective (obj) and to defeat enemy counterattacks (groups, series, designated priority targets, and FPFs). Plan for a hasty attack or defense.

Preparation fires may be planned and delivered.

To deceive the enemy into thinking an attack is taking place elsewhere, plan and deliver fires in support of the deception plan. These may be massed fires and smoke delivered before the attack begins on forward enemy elements not in the main attack.

Plan CFLs well forward to keep the maneuver forces from outrunning the CFLs and to give the forces enough room in which to move. Additionally, the brigade FSO must use on-order CFLs to rapidly place new CFLs in effect.

Plan suppressive fires on enemy overwatching direct fire systems to help maneuver direct fire systems engage the enemy systems. Plan smoke to screen movement, obscure enemy OPs, and help in breaching operations.

Plan massed fires at breakthrough points to create holes in enemy defenses. Also, plan heavy suppressive fires on the other side of the intended breakthrough.

Plan for a hasty defense.

EXAMPLE OF PLANNING A DELIBERATE ATTACK

The 1st Bde commander received the mission to conduct a deliberate attack from the division commander, While at the division CP, the brigade commander and FSCOORD were briefed on fire support for the operation. Fire support assets allocated to the brigade are described below.

FA missions

2-78 FA (155, SP): DS 1st Bde

3-17 FA (155, SP): GSR 2-78 FA

Status

2-78 FA: 89 percent personnel strength, 16 howitzers operational

3-17 FA: 92 percent personnel strength, 17 howitzers operational

Required supply rate (RSR)

2-78 FA: 240 rounds per tube per day

3-17 FA: 230 rounds per tube per day

Controlled supply rate

The CSR for 1st Bde for the next 24 hours is as follows:

Munitions	107 mm	155 mm
HE	60	35
DPICM		150
Smoke	20	10
Copperhead		16
Area denial artillery munition (ADAM)		4
Remote antiarmor mine system (RAAMS)		8
Illuminating (illum)	15	17

EXAMPLE OF PLANNING A DELIBERATE ATTACK (CONTINUED)

TACAIR missions

The brigade is allocated the following TACAIR missions:

Number	Type	Available	Mission	Remarks
2	A-10	0530 to 1030	CAS	Ground alert
2	F-16	0830 to 1230	CAS	Ground alert
2	A-7	1030 to 1430	CAS	Ground alert

No corps or division fire support coordinating measures are in effect.

Short-duration FASCAM is under the control of the division commander. Long-duration FASCAM is kept under the control of the corps commander. There are enough mine munitions for the DS battalion to provide one 400- by 400-meter, short-duration, high-density RAAMS minefield, if approved by division. No division preparation (prep) fires are planned; brigades may plan their own, if required.

Target list

The division FS cell has complied the division target list. Targets (extracted from TACFIRE) located in the brigade sector or affecting the brigade mission are as follows:

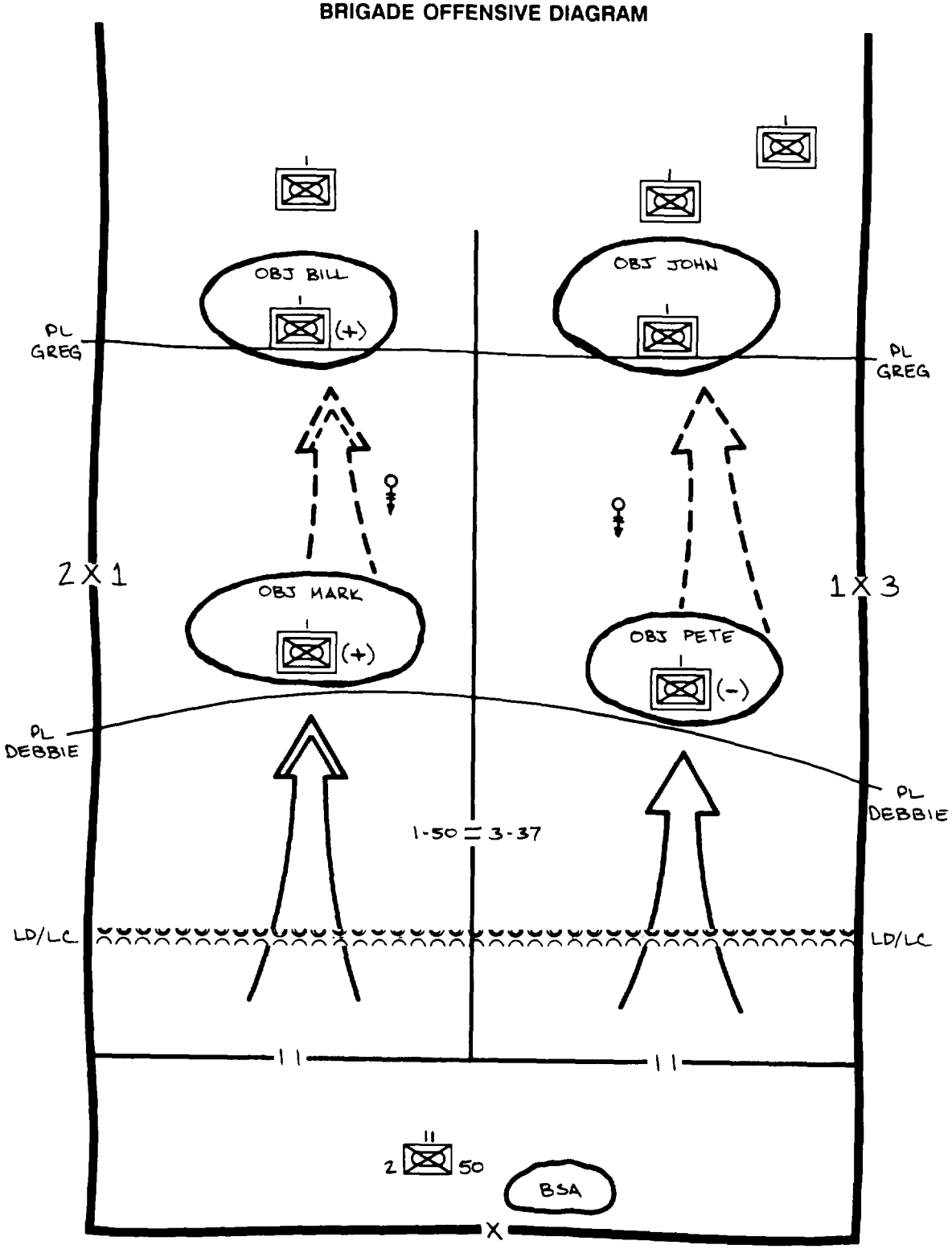
Line Number	Target Number	Description	Agency	Remarks
38	AA0072	Mortar position	Air reconnaissance	Counterfire program
39	AA0073	Howitzer battery	Air reconnaissance	Counterfire program
40	AA0076	Mortar position	Air reconnaissance	Counterfire program

The brigade commander's initial planning guidance is as follows:

"The brigade will attack at 0600 tomorrow (16 hours from now). Division has assigned intermediate and find objectives for us to take. As it looks, the 1-50 Mech zone is going to be the area of greatest resistance. We've got to take those objectives quickly. "I want a prep to start the battle to surprise the enemy. I don't think he can recover in time to a difference. As my battalions move to the objective, I want smoke. Because of the open terrain, I want to ensure that enemy antitank weapons are killed or at least suppressed as soon as possible by artillery and mortars."

EXAMPLE OF PLANNING A DELIBERATE ATTACK (CONTINUED)

BRIGADE OFFENSIVE DIAGRAM



EXAMPLE OF PLANNING A DELIBERATE ATTACK (CONTINUED)

The brigade S2 makes his analysis and determines the enemy strength within the brigade sector to be approximately 70 percent. He also determines that the most Iikely course of action is for the enemy to defend tenaclously in the brigade sector. The enemy has had several days to prepare positions, and he is dug in with overhead cover in many places.

The weather is favorable for the attack. The ground is solid and provides good avenues of approach into the area. The open terrain gives the enemy good fields of fire.

The brigade S3 reviews the division OPORD and guidance given by the brigade commander. After reviewing the information provided by the S2, the S3 recommends the boundaries as shown in the brigade offensive diagram. The brigade wiII attack with two battalions on Iine and a third battalion in reserve.

From the brigade commander's briefing and fire support planning guidance, the brigade FSO determines the following information:

- The brigade will be attacking with two battalions on Iine. Available fire support assets will be spread thin. Therefore, the FSO must prepare to forward targets to the division for engagement, if required.
- Priority of fire (POF) should be to the 1-50 Mach.
- Suppressive fires on antitank guided missiles (ATGMs) and counterfire are critical to the operation.
- A need for smoke, beyond that normally carried by FA battalions, exists. Currently the DS artillery battalion can provide about 10 minutes of smoke. The FSO notifies the FA battalion of the additional ammunition requirement. Also, he notifies the S3 and engineer representative of this shortage so that other smoke sources can be used (such as smoke pots, mortars, and tanks).

After evacuating the brigade commander's guidance and the resources available, the brigade FSO makes the following recommendations to the brigade commander:

"Sir, ammunition poses a problem in the support of the prep. With our Iimited CSR, I recommend that we do not fire a prep. Instead, I recommend that we fire groups of targets and a counterfire program to support the operation. Also, I recommend that we only suppress targets instead of destroying them, which would require considerably more ammunition. We just need to keep the enemy's head down long enough for the battalions to get within direct fire range. Further, I recommend that we plan to use two of the allocated CAS missions, the F-16s and the A-7s, on the final objectives to prevent the enemy from reinforcing the intermediate objectives.

"With our most difficult sector being that of the 1-50 Mech, I recommend giving it priority of fire.

"I recommend that we have an initial CFL on PL DEBBIE with an on-order CFL on PL GREG."

The brigade FSO also reviews the target list with the brigade commander.

After being briefed by the rest of his staff, the brigade commander approves the brigade S3's scheme of maneuver. He calls his battalion commanders together at his CP to issue the operation order:

"The brigade will attack at 0600 with two battalions, 1-50 Mech and 3-37 Mech, abreast to seize Intermediate Objectives MARK and PETE and, on order, continue the attack to seize Objectives BILL and JOHN. The 2-50 Mech will be the brigade reserve, On order, it will pass through 1-50 Mech and continue the attack.

"Within each battalion zone is a motorized rifle battalion. Each battalion has had several days to prepare its positions. The strength of the motorized rifle regiment is much less than ours (70 percent compared to our 92 percent). However, I expect taking the positions to be difficult, as they are well dug in with obstacles. The strongest resistance will be in the 1-50 Mech zone. I want the priority of fire support to go to that battalion.

'Terrain poses no significant problems, although it is constricting in some places. Our movement is not hindered by weather, urban terrain, or soft ground. Throughout the sector, the enemy has open fields of fire and can engage our systems before we get in range. Therefore, I want to seize those objectives quickly.

EXAMPLE OF PLANNING A DELIBERATE ATTACK (CONTINUED)

"If all goes as planned, the operation should last less than a day. Although we're only a supporting attack for the division attack, our failure to secure those objectives could jeopardize the division mission."

After the brigade commander's briefing, the brigade FSO briefs the brigade fire support plan:

"When the attack starts, both battalions will have 100 percent of their basic load. Direct support FA smoke is limited to 10 minutes total; therefore, other sources of smoke must be used.

"Neither the division nor the brigade will fire a prep. However, I have planned groups of targets (Al C and A2C on Objective MARK A3C and A4C on Objective BILL) and a counterfire program to support the operation.

"The 1-50 Mech is allocated two platoon priority targets as long as it has priority of fire. The 3-37 Mech will have one platoon priority target.

"The brigade has been allocated three CAS missions (six sorties) for the day. The sorties will be on ground alert and available during these time periods: 0530 to 1030, 0830 to 1230, and 1030 to 1430.

"The 1-50 Mech will receive two CAS missions for use on Objective BILL. The other mission will remain under brigade control. Remember to plan for engagement of planned CAS targets by alternate means if CAS is diverted or unavailable.

"Two COLTS will be allocated to the 1-50 Mech. The third COLT will go to the 3-37 Mech. The two COLTS, priority of fires, and two priority targets of the 1-50 Mech will be given to the 2-50 Mech, if that unit Is committed.

"Fire support coordinating measures consist of a brigade CFL initiaily on PL DEBBIE and an on-order CFL on PL GREG."

The FSO then briefs the allocation of fire support assets and the fire support plan for the 3-37 Mech attack.

The brigade FSO prepares his target list by initially reviewing the artillery target intelligence (ATI) file. He then tails the division FS cell and specifies the types of targets he needs for his plan – enemy maneuver forces located on the objectives and any deep targets within range of fire support assets available to the brigade not already planned for engagement by the division. Listed below is that part of the target list affecting the 1-50 Mech (the focus of the example) with tentative schedules.

Line Number	Target Number	Description	Agency	Remarks
14	AC0016	Squad pos	Air reconnaissance	Group A1C
15	AC0017	Squad pos	Air reconnaissance	Group A1C
16	AC0018	Squad pos	Air reconnaissance	Group A2C
17	AC0019	Squad pos	Air reconnaissance	Group A2C
18	AC0020	Squad pos	Air reconnaissance	Group A3C
19	AC0021	Squad pos	Air reconnaissance	Group A3C
20	AC0022	Squad pos	Air reconnaissance	Group A4C
21	AC0023	Pit pos	GSR	Group A4C
22	AC0024	Squad pos	GSR	Group A4C
41	AC0025	suspected OP		
42	AC0026	Road junction		

EXAMPLE OF PLANNING A DELIBERATE ATTACK (CONTINUED)

The brigade FSO selects Targets AC0077, AC0078, and AC0080, located in the brigade rear area, for the purpose of supporting the brigade support area. This target list is submitted to the forward support battalion commander. The target list is also submitted to the battalion FS cells, as combat trains from the maneuver battalions will use the roads around the BSA.

After the briefing, the commander of the 1-50 Mech returns to the battalion CP. The battalion commander issues to the staff his initial planning guidance, which is the mission he received from the brigade commander.

The 1-50 Mech S3 divides Objective MARK into Objectives RUBY, EMERALD, and TOPAZ. He further divides the brigade Objective BILL into Objectives DIAMOND, COOKE, and STONE. The S3, FSO, and other members of the FS cell begin formulating their courses of action.

The 1-50 Mech commander gives the battalion FSO the following guidance:

"We need to be able to get to both the intermediate and final objectives quickly. Keep the enemy heads down while we are out in the open.

"We're going to have some real problems taking and retaining those intermediate objectives if the enemy on the final objectives moves to support the intermediate objectives. You need to stop the reinforcement if those enemy forces try to move."

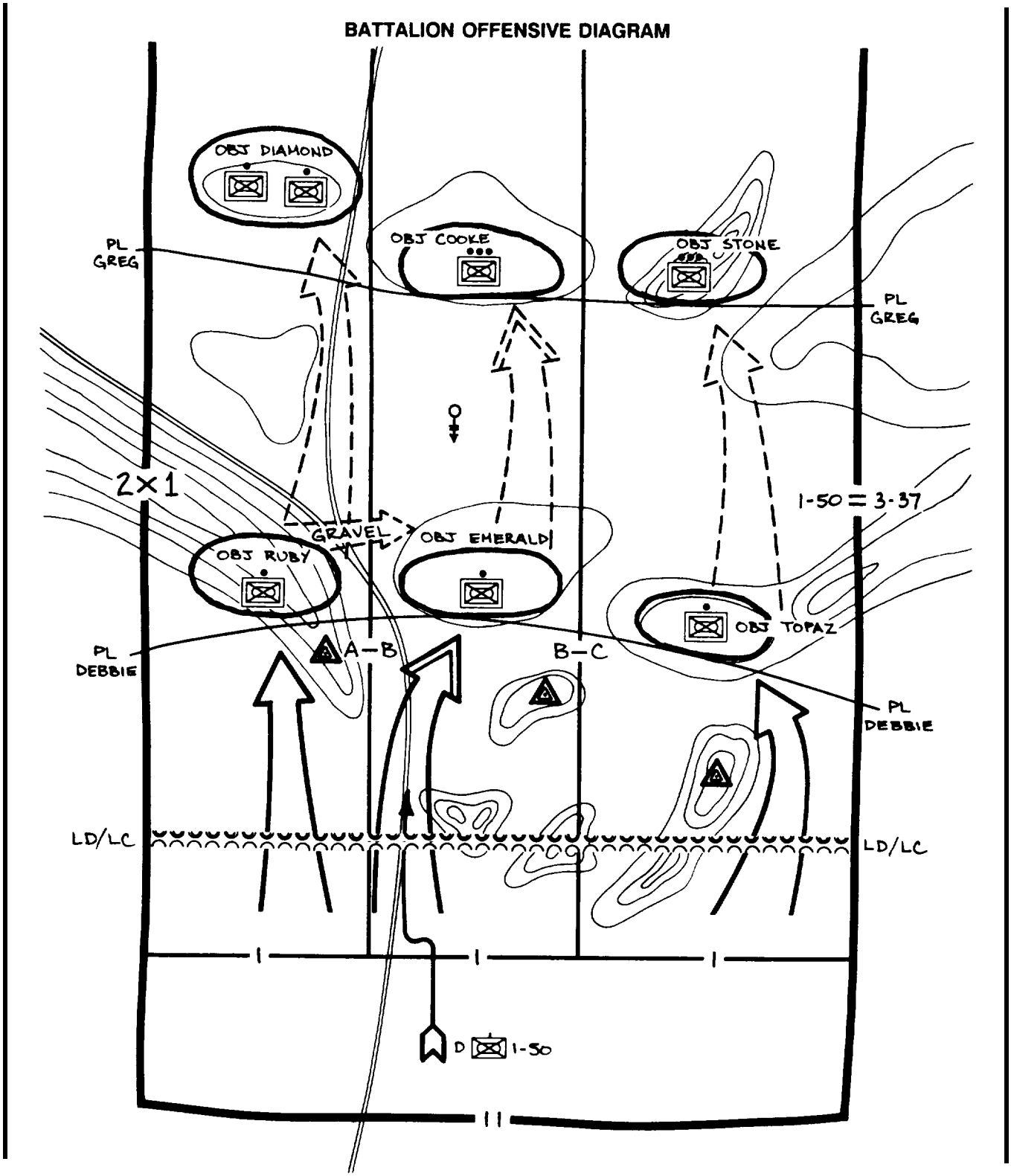
The battalion FSO determines that fire support must do the following:

- it must at least suppress the enemy forces on the final objective.
- It must prevent these enemy forces from reinforcing an intermediate objective if they try to do so.

The battalion FSO reviews the brigade fire support plan and extracts the pertinent information (allocation of fire support assets, the CSR, fire support coordinating measures, and special instructions concerning the employment of those assets). From that, the S3, FSO, and other members of the FS cell work together to determine the requirements for fire support to support the operation.

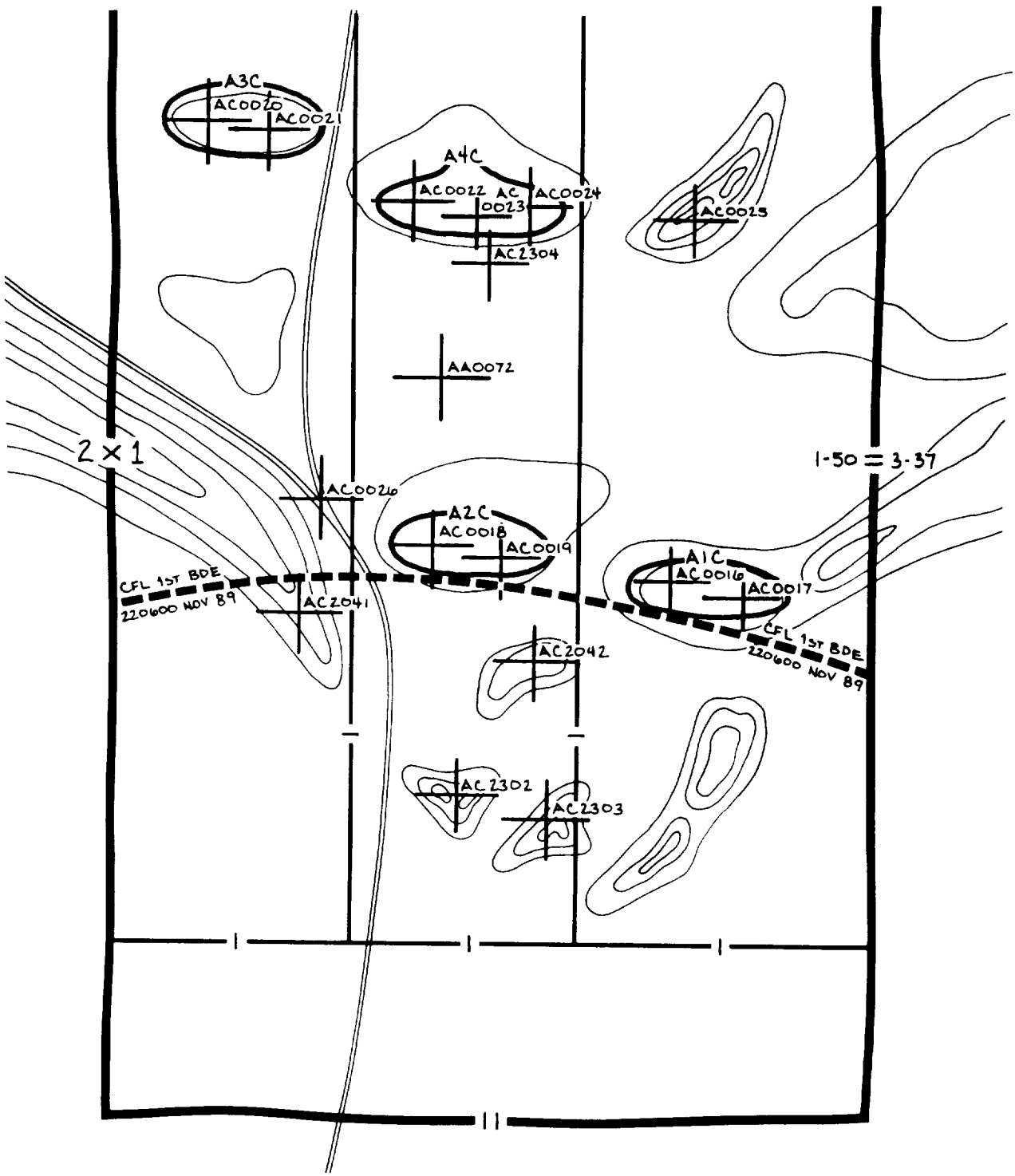
The battalion FSO reviews the brigade target list by plotting the targets that support the battalion operation. He also determines how many battalion-generated targets will be required.

EXAMPLE OF PLANNING A DELIBERATE ATTACK (CONTINUED)



EXAMPLE OF PLANNING A DELIBERATE ATTACK (CONTINUED)

BATTALION TARGET OVERLAY



EXAMPLE OF PLANNING A DELIBERATE ATTACK (CONTINUED)

BATTALION FIRE SUPPORT EXECUTION MATRIX

	AA LD/LC	PL DEBBIE	PL GREG	FINAL OBJECTIVE	
A	MORT 2 POF	MORT 2 POF O/O FA POF	MORT 2 POF O/O FA POF MORT 2 PRI TGT AC0026	MORT 2 POF	5
B	FA POF MORT 1 POF	FA POF MORT 1 POF 155 PRI TGT AC2042 GP A2C	FA POF 155 PRI TGT AA 0072	FA POF	4
C		GP A1C			3
D			O/O FA POF		2
BN	←	2 COLTs	→	GP A3C, A4C F-16 (GROUND ALERT) 0830-1230	1
	A	B	C	D	E

Using available target acquisition assets, the battalion FSO-plans the following targets:

Line Number	Target Number	Description	Agency	Remarks
29	AC2041	Pit pos	GSR	Group A1C
30	AC2042	Pit pos	GSR	Group A1C

All targets will be fired with DPICM. If possible, planned CAS will be delivered simultaneously on Objectives COOKE and STONE between 1030 and 1230. If the two missions are not used by 1230 and 1430 respectively, they will be lost and alternate fires will have to be used.

After being presented with possible courses of action by his staff, the battalion commander makes his decision. He then briefs his company commanders and FSOs on his concept of operation and intent. The battalion commander's guidance to the company commanders is as follows:

EXAMPLE OF PLANNING A DELIBERATE ATTACK (CONTINUED)

"The battalion will attack at 0600 tomorrow (11 hours from now) with three companies abreast to seize Intermediate Objectives RUBY, EMERALD, and TOPAZ. On order, the battalion will attack to seize final Objectives DIAMOND, COOKE, and STONE. I want to move to those objectives quickly. Also, I want Company A to be prepared to help Company B in taking Objective EMERALD by moving along Axis GRAVEL to flank Objective EMERALD after taking Objective RUBY.

"The objectives in the Company B sector are going to be the most difficult to take. The largest enemy force and best prepared defenses in the battalion sector are located around Objective EMERALD. Additionally, the enemy forces on the objectives can provide mutual support, Objective RUBY is the only objective we have that cannot be supported by enemy forces from other positions. I am concerned that the forces on Objective COOKE will move to support either EMERALD or TOPAZ.

"Before the attack on the primary objectives, I want smoke fired in front of Objectives COOKE and STONE. Without a screen, the enemy will be able to engage us long before we get in range. I want the priority of fires to go to Company B. If we move to the intermediate objectives slowly, the enemy is likely to move forward to support the intermediate objectives. There is a possibility that enemy forces will be shifted to the Company A sector as we try to take Objective RUBY. Therefore, I want on-order priorities of fire to Company A.

"The 2-50 Mech is the brigade reserve. It has an on-order mission of passing through our sector and continuing the attack."

The battalion FSO briefs the company FSOs on the battalion fire support plan as follows:

"Company B will have the priority of fires. Company A will have on-order priority of fire. With the assets available, company FSOs should develop fire plans that provide suppressive fires to support the operation. Field artillery smoke will be needed to help the maneuver forces get to the primary objectives. Since FA smoke is Iimited, plan on using mortar smoke on the intermediate objectives. I have planned two CAS missions on Objectives COOKE and STONE. The aircraft are on ground alert and are available 0830 to 1230 and 1030 to 1430, respectively. Plan an alternate engagement means on COOKE and STONE if the CAS missions aren't used during these periods or are otherwise unavailable.

"We are allocated two priority targets from brigade, These will go to Company B. A mortar priority target goes to Company A.

"I will position both COLTS throughout the operation. The COLTS will be behind the LD/LC initially. On my order, one COLT will move to the first hill mass (just across the LD/LC) in the middle of the Company B zone. That COLT will provide observation of the high-speed avenue of approach and provide overwatch while the second COLT and Company B move forward. When the first COLT is in position, the second COLT will move forward on my order behind Company A to Objective RUBY and position to observe the high-speed avenues into the battalion zone. When Company B consolidates on Objective EMERALD, the first COLT will move forward to a position on Objective EMERALD to complement the other COLT overwatch of the high-speed avenues of approach into our zone and support the attack of the primary objectives. On brigade order, the COLTS will chop to the 2-50 Mech.

"If Company A attacks along Axis GRAVEL, I will clear all indirect fires into the Company B sector.

"Should either forward company FSO not be able to fire on a target or take a required action from the fire support execution matrix, I will automatically do it. It is critical that company FSOs coordinate early and comprehensively for mutual support"

Fire support coordinating measures are disseminated, as are the organization for combat, fire support asset status, CSR, and target lists.

Each company FSO returns to his company CP and reviews the target list and schedules sent by the battalion FSO.

Using acquisition assets available, the commander designates targets for engagement on the objective (to suppress it as his forces move toward it). To protect his force from observation, the commander desires fires to suppress an OP and screen the movement of his force.

EXAMPLE OF PLANNING A DELIBERATE ATTACK (CONTINUED)

Company A forwards the following additional targets to the battalion:

Line Number	Target Number	Description	Agency	Remarks
02	AC2201	Pit pos	Scouts	DPICM
03	AC2202	OP	3d Pit	DPICM
04	AC2203	Road	Company FSO	Smoke

The Company B commander and FSO formulate their plan for the operation. They review target lists and determine that Groups A2C and A4C support the operation. The commander and FSO plan fires on the OP and smoke targets to facilitate the movement to the Intermediate and final objectives.

Company B forwards the following additional targets to the battalion:

Line Number	Target Number	Description	Agency	Remarks
01	AC2300	Squad pos	Scouts	Group A2C
30	AC2301	Pit pos	Scouts	Group A2C
31	AC2302	OP	FO	
32	AC2303	Suspected OP	Company FSO	Smoke
33	AC2304	Forward pos	Company FSO	Smoke
40	AC2311	Pit pos	Scouts	Group A2C

The Company C commander and FSO formulate their plan for the operation. They review target lists and determine that Group AIC supports the operation. They add only three targets – two targets to screen the company movement with smoke and one target on the OP. Company C forwards these additional targets to the battalion:

Line Number	Target Number	Description	Agency	Remarks
01	AC2441	OP	1st Pit FO	DPICM
02	AC2444	Road	Company FSO	Smoke
03	AC2445	Pit pos	Company FSO	Smoke

EXAMPLE OF PLANNING A DELIBERATE ATTACK (CONTINUED)

The battalion FSO plots all targets, resolves target duplications, and notifies affected company FSOs, The battalion FSO notifies the brigade FSO that the fire plan is complete.

The brigade FSO reviews the target lists to ensure they support the brigade mission and approves the schedules. He resolves any target duplications, ensures the affected battalion FSOs are notified of changes, and identifies possible conflicts over the use of the limited fire support assets. He checks the status of the fire support assets to see if ammunition and delivery systems are available to support the operation.

Exploitation

Description

Exploitation is an offensive operation that follows a successful attack to take advantage of weakened or collapsed enemy defenses. Its purpose is to prevent reconstitution of enemy defenses, to prevent enemy withdrawal, to secure deep objectives and to destroy enemy forces. An exploitation is conducted with two forces, the direct pressure force and the follow-and-support force.

The follow-and-support units clear the overrun area of pockets of resistance and expand the zone of exploitation. Follow-and-support units are assigned missions to help exploiting forces by relieving them of tasks that would slow their advance, such as preventing the enemy from closing a gap in a penetration and securing key terrain gained during a penetration or envelopment. As the exploiting brigade advances farther into the enemy rear areas, the follow-and-support units secure lines of communication and supply, support the exploiting elements of the brigade, destroy pockets of bypassed enemy, and expand the area of exploitation from the brigade axis.

Depending on the situation and its task organization, the brigade can exploit its own success. It can be used as an exploiting force for a higher echelon or it can follow and support another exploiting force. Subordinate battalions normally maneuver as in a movement to contact.

Fire Support Considerations

The FSO must be prepared to provide flexible fire support to both the direct pressure force and the follow-and-support force. On-order priorities of fire must be designated to rapidly shift priorities to units within the direct pressure force and/or to the follow-and-support force if necessary. Fire planning must be flexible. It must encompass fires not only in front of the force (on choke points and to canalize the enemy) but also to the flanks and rear. COLTS must be employed to support the force as a whole. Quick fire planning techniques may be necessary to provide responsive support planning. As the enemy force retreats, it will be necessary to slow it down for the encircling force to catch up. Also, it will be necessary to prevent the enemy from reinforcing the retreating force either logistically or with combat personnel. Plan massed fires on enemy choke points and key terrain to canalize, slow, and block the enemy movement. Multiple launch rocket system (MLRS) fires and DPICM are suitable for slowing down targets. FASCAM may be employed on escape routes. TACAIR on ground alert and attack helicopters employed in a fire support role can provide rapid engagement of hard or mobile targets and can provide massed fires for area targets. Smoke may be used to slow and disrupt the retreat. Fix bypassed pockets of resistance until follow-on forces can engage. Use suppressive fires. DPICM is suitable for slowing down vehicles and fixing the force.

Plan for hasty attack.

Plan CFLs well forward, Use on-order CFLs so they can be quickly emplaced and moved.

Pursuit

Description

If it becomes apparent that enemy resistance has broken down entirely, either an attack or an exploitation may give way to pursuit. The pursuit is ordered when the enemy can no longer maintain his position and tries to escape. The commander exerts unrelenting pressure to keep the enemy from reorganizing and preparing defenses. A direct pressure force places pressure on the enemy while another highly mobile encircling force cuts the enemy retreat to intercept and destroy him. Hasty attacks may take place with little or no preparation.

The mission of a direct pressure force is to prevent enemy disengagement and subsequent reconstitution of the defense and to inflict maximum casualties. Lead elements move rapidly along all available roads to contain or bypass small enemy pockets, which are reduced by follow-and-support forces. At every opportunity, the direct pressure force envelops, cuts off, and destroys enemy elements if such actions do not interfere with its primary mission. The enemy is not allowed to break contact.

The mission of the encircling force is to get behind the enemy and block his escape so that he can be destroyed between the direct pressure and encircling forces.

Fire Support Considerations

Responsive fire support must be provided to both the direct pressure and encircling forces. Priorities of fires may be designated for both forces. Because of distance considerations, the encircling force may get priority of field artillery, while the direct pressure force gets priority of the mortars. The decision to assign priorities of fire to one force or both forces at the same time will depend on the tactical situation. COLTS may be positioned to support both forces. As the enemy retreats, it will be necessary to slow him down for the encircling force to catch up. Also, it will be necessary to keep the enemy from reinforcing the retreating force, either logistically or with combat personnel. Plan massed fires on enemy choke points and key terrain to canalize, slow, and block the enemy movement. MLRS fires and DPICM are suitable for slowing targets. FASCAM may be employed on escape routes and to slow the retreat and prevent reinforcement. TACAIR and attack helicopters employed in a fire support role can attack hard targets. Smoke may be used to slow and disrupt the retreat.

Air support must be responsive to the needs of the force to effectively slow the retreat of the enemy. Air or ground alert may be necessary to provide the degree of responsiveness required. Also, ALOs, ETACs, and/or AFACs should be positioned forward to respond in a timely manner.

Fix bypassed pockets of resistance until follow-on forces can engage. DPICM delivered on vehicles may significantly reduce the enemy movement. Suppressive fires may be delivered to hinder the movement of bypassed forces.

Both direct pressure and encircling forces must plan for hasty attack.

Place CFLs well forward. Use on-order CFLs so they can be quickly shifted and lifted, Plan a restrictive fire line (RFL) between converging forces.

Section III. FIRE SUPPORT PLANNING FOR THE DEFENSE

Purpose of Defensive Operations

The purpose of any defense is to destroy the enemy, gain time, concentrate forces, or slow or weaken the enemy before the conduct of offensive operations. Friendly forces must retain the initiative to keep the enemy off-balance. The key to this type of defense is depth. Fire support considerations discussed in this section apply to any type of defensive operation.

Fire Support Considerations

Attack the Enemy Deep

Fires will always be planned to attack the enemy before he reaches the main battle area (MBA), These fires are planned–

- To disorganize, delay, and weaken the enemy.
- To strip away the enemy reconnaissance elements.
- To impair the enemy vision by causing him to button up. Use of variable time (VT) and time (ti) fuzes will also destroy some of the vehicle optics and antennas.

Plan Fires to Support Scouts

Fires also must be planned to support the scouts deployed forward to provide intelligence. These fires are planned –

- To screen scout movements with smoke.
- To suppress enemy units engaging the scouts.
- Along avenues of approach.

The purpose of the scouts is to report the enemy size, configuration, and direction of attack. Therefore, the scouts can provide much valuable information. This includes the following:

- Speed of enemy formations to trigger points and selection of trigger points.
- Dispersal of enemy formations.
- Amount and location of artillery and mortar assets.
- Locations of command, control, and communications (C3) cells.

Because the scouts belong to the task force commander and may have other information requirements, consider attaching forward observers with the scouts. Besides reporting specific information wanted by the FSO, the FOs can control indirect fires against the enemy force. Also, under emergency combat conditions the FOs can control fires delivered by CAS assets if the ALO, ETAC, or AFAC is not available.

Consider emplacing COLTS forward on prominent terrain to acquire specific high-value targets the commander wants destroyed. These high-value targets are normally determined by a target value analysis and included in the commander's guidance. High-value targets may include C3 cells, armored vehicles, combat support (CS) elements, and combat service support (CSS) elements.

Separate the Enemy Infantry From Armor

Plan fires where friendly units engage the enemy with direct fires. As the enemy deploys his infantry, the indirect fires will slow the infantry and cause the armor to outdistance the infantry support.

Airburst munitions, such as those delivered with VT and time fuzes, will be most effective against deployed troops in the open.

Support the Obstacle Plan

Plan fires in front of, on top of, to the sides of, and behind obstacles to maximize their effect as combat multipliers.

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

Plan fires 0n top of obstacles to hinder breaching attempts by destroying breaching teams or equipment, including lane markers. When deciding to fire on top of an obstacle, the commander must consider the effects of these fires on the obstacle itself.

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

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

Consider using smoke to support the obstacle plan. Fired in front of the obstacle, smoke obscures the obstacle from the enemy. Smoke fired on top and to the sides of the obstacle hinders breaching or bypassing efforts and silhouettes the enemy for overmatching elements if the enemy succeeds in breaching or bypassing.

The exact location of each obstacle must be determined after the obstacle is emplaced. COLTs can be used to provide exact location if time permits

Consider using FASCAM if available. (Use of FASCAM must be coordinated with the engineers.)

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

Support Disengagements

The commander's concept of the operation may state that friendly units are to disengage at a certain time to move to successive positions. Therefore, the fire plan must include fires to support the disengagement. The FSO must plan–

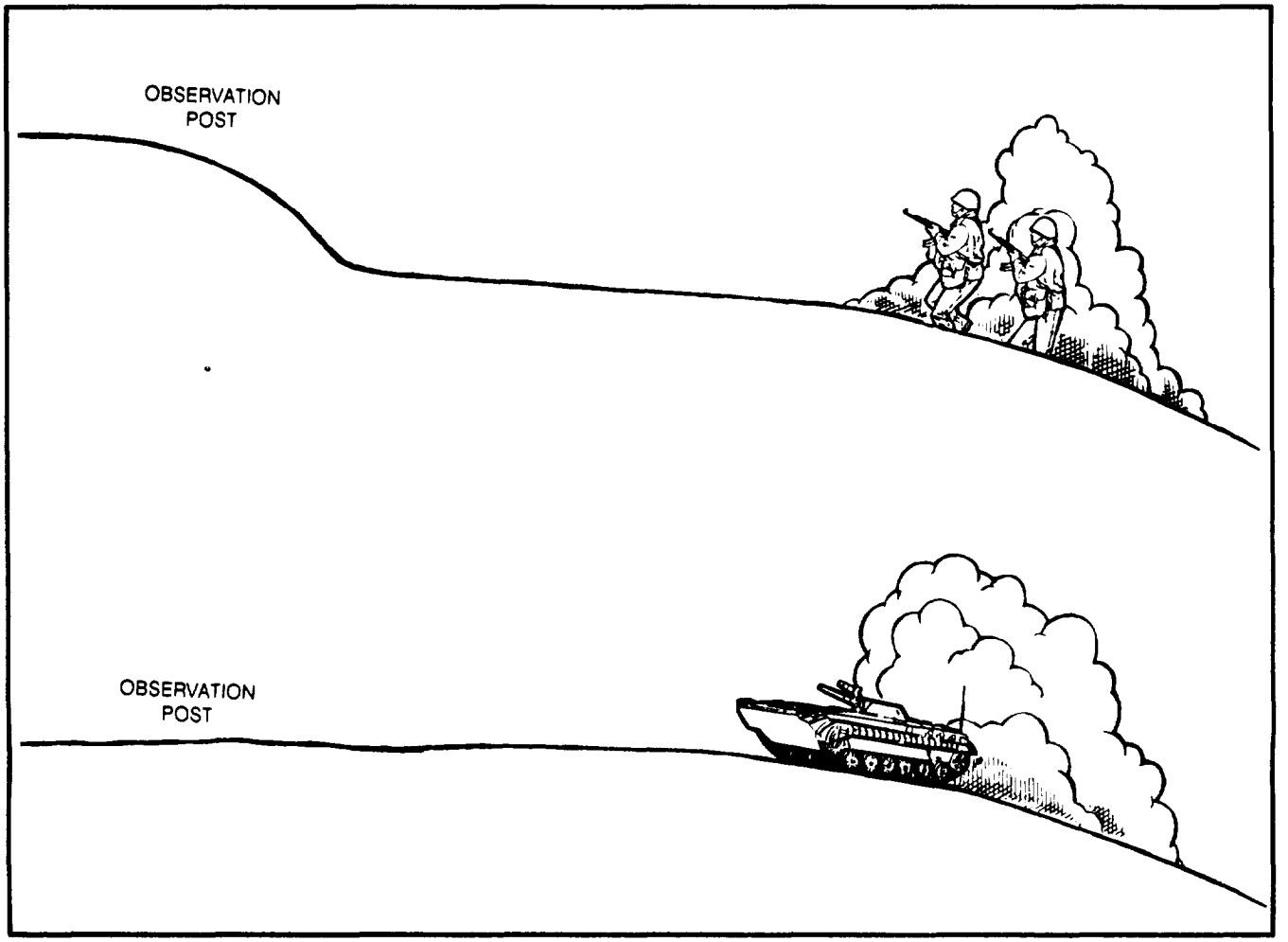
- On-call suppressive fires at the point where the unit will disengage.
- Smoke to screen the movement of friendly elements and obscure the enemy vision.
- Targets along the route to the next position.

Plan Smoke and Illumination

Because the enemy has the advantage of choosing when to fight, the FSO must be prepared to implement the fire plan both day and night, Smoke and illuminating munitions can be used to silhouette the enemy and thus provide more visible targets to direct fire systems. The commander must decide if and how he wants to employ smoke and illuminating munitions, Considerations for employing these munitions are as follows:

- Smoke used to screen friendly movements and obscure the enemy vision may also obscure the vision of adjacent friendly elements.
- Illuminating munition burning on the ground behind the enemy at night is also effective. Illumination will ruin the night vision of friendly units and, if not properly coordinated, can injure friendly observers looking through night vision devices.
- Units in the defense normally have the advantage of knowing the terrain better than the attacking force, The use of illumination may negate this advantage.
- Smoke deployed on the ground behind the enemy is effective during daylight.
- To create these silhouettes, the terrain must be either level or gently sloping with no crests between the munitions and the enemy.

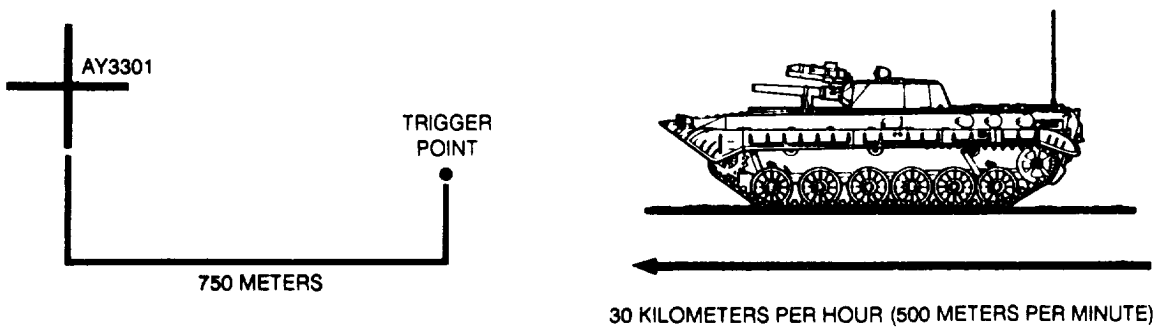
SMOKE USED TO SILHOUETTE



Use trigger points to determine when to engage moving targets with indirect fires. Trigger points are identifiable points (natural or man-made) on the ground. The enemy arrival at a trigger point signals the FOs to initiate a call for fire. The sequence for determining when to intiate a call for fire is as follows:

- Determine the position on the ground that you want fires to impact on the enemy or to silhouette the enemy.
- Determine the enemy rate of movement (speed). This may be done by estimation, on the basis of past experience, from doctrinal literature, or from scout reports or enemy speed. The best way is from scout reports.
- Determine the time of flight of the rounds from the weapon system firing the mission.
- Determine processing time (transmission time plus FDC time equals total processing time [TPT]).
- Determine total mission time (TOF plus TPT equals total mission time [TMT]).
- Back up the trigger point the required distance on the basis of computations based on total mission time and rate of speed as shown.

TRIGGER POINT DETERMINATION



TOTAL PROCESSING TIME = 60 SECONDS
TIME OF FLIGHT = 30 SECONDS
TOTAL MISSION TIME = 90 SECONDS (1.5 MINUTES) X SPEED OF ENEMY
1.5 MINUTES X 500 METERS PER MINUTE = 750 METERS

SEND THE CALL FOR FIRE FOR TARGET AY3301 WHEN TANKS REACH TRIGGER POINT.

Plan Fire Support Coordinating Measures

Fire support coordinating measures must be flexible to facilitate a changing situation and must not be too restrictive.

- A coordinated fire line may be employed to allow the attack of the enemy by all surface-to-surface systems. The CFL should be placed close to the front of the main battle area.
- Restricted fires areas (RFAs) may be employed around scout positions in forward areas.
- Remember that unit boundaries are also fire support coordinating measures in that fires from one unit may not cross boundaries into another unit sector without coordination.

To emplace fire support coordinating measures, consider wartime minimum safe distances of the munitions to be fired.

Plan Final Protective Fires

Plan final protective fires as they would be planned for any defensive operation. Final protective fires must be planned at blocking positions (if any) selected by the commander.

- Place FPFs along the most likely approach by the enemy into a friendly position.

- Place FPFs close enough to the friendly position to augment the direct fire weapons – normally no more than 300 meters in front of the position.
- Fire FPFs only when needed and end them only on order. The FPF may be initiated by a code word or target number or by calling specifically for the FPF. However, when this is done, such initiation should be a matter of SOP and should be coordinated carefully.

Allocate Mortars

The battalion FSO must recommend which company will receive priority of mortar fires. The priority of fires can change according to time, event, or threat so that during an operation, each company is provided priority of fires. The following considerations can be used to determine priority of fires.

- Priority is usually assigned to a forward security force initially.
- Priority may be subsequently assigned to weight a critical sector or battle position. The commander may state that a specific position, terrain feature, or event is vital to the success of the defense.
- Priority is changed as required to meet the threat. The enemy may not always attack where expected.
- Priority may be assigned to increase the effectiveness of the unit direct fires. For example, the effectiveness of ATGMs can be increased by forcing armor to button up and by canalizing the enemy.

The allocation of priority fires must –

- Provide fires to support the scheme of maneuver and/or commander's intent.
- Enhance response to anticipated on-call fires.
- Provide continuous indirect fire support.

The cavalry troop FSO recommends priority of fires for the troop mortars similarly. In certain circumstances and terrain, those mortars may not be able to support the entire troop front. The commander must decide to whom priority of fires will be provided. The commander must determine –

- Where the enemy will most probably deploy his infantry and attack.
- Likely enemy avenues of approach.
- What position or positions must be held to ensure the success of the defense.

Allocate Field Artillery Fires

The brigade FSO must allocate priority of FA fires from the supporting FA direct support battalion. Like the mortar allocation of fires, the FA priority of fires –

- Is usually assigned initially to a forward security force.
- IS subsequently assigned to weight a critical sector or battle position.
- Is changed as required to meet the threat.
- Can increase the effectiveness of direct fires of a unit.

Plan Close Air Support

The FSO (in coordination with the S3 air, S2, and ALO) recommends targets for engagement with preplanned CAS. Preplanning permits the most effective and efficient use of TACAIR assets. Preplanned requests permit ordnance to be precisely matched to the target. Mission planning can be more complete. CAS missions can be integrated into the

operations to ensure timely mission accomplishment. Preplanned missions facilitate the ALO, ETAC, and/or AFAC control of aircraft; the planning and employment of airspace control procedures; and SEAD planning.

As they become available, target information updates or changes in target status should be forwarded to the air support operations center (ASOC) through the TACP. If the target has moved or has been destroyed or if the commander no longer wants the target to be engaged by TACAIR, the ALO must be notified so the mission can be retargeted, diverted to a higher priority mission, or otherwise used in a more effective manner.

Plan for Nuclear Operations

When the division uses a division nuclear subpackage in the defense, the brigade FSO will ensure that the division FS cell knows the latest FLOT location. The FSO will inform the brigade commander of the location of the minimum safe distance (MSD) lines and will ensure that any STRIKEWARN message is disseminated. Further information is in Appendix H.

Security Area

Description

The security area extends from the FLOT or a line designated by the force commander back to the forward edge of the battle area (FEBA). The mission of the covering force is –

- To gain and maintain contact with attacking enemy forces,
- To develop the situation.
- To delay or defeat the enemy leading fighting forces.

Control

Corps and division commanders may establish a covering force as the first echelon of a two-echelon defense. When this is done, the covering force, normally composed of tank-heavy task forces and regimental cavalry, fights a major action to destroy leading enemy formations, to cause the commitment of follow-on forces, and to force the enemy to disclose his main effort. The covering force must be prepared to conduct counterattacks or drive between echelons to isolate leading units. The corps or division will normally control the covering force.

Fire Support Considerations

Engage the enemy before he moves into the covering force area. Target enemy combat units to force the enemy to deploy, to inflict casualties, and to strip away reconnaissance elements. Isolate the attacking force by engaging second-echelon forces, C3 facilities, and logistic sites. Plan fires deep to slow and canalize the enemy.

Target enemy reconnaissance and intelligence-gathering elements (the combat recon patrol and forward security element) to lessen the capability of the enemy to gain information on friendly forces status and disposition. Laser-guided munitions directed by COLTS placed forward may be used to accomplish this task.

Counterpreparation fires should be planned and may be fired (at the commander's direction) when the threat of enemy attack is discovered.

Deceive the enemy as to the location of the MBA. Cause the enemy to deploy early and reveal his main attack. Mass fires at critical points. Have observers in position to call for those fires. Mass fires to slow and canalize the enemy to provide better

targets for maneuver direct fire systems and to cause the enemy to deploy early and thus reveal his main attack.

Support the withdrawal of the covering force. Suppress enemy direct and indirect fire weapons. Assist maneuver in moving and disengaging. Plan smoke, FPFs, priority targets, suppression fires on direct and indirect fire systems, and groups and series along withdrawal routes. Support barrier and/or obstacle plans.

Plan for hasty attack.

Keep FS cells in the MBA informed of the current tactical situation. Among the items to be forwarded to FS cells in the MBA are –

Ž Fire support coordinating measures in effect.

Ž The tactical situation.

Ž Target lists and fire plans in effect.

Place CFLs close to friendly maneuver forces and plan on-order CFLs.

Main Battle Area

Description

The main battle area extends from the FEBA back to the rear limit of the brigade area of operation. The bulk of the defending force normally is deployed in the main battle area to defeat the enemy main thrust. Fire support in the MBA is used to slow, stop, or destroy attacking forces and to enhance the use of massed fires to inflict the greatest damage.

Fire Support Considerations

Before the enemy enters the main battle area, plan deep fires to disrupt, delay, canalize, and cause casualties. TACAIR missions may be planned on known, suspected, and likely enemy locations. Also, plan fires on choke points to inflict maximum casualties. If a covering force is deployed forward of the MBA, coordination must be made to fire on the targets.

Plan fires to deny the enemy information about friendly forces and to strip away his reconnaissance and intelligence-gathering elements (the combat recon patrol and forward security element). Laser-guided munitions directed by COLTS placed forward may be used to do this.

As the enemy moves into the main battle area, use fire support to canalize him, deny him use of chosen terrain, and cause him to deploy early and thus reveal his main attack. Mass fires to delay, disrupt, and destroy the enemy throughout the sector. Counterpreparation fires may be planned and executed. Observers (to include COLTS) may be placed in key positions overmatching avenues of approach. Also, fires should be planned to support the barrier and/or obstacle plan.

Plan fires to isolate front echelons from the follow-on forces, making it easier for friendly maneuver forces to defeat the enemy. Observers must be in forward positions to call for fire, Consider using smoke and FASCAM behind forward enemy elements and in front of enemy follow-on forces. Engage high-payoff targets in the follow-on forces early to disrupt their operations.

Help maneuver forces in moving and disengaging from enemy forces as they fall back through the MBA. Suppress enemy direct and indirect fire weapons. Plan smoke, priority targets, and fires along withdrawal routes.

Make contingency plans to reallocate fire support assets once the main attack is identified to strengthen the most vulnerable area. Fires must be planned along all viable avenues of approach, and on-order priorities of fire must be designated. TACAIR missions must be planned to support the contingencies.

Plan fires on obstacles to hinder breaching attempts with the use of massed fires and priority targets. FASCAM may be used to reseed breached minefield.

Plan for hasty attack. The opportunity may appear to conduct counterattacks. The FSO must be prepared to support a hasty attack using quick fire planning techniques, as planning time will be limited. Place CFLs close to forward units to open up the area for rapid engagement of the enemy.

EXAMPLE OF PLANNING A DEFENSE

The 7th Combined Arms Army, consisting of three motorized rifle divisions and two tank divisions is expected to launch an attack within 48 hours to seize the industrial complex of Cache. The 10th US Corps will defend in sector with two divisions abreast and one in reserve –the 40th Armd Div in the west, the 52d Mech Div in the east, and the 53d Mech Div in reserve.

The 52d Mech Div will deploy with three brigades on line and the combat aviation brigade (CAB) in reserve. The division cavalry (cav) squadron will screen forward of PL BUICK. The division commander intends to have the 1st Bde and 2d Bde defend in sector to destroy the enemy first-echelon divisions and then to hold the second-echelon division forward of PL FORD until the 3d Bde attacks the enemy flank to destroy his combat support and combat service support. The cavalry wiII withdraw through the 2d Bde and take up positions on the division eastern frank.

The CAB is in reserve and on order attacks into the flanks of the second-echelon division.

The 2d Bde commander and his FSCOORD return to the brigade CP, where the commander issues his initial planning guidance. (See the 2d Bde defensive diagram.) From the division FS cell, the brigade FSO receives the following information:

FA missions

6-14 FA (155, SP): DS 2d Bde

3-5 FA (203, SP): Reinforcing (R) 6-14 FA

C/1-12 FA (MLRS): GS

EXAMPLE OF PLANNING A DEFENSE (CONTINUED)

Status

6-14 FA: 97 percent strength, 22 howitzers operational

3-5 FA: 95 percent strength, 17 howitzers operational

C/1-12 FA: 98 percent strength, 8 launchers operational

2d Bde CSR

Munitions	107 mm	155 mm	203 mm
HE	80	35	20
DPICM		150	75
Smoke	20	20	
Copperhead		1	
ADAM		4	
RAAMS		16	
Illum	15	15	

TACAIR missions

Two CAS missions (four sorties) are allocated to the 2d Bale. The first mission Is two F-16 aircraft available between 0600 and 1100. The second mission is two A-10s available between 0900 and 1400.

FASCAM

The FA 155-mm battalion can deliver two 400- by 400-meter, medium-density, short-duration RAAMS minefieids. The division commander is executing authority for long-duration FASCAM. The brigade commander is the executing authority for short-duration FASCAM.

Fire support coordinating measures in effect are as follows:

Ž CFL (PL BUICK) is the initial CFL.

Ž CFL (PL PLYMOUTH) is on order.

Ž CFL (PL FORD) is on order.

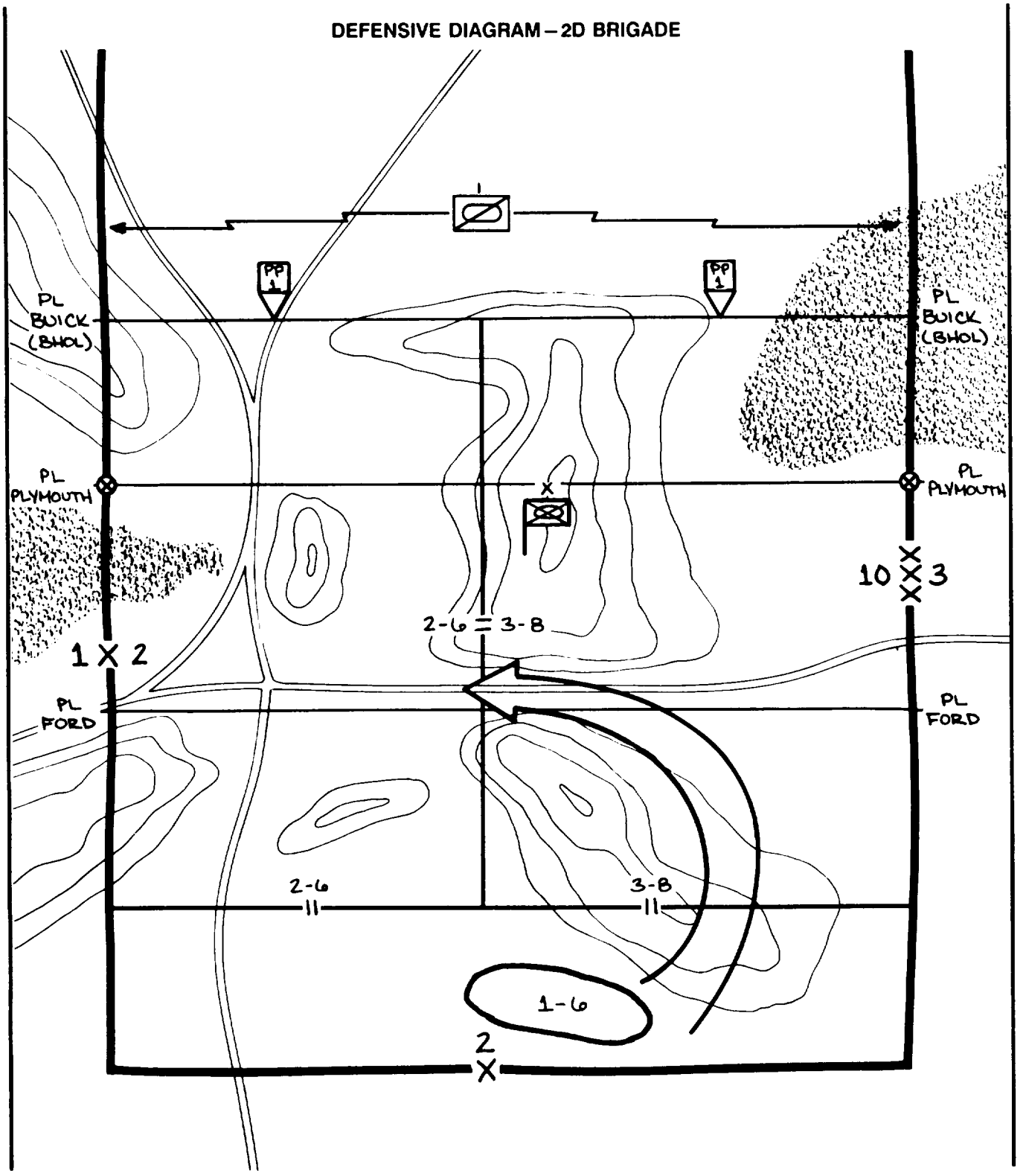
The brigade FSO requests from the division FS cell the division target list and schedules as they apply to the 2d Bale. These are as follows:

Ž The division has planned counterpreparation fires. They will last for 10 minutes, Direct support and reinforcing units will not take part in the counterpreparation. Targets for the counterpreparation will be provided by corps and division. No other schedules affecting the brigade operation have been planned.

Ž The part of the division target list affecting the brigade is as follows:

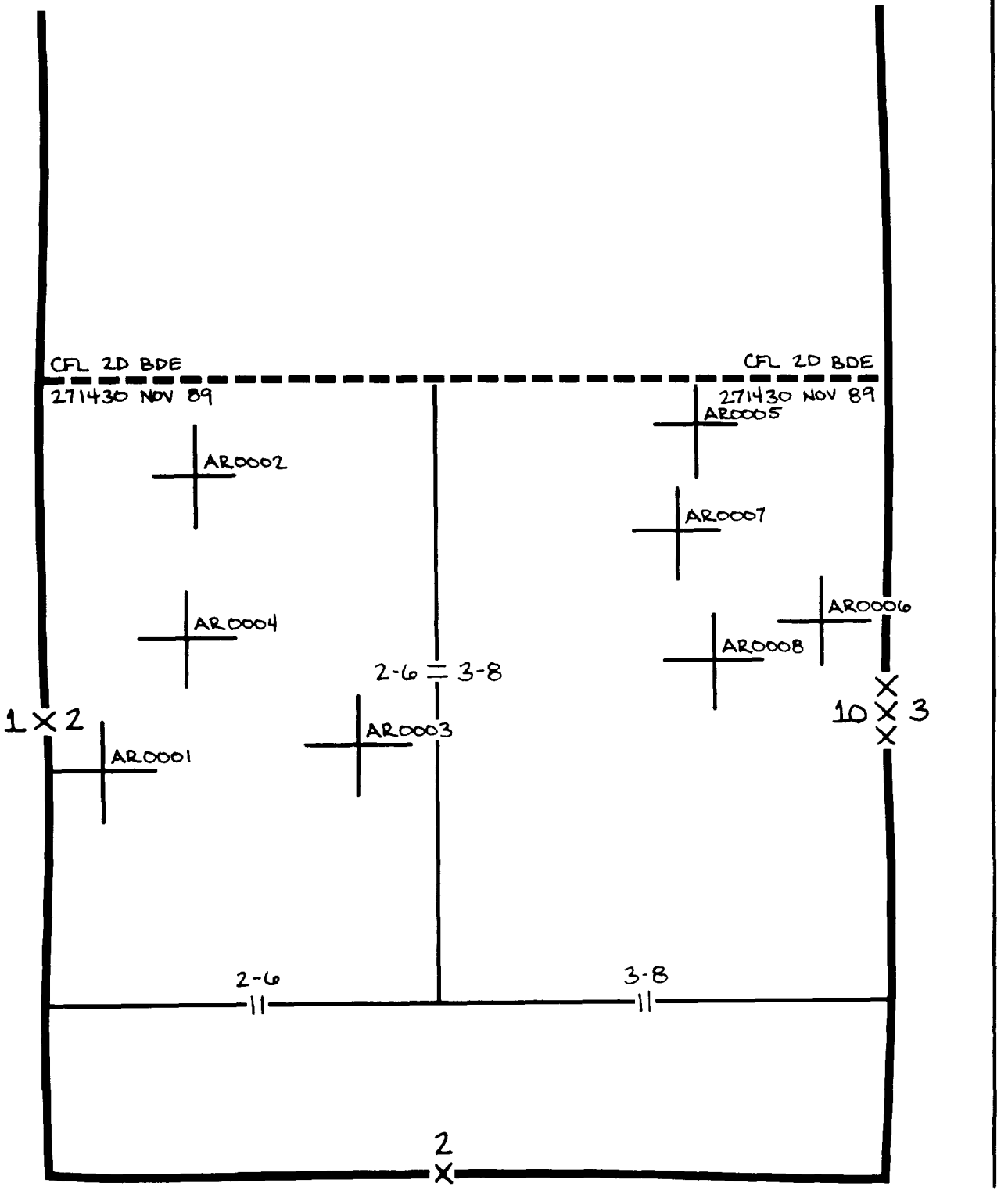
Line Number	Target Number	Description	Agency	Remarks
81	AN1052	First-echelon arty	Q-37	Counterpreparation
82	AN1053	First-echelon arty	Q-37	Counterpreparation

EXAMPLE OF PLANNING A DEFENSE (CONTINUED)



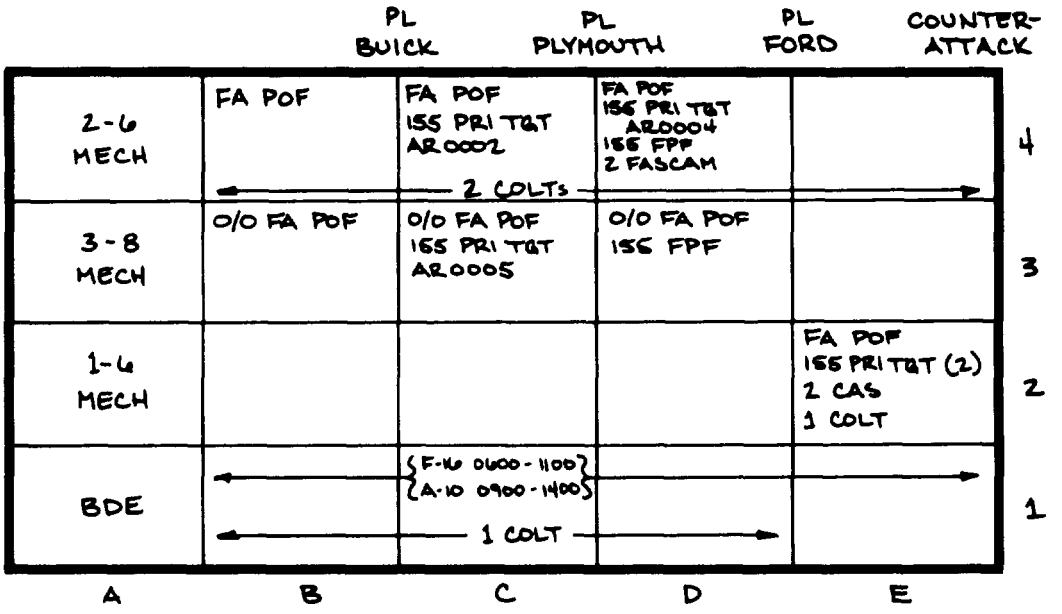
EXAMPLE OF PLANNING A DEFENSE (CONTINUED)

TARGET OVERLAY – 2D BRIGADE



EXAMPLE OF PLANNING A DEFENSE (CONTINUED)

FIRE SUPPORT EXECUTION MATRIX—2D BRIGADE



The brigade FSO recommends to the commander that priority of fires be given to the 2-6 Mech because Intelligence shows that the enemy main attack will be focused on that unit. Also, he recommends that an observer be positioned with each battalion scout platoon to target enemy command vehicles. Finally, after consulting with the ALO, the FSO recommends that the CAS be used against the enemy second-echelon regiment as it approaches the FLOT. The commander agrees to all the recommendations.

After the brigade S2 and the targeting officer Identify the probable enemy forces and their likely courses of action, they use target value analysis to Identify high-value targets. The targeting officer then determines which of those high-value targets can be located by acquisition sources available to the brigade. The S2 then requests that the division locate those targets the brigade doesn't have the means to acquire. The FSO and the S3 evaluate the ability of the brigade to attack the targets listed, After determining which targets will most effect friendly operations if successfully attacked, the S2 and the targeting officer consolidate them into a high-payoff target list. The refined high-payoff target list is given to the commander for his approval.

The brigade staff develops the courses of action and briefs the commander on these. He approves the following course of action:

"Initially, a cav troop from the division cav squadron will screen forward of PL BUICK and withdraw through our brigade, At PL BUICK, I want each battalion to establish its own screen to determine the enemy's main effort. The scouts will require an FO and/or a COLT; but I don't want the scouts to get decisively engaged. The FEBA is PL PLYMOUTH. Battalions will defend in sector to hold the enemy forward of PL FORD, I want two FASCAM minefields emplaced. Engineer and FSO, get back with me on the most effective and efficient way to do this. The 2-6 Mech will have priority of fires with on-order priority of fires to 3-8 Mech. If the enemy gets through the obstacles and forces us back to PL FORD, the 1-6 Mech will counterattack into the enemy flank. The emphasis must be on massed fires and the use of trigger points to properly engage moving targets. Battalions are to conduct limited counterattacks to restore PL PLYMOUTH in their sectors. We must keep the enemy from reaching PL FORD."

EXAMPLE OF PLANNING A DEFENSE (CONTINUED)

Detailed planning continues. The brigade FSO plans more targets, which are added to those that came from division. He then briefs the S3 and the the commander on how these targets support the mission, the scheme of maneuver, and the commander's intent. The targets that affect the 2-6 Mech are as follows:

Line Number	Target Number	Description	Agency	Remarks
93	AR0001	Minefield	Bde FSO	FASCAM
94	AR0002	Road junction	Bde FSO	DPICM
95	AR0003	Minefield	Bde FSO	FASCAM
96	AR0004	Road junction	Bde FSO	DPICM

Targets AR0002 and AR0004 are planned along likely enemy avenues of approach in the sector. Targets AR0001 and AR0003 are planned FASCAM minefields to slow the enemy forward of PL FORD.

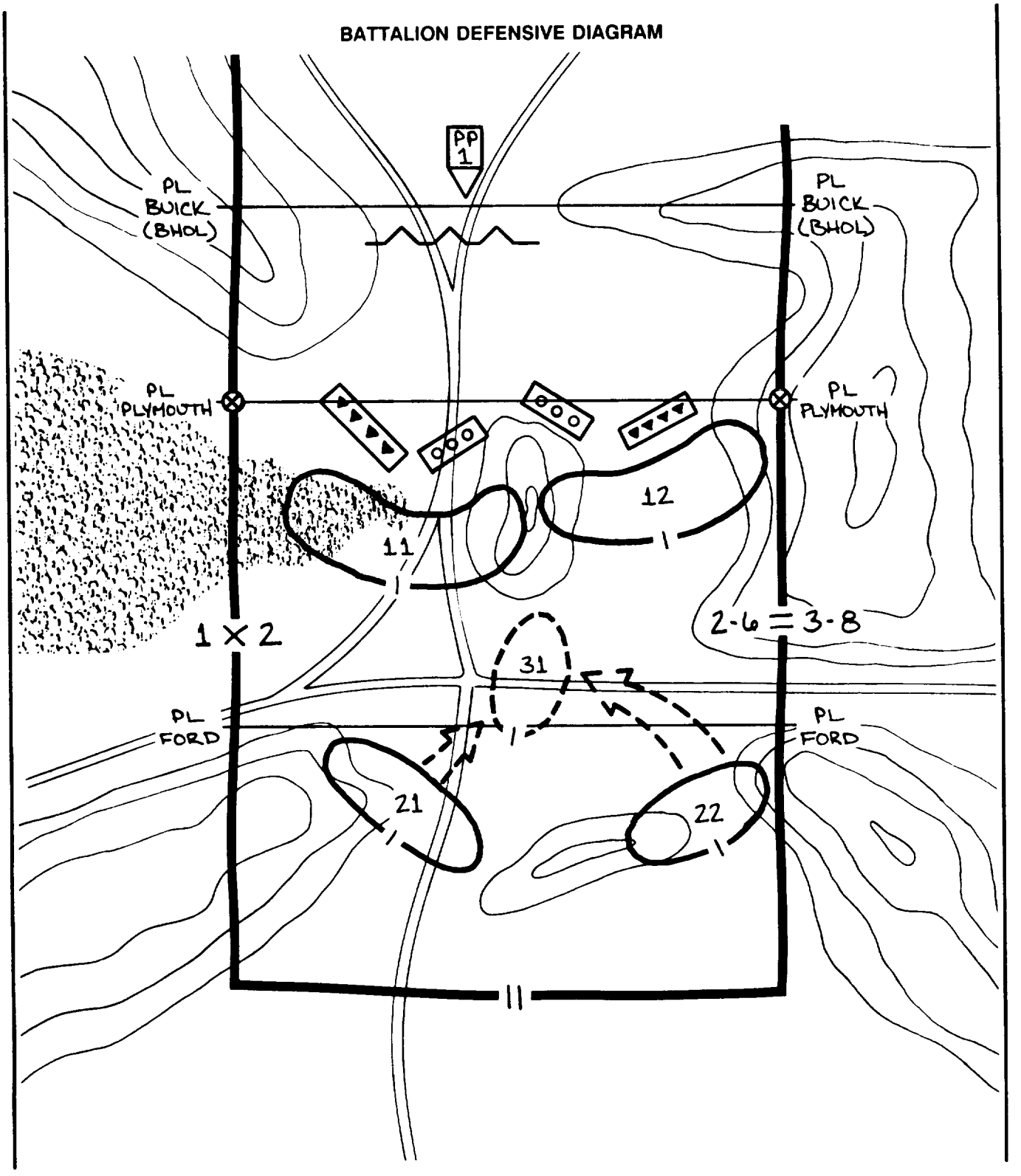
The battalion commanders and their FSOs arrive at the brigade CP and receive the OPORD. The brigade FSO passes the following Information to the battalion FSO.

- Target list (to include indication of some as priority targets) and target overlay.
- Schedules of fire.
- Fire support coordinating measures.
- Fire support assets and their Status.
- Allocation of priority of fires and FPFs
- Intelligence on the enemy.

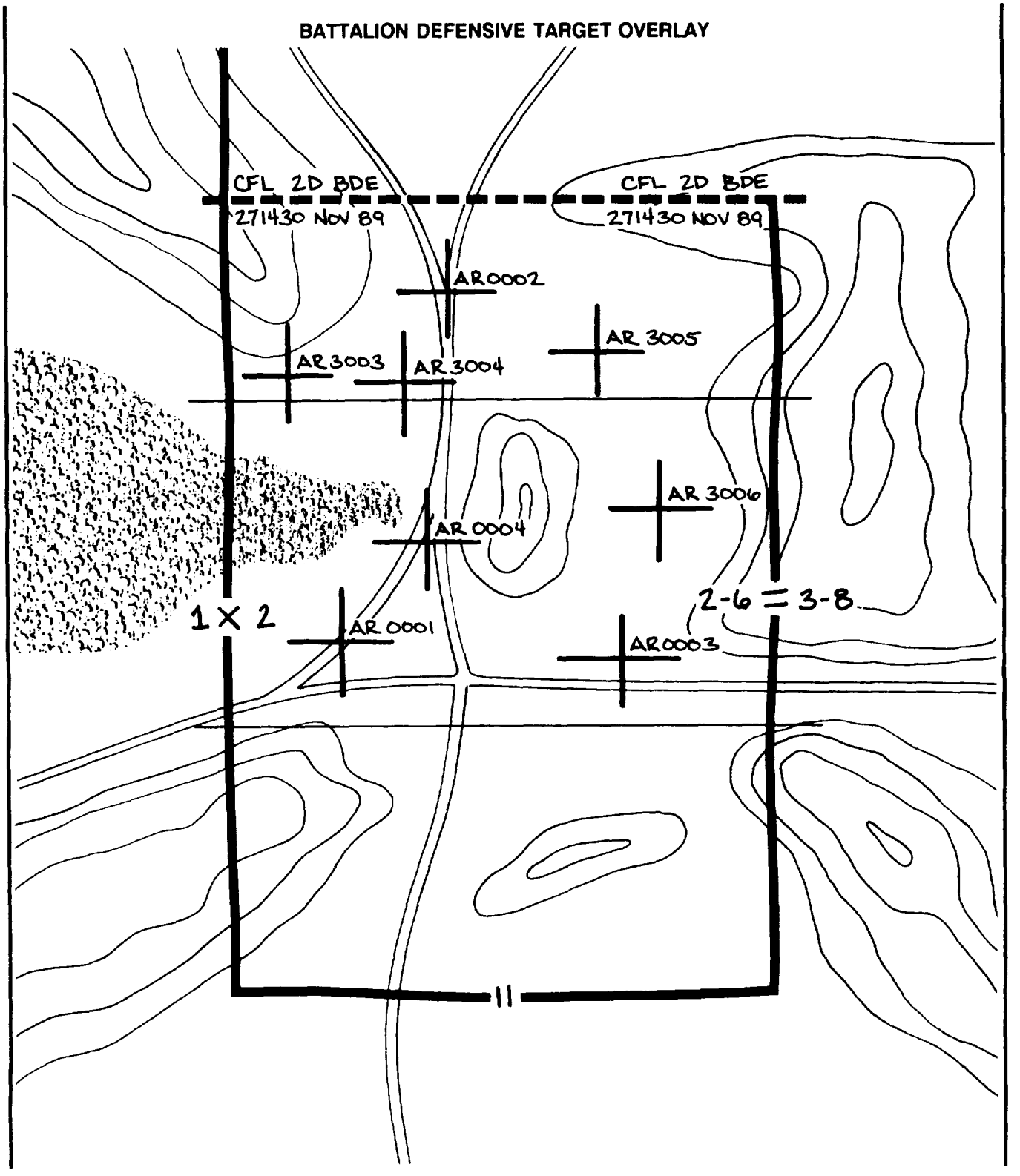
"All COLTS are operational. COLT 1 initially wiII be located with the brigade commander at the brigade CP set up between the battalion sectors. COLTS 2 and 3 will be positioned by the 2-6 Mech FSO. COLT 1 will join the 1-6 Mech when it is committed for the counterattack. Positioning will be by the 1-6 Mech FSO. A/6-14 FA has been tasked to provide the Copperhead firing unit. Try to use Copperhead against command vehicles (especially artillery command and reconnaissance vehicles) and mine-dearlng vehicles."

When the 2-6 Mech commander returns to the battalion CP, he issues his staff planning guidance.

EXAMPLE OF PLANNING A DEFENSE (CONTINUED)

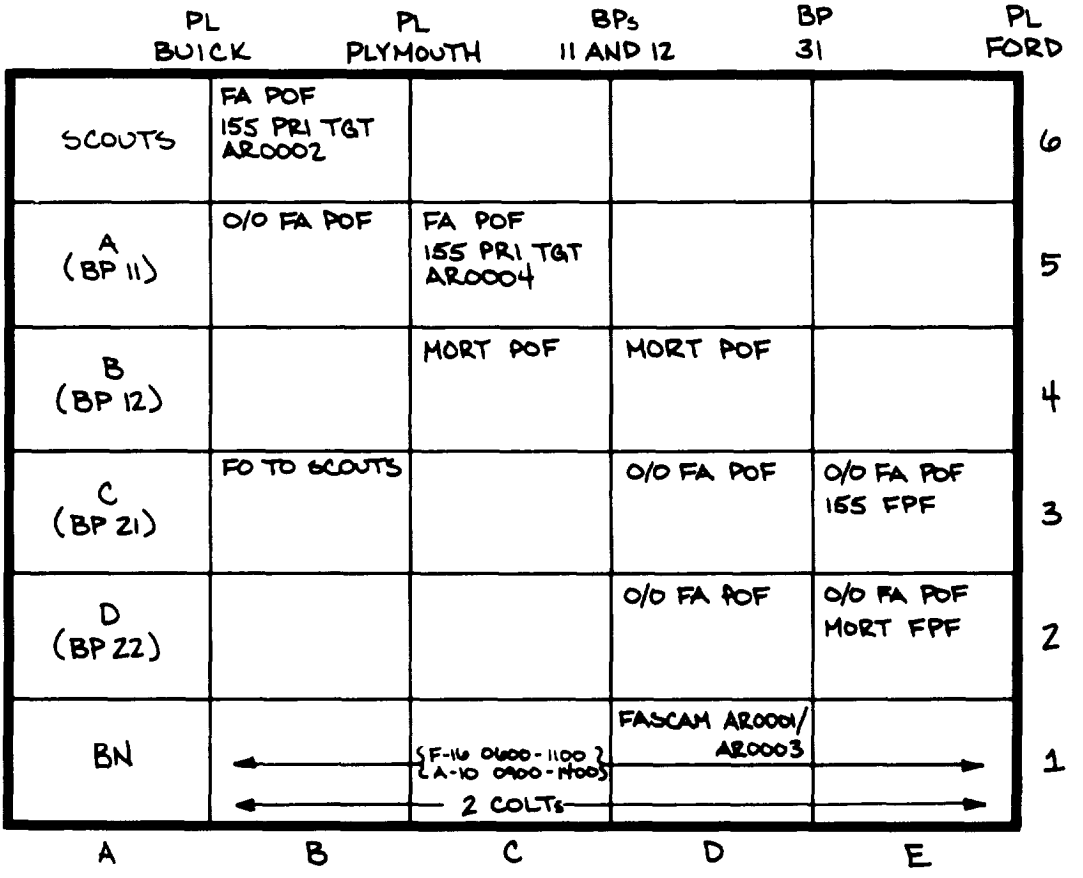


EXAMPLE OF PLANNING A DEFENSE (CONTINUED)



EXAMPLE OF PLANNING A DEFENSE (CONTINUED)

BATTALION FIRE SUPPORT EXECUTION MATRIX



"I want the scouts forward to report enemy location and strength and to try to destroy enemy lead and/or recon elements, but not to become decisively engaged. Company C will provide an FO to the scouts during their screening mission. I want to engage the enemy at the maximum range of our weapons, so we'll have to coordinate with the divisional cav troop in our sector. I want to establish barriers and minefields that will slow the enemy enough to destroy him in front of PL PLYMOUTH. I envision two engagement areas in our sector– one beyond PL PLYMOUTH and the other in front of PL FORD. To hit the enemy at long range, we'll have to concentrate on indirect fires initially, with scouts providing the coverage of the initial obstacle at PL BUICK. When the scout positions become untenable after the initial engagement, the scouts are to withdraw through Company A and establish a screen between the forest and PL FORD. However, if we can't defeat the enemy at PLYMOUTH, we will continue to defend in depth."

The commander then identifies battle positions for all the companies. Company A will occupy BP 11; Company B, BP 12; Company C, BP 21; and Company D, BP 22. The commander continues his guidance.

"If the enemy penetrates either BP 11 or BP 12, then an on-order battle position will be established at 31, BP 31 will be occupied on order by Company C or D, depending on which sector is penetrated. If the enemy penetrates both BP 11 and BP 12, Companies C and D will defend from their established Positions."

EXAMPLE OF PLANNING A DEFENSE (CONTINUED)

The staff then continues the planning process. The battalion FSO develops the following target list:

Line Number	Target Number	Description	Agency	Remarks
14	AR3003	Armor company	Bn FSO	DPICM
15	AR3004	Armor company	Bn FSO	DPICM
16	AR3005	Armor company	Bn FSO	DPICM
17	AR3006	Armor company	Bn FSO	DPICM

Targets AR3003, AR3004, and AR3005 support the barriers and obstacles. Target AR0004 (brigade target) will be used to provide fires on BP 11 as the company delays. Target AR3006 is planned on top of BP 12.

The battalion staff develops the maneuver plan in accordance with the commander's guidance. The FSO develops the fire support execution matrix in support of the plan. Company commanders and their FSOs are briefed on the maneuver plan at the battalion CP.

The FSO then briefs the company FSOs on the fire support plan. He provides them with –

The battalion target list, which includes division brigade, and battalion targets, it also indicates which targets have been designated as priority targets.

- Priority of fires.
- Fire support assets available and their status.
- Fire support coordinating measures.
- Available intelligence on the enemy.
- Call signs and frequencies.

The FSO continues the briefing as fallows:

"Brigade COLTs 2 and 3 are OPCON to us. I will position COLT 2 forward of PL PLYMOUTH on the prominent terrian in the west of the brigade sector overlooking and observing beyond the initial obstacle at PL BUICK COLT 3 will position in the hill mass on the company boundary to cover the initial and subsequent obstacles and to provide continuous coverage when COLT 2 has to displace. Upon withdrawal of the scouts, COLT 2 will reposition in BP 21 and cover the obstacle at PL FORD.

"Indirect fires covering the critical initial obstacle at PL BUCK will be initiated by COLT 2 or, if it is unable, by the FO with the scouts and the scout platoon leader, in that order. Most of our fires planned in the security area in some way support the obstacle. Our long-range fires in front of the obstacle are designed not only to slow the enemy and provide our forces with additional warning of the attack but also to help canalize him into our obstacle. We've planned fires on top of and to the sides of the obstacle to hinder breaching and bypassing by the enemy. We've also planned fires behind the obstacle to attack breaching elements as they present themselves piecemeal and to help the withdrawal of our forward elements. The COLTS will aid In obtaining accurate target obstacle locations by using target area survey and their ground/vehicular laser locator designator.

"The battalion commander has directed Company C to give up a platoon FO to work with the scouts until they withdraw behind PL PLYMOUTH."

The FSO also reminded the company FSOs of the following:

- Plan smoke to separate enemy elements that encounter our obstacles from their follow-on forces.
- Plan fires to supporti the counterattack.
- Use laser range finders to accurately locate and target obstacles.
- Plan fire to the franks-the enemy may dismount infantry to cross terrain not passable with vehicles.

When the company commanders and their FSOs depart, the battalion FSO consults with the ALO and S3 concerning CAS. He believes that a CAS strike against the enemy main force is essential. The S3 and ALO agree and present their case to the battalion commander. The battalion commander agrees and tells the battalion S3 air to get approval for a CAS strike from the brigade.

Section IV. SPECIAL TECHNIQUES

This section implements STANAG 2082, Edition 5.

Delay

Description

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

Fire Support Considerations

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

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

Fires must be planned in front of, on top of, and to the sides of the battle position to engage the enemy immediately before his attack of that position. Also, FPFs should be planned.

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

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

Withdrawal

Description

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

Fire Support Considerations

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

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

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

Passage of Lines

Description

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

Planning

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

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

- Location of passage lanes.
- Location of passage points.
- Location of contact points.
- Recognition signals.
- Attack positions or assembly area (in a forward passage).
- Routes (start points [SPs] and release points [RPs]).
- Location of CS and CSS units (in a rearward passage).

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

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

For a forward passage of lines –

- Screen enemy forward observation of passage.

- Plan groups and/or series of targets on enemy direct fire systems, command and control, indirect fire systems, TA systems, and air defense.
- Plan fires to support the deception plan.
- Plan smoke to screen friendly movement through passage points.
- Plan fires to interdict enemy counterattacks in the area of passage and reinforcements.
- Emphasize massing indirect fires.
- Ensure the stationary force supports the close battle while the passing force indirect fire assets move through.
- Ensure countefire is planned and controlled by the stationary force.
- Position COLTS of both forces to designate targets for precision guided munitions.
- Plan fire support coordinating measures.
- Use AFSOs to cover dead space and flanks.
- Ensure the passing force plans fires to support operations after the passage of lines.

For a rearward passage of lines –

- Plan smoke to conceal movement through passage points.
- Plan fires to disengage forces.
- Plan fires to support the obstacle and barrier plans.
- Plan fires to support the deception plain
- Plan fire support coordinating measures.
- Ensure the stationary force supports the close battle while the passing force indirect fire assets move through.
- Ensure counterfire is planned and controlled by the stationary force.
- Plan fires on the passage points to be fired after friendly units have passed through.
- Ensure the stationary force plans fires to support operations after the passage of lines.

Positioning of Field Artillery

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

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

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

Coordination

Close cooperation and coordination of plans between the commanders and staffs of the involved forces are mandatory. Once the passage of lines is ordered, the FSCOORD of the passing force in a forward passage of lines needs to send a liaison section to the

FSCOORD of the force in contact. In a rearward passage, the FSCOORD of the stationary force needs to send a liaison section to the FSCOORD of the passing force. The FSCOORDs define and assign mutually agreed upon fire support responsibilities to facilitate the passage. It is important to remember that each unit will be in the area of responsibility of another unit for a period of time and that detailed coordination is vital to ensure that each unit understands how the other operates. The two FSCOORDs need to share information and coordinate as follows:

- Exchange unit SOPS, and resolve differences in operating procedures.
- Exchange existing targets and fire plans.
- Describe unit target acquisition assets.
- Exchange high-payoff target list, attack guidance, and casualty criteria.
- Exchange control measures in effect; for example, passage points, passage lanes, and contact points.
- Exchange fire support coordinating measures currently in effect and those that-will be in effect.
- Coordinate recognition signals.
- Provide information on obstacles and barriers,
- Coordinate position areas.
- Provide met information to passing force.
- Provide available survey control to passing force.
- Exchange SOIs, and resolve communications differences; for example, frequencies, call signs, and challenge and password.
- Coordinate security measures in effect.
- Exchange intelligence.

Deliberate River Crossing

Maneuver Tasks and Events

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

In the **advance to the river–**

- The crossing site must be secured.
- Control measures must be established.
- Control must be transferred from the assault force to the crossing area commander, who controls the movement within the crossing area.

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

- Support forces develop crossing sites, emplace crossing means, and control unit movement into and away from the crossing sites.
- Defensible terrain on the exit bank is secured, The area must be large enough to accommodate the assault force and essential elements.
- Follow-up forces provide overmatching direct and indirect fire support, crossing site security, and follow-and-support assistance to the assault force.

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

- Assault forces lead, making the initial assault of the river and continuing to attack from the exit bank.
- Support forces help the assault forces to the objective.
- An assault force may make a hasty or a deliberate attack from the exit bank.

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

Fire Support Considerations

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

- Make fires immediately available to crossing forces.
- Assign priority of fires to assault forces.
- Plan smoke and suppression fires in greater than normal amounts if necessary.
- Use smoke to screen both actual and dummy crossing sites.
- Use smoke to obscure enemy direct fire positions in the bridgehead area until the crossing forces can engage them.
- Suppress enemy forces in the bridgehead area until the assault force can provide its own suppressive fires.
- Follow river-crossing SOP in planning fire support.
- Use all available targeting assets to develop targets in the bridgehead area. A direct link between TA assets and supporting artillery should be considered.
- Use target value analysis to help develop high-value targets and facilitate effective engagement of high-payoff targets.
- Ensure that DS and reinforcing units move into the bridgehead area as soon as feasible behind the assault force. This maximizes range capability of the weapon system and enhances coordination.

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

Command and Control. Maneuver forces may move into temporary defensive positions pending the crossing. The massed units at the crossing site are vulnerable to counterfire and counterattack. Fire support must be planned accordingly. Procedures to request, control, and coordinate fires must be designated to provide continuous fire support when DS artillery battalions cross the river. The following considerations apply:

- Designate and disseminate on-order fire support coordinating measures.
- Ensure that advance coordination between GS and DS units addresses C3 considerations to facilitate a smooth transition.
- Include all FS cells in the planning process.

Fire Support Planning and Coordination. Plans will be commensurate with visibility conditions that prevail during the crossing. The width of the crossing area will affect the planning. The amount of time necessary to cross a river – hence, the vulnerability of the crossing force –will affect the types and volume of fires requested.

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

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

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

sustain a smoke screen to support the operation.

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

Relief in Place

Description

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

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

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

The following principles apply to all relief operations:

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

Fire Support Considerations

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

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

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

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

- Prepare and disseminate plans to support the incoming force.
- Make available to all concerned fire planning SOP items of the incoming force.
- Make arrangements for the incoming force to use the targeting list and means of the outgoing force.
- Ensure that fires have been planned to support or emplace a barrier or an obstacle to slow advancing enemy.

Ž Plan smoke to screen friendly movements.

Ž Support the deception plan.

Breakout by Encircled Forces

Description

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

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

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

Fire Support Considerations

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

Ž Reorganize available fire support.

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

Ž prepare for the breakout.

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

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

Ž Plan fires for both the defense and the subsequent breakout.

Ž Effect fire support coordination with FS cells outside the encircled area.

Ž Use fire support for deception, if necessary.

Ž Establish fire support coordinating measures (an RFL if necessary).

Ž Use TACAIR and precision guided munitions during the breakout.

Ž Plan massed fires at breakout points to enhance momentum.

Linkup Operations

Description

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

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

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

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

Fire Support Considerations

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

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

Command and Control. Centralized control is desirable.

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

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

Security Operations

Description

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

- Screening.
- Guarding.
- Covering (discussed with defensive operations).
- Providing rear area protection.

A screening force maintains surveillance and gives early warning by maintaining contact with enemy forces without becoming decisively engaged. It will destroy or repel enemy reconnaissance units.

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

Providing rear area protection protects units, installations, facilities, and lines of communication from enemy attack or sabotage and reestablishes support capabilities.

Fire Support Considerations

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

- Fire support means must be as mobile as the force being supported.
- Fire Support communications means must be flexible.
- Secrecy will often dictate the nature of operations.

Command and Control. As security forces may operate some distance beyond the main body, field artillery may be attached to the supported security forces.

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

- Fires may be used to screen movements or areas.
- Illuminating fires may be needed during night operations.
- AFSOs and sensors maybe used.
- Tactical aircraft of all types can assist in most operations by providing current visual reconnaissance information. Requests for TACAIR reconnaissance support from the Air Force are made by the S2 or S3 through normal request channels.
- Indirect fire weapons are positioned to allow massing of fires in the target areas of interest.
- COLTS in overwatch positions should be used as designators for laser-guided munitions.

Reconnaissance Operations

Description

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

- **Route reconnaissance** missions are assigned to gather detailed information about a specific route and all adjacent terrain or about an enemy force moving along a route.
- **Zone reconnaissance** is a thorough reconnaissance of all routes and terrain within specified boundaries. It is made to report the locations of all enemy forces within the unit zone.
- **Area reconnaissance** is conducted when a commander needs information about a specific area, such as a town, proposed assembly area, or other feature that may be critical to an operation.

Fire Support Considerations

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

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

- Orienting on the location or movement of the recon objective.
- Reporting all information quickly and accurately.
- Helping the force retain freedom to maneuver.
- Gaining and maintaining enemy contact.
- Developing the situation quickly.

Command and Control. Attachment of field artillery may be considered.

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

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

CHAPTER 4

EXECUTION

Purpose

This chapter focuses on execution. The intent is to portray for the FSO how a fire support plan could be executed. This chapter addresses the following key items:

- Use of a fire support rehearsal.
- Fire support coordinating measures.
- Schedules of fire.
- COLT employment.
- Use of planned TACAIR missions.

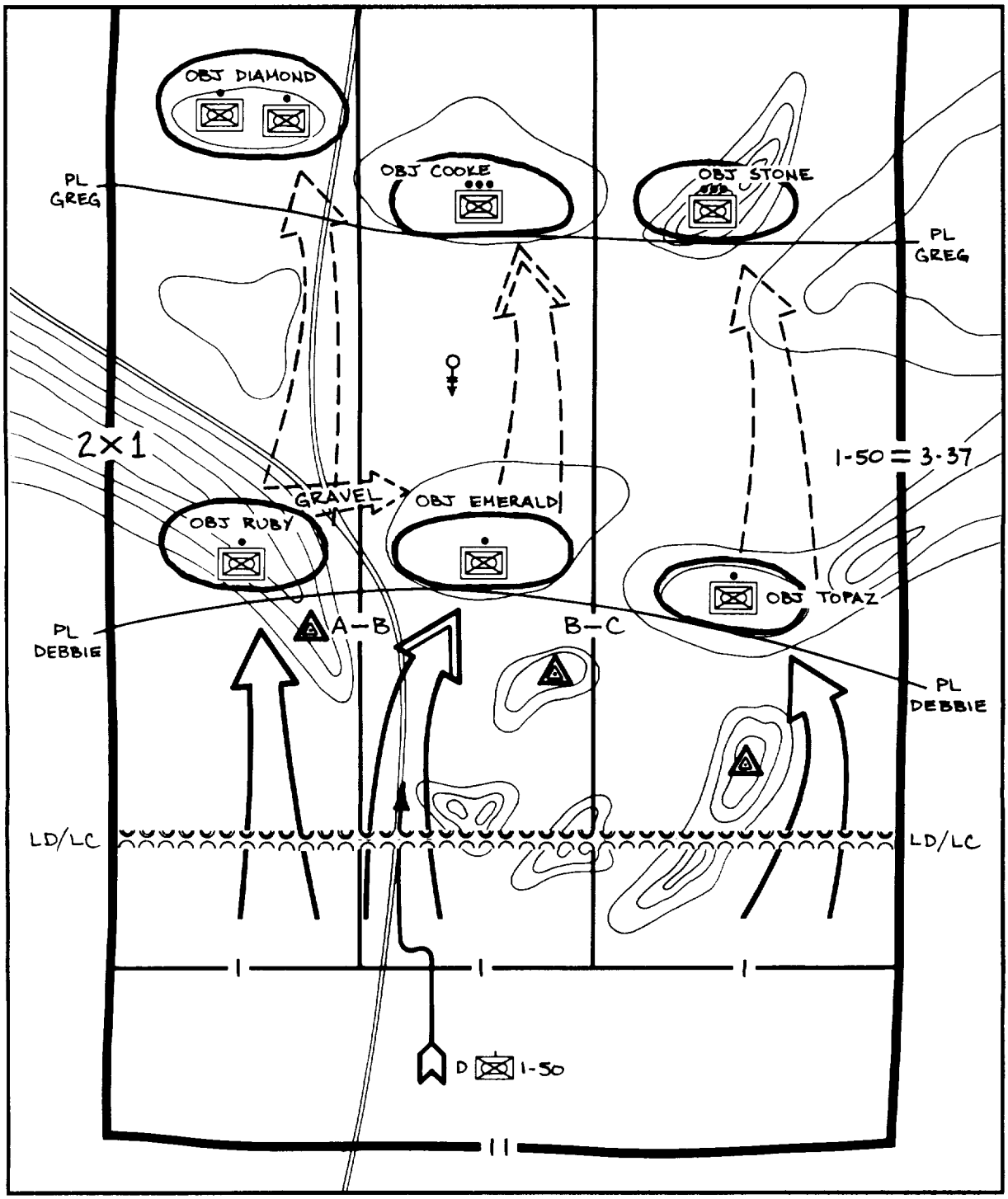
The chapter includes two examples – one for the offense and one for the defense. The plan for each scenario was developed in Chapter 3. The example solutions are not to be considered the best or only ways to execute the plans. Instead, they are examples that demonstrate how to effectively employ and manage various fire support assets. Only brigade, battalion, and Company B targets are plotted.

EXAMPLE OF FIRE SUPPORT EXECUTION FOR DELIBERATE ATTACK

The night before the attack, the battalion commander conducted a map rehearsal of the OPORD with all commanders and FSOs and the battalion staff. Since the OPORD had been briefed earlier in the day, commanders had had time to get back to their units with their FSOs and make initial plans for the upcoming operation. Before the rehearsal started, the maneuver battalion S2 updated the intelligence situation, which included a refined location for the mortar position (Target AA0072). This walk-through was a back-brief to the battalion commander, updated with new intelligence, on how prepared the units were for the attack and how well they understood his intent. As the rehearsal progressed through the phases of the operation, each commander discussed how he would execute his part of the attack. At the same time, each FSO using his fire support execution matrix explained how the fire support would be executed as the battle unfolds. The ALO interjected that the CAS will take 20 minutes to get on station once alerted. The battalion commander directed the CAS to scramble as soon as the companies begin to move toward their final objectives. The commander estimated it will take 30 minutes to reach those objectives. As the rehearsal progressed, the battalion commander realized that from his position he could not observe any enemy movement beyond the intermediate objectives to trigger interdiction of enemy moving to reinforce the intermediate objectives. The FSO suggested requesting an AFSO for that observation. Also, the battalion commander determined that alternate attack means other than CAS had not been planned on CAS targets. Therefore, he told the FSO to request the AFSO and to ensure that alternate attack methods were planned. Satisfied that the battalion at all levels had developed a cohesive plan that fully incorporated and synchronized fire support assets into the scheme of maneuver, the commander ended the rehearsal. He was confident that, with minor last-minute preparations, the battalion was prepared for the upcoming battle.

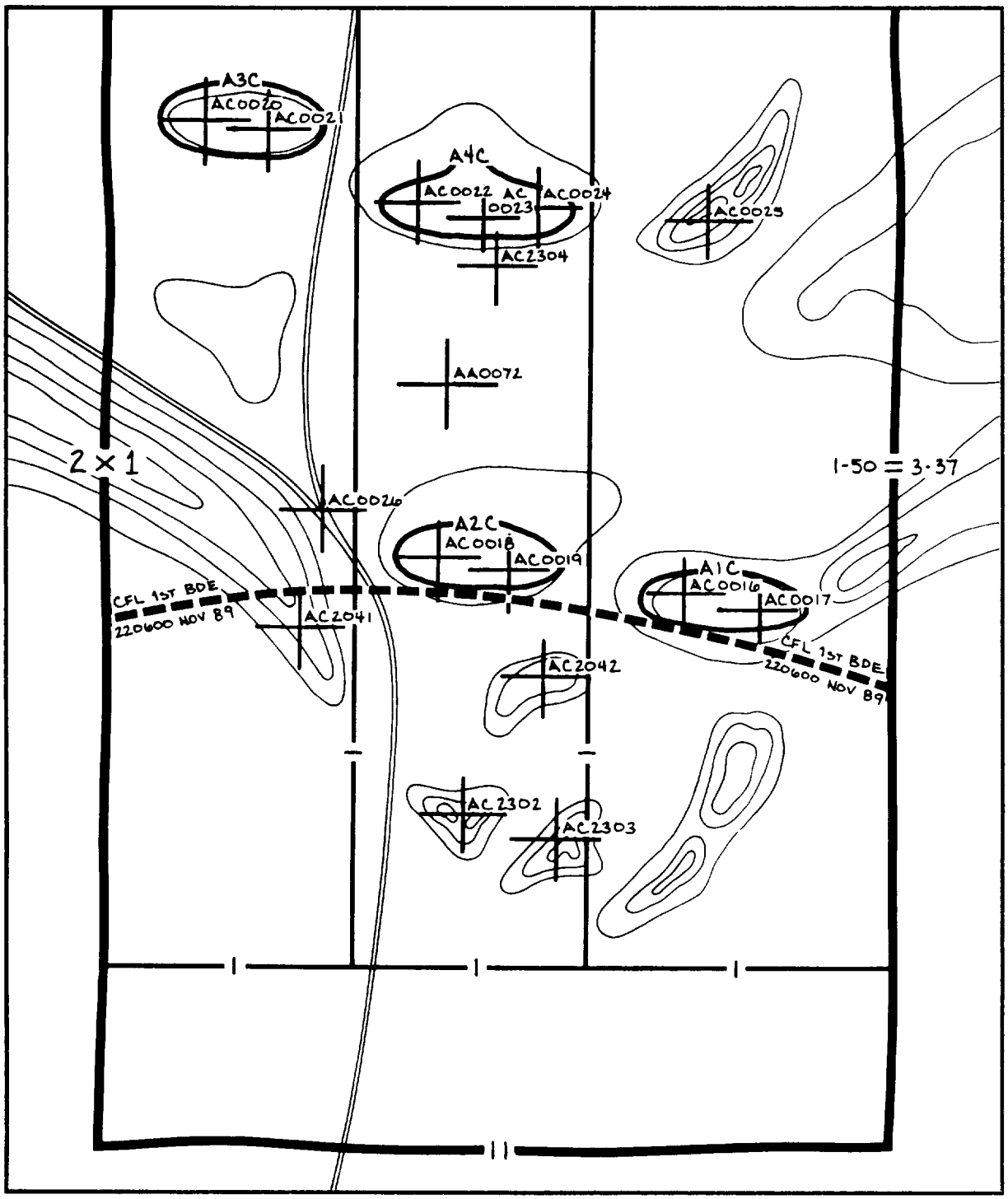
EXAMPLE OF FIRE SUPPORT EXECUTION FOR DELIBERATE ATTACK (CONTINUED)

BATTALION OFFENSIVE DIAGRAM



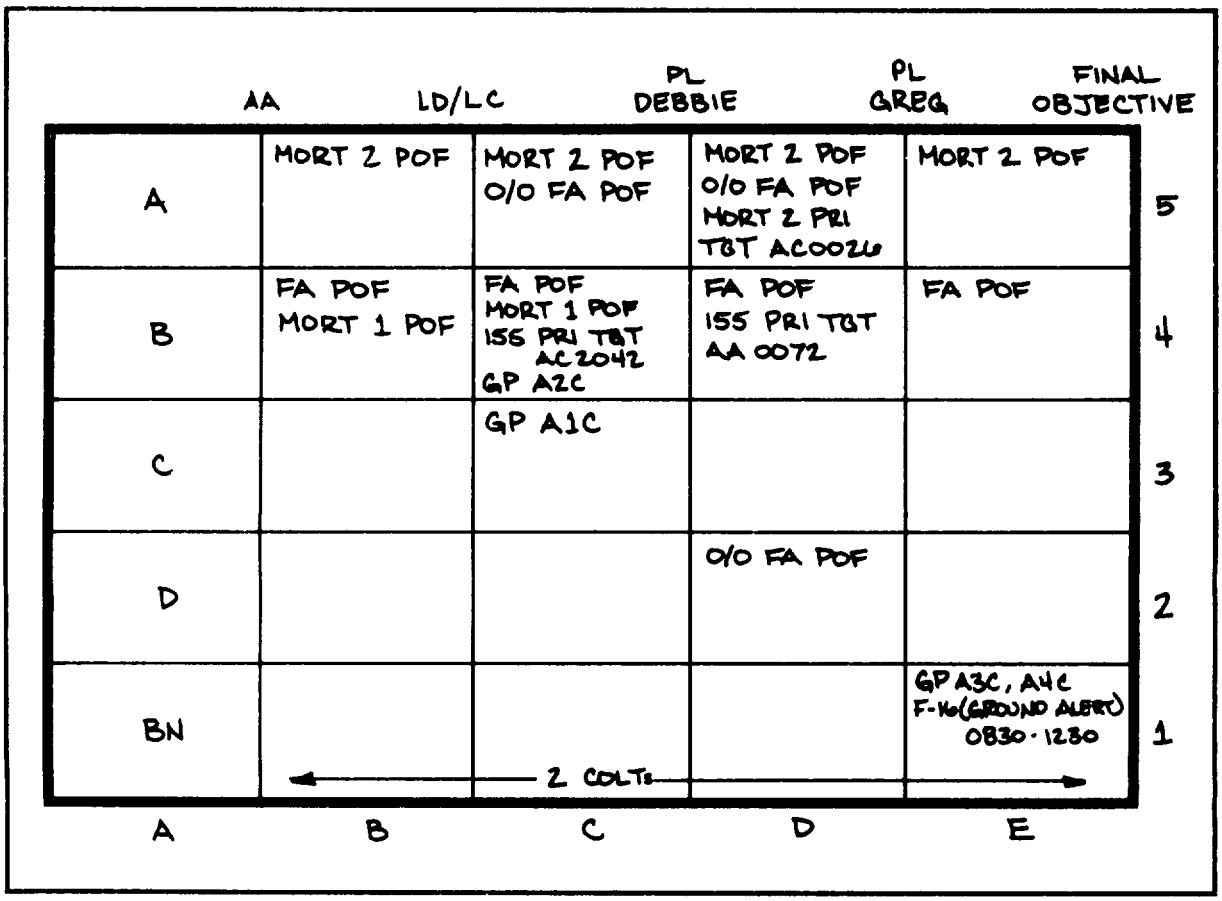
EXAMPLE OF FIRE SUPPORT EXECUTION FOR DELIBERATE ATTACK (CONTINUED)

BATTALION OFFENSIVE TARGET OVERLAY



EXAMPLE OF FIRE SUPPORT EXECUTION FOR DELIBERATE ATTACK (CONTINUED)

BATTALION FIRE SUPPORT EXECUTION MATRIX



At 0600 the next day, the 1-50 Mech crossed the LD/LC to attack and seize battalion intermediate and final objectives as shown in the offensive diagram. With three companies abreast, the battalion was moving as fast as possible in the haze of early morning. As each platoon and company reported its progress and position, no indication was given that the enemy was aware of the attack. Suddenly, heavy mortar and artillery fires impacted across Company C forward elements, causing Company C to slow down and button up. The battalion FSO traveling with the battalion commander behind Company B immediately requested that the counterfire program be fired.

As the counterfire program was fired, the fires impacting on Company C became less intense; however, intense direct fires are now being received by all companies. Vehicles of each company began generating smoke from their smoke generators to better screen their movements. The FSOs request that Groups A1C and A2C be fired. Company A FSO requests smoke on Target AC2202, Company C wants smoke on Target AC2441, and Company B wants smoke short of the intermediate objective. The battalion FSO begins sorting out the calls for fire and approves the Company B request using the battalion mortars.

EXAMPLE OF FIRE SUPPORT EXECUTION FOR DELIBERATE ATTACK (CONTINUED)

Company B is now meeting very heavy resistance and has lost several vehicles and personnel. The FSO for Company B is constantly requesting FA fires to suppress the enemy and smoke to screen the company. The battalion FSO directs that Group A2C be fired again to suppress active enemy positions on Objective EMERALD.

Company A is making good progress. The FSO for Company A is keeping the battalion mortars busy suppressing the enemy antitank positions and firing targets. The Company A FSO then reports that the company lead elements are about to reach PL DEBBIE. At this time, all indirect fires are shifted beyond Objective RUBY as the company makes the final assault onto that objective. Also, the CFL on PL DEBBIE is cancelled and the CFL on PL GREG is put into effect.

The battalion commander is concerned that the battalion is taking too long to seize EMERALD and TOPAZ. He's worried that the enemy (possible motorized rifle company) at Objective COOKE will move forward to reinforce. The battalion FSO suggests firing Group A4C to try to hold the enemy in place at Objective COOKE or at least to slow his movement. The commander agrees and Group A4C is fired. Company A has seized Objective RUBY. The battalion FSO contacts the COLT with Company A, and he determines the COLT can observe Objective COOKE and cannot see any movement. Therefore, the FSO tails the commander there is no need to fire Group A4C yet.

Meanwhile, Company C is crossing PL DEBBIE in the final assault on Objective TOPAZ, and Company B is stalled in the vicinity of AC2042. The Company B fire support sergeant, who took over for the wounded FSO, continues to direct FA fires against the enemy bunkers and mortar smoke to screen friendly movement.

The battalion commander issues frag orders to Company A to attack Objective EMERALD from the flank along Axis GRAVEL to relieve pressure on Company B. An RFL is not established because of the lack of identifiable terrain and the fluid enemy situation. The battalion FSO contacts the FSOs of Companies A and B to tell them that all requests for fire must be cleared through him to preclude fratricide.

in the meantime, the battalion FSO has received a report from the mortar platoon leader that mortar smoke is critically low. The commander and FSO must decide whether to expend all the smoke to screen the Company B assault on Objective EMERALD or to save some smoke to screen the battalion assault on the final objectives. The commander decides to save the smoke. The battalion FSO contacts the company FSOs and the mortars to tail them to fire no more smoke until the battalion attacks the final objectives.

The Company B fire support sergeant reports to the battalion FSO that suppressive fires are ineffective because the enemy is well dug in and that his company is making little progress without the smoke. The battalion FSO directs that HE-delay be fired against the fortifications.

The Company A flank assault against Objective EMERALD is also meeting stiff resistance. Company C has consolidated on Objective TOPAZ. The battalion commander directs Company C to monitor the enemy situation in the vicinity of Objectives COOKE and STONE and be prepared to move out. Forty-five seconds later, one bunker is completely destroyed with HE-delay. Five minutes later, two more bunkers are destroyed and Company B is now able to continue the advance.

EXAMPLE OF FIRE SUPPORT EXECUTION FOR DELIBERATE ATTACK (CONTINUED)

Minutes later, Companies A and B have consolidated on Objective EMERALD. The battalion commander tells them to be prepared to assault their final objectives within 30 minutes.

Before the final assault, the battalion FSO contacts the brigade FSO, the DS battalion, the battalion mortars, and each company FSO –

- Ž To get an update on the status of fire support assets and ammunition availability.
- Ž To receive any new Intelligence and targets.
- Ž To update his target list.
- Ž To revise the fire support plan, if necessary.
- Ž TO request a replacement from the brigade FSO for the wounded FSO of Company B.

Before the assault begins on Objective STONE, the AFSO reports three BMPs moving south toward Objective TOPAZ. Behind these BMPs, he also sees another BMP with several antennas. The AFSO fires a Copperhead mission on the last BMP. At the same time, Company C FSO fires DPICM against the three lead BMPs. The AFSO reports the suspected command vehicle has been destroyed and one of the three BMPs is disabled. The other two are withdrawing back to the north.

The commander orders the battalion to move out to seize their final objectives. The battalion FSO tells the ALO to scramble the CAS.

The battalion is moving quickly now, meeting sporadic light resistance. The battalion FSO requests that Groups A3C and A4C be fired to keep the enemy down and in place. Before the rounds impact, the enemy opens up with direct and indirect fires. Suddenly, the rounds impact on Groups A3C and A4C, and the enemy direct fires are temporarily suppressed. The companies quickly get into position to assault their objectives. The battalion FSO cancels the CFL on PL GREG and puts into effect another preplanned CFL beyond the final objectives. He also informs the company FSOs, the mortars, and the FA units that the smoke restriction is now lifted. Almost Immediately, the battalion mortars and the FA begin shooting smoke rounds to screen friendly movement.

Before the CAS arrives, the battalion FSO and ALO agree on the IP to be used and the egress instructions. They confirm a 30-second time separation. The battalion FSO contacts the FDC to reinitiate Group A4C and Target AC0025. He directs that the last round fired on AC0025 be white phosphorus. He establishes and initiates a 3-minute series with the last valleys to impact 5 minutes from his time hack. The FSO coordinates the time sequence with the ALO. Thirty seconds after the impact of the WP, the F-16s and A-7s strike Objectives COOKE and STONE. Companies B and C cross PL GREG. Companies B and C are now able to very quickly consolidate on both objectives. Company A had more trouble with Its objective but is eventually successful. The Company A FSO engages the enemy with indirect fire as the enemy forces withdraw north along the road.

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

EXAMPLE OF FIRE SUPPORT EXECUTION FOR DEFENSE IN SECTOR

The night before the expected enemy attack, the battalion commander conducted a rehearsal on the actual terrain to be defended the next day. In attendance were all commanders and FSOs and the battalion staff. Since the OPORD had been briefed earlier in the day, commanders had had time to get back to their units and make initial plans for the upcoming defense. This rehearsal on the terrain showed the battalion commander how well prepared his units were for the next day's events and how well they understood his intent. It also allowed personnel to check communications by using alternate frequencies. The S2 gave an Intelligence update. As the walk-through progressed, each commander (using the maneuver execution matrix as a guide) demonstrated his execution of the plan and described how he would react if everything didn't go according to the plan. At the same time each FSO (using his fire support execution matrix) explained how the fire support would be executed as the battle unfolds. Trigger points, Copperhead and/or COLTs, and priority targets were discussed In detail. During this review, it was discovered that COLT 2 would need retransmission (retrans) capability to be effective. Also, to meet observer and firing unit positioning considerations, Battery C was designated as the Copperhead firing unit. The backup plan for executing priority targets was also reviewed. FASCAM emplacement on targets AR0001 and AR0003 was coordinated with the engineer representative. Satisfied that the battalion at all levels had developed a cohesive plan that fully incorporated and synchronized fire support assets into the scheme of maneuver, the commander ended the rehearsal. He was confident that, with minor last-minute preparations, the battalion was prepared for the next battle.

The battalion is now in the initial positions as shown in the battalion defensive diagram. The battalion scouts are deployed in a screen along PL BUICK. The division covering force has already passed through the 2d Brigade. The two minefields and tank ditches have been completed and plotted on the obstacle overlay by the engineer representative in the battalion FS cell. The COLTs are deployed.

At 0420, the ground surveillance radar detects enemy movement to the front. At 0515, the scouts detect what they believe is an enemy patrol from a motorized rifle battalion approaching the forward obstacle at PL BUICK. The scouts, in well-concealed positions, allow this force to bypass the obstacle. The scouts can now see what is probably the enemy forward security element approaching the obstacle. This element consists of approximately a rifle company in BMPs and four medium tanks.

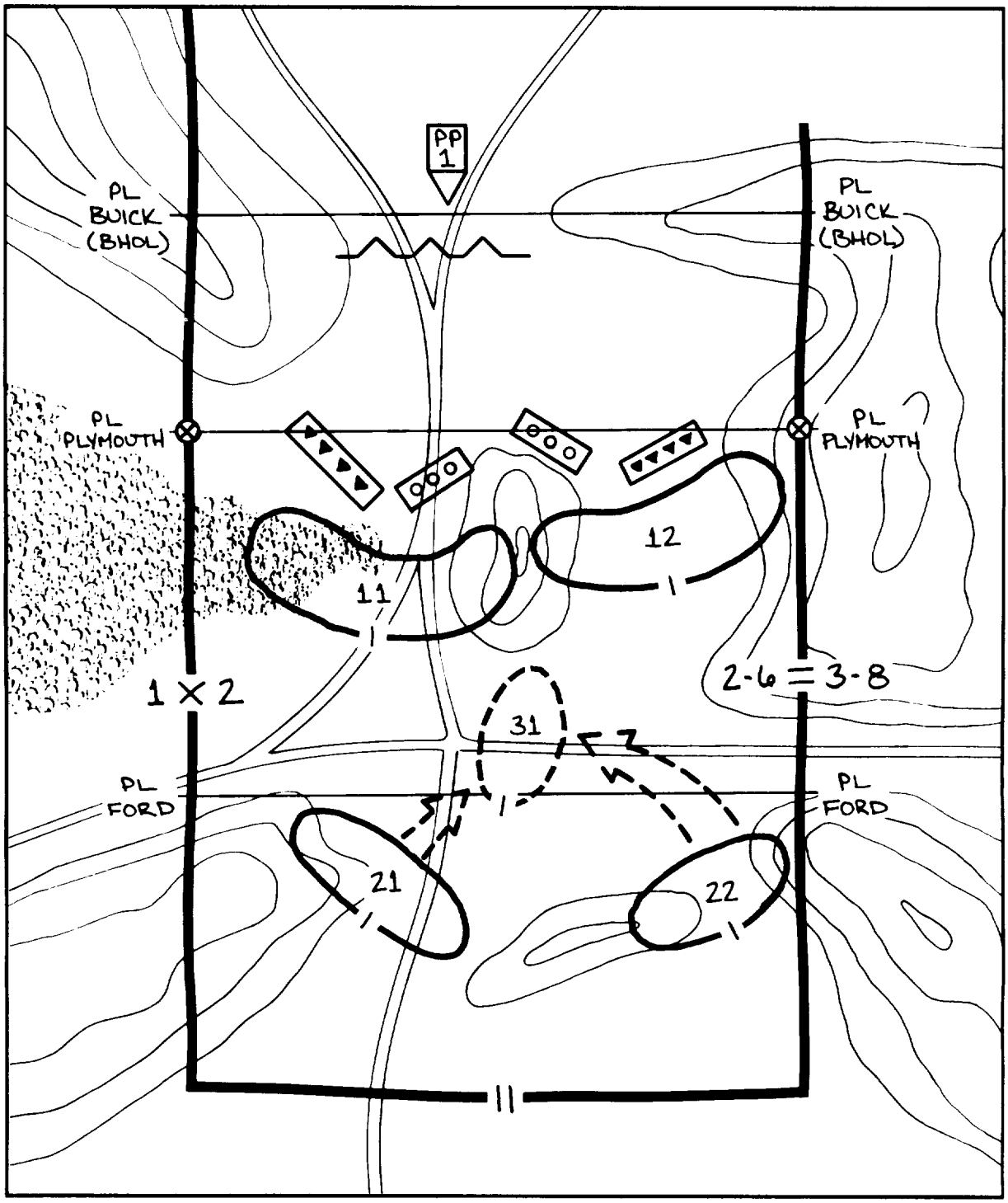
The position, strength, and rate of movement of the enemy forward security element are reported to the battalion command group forward. The battalion commander instructs the scouts to engage this enemy force when it comes into range. The scout platoon leader instructs the COLT to locate and engage the enemy company commander's vehicle.

The COLT locates the command vehicle, computes its rate of advance, and establishes a trigger point. The COLT completes the preformatted message, transmits it, and waits for the target to come into the Copperhead footprint before lasing it.

The COLT has also requested DPICM to button up the other vehicles. As the Copperhead round and DPICM impact, the scouts open fire with tube-launched, optically tracked, wire guided missiles (TOWs) against the enemy tanks and with their 25-mm guns against the BMPs. The surviving enemy vehicles immediately begin to generate smoke to conceal their positions and move toward defilade positions.

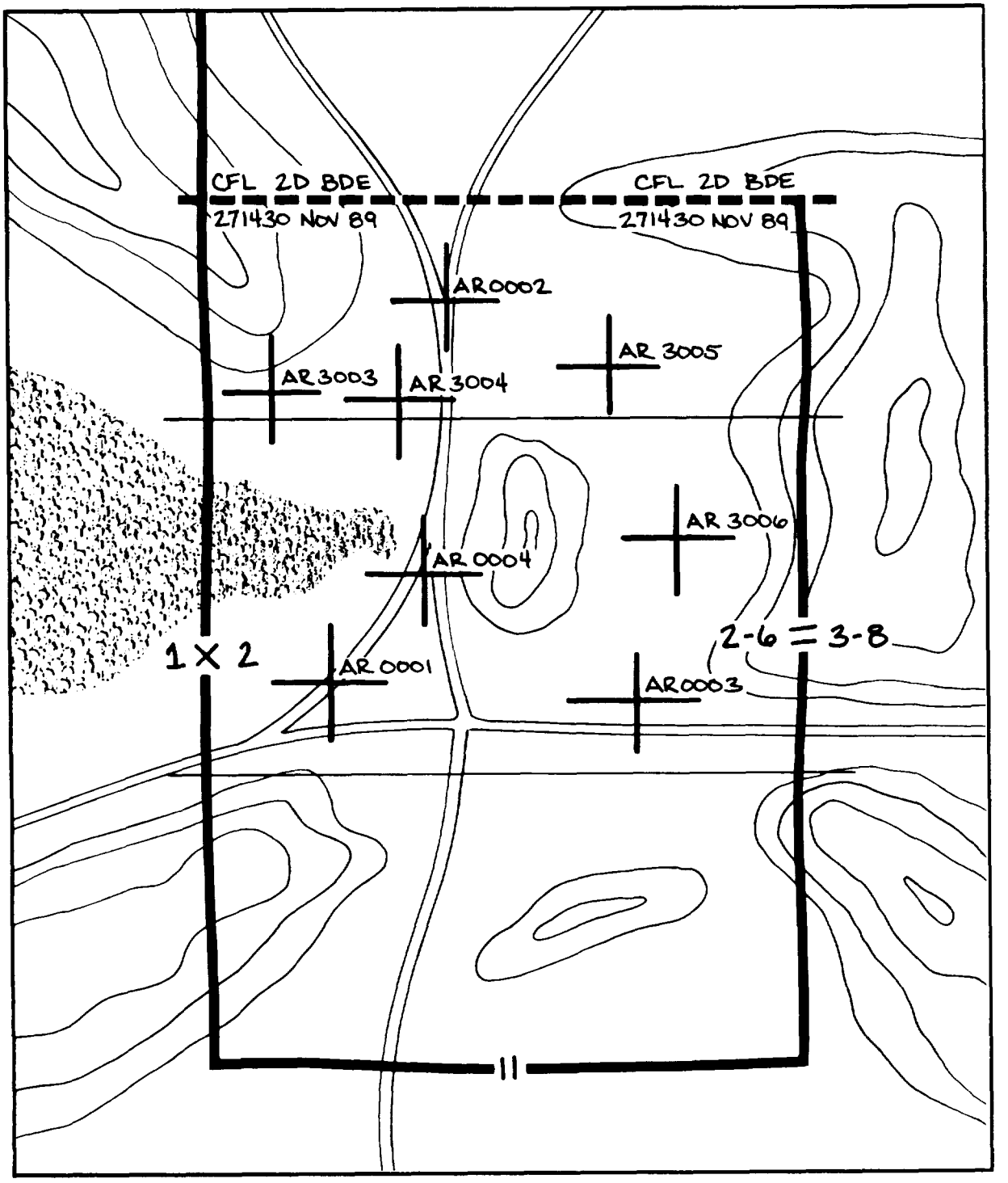
EXAMPLE OF FIRE SUPPORT EXECUTION FOR DEFENSE IN SECTOR (CONTINUED)

BATTALION DEFENSIVE DIAGRAM



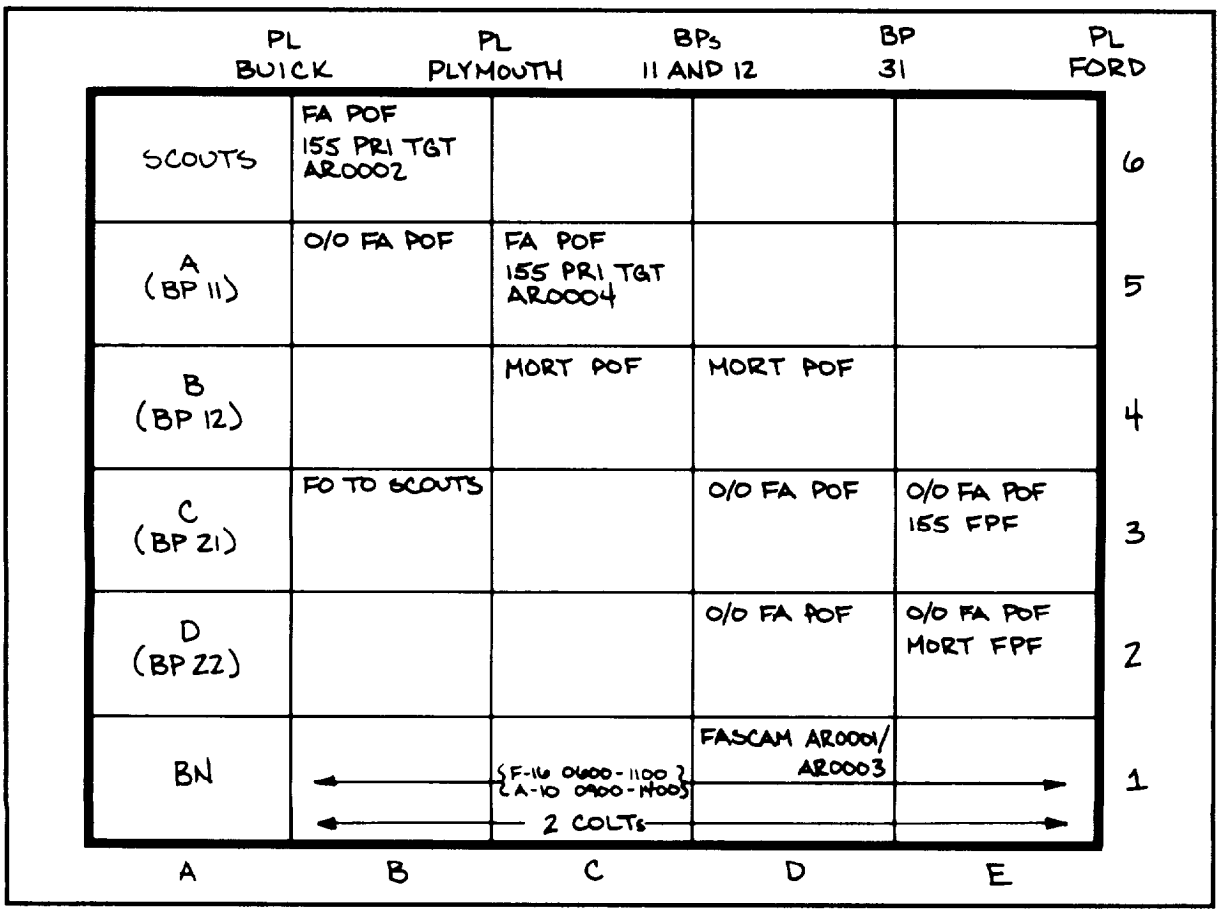
EXAMPLE OF FIRE SUPPORT EXECUTION FOR DEFENSE IN SECTOR (CONTINUED)

BATTALION DEFENSIVE TARGET OVERLAY



EXAMPLE OF FIRE SUPPORT EXECUTION FOR DEFENSE IN SECTOR (CONTINUED)

BATTALION FIRE SUPPORT EXECUTION MATRIX



The COLT uses a series of predetermined locations (trigger points) on likely avenues of approach to engage the fast-moving enemy. The COLT calls for fire as the enemy crosses the trigger points to ensure massed fires strike the enemy as he enters the engagement area.

The COLT sees a type 1 artillery command and reconnaissance vehicle (ACRV) moving toward the remaining BMPs in the engagement area. The COLT locates the ACRV, processes the mission, and directs a Copperhead round onto the enemy vehicle.

Enemy artillery is now impacting around the scout positions. The COLT reports this information to the battalion FSO, who relays it to the brigade FSO. The brigade FSO requests counterfire. Three minutes later, **BATTALION 4 ROUNDS** is fired at the enemy artillery, temporarily silencing it.

The advance guard (battalion [-]) of the enemy force can now be seen approaching from the north in preassault formation. The enemy patrol that was allowed to bypass the scouts has now run into the obstacles in front of BPs 11 and 12, and one vehicle is disabled. The enemy engineer squad marks the obstacles while the other elements try to find gaps in the barriers. Companies A and B open fire and destroy the entire patrol.

EXAMPLE OF FIRE SUPPORT EXECUTION FOR DEFENSE IN SECTOR (CONTINUED)

Suddenly, extremely heavy artillery concentrations Impact on Companies A and B and the forward elements. The battalion FSO, believing this is the start of the main attack, contacts the brigade FSO and requests that the counterpreparation be fired. The brigade commander approves the request, and the brigade FSO forwards the mission to the division FS cell. The request is approved, and soon the 10-minute division counterpreparation begins. Under the cover of the heavy artillery concentrations, the advance guard breaches and bypasses the forward obstacle, making the forward positions untenable. The battalion commander directs that the scouts withdraw to their position along the west flank of Company A. COLT 2 withdraws with the scouts. The CFL on PL BUICK is cancelled, and the CFL on PL PLYMOUTH is put into effect. COLT 2 positions itself on the hill mass in the vicinity of BP 21 observing to the northeast.

As soon as the lead company of the advance guard is within sight, the FOs of Companies A and B begin requesting fires to slow down and button up the enemy with DPICM. The lead enemy company now moves from prebattle formation to a wedge attack formation. The lead company also has two T-72s with the KMT-4 mine-clearing plows attached. The enemy attack seems to be heavier in front of Company A.

As enemy forces encounter the obstacles, they put the T-72s with mine-clearing plows in the front to try to force their way through. Both companies fire on the enemy while the company FSOs request fire on Targets AR3003, AR3004, and AR3005 to halt the enemy breaching attempt. TOWs fired at the mine-clearing vehicles disable one of the T-72s.

As the enemy force begins probing along the obstacles to find gaps, the Company A commander and FSO can see the enemy main force moving up very quickly in prebattle formation. The FSO immediately requests all available fires to slow and canalize the main body. Four minutes later, fires from two battalions and two MLRS launchers impact along the length of the enemy main body. The battalion S3 air also requests the battalion CAS mission to attack the enemy main force. The battalion FSO will coordinate the FA WP marking rounds.

The enemy lead company at the obstacles has now dismounted its infantry, and forces have begun to move into the hills on the right flank of Company B. The enemy tanks and BMPs try to suppress Companies A and B to allow enemy Infantry to advance more quickly. However, the company FSOs request and receive battalion mortar fires against the dismounted infantry, causing the enemy forces to halt and take cover.

Enemy engineer vehicles are identified trying to clear the minefield to the front of Company A while a T-54 carrying an MT-55 bridge is seen moving toward the antitank ditch. The enemy begins building a heavy smoke screen to obscure the obstacle-breaching efforts. The Company A FSO requests a shift from Target AR3004 with DPICM to better engage the enemy while Company A tries to halt the breach with direct fires. Meanwhile, Company B is receiving sporadically intense fires from the dismounted enemy in the hills to the right of the Company B position.

The main body of the motorized rifle regiment (MRR), now 1 kilometer behind the lead battalion, moves behind the forest to the left frank of Company A and dismounts its infantry. The flank platoon FO requests VT on those dismounted enemy troops in the open. The rounds impact, causing approximately 30 casualties, but the enemy infantry troops are still able to get into the forest.

EXAMPLE OF FIRE SUPPORT EXECUTION FOR DEFENSE IN SECTOR (CONTINUED)

As the enemy armor forces move toward the Company A position, they are acquired by COLT 3. The COLT initiates a Copperhead mission. At the same time, the FSO receives word from the ALO that the aircraft is at the IP. The FSO cancels the Copperhead mission and directs the COLT to lase for the TACAIR. The FSO verifies the PRF codes and frequencies with the ALO and passes them to the COLT. The CAS mission then attacks the enemy formations, using a combination of Maverick and 30-mm cannon. The mission destroys three vehicles and disables five others.

As the smoke clears around the obstacles, the enemy can be seen driving across the emplaced bridge and through a lane in the mine-field to the front of Company A. Battalion mortars are employed against the enemy dismounted troops in the forest, who are beginning to put heavy pressure on the flank of Company A.

The battalion commander directs Company D to move to BP 31. The company FSO requests suppressive fires to slow the enemy advance until Company D reaches its next position. Target AR3004 is fired with DPICM and the FA-delivered FASCAM (Target AR0001) is also fired.

The enemy, in approximately battalion (-) strength, is now driving toward BP 21. COLT 2 to the rear of Company C detects, engages, and destroys another suspected command vehicle.

The battalion FSO requests all available fires (shell DPICM) from the brigade FSO. The brigade FSO contacts the division FS cell, requesting as much support as possible for the mission. The request is approved and the fires of four FA battalions impact on the lead enemy formation, destroying or disabling seven vehicles and temporarily bringing the enemy advance to a halt.

The main enemy force is now within range of Company C in BP 21 and Company D in BP 31 and is within antitank weapon range. The battalion commander directs the FSO to reseed the breached minefield in front of BP 11. The FSO adjusts the FASCAM in from Target AR3004. As the enemy attack on BP 21 withers from heavy direct and indirect fires, Company A reestablishes BP 11.

All companies consolidate and begin to improve their positions in preparation for the enemy second echelon to attack. Company D reoccupies BP 22. The battalion is now at about 60 percent strength. Company A destroys the bridge emplaced over the antitank ditch. Engineer FASCAM is emplaced to close the gaps created by the enemy.

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

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

APPENDIX A

FIRE SUPPORT ASSETS

Section I. FIELD ARTILLERY

This section Implements STANAG 2887, Edition 3, and QSTAG 217, Edition 2.

Missions

The mission of the field artillery is to destroy, neutralize, or suppress the enemy by cannon, rocket, and missile fire and to help integrate all fire support into combined arms operations. The primary characteristic of field artillery is its massive firepower. It can deliver nuclear, chemical, and massed conventional fires rapidly within a large area and on a wide front, under all conditions of visibility, weather, and terrain. The four tactical missions and seven inherent responsibilities of the field artillery are outlined in the first table below.

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 ire in priority rom –	1. Supported unit. 2. Own observers.[1] 3. Force FA HQ.	1. Reinforced FA. 2. Own observers. [1] 3. Force FA HQ.	1, Force FA HQ. 2. Reinforced unit. 3. Own observers.[1]	1. Force FA HQ. 2. Own observers.[1]
Has as its zone of fire-	Zone of action of supported unit.	Zone of fire of reinforced FA.	Zone of action of supported unit to include zone of fire of reinforced FA unit.	Zone of action of supported unit.
Furnishes FIST or FSE2-	Provides temporary replacements for casualty losses as required.	No requirement.	No requirement.	No requirement,
Furnishes liaison officer-	No requirement.	To reinforced FA unit HQ.	To reinforced FA unit HQ.	No requirement,
Establishes communications with-	FSOs and supported maneuver unit HQ.	Reinforced FA unit HQ.	Reinforced FA unit HQ.	No requirement.
Is positioned by –	DS FA unit commander or as ordered by force FA HQ.	Reinforced FA unit or as ordered by force FA HQ,	Force FA HQ or reinforced FA unit if approved by force FA HQ.	Force FA HQ.
Has its fires planned by-	Develops own fire plans.	Reinforced FA unit HQ.	Force FA HQ.	Force FA HQ.

[1]Includes all target acquisition means not deployed with supported unit (radar, aerial observers, survey parties, and so forth.)

[2]An FSE for each maneuver brigade, battalion, or cavalry squadron and one FIST with each naneuver company or ground cavalry troop are trained and deployed by the FA unit authorized these assets by TOE. After deployment, FISTs and FSEs remain with the supported maneuver unit throughout the conflict.

The second table shows the tasks and responsibilities for control of artillery in an ABCA (Australia, Britain, Canada, America) operation.

TACTICAL TASKS AND RESPONSIBILITIES FOR CONTROL OF ARTILLERY (ABCA)

ARTILLERY WITH A TACTICAL TASK OF	ANSWERS CALLS FOR FIRE IN PRIORITY FROM	ESTABLISHES LIAISON WITH	ESTABLISHES COMMUNICATION WITH	FURNISHES FORWARD OBSERVERS TO[1]	WEAPONS MOVED AND DEPLOYED BY (POSITIONED BY)	HAS AS ITS ZONE OF FIRE	HAS ITS FIRES PLANNED BY	NATIONS TO WHICH TERMINOLOGY APPLIES
Direct support	Directly supported formation or unit. Own observers. Force field artillery.[2]	Directly supported maneuver formation or unit.	Directly supported formation or unit (battalion, regiment, or brigade).	Each maneuver company of the directly supported formation or unit.	Direct support artillery unit commander or as ordered by force field artillery HQ.	Zone of action of the directly supported formation or unit.	Develops own fire plans in coordination with directly supported formation or unit.	**us**
	Directly supported formation or unit. Any other formation or unit as authorized by the controlling HQ.	Directly supported formation or unit.	Directly supported formation or unit.	Directly supported formation or unit.	Next higher artillery HQ.	Zone of action of the directly supported formation or unit or as ordered by higher artillery HQ.	Artillery formation or unit in direct support in conjunction with directly supported formation or unit.	UK CA AS
In Support	Supported formation or unit. Any other formation or unit as authorized by the controlling HQ.	No inherent requirement.	No inherent requirement.	No inherent requirement.	Next higher artillery HQ.	Zone of action of the supported formation or unit or as ordered by higher artillery HQ.	Next higher artillery HQ.	UK CA AS
At Priority Call	Formation or unit to which placed at priority call. Any other supported formation or unit. Any other formation or unit as authorized by the controlling HQ.	No inherent requirement.	No inherent requirement.	No inherent requirement.	Next higher artillery HQ.	Zone of action of the formation or unit to which placed at priority ceil or as ordered by higher artillery HQ.	Formation or unit to which placed at priority call.	UK CA AS
General Support	Force field artillery HQ[2] and target acquisition artillery. Own observers.	No inherent requirement.	No inherent requirement.	No inherent requirement.	Force field artillery HQ.[2]	Zone of action of the supported formation or unit or zone prescribed.	Force field artillery HQ.[2]	us
General support Reinforcing	Force field artillery HQ Reinforced artillery unit. Own observers.	Reinforced artillery unit.	Reinforced artillery unit.	Reinforced artillery unit if approved by force field artillery HQ. [1,2] Applies also to the provision of liaison officers.	Force field artillery HQ[2] or reinforced artillery unit if approved by force field artillery HQ.[2]	Zone of action of the supported formation or unit to include zone of fire of the reinforced artillery unit.	Force field artillery HQ[2] or as otherwise specified.	us AS
Reinforcing	Reinforced artillery unit. Own observers. Force field artillery HQ.[2]	Reinforced artillery unit.	Reinforced artillery HQ	Reinforced field artillery unit. Applies also to the provision of liaison officers.	Reinforced artillery unit or as ordered by force field artillery HQ.	Zone of fire of the reinforced artillery unit or zone prescribed.	Reinforced artillery unit.	us

[1]The US will not furnish forward observers but will furnish fire support teams (on request).

[2]Force artillery headquarters or higher artillery headquarters.

LEGEND: AS = Australia CA = Canada UK = United Kingdom us = United States

Employment

An FA battalion is normally placed in direct support of a maneuver brigade. The direct support FA battalion may have one or more FA battalions reinforcing it. Generally, the brigade FSO coordinates field artillery positioning within the brigade zone; however, the battalion FSO may be required to coordinate positioning in the battalion zone with the battalion commander and/or S3. In a brigade zone, priorities for positioning are as follows:

- Direct support units.
- Reinforcing units.
- Divisional GSR, then GS units.
- Corps GSR, then GS units.

Considerations

An FSO must consider the following in planning FA support:

- Assigned tactical mission.
- Number and caliber of artillery units in support.
- Range capabilities, including special munitions and rocket-assisted projectiles (RAPs).
- Effects of munitions available and quantity on hand.
- Position location to include primary, alternate, supplementary, and future positions.
- Size of the final protective fire.
- Radius of burst.
- Maximum and sustained rates of fire.

Multiple Launch Rocket System

The MLRS is a highly mobile, rapid-fire, free-flight rocket delivery means designed to complement cannon artillery in all fire support roles. The MLRS provides potential for interdiction fires against high-payoff targets 15 to 30 kilometers (km) from the front line of troops.

Organization

MLRS battalions are assigned to corps, and MLRS batteries are organic to the armored and mechanized infantry divisions. Each battalion will have three firing batteries with nine launchers in each battery. All MLRS firing batteries are organized identically and are capable of operating independently from their parent headquarters. MLRS units, like all FA units, are organized for combat by the designation of a command relationship and the assignment of a tactical mission.

Mission

Unlike most other FA units, MLRS batteries operating independently of battalions may be assigned tactical missions. The most appropriate standard tactical mission for an MLRS unit is general support. An MLRS unit can perform only nonstandard versions of general support reinforcing and reinforcing missions, because it lacks the personnel and equipment to establish liaison with the reinforced unit. An MLRS unit should not be assigned a mission of direct support. The need for moving after firing, ammunition constraints, and lack of communications prevent the MLRS unit from effectively performing a DS mission.

Munitions

The central component of the MLRS is the self-propelled launcher-loader (SPLL). The launcher can fire 12 rockets per minute. Each rocket can be loaded with dual-purpose (antipersonnel and/or antimateriel) bomblets.

The bomblets of one rocket cover an area roughly equivalent to three football fields. The launcher can be reloaded in 10 minutes.

Section II. MORTARS

Mission

Mortars are the only organic indirect fire support asset in the maneuver arms arsenal. Mortars provide responsive high-angle fires that can kill the enemy, suppress enemy fires, and conceal the movement of friendly forces. Therefore, it is extremely important to include mortar fires in the fire support plan. The FSO's doctrinal responsibility is limited to recommending the integration of mortars into the fire support plan. For considerations of mortar employment, refer to FM 7-90. Some of the areas with which the FSO must be concerned are as follows:

- Characteristics and capabilities.
- Support and command relationships.
- Employment.
- Displacement.

Characteristics and Capabilities

The maneuver battalion mortar platoon consists of six 107-mm (4.2-inch) mortars (three sections with two mortars each). Each mortar is track-mounted in an M106A1 (an M113 chassis), which can carry 88 rounds of ammunition. Listed below are specific characteristics that the FSO must consider when including mortars in the fire support plan.

When planning mortar fires, the FSO must consider the high rate of fire and the ammunition availability. A mortar platoon can fire over 300 rounds in less than 5 minutes. As a result, the ammunition supply may be exhausted very quickly.

SELECTED CHARACTERISTICS

RANGE (IN METERS)	HE M329A2	HE M329A1	ILLUM	WP	CHEMICAL
Minimum	770	920	400	920	1540
Maximum	6840	5650	5490	5650	5650
RATE OF FIRE					
Maximum	18 rounds per minute (rd/min) for 1 min and 9 rd/min for the next 5 minutes				
Sustained	3 rd/min				
EFFECTIVE BURSTING RADIUS	HE: 20 meters				
FINAL PROTECTIVE AREA	300 X 40 meters (six tubes)				

Support and Command Relationships

Support and command relationships are means by which the commander can designate priorities for mortar fires or establish command relationships. Previously, mortars and other battalion organic assets were given missions of direct or general support. Because mortars are organic to the battalion, the assignment of such missions is not necessary. However, the commander must clearly establish priorities of fire as required.

Priorities

The commander may specify support by assigning priority of fires and/or priority target(s) to a subordinate unit.

Command Relationships

There may be situations in which the mortar platoon cannot support all of the battalion while remaining under battalion control. This may occur when a maneuver unit is given a mission that separates it from its parent unit. In those situations, a platoon or a section may be placed under operational control of or be attached to the supported unit.

Operational Control. This gives a commander the authority to direct forces provided him to do specific missions, usually limited by function, time, or location. The commander controls the tactical employment, movement, and missions of the mortars. He is not responsible for logistical or administrative support.

Attachment. This temporary relationship gives the commander receiving the attachment the same degree of command and control (C2) as he has over units organic to his command. The commander selects the general location of the attached mortar element and controls its deployment as well as its fires. He is also responsible for logistical support and security of the mortars. Attachment is appropriate when units are assigned independent missions.

Employment

The commander has three options in considering how to employ the battalion mortar platoon. It can be employed by platoon, by section, or by squad. Each squad consists of one mortar and its crew. Squads can be grouped together into sections. Finally, the entire platoon may be employed together. Selected options are based on commander's guidance, METT-T, and priority of fires. The FSO must be prepared to advise the commander on which option to use. (See the table of tactical tasks and responsibilties for control of artillery.) When employing mortars, the FSO must consider the following:

- Mortars can provide responsive smoke and illumination fires.
- Mortars are most effective against soft-skinned targets.
- Their high-angle trajectories make mortars effective against targets masked or in defilade.
- High-angle fires are easily detected by enemy radars.
- High-angle fires are adversely affected by strong winds.
- Mortar positions are seldom surveyed; therefore, more adjustments are needed and surprise may be lost when targets are attacked. (Overcome this by requesting FA survey support.)
- Mortars are effective in military operations on urban terrain (MOUT).
- METT-T must be considered when mortars are employed. General positioning guidelines are as follows:
  - In the offense, one-half to two-thirds of the maximum range should be in front of lead elements.

- In the defense, one-third to one-half of the maximum range should be in front of the forward elements.
- Positions should be selected to minimize the number of moves required.
- The mortars must be able to displace quickly and provide continuous support.

Platoon Employment

The platoon operates from one or two firing positions and fires as one unit. The best way to position a platoon with four or more mortars is to place the platoon sections in two separate locations, at least 300 meters apart. However, this distance must be based on the terrain, the ability to cover the sector, and limits in command and control. A platoon located in a single area enhances command and control and local security but is more vulnerable to enemy counterfire. The FDCs are trained to mass fires from separate locations onto a single target.

Section Employment

This places each section as a separate firing unit. The mortar platoon is normally employed by section to cover wider frontages. Each section is positioned so it can provide fires within the zone of action of the supported maneuver element. When the platoon is employed by section, each section has an FDC or a computer. Depending on the range to target and separation of sections, more than one section may be able to mass fires on the same target.

Squad Employment

This places one or more mortar squads on the battlefield as separate firing units. This is usually done to support special requirements, such as—

- One-mortar illumination mission(s).
- Roving mortar adjustments.
- Antiarmor ambushes.
- Support of a very wide front.
- Coverage of a large front by the maneuver element.
- Support for critical installations during rear combat operations.

Displacement

It is essential that the mortars displace quickly and remain flexible to provide continuous fire support. On the basis of the scheme of maneuver, the mortar platoon leader forms a displacement plan in support of the fire plan. The displacement plan is a map overlay showing initial positions, subsequent positions, routes between the positions, and any control measures in effect.

Considerations for selecting displacement techniques are described below.

Displacement Techniques

By Platoon. Displacement by platoon may be used when contact with the enemy is unlikely. In this method of displacement—

- The need for speed outweighs the need for immediately available fires.
- Accurate and timely response to calls for fire is sacrificed; therefore, greater reliance is placed on *hip shoots.*
- Command and control problems are minimal.

By Section. Displacement by section is slower than displacement by platoon. In displacement by section—

Ž Continuous accurate fires are required.

DESIRABILITY OF OPTIONS

EMPLOYMENT OPTIONS				
TACTICAL REQUIREMENT	PLATOON (ONE LOCATION)	PLATOON (TWO LOCATIONS)	SECTION	SQUAD
Massing fires	1	2	3	4
Responsiveness	1	2	3	4
Command and control	1	2	3	4
Ease of resupply	1	2	3	4
24-hour operations	1	2	3	4
Radio traffic	1	2	3	4
Effects on target (rounds per volley)	1	2	3	4
Displacement	4	3	2	1
Survivability	4	3	2	1
Restricted by terrain	4	3	2	1
Support for wider front	4	3	2	1
Vulnerability (to counterfire)	4	3	2	1
1 = Best option	4 = Worst option			

- Speed is essential.

Ž Command and control is more difficult.

By Individual Squad. Displacement by individual squad is the slowest technique. In this method—

Ž The need for continuous fire outweighs the need for speed.

- Command and control is extremely difficult.

Movement Options

Two movement options are available—successive bounds and alternate bounds. Generally, the alternate bounds method is used to keep up with supported elements when displacement is rapid. The successive bounds method is used when the maneuver element movements are not so rapid.

Successive Bounds. In this technique, part of the platoon is moved to the next position. After that subelement is in position and ready to fire, the rest of the platoon moves to the same position.

Alternate Bounds. In this technique, part of the platoon is moved to the next position. After that subelement is in position and ready to fire, the rest of the platoon moves to a different position. This method of movement applies to both the offense and the defense.

Section III. TACTICAL AIR SUPPORT

Missions

TACAIR supports the AirLand Battle by providing interdiction (air interdiction [AI] and battlefield air interdiction [BAI]) and close air support missions. At the brigade and battalion levels, CAS will be the primary support mission. CAS involves air actions against hostile targets that are in close proximity to friendly forces and require detailed integration of each air mission with the fire and movement of friendly forces. CAS includes the delivery of munitions by Air Force, Navy, and Marine Corps aircraft. The missions are distributed to each corps by the land component commander (cdr). The corps commander then further distributes the CAS missions down the Army chain of command. Usually, CAS missions are distributed no lower than brigade. CAS targets are either preplanned or immediate.

Preplanned Close Air Support

Preplanned CAS may be categorized as follows:

- Scheduled mission— CAS strike on a planned target at a planned time (TOT).

Ž Alert mission— CAS strike on a planned target or target area executed when requested by the supported unit. Usually, this mission is launched from a ground alert (scramble), but it may be flown from an airborne alert status. Alert (on-call) CAS allows the ground commander to designate a general target area within which targets may need to be attacked. The ground commander designates a conditional period within which he will later determine specific times for attacking the targets.

To plan CAS, the S3 air must work closely with the S3, FSO, and ALO.

Requirements that can be foreseen in time to be included in the tactical air control center (TACC) air tasking order (ATO) are forwarded as preplanned air requests. Ground unit planners must forward CAS requests as soon as they can be forecast. These requests for CAS normally do not include detailed timing information because of the lead time involved. Preplanned CAS requests involve any information, even general information about planned schemes of maneuver, that can be used in the apportionment, allocation, and distribution cycle. Estimates of weapons effects needed by percentage (for example, 60 percent antiarmor and 40 percent antipersonnel), sortie time flows, peak need times, and anticipated distribution patterns are vital to preplanning the air tasking order. The ALOs and S3s at all planning echelons must ensure that such information is forwarded through the battlefield control element (BCE) as soon as it is foreseen by the echelon planners, Do not wait to plan all details of individual CAS missions before forwarding preplanning data to higher echelons.

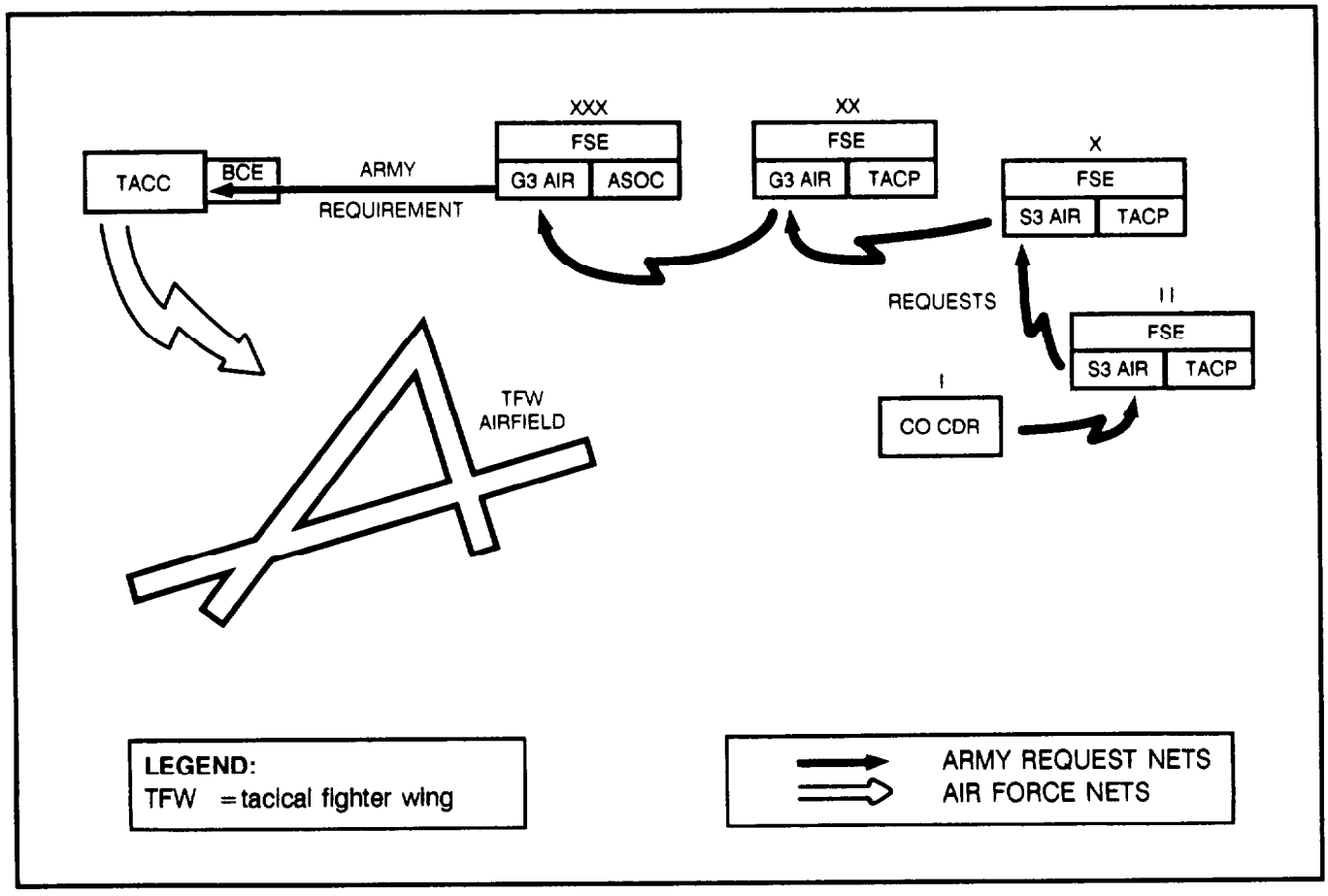
There are specific request channels for preplanned CAS. Requests for preplanned tactical air support missions are submitted to the FS cell. The commander, ALO, and S3 at each echelon evaluate the request; coordinate such requirements as airspace, fires, and intelligence; consolidate; and if approved, assign a priority or precedence to the request. The S3 air then forwards approved requests by Army communications nets to the next higher echelon. The FS cell of the corps main CP makes the final consolidation and approves preplanned requests for TACAIR support. After approval, the requests become the ground force request that is passed through the BCE to the TACC for execution. The requestor is notified of the approval. The requestor is also notified if requests are disapproved at any echlon. The TACC does the necessary planning and includes the

mission in the ATO for execution. Requests for CAS that do not reach the TACC in time to be included in the ATO are treated by the air support operations center the same as immediate requests.

The CAS aircraft assigned to attack preplanned targets may be diverted to higher priority targets; therefore, the FSO should plan for the engagement of CAS targets by alternate fire support assets. Specific planning considerations are as follows:

- Unit mission.
- Enemy air defenses. What are the enemy air defense capabilities?
- Terrain. Does the terrain restrict the use of any type of munition or aircraft?
- Weather. Does the weather favor the use of aircraft? What is the weather forecast for the immediate future?
- Time available for planning.
- Weapons effects. What types of targets are to be engaged and what are the desired weapons effects?
- Command control, and communications.
- Mission response time.
- Close air support and artillery integration.

PREPLANNED CLOSE AIR SUPPORT REQUEST CHANNELS

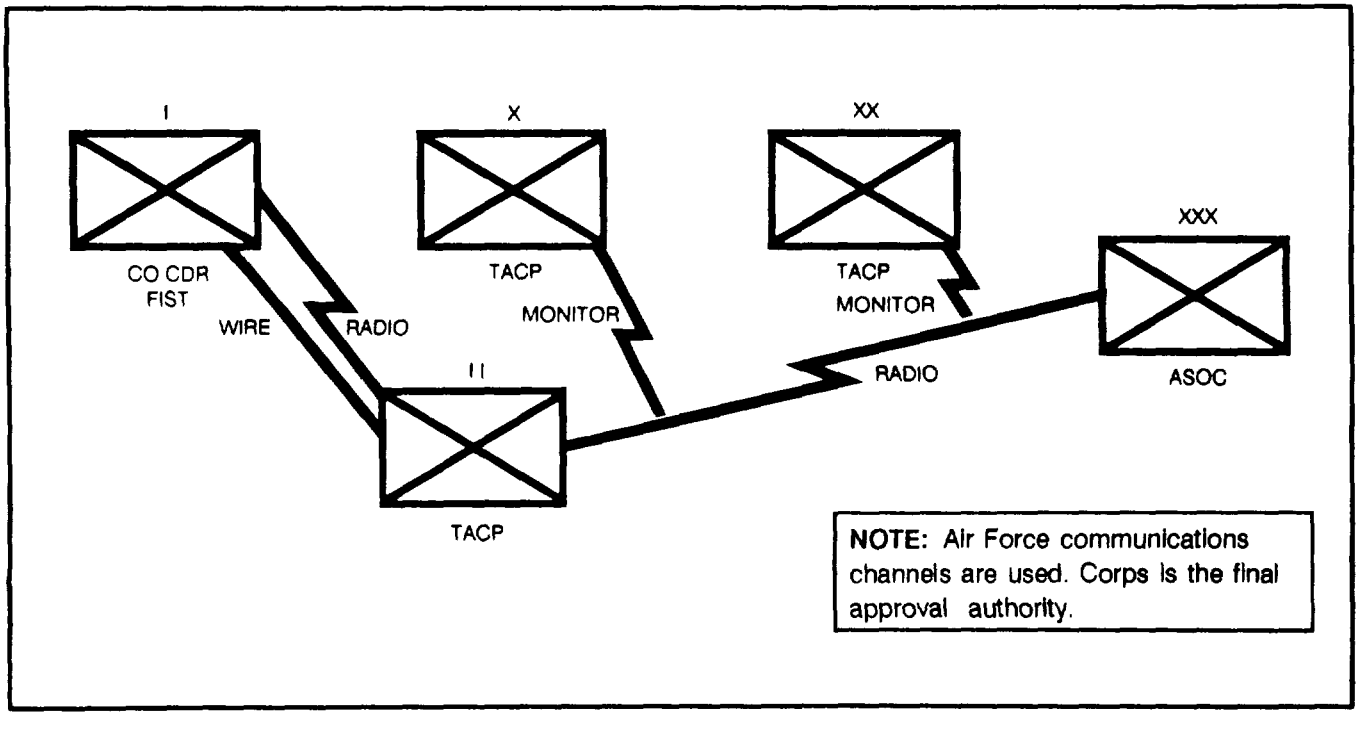


Immediate Close Air Support

Immediate requests are used for air support mission requirements that were identified too late to be included in the current air tasking order. They are sent through specific request channels.

Those requests initiated below battalion level are forwarded to the battalion command post by the most rapid means available. At battalion level, the commander, ALO, and S3 consider each request. Approved requests are transmitted by the TACP over the Air Force air request net directly to the ASOC collocated with the corps tactical operations center (CTOC) or separate division TOC. The TACP at each intermediate headquarters monitors and acknowledges receipt of the request. Silence by an intermediate TACP indicates approval by the associated headquarters unless, within a specified period, a disapproval is transmitted. The ASOC coordinates the request with the corps G3 air for all air support requests initiated by the corps. Meanwhile, intermediate TACPs pass the request to the associated headquarters G3 or S3 for action and coordination. All echelons coordinate simultaneously. If any Army echelon above the initiating level disapproves a request or substitutes another support means (for example, Army aviation or field artillery), the TACP at that headquarters notifies the ASOC at corps and the originating TACP, which notifies the requestor. When the corps commander or his representative approves the request, the ASOC initiates the necessary action to satisfy the request. If all distributed sorties are committed, the corps commander can request additional sorties from the next higher echelon, when appropriate. If the ASOC has no CAS missions available, it can, with Army concurrence, divert sorties from lower priority targets or request support from lateral or higher commands.

IMMEDIATE CLOSE AIR SUPPORT REQUEST CHANNELS



Organization

At brigade and battalion levels, a TACP advises the maneuver commander on the capabilities and proper use of air support, requests immediate CAS through the Air Force request net, helps with planning if required, and provides final control of CAS missions. At brigade, the TACP is composed of two Air Force ALOs who are trained to control air strikes and two noncommissioned officers (NCOs) called tactical air command and control specialists (TACCSs). At battalion, the TACP is composed of one ALO and two enlisted specialists. At least one TACCS per battalion TACP is qualified as an ETAC (qualified to control CAS sorties).

The person who has final control of CAS missions, formerly referred to as the forward air controller (FAC), will vary from mission to mission according to the situation. Threat permitting, the AFAC is best able to control CAS because of his mobility, wide field of observation, and improved line-of-sight communications. If an AFAC is not available, the ALO and ETAC members of the TACP are qualified to control CAS from the ground. In this manual, the term FAC has been used to refer to the particular individual – ALO, ETAC, or AFAC – who performs the final coordination and control of CAS missions.

Attack Coordination

After submitting a CAS request, the TACP and FIST must take a number of actions before munitions can hit the target.

Communications

Radio frequencies (primary and alternate) and laser designation settings used by FISTs, TACPs, AFACs, tactical air controllers-airborne (TAC-As), and tactical fighters should be predetermined and forwarded to all parties. Not all CAS aircraft have frequency modulated (FM) radios. The TACP may have to relay FIST FM transmissions to the fighters by ultrahigh frequency (UHF) (Have Quick) or very high frequency (VHF) if available. The Army SOP is to operate FM-secure. Most Air Force FM is not secure-capable. Even if it is secure-capable, Air Force FM is not compatible with the Army secure FM because of encoding procedures.

Authentication

Proper authentication procedures must be used during CAS missions. Because intraservice Air Force and Army authentication tables differ, each air and ground element must obtain the joint authenticator, AKAC-1553, through unit communications security (COMSEC) custodians. This joint authenticator, which has been developed for crisis or contingency and exercise use only, is called the dryad numeral authentication system. This system is used for joint interoperability worldwide and is part of the intertheater COMSEC package.

Tactical Air Control Party Functions

The battalion TACP directs contact between a FAC and a FIST on a common frequency. The FAC moves to where he can observe the target. When the FAC arrives, the FIST orients him to the target, friendly positions, and known enemy air defense artillery (ADA) positions. If no FAC is available, the TACP contacts the FIST. The FIST becomes the *eyes* for the TACP in the target area. These actions take place while higher echelons process the air request.

After approval of the air request, either the TACP or the TAC-A or both receive fighter mission data from the ASOC. Data include —

- Mission number.

Ž Fighter call sign.

Ž Number and type of aircraft.

Ž Ordnance.

• Time on target.

While the air request is being processed, the FAC, battalion ALO, or TACP determines additional mission-essential information. Such information includes, but is not limited to —

• Updated target location and identification means.

• Availability of fires for SEAD.

• Fighter communications capability.

Ž Attack restrictions.

• Friendly AD considerations.

• Time factors for the attack.

If the aircraft have airborne laser spot trackers (LSTs), the laser setting must be passed to the attack aircraft. If the aircraft have laser-guided weapons (LGWs), the laser setting to be used (Army setting for LSTs, Air Force setting for LGWs) and the laser target line must be passed to the TACP.

When the aircraft arrive in the target area, the TACP gives them current target information, navigation data, and a verbal picture of the specific target. The FAC must pass enough information to enable the pilots to positively identify the targets. If required, he calls corrections from target marks or the flight leader's bombs. He is prepared to abort the attack if the safety of friendly troops is threatened. During the entire attack, the FAC watches for enemy surface-to-air fires and warns the aircraft accordingly.

After the attack, the FAC or FIST or both send their bomb damage assessment (BDA) to the TACP. The TACP relays the BDA to the appropriate headquarters.

Airborne Forward Air Controller Functions

The airborne FAC, when available, usually operates in a fixed-wing aircraft. With his excellent mobility and improved line-of-sight communications, he is better able to observe and describe the target. His functions are—

• To coordinate with the TACP and ground commander.

Ž To relay CAS requests if required.

• To observe the target.

Ž To provide or relay the mission briefing to the flight leader.

Ž To provide final attack control when the threat permits.

Ž To mark the target with WP rockets.

• To observe (if possible) and report BDA.

Fire Support Team Functions

As new targets appear, the company FIST may be in the best observation position. The FIST can help in CAS by orienting the FAC to the target, friendly positions, and enemy ADA. The FIST should also prepare to initiate on-call SEAD and to mark the target.

If no FAC is available, the FIST becomes the eyes of the battalion TACP. Target data from the FIST are relayed to the fighters by the TACP. Should troop safety so require, the FIST calls for a mission-abort through the TACP. He also passes munitions corrections and assesses mission results. Regardless of the type of munitions used, Air Force mission results are referred to as BDA.

If no AFAC or battalion TACP is available in an emergency, the FIST will direct tactical fighters that are equipped with compatible

radios. In this case, the brigade TACP prepares the CAS mission briefing.

Laser Target Designation Procedures

The TACP coordinates with the FIST on using lasers to accurately mark targets for aircraft with airborne LSTs. A FIST can mark a target by placing a laser spot on or near the target. The LST-equipped aircraft receives the reflected laser energy, locks onto it, and displays an aiming cue in the pilot's head-up display (HUD). The pilot uses the aiming cue to locate the target and aim the aircraft weapons.

The LST on the A-7 is called a target identifier set, laser (TISL) and on the A-10 aircraft, a Pave Penny. The Air Force uses FIST laser settings with Pave Penny or TISL, while the FIST uses the Air Force laser setting for Air Force LGWs. When Air Force settings are required, the TACP passes them to the FIST. The USAF laser code is a four-digit number; the first digit is always 1. The Army laser code uses the last three digits of the USAF code. The laser code setting of three digits is passed in the CAS briefing.

Even when using laser designations, TACPs and FISTs should also consider marking with smoke. Marking smoke allows a pilot to point his LST accurately enough to acquire the laser spot. Caution should be used to avoid laser-to-target visibility problems or attenuation problems caused by the smoke. However, without marking rounds, aircraft may be pointed too far away from the target area for the LST to acquire the laser spot.

Effective employment of laser designation depends on timely and correct radio calls between the FAC or FIST and the CAS aircraft. When using a laser, the pilot will make the following radio calls:

Ž **10 SECONDS** (time until **LASER ON** call expected).

• **LASER ON.**

• **SPOT.**

• **TERMINATE.**

Saying **10 SECONDS** means the pilot wants the laser on in approximately 10 seconds. The FAC relays the call to the laser designator operator (LDO).

LASER ON directs the FAC or FIST to ensure that the LDO designates the target immediately. Maximum laser designation time is usually 20 seconds. The pilot may request a longer laser-on time by saying **LASER ON** and the time; for example, **LASER ON, 30 SECONDS.** The FAC should acknowledge this call.

The pilot calls **SPOT** when he acquires the laser spot. This confirms to the FAC and the pilot's wingman that the pilot sees the designated target.

The last call in the sequence is **TERMINATE.** The pilot makes this call to turn the laser off. Minimizing laser-on time is important in a laser countermeasures environment and when battery-operated laser designators are used. The LDO will turn the designator off—

• When the LDO hears **TERMINATE.**

Ž When the weapon hits the target.

• After 20 seconds (or longer, if requested).

Detailed information on CAS laser procedures is in TRADOC Pamphlet 34-3.

After a request for immediate CAS is approved, the TACP and FIST perform the functions shown on the next page.

LASER TARGET DESIGNATION FUNCTIONS OF TACTICAL AIR CONTROL PARTY AND FIRE SUPPORT TEAM

WHEN FAC CAN OBSERVE TARGET	WHEN FAC CANNOT OBSERVE TARGET
The FAC locates— • The target. • Friendly forces. Ž Enemy air defense. The FAC passes the mission briefing. The FAC requests, as required— Ž AD suppression. • Target marking. • Abort code (from fighters). The FAC — • Considers troop safely. • Warns flight leader of enemy AD fires. Ž Orients flight leader to target. • Calls corrections. • Provides BDA. The FIST helps the FCA— • Locate the target. • Locate friendly forces. • Locate enemy air defense. Ž Initiate and control on-call SEAD. • Mark with smoke, or laser-designate the target. Ž Integrate fire support with CAS.	The TACP passes the following target Information from the FIST to the TAC-A or flight leader Ž Target location. Ž Description. • Location of friendly forces. • FIST frequencies and call signs. • Laser code. The TACP requests, as required— Ž AD suppression. • Target marking. Ž Abort code (from fighters). The TACP is prepared to relay the following instructions to the flight leader • Orientation to the target. • Abort calls Ž AD warnings. • Corrections. • Troop safety. The TACP relays bomb assessment from the FIST. The FIST passes target information to the TAC-A and is prepared— • To initiate and control on-call SEAD. • To mark with smoke or laser-designate the target. • To pick up fighters visually, if possible. Ž To orient fighters to the target. • To call corrections, if appropriate. • To call ABORT (danger to friendly ground or air forces or wrong target), if required. • To provide BDA.

Planning Considerations

CAS mission success is directly related to thorough mission planning. Planners must consider weather, target acquisition, target identification, identification of friendly forces, general ordnance characteristics, final attack heading, troop safety, SEAD, and CAS and artillery integration.

Weather

Weather is one of the most important considerations in visual employment of weapons. Poor light, limited visibility (rain, snow, fog, smoke, or night), low clouds, or attack into a low sun all hinder target identification. Gusty winds can degrade the accuracy of weapons employment.

Target Acquisition

Well-camouflaged or small stationary targets are difficult to acquire from fast-moving aircraft, as are targets masked by hills or other natural cover. On the other hand, moving vehicles may highlight themselves by their dust trails, exhaust smoke, and relative movement against their background. The use of marking rounds can key the attacking pilot's eyes to the right target area, enhance target identification and help ensure first-pass success.

Target Identification

A precise description of the target in relation to terrain features easily visible from the air, smoke or laser target marking, or other means is critical to avoid attacking friendly forces by mistake. Target identification is always difficult at the ranges at which fighter aircraft must line up on the target. This task becomes even more difficult when both sides use similar vehicles.

Radar beacons are an alternate means of target identification. USREDCOM Manual 525-5 provides a single-source document for planning and executing beacon procedures.

Identification of Friendly Forces

Pilots of fighter aircraft must know the position of friendly forces before attacking. Several safe means of friendly identification may be used. These include a mirror flash, a marker panel, and the direction and distance from prominent land features or target marks.

General Ordnance Characteristics

Tactical fighter aircraft can employ a wide variety of general- or specific-use weapons. Newer weapons are designed to produce specific effects against specific targets. Some weapons require restrictions when used with troops in contact. Modifications to existing aircraft, such as improved weapons delivery computers and sight systems, also improve their capability to use existing general-purpose (GP) weapons more effectively.

Final Attack Heading

Choice of the final attack heading depends on considerations of troop safety, aircraft survivability, and optimum weapons effects. For example, overflying a ZSU-23-4 on an otherwise perfect final attack heading would be foolish. In general, linear targets should be attacked at a small angle off the long axis to ensure target coverage and to increase the probability of multiple hits. Missiles or bombs are effective from any angle; cannons, however, are more effective against the sides and rears of armored vehicles.

Troop Safety

Troop safety is a key consideration in using CAS. The primary cause of friendly air attacks on friendly troops is misidentification of friendly forces as enemy forces.

Suppression of Enemy Air Defenses

SEAD may be required, depending on the capabilities of the tactical aircraft and the presence of enemy air defense systems in the target area.

Close Air Support-Artillery Integration

Army artillery and tactical air power are complementary. Because artillery support available to ground forces is more continuous and faster to respond than CAS, ground elements depend heavily on artillery and are reluctant to impose firing restrictions. CAS missions, therefore, must integrate with artillery so that only limited firing restrictions are required. The ACA is the fire support coordinating measure that accomplishes this integration.

Airspace Coordination Area Development. The following criteria will be considered in developing an ACA for an operation:

Ž The ACA should be easily identifiable from the air.

Ž It must allow the particular aircraft involved enough room for maneuver.

Ž It must allow access to and egress from the initial point to the target area. Establish an IP that is deconflicted with the mortars, AD, and FA.

• It must consider the ordnance and capabilities of the aircraft. (Will the aircraft use the standoff technique, or must it overfly the target?)

Ž When possible, it should include terrain that masks aircraft from hostile air defense systems.

Ž It should separate the aircraft from friendly fires and their effects by either time or space.

• It should allow surface systems to provide SEAD and to mark targets if necessary.

• It should be simple so that dissemination to both pilots and surface systems is easy.

Separation Plans. FACs learn four standard separation plans and coordination procedures at the Air-Ground Operations School and basic FAC flight school.

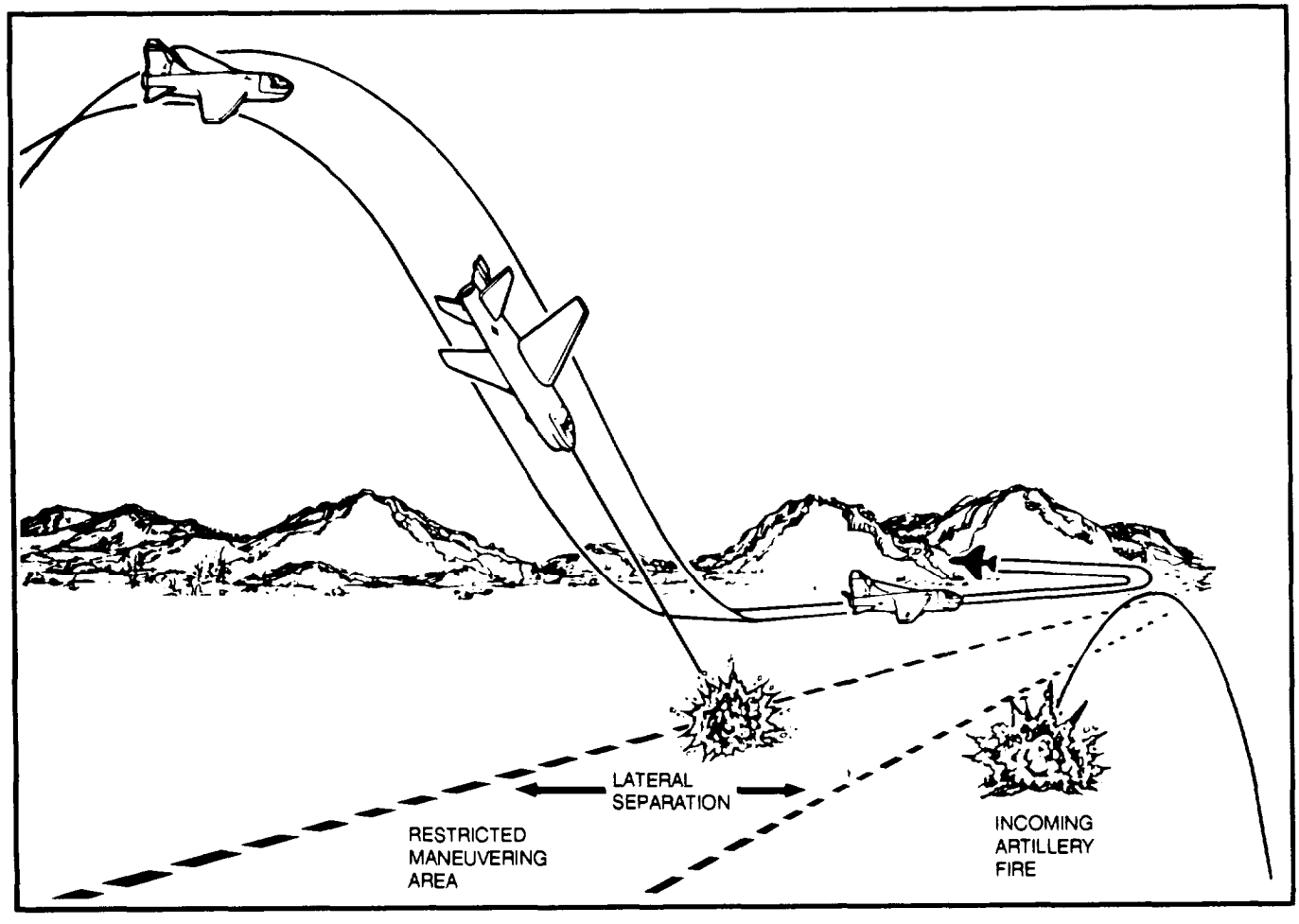
Ž Lateral separation.

- Altitude separation.
- Time separation.
- Altitude and lateral separation.

The degree to which these plans are practiced varies greatly. It is based on the theater, the availability and restrictions of ranges, and unit safety restrictions. Air Force FACs understand the importance of not restricting Army artillery unnecessarily during CAS.

Lateral Separation (Adjacent Targets). Lateral separation plans are for coordinating attacks against two targets that are close together. The FAC needs to know the gun-target (GT) line so he can restrict any fighter attack run from crossing this line. Establishing a temporary ACA is one way to do this. It will keep the fighters and airborne FAC away from indirect supporting fires. The ACA should be big enough that fighters can operate over the target yet small enough that supporting fires are not too restricted. The ACA can be defined by grid coordinates, geographical features, or time.

ARTILLERY-FIGHTER LATERAL SEPARATION

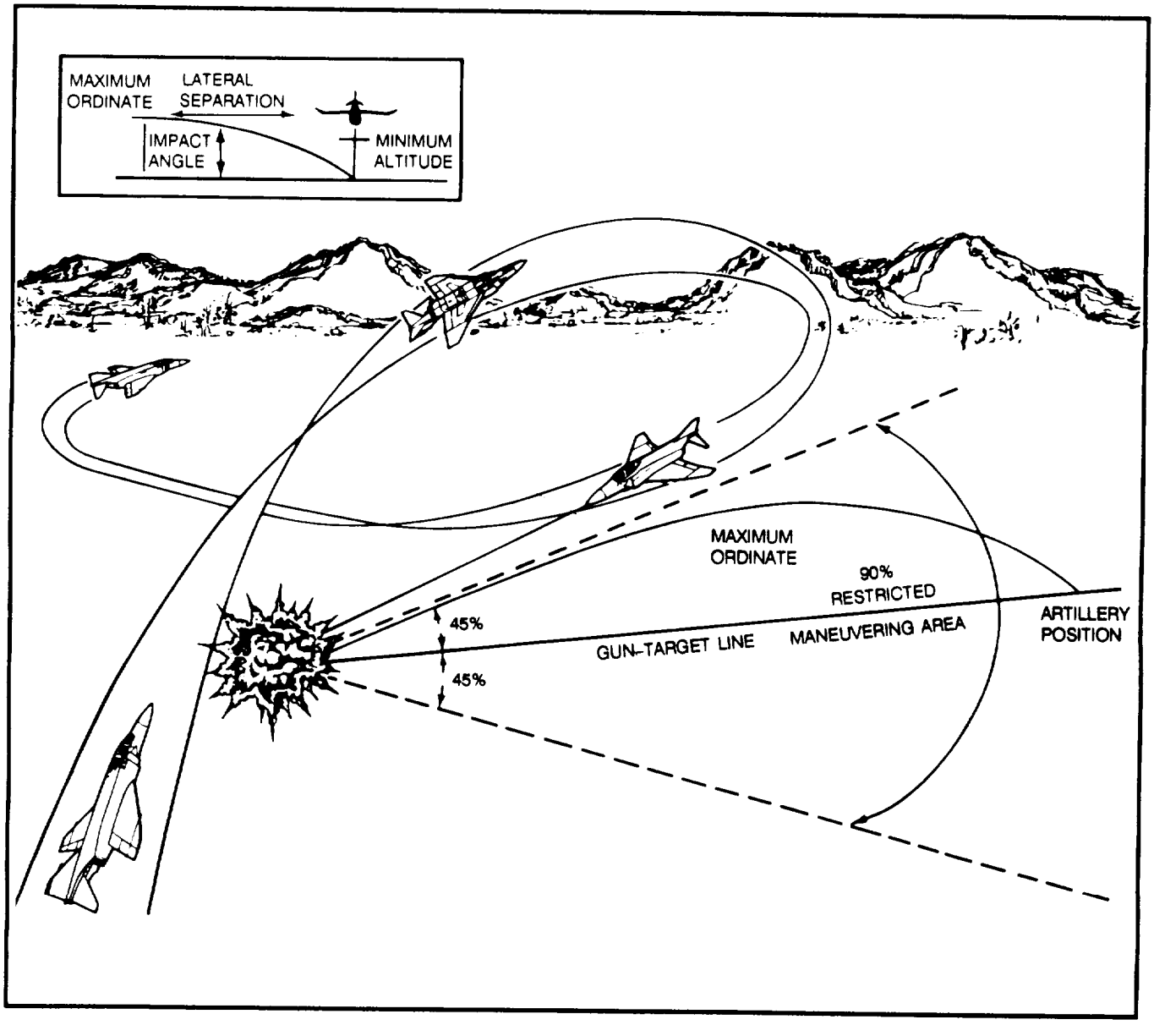


Altitude Separation (Same Target). Altitude separation plans apply when both CAS and artillery attack the same target and the artillery fires at a low angle. Lateral separation and recovery altitude restrictions ensure clearance from the artillery trajectory and frag pattern. Other restrictions normally include—

- No change in artillery trajectories.
- No overflight of the GT line by the fighters, except at the impact point.
- Restricted final attack heading.

When fighter pilots cannot adhere to these restrictions, the FAC must instruct them to recover above the maximum ordinate altitude or frag pattern, whichever is higher.

ARTILLERY-FIGHTER ALTITUDE SEPARATION



Time Separation (Same Target). Time separation plans specify the intervals during which artillery and/or mortars fire. The FAC determines these intervals in conjunction with the FSO. The artillery and/or mortar fires are controlled by the call for fire. The aircraft is controlled by appropriate instructions included in the CAS briefing, sometimes called the *nine-line brief.* These controls ensure a time separation of aircraft and artillery and/or mortar fires on the same target or target area.

EXAMPLE OF TIME SEPARATION

The FSO and ALO determine the IP to be used. The time separation agreed upon between the ALO and FSO is 30 seconds.

Call for Fire:

(BATTALION FDC) **THIS IS** (TF FSO) (use appropriate call signs).

TARGET AC2101, 2-MINUTE SEAD PROGRAM, FINAL VOLLEY IMPACT 6 MINUTES FROM MY MARK.[1]

TARGET AC2103 MARKING ROUND 6 MINUTES FROM MY MARK, PREPARE TO MARK.[2]

PREPARE TO MARK, 5, 4, 3, 2, 1, MARK. (The mark given is for both the SEAD program and the marking round.)

CAS Mission Briefing (transmitted concurrently by the ALO):

(1) X RAY.

(2) 075 OFFSET LEFT.

(3) 10.2.

(4) 1,200 FEET (mean sea level [MSL]).

(5) TANK COMPANY ATTACKING WEST.

(6) QA044092.

(7) WP.

(8) 2,000 METERS SOUTH ON HIGH GROUND.

(9) WEST TO AVOID ARTILLERY SUPPRESSION.

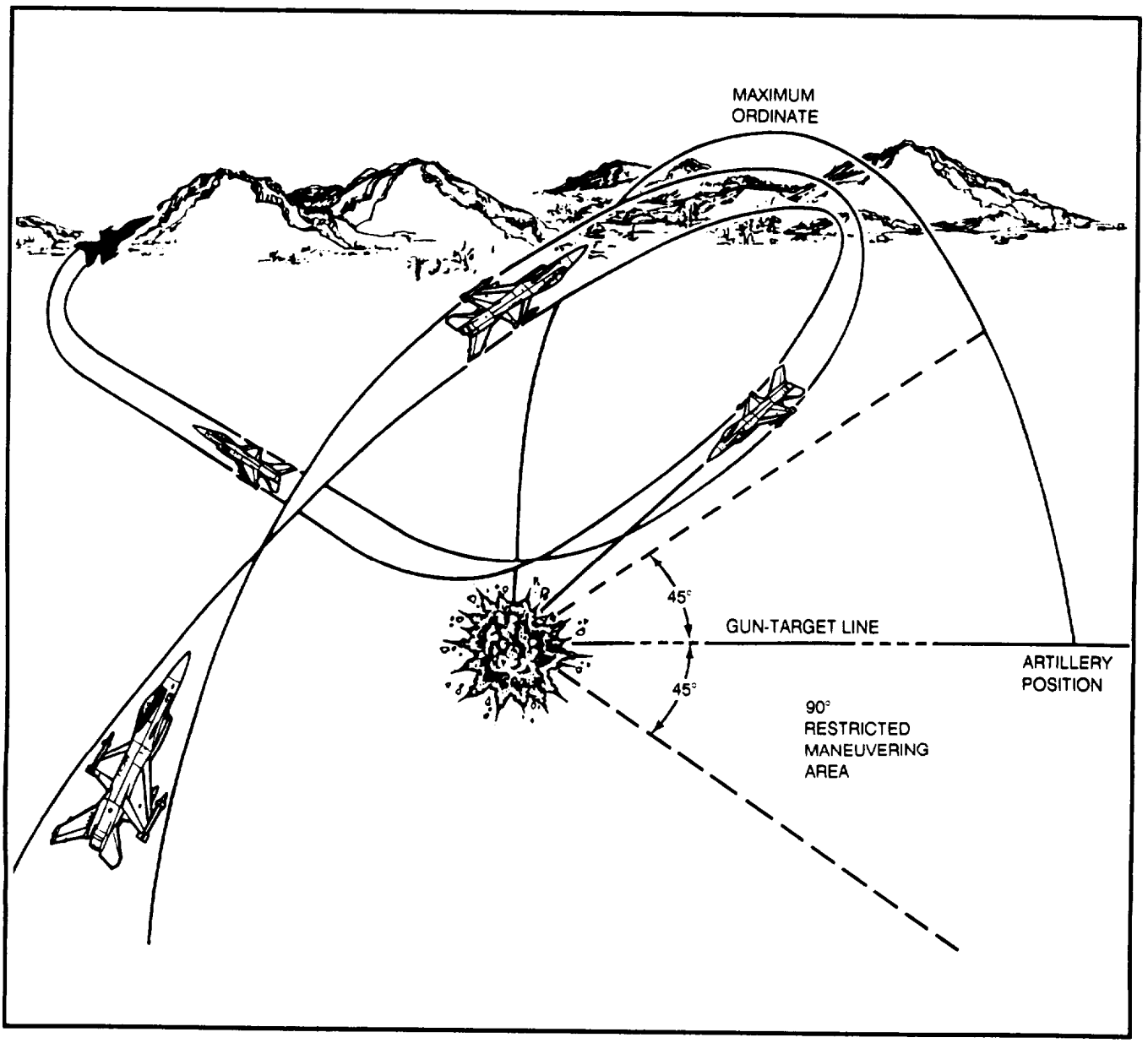
REMARKS: TOT 6 MINUTES FROM MY MARK. (In case rounds are not complete on SEAD program, abort instructions may be issued here.)

The FSO waits 30 seconds, taking into account transmission time, and tells the ALO to give the 6-minute mark to the aircraft. The ALO contacts the aircraft and transmits **6-MINUTE MARK, MARK.**

At minute 4 of the schedule, the first artillery and/or mortar rounds impact; at minute 6, the final rounds impact (both suppression and marking rounds). Aircraft will be 30 seconds behind the final volley impacting. The ALO will clear the aircraft to attack.[3]

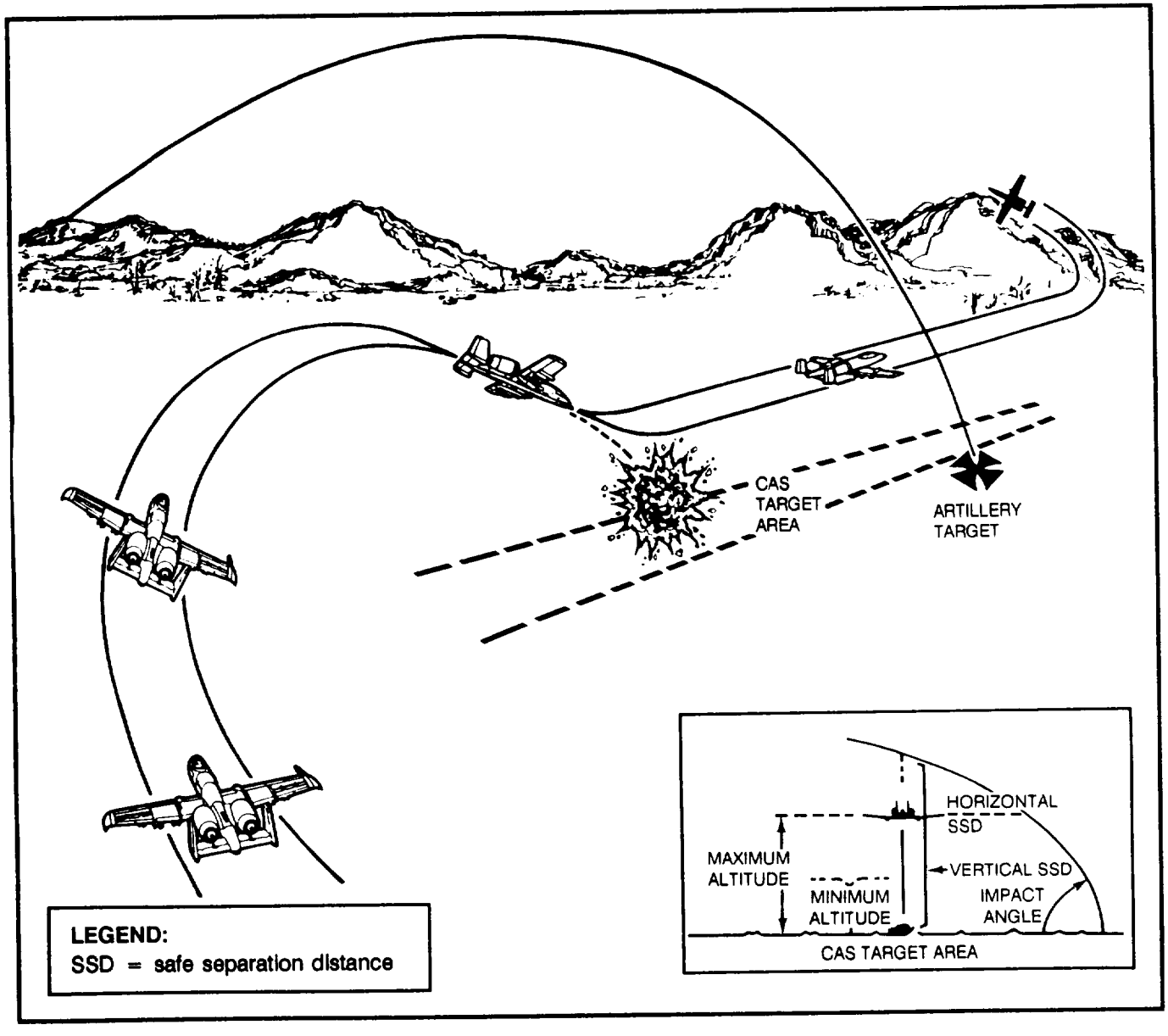
[1]The artillery and and/or mortars execute the mission as a schedule of fires.
[2]The marking round may or may not be requested.
[3]The artillery and/or mortars may still be firing elsewhere in the zone but only through positive clearance by the TF FSO.

ARTILLERY-FIGHTER TIME SEPARATION



Altitude and Lateral Separation (Closely Ad]acent Targets). Altitude and lateral separation plans are the most restrictive. They provide for SEAD when the CAS target is between the artillery and enemy antiaircraft positions. As shown in the graphic on the next page, the vertical restriction is a maximum altitude directly over the CAS target and under the gun line. This restriction provides both horizontal and vertical clearance. The fighters need to know the minimum ordinate over the target. To avoid artillery, they must remain well below this altitude when near the gun-target line. Normally, the fighters will restrict their attack headings to within + 45° of a line perpendicular to the gun line.

ARTILLERY-FIGHTER LATERAL AND ALTITUDE SEPARATION



Attack Execution

Close Air Support Mission Briefing

The CAS mission briefing format varies slightly from theater to theater; however, the information is the same. Target information may be passed to a TACP, an airborne FAC, or a TAC-A. It will be properly formatted and passed to the flight leader.

The following brief would be transmitted as follows: **X RAY** (pause), **075** (pause), **10.2** (pause), **1,200** (pause), **TANK COMPANY ATTACKING WEST** (pause), **QA044092** (pause), **LASER 372** (pause), **2,000 METERS SOUTH ON HIGH GROUND** (pause), **EGRESS WEST TO AVOID ARTILLERY SUPPRESSION.**

The mission briefing format may include the following additional information:

ŽHazards (weather or high terrain, for example).

- Attack restrictions (assume non$_e$ unless specified).
- Attack frequency and FAC call sign.
- Fire support integration.
- Threat update.
- Detailed description of target area.

EXAMPLE CLOSE AIR SUPPORT BRIEF

CLOSE AIR SUPPORT BRIEF
(GIVEN TO THE AIRCRAFT)

(AIRCRAFT CALL SIGN) THIS IS (YOUR CALL SIGN) CAS BRIEFING FOLLOWS:

(1. INITIAL POINT (IP)) " XRAY "

(2. HEADING (IP TO TARGET [TGT]) " 075 " (MAGNETIC) (OFFSET:) " L / R "

(3. DISTANCE (IP TO TGT)) " 10.2 " (NAUTICAL MILES)

(4. TARGET ELEVATION) " 1,200 " (FEET MEAN SEA LEVEL)

(5. TARGET DESCRIPTION) " TANK COMPANY ATTACKING WEST "

(6. TARGET LOCATION) " QA044092 " (LATTITUDE/LONGITUDE OR UTM OR OFFSETS OR VISUAL)

CLOSE AIR SUPPORT BRIEF (CONT'D)

(7. TYPE MARK) " LASER " (CODE) " 372 "
(WP, BEACON, LASER) (BEACON, LASER)

(8. LOCATION OF FRIENDLIES) " 2,000 METERS SOUTH ON HIGH GROUND "

(9.) "EGRESS WEST TO AVOID ARTILLERY SUPPRESSION"

(REMARKS)" _____ "

(TIME ON TARGET) "TOT _____ " OR
(TIME TO TARGET (TTT)) "STAND BY _____ (MIN) PLUS _____ (SEC) HACK"

OMIT DATA NOT REQUIRED. LINE NUMBERS ARE NOT TRANSMITTED. UNITS OF MEASURE ARE STANDARD; SPECIFY IF OTHER UNITS OF MEASURE ARE USED.

NOTES:
1. For further information, see TC 90-7
2. The three-digit number in item 7 is the laser designator setting

- Abort code (obtained from the attack aircraft).
- Clearance (for example, **CLEARED TO DEPART, CALL DEPARTING).**

Additional data may be passed if the situation permits. The FAC will assume that a jamming environment exists and transmit the FAC-to-fighter briefing by using short, concise transmissions. When the FAC gets to the additional information step, he may try to expand on his briefing. The fighters should use this time to ask for repeats or to ask questions critical to the attack. Some information can be passed only after the fighters see the target area.

Final Attack Control

At the contact point, the TAC-A, TACP, or FAC updates the flight leader as he flies toward his initial point. When cleared to attack, the flight leader switches to the attack frequency, checks in with the FAC or FIST, and calls as his flight departs the IP. This radio call is used to coordinate SEAD and/or marking rounds. Whenever tactically possible, the FAC will try to pick up the fighters visually and give them final directions to help the pilots acquire the target.

Direction and Distance Reference

If the tactical situation permits, a direction and distance reference can be used to aid in target acquisition. The FAC should provide a common reference for orientation, For example, **THE MAIN ROAD** (or river, tree line, and so forth) **RUNS EAST-WEST.** Next, the FAC must select some discernible ground feature to establish a common distance reference. A river, road, or field can be used; and distances are given in meters. For example, **THE MAIN FIELD** (or drop zone, assault strip, and so forth) **IS 100 METERS LONG.** Use definite statements in this and all other briefing items. The fighters expect the FAC to give them the best available measurements and estimates. Words like *about, approximately, let's,* and *please* waste radio transmission time. Specific and authoritative instructions are needed to accomplish a mission.

EXAMPLES OF DIRECTION AND DISTANCE REFERENCE

STAR 11, THIS IS ALFA 53.

THE RIVER RUNS NORTH-SOUTH.

THE FIELD IS 100 METERS LONG.

OFF YOUR RIGHT WING, NOTE SANDBAR IN RIVER.

TARGET IS 400 METERS EAST OF SANDBAR.

and

STAR 11, THIS IS ALFA 53.

THE TREE LINE RUNS EAST-WEST.

FROM X INTERSECTION TO Y INTERSECTION IS 100 METERS.

HALFWAY BETWEEN X AND Y, TARGET IS NORTH 25 METERS.

Call to Abort Attack

If the fighters are not aligned with the correct target or if it appears that friendly troops may be endangered, the attack must be aborted. The authentication abort code is obtained from the attack aircraft during the CAS briefing. To abort a CAS attack, the FAC and FIST must have the same authentication system as the aircraft.

The CAS abort procedure uses the challenge-reply response. The flight leader gives the FAC the two-letter challenge code. The reply letter is the abort-call code word. The reply letter will be given to the fighters only when an abort is desired. The letter should be transmitted after the words **ABORT, ABORT, ABORT.**

EXAMPLE ABORT CALL

STAR 11, ALFA 53.

ABORT, ABORT, ABORT.

DELTA (authentication of the abort code received from the attack aircraft).

Reattacks

The FAC or FIST coordinates reattacks with the fighters. This may require additional coordination such as SEAD, fire support coordination, and re-marking the target. In a medium- to high-threat environment, reattacks degrade aircraft survivability.

Bomb Damage Assessment

The BDA provides the same information as mortar or artillery fire mission surveillance. The TACP relays the BDA through USAF channels, while the FIST uses Army channels.

Night Close Air Support

The capability of TACAIR to attack moving targets or provide CAS at night is limited to low-threat situations. In a night high-threat scenario, current capability is very limited. To enhance execution of night CAS in the future, the Air Force is acquiring additional night-capable systems, such as the low-altitude navigation and targeting infrared for night system (LANTIRN).

Advantages. For tactical fighters engaged in CAS, the most important advantage of night is the limitation it imposes on all enemy optically-sighted antiaircraft artillery (AAA) and infrared (IR) surface-to-air missiles (SAMs). This is particularly true if operators do not have night vision devices. Also airborne and ground illumination may degrade enemy night vision capabilities.

Disadvantages. Darkness imposes limitations on the use of tactical fighters for CAS. During night and twilight, pilots have more difficulty visually pinpointing targets and accurately locating enemy and friendly forces.

Levels of Threat Air Defense. Enemy muzzle flash, tracer, and missile burn are easier to identify at night. However, radar-guided SAMs and AAA and enemy air-to-air operations may hinder night CAS operations.

Low-Threat Close Air Support. The Air Force considers small arms, optically-sighted AAA, possible SA-7, and limited enemy counterair operations as low-threat defenses. In such an environment, expect the Air Force to fly more night CAS missions.

High-Threat Close Air Support. Radar-guided SAMs and AAA and enemy air-to-air operations pose a high threat to CAS aircraft. Such defenses may cause high losses and require limiting CAS to tactical emergencies. SEAD operations greatly increase the chances of success.

Planning. Close air support missions at night require extensive planning. The TACPs and FISTs must emphasize—

Ž Target and friendly force identification.

Ž The availability of mortars or artillery for target illumination and SEAD.

The maneuver commander, his chain of command, and the ALO must plan and coordinate as early as possible. The ALO, in turn, coordinates with the ASOC to ensure that they have addressed all the necessary planning considerations. In this regard, planning for night CAS should include all day CAS considerations, plus those discussed in this appendix.

In general, two to four aircraft will perform night CAS. They will fly at low, medium, or high altitude, depending on the threat, offensive tactics, and avionics capabilities.

Targets. The first priority for a successful night CAS mission is identifying the target. The second is accurately marking the friendly forces whose safety is important. Once supporting aircraft have identified the target and friendly positions, enemy defenses can be referenced from the target location. The ground commander should rely first on Army assets to mark and/or illuminate the target. The Air Force ground or airborne FAC may also request Air Force illumination.

Airborne and Artillery Illumination. Artillery or mortar illumination is preferable because Army units can provide continuous illumination within their resources.

Flares released from AFAC aircraft, fighters, or flare aircraft can effectively illuminate an area. The A-10, A-7, F-4, OV-10, OA-37, and AC- 130 can carry target-marking flares. For effective lighting, the flares must be close enough to the target and at the proper height. Then fighters will be able to respond to a detailed target description. The Air Force fighters capable of night CAS missions under battlefield illumination are the A-10, A-7, F-16, F-4, and F-111.

Flare aircraft or AFAC aircraft can drop long-burning illumination markers (LOGs) to mark targets for use as a common reference for fighter employment. After being dropped, the LOGs burn on the ground for 30 minutes. Ground fires from any source may also serve the same purpose. Once there is a reference on the ground, fighters can use the reference mark to attack the marked position or other locations.

Enemy Ground Fire. Enemy ground fire, AAA, tracer rounds, and surface-to-air missile firings can disclose targets.

Laser Designators. Laser designators can enhance night target acquisition. CAS aircraft may be equipped with laser energy receivers known as laser spot trackers. They can acquire targets without using conventional illumination. The LST receives laser energy and provides cockpit head-up steering to the source. When LSTs are used, coordination is paramount between the ground unit, the FAC, and the fighters.

Radar, The F-4, F-16, F-1 11, and A-7 can use radar-significant terrain points, radar reflectors, or portable radar beacons to provide reference information for blind or beacon bombing.

Friendly Positions. Friendly marks improve CAS safety and can provide target area references. Tracers and radar beacons can serve both purposes. Whenever possible, friendly positions should be marked if safe separation is a factor.

Flares. Fired in the air, flares such as trip flares and 40-mm illuminating grenades are effective marks. However, they are usually visible to the enemy as well.

Both wind and cloud cover are important factors in using flares successfully at night. Planners and flare aircraft should calculate the time of delivery and the wind drift to make sure that the target is illuminated during the attack. Flares used during limited visibility can create a *milk bowl* effect, making it more difficult for an aircraft to find the target. When used under a cloud deck, the flares might highlight the fighters against the clouds. Under these conditions, LOGs will be better than flares to mark the target.

Lights. Strobe lights are often excellent for night marking. They are commonly used with blue or infrared filters. They can be made directional by using any opaque tube. In overcast conditions, strobe lights can be especially useful.

Bright directional lights are useful marks, especially in overcast conditions. They are highly directional and can easily be covered with colored filters. Vehicle lights are useful

nighttime marks; but for security, it is best to cover headlights and use tail or brake lights. Any light source that can be readily covered and uncovered can be used for coded signaling.

Combinations of Marks. Combinations or arrays of two or more signaling devices improve chances of acquisition and security of the signal.

Additional Night Close Air Support Capabilities. Other CAS capabilities for night operations are discussed below.

Laser Target Designation Systems. Pave Tack is a pod-contained laser target designating, ranging, and tracking system. Pave Tack uses forward-looking infrared (FLIR). It can be installed on the RF-4C, F-111F, and certain modified F-4E aircraft. The pod provides laser tracking of ground targets for attack with conventional ordnance or laser-guided weapons.

AC- 130A/H Spectre Gunshlps. The primary missions of the AC- 130s are special operations and conventional CAS for troops in contact. They also conduct armed reconnaissance, convoy escort, and perimeter defense, AC-130s normally remain rear-area CAS assets and will not cross the FLOT unless the threat is low and friendly air superiority prevails. An AC-130 carries the following guns:

- 7.62 mm (AC-130A only) for use against personnel under light cover.
- 20 mm for use against personnel under light cover.
- 40 mm for use against trucks and personnel under medium cover.

Ž 105 mm (AC-130H only) for use against trucks, tanks, and personnel under any condition.

NOTE: Ammunition includes HE, WP smoke, and HE plastic tracers.

Using one sensor or a combination of them, AC-130s can locate enemy and friendly positions as follows:

- The radar can locate beacons and ground reflectors.
- The television (TV) or laser platform provides low-light-level TV (LLLTV) during darkness and during day or night laser designation.
- The IR detection set provides visual presentations of the temperature differentials between objects. IR strobes, reflective panels, or reflective tape can help locate friendly positions.

Ž Xenon arc lamps and infrared lamps provide airborne illumination.

- The Black Crow direction finder searches for electromagnetic energy in subradar frequencies. Detectable signatures include those from generators, alternators, and some radios and condensers.

Section IV. NAVAL GUNFIRE

General Mission

The general mission of naval gunfire support is to assist the ground force by destroying, neutralizing, or suppressing targets that oppose that force.

Organization

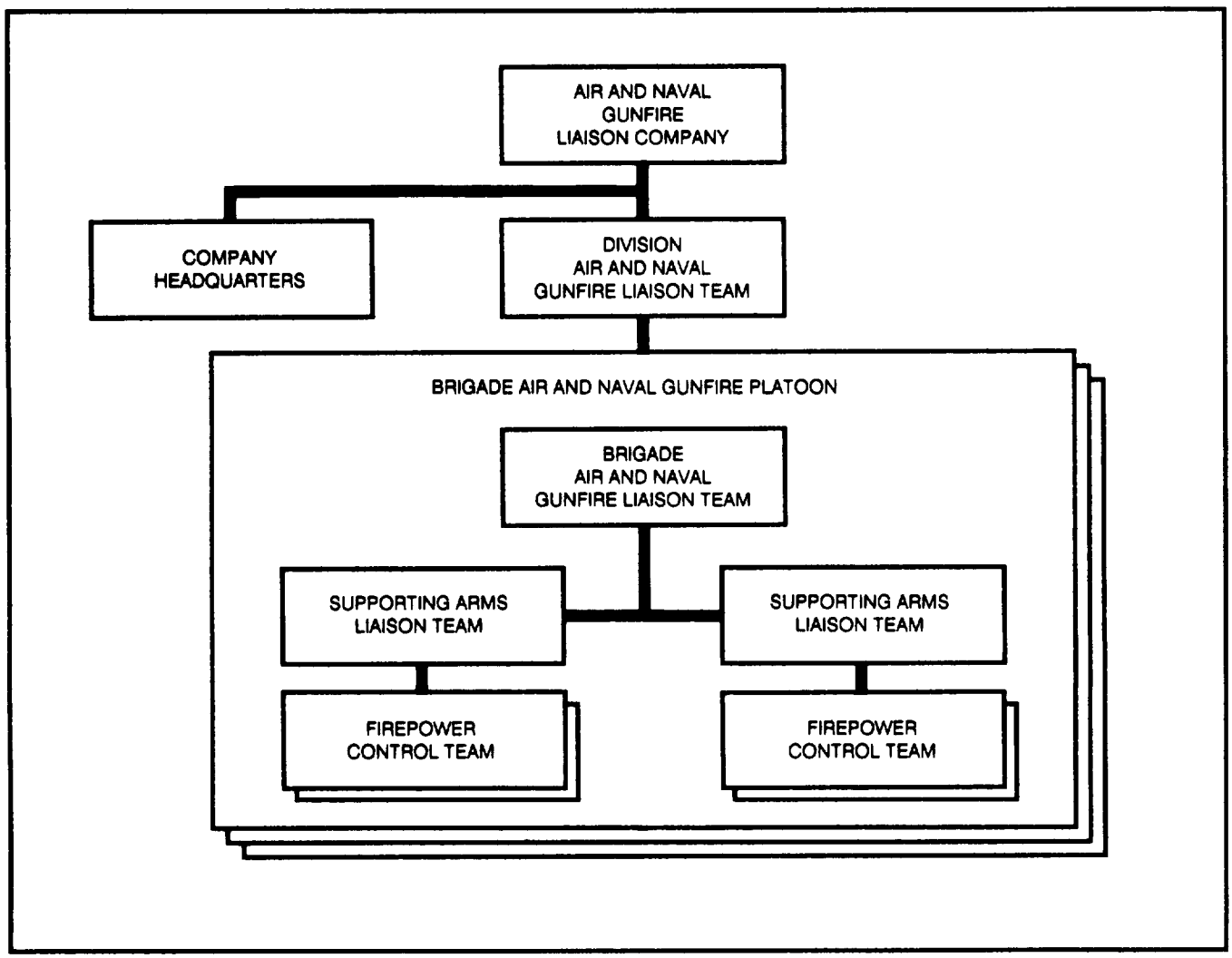
Naval gunfire is coordinated by the brigade air and naval gunfire platoon, a part of the air and naval gunfire liaison company (ANGLICO). The ANGLICO is a Marine

organization. The brigade air and naval gunfire platoon is organized and equipped to plan, request, coordinate, and control naval gunfire and naval air at the brigade level. Each brigade platoon is organized with a team to support the brigade and two battalion supporting arms liaison teams. Under normal conditions, each of two maneuver battalions is provided a SALT. The SALT is composed of two SALT officers and six personnel, who become part of the FS cell. Two firepower control teams are available to be sent to the maneuver companies to request, observe, and adjust navel fire support. The SALT officers coordinate all naval gunfire and supervise the activities of the FCTs. In addition, they advise the FSCOORD on all matters pertaining to naval gunfire employment, to include capabilities, limitations, and targets suitable for naval gunfire engagement.

Tactical Missions

Naval gunfire ships are assigned one of two missions—direct support or general support—in much the same way that field artillery is organized for combat.

ANGLICO ORGANIZATION



Direct Support

A ship in direct support usually supports a battalion. This ship can deliver both planned and on-call fires. Call (on-call) fires are normally requested and adjusted by the firepower control team of the supported unit or by an air spotter.

General support

A ship is usually placed in general support of committed brigades and divisions. The fires for a GS ship are conducted as directed by the naval gunfire officer of the unit being supported. The primary purpose of a GS ship is to allow the supported commander to add depth to the fires of the DS ships without the necessity for requests to higher echelons. An understanding of the capabilities and limitations of the naval gun facilitates its use in the ground support role. In considering the characteristics of naval gunfire, it should be remembered that the naval gun was designed for ship-to-ship combat.

Capabilities

Ammunition Variety

The variety of projectiles, powder charges, and fuzes permits selection of optimum combinations for the attack of targets.

Muzzle Velocity

The high muzzle velocity and relatively flat trajectory make the naval gun suitable for direct fire or assault fire, particularly against reinforced targets such as bunkers and hardened positions.

Rates of Fire

Some naval guns have a very rapid rate of fire.

Dispersion Pattern

The normal dispersion pattern is narrow in deflection and long in range. It permits effective coverage of such targets as roads and runways when the GT line coincides with the long axis of the target. Very close supporting fire can be delivered when the GT line is parallel to the front line of troops.

Mobility

Within the limits imposed by hydrographic conditions, the naval gunfire ship may be positioned for the best support of the ground force. The ability of the ship to maneuver is an important factor in planning for support of separated forces. It also allows selection of the most favorable gun-target line.

Fire Control Equipment

Precision fire control equipment permits accurate direct and indirect fires while the ship is under way or at anchor.

Limitations

Range Probable Error

The relatively flat trajectory results in a large range probable error. Therefore, the dispersion pattern of the naval gun is roughly elliptical, with the long axis in the direction of fire. The GT line and its relation to the FLOT must be considered by the FSO in selecting naval gunfire as a fire support means. Friendly units should avoid the GT line. If possible, the GT line should be parallel to the FLOT.

Changing Gun-Target Line

Because of the movement of the ship while firing, the GT line in relation to the FLOT may change. This can cause cancellation of the fire mission as the large range probable errors may cause rounds to endanger friendly forces.

Communications

The sole means of communication between the ship and the shore is high-frequency (HF) radio, which may be interrupted or jammed.

Hydrography

The hydrographic conditions of the sea area in which the naval gunfire ship must operate may be unfavorable. They may cause undesirable firing positions or require firing at longer ranges.

Fixing of Ship Position

The accuracy of naval gunfire depends on the accuracy with which the position of the firing ship has been fixed. Navigational aids, prominent terrain features, or radar beacons emplaced on the shore may be used to compensate for this limitation.

Weather and Visibility

Bad weather and poor visibility make it difficult to determine the position of the ship by visual means and reduce the observer's opportunities for locating targets and adjusting fires. Bad weather also might force the ship out to sea.

Enemy Action

If the naval gunfire ship comes under enemy surface, subsurface, and/or air attack, the ship may cancel its fire mission with the ground forces and try to counter this threat.

Magazine Capacity

The shore bombardment allowance varies with the ship type (600 to 1,800 rounds). When the need arises, remaining rounds will be held for self-defense of the ship.

Control Measures

Measures used by the Navy for its operations are identical to those used by the FSCOORD to control other surface-to-surface fires. Those peculiar to naval operations which limit ship movement or affect the fire support provided are discussed below.

Zone of Fire

The objective area is divided into zones into which ships are assigned to coordinate their efforts. The zones depend on locations of boundaries, size, visibility, and accessibility to fire.

Fire Support Area

A fire support area (FSA) is a definite sea area assigned to an individual fire support ship or a fire support unit (more than one ship). These areas are selected on the basis of factors such as hydrographic conditions, minefield, antiaircraft and antisubmarine disposition, other naval activity, and the best position based on GT line, range, and observation.

Fire Support Station

A fire support station (FSS) is a specific location in which ships may be placed and maintained while providing fire support.

Communications

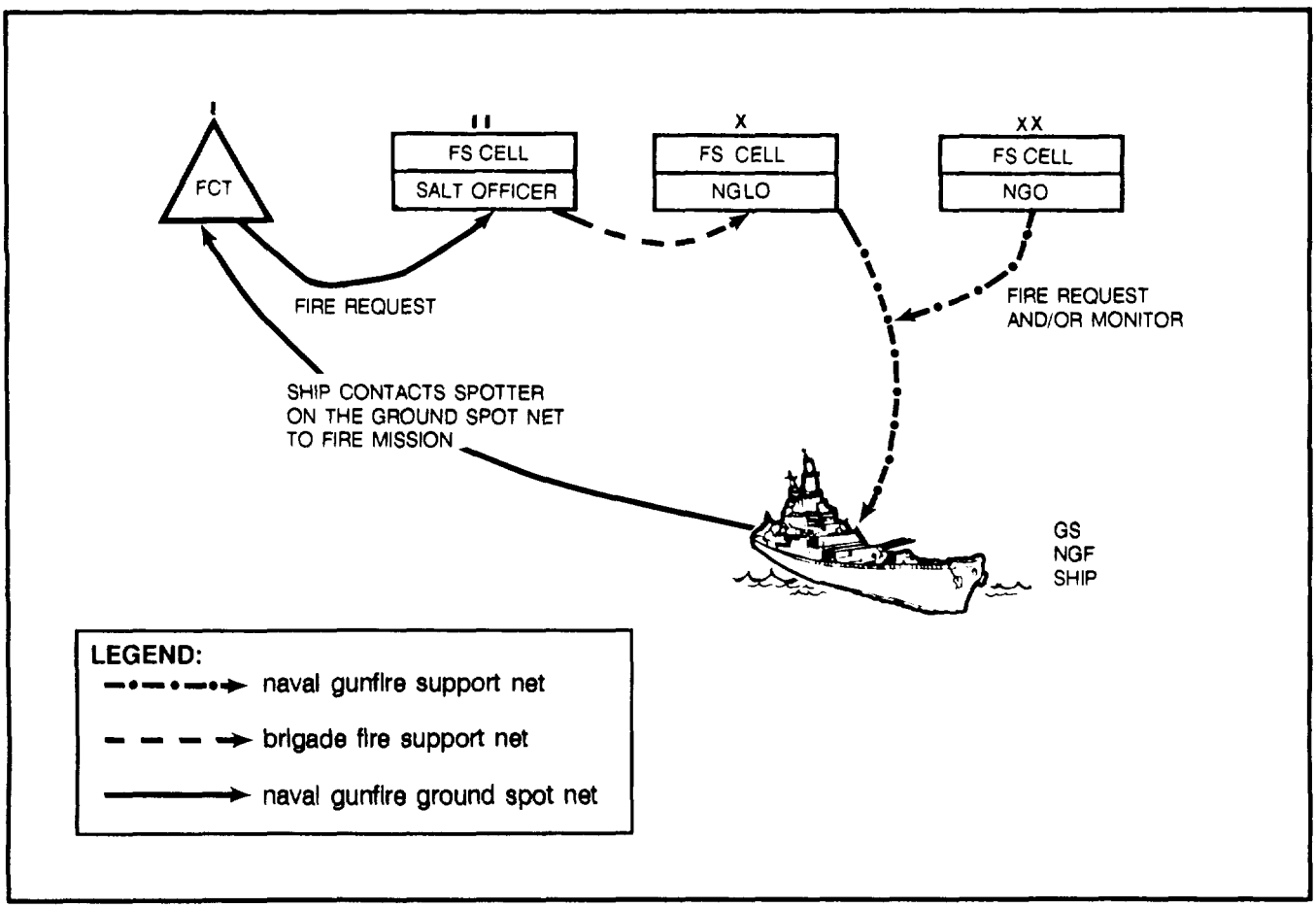
The brigade team operates on the division naval gunfire support net (HF). This net provides for communication between the division naval gunfire officer (NGO), the brigade NGLO, and the ships in support of these units. This net is used for the day-to-day planning between the units. No direct naval communications net exists between the battalion FCTs and brigade SALTs. Fire support or maneuver nets must be used for communication between these two agencies. Brigade-initiated requests for fire support are transmitted to the brigade air and naval gunfire liaison team, which then forwards the requests to the ship. A SALT officer at the maneuver battalion FS cell monitors the request and coordinates as necessary at his echelon. This coordination is much the same as for field artillery engagement. The one exception is that the SALT officer at maneuver battalion must contact the NGLO at

brigade, if brigade coordination is necessary He does this over the FSOs communications means, as he does not have direct communication with the brigade NGLO.

Naval and Marine Corps Air

Naval and/or USMC air requests are forwarded by the respective SALTs to the aviation support unit in support of the unit. The brigade FSO submits his requests through the Marine air officer. The actual terminal control of the air is done by the firepower controller of the firepower control team. In the absence of an observer, naval and/or USMC air may be controlled by the company FSO, the ALO, or the Air Force FAC.

GENERAL SUPPORT NAVAL GUNFIRE REQUEST CHANNELS AT BRIGADE LEVEL



Section V. ARMY AVIATION

Fire Support Tasks

In general, attack helicopter units are not attached lower than division level, but they may be placed OPCON to a brigade. The organization and equipment of combat aviation units enable them to do several key fire support tasks. They–

- Provide limited aerial fire support to ground maneuver units.
- Coordinate and adjust indirect fires when tactical air and artillery are employed.
- Conduct joint air attack team (JAAT) operations.

The attack helicopter can mount an impressive array of weapons and can be used in a fire support role similar to that of air support aircraft. In this role, the attack helicopter battalion may—

Ž Attack critical logistics and command and control facilities.

- Control JAAT operations.
- Perform SEAD missions,

Ž Provide fire support for rear operations.

Capabilities

Attack helicopter capabilities include—

- Long standoff capability.
- Rapid movement to the engagement area.

Ž Delivery accuracy.

Ž Air-ground communications.

Ž Quick maneuver and massed fires regardless of battlefield dispersion.

Limitations

Attack helicopters—

- Have a limited time on station and delayed response.

Ž Are affected by weather and visibility.

Ž Are affected by the air defense threat.

Target

The type of targets should be carefully specified to ensure that the best ordnance is used to attack the target. The objective of attack helicopter employment is to put the aircraft on station at the right time with the right munition. Scheduled or on-call SEAD fires may be required to suppress enemy air defenses for the attack and to cover helicopter withdrawal after the mission.

Section VI. JOINT AIR ATTACK TEAM

Description

The JAAT is a combination of scout and attack helicopters and tactical aircraft supported by field artillery, operating together to attack a single high-priority target or target array. The JAAT may operate either with or independently from ground units. When operating with ground forces, the JAAT may be strengthened by the firepower capabilities of maneuver forces.

When to Use JAAT

The JAAT is most effective against moving targets in open areas. It is least effective when

attacking targets that are in camouflaged dug-in positions. The combination of TOWs (from attack helicopters), Maverick missiles, and 30-mm gunfire (from the A-10s) is deadly against moving armor units.

Planning Considerations

JAAT operations, whether planned or spontaneous, require a thorough understanding of the maneuver commander's intent and of factors influencing the battlefield, and a knowledge of JAAT capabilities. Key JAAT members must stringently use the time available to develop an in-depth JAAT plan and must coordinate in detail with all participants. The amount of time available will be a major factor in the complexity of the plan.

Staffs at all levels influence JAAT planning through their IPB. Through this analytical approach, appropriate targets and target areas for employment of a JAAT can be identified. Essential to effective JAAT employment is the identification of key intelligence trigger events, which signal the buildup of a likely enemy target. Also, intelligence on Threat air defense by type, amount, and location is vital to the success of a JAAT operation.

The foundation of a successful JAAT operation is the maneuver commander's tactical plan, around which JAAT plans are based. The maneuver commander's tactical plan specifies actions in the objective area to ultimately accomplish the mission and to prepare for subsequent operations. A JAAT should be planned for and used in support of this overall mission. JAAT mission assignment considerations include the following:

- Massed enemy armored and/or mechanized vehicles.
- Whether the enemy is on the move.

Ž Availability of JAAT assets.

Ž Whether the enemy can be flanked.

- Whether local air superiority can be seized.

Ž Whether enemy helicopters can be suppressed.

Ž Likely offensive operations:

  - Enemy counterattacks.
  - Exploitations.
  - Pursuits.

- Likely defensive operations:

  - Reinforcement of committed ground maneuver units.
  - Destruction of enemy penetrations.

Ž Deep operations to attack follow-on elements.

Brigade should be the lowest level at which a joint air attack is planned. Coordination with the appropriate task force is required if the JAAT is to be employed in the task force sector; execution may be handed off to the task force.

The ground maneuver commander is responsible for planning, coordinating, and employing the JAAT. The plan to employ the JAAT should allow for multidirectional attack. This enhances the survivability and success of the JAAT by denying the ability of the enemy AD assets and maneuver forces to focus or orient in one direction. The key staff members who plan and coordinate for the JAAT, on the basis of the commander's guidance, are discussed below. The coordination process takes place in the FS cell under the supervision of the FSCOORD or FSO and the S3 air.

S3 Air

The S3 air plans and requests the use of close air support and attack helicopters to support the commander's concept of the operation.

S2

The S2–

Ž Provides information on the avenues of approach, target array, terrain, and weather as it applies to the time and location of the JAAT operation.

Ž Plans and coordinates the use of nonlethal attack assets to complement the JAAT.

Attack Helicopter Battalion and/or Company Commander or Liaison Officer

This officer—

Ž Provides status of Army aviation assets available.

- Begins planning the air corridors and air battle positions (ABPs) to support the operation.
- Coordinates with the FSCOORD or FSO and the air defense officer (ADO) to deconflict air corridors.
- Coordinates for the planned ACAs.

Fire Support Coordinator or Fire Support Officer

The FSCOORD or FSO—

Ž Determines the need, availability, and positioning of artillery, commensurate with the Threat update, to support the JAAT.

Ž Coordinates with the aviation representative to provide call signs and frequencies to the supporting FDC.

- Helps the TACP deconflict the IPs from artillery positions and develop ACAs to support the mission.
- Determines the need for SEAD.
- Determines when and how priorities of fires shift.

Ž Recommends fire support coordinating measures to enhance the success of the mission.

Ž Establishes a quick fire channel if necessary.

Air Defense Officer

The air defense officer—

- Coordinates to ensure that the AD assets know the location of air corridors, ABPs, IPs, and ACAs.

Ž Ensures these assets are informed of friendly air operations and their integration into the battle.

Tactical Air Control Party

The TACP—

Ž Develops contact points and/or initial points and ACAs in coordination with the FSCOORD or FSO and the ADO.

Ž Disseminates the contact point and/or IP and ACAs to the ASOC for dissemination to the ground liaison officer (GLO) and wing operations center (WOC) for preflight briefing.

Ž Helps the TAC-A move aircraft forward to the appropriate contact point or IP and then hand them off to the aviation commander conducting the JAAT operation.

Preparation

The preparation phase includes briefing the plan, ensuring dissemination of the plan to subordinate units that may have an impact on the mission, reconnaissance, and rehearsal.

Reconnaissance by the aviation commander is critical to the success of the JAAT. It allows him to see the terrain and determine if the ABPs need to be adjusted because of dust signature, survivability, or communications and/or to facilitate control of the JAAT. On completion of the recon, the aviation commander will provide feedback to the FSCOORD or FSO and the S3 air. If refinements to the plan are needed, they will be made and disseminated expeditiously.

Rehearsals are crucial to check communications channels, routes and ABPs to be used, time required to move assets forward, graphical control measures, and the fire plan. The JAAT rehearsal participants should be as follows:

- Aviation commander (JAAT commander).
- Attack helicopter platoon leader.
- Brigade FSO (may require TF FSO).

Ž Brigade air liaison officer.

- Aviation liaison officer.
- Battalion and/or battery fire direction center.
- Aerial observer and/or AFSO (if available).

Execution

During the execution phase, the aviation commander is the director and coordinator of the total team effort.

The flight leader and aviation platoon leaders manage their own individual elements. The aviation commander does not dictate their attack methods.

En route to the target or engagement area, the aviation commander contacts the ground commander for a tactical update.

The aviation commander should talk directly to all fire support assets involved in the JAAT operation. However, the ground commander's staff will monitor their appropriate nets to keep abreast of the JAAT operation and to help the aviation commander as needed.

NOTE: The following checklist may aid in fixing responsibility for each facet of ACA planning and execution of CAS or JAAT operations.

RESPONSIBILITIES FOR CLOSE AIR SUPPORT AND JAAT OPERATIONS

	PLANNING	EXECUTION
S3	Plan for the use of CAS and helicopters to support the commander's concept of the operation. Brief FAC and FSO on commander's concept and his intent. Identify the JAAT commander who will control and execute the air movement and attack.	Determine if the timing of the air attack is still valid and synchronized with the commander's intent. Determine if the enemy situation and predicted location are valid, and make any required changes to the kill zone. Pass control of the air attack to the appropriate FAC or JAAT commander.

RESPONSIBILITIES FOR CLOSE AIR SUPPORT AND JAAT OPERATIONS (CONTINUED)

	PLANNING	EXECUTION
S2	Prioritize electronic support measures and target acquisition assets in support of the maneuver mission. Develop appropriate targets for inclusion in the brigade or task force FSO's SEAD program. Use all assets available to provide real-time enemy AD targets to FSO and FAC. Plan and coordinate attack of enemy targets with electronic countermeasures. Jam and disrupt enemy AD C2 links and AD radars. Use IPB to identify potential engagement areas to employ TACAIR and/or JAAT.	Initiate jamming of enemy AD radars and C2 links when FAC or JAAT commander reports that aircraft are crossing the start point (SP).
Brigade or Task Force Fire Support Officer	Plan the integration of indirect fires in support of the operation. Integrate fire support coordinating measures into the operation. Plan for SEAD based on intelligence from the S2. Develop a plan for marking the target area and employing SEAD. Coordinate with the S3 air and the TACP to input the required ACAs that support the operation. Develop fire plans for indirect fires in support of the operation. Request and plan for use of aerial observers or AFSOs, if applicable. Coordinate with the direct support FA battalion S3 for positioning of the FA batteries to ensure minimal disruption from the proposed ACA on their support to maneuver forces. Coordinate positioning of the heavy mortar platoon with same considerations as FA batteries. Coordinate with the JAAT commander and FAC for marking rounds on the target area. Determine and disseminate PRF codes, as required	

RESPONSIBILITIES FOR CLOSE AIR SUPPORT AND JAAT OPERATIONS (CONTINUED)

	PLANNING	EXECUTION
Forward Air Controller	In conjunction with the ADO and FSO for attacking aircraft. Inform brigade or TF FSO and S3 air. Coordinate ACAs with FSO, plan air routes and ADO to support aircraft attack of enemy forces. Ensure ADO receives ACAs for dissemination to AD assets. Plan for optimum location of FAC to control attacking aircraft. Request that target updates from USAF sources be passed to S2 and FSO, aviation liaison officer, JAAT commander, and FAC. Plan air routes for attacking helicopters (in conjunction with S3 air and JAAT commander). Consider location of ABPs to facilitate control of aircraft by JAAT commander. Inform brigade or TF FSO. Coordinate the synchronization of the air movement and attack. Provide frequencies to the JAAT commander who will control the air attack. Coordinate with the brigade or TF FSO, JAAT commander, and other agencies to ensure expeditious activation and cancellation of an ACA.	Relay to brigade or TF FSO the position and movement of aircraft through communication with the controlling JAAT commander.
S3 Air	Plot attack routes and attack and/or loiter areas received from FAC and aviation liaison officer. Coordinate with brigade or TF FSO, S3, and division FS cell to deconflict air operations with maneuver operation. Coordinate with supporting AD units for appropriate weapon status during the air operation.	
JAAT Commander	Coordinate directly with the FSO and FAC. Receive from these agencies call signs, frequencies, target lists, proposed ACAs, priority target types, and so forth. Plan with the FSO and TACP for priority calls for fire, aerial observation tasking, net usage and assignment, and so forth.	Report aircraft IP inbound to FSO. Report entering attack area. Report clearing attack area. Report aircraft departing maneuver sector.

RESPONSIBILITIES FOR CLOSE AIR SUPPORT AND JAAT OPERATIONS (CONTINUED)

	PLANNING	EXECUTION
JAAT Commander (Continued)	Pass all USAF graphics (IPs and so forth) and known aircraft weapon configurations. Receive enemy AD locations to pass to appropriate agency.	Coordinate direction of fires on targets of opportunity with the attack helicopter FSO. IReport any intelligence received from the aircraft to FSO and S2.
JAAT Commander or Aerial Fire Support Officer		Initiate SEAD program in synchronization with air movement. Initiate the fire plan in coordination with the attack helicopter FSO and the FAC. Activate ACAs when aircraft are about to enter the attack area. Activate air corridors as necessary. Cancel the ACA when the aircraft have cleared.
Air Defense Officer	Help the FAC identify friendly air routes for CAS and attack helicopters. Provide input to ACA and IP location based on location of AD assets and posture.	
DS Artillery Battalion and Mortars		Plot all active ACAs onto firing charts. Maintain status of those ACAs that are active and those that have been cancelled.

APPENDIX B

COMMANDER'S GUIDANCE FOR FIRE SUPPORT PERSONNEL

The commander's intent should prioritize fire support on the battlefield and identify critical tasks for fire support as well as for maneuver, His intent focuses fire support execution at the critical time and place. To ensure that fire support is properly integrated into the scheme of maneuver, the FSO must obtain answers to the questions below. Most of the answers may be obtained from information presented at the mission brief or deduced from the commander's intent. Some answers may require clarification by the commander himself. Regardless, these answers should be confirmed as meeting the commander's intent for fire support during the staff estimate, war-gaming, and rehearsal processes.

GUIDANCE FOR FIRE SUPPORT PERSONNEL

OFFENSIVE OPERATIONS

- What is the offensive mission?
- What Is the scheme of maneuver?
- Are there any unique maneuver requirements for the firing batteries?
- What Is the zone of action?
- What Is the enemy situation?
- What are the known and/or suspected enemy locations?
- What units are to receive priority of fires?
- What fire support assets are providing the priority fires?
- What are the priority targets, and which units will be allocated a priority target'?
- When Is priority shifted to the next priority target?
- Where are special fires to be planned (smoke, illumination, FASCAM, and so forth)?
- Is there a requirement to adjust smoke or Illumination targets?
- Is there a requirement to register fire support assets?

DEFENSIVE OPERATIONS

- What is the defensive mission?
- What Is the plan for defense?
- What Is the sector of action?
- What Is the enemy situation?
- What are the known and/or suspected enemy locations?
- What are the priority targets?
- Where are designated engagement areas?
- Which are the most likely avenues of approach?
- What and where are the obstacles, and how are they to be covered? (Coordinate with engineers.)
- Have FPFs been allocated? Where are they to be planned? Are they to be adjusted?
- What are the primary and alternate signals to fire the FPFs?
- How are COLTs to be employed?
- Are scouts forward?
- What special fires are to be planned (smoke, illumination, FASCAM, and so forth)?

GUIDANCE FOR FIRE SUPPORT PERSONNEL (CONTINUED)

OFFENSIVE OPERATIONS	DEFENSIVE OPERATIONS
Ž How are COLTs to be employed? • Which signals or events will be used to start special fires? • Which maneuver control measures have been established? Ž Are any restrictive fire support coordinating measures required? • What additional fire support assets have been allocated (attached or In support)? Ž Are there any pecullar communications requirements? • How will logistical support for mortars be accomplished? • Who will reposition mortars? • What are the future plans? • What is the chain of command?	• Are there special fire support requirements for the scouts? • Is there a requirement to adjust fires or to register? • Which maneuver control measures have been established? • Are any restrictive fire support coordinating measures required? Ž What additional fire support assets have been allocated? • Are there any peculiar communications requirements? • Which signals will be used to start firing? • What are the future plans? Ž What is the chain of command? Ž How much time is available? • Which units are to receive priority of fires? • When is priority shifted to the next priority target?

APPENDIX C

FIRE SUPPORT DOCUMENTS

This appendix implements STANAG 2014, Edition 5, and QSTAG 506, Edition 1, and STANG 2031, Edition 5, and QSTAG 515, Edition 1.

The operation order displays in a written format the commander's selected course of action, his concept of the operation, and all guidance given during the planning of the operation. It merges maneuver, fires, combat support, and combat service support into a synchronized operation. In this appendix, the OPORD format is shown and fire support documents have been incorporated into the OPORD.

GLOSSARY FOR EXAMPLE OPERATION ORDER

A = as acquired (attack matrix)

ammo = ammunition

AOF = azimuth of fire

APDS = armor-piercing discarding sabot

APFSDS = armor-piercing, fin-stabilized, discarding sabot

ASP = ammunition supply point

ATP = ammunition transfer point

AVLB = armored vehicle-launched bridge

az = azimuth

BMP = Soviet amphibious infantry combat vehicle

BSA = brigade support area

BTR = Soviet amphibious armored personnel carrier

CAA = combined arms army

CFZ = critical friendly zone

Chap = Chaparral

CM = countermobility (mission)

cml = chemical

Cphd = Copperhead

COP = command observation post (Soviet)

counterprep = counterpreparation

D = destroy (attack matrix)

det = detachment

DSA = division support area

ENG = engineer (attack matrix)

engr = engineer

ERP = engineer reconnaissance patrol

FAAR = forward area alerting radar

FAST = forward area support team

FFA = free-fire area

FS = fire support

FSB = forward support battalion

FSCL = fire support coordination line

GM = guided missile

GMRD = guards motorized rifle division

H = howitzer (high-payoff target list)

HP = high-payoff target (attack guidance matrix)

HPT = high-payoff target

HEMTT = heavy expanded mobility tactical truck

I = immediate (attack matrix)

ICM = improved conventional munitions

IGB = intergovernmental boundary

immed = immediate

ITR = independent tank regiment

kmph = kilometers per hour

KT = kiloton

GLOSSARY FOR EXAMPLE OPERATION ORDER (CONTINUED)

LIFT = type of ground transport target (attack matrix)

LOC = lines of communication (attack matrix)

LRRP = long-range reconnaissance patrol

M = mobility (mission); mortar (high-payoff target list)

maint = maintenance

MAN = maneuver (attack matrix)

MANT = maintenance (attack matrix mnemonic)

MR = motorized rifle

MRD = motorized rifle division

MRR = motorized rifle regiment

MSR = main supply route

MRL = multiple rocket launcher

N = neutralize (attack matrix)

N/CH = nuclear and chemical (attack matrix)

obs = observation

P = plan (attack matrix)

PNL = prescribed nuclear load

prep = preparation

RAG = regimental army group

RSO = reconnaissance and survey officer

RSTA = reconnaissance, surveillance, and target acquisition

REC = radio electronic combat (attack matrix)

RDO = radar deployment order

RAP = rocket-assisted projectile

S = survivability (engineer mission); suppress (attack guidance matrix)

SASP = special ammunition supply point

std = standard

subs = subsequent

tm = team

TR = tank regiment

TBP = to be published

TLE = target location error

TTC = TOC team chief (attack matrix)

VBK = Verteidigungsbezirkskommando (military region command) (German home defense unit)

vic = vicinity

WBK = Wehrbereichskommando (military district command) (German home defense unit)

EXAMPLE OPERATION ORDER

(Classification)

Copy No _____ of_____ copies
2d Bde, 23d Armd Div
GORZHAIN (NB283302), GERMANY
040600Z July _____
JTM

OPERATION ORDER COSMIC

Reference: Map, USACGSC 50-264, BAD HERSFELD-ALSFELD, edition 1977, 1:50,000.

Time Zone Used Throughout the Order: ZULU.

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

OPORD COSMIC--2d Bde, 23d Armd Div

Task Organization:

TF 1-14 Armor
1-14 Armor(-)
B/1-92 Mech
3/C/1-440 ADA (Vulcan) (OPCON)
3/4/C/1-440 ADA (Stinger)
2/B/23d Engr (DS)
2/2/B/23d MI Bn(-)(DS)

TF 1-92 Mech
1-92 Mech(-)
B/1-14 Armor
2/C/1-440 ADA (Vulcan)(OPCON)
2/4/C/1-440 ADA (Stinger)
3/B/23d Engr (DS)
4/2/2/B/23d MI Bn(-)(DS)

1-12 Armor
4/4/C/1-440 ADA (Stinger)(OPCON)

Bde Control
1-51 FA (155, SP) (DS)
2-636 FA (155, SP)(GSR 1-51 FA)
C/1-440 ADA (-)(Vulcan)(DS)
1/C/1-432 ADA (Chap)
FAAR 3&4
B/23d Engr(-)(OPCON)
Tm B/23d MI Bn (-) (DS)
2/23 MP Co (DS)
2d FSB (DS)

1. SITUATION (Refer to Annex A [Sketches].)

a. Enemy Forces.

(1) Enemy Situation. Motorized rifle and tank regiments of the 8th CAA can attack in the brigade sector within 8 to 10 hours. At the initiation of hostilities, Threat units will be at 95 percent strength. First-echelon regiments are equipped with BTRs and T-55 tanks. Second-echelon MRRs have BMPs. At the FEBA, lead-echelon units will be at or near 70 percent strength. Second-echelon units will be 95 to 100 percent. The enemy can air assault a battalion-size force to seize crossing sites across the FULDA River. The enemy can achieve local air superiority for limited periods of time. We can also expect the enemy division objectives to be west of the FULDA River. See Appendix 1 (Threat Sketch) to Annex A (Sketches).

(2) Terrorist. Spetznaz teams and LRRPs can be expected in the BSA vicinity of IMMECHIHEIM.

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

OPORD COSMIC--2d Bde, 23d Armd Div

b. Friendly Forces.

(1) Appendix 2 (Friendly Sketch) to Annex A (Sketches).

(2) 23d Armd Div defends in sector from NB718485 to NB655095 to destroy first-echelon assault divisions of the 8th CAA. Division intent is to maintain the FEBA on the FULDA River and be prepared to counterattack east to reestablish the IGB.

(3) TF 1-22 (division cav squadron plus A/1-91 Mech) in the north screens in sector from NB535480 to NB510370.

(4) 3d Bde, the division main effort in the south, defends in sector from NB408227 to NB443065 to defeat 39th GMRD.

(5) TF STAR (consisting of 208 ACR, TF 1-13 Armor, and TF 2-141 Mech) defends in sector from NB718485 to NB655095 to PL SABER to destroy first-echelon MRRs.

(6) 1st Bde is division reserve in AA OMEGA. On order 1st Bde counterattacks along Axis COUGAR to destroy ITR in Objective HAWK.

(7) 23d CAB provides rear area security and is division reserve in AA BILL.

(8) WBK 4, VBK 44, and VBK 43 control civil and territorial forces in sector.

2. MISSION

2d Bde defends in sector from NB495345 to NB408227 to defeat the 4th MRD (-).

3. EXECUTION

a. Concept of Operation. Intent of the 2d Bde commander is to destroy the 4th MRD in sector between the FEBA and PL JAY to support the division counterattack. At the end of the operation, the brigade should be in a position to continue the defense along PL JAY to begin the destruction of second-echelon divisions.

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

OPORD COSMIC--2d Bde, 23d Armd Div

(1) Maneuver. 2d Bde defends in sector with two task forces along the FEBA and one task force in reserve. TF 1-92 Mech will defend in sector in the north, and TF 1-14 Armor defends in sector in the south. 1-12 Armor is the brigade reserve in AA JOYCE. Operations will begin with battle hand-over from TF STAR at PL SABER. TFs will then assist passage of TF STAR on Routes NANCY and LYNN. Before battle hand-over, brigade will use EW assets to locate enemy division CPs and CPs of second-echelon regiments and battalions. CAS, FA, and EW will be used to attack these deep targets to slow their arrival and deployment. TFs will complete destruction of lead MRRs at the FEBA and begin destruction of second-echelon MRRs. Brigade main effort is TF 1-14 Armor. 2d Bde will continue destroying second-echelon MRRs as it delays to PL JAY. At PL JAY, TFs will defend to complete the destruction of second-echelon MRRs. 2d Bde will counterattack to destroy enemy forces that have penetrated the sector in depth. The counterattack will be conducted after TF 1-14 Armor has completed the delay to PL JAY. 1-12 Armor becomes the brigade main effort and moves along Axis PUMA. 1-12 Armor counterattacks enemy forces by fire vicinity Objective HORSE. After completely destroying enemy forces vicinity Objective HORSE, 1-12 Armor returns to AA JOYCE. TF 1-14 Armor becomes the brigade reserve until 1-12 Armor begins its return to AA JOYCE. Then 1-12 Armor resumes its role as brigade reserve. The brigade reserve TF defends against Level III Threat in brigade rear area.

(2) Fires. Priority of fires to TF 1-14 Armor, on order 1-12 Armor for counterattack. Copperhead priority--for use against command vehicles and AVLBs before deployment--to TF elements assisting with battle hand-over initially and then to TF 1-14 Armor. Brigade will plan a 10-minute counterprep to be fired when Threat forces try to cross the FULDA.

(3) Counterair Priority. Counterair priority of effort will be in the MBA to protect maneuver forces from enemy CAS and to retain freedom of movement. Priority for protection, in order, to TF 1-14 Armor, TF 1-92 Mech, brigade reserve, and brigade CP. Weapon control status is TIGHT. AD warning is RED.

(4) Intelligence. Priority of intelligence efforts will be to locating the second-echelon units and command elements. Early location of second-echelon maneuver units will facilitate

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

OPORD COSMIC--2d Bde, 23d Armd Div

attack to separate echelons and slow their arrival in the MBA. Priority of intelligence targets is: division main CP, division forward CP, regimental CPs, RAGs, tank battalions, and MR battalions.

(5) Electronic Warfare. Priority of jamming to Threat division C2, second-echelon MRR C2, fire control, and aviation nets.

(6) Engineer. Engineers will emplace obstacles to reinforce the FEBA and to deny the enemy the west bank of the FULDA River. Countermobility priority of support is to TF 1-14 Armor then to TF 1-92 Mech. Do not execute targets on route LYNN or NANCY without approval of responsible task force commander. Brigade has four short-duration FA FASCAM minefields. Priority is to TF 1-14 Armor then to TF 1-92 Mech. Approval authority is the brigade commander. Refer to Annex D (Engineer Matrix).

b. Tasks to Maneuver Units.

(1) TF 1-14 Armor.

(a) Defend in sector from NB450289 to NB408227 to complete destruction of first-echelon MRR, and begin destruction of second-echelon MRR.

(b) On order, defend on PL JAY to complete destruction of second-echelon MRR.

(c) Brigade reserve during 1-12 Armor counterattack.

(2) TF 1-92 Mech.

(a) Defend in sector from NB495345 to NB450289 to complete destruction of first-echelon MRR, and begin destruction of second-echelon MRR.

(b) On order, defend on PL JAY to complete destruction of second-echelon MRR.

(c) Assist movement of 1-12 Armor on Axis PUMA.

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

OPORD COSMIC--2d Bde, 23d Armd Div

(3) 1-12 Armor.

(a) Brigade reserve. Occupy AA JOYCE vic NB2632.

(b) On order, defeat Level III Threat in brigade rear.

(c) On order, counterattack to destroy second-echelon forces at Objective HORSE vic NB3838.

c. Tasks to Combat Support Units.

(1) Fire Support.

(a) Air Support. Six CAS sorties available. TF 1-14 Armor has planning authority for two sorties. Brigade holds four sorties for counterattack.

(b) Chemical Support. Priority of support to TF 1-14 Armor then to 1-12 Armor when committed.

(c) Field Artillery Support. Priority of fires to TF 1-14 Armor, on order 1-12 Armor. TF 1-14 Armor plans two 400-meter by 400-meter standard FA-delivered FASCAM minefields. TF 1-92 Mech plans one standard FASCAM minefield and brigade holds one minefield. Long-duration FASCAM release held at division. Execute only on east side if enemy successfully crosses FULDA. TF 1-14 Armor has three platoon FPFs. Copperhead priority to TF elements assisting with battle hand-over initially and then to TF 1-14 Armor. Counterfire priorities: indirect fires affecting MBA units, COPs, and second-echelon RAGs. Brigade will plan a 10-minute counterpreparation to be fired as the Threat tries to force the FULDA.

(d) Nuclear Support.

1. Nuclear release authority is retained at corps. 23d Armd Div nuclear subpackage A is in effect for planning.

2. PNL:

0.2 KT	1.0 KT
4	4

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

OPORD COSMIC--2d Bde, 23d Armd Div

(e) Fire Support Coordinating Instructions.

1. PL DICK is on-order corps FSCL. For planning purposes PL SABER is intended brigade CFL (TBP after complete battle hand-over along FULDA River). Division FFA in effect throughout operation vic ULRICHSTEIN (see OPLAN 6).

2. Attack Guidance Matrix.

CATEGORY	HP NUMBER	WHEN	HOW	RESTRICTIONS
1 (C^3)	25, 26	I	N/EW	COORDINATE ATTACK WITH S2
2 (FS)	1-8, 18-21	A	N	
3 (MAN)	43, 45, 50	A	N	
4 (ADA)	57, 61	A	N/S	CONSULT FSE
5 (ENG)	70, 71	I	N	
6 (RSTA)	86	A	N	
7 (REC)	16, 105	I	N	TLE <250
8 (N/CH)	81, 82, 19	A	N	CONSULT TTC/FSE
9 (POL)	115	A	D	
10 (AMMO)	119	P	D	TLE <300
11 (MANT)	126	P	N	NOT HPT
12 (LIFT)		P	N	
13 (LOC)		P	S	

3. Fire Support Execution Matrix. Refer to Annex C.

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

OPORD COSMIC --2d Bde, 23d Armd Div

(2) Engineer Support. Refer to Annex D (Engineer Matrix).

(3) Military Police. Priority of effort to battlefield circulation control, with priority to MSRs in TF 1-14 Armor sector and area security in BSA.

d. Coordinating Instructions.

(1) High-Payoff Target List

Priority	Category	Sheet Number	Description
1.	5 ENG	70, 71	Movement Support Det, ERP
2.	1 C^3	25, 26, 30, 31	MRR/MRD Forward and Main CP
3.	7 REC	16, 105	Radar Intercept, UHF/VHF Jamming Site
4.	2 FS	1-8, 18-21	FDCSs COPS, 122 mm, 152 mm 82 mm
5.	8 N/CH	19, 81, 82	MRLs , 203-mm H, 240-mm M
6.	3 MAN	43, 45, 50	Advance Guard, March Column
7.	4 ADA	57, 61, 62	SA-6 , SA-9, ZSU-23 4 Platoons
8.	6 RSTA	86	Div Recon Patrol

(2) PIR.

(a) When and where will the 4th MRD commit its TR?

(b) Employment of chemical or nuclear weapons?

(c) Helicopter overflights?

(d) Any Threat bridging attempts across the FULDA?

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

OPORD COSMIC--2d Bale, 23d Armd Div

(3) On order, 2d Bde sector extends to PL DICK.

(4) Maintain radio silence until battle hand-over.

(5) Antiterrorism Actions. All rear base entrances will be barricaded to reduce traffic speed to a maximum of 10 kmph. Report any attack to the 2d FSB CP.

4. SERVICE SUPPORT

a. General. Concept of Logistic Support. Before the outbreak of hostilities, priority of effort will be to barrier haul. At the initiation of hostilities, priority shifts to movement and forward positioning of Class V and Class III. Priority on MSRs to TF 1-14 Armor, TF 1-92 Mech, 1-51 FA, and 2-636 FA; then to 1-12 Armor when committed.

b. Materiel and Services.

(1) supply.

(a) Class I. A 2-day supply available at the forward supply section.

(b) Class II. A l-day supply available of the DSA.

(c) Class IV. Barrier materials are command regulated. Priority to TF 1-14 Armor.

(d) Class V.

1. CSR:

	D-Day	S-Day
GM, TOW	5	4
155 mm (DPICM)	204	90
155 mm (ICM)	15	30
155 mm (ILLUM)	10	17

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

OPORD COSMIC--2d Bale, 23d Armd Div

155 mm (RAP)	25	10
155 mm (HE)	10	15
155 mm (WP)	10	10
155 mm (SMOKE)	10	15
155 mm (CPHD)	10	15
155 mm (ADAM)	2	7
155 mm (RAAMS)	7	8
120 mm (APFSDS)	35	26
25 mm (APDS)	120	120

2. Distribution locations:

ATP: BSA (MA270280)
ASP 997 (MB770101)
ASP 999 (MA800935)
SASP: BOMBACH (MA530746)

(e) Class VII.

1. All tracked and wheeled vehicles, 2 1/2-ton truck and larger, are command regulated.

2. Critical shortage of 5-ton tractors.

(f) Class IX Shortages.

1. Engine M1500 and transmission X1100.

2. Engine HEMTT.

3. Transmission M2/M3.

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

OPORD COSMIC--2d Bde, 23d Armd Div

(2) Transportation. SOP.

(3) Services. Priority to main effort.

c. Medical Evacuation and Hospitalization. SOP.

d. Personnel. SOP.

e. Civil-Military Cooperation. SOP.

5. COMMAND AND SIGNAL

a. Command.

(1) Tactical CP at NB377284. Future location at NB312268.

(2) Main CP at NB283302. Future location at NB158283.

(3) Rear CP at NB243223. Future location at NBO04203.

(4) Alternate CP is 1-12 Armor CP.

b. Signal. SOI Index. 103-23.

Acknowledge.

WEIMAN
COL

OFFICIAL:
MULDOWNEY
S3

Annexes: A--Situation Sketches
B--Operation Overlay (TBP)
C--Fire Support Execution Matrix
D--Engineer Matrix
E--Brigade Target List
F--FA Support Plan

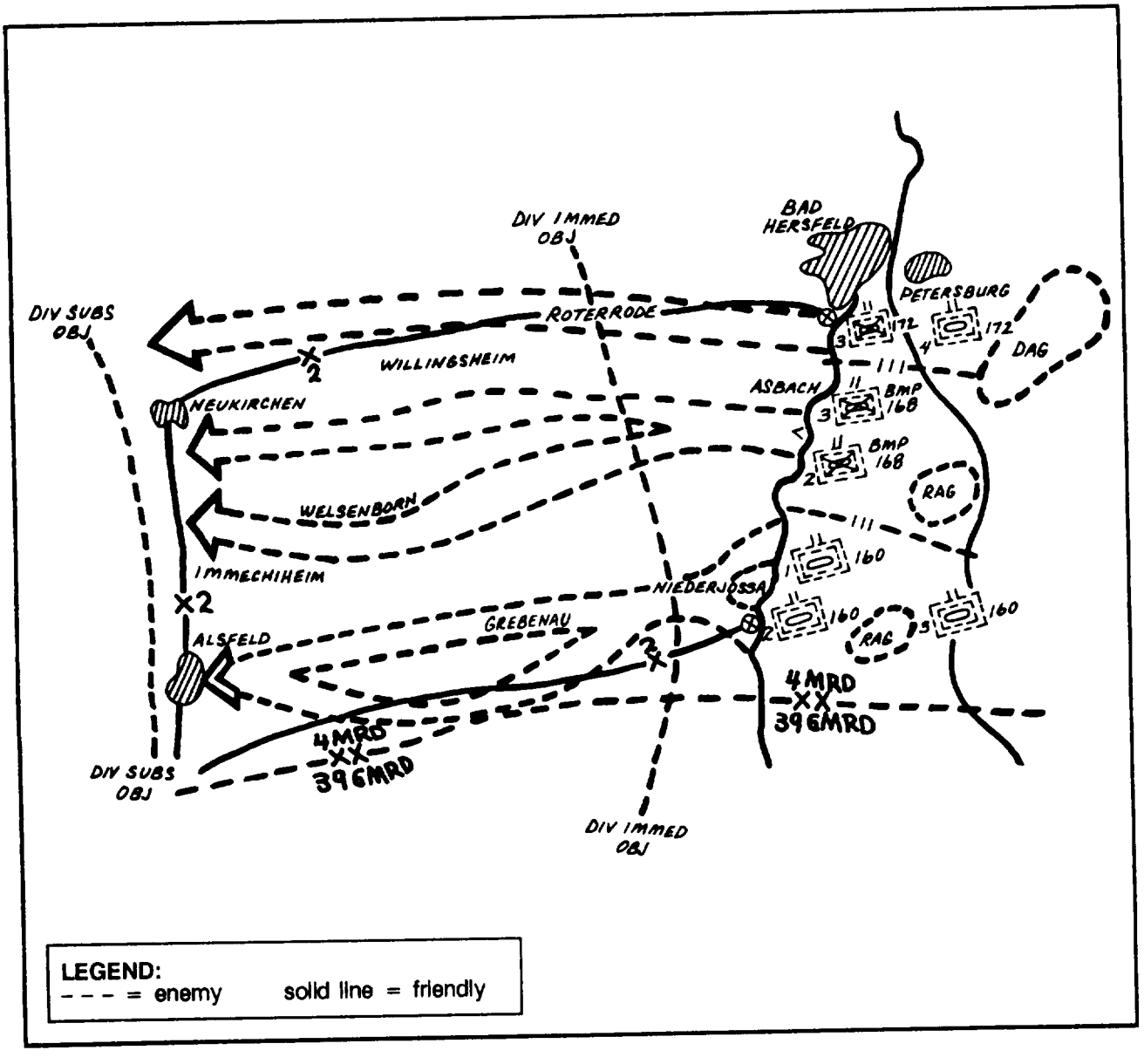
Distribution:

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

APPENDIX 1 (THREAT SKETCH) TO ANNEX A (SKETCHES) TO OPORD COSMIC--2d Bde, 23d Armd Div

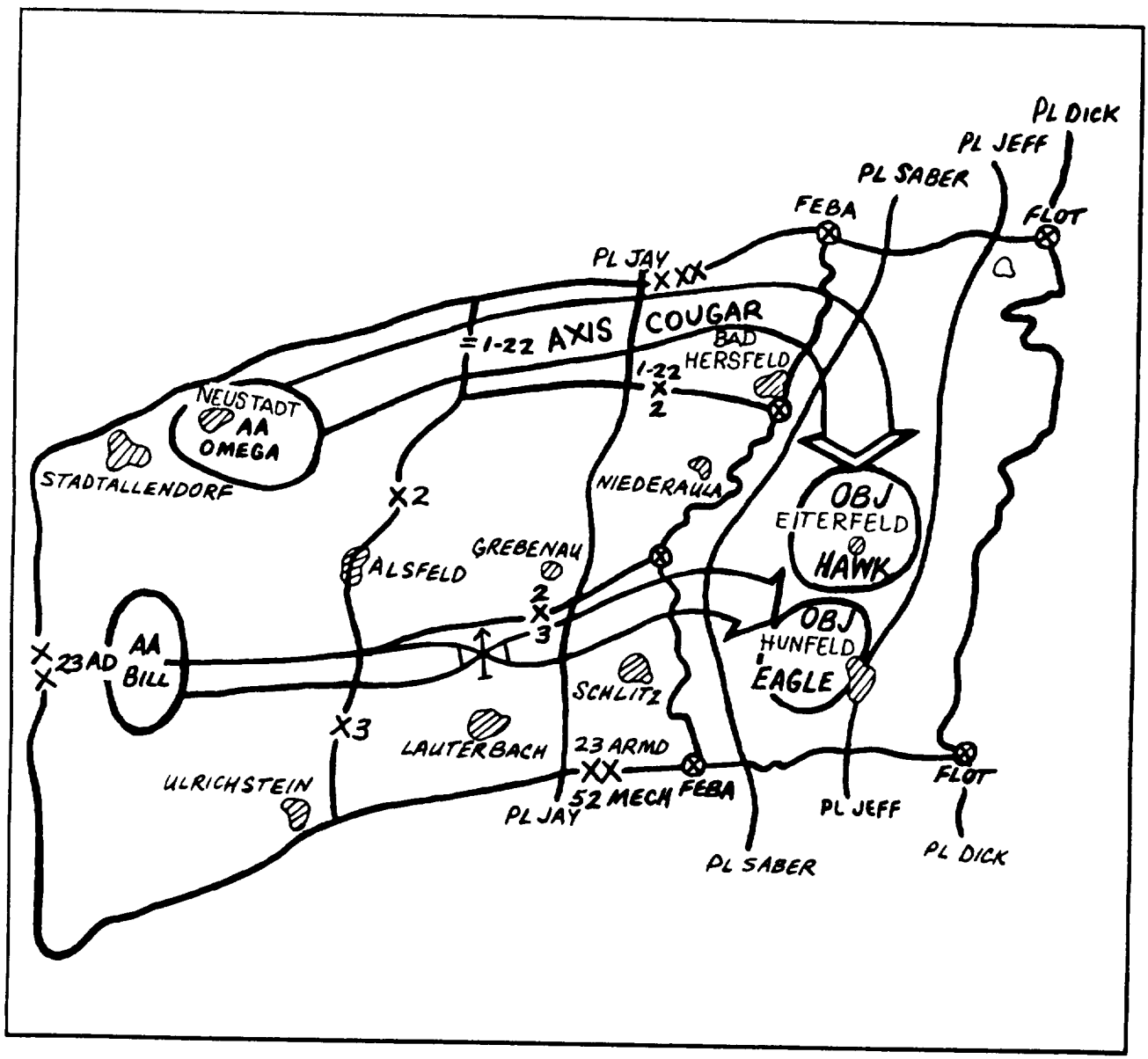


(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification

APPENDIX 2 (FRIENDLY SKETCH--23d ARMD DIV TO ANNEX A (SKETCHES) TO OPORD COSMIC--2d Bale, 23d Armd Div

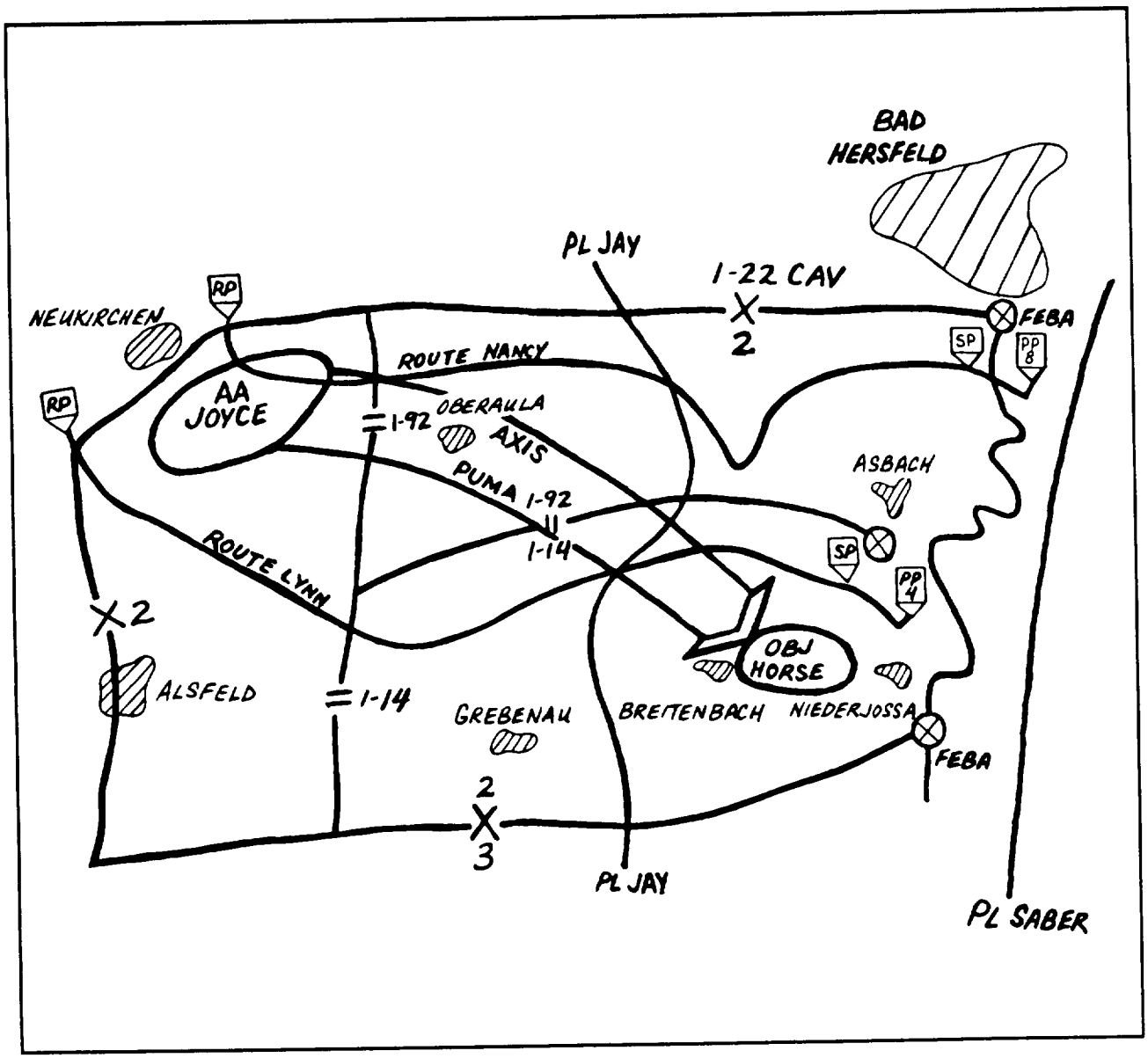


(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

APPENDIX 3 (FRIENDLY SKETCH -- 2d BDE) TO ANNEX A (SKETCHES) TO PORD COSMIC--2d Bale, 23d Armd Div



(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

ANNEX C (FIRE SUPPORT EXECUTION MATRIX) TO OPORD COSMIC--2d Bale, 23d Armd Div

	PL SABER TO FEBA	FEBA TO PL JAY	COUNTERATTACK
1-12 ARMOR			PRIORITY FA COLT/CPHD FA SERIES GP 3, 6, 9
TF 1-14	PRIORITY FA COLT COPPERHEAD PRIORITY 2 FA PRIORITY TGTS GP 1, 2, 3	PRIORITY FA COLT/CPHD 3 FA PRI TGTS/FPF 2 STD FASCAM 2 CAS GP 6, 7, 8, 9 ACA RED	GP 2, 7, 8
TF 1-92	O/O PRIORITY FA 2 FA PRIORITY TGTS GP 4, 5	1 FA PRIORITY TGT/FPF 1 STD FASCAM	GP 4, 5
2D BDE CONTROL	COUNTER PREP * * * * * * * * *	1 STD FASCAM 4 CAS SORTIES * *	* * * * * * *

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

ANNEX D (ENQINEER MATRIX) TO OPORD COSMIC--2d Bale, 23d Armd Div

DAY	UNIT	MISSION	WHERE	ENG UNIT	HOW
1	TF 1-14 ARMOR	CM	FEBA TO PL SABER	2/B/23	DS
				1/B/23	DS
	TF 1-92 MECH	CM	FEBA TO PL SABER	3/B/23	DS
2	TF 1-14 ARMOR	CM	FEBA TO PL SABER	2/B/23	DS
				1/B/23	DS
	TF 1-92 MECH	CM	FEBA TO PL SABER	3/B/23	DS
3	TF 1-14 ARMOR	CM	PL JAY TO FEBA	2/B/23	DS
				1/B/23	DS
	TF 1-92 MECH	CM	PL JAY TO FEBA	3/B/23	DS
4	TF 1-14 ARMOR	S	MBA	1/B/23	DS
	TF 1-92 MECH	S	MBA	3/B/23	DS
	1-51 FA	S	MBA	2/B/23	DS
5	1-12 ARMOR	M	MBA	2/B/23	ATTACH
	TF 1-14 ARMOR	S	MBA	1/B/23	DS
	TF 1-92 MECH	S	MBA	3/B/23	DS
6+	1-12 ARMOR	M	MBA	2/B/23	ATTACH
	TF 1-14 ARMOR	CM	PL JAY TO REAR	1/B/23	DS
	TF 1-92 MECH	CM	PL JAY TO REAR	3/B/23	DS

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

ANNEX E (TARGET LIST) TO OPORD COSMIC--2d Bale, 23d Armd Div

Reference: Map , USACGSC 50-264, BAD HERSFELD-ALSFELD, edition 1977, 1;50,000.

LINE NUMBER	TARGET NUMBER	DESCRIPTION	LOCATION
1	AC0001	ROAD INTERSECTION	490209
2	AC0002	SUSPECTED COP	494226
3	AC0003	ROAD INTERSECTION	483236
4	AC0004	CHOKE POINT	499245
5	AC0005	SUSPECTED COP	470248
6	AC0006	ROAD INTERSECTION	475260
7	AC0007	ROAD INTERSECTION	501276
8	AC0008	BRIDGE	513308
9	AC0009	ROAD INTERSECTION	552353
10	AC0010	ROAD INTERSECTION	508340
11	AC0010	ROAD INTERSECTION	569344
12	AC0012	ROAD INTERSECTION	529343
13	AC0013	CHOKE POINT	530284
14	AC0014	SUSPECTED COP	472284
15	AC0015	SUSPECTED COP	520328
16	AC0016	BRIDGE	506319
17	AC0017 (a)	CHOKE POINT	426241
18	AC0018 (a)	ROAD	425236
19	AC0019 (b)	ROAD INTERSECTION	418242
20	AC0020 (b)	BRIDGE	419248
21	AC0021 (c)	BRIDGE	433276
22	AC0022 (c)	ROAD	434269
23	AC0023 (d)	BRIDGE	461294
24	AC0024 (d)	POSSIBLE BRIDGE SITE	460297
25	AC0025 (e)	BRIDGE	476315
26	AC0026 (e)	ROAD INTERSECTION	473316
27	AC0027	ROAD INTERSECTION	494339
28	AC0028 (b)	BRIDGE	415247
29	AC0029	CHOKE POINT	450334
30	AC0030	ROAD	460322
31	AC0031	ROAD	456308
32	AC0032 (f)	ROAD INTERSECTION	421285
33	AC0033 (f)	ROAD INTERSECTION	420281
34	AC0034 (g)	ROAD	410244

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

ANNEX E (TARGET LIST) TO OPORD COSMIC--2d Bale, 23d Armd Div

35	AC0035 (g)	ROAD INTERSECTION	408252
36	AC0036 (h)	ROAD INTERSECTION	389248
37	AC0037 (h)	ROAD INTERSECTION	388253
38	AC0038 (i)	ROAD INTERSECTION	404302
39	AC0039 (i)	ROAD INTERSECTION	408303
40	AC0040	ROAD INTERSECTION	412324
41	AC0041	CHOKE POINT	426350

* * * * * * *

REMARKS:

(a) Group A1C

(b) Group A2C

(c) Group A3C

(d) Group A4C

(e) Group A5C

(f) Group A6C

(g) Group A7C

(h) Group A8C

(i) Group A9C

Enter all roads, road intersections, and choke points into TACFIRE as possible armored vehicles.

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

Copy No ____ of _____ copies
1st Bn, 51st FA
RIMBERG (NB326276) GER
040115Z July _____

ANNEX F (FA SUPPORT PLAN) TO OPORD COSMIC--2d Bale, 23d Armd Div

Reference: Map, USACGSC 50-264, BAD HERSFELD-ALSFELD, edition 1977, 1:50,000.

Time Zone Used Throughout the Plan: ZULU

1. SITUATION

a. Enemy Forces. We expect to face all calibers of Threat FA in our sector. At least three MRL battalions will also fire into our zone. The TA threat consists of counterbattery radars and direction-finding and sound and flash ranging units. We can expect 100 to 300 air sorties to be flown against us by both fixed- and rotary-wing aircraft. If we can survive the indirect fire and air threats, then we can worry about the ground threat later .

b. Friendly Forces. 23d Armd Div defends in sector. See OPLAN 6 and OPORD COSMIC.

c. Attachments .

See 2 (AN/TPQ-36) , Btry A (TA) , 23d FA: Att 1-51 FA

See 6 (AN/TPS-25A), Btry A (TA), 23d FA: Att 1-51 FA

Secs 1 and 2 AFSOs, 23d FA: OPCON 1-51 FA

2. MISSION

1-51 FA supports 2d Bde defense. Brigade will plan a 10-minute counterpreparation to be fired as the Threat attempts to force the FULDA.

3. EXECUTION

a. General. We have to transition from a grudging defensive struggle to a bold and aggressive counterattack. The 2d Bde commander, wants at least 40 percent of our ammo held back for the

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

ANNEX F (FA SUPPORT PLAN) TO OPORD COSMIC--2d Bale, 23d Armd Div

counterattack . Priority of fires to TF 1-14 Armor, on order 1-12 Armor . TF 1-14 Armor plans two 400-meter by 400-meter standard FA-delivered FASCAM minefield. TF 1-92 Mech plans one standard FASCAM minefield and brigade holds one minefield. Long-duration FASCAM release held at division. Execute only if enemy successfully crosses FULDA in strength. TF 1-14 Armor has three platoon FPFs and two priority targets. Copperhead priority to battalion scouts initially and then to TF 1-14 Armor. Counterfire priorities: indirect fires affecting MBA units, COPs, and *RAGs.*

b. Organization for Combat.

1-51 FA (155, SP): DS 2d Bde

2-636 FA (155, SP): (GSR 1-51 FA

c. Positioning. The battalion will displace by battery from forward supplementary positions. All batteries must be in position to support the battle hand-over, assisting the covering force in its disengagement. We expect a massive Threat artillery prep and 50 to 100 air sorties against us long before we see the ground attack. I want batteries to occupy positions that have maximum protection from indirect and air-to-ground fires. See Appendix 1 (FA Support Matrix).

d. Nuclear Fire Support.

(1) Nuclear release authority is retained at corps. 23d Armd Div nuclear subpackage A is in effect for planning.

(2) PNL :

$$\frac{0.2\ KT}{4} \quad \frac{1.0\ KT}{4}$$

e. Coordinating Instructions.

(1) Target Acquisition. See Appendix 2.

(2) Meteorology . Computer met sent by 23d Div Arty every 2 hours or when conditions dictate.

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

ANNEX F (FA SUPPORT PLAN) TO OPORD COSMIC--2d Bale, 23d Armd Div

(3) Target List. See brigade Annex F.

(4) Schedules. Appendix 3.

(5) Survey .

(a) RSO coordinate survey with 2-636 FA.

(b) Survey priorities: Cannons, radars, and OPs/COLTS. See Appendix 1, FA Support Matrix.

(6) Ammo Restrictions. FASCAM must be approved by brigade commander. Illumination and HC smoke will be approved by TF commanders.

4. SERVICE SUPPORT

a. ATP: BSA (MA270280)
ASP 997 (MB770101)
ASP 999 (MA800935)
SASP: BOMBACH (MA530746)

b. CSR:

		D-DAY	S-DAY
M483A1	DPICM	204	190
M485	ILLUM	10	10
M449	ICM	15	15
M549A1	RAP	25	20
M107	HE	10	10
M110	WP	10	10
M116A1	HC SMOKE	10	10
M712	COPPERHEAD	12	10
M731	ADAM	2	2
M741	RAAMS	7	7
M4A2	WHITE BAG	210	190
M3A1	GREEN BAG	140	120
M119	CHARGE 8	25	20
M557	PD	25	25
M78	CP	10	10
M577	TI	140	130
M564	TX	30	30
M565	T1	40	40
M728	VT	40	40
M732	VT	30	30

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

ANNEX F (FA SUPPORT PLAN) TO OPORD COSMIC--2d Bale, 23d Armd Div

5. COMMAND AND SIGNAL

a. Command.

(1) 2d Bde tactical CP at 377284, future location at 312268.

(2) 2d Bde main CP at 283302, future at 158283.

(3) 1-51 FA CP vic grid 3728.

(4) Div arty CP vic grid 2020.

b. Signal . Current SOI.

LANCE
LTC

OFFICIAL
/S/HANSEN
S3

APPENDIXES: l--FA Support Matrix
2--Target Acquisition
3--Schedules

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

APPENDIX 1 (FA SUPPORT MATRIX) TO ANNEX F (FA SUPPORT PLAN) TO OPORD COSMIC--2d Bale, 23d Armd Div

	PL SABER TO FEBA		FEBA TO PL JAY		COUNTERATTACK
A/1-51	OCCUPY POS 10 AOF 1400	RECON POS 11	OCCUPY POS 11 AOF 1400		RECON POS 12
B/1-51	OCCUPY POS 20 AOF 1600	RECON POS 21	OCCUPY POS 21 AOF 1600		RECON POS 22
C/1-51	OCCUPY POS 30 AOF 1600	RECON POS 31	OCCUPY POS 31 AOF 1600		RECON POS 32
BN CP	OCCUPY POS 40 RECON POS 41	DISPLACE JUMP CP POS 41	MAIN CP OCCUPY POS 41 RECON POS 42	DISPLACE JUMP CP POS 42	RECON POS 43
COLT 1	OCCUPY POS C1	ZONE OF OBS AZ 1100-2400	OCCUPY POS C2	ZONE OF OBS AZ 0200-1000	OCCUPY POS C1
COLT 2	OCCUPY POS C4	ZONE OF OBS AZ 0900-2700	OCCUPY POS C5	ZONE OF OBS AZ 0800-2600	OCCUPY POS C4
RADAR SEC 2 Q-36	OCCUPY POS R1	SEARCH SECTOR AZ 2200	OCCUPY POS R2	SEARCH SECTOR AZ 1800	
RADAR SEC 6 TPS-25	OCCUPY POS R3	SEARCH SECTOR AZ 2400	OCCUPY POS R4	SEARCH SECTOR AZ 1700	

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

APPENDIX 2 (TARGET ACQUISITION) TO ANNEX F (FA SUPPORT PLAN) TO OPORD COSMIC--2d Bale, 23d Armd Div

References : Map, series M745, EUROPE, sheet 1 (LAUTERBACH - STADTALLENDORF) , edition 1979, 1:50.000.
Map, series M745, EUROPE, sheet 1 (BERKA - FULDA) , edition 1979, 1:50,000.

Time Zone Used Throughout Plan: Zulu

1. PROCESSING. All counterfire targets will be sent to 1-51 FA CP and then to div arty.

2. VISUAL OBSERVATION

a. Ground Observation. COLT: Copperhead priority to AVLBs and enemy bridging assets before deployment.

(1) Located 50102950, zone of obs az 1100 to 2400 mils.

(2) Located 48302070, zone of obs az 0900 to 2700 mils.

FSO 1-92 Mech provides OPs at 463346 and 449302.

b. Aerial Observation. Sections 1 and 2 AFSOs OPCON to 1-51 FA.

(1) Section 1 OPCON to TF 1-14 Armor, report to TF FSO.

[2) Section 2 GS, report to 1-51 FA S2. Observation priorities: bridging assets, movement support detachment, and MRLs.

3. RADAR

a. AN/TPS-25A, Section 6, Btry A (TA), 23d FA: Attached to 1-51 FA. Priority of observation to TF 1-14 Armor, initial location vic 4027, azimuth 2,400 mils.

b. AN/TPQ-36, Section 2, Btry A (TA) , 23d FA: Attached to 1-51 FA. Receive RDO from battalion S2. Initial position vic 4030, azimuth 2,200 mils. TF 1-14 Armor will provide initial security.

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

APPENDIX 2 (TARGET ACQUISITION) TO ANNEX F (FA SUPPORT PLAN) TO OPORD COSMIC--2d Bale, 23d Armd Div

4. COORDINATION

a. Brigade critical friendly zones are: TF 1-14 Armor CP; TF 1-92 Mech CP; brigade tactical CP; 1-51 FA CP; 2-636 FA CP; and Btry A, B, and C, 1-51 FA.

b. Cueing Instructions. Q-36 radiates 0/0 of the battalion S2. Other acquisition assets (FIST, OPs, COLTS, FSOs) request radar coverage through the DS battalion CF.

c. All observers submit visibility diagrams to the DS battalion S2.

TABS :

A--COLTS Capability Overlay (omitted)
B--Radar Deployment Order TPS-25 (omitted)
C--Radar Deployment Order TPQ-36 (omitted)

(Classification)

(Classification)

APPENDIX 3 (SCHEDULES) TO ANNEX F (FA SUPPORT PLAN) TO OPORD COSMIC--2d Bde, 23d Armd Div

Reference: Map, series M745, EUROPE, sheet 1 (LAUTERBACH - STADTALLENDORF), edition 1979, 1:50,000.

LINE NUMBER	FIRING UNIT	TARGET NUMBER	ROUNDS
Group A1C			
17	B/1-51	AC0017	24
18	A/1-51	AC0018	24
Group A2C			
19	A/1-51	AC0019	32
20	B/1-51	AC0020	32
28	C/1-51	AC0028	32

(Classification)

EXAMPLE OPERATION ORDER (CONTINUED)

(Classification)

APPENDIX 3 (SCHEDULES) TO ANNEX F (FA SUPPORT PLAN) TO OPORD COSMIC--2d Bale, 23d Armd Div

LINE NUMBER	FIRING UNIT	TARGET NUMBER	ROUNDS
Group A3C			
21	B/1-51	AC0021	24
22	A/1-51	AC0022	24
Group A4C			
23	B/1-51	AC0023	24
24	C/1-51	AC0024	24
Group A5C			
25	B/1-51	AC0025	32
26	C/1-51	AC0026	32
Group A6C			
32	C/1-51	AC0032	24
33	B/1-51	AC0033	24
Group A7C			
34	B/1-51	AC0034	24
35	A/1-51	AC0035	24
Group A8C			
36	A/1-51	AC0036	24
37	B/1-51	AC0037	24
Group A9C			
38	B/1-51	AC0038	32
39	C/1-51	ACO039	32

* * * * * *

Remarks:

Fire DPICM on all groups.

(Classification)

APPENDIX D

FIRE PLANNING TERMS, SYMBOLS, SCHEDULES, AND TOOLS

This appendix implements portions of STANAG 2031, Edition 5, and QSTAG 515, Edition 1.

Target Terms

The term target is the most fundamental term used in fire support planning. A target is personnel, materiel, or a piece of terrain that is designated and numbered for future reference and/or attack.

Target of Opportunity

A target of opportunity is a target that appears during combat and against which no attack has been prearranged.

Planned Target

A planned target is a target upon which fires are prearranged. The degree of prearrangement varies, but some prior coordination or action has been done to facilitate its engagement. Planned targets may be further subdivided into scheduled, on-call, and priority targets.

Scheduled Target. A scheduled target is a planned target that will be attacked at a specific time. This time may be related to an H-hour or to another time reference.

On-Call Target. An on-call target is a planned target which has not been scheduled for attack at a specific time but which may be attacked when requested. The on-call target requires less reaction time than a target of opportunity.

Priority Target. A priority target is a target the attack of which. when requested, takes priority over all other requests. Priority targets are designated by the maneuver commander. He also gives specific guidance as to when the targets will become priority, the munitions to use, the accuracy required, and the desired effects. When not engaged in fire missions, firing units lay on priority targets. FSOs should note that they can get as many as three priority targets from a six-gun battery or four priority targets from an eight-gun battery. Two priority targets may be assigned to an 81-mm mortar platoon – one per section.

Final Protective Fires. Final protective fires are a special set of priority targets. They are designed to create a final *barrier of steel* that keeps the enemy from moving across defensive lines. Final protective fires are desperation fires.

Target Numbering System

This paragraph implements STANAG 2147, Edition 4, and QSTAG 221, Edition 2.

To designate nonnuclear targets for fire support operations, the Army adheres to the provisions of STANAG 2147 and QSTAG 221. Target designators consist of two letters followed by four numerals; for example, CB3002. This numbering system is used for each corps-size force.

Normally, nuclear targets are not assigned a special block of target numbers. A target

should be assigned a number when it is received at a fire planning agency. If a target is selected for attack, the most appropriate means (nuclear, chemical, or conventional), as determined by target analysis, will be used to attack the target. That analysis is guided by the commander's attack guidance and other factors such as nature of the target and munitions available.

The first letter of the two-letter group designates a particular nation or a corps associated with a particular nation.

NATIONAL IDENTIFYING LETTERS

NATION	LETTER
Australia	V
Belgium	B
Canada	C, *Z*
Denmark	D
France	F
Germany	G
Greece	E
Italy	R
Luxemburg	L
Netherlands	H
Norway	N
Portugal	P
Spain	*S*
Turkey	T
United Kingdom	U, X
United States	A, K, Y, W
AMF (L)	M

LEGEND:
AMF (L) = ACE (Allied Command Europe) Mobile Force (Land)

NOTE: The letters O and I are not used.

Each Army headquarters allocates a first letter to its corps. A corps may be assigned more than one letter. Letters assigned to each nation may be reused as long as adjacent corps of that nation do not share the same letter.

The second letter is assigned by corps down to brigade level. Also, second-letter designators are made for corps artillery CPs, corps FS cells, div arty CPs, and division FS cells.

EXAMPLE LETTER DESIGNATORS FOR 12TH (US) CORPS WITH 54TH MECH DIV AND 16TH ARMD DIV

ORGANIZATION	LETTER DESIGNATOR
12th (US) Corps	A
12th (US) Corps Artillery CP	AX
12th (US) Corps FS Cell	AY
54th Mech Div FS Cell	AA
54th Mech Div Arty CP	AB
1st Bde, 54th Mech Div	AC
2d Bde, 54th Mech Div	AD
3d Bde, 54th Mech Div	AE
4th Bde, 54th Mech Div	AF
16th Armd Div FS Cell	AG
16th Armd Div Arty CP	AH
1st Bde, 16th Armd Div	AJ
2d Bde, 16th Armd Div	AK
3d Bde, 16th Armd Div	AL
4th Bde, 16th Armd Div	AM

Blocks of numbers are assigned by those headquarters having two assigned letters. Field artillery CPs assign blocks from 0001 through 7000 as needed.

ASSIGNMENT OF BLOCKS OF NUMBERS

NUMBER	ASSIGNED TO
0001-1999	FS cell
2000-2999	FSO, lowest numbered maneuver battalion or squadron[1]
3000-3999	FSO, second lowest numbered maneuver battalion or squadron
4000-4999	FSO, third lowest numbered maneuver battalion or squadron
5000-6999	Additional FSOs
7000-7999	FDC, direct support artillery
80000-8999	Counterfire targets
9000-9999	Toxic chemical targets

[1]Lowest regimental number.

A battalion- or squadron-size element with a block of numbers may suballocate numbers as shown below.

SUBASSIGNMENT OF BLOCKS OF NUMBERS

NUMBERS	ASSIGNED TO
000-199	FSO
200-299	FIST, Co A
300-399	FIST, Co B
400-499	FIST, Cc C
500-699	Additional FISTs and/or COLTs
700-799	Battalion mortar platoon, squadron, or howitzer battery
800-999	As required.

NOTE: If additional numbers are needed, company FSOs get them from the battalion FSO. The target numbering system in effect within your unit should be a part of the unit SOP, when possible. For contingency units, the system is OPORD-dependent.

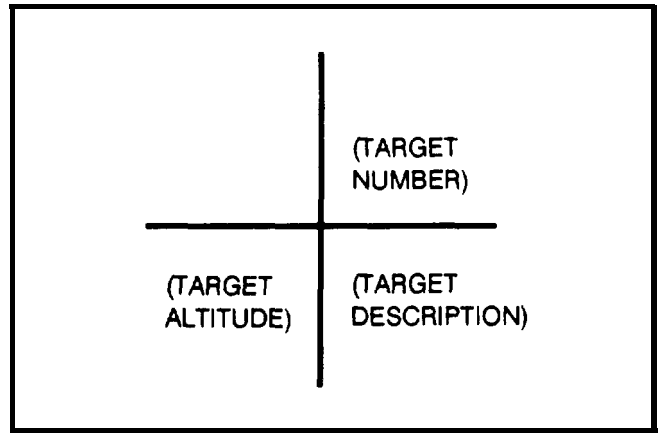
Target Symbols

Standard symbols are used in the preparation of maps, charts, and overlays to identify targets by type.

Point Target

A point target is a target that is less than 200 meters wide. The symbol with relevant information is as shown below.

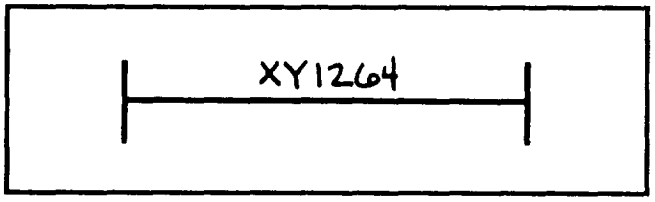
POINT TARGET SYMBOL



Linear Target

A linear target is more than 200 meters but less than 600 meters long. Targets longer than 600 meters require fire support assets other than field artillery or must be further subdivided into multiple targets for attack by field artillery. A linear target is designated on the target list by two grids or a center grid, length, and attitude.

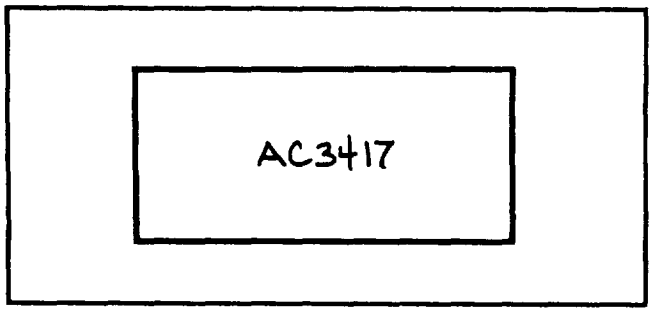
LINEAR TARGET SYMBOL



Rectangular Target

A rectangular target is wider and longer than 200 meters. It is designated on the target list by four grids or by a center grid, length, width, and attitude.

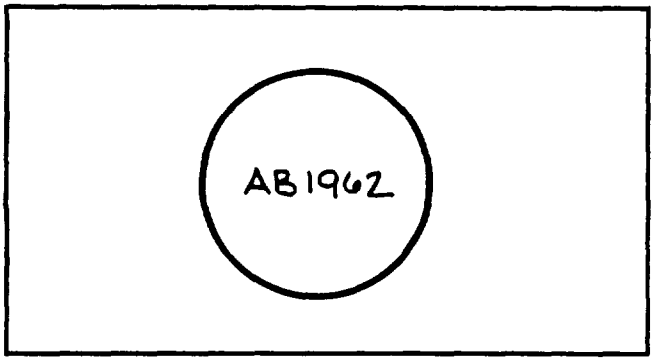
RECTANGULAR TARGET SYMBOL



Circular Target

A circular target is circular in nature or its exact shape is vague. On the target list, it is designated by a center grid and a radius.

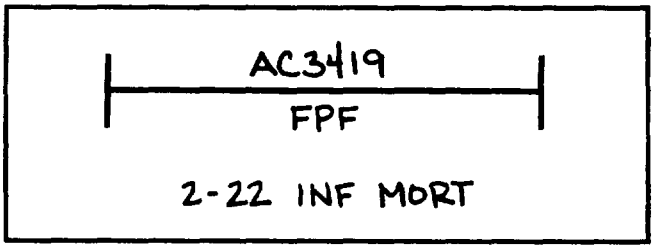
CIRCULAR TARGET SYMBOL



Final Protective Fire

An FPF is a type of priority fire which is similar to a linear target. The symbol used includes the target number, the designation of FPF, and the system and/or unit to deliver the fires.

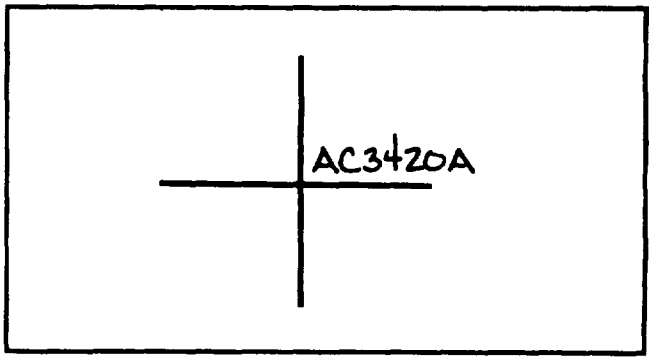
FINAL PROTECTIVE FIRE SYMBOL



Target Reference Point

Maneuver elements use an easily identifiable target reference point to orient direct fire weapon systems. This is one of our direct interfaces into the direct fire system. All TRPs should be dually identified in terms of the direct fire system and the target numbering system. The symbol is the same as that for a standard target with a target number and a TRP letter. Each TRP should be plotted on the map and identified as a target. Maneuver will call for it to be fired. TRPs are included on the target list and are identified in the remarks section as TRPs.

TARGET REFERENCE POINT SYMBOL



Target List Work Sheet

The target list work sheet is a form that facilitates fire planning by the fire support coordinator. It is a preliminary listing of all targets and their descriptions from which the FSO can select and plan. (See Appendix L.)

Preparation of the Target List Work Sheet

The procedure for preparing DA Form 4655-R is outlined below.

Line Number

This is an administrative control measure for internal use. Assign each target a line number.

Target Number

Assign each target a target number from the block of numbers given to the planning source.

Description

Enter a concise target description that is adequate for a decision on how the target should be attacked.

Location

Enter grid coordinates for point, rectangular, and circular targets. For linear targets, enter the coordinates of the center point.

Altitude

Show the altitude of the target in meters, unless otherwise specified.

Attitude

Enter the attitude of linear and rectangular targets in grid azimuths.

Size (Length and Width)

Enter no dimensions for a point target, one dimension (length) for a linear target, two dimensions (length and width) for a rectangular target, or the radius of a circular target (width).

Source and/or Accuracy

The information this column aids in determining how to attack the target. When known, enter the source and accuracy of the target data.

TARGET LIST WORK SHEET

( ) TARGET LIST WORK SHEET

For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC.

SHEET 1 OF 1

LINE NO	TARGET NO	DESCRIPTION	LOCATION	ALTITUDE	ATTITUDE	SIZE		SOURCE / ACCURACY	REMARKS
						LENGTH	WIDTH		
1	AA 3411	82-mm MORTAR POSITION (4 TUBES)	923435						
2	AA 3412	MECH INF IN TRENCH LINE	918560		1600	400	50		
3	AA 3413	AIRCRAFT LANDING STRIP	920450		4800	1200	200		
4	AA 3414	SUSP REGT CP	947343			(RADIUS 800 m)			
5	AA 3415	FPF	875689	340	1650	200			ADJ W/+2 DELAY
6	AA 3416	ROAD JUNCTION	885670						TRP A3
7									
8									

Remarks

Enter any special consideration(s) for attack of the target. The target description may be amplified here.

Work Columns

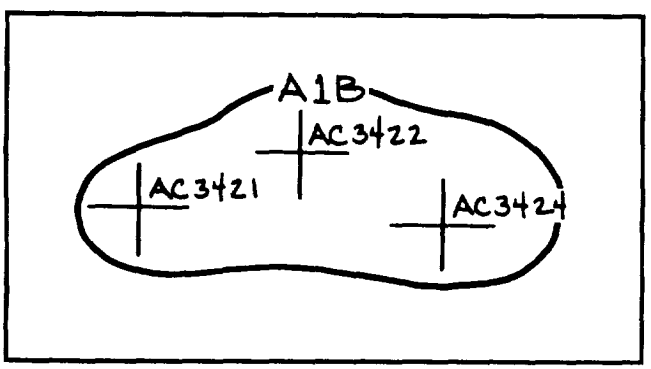
These columns are used to indicate targets that are to be inclided in a particular fire support schedule. Enter one diagonal line (/) under the appropriate column to show the target is to be included in a particular schedule. When the target has been scheduled, enter an opposing diagonal line, forming an X to show the action is complete.

Types of Planned Fires

Group of Targets

A group of targets consists of two or more targets on which the maneuver commander desires simultaneous attack. It is graphically portrayed by circling the targets and identifying them with a group designator. This designator consists of the two letters assigned to the maneuver brigade with a number between the letters. The numbers should be assigned sequentially as they are used. The number of FA firing batteries and/or battalions available must be considered in planning groups of targets. Inclusion of individual targets in a group does not preclude them from being attacked individually.

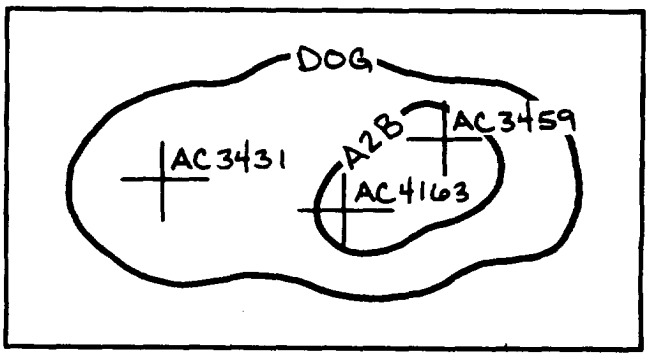
GROUP OF TARGETS



Series of Targets

A series of targets is a number of targets and/or groups of targets planned to be fired in a predetermined time sequence to support a maneuver operation. A series may also be fired on call, at a specified time, or when a certain event occurs. The maneuver commander determines the need for a series on the advice of his FSO. The series is indicated by a code name or nickname. Inclusion of individual targets or a group of targets in a series does not preclude targets from being attacked individually.

SERIES OF TARGETS



Program of Targets

A program is the predetermined sequential attack of targets of a similar nature. It may be executed on call, at a specific time, or when a particular event occurs. Targets are designated by their nature and are based on the commander's guidance. For example, in a counterfire program, all the targets are artillery-system-related -OPs, artillery batteries, mortar platoons, CPs. A program is not graphically displayed.

Preparation Fire

Fire delivered on targets preparatory to an assault is called preparation fire. The preparation is planned by a direct support FA battalion or higher echelon. It is an intense volume of fire delivered in accordance with a

time schedule. The fires normally begin before H-hour and may extend beyond it. They may start at a prescribed time or be held on call. The duration of the preparation is influenced by factors such as the fire support needs of the entire force, the number of targets, and the firing assets and ammunition available.

Counterpreparation

A counterpreparation is an intense volume of prearranged fire that is delivered when the threat of enemy attack is discovered.

NOTE: The decision to plan and/or fire a preparation or counterpreparation is made by the maneuver commander with advice from his FSO. These fires, along with the other types of fires discussed, are an Integral part of the overall operation and must be synchronized with other activities.

Scheduling of Fire Support Assets

Once the decisions are made concerning planned targets, the FSO coordinates fire support assets to implement the plan. For example, if mortars and artillery are available assets, the FSO, with input from personnel of those various systems, coordinates which targets and when the mortars will attack. The same is true for the artillery. The various fire support systems retain the responsibility for the more precise scheduling of their integral fire units.

Target Overlay

The target overlay is used to supplement the DA Form 4655-R. The overlay is a graphical representation of the target list work sheet. Symbols used on it should be standard military symbols. Targets are plotted on the overlay by symbols and target numbers. Fire support assets supporting the maneuver unit, as well as all coordinating measures, should be plotted on the overlay. The overlay is used as a tool –

- To resolve duplications of targets.
- To integrate the scheme of maneuver with the plan of supporting fires.
- To determine the most appropriate unit to engage the target.

Scheduling Work Sheet

The FSO finds the commander's guidance and the fire support requirements in the fire support plan. He analyzes this information, plus that on DA Form 4655-R, and determines what schedules of fire must be prepared to support the scheme of maneuver. The FSO then passes these requirements to the DS battalion CP where the necessary DA Forms 4656-R (Scheduling Work Sheets) are prepared. (A reproducible copy of DA Form 4656-R is in Appendix L.) Any of the following schedules may be prepared, depending on the situation:

- Groups.
- Series.
- Programs.
- Preparations.
- Counterpreparations.
- Illumination.
- Harassing.
- Interdiction.
- Smoke.

A separate DA Form 4656-R is prepared for each. It is the fire planner's tool for organizing the targets that appear on the DA Form

4655-R into specific schedules. The DA Form 4656-R provides the following information:

Ž A specific sequence during which the targets scheduled will be engaged.

- Targets requiring more than one volley. These will be scheduled at the sustained rate of fire for the weapon system being used.
- The total expenditure of ammunition by each firing unit on each target.
- The shell-fuze combination for each target if it deviates from the standard of HE-quick.
- Any targets that are to be engaged on call.
- Any special instructions, such as 50 percent VT on OPs.

Ž The fire support assets available.

Unless otherwise indicated in the REMARKS column, all targets will be engaged with HE-quick. For planning purposes, the schedule -- reflects time of impact (TOT) for all targets. Targets that appear on the target list work sheet but do not appear on the scheduling work sheet are on call.

Preparation of the Scheduling Work Sheet

The procedure for preparing a DA Form 4656-R is outlined below.

Heading

Enter the type of schedule, the supported unit, and the OPORD for which it is being prepared.

Line Number

This is an administrative control number. Number each line sequentially. This gives all holders of the schedule a means of quick reference for finding which units have been

scheduled and specific information that relates to those targets.

Organization and Caliber

Enter the organizational information, to include caliber and weapon type, for each unit for which you have planning authority.

Firing Units

Information entered here reflects the size and designation of the firing unit.

Scheduling Targets

To the upper right of the FIRING UNITS column is an untitled portion of the work sheet, referred to as the timing block.

The upper portion of the block is used by the firing units to establish time to fire, or *lanyard pull time,* so that the rounds impact at the scheduled times.

Information on the lower portion of the block is based on time of impact of rounds fired. The purpose of the block is to establish the duration of a particular schedule relative to time. Schedules may start at a specific time (H-hour) or may be scheduled on call (start plotting at time 0).

Below the timing block is a block of intersecting horizontal and vertical lines, called the time matrix. It is used to assign targets to firing units. This assignment is based on the ability of the unit to adequately engage the target as shown by the target overlay. The time matrix graphically portrays time of impact and duration of fires and may refer to a specific shell-fuze combination to be used. This is done by representing the target to be engaged by either a dot (one volley) or a horizontal line (more than one volley). The interval between the vertical lines is based on the weapon system rate of fire and the number of different systems being scheduled on the same work sheet. For example, for a 155-mm howitzer, the normal interval is 60 seconds. Thus, a target being engaged by three 155-mm volleys would have a duration line three vertical lines long with impacts on each of the vertical lines. Another factor that must be considered in scheduling is the shift time of the weapon system being scheduled. Shift time is the length of time needed for the firing unit to cease firing on one target and commence firing on the next scheduled target.

SHIFT TIMES

WEAPON	SUSTAINED RATE OF FIRE	SHIFT TIME
60-mm mortar	15 rd/mln	1 min
81-mm mortar	8 rd/mln	1 min
81-mm mortar (improved)	15 rd/min	1 min
105-mm howitzer	3 rd/min	1 min
155-mm howitzer	1 rd/min	1 min
203-mm howitzer	0.5 rd/min	2 min

LEGEND: min = minute rd/min = rounds per minute

Remarks

The REMARKS column is used to amplify information in the time matrix portion of the work sheet and to include information for the engagement of on-call targets. A parenthetical letter refers to the amplifying information in the REMARKS column. On-call targets are listed on the line of the firing unit assigned to engage them. Any other amplifying information is listed starting under the last firing unit line. No duration lines or dots are used for on-call targets because the duration of fire is not specified. If a unit is ordered to fire its on-call target while it is firing the schedule, it will –

- Leave the schedule.
- Fire its on-call target at the maximum rate of fire.
- Rejoin the schedule at real time.
- Report to its controlling headquarters those scheduled targets that were not engaged and those targets on which commander's effects were not achieved.

It is up to the controlling headquarters to notify the commander and recommend appropriate action to engage these targets.

SAMPLE GROUPS OF FIRES SCHEDULE

(GROUPS FOR 53 MECH DIV OPORD 20)

SCHEDULING WORK SHEET

For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC

SHEET 1 OF 1

LINE NO	ORGANIZATION AND CALIBER	FIRING UNITS	(D1Y)			(D2Y)			REMARKS
1.	3-42 FA	A	AB 24	4074 (a)		AB 48	4108 (a)		
2.	(155, SP)	B	AB 32	4083 (a)		AA 48	3251 (a)		
3.		C	AZ 32	4123 (a)					(a) 50% VT

SAMPLE SERIES SCHEDULE

(SERIES PAUL FOR 53 MECH DIV)
OPORD 20

SCHEDULING WORK SHEET

For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC

SHEET 1 OF 1

LINE NO	ORGANIZATION AND CALIBER	FIRING UNITS	0 1 2 3 4 5 6	REMARKS
1	3-42 FA	A	AA 3251 AA 3246 24 (a) B (b)	AA 3260 16 (b)
2.	(155 SP)	B	AA 3251 AA 3246 24 (a) B (b)	
3.		C	AA 3251 AA 3246 24 (a) B (b)	
				(a) 50% VT
				(b) 50% SMK

SAMPLE COUNTER-OP PROGRAM SCHEDULE

(COUNTER-OP PROGRAM FOR
53 MECH DIV OPORD 20)

SCHEDULING WORK SHEET

For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC

SHEET 1 OF 1

LINE NO	ORGANIZATION AND CALIBER	FIRING UNITS	0 1 2 3 4 5 6	REMARKS
1.	3-42 FA	A	AA 3232 AY 0074 32 (a) B (a)	
2.	(155, SP)	B	AB 4092 AY 0074 32 (a) B (a)	
3.		C	AY 0063 AY 0074 32 (a) B (a)	
				(a) 50% SMK

APPENDIX E

FIRE SUPPORT COORDINATING MEASURES

This appendix Implements STANAG 2099, Edition 4, and QSTAG 531 (Draft)

Maneuver Control Measures Affecting Fire Support

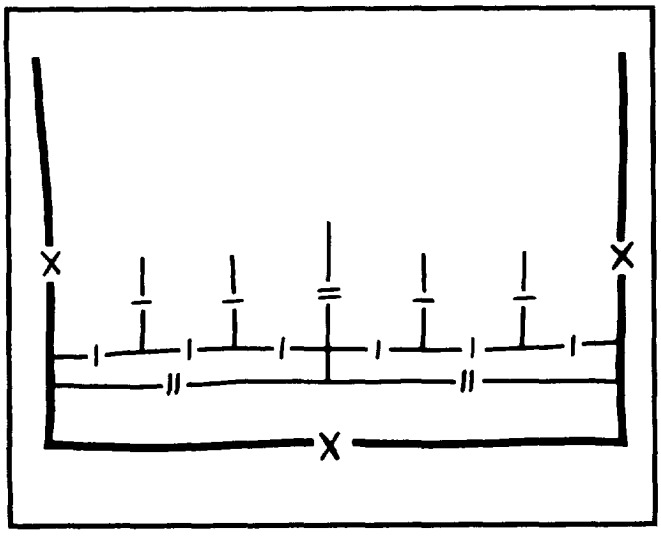
Boundaries are the basic maneuver control measures used by commanders to designate the geographical area for which a particular unit is tactically responsible. They are normally designated along terrain features easily recognizable on the ground. They affect fire support in two ways:

- They are **restrictive** in that no fire support means may deliver fires across a boundary unless those fires are coordinated with the force having responsibility for the area within that boundary (unless a permissive measure is in effect).
- They are **permissive** in that the maneuver commander has complete freedom of fire and maneuver within his boundaries (unless otherwise restricted by higher headquarters).

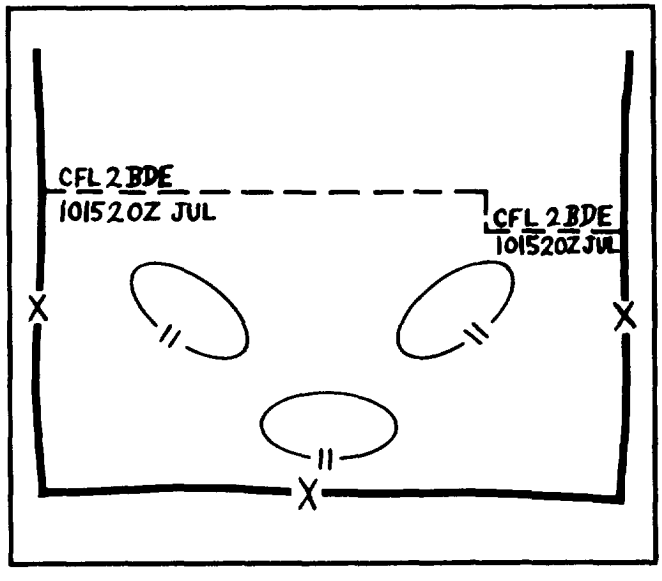
Many times, boundaries negate the need for fire support coordinating measures.

In many instances, the maneuver commander may choose not to establish boundaries for his subordinate elements. In that case, the FSO at that level is responsible for all fire support coordination within the area of operations or zone of action. The graphic below shows just such a situation. The brigade commander has assigned battle positions to his subordinate units and has not designated battalion boundaries. Thus, the brigade FSO is now responsible for coordinating all fires in the brigade sector except in those areas bounded by the battle positions. He may recommend to the brigade commander the use of fire support coordinating measures as the situation dictates; for example, a brigade CFL.

EXAMPLE OF BOUNDARIES



EXAMPLE OF FIRE SUPPORT COORDINATING MEASURES



Fire Support Coordinating Measures

Fire support coordinating measures are designed to facilitate the rapid engagement of targets and, at the same time, provide safeguards for friendly forces. They ensure that fire support will not jeopardize troop safety, will interface with other fire support means, and/or will not disrupt adjacent unit operations. Graphic portrayal is in black and includes, at a minimum, the abbreviation of the measure, the establishing headquarters, and the effective date-time group (DTG). Usually, coordinating measures are labeled at each end of a line or within the graphic, space permitting.

Permissive Measures

Permissive measures are those that facilitate the attack of targets.

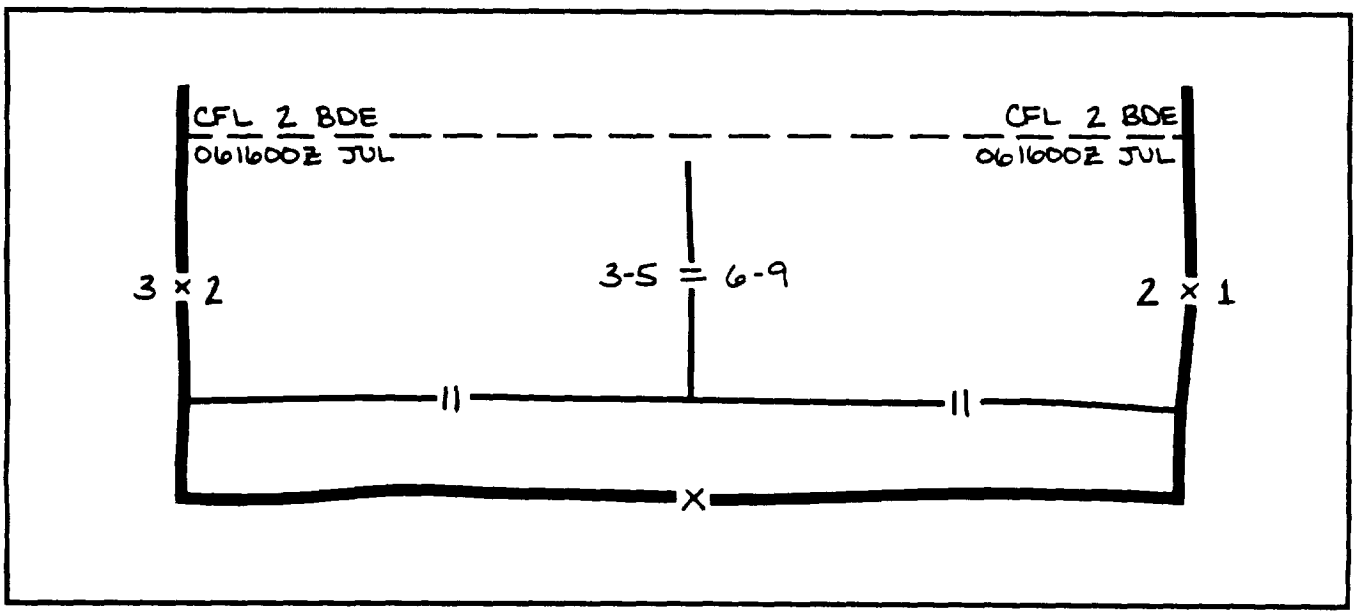
Coordinated Fire Line

The CFL (denoted by a broken line) is a line beyond which conventional surface-to-surface fires may be delivered within the zone of the establishing headquarters without additional coordination. Normally, it is established by brigade or higher headquarters; however, it may be established by a battalion operating independently. In the example below, the area that extends from the CFL forward to the end of the 2d Brigade boundary may be attacked by all surface-to-surface fire support means without coordination with 2d Brigade. This attack includes units in and adjacent to 2d Brigade.

In the offense, the CFL should be placed far enough in front of friendly forces to facilitate lifting and/or shifting of the measure to avoid friendly casualties and to allow room for the maneuver forces. Always be aware of the time required to lift and/or shift the measure.

In the defense, the CFL should be brought in close to friendly forces. Considerations for how close are based on weather, terrain, and munitions effects.

EXAMPLE OF COORDINATED FIRE LINE



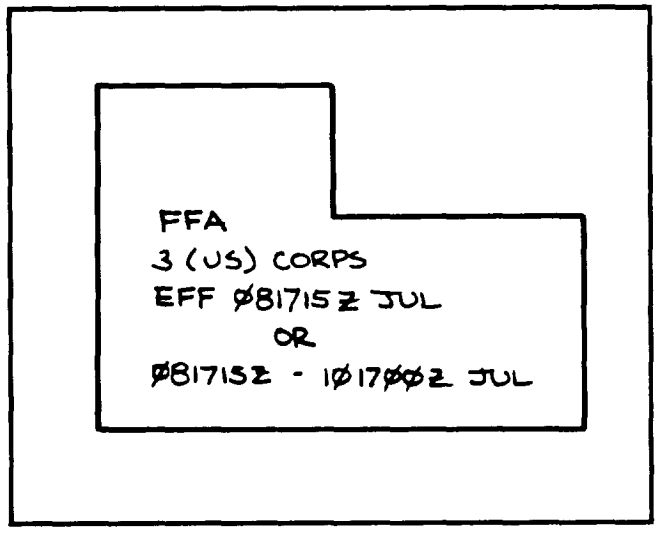
Fire Support Coordination Line

A fire support coordination line (FSCL) may be established by corps within its area of operation to support its concept of the operation. The FSCL is used to coordinate fires of air, ground, or sea weapon systems using any type of ammunition against surface targets. The location of the FSCL must be coordinated with the appropriate tactical air commander and other supporting elements. The purpose of this permissive fire control measure is to allow the corps and its subordinate and supporting units (such as the Air Force) to expeditiously attack targets of opportunity beyond the FSCL. The attack of targets beyond the FSCL by Army assets should be coordinated with supporting tactical air. This coordination is defined as informing and/or consulting with supporting tactical air. However, the inability to effect this coordination will not preclude the attack of targets beyond the FSCL. The interface within the FS cell between the various fire support representatives provides an excellent means of initially coordinating the attack of targets in this area. The FSCL is denoted by a solid line.

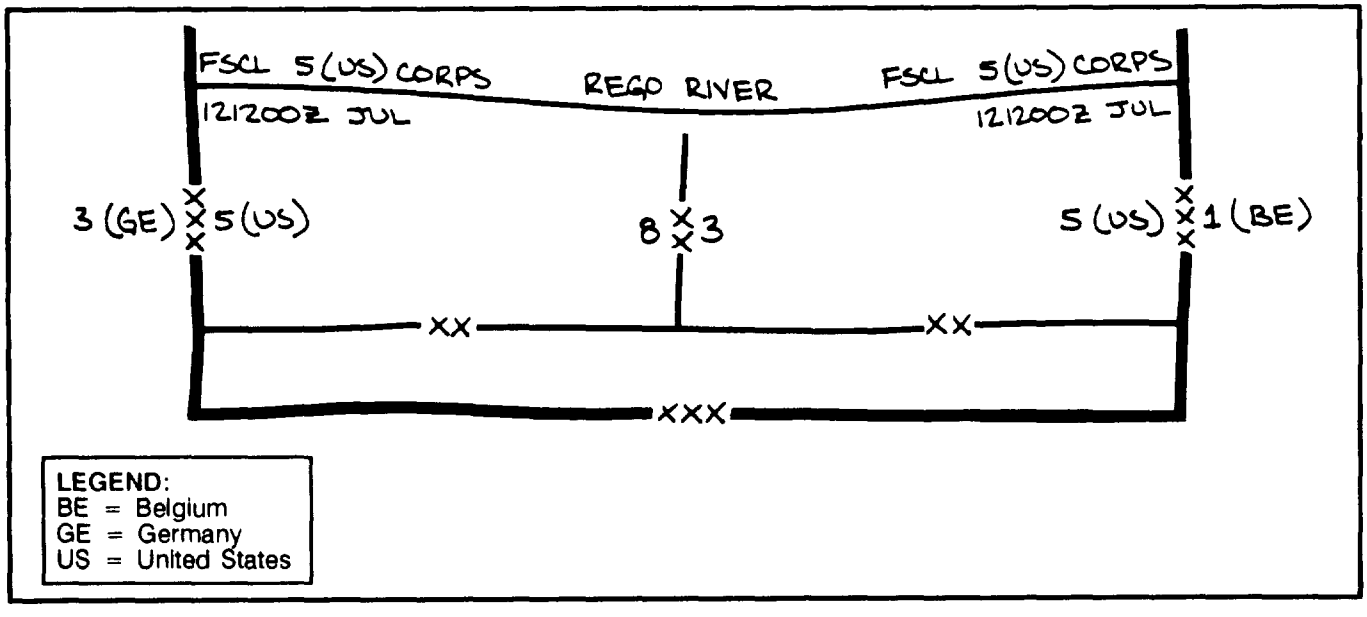
Free-Fire Area

A free-fire area (FFA) is an area into which any weapon system may fire without additional coordination with the establishing headquarters. Normally, it is established on identifiable terrain by division or higher headquarters.

EXAMPLE OF FREE-FIRE AREA



EXAMPLE OF FIRE SUPPORT COORDINATION LINE



Restrictive Measures

Restrictive measures are those that provide safeguards for friendly forces, facilities, or terrain.

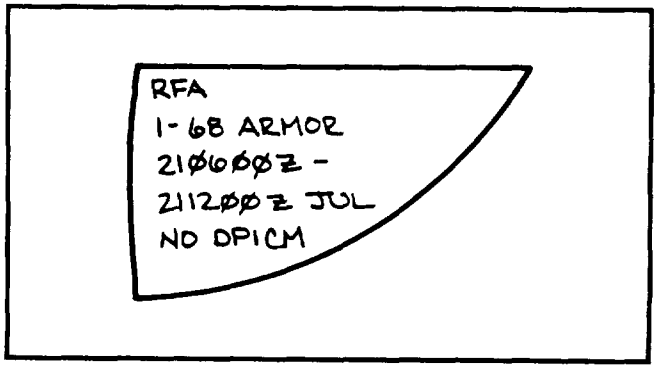
Restrictive Fire Line

An RFL is a line between converging friendly forces that prohibits fires, or their effects, across the line without coordination with the affected force. It is established on identifiable terrain by the common commander of the converging forces. In the graphic below, 2d Brigade is conducting a link up with 1st Brigade. The 8th Inf Div commander, the common commander of both forces, has established the RFL. If 2d Brigade wants to attack Target AC2301, it must coordinate with 1st Brigade.

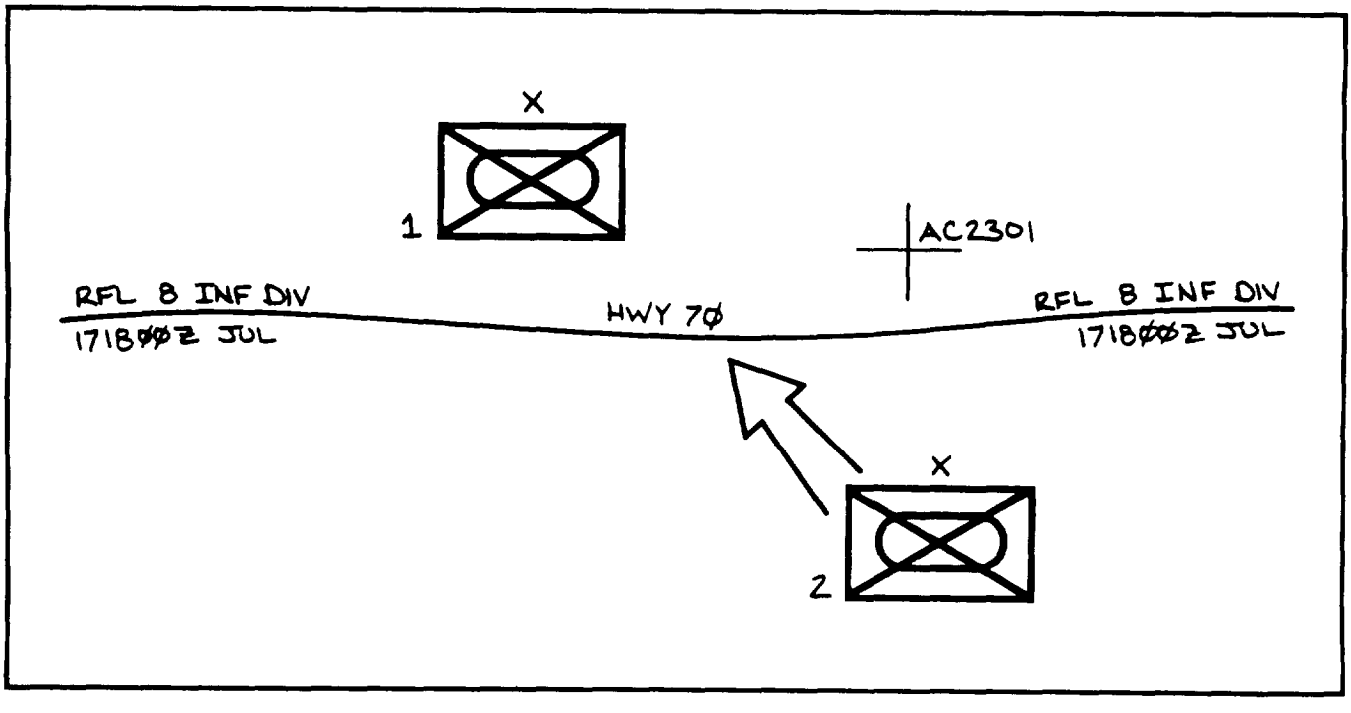
Restrictive Fire Area

An RFA is an area with specific restrictions and in which fires that exceed those restrictions will not be delivered without coordination with the establishing headquarters. It is established by battalion or higher headquarters. On occasion, it may be established by a company operating independently. The imposed restriction will be shown as in the graphic below, or a reference to the OPORD or OPLAN where the restriction can be found is annotated on the overlay.

EXAMPLE OF RESTRICTIVE FIRE AREA



EXAMPLE OF RESTRICTIVE FIRE LINE



No-Fire Area

A no-fire area (NFA) is an area into which no fires or their effects are allowed. It is established on identifiable terrain, normally by division or higher headquarters. It may be established in conjunction with a host nation to preclude damage or destruction to a national asset, population center, or shrine. It also may be established to protect an element of tactical importance, such as a fuel storage area. Two exceptions to the no-fire rule exist:

- When the establishing headquarters allows fires on a mission-by-mission basis.
- When a friendly force is engaged by an enemy located within the NFA and the commander returns fire to defend his forces. The amount of return fire should not exceed that sufficient to protect the force and continue the mission.

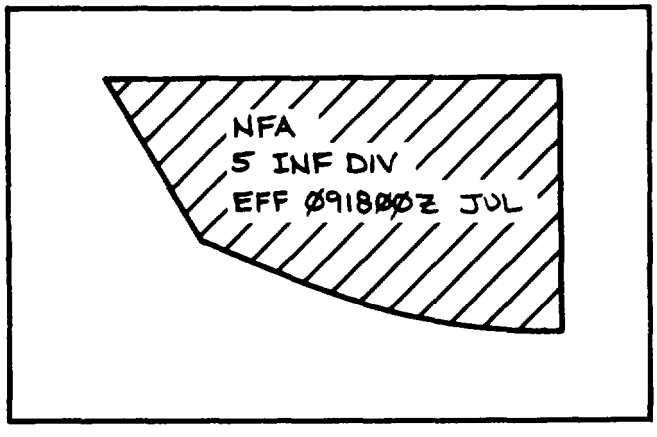
Airspace Coordination Area

An ACA is a block of airspace in the target area in which friendly aircraft are reasonably safe from friendly surface fires.

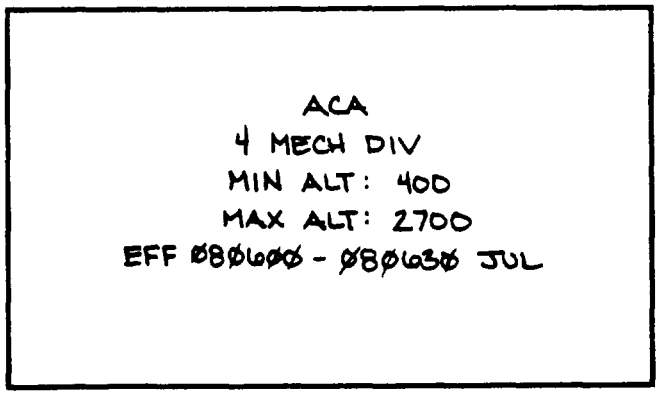
Informal ACAs are most often used and are the preferred method. An informal ACA can be established at task force or higher level and normally is not depicted on charts or maps. It can be established by using lateral, altitude, timed, or lateral and altitude separation. Informal ACAs are normally in effect for very short periods of time. Usually, the time period is only long enough to get the mission into and out of the target area (3 to 6 minutes). (See Appendix A.)

A formal ACA is occasionally established by brigade or higher headquarters. The ALO recommends the size. Altitude **is in feet above sea level.**

EXAMPLE OF NO-FIRE AREA



EXAMPLE OF FORMAL AIRSPACE COORDINATION AREA



APPENDIX F

COMMUNICATIONS

Introduction

This appendix is intended for users, supervisors, and planners. It provides basic guidance on planning and employing communications assets. The development of operating procedures and doctrinal changes is an evolutionary process. The information in this appendix is modeled on an objective heavy division (L-series) TOE. Users operating under modification TOES (MTOEs) must understand that some of the procedures and methods outlined herein are a model solution and may be tailored to meet specific unit requirements.

Communications Systems

Radio is the major means of voice and digital communications within the field artillery. Separate radio nets are established for command and control, fire direction, fire support coordination, fire support planning, and administration and logistics. The execution of AirLand Battle doctrine requires the skillful use of all communications resources. Thus, close coordination and a clear understanding of radio net structure are necessary.

A communications system is the result of a plan designed to fulfill the requirements of a general heavy division mission. As a result of net standardization, units can quickly and accurately communicate in combat. Command discipline must be established so that these standard net structures and purposes are not arbitrarily changed except to tailor for a specific modified mission. This tailoring is based on the factors of METT-T. Standard net structures (net title, Purpose, users, and equipment) should be defined in SOP and should be kept current as changes in procedures and/or systems occur.

Communications system planning must include advance coordination for SOI and COMSEC materials for secure operations. Consider the fire support scheme of maneuver for planned, on-order, and anticipated missions.

Radio Net Structures

Refer to the fire support communications nets matrix on page F-6.

Forward Observer and/or Aerial Observer

A forward observer is equipped with a single radio set; however, several nets may be available for the observer. The net the observer selects is based on several factors – mission, experience level, and operational control. Whether the observer is airborne, in a tracked vehicle, or on foot, each may operate on the nets discussed below.

Maneuver Battalion Mortar Fire Direction Net VHF-FM (Digital). This net is used for battalion mortar tactical and technical fire direction within the maneuver battalion. The battalion mortar FDC is the net control station.

Maneuver Battalion Fire Support Net VHF-FM (Voice). This net is used for voice fire support coordination between maneuver and fire support elements. The battalion FS cell is the net control station.

Direct Support Battalion Fire Direction Nets 1, 2, and 3 VHF-FM (Digital). These nets are duplicates of each other. They are used for tactical and technical fire direction from the FOs through the DS battalion FDC to the battery and/or platoon FDC. The DS battalion FDC at the tactical CP is the NCS.

Division Artillery Operations/Fire Nets 1, 2, and 3 VHF-FM (Digital). These nets also are duplicates of each other. They are used for tactical fire direction and fire support planning for the div arty elements. The aerial observer may be required to operate on these nets. The div arty CP is the NCS.

Division Artillery Target Acquisition/intelligence Net VHF-FM (Digital). This net is used for div arty target acquisition and intelligence (intel) gathering. The aerial observer may be required to operate on this net, as do other TA assets at div arty such as the Q-36 radar. The NCS is the div arty operations and processing section at the div arty CP.

Maneuver Battalion Mortar Fire Direction Center

The maneuver battalion mortar FDC operates on three nets:

- Maneuver battalion command/operations (cmd/ops) net VHF-FM (voice).
- Maneuver battalion fire support (FS) net VHF-FM (digital).
- Maneuver battalion mortar fire direction net VHF-FM (digital).

Combat Observation/Lasing Team

The COLT has three radio sets and operates in the following nets as directed by the brigade fire support officer:

- Maneuver battalion fire support net VHF-FM (voice), as required.
- Maneuver brigade fire support net VHF-FM (voice). This net is used for fire support coordination between the brigade FSO, his FS cell, FA elements, and the maneuver brigade. The brigade FS cell is the NCS.
- Maneuver battalion mortar fire direction net VHF-FM (digital), as required.
- Direct support battalion fire direction nets 1, 2, and 3 VHF-FM (digital), as required.

Fire Support Team or Company Fire Support Officer

The FIST and the company FSO have equipment configurations based on supported maneuver companies. The mechanized infantry FIST is equipped with four radio sets, and the armor or armored cavalry FIST has three radio sets. The FIST and FSO control the FOs and respond to input from both the maneuver and DS battalions on the following nets:

Direct Support Battalion Command Net VHF-FM (Voice). This net is used for command and control and for initial coordination. On reaching the maneuver element or unit, the FIST normally *drops off* this net and enters the DS battalion FD net assigned.

Direct Support Battalion Fire Direction Nets 1, 2, and 3 VHF-FM (Digital). The FIST may control FO calls for fire support on these nets.

Maneuver Battalion Mortar Fire Direction Net VHF-FM (Digital). The FIST may control FO calls for mortar fire support on this net and may use it for digital control of the FOs in the centralized mode of operation.

Maneuver Battalion Fire Support Net VHF-FM (Voice). This net is used for voice fire support coordination when the FSO is physically with the maneuver commander and calls for fire support from other than FA observers.

Maneuver Company Command/Operations Net VHF-FM (Voice). When the FSO is not physically with the maneuver commander, the FIST monitors this maneuver net to provide rapid response to the commander's intent.

Battalion FS Cell and Battalion Fire Support Officer

The battalion FS cell and the battalion FSO have five radio sets and respond to input from

both maneuver and DS battalions on the following nets:

- Maneuver battalion command/operations net VHF-FM (voice). When the FSO is not physically with the maneuver commander the FS cell monitors this maneuver net to provide rapid response to the commander's intent.
- Maneuver battalion fire support net VHF-FM (voice). The FS cell is the NCS of this net.
- Maneuver brigade fire support net VHF-FM (voice).
- Maneuver battalion mortar fire direction net VHF-FM (digital), as required.
- Direct support battalion fire direction nets 1, 2, and 3 VHF-FM (digital), as required.
- Direct support battalion operations/fire net VHF-FM (digital). This net is used for FA digital fire support planning and coordination calls for reinforcing fire, and mutual support operations. The DS battalion CP is the NCS.
- Direct support battalion command net VHF-FM (voice). This net is used for initial coordination and control of movement before arrival at the maneuver battalion. Then the FS cell drops off to the maneuver brigade fire support net VHF-FM (voice). The FSO may monitor this net as required.
- Div arty command net VHF-FM (voice). This net is used for command and control of all div arty elements. The FSO may monitor this net as required.

Battery or Platoon Fire Direction Center

The battery or platoon FDC has four radio sets to operate on the following nets:

- Battery command net VHF-FM (voice). This net is used for command and control of all battery elements and provides a voice radio net for battery use.
- Battery fire direction net VHF-FM (digital). This net is used for technical fire direction.
- Direct support battalion command net VHF-FM (voice).
- Direct support battalion fire direction nets 1,2, and 3 VHF-FM (digital).

Direct Support Battalion Command Post

The DS battalion CP has two distinct entities– the FDC and the operations processing section. In addition, the DS battalion has a logistics operations center located with the brigade combat trains. This center has its own radio net, the DS battalion administrative/logistics (admin/log) net VHF-FM (voice). The CP operates on the following nets:

- Maneuver brigade command/operations net VHF-FM (voice).
- Maneuver brigade fire support net VHF-FM.
- Direct support battalion command net VHF-FM (voice).
- Direct support battalion fire direction nets 1, 2, and 3 VHF-FM (digital).
- Direct support battalion operations/fire net VHF-FM (digital).
- Div arty command net VHF-FM (voice).
- Div arty operations/fire nets 1, 2, and 3 VHF-FM (digital).
- Div arty command/fire (CF) net HF-AM/single sideband (SSB) (voice/facsimile). This net is used to provide a multipurpose long-distance capability for communication with its subordinate battalions, its MLRS battery, and the division FS cell. The operations/processing section is the NCS.

Brigade FS Cell and/or Brigade Fire Support Officer

The brigade FS cell and FSO have four radio sets to operate on the following nets:

- Maneuver brigade command/operations net VHF-FM (voice). he FS cell monitors this net when the FSO is not physically with the maneuver commander.
- Maneuver brigade fire support net VHF-FM (voice) (NCS).
- Direct support battalion command net VHF-FM (voice), as required.
- Direct support battalion operations/fire net VHF-FM-(digital), as required.
- Div arty command net VHF-FM (voice).
- Div arty operations/fire nets 1, 2, and 3 VHF-FM (digital), as required.
- Maneuver battalion fire support net VHF-FM (voice), as required.

Aviation Brigade FS Cell and/or Aviation Brigade Fire Support Officer

The aviation (avn) brigade FS cell and FSO have three radio sets to operate on the following nets:

- Maneuver brigade command/operations net VHF-FM (voice), as required.
- Maneuver brigade fire support net VHF-FM (voice).
- Direct support battalion command net VHF-FM (voice), as required.
- Direct support battalion operations/fire net VHF-FM (digital), as required.
- Div arty command net VHF-FM (voice).
- Div arty operations/fire nets 1, 2, and 3 VHF-FM (digital), as required.
- Maneuver battalion fire support net VHF-FM (voice), as required.

Division Fire Support Elements

The tactical and main fire support elements have similar equipment, but the tactical FSE is mounted in an armored carrier command post (M577). Both FSEs operate on the following nets:

- Division fire support net HF-AM/SSB (voice anchor facsimile [fax]). On this net, the FS cells conduct fire support planning and coordination with each other and the div arty command post. The main FS cell is the NCS.
- Corps fire support net HF-AM/SSB (voice and/or facsimile). The corps FS cells conduct fire support planning and coordination on this net. Division FS cells (tactical and main) may enter this net as required.
- Div arty command net VHF-FM (voice).
- Div arty operations/fire nets 1, 2, and 3 VHF-FM (digital).
- Div arty command/fire net HF-AM/SSB (voice and/or facsimile), as required.

Div Arty Tactical Command Post

The div arty CP is the hub of the artillery effort within the division area. Therefore, the CP plays an extremely important role within each maneuver brigade area. The CP is divided into two main sections, the FDC and the operations/processing section. An additional element, the div arty logistics operations center, has a radio net of its own, the div arty admin/log net VHF-FM (voice). The div arty CP maintains communications with division, corps artillery, direct support battalions, and the MLRS battery on the following nets:

- Division cmd/ops net VHF-FM (voice). This is a maneuver net for command and control and combat operations. The div arty CP monitors this net to respond to the maneuver commander's intent.

Ž Division fire support net HF-AM/SSB (voice and/or facsimile), as required.

- Div arty command net VHF-FM (voice) (NCS).

- Div arty operations/fire nets 1, 2, and 3 VHF-FM (digital) (NCS).

Ž Div arty target acquisition/intelligence net VHF-FM (digital) (NCS).

- Div arty command/fire net HF-AM/SSB (voice and/or facsimile) (NCS).

Ž Corps artillery command/fire net HF-AM/SSB (voice and/or facsimile). This net is a multipurpose net used for long-distance command and control and for technical and tactical fire direction to all artillery elements within the corps area. The corps artillery CP is the NCS.

Separate Maneuver Brigade Fire Support Element and Separate Brigade Fire Support Officer

The separate (sep) brigade fire support effort is multifaceted and must be able to respond to the maneuver commander at corps or division, depending on operational control and the mission assigned. The FSE and FSO may have to coordinate with corps artillery, div arty, or an FA brigade. The separate brigade FSE and FSO may have to operate in the nets described below.

When the maneuver brigade is OPCON to corps, the brigade FSE and FSO may operate in the following nets:

- Corps command/operations net VHF-FM (voice). This is a maneuver net for command and control and for combat operations. The separate brigade FSE monitors this net to respond to the maneuver commander's intent. Corps main CP is the NCS.

- Corps fire support net HF-AM/SSB (radio teletypewriter [RATT).

- Corps artillery command net VHF-FM (voice). This net is used for command and control of all corps artillery elements. The corps artillery CP is the NCS.

- Corps artillery operations/fire nets 1,2, and 3 VHF-FM (digital). These nets are used for fire support planning and coordination between artillery units. They also are used for tactical and technical fire direction to subordinate artillery elements. The corps artillery FDC is the NCS.

Ž Corps artillery command/fire net HF-AM/SSB (voice and/or facsimile). This

When the maneuver brigade is OPCON to corps but with a supporting FA brigade, the maneuver brigade FS cell and FSO may operate in the following nets:

- FA brigade command net VHF-FM (voice). This net is used for command and control of the FA brigade elements. The FA brigade CP is the NCS.

- FA brigade operations/fire nets 1, 2, and 3 VHF-FM (digital). These nets are used for fire support planning and coordination between artillery units and for tactical and technical fire direction to subordinate artillery elements. The FA brigade CP is the NCS.

- FA brigade command/fire net HF-AM/SSB (voice and/or facsimile). This net is a multipurpose net used for long-distance command and control and for technical and tactical fire direction to all artillery elements within the FA brigade area. The FA brigade CP is the NCS.

FIRE SUPPORT COMMUNICATIONS NETS MATRIX

	FO	AERIAL OBSERVER	BN MORTAR FDC	COLT	FIST	CO FSO	BN FS CELL	BN FSO	BTRY OR PLT FDC	DS BN CP	BDE FS CELL	BDE FSO	AVN BDE FS CELL	AVN BDE FSO	DIV FSE (TAC)	DIV FSE (MAIN)	DIV ARTY CP	SEP BDE FSE	SEP BDE FSO
Maneuver co cmd/ops net VHF-FM (V)					X[1]														
Maneuver bn cmd/ops net VHF-FM (V)			X				X[1]												
Maneuver bde cmd/ops net VHF-FM (V)										X	X[1]		X[1]						
Division cmd/ops net VHF-FM (V)																	X	X[2]	X[2]
Corps cmd/ops net VHF-FM (V)																		X	X
Maneuver bn FS net VHF-FM (V)	X[3]	X[3]	X	X[1]	X	X[1]	X	X[1]				X[1]		X[1]					
Maneuver bde FS net VHF-FM (V)				X		X[1]	X	X[1]		X	X	X[4]	X	X[4]					
Division FS net HF-AM/SSB (V-fax)															X	X	X[1]	X[2]	
Corps FS net HF-AM/SSB (RATT)															X[1]	X[1]		X	
Maneuver bn mortar FD net VHF-FM (D)	X	X[1]	X	X[6]	X	X[1]	X[1]												
Btry cmd net VHF-FM (V)									X										
Btry FD net VHF-FM (D)									X										
DS bn cmd net VHF-FM (V)					X[1]	X[1]		X[1]	X	X	X[1]	X[1]	X[1]	X[1]					
DS bn FD nets 1, 2, and 3 VHF-FM (D)	X[7]	X[7]		X[6]	X[7]	X[1]	X[1]		X	X									
DS bn ops/F net VHF-FM (D)							X			X	X[1]		X[1]						
Div arty cmd net VHF-FM (V)								X[1]		X	X	X[1]	X		X	X	X	X[2]	
Div arty ops/F nets 1, 2, and 3 VHF-FM (D)		X[1]								X	X[1]		X[1]		X	X	X	X[2]	
Div arty TA/Intel net VHF-FM (D)		X[1]															X		
Div arty CF net HF-AM/SSB (V-fax)[5]										X					X[1]	X[1]	X	X[2]	
FA bde cmd net VHF-FM (V)																		X[1]	
FA bde ops/F nets 1, 2, and 3 VHF-FM (D)																		X[1]	
FA bde CF net HF-AM/SSB (V-fax)[5]																		X[1]	
Corps arty cmd net VHF-FM (V)																		X	
Corps arty ops/F nets 1, 2, and 3 VHF-FM (D)																		X	
Corps arty CF net HF-AM/SSB (V-fax)[5]																	X	X	

[1]As needed
[2]When operating under control of division
[3]May be entered for voice coordination
[4]Net used by FSO when separate from FS cell
[5]Currently RATT net
[6]COLTs will operate in the net directed by brigade FSO
[7]As directed

NOTE: Admin/log VHF-FM (V) nets at corps artillery, FA brigade, div arty, and DS battalion may be entered, as required, by any subordinate element to coordinate administrative and logistic operations.

LEGEND:
V = voice
D = digital
TA/Intel = target acquisition/intelligence

When the maneuver brigade is OPCON to a division, the brigade FS cell and FSO may operate in the following nets:

- Division command/operations net VHF-FM (voice).
- Division fire support net HF-AM/SSB (voice and/or facsimile).
- Div arty command net VHF-FM (voice).
- Div arty operations/fire nets 1, 2, and 3 VHF-FM (digital).
- Div arty command fire net HF-AM/SSB (voice and/or facsimile).

Single-Channel Ground-Airborne Radio System

The single-channel ground-airborne radio system (SINCGARS) is the new generation combat net radio (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 battalion level and will require intensive management by staff and supervisors at all levels of command.

Battlefield Electronic CEOI System

The battlefield electronic communications-electronics operation instructions (CEOI) system (BECS) is a decentralized system for frequency management and the publication of unit CEOIs (now called signal operation instructions). The BECS has been designed to provide more responsiveness to rapidly changing and highly mobile battlefield conditions. The system consists of a basic generation unit (BGU) and an electronic notebook (EN). 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.

Mobile Subscriber Equipment

Mobile subscriber equipment (MSE) is a common-user area communications system

COMMUNICATIONS TIPS

DO –	DON'T–
Use the lowest power setting for effective transmission.	Use homemade codes.
Make transmissions as short as possible.	Use homemade call signs.
Use proper radiotelephone procedures.	Start vehicle with radios on.
Use the proper antenna directional antenna (possible).	Attempt to talk around sensitive information.
Use masking, if possible, to hide your signal.	Display frequencies or call signs.
Use only authorized codes.	Make antenna *farms.*
Remote radios if possible.	
Enforce net discipline.	
Authenticate.	
Try to work through jamming.	
Plan for the use of retrans.	
Keep radios aligned and tuned.	

very similar to the civilian telephone system. It has mobile subscribers as well as regular telephone subscribers. The MSE in conjunction with the improved high frequency radio (IHFR) will eliminate radio teletypewriters.

Loss of Communications

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

Ž 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/stations to reestablish communication. Unit SOP must delineate exact actions to be taken to reestablish communication, and all personnel must be intimately familiar with those actions.

Retransmission

Frequency modulated VHF transmission distances are restricted by terrain and obstacles. The siting of radio equipment is often critical. The following are helpful hints for using FM retrans:

Ž A a minimum, make a map recon of the area of operation. Coordinate with the S2 and S3 during the planning phase.

- Analyze the terrain for optimum communications to support the scheme of maneuver.
- Select primary and alternate locations for retrans. Consider accessibility, defense, and logistical support.
- Arrange the timetable for site occupation and net operation. Don't wait until retrans is needed before sending it out.
- Ensure operators are well trained. They must be able to provide manual relay if they have equipment failures.
- Ensure operators are aware of the tactical situation.
- Ensure users understand how retrans works.
- If retransmitting digital traffic, program additional key and/or delay time to allow radios to key up.

Ž Users of forward entry devices (FEDs) may plan to use nearby battery computer systems 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.

Communications Planning Ranges

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

PLANNING RANGES FOR FIRE SUPPORT RADIOS

RADIO	RANGE (KM)[1]
AN/PRC-77 with whip antenna	8
AN/PRC-77 with long-wire antenna (AT-984/G)	28
AN/GRC-160 with whip antenna	8

PLANNING RANGES FOR FIRE SUPPORT RADIOS (CONTINUED)

RADIO	RANGE (KM)[1]
AN/GRC-160 with RC-292, OE-254, or OE-303 antenna	19
AN/GRC-160 with long-wire antenna (AT-984/G)	28
AN/VRC-46 with whip antenna	40
AN/VRC-46 with RC-292, OE-254, or OE-303 antenna	58

[1]The normal planning range for the AN/GRC-160 series is 8 km; and for the VRC-46 series, it is 40 km. The above extended ranges are achieved by use of various antenna arrays.

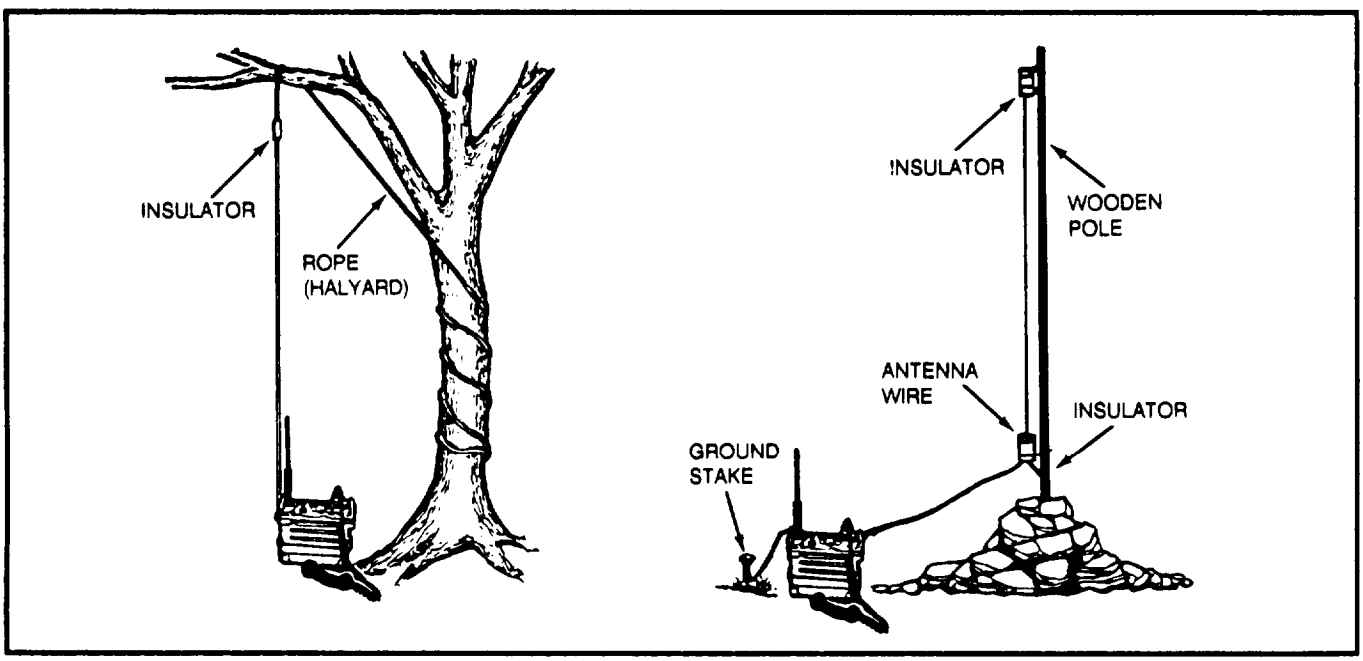
Field-Expedient Antennas

Poor or erratic radio communications may be the result of excessive distances between stations, unfavorable terrain or weather, or defective antenna equipment. All fire support personnel must understand the application of Field-expedient antennas for maintaining or enhancing communications and for electronic counter-countermeasures (ECCM). Regardless of the type of antenna used, proper maintenance must be performed to get optimum performance from the equipment. The field-expedient antennas discussed below are relatively simple, easy to construct from available materials, and highly effective.

Replacement Whip Antenna

In a static position, a broken whip antenna may be replaced by using WD-1 communications wire and an overhead branch or some support assembly. Cut a lo-foot piece of wire, attach an insulator to one end, and use a rope attached to the insulator to elevate the antenna. Strip about 1 inch of insulation from the end to be attached to the radio. Loosen the antenna base on the radio, place the bare wire between the antenna base and the antenna support receptacle, and retighten the antenna base. Ensure the improvised antenna is vertical.

REPLACEMENT WHIP ANTENNAS



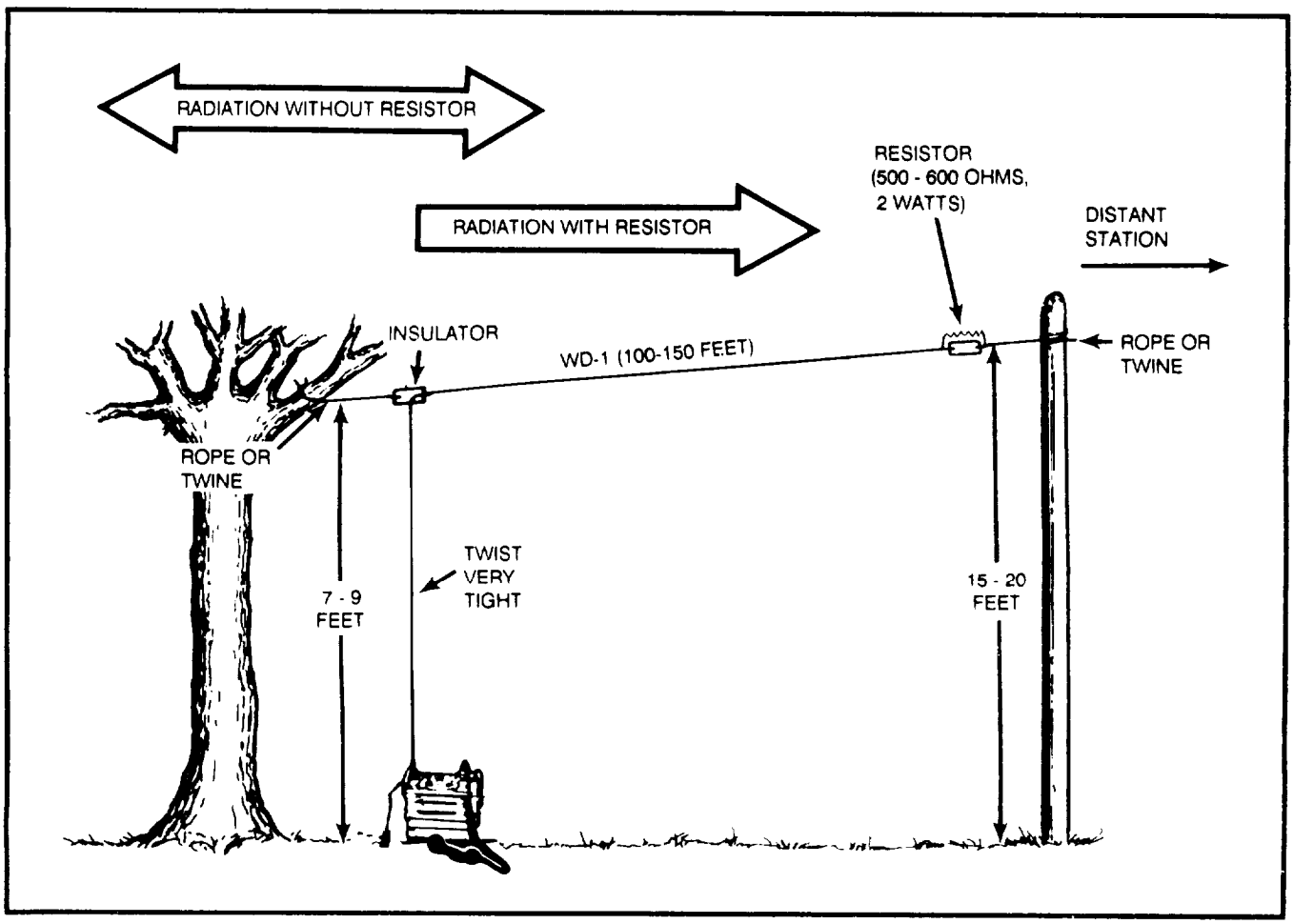
Horizontal Long-Wire Antenna

This is probably the simplest, yet most effective, antenna for communicating over long distances. Maximum radiation is off the ends of this antenna; thus, it is highly directional. It not only increases the range of transmission and reception, but it also tends to reject or reduce signals from other directions. This makes it an excellent antijamming device.

WD-1 is ideal for making this antenna. The wire should be 100 to 150 feet long. Tightly twist the first section of the WD-1, and connect the end between the antenna base and the antenna support receptacle on the radio. The wire must be adequately insulated to prevent accidental grounding. The antenna should be erected at least 7 to 9 feet high at the radio and 15 to 20 feet above ground at the other end. Connect the other end to a pole or a tree in the direction in which communication is required. This ground clearance is necessary to prevent accidents or injuries involving personnel or vehicle traffic.

To make this a one-way (unidirectional) antenna, add a resistor at the end toward the distant station. A dead flashlight battery BA-30 makes an ideal resistor for low-power radios. Attach a nail or screw to each end of the battery, ensuring they don't touch, and connect the wire to each.

HORIZONTAL LONG-WIRE ANTENNA



Center-Fed Doublet Antenna

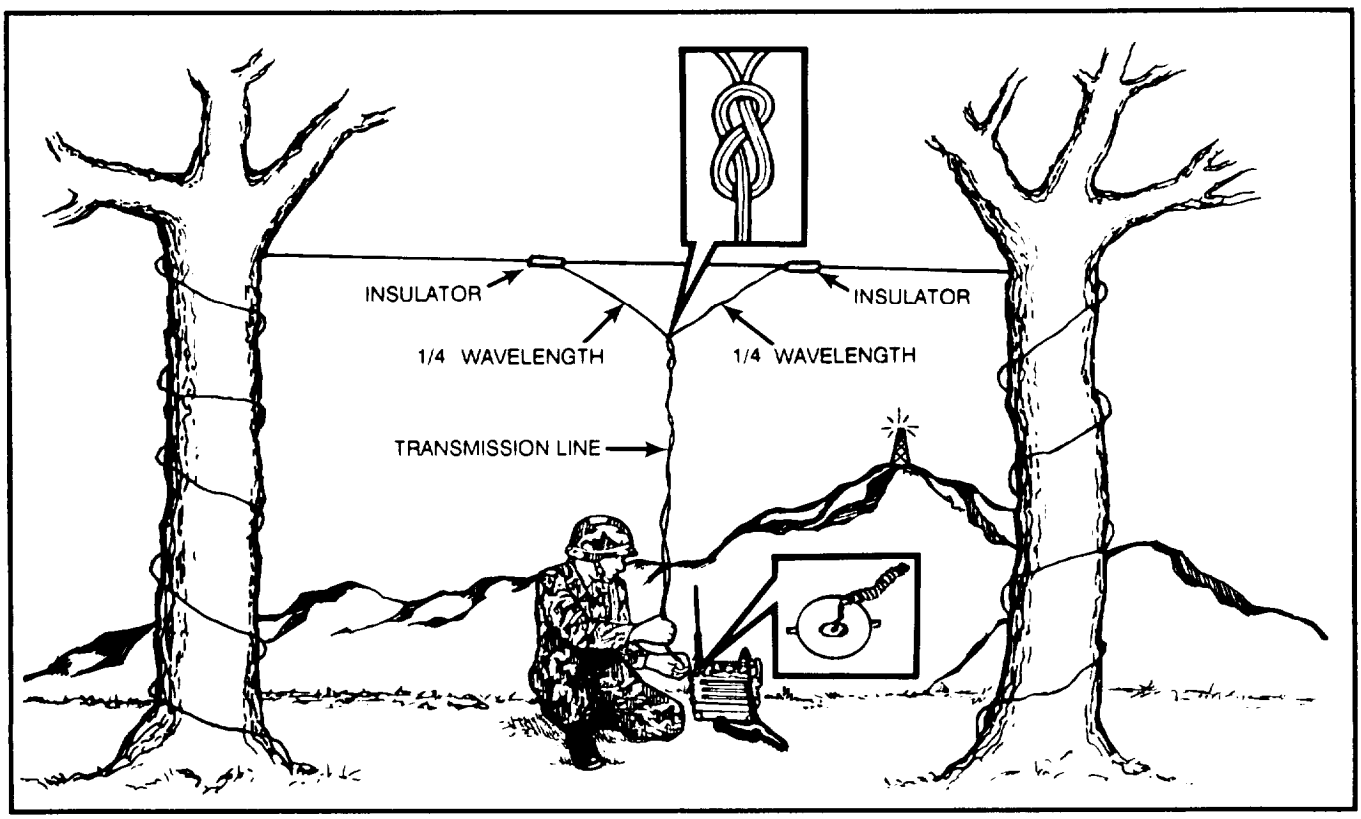
The center-fed doublet is an effective two-way (bidirectional) antenna. It is particularly efficient in jungle environments and for ECCM if both the sending and receiving stations are using the same type of antenna. Unlike the whip and many other antennas discussed in this appendix, this antenna is electronically horizontal and will not communicate with those that are electronically vertical.

The length of each element is critical and depends on the operating frequency. This length must be one-quarter wavelength. To determine the length of each element in feet, divide 468 by the frequency in megahertz (MHz) which gives you one-half wavelength. Then divide this result by 2 to get one-quarter wavelength in feet. An example using the operating frequency of 46.80 MHz follows:

468 48.80 =10; 10÷2=5 feet; so each element is 5 feet long.

After determining the length of each element, construct the antenna by measuring off slightly more than the required length of wire and tie a figure-eight knot at that point. Separate the wire into the elements, and attach insulators at each end. Ensure the elements are the exact length required. Tightly twist the remaining wire going to the radio to make a transmission cable, and strip each end of the wire. Put one wire into the center of the antenna cable conncetor, and attach the other wire to the metal case of the radio. Attach the insulators to the rope to permit erecting the antenna between two trees or other support assemblies. Raise the antenna 20 to 30 feet, and ensure the broadside is directed toward the receiving station(s).

CENTER-FED DOUBLET ANTENNA



Vertical Half-Rhombic Antenna

The vertical half-rhombic antenna consists of 100 to 150 feet of WD-1 on a 30- to 45-foot-high support. The support should be centered with approximately half of the wire on each side. Attach insulators to the ends, and fasten rope to these insulators. This permits the ends to be tied down to stakes and the antenna element to be insulated from a ground. Make a transmission cable by tightly twisting the section of WD-1 coming from the radio end of the antenna element. Strip the ends of the cable approximately 1 inch, and connect these leads between the antenna base and the antenna support receptacle on the radio. The antenna in this configuration is a two-way (bidirectional) antenna.

To make this a one-way (unidirectional) antenna, add a resistor at the end toward the distant station. A dead flashlight battery BA-30 makes an ideal resistor for low-power radios. Attach a nail or screw to each end of the battery, ensuring they don't touch, and connect the wire to each.

Resistors and Field-Expedient Resistors

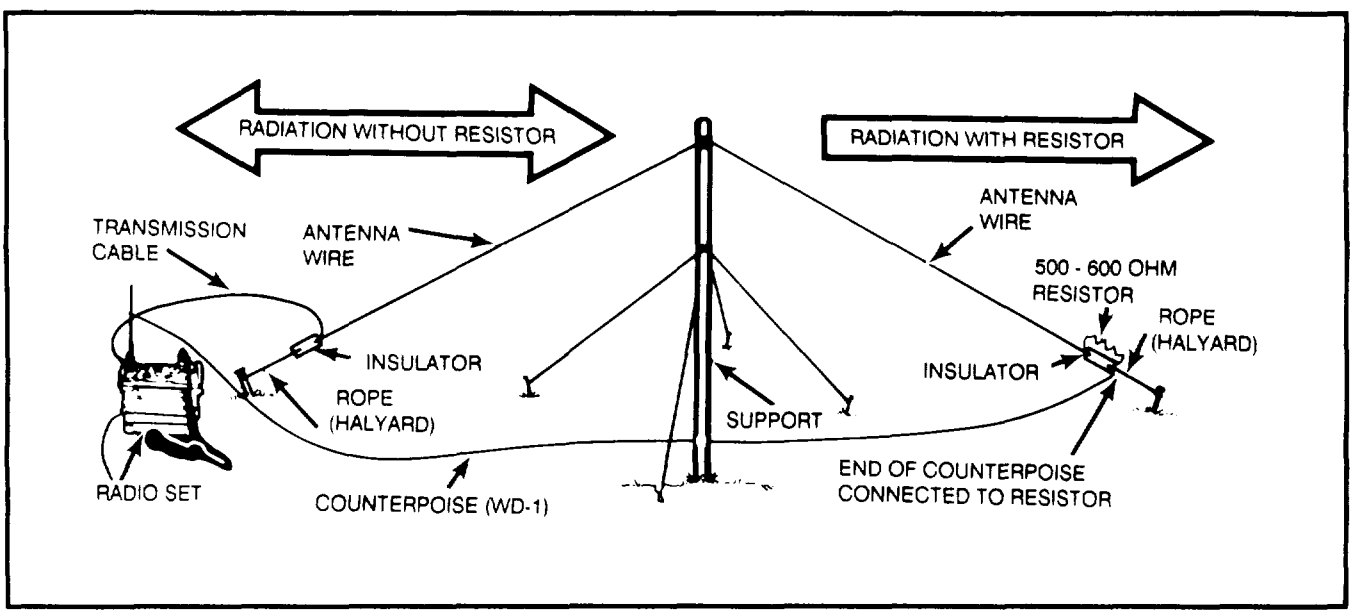
Resistors are used to draw the signal in the desired direction of transmission.

Resistors used to construct the long-wire and half-rhombic antennas are readily available through supply channels and local radio repair shops. These resistors must have a resistance of 500 to 600 ohms and be at least half the wattage of the transmitter power output. For example, a 600-ohm, 2-watt resistor works with the AN/PRC-77. Typical power outputs for combat net radios are as follows:

- AN/VRC- 12-series (-46, -47, and so forth):
  - High power = 35 watts (minimum).
  - Low power = 0.5 to 8 watts.
- Ap/PRC-77 = 4 watts.

Ž SINCGARS = 50 watts (maximum).

VERTICAL HALF-RHOMBIC ANTENNA



NOTE: SINCGARS radios do not perform frequency hopping very well with field-expedient antennas, but any antenna is better than none at all. The use of a field-expedient antenna may degrade the SINCGARS to a single-channel operation, but it will permit communication.

Field-expedient resistors should be of the same values as those listed above, approximately 500 to 600 ohms at about half the wattage output. A dead BA-30 with nails driven into each end will approximate 500 to 600 ohms at 1 to 3 watts. An earplug container with holes drilled in the case opposite each other and filled with sand and a few drops of crankcase oil will work much like the battery.

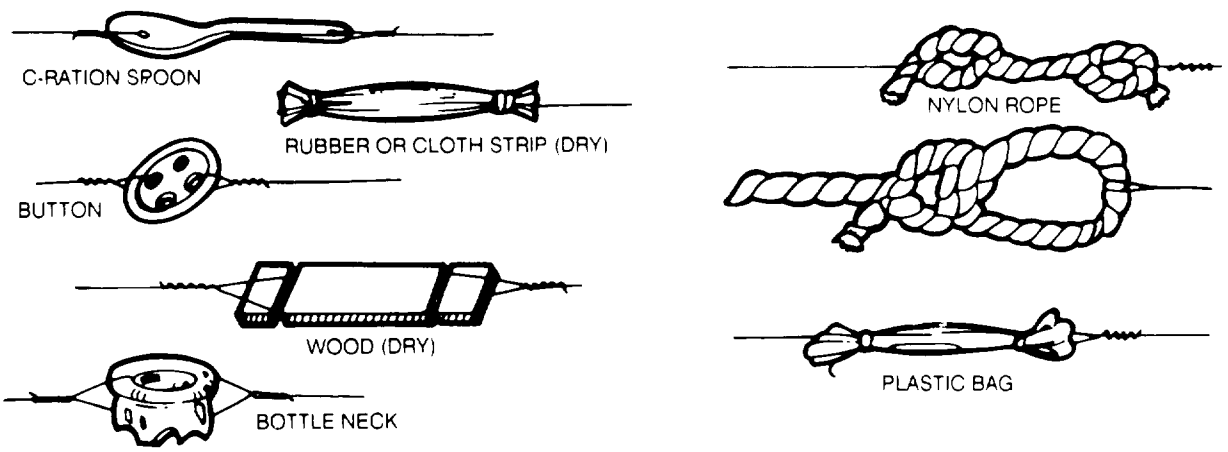
Field-Expedient Insulators

Insulators keep the signal from going in an unwanted direction. Almost anything that will not conduct electricity but has some strength can be an insulator. The very best insulators are glass, plastic, and rubber. Less effective but still usable are cloth, wood, and rope; however, these are not good when wet.

NOTE: The US Army Signal School is in the process of replacing the terms *FM (frequency modulated)* and *AM* or *AM/SSB (amplitude modulated and sing/e sideband)* in most radio net titles with terms more closely denoting range. The following frequency range designations will be used:

- HF - high frequency (replacing AM/SSB).
- VHF - very high frequency (replacing FM).

FIELD-EXPEDIENT INSULATORS



APPENDIX G

TARGET VALUE ANALYSIS

Description

Targeting is the process of selecting targets and matching the appropriate response, taking into account operational requirements and friendly force capabilities. Atacking targets that the enemy can least afford to lose strips him of his initiative and forces him to conform to our battle plan. Targeting requires interaction between fire support, intelligence, engineer, and maneuver personnel. Target value analysis is an analytical tool to be used in the targeting process by which the maneuver commander –

- Provides focus for his target acquisition effort.
- Identifies priorities for the engagement of enemy targets that will facilitate the success of his mission.
- Identifies effects criteria.
- Ž Permits planning for identified contingencies based on enemy options available when the enemy operation fails.
- Better estimates friendly unit capabilities.

Target value analysis is described in Chapter 3 of the Fire Support Mission Area Analysis (FSMAA) (classified SECRET) and in FM 6-20-10. The complete FSMAA is normally distributed to FSEs at division and higher echelons. Selected extracts may be distributed to brigade and battalion levels.

Definitions

High-value targets (HVTs) are targets deemed important to the enemy commander for the successful accomplishment of his mission. The loss of HVTs can be expected to contribute to a substantial degradation of an important enemy battlefield function. High-value targets are developed by using the TVA tools based on the interpretation by the friendly intelligence system of the enemy course of action.

High-payoff targets are HVTs that must be successfully acquired and attacked to contribute substantially to the success of friendly operations. They are developed on the basis of METT-T and are not dependent on the ability of the unit to acquire or attack them. If an HPT is beyond the capability of the unit to acquire, then it should be passed to the next-higher echelon as a priority intelligence requirement.

Attack criteria are a compilation of the commander's guidance, desired effects of attack, high-payoff target lists, and attack priorities.

The **attack guidance matrix** is a compilation of attack criteria in a format that can be understood by fire support and targeting agencies.

Time-sensitive targets are those targets requiring immediate response because they pose (or will soon pose) a clear and present danger to friendly forces or are highly lucrative fleeting targets of opportunity.

Target development is the process of providing direct combat information, targeting data, and correlated targeting information. It gives the commander and his attack managers timely and accurate locations of enemy weapon systems, units, and activities that may impact on current or projected operations.

TVA Tools

Integral to the performance of duties by the targeting officer is the use of the IPB and the TVA The TVA tools in the FSMAA include the spread sheets and the target sheets. The high-payoff target list is a product of target value analysis.

Spread Sheets

On the front side of each spread sheet (example below) is information about Threat forces at regiment, division, army, and front with respect to the operations the forces are expected to conduct. On the back side of the spread sheet (example on page G-5) is a summary of information about the enemy doctrine and tactics. It indicates how the Threat is expected to fight, what his operation is intended to accomplish, and what alternatives he has if he fails to accomplish his primary mission. The major sections of the spread sheet are as follows:

- Title and sheet number (front and back) (A).
- Relative value matrix (front) (B).
- Attack rationale column (front) (C).
- Specific high-value targets (front) (D).
- Doctrinal template (back) (E).
- Threat force doctrinal resume (back) (F).
- Fallback option statement (back) (G).

EXAMPLE SPREAD SHEET (FRONT)

2 REGIMENTAL MEETING ENGAGEMENT 2 ← (A)

DISRUPT	DELAY	LIMIT	TARGET SET	RELATIVE WORTH
X	X		C^3	
X	X	X	FIRE SPT	
X	X	X	MANEUVER	
X			ADA	
X			ENGINEER	
X			RSTA	
X			REC	
*	*	*	NUKE/CHEMICAL	
			CLASS III POL	
			CLASS V AMMO	
			CLASS IX MAINT	
			LIFT	
X	X	X	LOC	

← (B)

(C)

(CLASSIFICATION)

Lead elements concentrated on to slow momentum of attack and cause compression of enemy forces with resulting vulnerability to heavy missile/nuclear strikes.

C^3 attacked to disrupt sequence of attack.

LOC attacked to prevent reinforcement or resupply.

FS attacked to prevent use of additional firepower from reinforcing lead element attacks.

ADA attacked to allow friendly aircraft to canalize main forces into undesirable areas.

RSTA deceived as to actual strength of friendly forces, canalized to lead main forces into indefensible terrain, or neutralized.

POL storage and transport allow enemy to maintain momentum.

REC attacked as a priority, since enemy forces will not rely on C^3 and thus will be more likely to utilize REC with more frequency than usual.

ENGR attacked to limit the enemy ability to break obstacles.

(CLASSIFICATION)

(D)

Movement (43, 44, 46, 48)
Deployed Elements (50)
Accompanying Arty (45)

Forward CP (39)
Main CP (28, 38)

Ammo transport (118)

Fire Direction (1, 2, 3, 4)
Air Support (22, 23)
Weapons (19, 20)

Weapons (61, 62)

Battlefield Surv and TA Radar (83)
Recon Patrol (84, 85)
Radar Intercept (103)

Transport (111, 128)
Storage (114, 115)

Comm Jammers (88, 89)
Intercept and DF (91, 104)

Movement Support (70)

NOTE: This is not an actual spread sheet. It is an example using a notional situation and is not to be used as an actual targeting aid.

Title and Sheet Number

These specify the unit level and enemy mission of interest. This header is shown on the front and back of the spread sheet.

Relative Value Matrix

The relative value matrix is the part of the spread sheet that indicates which of the 13 target sets are high value in that situation. The matrix presents information that aids managers of attack assets (both maneuver and fire support) and collection managers in establishing priorities.

The 13 target categories (center of the matrix) represent target groupings based on their battlefield functions, not on the associated equipment. The categories (also known as target sets) cover all of the major battlefield functions of the Threat. The categories are as follows:

- Ž C^3 targets are command, control, and communications centers that affect maneuver or combined arms.
- Ž The FIRE SPT category covers the entire Threat fire support system.
- • MANEUVER targets are combat arms tactical subunits in various postures.
- • ADA refers to air defense system targets, including missile unit headquarters and processing centers, radar sites, and short-range air defense platoons.
- Ž ENGINEER denotes engineer targets, including crossing sites, snorkeling sites, and movement support elements.
- • RSTA assets include ground surveillance radars, reconnaissance patrols, and airborne sensor systems.
- • The REC category is radio-electronic combat, known as offensive electronic warfare. Because of the nature of the Soviet system, some dedicated collection target acquisition assets are listed in this category instead of under RSTA.
- Ž NUKE/CHEMICAL targets are major firing positions and nuclear and chemical support elements.
- Ž CLASS III POL refers to petroleum, oil and lubricants support and includes transport and pipeline units and POL points.
- Ž The CLASS V AMMO category covers the ammunition support targets.
- Ž CLASS IX MAINT covers maintenance and repair capabilities.
- Ž LIFT refers to general transport units in the Threat.
- • LOC represents lines of communication for which no specific target types are designated. However, any target attacked that would interfere with the ground or air lines of communication is a candidate.

The right side of the matrix indicates the relative worth of target sets that are considered high value for the situation. This part of the matrix uses a simple bar chart to show the relative worth of the target sets with respect to each other for the specific operation depicted by the spread sheet. The relative worth of a target refers to the relative effect that successful attack of the target will have on the friendly operation and the friendly scheme of maneuver. The stated relative worth is confirmed by the staff during the war-gaming process. The target sets that are not considered to be of high relative worth are not assigned a value bar.

The left side of the matrix consists of three columns, labeled DISRUPT, DELAY, and LIMIT. An X in the column associated with the target set indicates that a benefit may be accrued by attacking the target with one of these particular goals in mind.

An X in the DISRUPT column indicates that attacking a target with the goal of disrupting its function may be of considerable benefit. Such attack can be by continuous suppression, neutralization, or destruction of the target by lethal means or by offensive EW for some types of targets. The enemy function represented by the target is considered unacceptable on the battlefield and must be removed.

An X in the DELAY column indicates that a benefit can be gained by attacking the target to delay its arrival on the battlefield. In some cases, a commander could opt to use a smaller amount of ammunition and slow a second-echelon force for a period of time. This would allow his maneuver forces to recover and conduct a coordinated effort when the enemy second echelon arrives at the FLOT. In this case, the unacceptable aspect of the target set function is its time of arrival at the battlefield, The implication is that the combined arms team can defeat such a target if it is given enough time to prepare.

An X in the LIMIT column indicates that a benefit can be gained if the target approach is limited, thus shunting the enemy unit to another portion of the battlefield. This either puts the target into a portion of the battlefield where it can be better handled or puts the enemy on terrain not suitable to his purposes. The unacceptable aspect of this target set function is where it is employed on the battlefield.

Attack Rationale Column

The attack rationale column in the center of the spread sheet provides a guide of the benefits to be derived by attacking targets of a particular category. This column discusses the desired objectives for attack of the target in the category. Each description is connected to the appropriate category by lines. A solid line indicates the primary results of attacking targets in the category from which the line is drawn. (Solid lines should be traced from left to right.) Some descriptions are further attached to other categories by dotted lines. This indicates that a secondary benefit is achieved for that category when the primary target is attacked. Dotted lines are traced from the attack rationale column back to the category (right to left).

Two type styles are used in the attack rationale column. Descriptions in normal type indicate that the greatest benefit is achieved by attacking targets in their associated groups sequentially from the top of the matrix to the bottom. Descriptions in italics indicate that the categories always have the same value throughout the operation, regardless of posture.

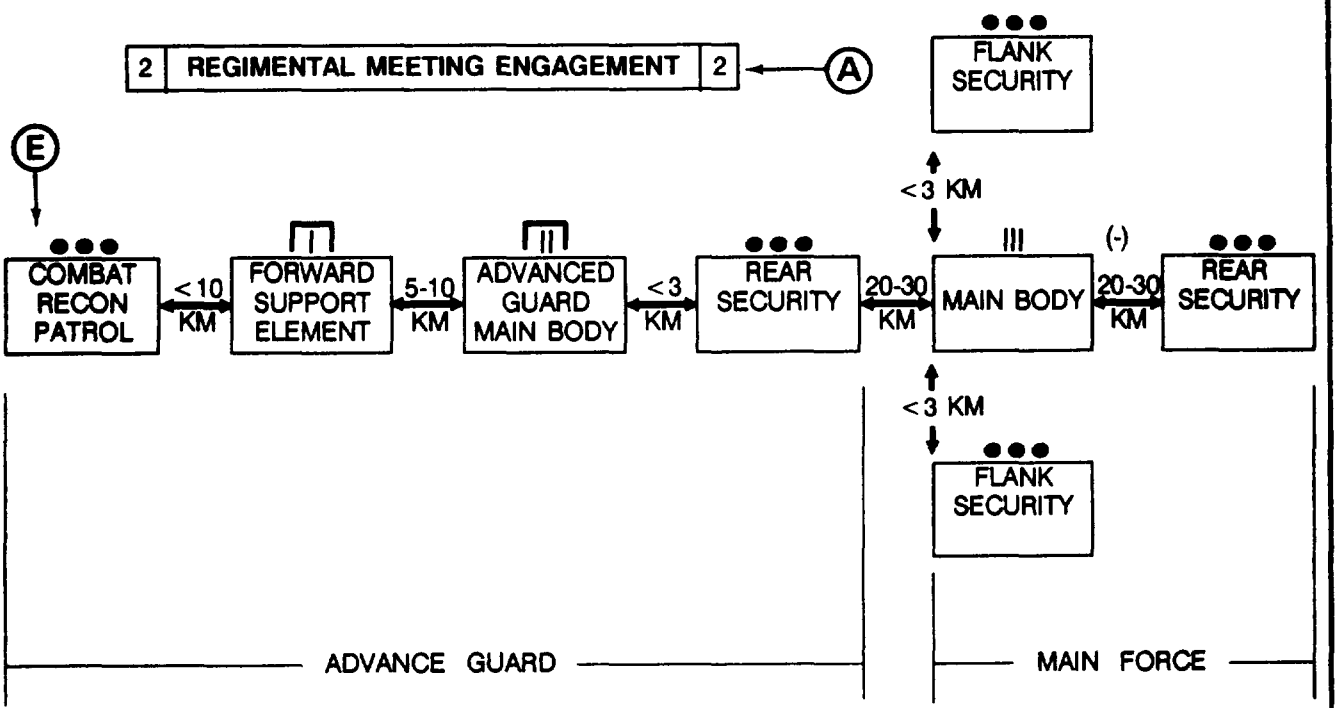
Specific High-Value Targets

The high-value target column of the spread sheet specifies the high-value targets for each set. Numbers in parentheses refer to specific target sheets containing individual target descriptions for the high-value target type given. Usually, there are some high-value targets for each category even though the set itself might be given a low relative value. When formulating detailed attack guidance, one should be aware of all of the specified high-value targets, not just those in the higher-value categories. In developing the high-payoff target list, targeting personnel should consider all of the high-value targets in the context of the situation in addition to the commander's directive.

Doctrinal Template

The doctrinal template indicates the major subunits of the unit considered, deployed to scale, without regard to the effects of terrain and weather. Fire support personnel can use the template to plan acquisition coverage and likely areas of interest. However, it should be used cautiously and only as a guide, because of the effects of terrain.

EXAMPLE SPREAD SHEET (BACK)



REGIMENTAL MEETING ENGAGEMENT

F → **Objective:** Destruction of the enemy forces, seizure of key terrain, and continuation of the advance.

Doctrinal Approach: The regiment is normally part of a division meeting engagement. Continuous and thorough reconnaissance is conducted. The enemy goal is to achieve the initiative immediately. The regiment will deploy into combat from the march at a high rate of speed. The combat recon patrol and forward support element will attempt to penetrate the enemy upon contact. Deployment of the main body depends on the outcome of the advance guard action. The regiment may attempt an envelopment, a flank attack, or a frontal attack (normally conducted with an envelopment or flank attack). Adequate flank and rear security will be maintained throughout the operation.

G → **Fallback:** Given a successful US effort, the following options are available to the Soviet commander:

The division attacks and seizes subsequent objectives (18).

Hasty defense (14).

Withdrawal (16).

Doctrinal Resume

The doctrinal resume is a synopsis of the major features of the operation. This portion indicates the objective of the force and the tactical principle that governs how the unit is supposed to fight.

Fallback Option Statement

The fallback option portion details what we can expect the enemy to do if he fails to accomplish his mission. Contingency plans and high-payoff target recommendations based on the most likely outcome of the current battle can be prepared and presented. Fallback options are referenced to other spread sheets in the FSMAA.

Target Sheet

The target sheet is made up of seven major sections:

- Target category.
- Target sheet number and title (incorrectly labeled in the FSMAA as high-payoff target).

Ž Function.

- Description.
- Signature.
- Degradation effect.
- Some form of graphic representation.

Target Category, Sheet Number,and Title

The target category indicates in which of the 13 sets the target belongs,

The sheet number can be used to cross reference the target sheet with the spread sheet. The target title refers to the target type and function. The label "high-payoff target" from the FSMAA is a misnomer. This section really represents the high-value target cross-reference number (as shown on pages

EXAMPLE TARGET SHEET

(Classification)

TARGET CATEGORY:	Engineer
HIGH-PAYOFF TARGET:	Target 75. Ferry crossing site.
FUNCTION:	Provide rapid crossing of water obstacles for tanks and other nonamphibious systems.
DESCRIPTION:	Target radius – point target. Posture – exposed on water surface FEBA distance.
Composition:	Vehicles normally two ferries or rafts (if river over 300 meters wide, may be as many as five).
Personnel:	
SIGNATURE:	Visual – see graphic.
	Electronic –
	Other –
DEGRADATION:	Nonamphiblous forces must find alternate means to cross.
	Force that secured bridgehead is not reinforced.
GRAPHIC REPRESENTATION:	(Omitted)

(Classification)

G-8 through G-11). The other portions of the target sheet are more complex and contain most of the information useful to targeting personnel.

Function

The function section details the specific operations and tasks that the target is expected to perform. It includes the primary and secondary functions and indicates any relationship to the other target categories or types.

Description

The description of the target details the number and type of vehicles and equipment in a position and specifies the approximate number of personnel associated with the position. It details the usual distance from the FEBA and indicates the normal posture of the target with respect to camouflage and orientation and the amount and type of terrain occupied. The description is useful in considering what types of attack systems and munitions are to be used. It also helps to discriminate between targets of a similar function.

Signature

The signature section describes signatures ranging from visual and electronic to auditory and infrared.

Degradation

The degradation portion indicates what happens to the parent unit or an associated unit when the target function is removed. This section can be used by operations and fire support personnel to help determine effects desired against a target.

Graphic Representation

The graphic representation shows in a general overlay format how the target would be arrayed doctrinally on the battlefield.

GLOSSARY FOR TARGET CATEGORIES GRAPHIC

A/C	=	aircraft	MTR	=	motor transport regiment
AD	=	air defense	off	=	offense
ARPD	=	army missile transport battalion	ORPD	=	independent missile transport battalion
CGI	=	control group intercept	PMP	=	heavy folding pontoon (bridge type)
comm	=	communications	POZ	=	mobile obstacle detachment
COP	=	command observation post	PRTB	=	mobile repair technical base (rocket and missile)
CRTA	=	chief of rocket troops and artillery	PSNR-1	=	battlefield surveillance radar
DAG	=	division artillery group	RAG	=	regimental artillery group
DARM-4	=	mobile artillery repair shop complex (type)	regt	=	regiment
def	=	defense	R/R	=	radio/radar
DF	=	direction finding	SASP	=	special ammunition supply point
div	=	division	SIGINT	=	signal intelligence
ERP	=	engineer reconnaissance patrol	SP	=	self-propelled
how	=	howitzer	SSM	=	surface-to-surface missile
hvy	=	heavy	TA	=	target acquisition
inter	=	intercept	tac	=	tactical
MR	=	motorized rifle	TACAN	=	tactical air navigation
MRL	=	multiple rocket launcher	TR	=	tank regiment
MRR/TR	=	motorized rifle regiment/tank regiment	trans	=	transport
MTB	=	motor transport battalion	UHF	=	ultrahigh frequency
mtr	=	motor			

TARGET CATEGORIES CROSS-REFERENCE

CATEGORY	NUMBER AND TITLE
Fire Support Command, Control, and Communications	1. Bn FDC (SP) 2. Bn COP 3. RAG COP 4. DAG COP 5. Div arty command battery/CRTA/div COP 6. Btry FDC (SP how) 7. Bn FDC 8. Btry COP 9. Combat control group (air) and forward air controller 10. Vectoring target designation point (air) 11. Radio navigation point (air) 12. CGI radar site

TARGET CATEGORIES CROSS-REFERENCE (CONTINUED)

CATEGORY	NUMBER AND TITLE
Target Acquistion	13. TA btry CP, arty regt, div/army 14. Countermortar/counterbattery site 15. Sound ranging site 16. Radar intercept/DF site (pole dish–twin box) 17. Battlefield surveillance radar site (Big Fred, Small Fred)
Weapons	18. Arty battery firing position 19. MRL firing position 20. SSM firing position 21. Mortar btry firing position 22. Attack helicopter flight 23. Tac air flight
Logistics	24. Ammo resupply trucks/convoy
Command, Control, and Communications Maneuver CPS	25. MR regiment main CP 26. MR regiment forward CP 27. MR regiment rear CP 28. MR battalion main CP/COP 29. Division main CP 30. Division forward CP 31. Division rear CP 32. Division alternate CP 33. Radio reiay site 34. Army main CP 35. Army forward CP 36. Army alternate CP 37. Army rear CP 38. TR main CP 39. TR forward CP 40. TR rear CP 41. Tank battalion main CP/COP 42. Traffic control point
Maneuver	43. Advanced guard battalion 44. Advanced detachment 45. Accompanying artillery 46. MR company reinforced (off) 47. MR company reinforced (def) 48. Tank company reinforced (off 49. Tank company reinforced (def) 50. Tactical march column 51. Battaiion assembly area 52. Administrative march column

TARGET CATEGORIES CROSS-REFERENCE (CONTINUED)

CATEGORY	NUMBER AND TITLE
ADA	53. SA-4 brigade CP 54. SA-6 regiment CP 55. SA-8 regiment CP 56. SA-4 battalion CP 57. SA-6 btry CP 58. SA-8 btry CP 59. SA-4 btry CP 60. AD EW/TA radar site, long range 61. ZSU-23-4 platoon 62. SA-9 platoon 63. AD EW site, low level 64. AD EW site, medium range
Engineer	65. Assault crossing company 66. Pontoon bridge company 67. Tracked amphibian company 68. Tracked ferry company 69. Mobile obstacle detachment 70, Movement support detachment 71. Engineer reconnaissance patrol 72. Tank snorkeling site 73. PMP bridge 74. Tracked amphibian crossing site 75. Ferry crossing site
Nuclear/Chemical	76. ORPD 77. PRTB 78. ARPD 79. Nuclear depot/SASP 80. SSM met station 81. 203-mm howitzer firing position 82. 240-mm mortar firing position
RSTA	83. Battlefield surveillance radar site (PSNR-1) 84. Combat reconnaissance patrol 85. Recon patrol, regt, reconnaissance company 86. Recon patrol, regt, div reconnaissance company 87. Airbome sensors 88. HF comm jamming site 89. I band noise jamming site 90. TACAN jamming site

TARGET CATEGORIES CROSS-REFERENCE (CONTINUED)

CATEGORY	NUMBER AND TITLE
	91. Radio/radar intercept/DF site(division) 92. Radio/radar intercept/DF site (front) 93. I band noise jamming site 94. J band noise jamming site 95. A/C comm jamming site 96. HF DF site, army 97. HF DF site, front 98. Processing group, R/R recon company, recon bn, div 99. Airborne SIGINT platform 100. Radar DF site (mobile co, radar ranging intercept regiment, front) 101. Tropospheric scatter intercept site 102. Radio relay airborne jamming system 103. Radar intercept site (hvy co, R/R inter regt, front) 104. Radio inter and DF site 105. VHF/UHF jamming site 106. HF jamming site 107. Radar intercept and DF site 108. Radar intercept and DF site (radio inter regt, front and R/R inter regt, front) 109. VHF jamming site 110. Radio intercept and DF site (radio inter and DF co, radar inter bn, army)
Class III (POL)	111. Mtr trans co, regt 112. POL trans co, MTB, div 113. POL regt, MT bde, front 114. Pipeline bn, front 115. Regt POL point 116. Div POL depot 117. Army POL depot
Class V (Ammo)	118. Ammo transport co, MTB, dlv 119. Regt ammo depot 120. Div ammo depot 121. Army ammo depot 122. Front ammo depot 123. Front supply base section
Class IX (Maint, Repair Parts)	124. Regt rnaint co, MRR/TR 125. Bn repair and evacuation group 126. Damaged vehicle collection point 127. DARM-4 mobile artillery repair shop complex
Lift	128. MTR, trans bn, div

High-Payoff Target List

The high-payoff target list identifies the HPTs for a specific point in the battle in the order of their priority for acquisition and attack. While target value is usually the greatest factor contributing to target payoff, other things to be considered include the following:

- Sequence or order of occurrence.
- Ability to locate and identify the target.
- Degree of accuracy and identification available from the acquisition system.
- Ability to engage the target.
- Ability to defeat the target.
- Resource requirements necessary to accomplish all of these.

The PRIORITY column simply lists the priority order of the list. The list may have any number of target priorities.

The CATEGORY column identifies the target category from which each listed high-payoff target comes. Time-sensitive (TS) targets may be identified in this column.

The SHEET NUMBER column identifies the target sheet number of each high-payoff target.

The DESCRIPTION column identifies the target description from the appropriate target sheet.

EXAMPLE HIGH-PAYOFF TARGET LIST

PRIORITY	CATEGORY	SHEET NUMBER	DESCRIPTION
1	8 N/CH (TS)	77, 79	PRTB, nuclear depot
2	1 C^3 (TS)	29, 34	Division, army main CP
3	2 FS (TS)	5	Div arty command btry
4	2 FS	1, 2, 18	Arty bn FDC, COP, FA btry
5	1 C^3	25, 30	Regimental main CP, div fwd CP
6	3 MAN	50, 51, 46, 48	Bn assembly area, march column, MR/TK co
7	4 ADA 7 REC	63, 64 91, 92	AD EW site, radio/radar inter sites
8	9 POL	115, 116	Regimental/division POL points
9	10 AMMO	120, 121	Division/army ammo depots

The TVA Process

The following paragraphs present a divisional how-to guide with enough detail to provide a transition from concepts to workable TVA attack guidance. The specific tasks discussed are not normally done at levels below division. However, similar tasks are done as part of normal operations of a brigade battle staff. In performing its own target value analysis, the brigade concentrates on division-level spread sheets and target sheets. The brigade attack guidance addresses assets the brigade controls. The brigade targeting effort always occurs within the context of the decision support template. The high-payoff target list and attack guidance at brigade and task force or battalion are normally more detailed and focused than those at higher levels. This discussion is presented to facilitate an understanding of the requirements and products of the TVA process that may impact at brigade level and below. Tasks identified are done at division by the field artillery intelligence officer (FAIO) in conjunction with the targeting team and at brigade and below by the targeting officer in conjunction with the battle staff. For a more detailed discussion of specific TVA tasks and the targeting process, see FM 6-20-10.

As soon as a likely enemy course of action is determined, determine the tactical situation and find the appropriate spread sheet. Then, identify the target sets with the highest relative worth.

Coordination

Coordinate with G2 and G3 plans as follows:

- From the G2 and G3, get any commander's guidance for relative worth or delay or limit modifications.
- Ž With the G2 and/or G3, integrate finding high relative worth target sets into division priority intelligence requirements.

Get G2 input for the high-value target list based on the G2 estimate of the enemy situation.

Coordinate with G2 for planning target areas of interest and decision points. The FS cell should brief the G2 on the deep attack assets available, their ranges and capabilities, and their reaction times.

Use of Spread Sheets

From the selected spread sheet, extract the following:

- The relative worth for each set. The relative worth will drive target attack guidance.
- Target sets to be delayed or limited. These sets will drive the attack in depth (interdiction) effort.
- High-value targets. Develop the list of high-value targets from the mission area analysis and the commander's guidance. This list will drive the development of the high-payoff target list.
- Enemy fallback options. These will drive preparation of TVA for future operations.

Development of the High-Payoff Target List

Start with the list of identified high-value targets, and prioritize the targets according to their relative worth and the commander's guidance.

Eliminate all targets beyond the range of division-level weapons. When the commander has approved the high-payoff target list, coordinate with the next-higher FS cell and the ALO to engage these targets.

Eliminate those targets that are too large or too hard to engage with division-level assets. Consider these targets for engagement by corps, CAS, and nuclear and chemical weapons.

Coordinate with the G2 and/or ASPS. Eliminate targets to be engaged that cannot be regularly acquired in a timely manner.

The remaining high-value targets, which can be acquired and effectively attacked once they are acquired, comprise the high-payoff target list,

Coordinate with the G2, ASPS, and/or div arty targeting personnel to search for the targets on the high-payoff target list.

Disseminate the high-payoff target list to all fire support agencies.

Preparation of Target Attack Guidance Matrix

The attack guidance matrix is a means used to present the attack guidance for specific high-payoff targets. This guidance is recommended by operations and fire support personnel for approval by the commander. The procedure for preparing a target attack guidance matrix is described below.

Target Category and High-Payoff Target Numbers

First, list the 13 target categories in the CATEGORY column. Transfer all the target sheet numbers for these categories from the high-payoff target list to the HIGH PAYOFF column.

Effects Levels

Determine what effect (suppress, neutralize, or destroy) the commander wants on each target set. Determine if the effect the commander wants requires that a modification be recommended. If ammunition and fire units are plentiful, greater effects may be achievable. If ammunition and fire units are limited, decrease the effects levels for borderline categories. On the basis of this determination, insert the appropriate effects in the HOW column of the attack guidance matrix. Enter the letter *S* for suppress, *N* for neutralize, or *D* for destroy. If a modification or a specific effects level is required, indicate that in the HOW column.

When to Attack

Determine when to attack each target set. Indicate in the WHEN column the decision for each target set. Enter the letter *I* for immediate, *A* for as acquired, and *P* for plan.

Immediate attack should be limited to not more than two target categories. The nuke/chemical target category is always **immediate.** If there is another category that has very high relative worth and is highly mobile, make it **immediate.**

Most targets will fit in the **as acquired** category. In general, any target that is worth shooting and is expected to move will be classified **as acquired.** Targets that are worth shooting and are not expected to move may be classified **as acquired** or **plan.**

NOTE: The term *expected to move* means that the target is likely to move before fires on the target are planned and executed. The exact length of this time will depend on both technical considerations (how long it will take to compute the fire plan, move fire units into position, break out ammunition, and so forth) and operational considerations (for instance, SEAD plans will not be fired until nearly the time of the air strike, preparations will not be fired until nearly H-hour, and so forth).

The **plan** attack guidance should apply to two different types of target categories:

- Target categories that, in the current situation, are not worth shooting at this time.
- Targets that may be used in future schedules of fire (such as preparations, counterpreparations. and programs) and are not likely to move before the schedule of fires is expected to be shot.

Determine any exceptions to the I, A, and P guidelines given above and adjust guidance accordingly. For example The guidance might be "Don't shoot C^3 targets because we are getting good intel from radio intercepts," This

guidance would make C^3 a **plan** target set instead of **as acquired.**

Restrictions and/or Remarks

In the RESTRICTIONS column, identify targets that are to be coordinated with or engaged solely by EW assets. Coordinate with the G3 EW officer for guidance on what can be effectively jammed and how jamming can be coordinated.

Identify targets that are well suited for engagement with nuclear and/or chemical weapons. Note which targets should go in the nuclear development file.

Identify targets that should be nominated for attack by CAS or Army aviation assets.

Identify any special ammunition or weapon systems considerations.

Identify specific targets within a category that are much more important than the category as a whole. For instance, if a maneuver commander is particularly concerned about ATGMs, maneuver as a whole might be a category to suppress. To indicate this, include the remark *Neutralize A TGMs.*

Dissemination of Matrix

Finalize the attack guidance matrix as shown below. Disseminate the attack guidance matrix so that all fire support agencies have it.

EXAMPLE ATTACK GUIDANCE MATRIX

CATEGORY	HIGH PAYOFF	WHEN	HOW	RESTRICTIONS
1 (C^3)	25, 29, 30, 34	I	N/EW	Coordinate attack with EW
2 (FS)	1, 2, 5, 18	I	N	Plan all calibers greater than 122 mm
3 (MAN)	46, 48, 50, 51	I	10%	
4 (ADA)	63, 64	A	N	
5 (ENGR)	69, 70	P	N	Not high-payoff target
6 (RSTA)	14, 16, 17, 84, 85, 107	A	D	Not high-payoff target
7 (REC)	91, 92	A	S/EW	Coordinate attack with EW
8 (N/CH)	77, 79	P	D	Forward targets to division
9 (POL)	115, 116	A	D	
10 (AMMO)	120, 121	A	N	
11 (MAINT)		A	S	
12 (LIFT)		A	S	
13 (LOC)	118	A	N	Not high-payoff target

Preparation for Future Operations

To prepare TVA for future operations, identify enemy fallback options. As time permits, perform TVA through the identification of high-payoff targets for each enemy fallback option. Coordinate with G3 plans to update and modify TVA for future operations.

Integration of TVA Process Into Fire Support Planning

In the conduct of combat operations, the TVA process described in this appendix must be modified at brigade level according to the time and resources available for planning. This is because TVA is not conducted formally below brigade level. Targeting at the brigade is focused on close operations, the nature and posture of the opposing force, and the resources available to the commander. Targets of interest are primarily tactical CPs, small combat and combat service support units, and possibly key terrain of immediate concern to the brigade.

If the brigade is deployed as part of a division, the brigade S2 should receive the results of a detailed IPB from the division G2. The brigade S2 will further develop the IPB within the brigade zone in an attempt to identify likely enemy avenues of approach and possible enemy courses of action. The targeting officer, with the maneuver brigade S2, uses target spread sheets (if available) to identify potential high-value targets. Spread sheets are based on the size of the opposing enemy force and a possible enemy course of action. A list of these targets prioritized on the basis of their relative worth to the enemy commander becomes the high-value target list associated with that particular enemy course of action.

As the staff prepares their estimates, staff members consider the high-value target list in determining the friendly course of action. During the staff war-gaming process, the targeting officer (in conjunction with the S2, S3, and FSO) develops the high-value target list into a high-payoff target list based on the targets that are of concern to the friendly maneuver commander and that will facilitate the success of the friendly course of action. The high-payoff target list is sent to the maneuver commander for his approval and to allow him to modify the list as he deems necessary.

The targeting officer recommends attack guidance from the high-payoff target list to describe how targets are to be attacked (effects criteria), when they are to be engaged (prioritization in the engagement of specific target types), and any restrictions that may apply in terms of target dwell time, target location error, or munition type. Some target categories may be restricted from engagement, because of the limited availability of assets or because the target can be exploited for SIGINT information. Attack guidance is disseminated to all fire support attack and acquisition agencies available to the brigade.

The targeting officer recommends changes to the attack guidance based on events that occur during the battle and on target damage assessment (TDA) reports.

Integration of TVA Process into TACFIRE Operations

The primary means of integrating the high-payoff target list and the attack guidance into TACFIRE operations is by establishing fire mission modifications in the FM; MOD file. Select the HPT types identified on the attack guidance matrix for immediate attack, and identify them by target type or subtype in the PTYPE field of the FM; MOD file.

Target attack modifications must then be made to the FM;ATTACK file to override default attack criteria with any modifications from the attack guidance matrix. First, review the default attack criteria for target types or subtypes in the FM; ATTACK file. Then,

modify the default guidance to conform to the commander's attack guidance contained in the approved matrix.

Specific changes to TACFIRE default criteria must be published in the operation order. In addition to other tactical fire support files, the FM; MOD and FM;ATTACK files should be reviewed by TACFIRE shift personnel at least as often as shifts change to ensure that the current commander's guidance is reflected in the files.

For specific procedures and mnemonics for the FM; MOD and FM; ATTACK files, see the current edition of TM 11-7440-240-10.

APPENDIX H

SPECIAL MUNITIONS

Section I. FAMILY OF SCATTERABLE MINES

Employment Considerations

The decision to use and the purpose of FA-delivered FASCAM must be carefully considered by the commander, engineer, FSO, and S3. The engineer officer provides the expertise on employment of all types of FASCAM. The FSO provides the technical expertise to the engineer concerning the employment of FA-delivered FASCAM. The ALO advises the engineer officer concerning FASCAM delivered by the Air Force. As part of the estimate process, the FS cell should advise the commander of anticipated FA-delivered FASCAM densities and safety zones. The estimated densities and safety zones could affect the use and/or positioning of FA-delivered FASCAM. The engineer must seek an alternative FASCAM delivery means if FA-delivered FASCAM will not meet the commander's density requirement or cannot be used because of range, positioning, or safety limitations. There are two types of FA-delivered FASCAM: an area denial antipersonnel mine (ADAM) and the remote antiarmor munition system (RAAMS) for use against lightly armored vehicles. **Both are available only in 155 mm.** FASCAM has two preset self-destruct times:

- Short duration (unclassified self-destruct time of less than 24 hours).
- Long duration (unclassified self-destruct time of greater than 24 hours).

The corps commander has the authority to employ FASCAM. Employment may be delegated for specific operations or limited periods of time as follows:

- Long duration down to maneuver brigade.

Ž Short duration down to maneuver battalion.

FA-delivered FASCAM enables the maneuver commander to quickly emplace a minefield. Like any obstacle, FASCAM is best used at a choke point covered by effective indirect and antitank (AT) fire. The principles of obstacle coverage apply even more strongly to FASCAM because the mines are surface-laid and visible. An undisturbed enemy in column can work through this type of field quickly.

Capabilities

In the defense, FASCAM is used –

- To develop targets for long-range antitank weapons.

Ž To close gaps and lanes in other obstacles.

Ž To delay or disrupt attacking forces.

- To deny enemy unrestricted use of selected areas.

Ž To disrupt movement and commitment of second-echelon forces.

Ž To disrupt and harass enemy command and control, logistics, or staging areas.

- To reinforce existing obstacles.
- To disrupt or delay river crossings.

In the offense, FASCAM is used –

Ž To supplement flank reconnaissance and security forces in protecting flanks along avenues of approach.

• To suppress and disrupt enemy security elements once contact has been made.

Ž To hinder withdrawal of enemy forces.

Ž To hinder the ability of the enemy to reinforce the objective area.

Employment Options

FASCAM may be delivered all RAAMS, all ADAM, or a combination of both. If RAAMS and ADAM are employed on the same target, ADAM is fired as the last volley.

ADAM may be used without RAAMS. Five basic missions for ADAM (besides augmenting RAAMS on an artillery-delivered minefield) are as follows:

• Reinforce antitank obstacles. ADAM can be used to augment antivehicle obstacles by inhibiting dismounted clearing parties. Having ADAM available for this task allows engineer units to concentrate their efforts on antivehicle obstacles such as antitank minefields, abatis, and road craters.

• Reinforce antipersonnel obstacles. ADAM can be used in a similar manner to augment barbed wire or concertina wire obstacles against personnel.

• Interdict unarmored vehicles. When used LAW guidelines discussed later, ADAM can be used for interdiction or area denial against a variety of soft targets. These include resupply vehicles; towed artillery and mortars; and truck-mounted headquarters, communications, and EW sections.

• Augment conventional fires on unarmored targets. ADAM can be used to increase the effectiveness of fires against the same sort of targets it can interdict. These targets can be engaged with HE or improved conventional muntions (ICM), followed by ADAM to limit their ability to reconstitute or reorganize and displace.

Ž Provide counterfire or suppress enemy air defense or field artillery. ADAM could be delivered after HE or DPICM volleys on enemy AD or indirect fire units. This use would prolong the effectiveness of the artillery attack by disrupting and neutralizing or suppressing the target after firing has ceased. If the enemy indirect fire units are self-propelled, RAAMS could be used in conjunction with ADAM.

FASCAM may be delivered in conjunction with other munitions. In that way, it extends the effects of other munitions. For example, ADAM may be fired into a logistical site after DPICM is fired. If fired in conjunction with other munitions, FASCAM is fired in the last volleys.

Basic Uses of FASCAM

There are four basic uses of FA-delivered FASCAM:

Ž Interdiction or area denial.

Ž Employment as an obstacle.

• Employment to augment an obstacle.

• Employment against targets of opportunity.

Interdiction or Area Denial

FA-delivered scatterable mines are not well suited for interdiction or area denial. Because FA-delivered minefield tend to be small and of low density (because of low ammunition availability), they are easily bypassed and/or breached. FA-delivered mines are poorly suited for interdicting roads for three reasons:

- The mines tend to break up or malfunction when they land on a hard surface road.

Ž The mines are easy to see against the uniform background of a road.

Ž Units on roads are already moving in column and columns are the best formations for breaching scatterable rninefields.

If RAAMS and ADAM are used for interdiction or area denial, three employment guidelines apply:

- Employ them only at choke points to keep the enemy from easily bypassing the minefield.

- Employ them in high-density fields to prevent breaching.

- Employ them when and where they are hard to detect; for example, in limited visibility (at night or in fog) or where the enemy will be buttoned up (for instance, in a chemically contaminated area).

In summary, FA-delivered minefields can be used for interdiction and area denial, but a larger amount of ammunition must be delivered at a carefully chosen place and time. In general, RAAMS and ADAM are most effectively employed when covered by direct fire.

Employment as an Obstacle.

Any type of FASCAM should be employed according to the basic principles of minefield employment:

- Employ mines at a choke point.

Ž Cover mines with effective direct fire and indirect fire by using HE-VT or DPICM.

- Keep minefields under continuous observation. Use night observation devices (NODS) and planned illumination targets at night.

- Emplace rninefields in belts if possible. It is better to force the enemy to breach three narrow minefield than to have him breach one wide one.

- plan to defeat enemy breaching efforts. Coordinate with the S2 and engineer to anticipate how and where the enemy will try to breach the minefield. Plan direct and indirect fires to defeat enemy breaching parties.

FASCAM in general presents a unique planning challenge for fire support personnel because it is visible and vulnerable on the surface of the terrain. This leads to two special considerations:

- Reduce the enemy's ability to see. Use indirect fire to make him button up, If you can force the enemy into MOPP 4 with a real or simulated chemical attack, that is even better.

- Minimize indirect fires on top of the FASCAM. This represents a judgment call. Firing on the minefield destroys breaching parties, but it also makes the minefield easier to breach (by destroying the exposed mines).

One compromise is to concentrate indirect fires on targets immediately beyond the minefield and direct fires on targets in the minefield, (This also keeps the artillery from interfering with TOW gunners), If a mine plow or other mine-clearing vehicle enters the minefield and clears a lane, following vehicles will have to bunch up to enter the lane and may present a good target.

If the enemy has cleared a lane and is on the verge of breaching the minefield, consider firing a heavy concentration of smoke and/or DPICM directly on top of the minefield. The smoke should obscure the remaining mines as well as the clear lane markers that the vehicles are trying to follow. Use of smoke will have to be carefully coordinated, since it will inhibit friendly direct fire weapons, However, a fire mission of this type should be on call in case

the enemy places smoke in between your maneuver force and the minefield to screen his breaching efforts. If the enemy fires smoke first, it is to your advantage to shoot the minefield with smoke and/or DPICM to disrupt his crossing efforts.

FA-delivered scatterable mines introduce another planning problem – timing. Firing mines too early gives the enemy time to avoid them, limits friendly freedom to maneuver, and can result in the mines self-destructing too early. Firing mines too late can result in their landing behind attacking enemy forces and being worthless.

For these reasons, the trigger point for firing RAAMS and/or ADAM must be very carefully coordinated between the S3, the S2, and the FSO. The trigger point for firing FA-delivered mines must meet two criteria:

- When the enemy reaches the trigger point, he must be committed to the avenue of approach on which the mines will be delivered.

- The trigger point must be far enough forward of the proposed minefield that the minefield can be emplaced before the enemy reaches it.

The trigger point should be a target area of interest in the brigade S2's IPB. The TAI should be under surveillance at all times (use NODS and planned illumination targets at night). The element observing the TAI should have the authority to fire the minefield or a direct communications link to whoever is going to call for the mines.

The TAI must be far enough beyond the minefield that the minefield will be in place in time in a worst-case scenario. The FSO should allow for the time it takes to send the call for fire, process the call for fire, execute the mission, and arm the mines. (Remember, the mines do not arm immediately on impact.) There should be an alternate method of firing the minefield in case TACFIRE is jammed with other fire missions.

The key consideration in emplacing FA-delivered mines is that mines delivered too early may be less effective than they could be, but mines delivered too late are worthless.

Employment to Augment an Obstacle

FA-delivered scatterable mines are optional weapons for closing lanes in existing obstacles or reseeding breached minefield.

RAAMS and/or ADAM used to close a lane(s) in an obstacle should be planned with the same considerations as RAAMS and/or ADAM planned as an obstacle. Another consideration in using RAAMS and/or ADAM to close a lane is how wide the artillery minefield should be. A rule of thumb is to use the width of the lane plus the expected delivery error when the mines are fired. This leads to two planning considerations to minimize the amount of ammunition used:

Ž Get the best possible grid to the center of the lane. Use PADS if possible – intersection or resection if necessary.

Ž If possible, depending on METT-T, adjust the mission in advance onto the center point of the lane and record it as a target.

Planning for using artillery-delivered mines to close breached obstacles should involve the S3, S2, engineer, and FSO. This group should identify the most likely points at which the enemy will try to breach the obstacle and how wide the breach will probably be. As with using mines to close a lane, these points should be identified by the most accurate grid attainable, fired in, and recorded as targets. Even if the enemy does not breach at these exact locations, the targets should provide accurate points from which to shift in firing mines.

The FSO must identify which observer is to fire RAAMS and/or ADAM to close a breach and under what conditions the obstacle is considered breached. (For example, is it when one vehicle passes through or when one engineer vehicle has passed through and marked a lane?) The FSO should identify an alternate observer to fire the minefield in case smoke screens, communications problems, or enemy fire prevents the primary observer from reseeding the obstacle at the proper time.

A call for fire for mines to close a breach will conflict with conventional calls for fire on the breaching units. If a RAAMS or ADAM call for fire is going to take priority over other calls for fire, an alternate channel could be set up so the RAAMS or ADAM call for fire can jump the TACFIRE message queue. This will probably require a voice call for fire over a command net.

Employment Against Targets of Opportunity

Minefields against targets of opportunity (unplanned) must be emplaced immediately because of the fleeting nature of the targets. Minefield may be requested through the fire support channels at any level. Once the maneuver commander has approved the use of FA-delivered FASCAM, minefield can be emplaced according to his guidance.

Normally, these minefield are used against targets that can be observed (by the FIST or AFSO) or that are specifically identified by target acquisition sources such as radar, sensors, and other acquisition devices. Their processing is similar to that of FA target-of-opportunity missions. Fire for effect (FFE) or observer adjustment is used against either moving or stationary targets.

Density and Duration. Unplanned minefield are standard in density and duration, depending on the tactical situation and the commander's guidance. An example is as follows:

Ž Density: 24 RAAMS, 6 ADAM.

• One aimpoint.

Ž Short duration.

Target Location. There are two types of aimpoints – stationary and moving targets:

- The aimpoint for a **stationery target** is placed directly over the target center. Aimpoints are located to an accuracy of 100 meters (adjust fire) and 10 meters (FFE).
- The aimpoint for a **moving target** is placed directly in front of the enemy axis of advance, 1,000 meters in front of the enemy target for every 10 kilometers per hour (kmph) of speed. This allows enough time for mine delivery and arming before enemy encounter.

Fire Mission Request. The fire mission request is transmitted and processed generally the same as other requests for target-of-opportunity fire missions. The requestor must specify the following:

• Identification (call sign).

• Warning order (include RAAMS, ADAM, or both).

Ž Target location (aimpoint).

• Target description.

Ž Method of engagement.

• Method of fire and control.

Unless the observer requests ammunition for adjustment, he will receive DPICM (self-registering) in adjustment and the standard minefield in effect (6 ADAM and 24 RAAMS, according to the previous example).

WARNING

Targets of opportunity are either FFE or adjust fire missions. FFE missions should not be requested If the center of the minefield is less than 700 meters from the nearest friendly position. Adjust fire missions should not be requested if the center of the minefield is less than 425 meters from the nearest friendly position.

EXAMPLES OF FIRE MISSION REQUEST

Fire-for-Effect Mission

A4Z57 THIS IS A4Z42, FIRE FOR EFFECT, ADAM, OVER.

GRID 18045132, OVER.

PLATOON IN THE OPEN, OVER.

Adjust Fire Mission

A4Z57 THIS IS A4Z42, ADJUST FIRE, RAAMS, OVER.

GRID 180513, OVER.

FIVE T72 TANKS ATTACKING OVER.

The FA battalion receiving the call for fire designates the firing unit(s): On completion of the minefield emplacement, the fired data are forwarded to the divisions, brigade, or battalion FSE. The fired data are recorded in Section D of DA Form 5032-R (Field Artillery Delivered Minefield Planning Sheet). A reproducible copy of this form is in Appendix L. The FSE computes the safety zone according to the fired data and passes it to the engineer for dissemination to higher, lower, and adjacent units as appropriate.

Firing in Artillery-Delivered Mines

One of the key considerations in emplacing a minefield with indirect fire is to get a precise target location, The three basic ways of doing this, from most to least desirable, are as follows:

- Use target area survey.
- Fire the center grid in with DPICM in the self-registering (ground burst) mode and have the FDC replot to get the adjusted grid.
- Carefully map-spot the grid through intersection, resection, or terrain association.

No matter which method is used, the center grid of the proposed minefield should be recorded as a target. This provides a center for RAAMS and/or ADAM fires, a target for smoke and/or ICM to attack breaching forces, and a known point from which to shift in calling fires onto units just beyond or in front of the minefield. The use of FA target numbers for FASCAM planning by the engineer facilitates coordination.

Choosing Minefield Width and Density

The first, and most obvious, consideration is ammunition availability. This, combined with fire unit positioning and minefield depth, will provide an estimate of how many meters of minefield width are available for various densities.

Lane-closing mines should be delivered in a sufficient width to cover the lane and allow for delivery error. If the aimpoint grid has been determined by PADS or by replot procedures after being fired in, the delivery error will probably be small. If the aimpoint location is map-spotted, the minefield width must allow for errors in grid location.

Artillery-delivered mines used for interdiction or area denial or as an obstacle should be wide enough to fill the choke point and to tie into natural or artificial obstacles at either end.

Again, the width of the minefield should allow for errors in delivery and aimpoint location.

Density depends on the mission of the minefield. If a minefield is covered with direct and indirect fire (for example, if the enemy is buttoned up and maneuvering), a low-density minefield will provide an effective obstacle. If the mines are available, a medium-density field is desirable but not absolutely necessary.

Medium- and high-density fields are particularly useful for defending forces that are heavily outnumbered and/or who need time to move to alternate firing positions or withdraw to a subsequent battle position.

In general, the greater the enemy combat power, the denser the minefield should be. If the defending force has a relatively large amount of firepower, the minefield serves to slow and restrict enemy units so that they can be engaged with direct fire. If the defending force has relatively little firepower, the direct fire of the force is used to make the enemy maneuver through the minefield so that he can be engaged by the mines.

Fire Unit Selection Considerations

Two questions should be answered in selecting a fire unit:

- What is the counterfire threat?
- What could the battery do if it were not firing RAAMS or ADAM?

The competition for artillery tubes during battle will be great. This tends to increase the time between mission request and completion. The proliferation of artillery munitions and limited haul capabilities of artillery units may tend to reduce the number of mine rounds immediately available at battery level. Given a limited carrying capacity for artillery ammunition, a choice must be made whether to leave behind other ammunition to carry additional FASCAM. Requesting ammunition for immediate consumption, stockpiling of ammunition on the ground, and other measures can be used to overcome the constraint.

Another factor in the counterfire threat is how good the enemy target acquisition assets are. If a battery fires one volley, it is acquired; if a battery fires 20 volleys, it is acquired. The key question becomes not whether or not a battery will be acquired (it will be) but how long it will be before acquired batteries will be engaged. If you are acquired on the first round and you have to move anyway, you might as well finish your mission before you go.

Safety Zone Determination

The FSO is responsible for obtaining safety zones. Safety zones may be computed by the DS battalion FDC or by the FSO by using the safety zone table on page H-8. An alternative method is to use the mine safety template. (See TC 6-40 for specific delivery techniques.) The engineer is responsible for disseminating the safety zones to appropriate units.

Use of Safety Zone Table

Use the following fired minefield data:

- Type of projectile fired (ADAM or RAAMS).
- Trajectory (high or low angle).
- Range (to minefield center).
- Technique (met + velocity error [VE]/transfer or observer adjust).
- Aimpoint coordinate(s) (single or left and right).

Enter the table at the nearest range for the projectile type and trajectory, and use the correct employment technique column to determine the size of the safety zone.

Draw the determined safety zone centered over each aimpoint to establish the minefield safety zone.

NOTE: Approximately 99 percent of all mine-delivery missions will result in the entire minefield (minefleld modules) being inside the safety zone squares.

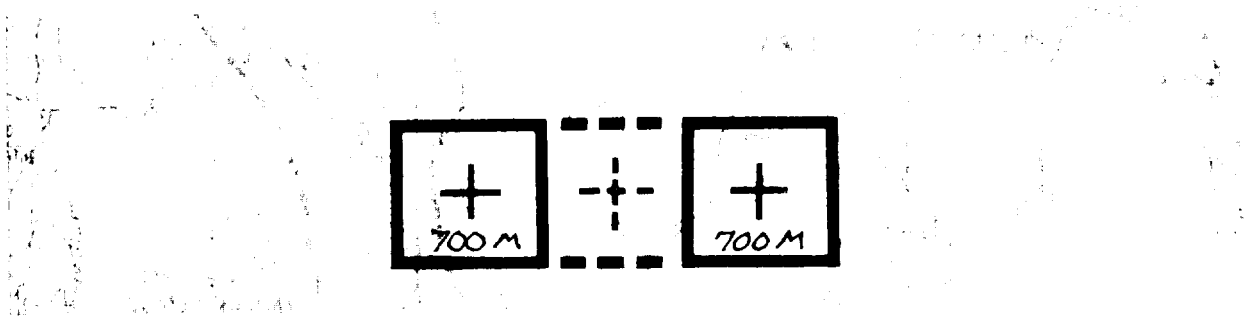
MINEFIELD SAFETY ZONES

PROJECTILE AND TRAJECTORY	RANGE (KM)	MET + VE/TRANSFER TECHNIQUE	OBSERVER ADJUST TECHNIQUE
RAAMS Low-Angle	4	500 x 500	500 x 500
	7	550 x 550	500 x 500
	10	700 x 700	550 x 550
	12	850 x 850	550 x 550
	14	1000 x 1000	650 x 650
	16	1050 x 1050	650 x 650
	17.5	1200 x 1200	650 x 650
ADAM Low-Angle	4	700 x 700	700 x 700
	7	750 x 750	700 x 700
	10	900 x 900	750 x 750
	12	1050 x 1050	750 x 750
	14	1200 x 1200	850 x 850
	16	1250 x 1250	850 x 850
	17.5	1400 x 1400	850 x 850
RAAMS or ADAM High-Angle	4	750 x 750	700 x 700
	7	900 x 900	700 x 700
	10	1050 x 1050	750 x 750
	12	1200 x 1200	750 x 750
	14	1400 x 1400	850 x 850
	16	1500 x 1500	850 x 850
	17.5	1400 x 1400	850 x 850

EXAMPLE SAFETY ZONE DETERMINATION

FIRED DATA	ACTION
Projectile: RAAMS **Trajectory:** Low-angle **Range:** 9 kilometers **Technique:** Met + VE **Aimpoints:** Three (left and right aimpoint coordinates given)	Enter the table at range 10 km (closest) for RAMMS, low-angle, and met + VE. The safety zone for each aimpoint is 700 x 700 meters. Draw the 700- by 700-meter safety zone over the left and right aimpoints. To determine the safety zone for the minefield, draw lines connecting the two squares.

Completed Example



Use of the Mine Safety Template

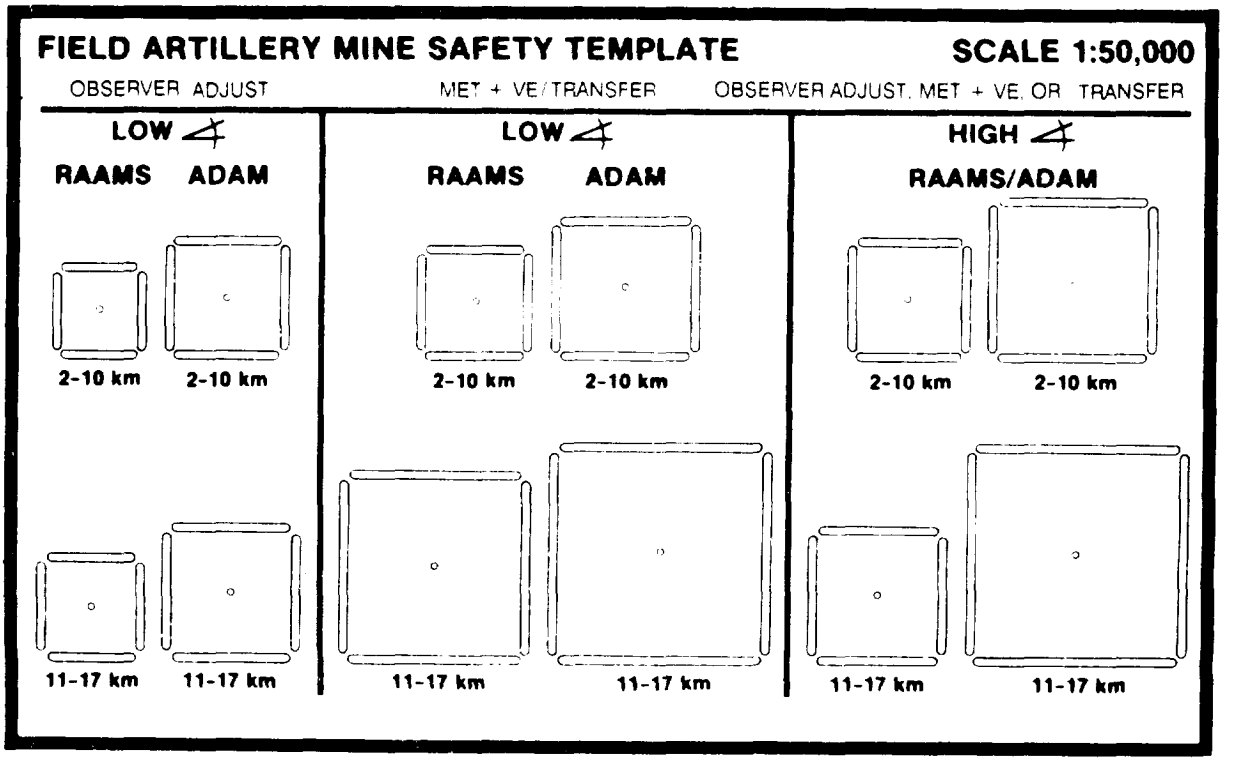
Enter the template with the fired minefield data:

- Technique (met + VE/transfer or observer adjust).
- Trajectory (high or low angle).
- Type projectile fired (RAMMS or ADAM).
- Range (to minefield center).
- Aimpoint coordinates (center or left and right).

Center the selected template safety zone square over the aimpoint(s). Draw a square to establish the minefield safety zone.

NOTE: A template pattern is in Appendix L.

FIELD ARTILLERY MINE SAFETY TEMPLATE



Scatterable Minefield Report

The FASCAM delivery unit is responsible for initiating the scatterable minefield report, first by radio and later by hard copy. This report is submitted through the FS cell to the engineer. The format is as shown below.

SCATTERABLE MINEFIELD REPORT FORMAT

LINE	INFORMATION REQUIRED	INSTRUCTIONS
1	Approving authority	Enter the approving authority; for example, *CDR 3AD.*
2	Target or obstacle	If the minefield is part of an obstacle plan, enter the obstacle number (such as *2XXX0157*, which represents 2d Corps, target number 157). If the minefield is not a part of an obstacle plan or does not have a number, then leave this line blank or enter *NA*.
3	Type emplacing system	Enter the type of system that emplaced the minefield; for example, *GEMSS, ARTY,* or *Volcano.*
4	Type mines	Enter *AP* for antipersonnel mines or *AT* for antitank mines. If both are used, enter *AP/AT.*

SCATTERABLE MINEFIELD REPORT FORMAT (CONTINUED)

LINE	INFORMATION REQUIRED	INSTRUCTIONS
5	Self-destruct period	Enter the time period in which the minefield will self-destruct
6-14	Aimpoint or corner points of minefield	If the system emplacing the minefield uses a single aimpoint to deliver the mines, enter that aimpoint; for example, *MB10102935.* If the system has distinct corner points, as does *GEMSS*, enter those corner points; for example, *MB17954790, MB18604860, MB18504890, MB18054895, MB17804850.*
15	Size of safety zone from aimpoint	If an aimpoint is given in line 6, enter the size of the safety zone from that aimpoint. For example, if artillery emplaces a minefield from aimpoint MB10102935 and the safety zone is 1,000 by 1,000 meters, enter *500 M* so that personnel plotting or receiving the information can plot the coordinate and then plot the safety zone 500 meters in each direction from the aimpoint.
16	Unit emplacing mines and report number	Enter the unit emplacing the mines and the report number; for example, *CO B, 23 ENGR BN 4.* (Reports are numbered consecutively.) This would be the fourth minefield that Co B, 23d Engr Bn has emplaced.
17	Person completing report	Enter the name of the person completing the report; for example, *SFC Hollings.*
18	Date-time group of report	Enter the date-time group of the report; for example, *160735ZJUL89.*
19	Remarks	Enter any other items the reporting unit may consider important.
LEGEND: ARTY = artillery AP = antipersonnel GEMSS = ground-emplaced mine-scattering system		

MATRIX KEY TO FA-DELIVERED SCATTERABLE MINE EMPLOYMENT TABLES

ENTRY DATA	EMPLOYMENT TABLE							
	1	2	3	4	5	6	7	8
Transfer or met +VE	X	X	X	X				
Observer adjust					X	X	X	X
M718/741 (RAAMS) low angle	X	X			X	X		
M718/741 (RAAMS) high angle			X	X			X	X
M692/731 (ADAM) low or high angle			X	X			X	X
BMA ≤ 800 mils	X		X		X		X	
BMA > 800 mils		X		X		X		X

Field Artillery Employment Tables

Matrix Key

As a quick reference, use the matrix key to determine the minefield employment table to be used. Enter the matrix from the left with the appropriate deiivery technique, shell, trajectory, and the battery-minefield angle (BMA). Read right and then up to select the proper employment table.

Employment Tables

Once the correct table has been located, the entry arguments into each table are the range to the minefield center (expressed to the nearest 2,000 meters; if exactly halfway between, express to lower range) and the desired width of the minefield. Extract from the table the number of aimpoints required to emplace the minefield.

MINE EMPLOYMENT TABLE 1

Delivery Technique: Transfer or met + VE
Shell: M718/741 (RAAMS)
Trajectory: Low angle
BMA: Equal to or less than 800 mils

RANGE (METERS)	DESIRED MINEFIELD WIDTH (METERS)									
	100	200	300	400	500	600	700	800	900	1,000
4,000	2	3	3	4	4	5	5	6	6	7
6,000	2	3	3	4	4	5	5	6	6	7
8,000	2	3	3	4	4	5	5	6	6	7
10,000	3	3	4	4	5	5	6	6	7	7
12,000	3	4	4	5	5	6	6	7	7	8
14,000	4	4	5	5	6	6	7	7	8	8
16,000	4	4	5	5	6	6	7	7	8	8
17,500	4	5	5	6	6	7	7	8	8	9

MINE EMPLOYMENT TABLE 2

Delivery Technique: Transfer or met + VE
Shell: M718/741 (RAAMS)
Trajectory: Low angle
BMA: Greater than 800 mils

RANGE (METERS)	DESIRED MINEFIELD WIDTH (METERS)									
	100	200	300	400	500	600	700	800	900	1,000
4,000	1	2	2	3	3	4	4	5	5	6
6,000	1	2	2	3	3	4	4	5	5	6
8,000	1	2	2	3	3	4	4	5	5	6
10,000	2	2	3	3	4	4	5	5	6	6
12,000	2	3	3	4	4	5	5	6	6	7
14,000	2	3	3	4	4	5	5	6	6	7
16,000	3	3	4	4	5	5	6	6	7	7
17,500	3	3	4	4	5	5	6	6	7	7

MINE EMPLOYMENT TABLE 3

Delivery Technique: Transfer or met + VE
Shell: M692/731 (ADAM)
M718/741 (RAAMS)

Trajectory: Low angle or high angle (ADAM)
High angle (RAAMS)
BMA: Equal to or less than 800 mils

RANGE (METERS)	DESIRED MINEFIELD WIDTH (METERS)									
	100	200	300	400	500	600	700	800	900	1,000
4,000	1	2	2	2	2	3	3	3	3	4
6,000	1	2	2	2	2	3	3	3	3	4
8,000	1	2	2	2	2	3	3	3	3	4
10,000	2	2	2	2	3	3	3	3	4	4
12,000	2	2	2	3	3	3	3	4	4	4
14,000	2	2	3	3	3	3	4	4	4	4
16,000	2	2	3	3	3	3	4	4	4	4
17,500	2	3	3	3	3	4	4	4	4	5

MINE EMPLOYMENT TABLE 4

Delivery Technique: Transfer or met + VE
Shell: M692/731 (ADAM)
M718/741 (RAAMS)

Trajectory: Low angle or high angle (ADAM)
High angle (RAAMS)
BMA: Greater than 800 mils

RANGE (METERS)	DESIRED MINEFIELD WIDTH (METERS)									
	100	200	300	400	500	600	700	800	900	1,000
4,000	1	1	1	2	2	2	2	3	3	3
6,000	1	1	1	2	2	2	2	3	3	3
8,000	1	1	1	2	2	2	2	3	3	3
10,000	1	1	2	2	2	2	3	3	3	3
12,000	1	2	2	2	2	3	3	3	3	4
14,000	1	2	2	2	2	3	3	3	3	4
16,000	2	2	2	2	3	3	3	3	4	4
17,500	2	2	2	2	3	3	3	3	4	4

MINE EMPLOYMENT TABLE 5

Delivery Technique: Observer adjust
Shell: M718/741 (RAAMS)
Trajectory: Low angle
BMA: Equal to or less than 800 mils

RANGE (METERS)	DESIRED MINEFIELD WIDTH (METERS)									
	100	200	300	400	500	600	700	800	900	1,000
4,000	2	2	3	3	4	4	5	5	6	6
6,000	2	2	3	3	4	4	5	5	6	6
8,000	2	3	3	4	4	5	5	6	6	7
10,000	2	3	3	4	4	5	5	6	6	7
12,000	2	3	3	4	4	5	5	6	6	7
14,000	2	3	3	4	4	5	5	6	6	7
16,000	3	3	4	4	5	5	6	6	7	7
17,500	3	3	4	4	5	5	6	6	7	7

MINE EMPLOYMENT TABLE 6

Delivery Technique: Observer adjust
Shell: M718/741 (RAAMS)
Trajectory: Low angle
BMA: Greater than 800 mils

RANGE (METERS)	DESIRED MINEFIELD WIDTH (METERS)									
	100	200	300	400	500	600	700	800	900	1,000
4,000 through 17,500	1	2	2	3	3	4	4	5	5	6

MINE EMPLOYMENT TABLE 7

Delivery Technique: Observer adjust
Shell: M692/731 (ADAM)
M718/741 (RAAMS)
Trajectory: Low angle or high angle (ADAM)
High angle (RAAMS)
BMA: Equal to or less than 800 mils

RANGE (METERS)	DESIRED MINEFIELD WIDTH (METERS)									
	100	200	300	400	500	600	700	800	900	1,000
4,000 through 17,500	1	1	1	2	2	2	2	3	3	3

MINE EMPLOYMENT TABLE 8

Delivery Technique: Observer adjust
Shell: M692/731 (ADAM)
M718/741 (RAAMS)

Trajectory: Low angle or high angle (ADAM)
High angle (RAAMS)
BMA: Greater than 800 mils

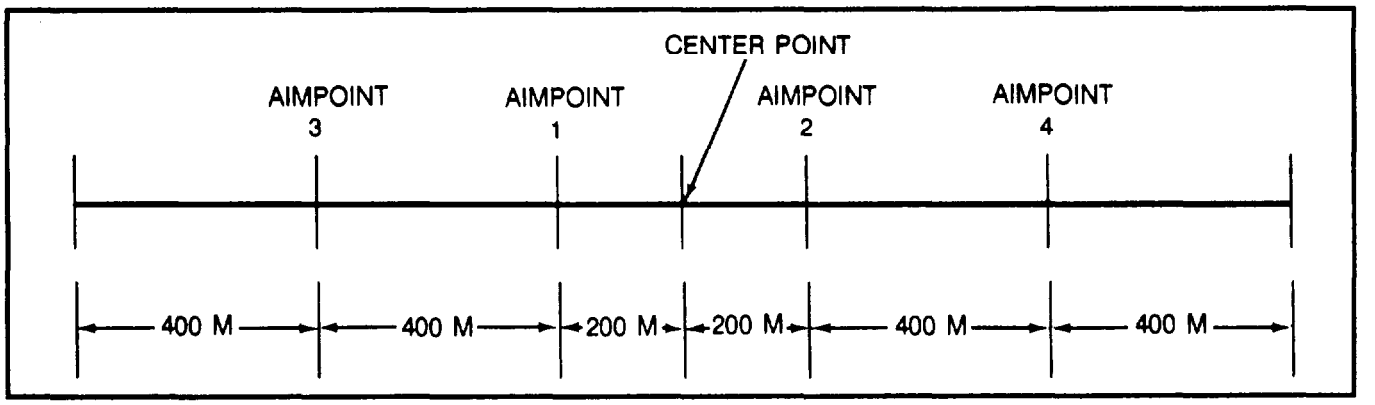
RANGE (METERS)	DESIRED MINEFIELD WIDTH (METERS)									
	100	200	300	400	500	600	700	800	900	1,000
4,000	1	1	2	2	2	2	3	3	3	3
6,000	1	1	2	2	2	2	3	3	3	3
8,000	1	2	2	2	2	3	3	3	3	4
10,000	1	2	2	2	2	3	3	3	3	4
12,000	1	2	2	2	2	3	3	3	3	4
14,000	1	2	2	2	2	3	3	3	3	4
16,000	2	2	2	2	3	3	3	3	4	4
17,500	2	2	2	2	3	3	3	3	4	4

Location of Aimpoints

To locate aimpoints for 400- by 400-meter modules–

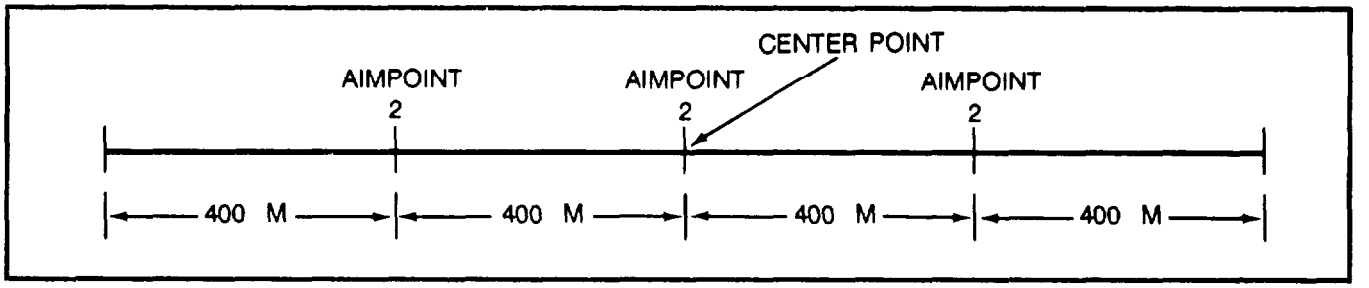
Ž For an even number of aimpoints, place the aimpoints 200 meters left and right of the center point along the centerline with the remaining points at 400-meter intervals.

MODULE SIZE 400 x 400 METERS, EVEN NUMBER OF AIMPOINTS



Ž For an uneven number of aimpoints, place the first aimpoint at the center point of the minefield and the others at 400-meter intervals.

MODULE SIZE 400 x 400 METERS, ODD NUMBER OF AIMPOINTS



Projectiles Per Aimpoint

The number of projectiles required to achieve the desired density within each module (as defined by each aimpoint) is determined from the table below. Entry arguments are the projectile type, trajectory, and desired density.

M718/M741 RAAMS AND M731 ADAM ROUNDS PER AIMPOINT

	HIGH-ANGLE RAAMS			LOW-ANGLE RAAMS			HIGH- OR LOW-ANGLE ADAM		
Desired density	0.001	0.002	0.004	0.001	0.002	0.004	0.0005	0.001	0.002
Rounds per aimpoint	24	48	96	6	12	24	3	6	12

EXAMPLE PROBLEMS

PROBLEM 1

Given		Action
Delivery Technique:	Met + VE	Select Table 2.
Shell:	M718/741 RAAMS	
Trajectory:	Low angle	Enter at range 14,000 to 600-meter minefield width.
BMA:	840 mils	
Range:	14,000 meters	Extract number of aimpoints = 5.
Minefield Width:	600 meters	

EXAMPLE PROBLEMS (CONTINUED)

PROBLEM 2

Given		Action
Delivery Technique:	Observer adjust	Select Table 5 for RAAMS and Table 7 for ADAM.
Shell:	M718/741 RAAMS and M692/731 ADAM	Enter at range 14,000 meters (if over 15,000 meters in range, round up) to 300-meter minefield width.
Trajectory:	Low Angle	
BMA:	660 mils	
Range:	15,000 meters	Extract number of aimpoints = RAAMS 3, ADAM 1
Minefield Width:	300 meters	

PROBLEM 3

Given		Action
Delivery Technique:	Transfer	Select Table 4.
Shell:	M692/731 ADAM	
Trajectory:	High Angle	Enter at range 12,000 meters to 500-meter minefield width.
BMA:	830 mils	
Range:	12,350 meters	
Minefield Width:	460 meters	Extract number of aimpoints = 2

NOTE: The RAAMS or ADAM minefield is based on a 400- x 400-meter planning module with one exception. When RAAMS is delivered by low angle, a 200- x 200-meter module is used. Consider this when determining the delivery technique to provide the minefield depth required.

Section II. OBSCURANTS

Applications

Obscurants have many applications on the battlefield. During offensive operations, they are used to conceal units and individual weapon systems. This enables the commander to maneuver behind a screen and deceive the enemy about his strength and position. Obscurants are also used to blind acquisition means. During defensive operations, smoke is used to separate and isolate attacking echelons, which creates gaps and disrupts enemy movements. Smoke can slow and blind individual units and weapon systems, forcing mechanized infantry to dismount. Also, it makes enemy targets easier to hit and may conceal defensive positions.

There are four general applications of obscurants on the battlefield:

- Obscuration.
- Screening
- Marking and signaling.
- Deception

Obscuration

Smoke placed on or near the enemy position to interfere with his observation of the battlefield is called obscuration smoke.

Screening

Screening smoke is placed within the areas of friendly operation or in areas between friendly and enemy forces to degrade enemy observation and fire. It is primarily intended to conceal friendly forces.

Marking and Signaling

Smoke is used to communicate actions on the battlefield or to mark locations.

Deception

Smoke used in conjunction with other actions to confuse or mislead the enemy. This use is generally in conjunction with other deceptive measures.

Employment Considerations

To be effective, smoke must be used in sufficient quantities. Factors affecting the amount used are atmospheric conditions, type of smoke required, size of the area to be obscured, and length of time needed. On the basis of those conditions, excessive amounts of ammunition may be required to meet the commander's guidance.

If not coordinated properly, smoke may adversely affect battlefield systems that must operate in concert, such as tactical air, armor, infantry, field artillery, and Army aviation.

Smoke hinders visual communications, which causes the unit to rely to a greater degree on radios.

Sources of Obscurants Available to the Fire Support Officer

Mortars can deliver a high volume of smoke at midranges. They are the most rapid and effective indirect delivery means. Both 8l-mm and 107-mm mortars deliver WP.

Field artillery cannons can deliver smoke out to distant targets. They can deliver HC (hexachloroethane) and WP; however, as smoke is available in limited quantities, excessive use should be planned in advance.

Smoke pots can produce large volumes of smoke for extended periods. They are the commander's primary means of producing small smoke screens.

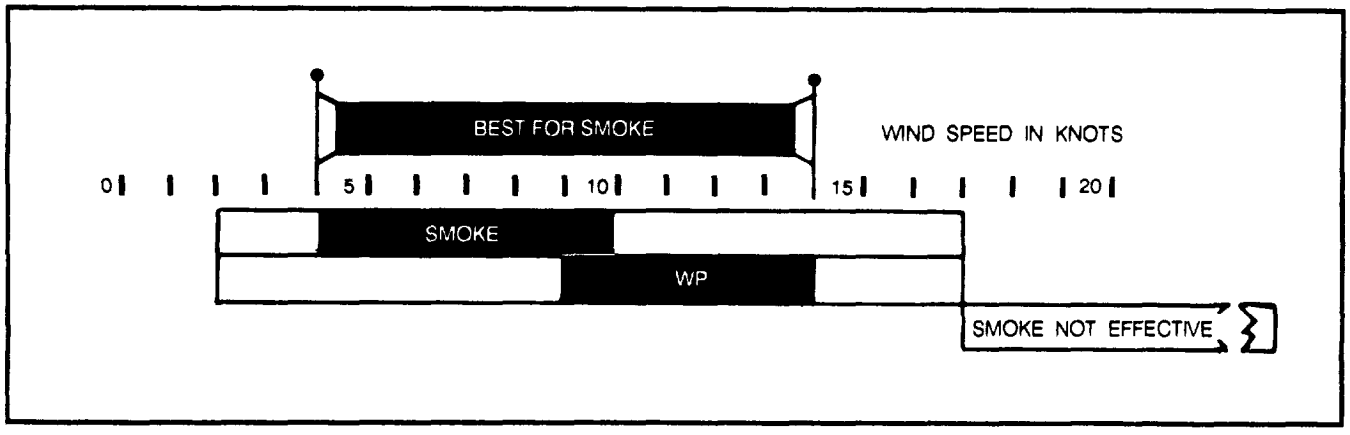
The heavy division has an organic smoke generator platoon in the chemical company. The platoon has 12 M3A3 smoke generators, which can provide large-area smoke support.

Obscurant Employment Tasks

When obscurants are to be used, the FSO must do the following:

- Coordinate with the commander or S3 to determine obscurants requirements for the unit.

SMOKE EFFECTIVENESS



- Obtain from subordinate FSOs their lists of obscuration targets that require engagement beyond their capability.

Ž Identify the potential sources of obscurants that will support the operation (mortars, maneuver combat vehicles, FA, and smoke generators if available).

- For FA-delivered smoke, use the graphics in the rest of this section to determine the number of rounds required to support the screens.

NOTE: The first three graphics provide general employment data and/or specific weather characteristics. These serve as planning factors and as entry values to the last two tables for the purpose of calculating the number of obscuration munitions required to support the operations. For specific employment techniques, refer to TC 6-40.

- Notify FA units of calculated ammunition requirements. If insufficient ammunition exists, delete targets or select an alternative delivery source.

Ž For any delivery source other than field artillery, coordinate with the brigade chemical officer to determine brigade capability to support.

Ž For smoke planned at brigade level, designate the person, event, or time that will initiate the smoke mission.

Ž For smoke planned at brigade level, coordinate with units that might be affected by the smoke.

- Before firing the smoke, check weather conditions to determine if conditions still support the smoke mission.

GENERAL ATMOSPHERIC CONDITIONS AND THE EFFECTS ON SMOKE

SMOKE CONDITION (TEMPERATURE GRADIENT)	TIME OF DAY WEATHER CONDITIONS	EXPECTED SMOKE BEHAVIOR AS THE SMOKE DRIFTS DOWNWIND (WIND DIRECTION → →)
Ideal (inversion)	1. Night—until 1 hour after sunrise. 2. Wind speed less than 5 knots. 3. Sky cover less than 30 percent. **All three conditions must be met.**	 Stable condition—ideal for smoke employment.
Favorable	This condition occurs most often 1 to 2 hours before and after sunrise and when the wind speed is 5 knots or more and/or the sky cover is 30 percent or more.	 Neutral condition—favorable for smoke employment.
Marginal (lapse)	1. Day—beginning 2 hours after sunrise. 2. Wind speed less than 5 knots. 3. Sky cover less than 30 percent. **All three conditions must be met.**	 Unstable condition—marginal for smoke employment.

EQUIVALENT WIND SCALE FOR ESTIMATING WIND SPEED

KNOTS	OBSERVATION
1	Smoke, vapor from breath, or dust raised by vehicles or personnel rises vertically. No leaf movement.
1-3	Direction of wind slightly shown by smoke, vapor from breath, or dust raised by vehicles or personnel. Slight intermittent movement of leaves.
4-6	Wind slightly felt on face. Leaves rustle.
7-10	Leaves and small twigs in constant motion.
11-16	Wind raises dust from ground. Loose paper and small branches move.
17-21	Small trees with leaves sway. Coastal wavelets form on inland waters.
22-27	Large branches on trees in motion. Whistle heard in telephone or fence wires.
28-33	Whole trees in motion. Inconvenience felt walking against wind.
NOTE: One knot equals 1.15 miles per hour (mph).	

PLANNING DATA FOR SMOKE

DELIVERY SYSTEM	TYPE ROUND	TIME TO BUILD EFFECTIVE SMOKE	AVERAGE BURNING TIME	AVERAGE OBSCURATION LENGTH (METERS PER ROUND) WIND DIRECTION		
				Cross	Quartering	Head/Tail
155 mm	WP	1/2 min	1-1 1/2 min	150	75	50
	HC	1-1 1/2 min	4 min	350	250	75
105 mm	WP	1/2 min	1-1 1/2 min	75	60	50
	HC	1-1 1/2 min	3 min	250	175	50
107 mm	WP	1/2 min	1 min	200	80	40
81 mm	WP	1/2 min	1 min	100	60	40
60 mm	WP	1/2 min	1 min	75	50	40

NOTE: All rounds are fired as standard missions with parallel sheafs under favorable conditions.

QUICK SMOKE DATA—155-MM SHELL SMOKE

WEATHER CONDITION	WIND SPEED (KNOTS)	RATE OF FIRE	DURATION REQUESTED BY FORWARD OBSERVER (MINUTES)											
			4	5	6	7	8	9	10	11	12	13	14	15
			Rounds Per Tube											
Ideal	5	1 rd per 2 min	2	2	3	3	4	4	5	5	6	6	7	7
Favorable	5	1 rd per 2 min	2	2	3	3	4	4	5	5	6	6	7	7
	10	1 rd per 1 min	2	3	4	5	6	7	8	9	10	11	12	13
	15	1 rd per 40 sec	3	4	6	7	9	10	12	13	15	16	18	19
Marginal	5	1 rd per 40 sec	3	4	6	7	9	10	12	13	15	16	18	19

QUICK SMOKE DATA—155-MM SHELL WP

WEATHER CONDITION	WIND SPEED (KNOTS)	RATE OF FIRE	DURATION REQUESTED BY FORWARD OBSERVER (MINUTES)												
			2	3	4	5	6	7	8	9	10	11	12	13	14	15
			Rounds Per Tube													
Ideal	5	1 rd per 2 min	2	3	3	4	4	5	5	6	6	7	7	8	8	9
Favorable	5	1 rd per 1 min	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	10	1 rd per 30 sec	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	15	1 rd per 20 sec	6	9	12	15	18	12	24	27	30	33	36	39	42	45
Marginal	5	Exceeds rate of fire														

Section III. COPPERHEAD

Description

Copperhead is a 155-mm cannon-launched guided projectile (CLGP) with a shaped-charge warhead and a laser seeker. When fired at a moving or stationary hard point target, Copperhead homes in on laser energy reflected from the target during the final part of its trajectory. Laser energy is provided by a remote laser designator. Optimum use of Copperhead is against multiple targets in large target arrays outside the range of maneuver direct fire weapon systems (approximately 3,000 meters). Single targets or very few widely separated targets may be engaged by Copperhead if they are high-value targets; for example, an enemy commander's vehicle. Targets appearing within the range of maneuver direct fire weapon systems should be engaged by Copperhead only when the maneuver commander directs or when the direct fire systems are unable to engage the targets.

G/VLLD Employment

Since the success of the Copperhead depends greatly on reflected energy, the FSO should ensure the G/VLLD is positioned to optimize the system capabilities and complement the direct fire weapons. Laser designation requires an uninterrupted line of sight between the designator and the target. Anything that obstructs or weakens the laser signal will cause a significant decrease in the performance of the round. Terrain, vegetation, fog, smoke, and dust obstruct visibility.

Copperhead Employment

Copperhead targets can be engaged as either planned targets or targets of opportunity. Planned targets are preferred because the firing battery requires less reaction time. Most often, the target-of-opportunity technique is used only during offensive operations.

CHARACTERISTICS OF COPPERHEAD

STRENGTHS	WEAKNESSES
Copperhead has high hit probability on point targets, moving or stationary, at longer ranges than possible with current direct fire weapons.	Responsiveness of the system depends on several variables created by distinct acquisition and delivery components of the system.
Copperhead is extremely lethal.	The G/VLLD and operator are vulnerable to suppressive fires.
Mulitple engagement is possible against an array of targets within the same footprint.	The Copperhead system depends on two-way communications between the operator and the firing battery FDC.
A laser designator does not have the pronounced firing signature of an ATGM.	Effectiveness of target engagement is limited by the operator's ability to track the target during the last 13 seconds of the projectile flight. Weather conditions and battlefield obscuration also may degrade observation of the target.
	The emitted signal from the designator can be detected.

Regardless of the method of attacking targets, the FSO must get at least the following guidance from the maneuver commander to effectively employ Copperhead:

- Copperhead usage (when, where, and what type of targets)
- Most likely avenues (areas) to be targeted.

FSOs should recommend the use of Copperhead against command and control vehicles and high-payoff targets, rather than against tanks. Command OPs, ACRVs, radars, bridges, and AD assets are examples of generally good high-payoff targets. Analysis of TVA and METT-T provides the best choices.

If the command decision is made that tanks are the targets of choice for Copperhead, our observers must seek flank and rear shots to achieve greatest kill probability, since tanks are difficult to penetrate from the front.

Once the targeting information is obtained, the FSO and G/VLLD operator must be able to visualize Copperhead footprints on existing terrain for effective target planning. Use of the Copperhead footprint template and the ability to construct a visibility diagram for the area contribute to fire planning success. (See TC 6-40 for use of the footprint template.)

Positioning for Copperhead Employment

Effective employment of the Copperhead munition is enhanced by techniques used by the FSO to position the observer or COLT and by the observer or COLT before and during target engagement. Steps involved in optimizing the potential employment of Copperhead are as follows:

Ž Position the observer or COLT to most effectively accomplish the commander's target attack guidance.

- Construct a visibility diagram from the selected position when it is occupied.
- Employ the appropriate Copperhead footprint to engage targets effectively.

These steps do not take into account the natural effects of weather, battlefield obscuration, and so forth on Copperhead employment. Since the positioning of the observer or COLT for employment of Copperhead is the concern of the FSO, the first step is discussed below. The other steps are observer tasks; therefore, they are described in detail in FM 6-30.

Copperhead Coverage Template

The Copperhead coverage template was designed as an observer position selection aid. It is used to discriminate quickly between can *shoot* and *can't shoot* engagement areas so that positions which will most effectively meet the commander's attack intent can be selected. (A template pattern is in Appendix L.) The template design is based on experience, which has shown –

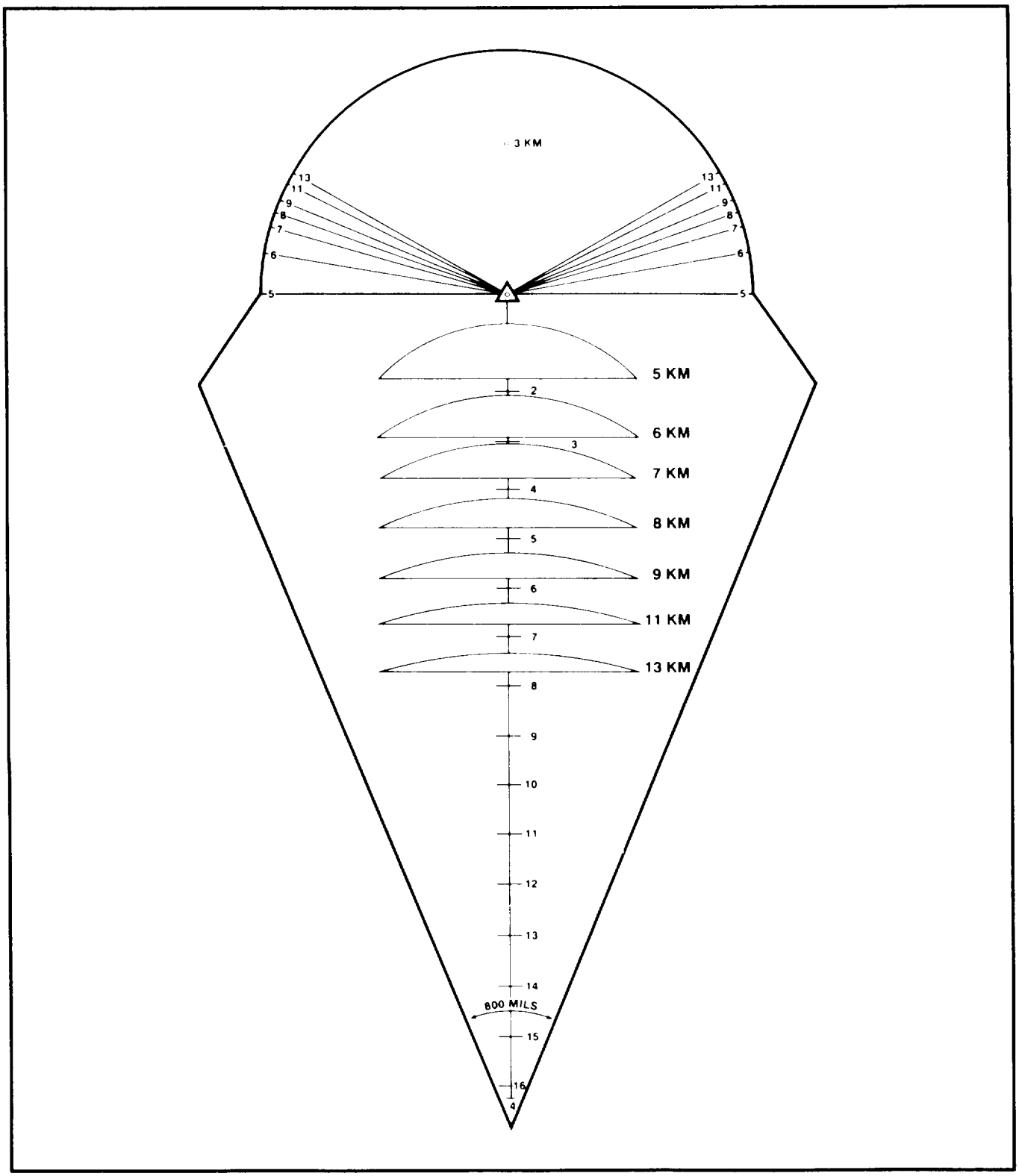
- A target engagement angle T greater than 800 roils adversely effects Copperhead targeting.
- The maximum effective distance for G/VLLD operator engagement is 3 kilometers for moving targets and 5 kilometers for stationary targets.

Thus, given desired observer positions and known firing unit locations, the Copperhead coverage template is used to quickly evaluate potential engagement areas.

There are two different procedures for determining effective Copperhead engagement areas from a given position. They are based on the location of the observer:

- More than 5 kilometers from the delivery unit.
- Less than 5 kilometers from the delivery unit.

COPPERHEAD COVERAGE TEMPLATE



More Than 5 Kilometers

The following procedure should be used to determine Copperhead coverage if the observer is located more than 5 kilometers from the FA delivery unit:

- (A) Determine the prospective observer positions to support the commander's intent. Place the template OP symbol over the initial desired OP location. Rotate the template over the selected OP location until the delivery unit location is under the center range line of the template.

Ž (B) Read the distance on the center range line from the observer to the delivery unit. This distance becomes the entry distance for other parts of the template.

Ž (C) Mark the distance obtained above at the appropriate point on each side of the 5-kilometer semicircle. Trace the arc along the semicircle between the marks. This arc represents the maximum effective observer engagement distance for stationary targets.

Ž (D) Select the arc in the middle of the template that is next lowest from the distance determined in (B) above. Reposition the template so that the ends of the selected arc are over the observer location and one end of the 5-kilometer engagement arc draw in (C) above. Trace the selected arc from point to point. Repeat the step for the other end of the 5-kilometer engagement arc.

Ž (E) Draw the 3-kilometer engagement arc within the engagement area designated by the previous steps. This may be done by using the holes in the template at the observer location and the 3-kilometer mark of the center range line as a field-expedient protractor.

- (F) This completes the construction of the Copperhead coverage area for the observer's location in relation to the particular FA delivery unit.

This procedure must be repeated for each additional Copperhead delivery unit that may fire for this observer. Considering the coverage area constructed, the FSO must now determine if the intended observer location will allow the observer to meet the commander's intent for target engagement. If the intended location will not meet the commander's intent, then another location should be selected; or, if the tactical situation does not permit alternative position selection, the commander should be told of the deficiencies in targeting capability in the selected position. A third alternative is to move the firing unit location to better support the desired observer position. This is a less desirable alternative, since the firing unit move undoubtedly would be of a greater distance than a move by the observer.

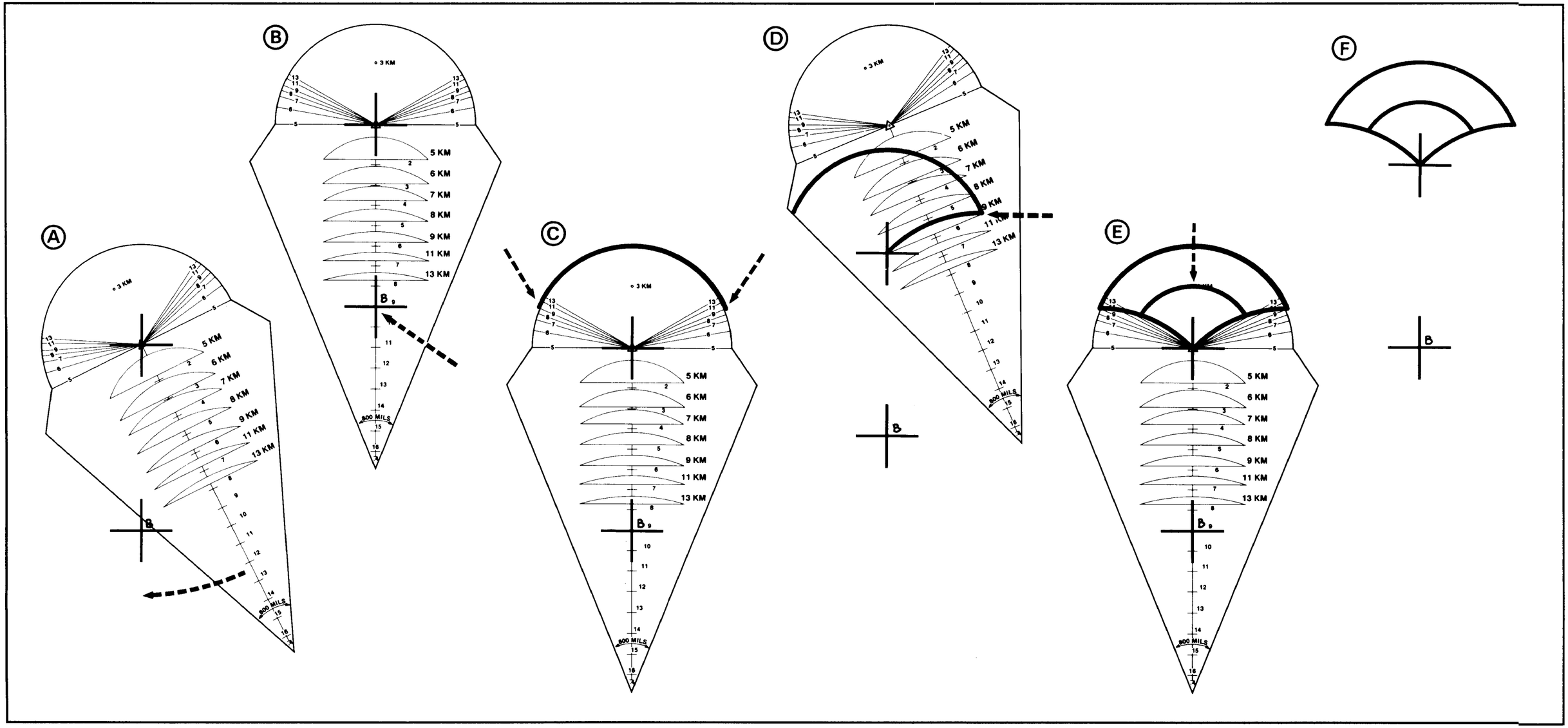
Less Than 5 Kilometers

The following procedure to determine Copperhead coverage should be used when the observer is located less than 5 kilometers from the FA delivery unit:

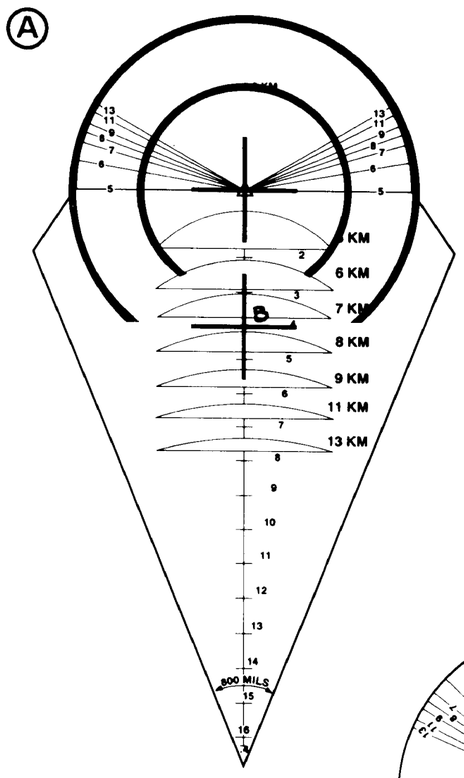
Ž (A) Draw the 5- and 3-kilometer engagement arcs around the proposed observer location. The 5-kilometer arc and the holes at the observer designation and the 3-kilometer center range line mark of the template can be used for this purpose.

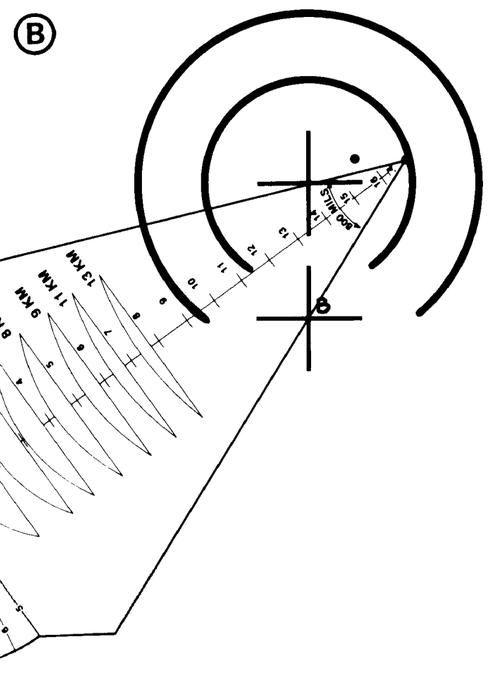
- (B) Determine the *minimum distance wings* of the Copperhead coverage area. Position the template so that one side intersects the observer location, the other side intersects the delivery unit location, and the vertex of the 800-mil angle on the template is on the 5-kilometer arc. Mark the location of the vertex. Keeping the sides of the template aligned on the observer and delivery unit locations, move the vertex of the template and mark its location at several points across the radius of the 5-kilometer arc. These points at the vertex of the template 800-mil angle designate the minimum angle T distance for effective target engagement.

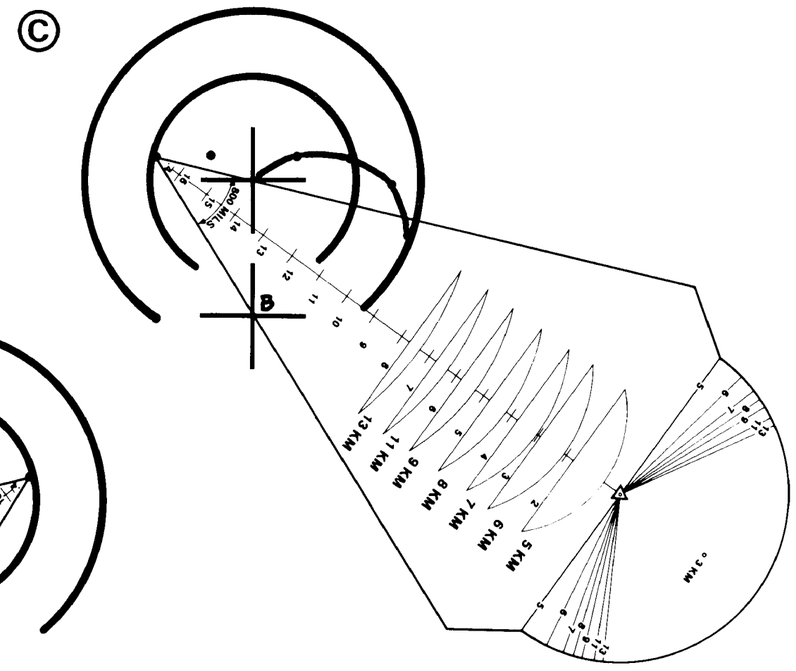
OBSERVER POSITION DETERMINATION – DISTANCE MORE THAN 5 KILOMETERS

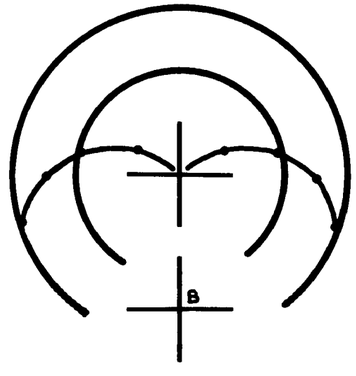


OBSERVER POSITION DETERMINATION –OBSERVER-TO-DELIVERY-UNIT DISTANCE LESS THAN 5 KILOMETERS









- (C) Realign the template, and mark points across the opposite radius of the 5-kilometer arc.
- (D) Connect the selected points through the observer location. The resulting Copperhead coverage area is the optimum for that observer location with respect to the specific delivery unit location.

Additional coverage areas should be computed for the intended observer location in relation to other delivery units. As discussed in the previous procedure, the FSO must determine if the coverage area for the intended position meets the commander's intent. If not, another location for the observer should be chosen or the commander should determine whether the degradation of attack capability is acceptable. The third option, moving the firing unit, is also available with the same considerations as discussed previously.

Section IV. CHEMICAL MUNITIONS

Chemical Munitions Employment

The responsibility for controlling chemical weapons remains at corps until after release has been approved by national command authority. The technical aspects of planning and coordination are done at division in the FS cell with assistance from the chemical element. Authority to execute may be delegated to lower echelons (that is, division, separate brigades, or in some cases brigade) in the release message.

Planning For Chemical Munitions

For the brigade, the focal point of chemical fire planning input is the division FS cell.

The brigade may impact on the chemical strike plan by nominating to the division FS cell targets to be considered for chemical attack.

There are two important planning factors to remember:

- Chemical agents do not cause many casualties against a well-trained and well-equipped force.
- Large quantities of ammunition must be delivered in a very short time period to achieve lethal dose rates.

If authority to plan and fire chemical weapons is delegated to brigade, chemical fire planning is done by the FS cell with the assistance of the S2, S3, and chemical officer. Together they select high-payoff targets for attack with chemical munitions. Constraints from division and corps, along with the brigade commander's guidance, are considered. Just before attack chemical warning (CHEMWARN) messages are disseminated to higher, lower, adjacent, and supporting units.

Section V. NUCLEAR MUNITIONS

Nuclear Employment

In most cases, final control for the employment of nuclear weapons rests with the corps commander. It is his responsibility to ensure that nuclear weapons are used to the greatest tactical advantage, integrated into the battle plan, and employed in accordance with guidance from higher commanders. For this reason, corps is the focal point in the planning and employment of nuclear weapons using a corps nuclear package. Divisions are involved in the process using a division nuclear subpackage. Echelons below division level usually are involved as executors. Exceptions to this may exist when, for example, a brigade assumes the responsibilities of a division.

Nuclear Planning

For the brigade, the focal point of nuclear planning is the division FS cell. Nuclear planning is rarely done below this level. Brigade may impact on the nuclear strike plan by nominating to the division FS cell targets to be considered for nuclear attack. (See FM 101-31-1.)

Nuclear Execution

The DS FA battalion maybe required to execute part of the division subpackage. Just before the nuclear subpackage is executed, the brigade receives the portion of the nuclear strike warning (STRIKEWARN) that affects its zone. The brigade FSO analyzes the brigade battle plan in light of the STRIKEWARN and reports its impact to the brigade commander along with recommended changes. Also, the brigade FSO verifies the safety of friendly elements in the brigade zone against the nuclear aimpoints selected by division. If a conflict arises, he takes one of the following actions:

- Recommends to the S3 that the element be moved to a safe area or its protection be increased.
- Tells the division FS cell of the conflict and requests that the aimpoint be moved.

Nuclear Vulnerability Analysis

The brigade chemical officer conducts a nuclear vulnerability analysis for all elements of the brigade anytime the brigade is in a nuclear environment (anytime either force has the capability to use nuclear weapons, whether or not they have been employed). Recommendations on increasing protection and dispersal distances are discussed with the S3 and are presented to the commander when the situation dictates.

Fire Support Coordination

The use of nuclear weapons does not change the principles of fire support coordination. However, the greater lethality and variety of effects place an increased importance on methods and procedures for safeguarding friendly troops and activities during nuclear employment.

Fire Support Officer Responsibilities

The brigade FSO is responsible for advising the brigade commander on all aspects of the nuclear operations. These aspects include, but are not limited to –

- Time considerations in performing the nuclear mission.
- How the nuclear weapons effects may enhance the scheme of maneuver.

NOTE: See FM 101-31-1 and FM 6-20-30.

Aimpoint Refinement

Certain aimpoints of the division subpackages may be located in the brigade area of operations. During the decision-making process, the brigade commander or S3 and FSCOORD must analyze the aimpoint locations as follows to ensure that the brigade scheme of maneuver is not affected:

- Will collateral damage rubble structures that will interfere with movement?
- Are aimpoints located where collateral and equipment damage is avoided from tree blowdown, bridge blowdown, and fires?
- Are minimum safe distance constraints followed?
- How will a nuclear detonation at the aimpoints affect the unit RES category?
- If the brigade is required to exploit a nuclear strike, will radiological contamination affect the scheme of maneuver?

APPENDIX I

COMBAT OBSERVATION/LASING TEAM

Description

The COLT is a high technology observer (HTO) team designed to maximize the use of smart munitions. Although originally conceived to interface with the Copperhead a COLT can be used with any munition that requires reflected laser energy for final ballistic guidance. Thus, at present, the team can also lase for smart munitions delivered by Air Force and Army aircraft. Within the heavy force structure, the team is composed of three soldiers equipped with a ground/vehicular laser locator designator (G/VLLD) and the necessary mobility and communications assets.

Organization

Each team is composed of one sergeant, who is the team chief and primary operator of the G/VLLD; one fire support specialist; and one PFC, who is the driver and RATELO.

Each team is equipped with the following:

- One M981 with G/VLLD.
- Two radios – one AN/VRC-46 and one AN/GRC-160.
- One forward entry device.

General Considerations

The COLT laser (G/VLLD) can be used for target ranging and/or designation. A COLT can provide observation for both standard and laser-guided weapons. The G/VLLD is the current organic laser for heavy forces. However, other Army (laser target designator [LTD] and OH-58D helicopter) or Marine (modular universal laser equipment [MULE]) lasers may be available.

Target Ranging

A COLT can use the G/VLLD to provide accurate range, azimuth, and vertical angle to locate targets.

Target Designation for Laser-Guided Weapons

The LGW homes on reflected energy to attack a target. A G/VLLD can be used to designate for a variety of LGWs. These include 155-mm Copperhead (Army FA), Hellfire missile (Army aviation), Pave Penny (USAF), laser-guided bomb (LGB) (USAF), and Laser Maverick air-ground missile (Marine). For effective use of laser designators, certain criteria must be met:

- The PRF codes of the laser designator (G/VLLD) and the LST or LGW must be the same.
- Prearranged direction of attack (geometry to ensure necessary laser energy reflection is obtained) must be coordinated. For example, Copperhead firings require an angle T of less than 800 mils.
- The laser must lase at the correct time and for the required duration.
- The delivery system must place the LGW into the required footprint or envelope.

Environmental Restrictions

Laser designator and acquisition devices are designed to enhance current capabilities of fire support. Several factors—environment, laser system inherent limitations, and target types—affect laser employment. Tactics and techniques must take these factors into consideration.

Line of Sight. There must be line of sight between the designator and the target and between the target and the laser acquisition device or laser-guided weapon.

Visibility Degradation. Visibility can be degraded as discussed below.

Clouds. Clouds attenuate laser energy and degrade LSTand LGW ability to see the spot. Since the laser spot is acquired only after the bomb comes out of the cloud, laser energy acquisition time is short; thus, ballistic accuracy is essential. Typical minimum ceilings and times of flight must be considered. In conditions of reduced visibility, present laser systems provide signal transmission ranges only slightly in excess of visual range.

Darkness. Laser energy transmission is unaffected by darkness, but darkness makes locating, identifying, and tracking targets more difficult for the COLT. The night sights for laser designators enhance operator target identification and engagement during night battlefield operations.

Battlefield Obscuration. Smoke, dust, and chemical particles in the air may attenuate or reflect the laser beam. This prevents sufficient energy reflection from the target for lock-on by LST or LGWs. Laser energy reflected from such particles also may present a false target to either the tracker or the munition. When faced with enemy obscurants, a COLT can reduce the impact by following some simple rules of thumb. Generally, if the observer can see a target through either day or night optics, he can successfully designate it. Positioning is key to reducing obscurant degradation of laser performance. Lasers should be positioned on the flanks or on terrain where smoke is likely to be less heavy along the line of sight. Transferring the mission from a laser being obscured to an unobscured laser is another simple way to counter enemy obscurants and tactics. These techniques would require use of COLTS in pairs or in combination with other laser designators.

Concave Targets. Tunnels and other targets that do not reflect laser energy cannot be directly laser-designated. Instead, the designator must be aimed at a nearby surface. For example, aiming the laser slightly above a tunnel opening would allow a weapon to impact at that critical point. For weapons that tend to miss short, like LGBs, this could guide the bomb to enter the tunnel opening.

Obstructions. Optimum positioning of ground laser designators is essential. Obstructions (trees, leaves, grass, and so forth) between the designator and the target may prevent a clear, unobstructed view for ground laser designator employment. Thus, jungle operations may preclude the use of ground designators and limit the effectiveness of airborne laser designators (ALDs).

Temperature Extremes. Extreme temperatures affect battery-powered laser operation. For example, a cold, soaked battery may have a much-reduced capability to power the laser.

Solar Saturation. Laser seekers look for a spot of IR energy that stands out from the background. This can be a problem when engaging with low-angle LGWs or LST-equipped aircraft, especially against targets above the horizon just after sunrise and just before sunset.

Seeker Characteristics

Code

A laser seeker looks for laser designator energy on a specific PRF code, A designator and a seeker must work together as a team on a specific code. Thus, seekers do not detect or interfere with designators set on other codes.

Field of View

All seekers have a limited field of view, They must be pointed close to the target to see the laser designator spot.

Acquisition Time

To avoid detection by enemy forces and to conserve battery energy, a COLT limits the amount of time it designates a target. Therefore, laser seekers and munitions have a very short time to detect the laser spot and guide to the target.

Sensitivity

Different laser guidance and/or acquisition systems require various amounts of reflected laser energy to operate. Under ideal conditions, a G/VLLD must be within 5 kilometers of an average stationary target to provide optimum Copperhead guidance; whereas under ideal conditions, a Pave Penny LST can acquire an LTD spot as much as 30 kilometers away on a clear day. Less sensitive seekers are more susceptible to reflection and the relative positions of the target, designator, and seeker.

Seeker Types

Airborne Laser Spot Tracker

An airborne LST points out laser-designated targets to the pilot. The pilot can then attack the target with any weapons on board. Pilots require this target cue; without this assistance, it is very difficult for them to see camouflaged targets at long ranges and from high-speed aircraft. Normally, an LST uses a laser pulse code established by the COLT. An LST has a narrow field of view, and the pilot must accurately point the airplane so the seeker lines up on the laser energy.

Laser-Guided Missile and Copperhead Cannon- Launched Guided Projectile

The laser-guided missile (LGM) and CLGP must be precisely aimed to see the laser energy on the target. To optimize LGM or CLGP terminal guidance, laser designation must be timed according to the LGM or CLGP predicted time of flight. If the laser designator is turned on late, the LGM or CLGP may miss; turning the laser designator on early will not cause a miss.

Laser-Guided Bomb

The LGB must be aimed so that the target is within the field of view by the seeker. If the aircraft does not have an LST, a visible target mark may be required as an aiming cue. Since the laser pulse code is preset on the LGB and cannot be changed while it is airborne, the COLT must use the code set in the bomb. When the lofting or shallow delivery method is used, if the laser designator is turned on too early, the LGB will steer to the laser mark too soon and miss by falling short of the target. Whenever possible, the pilot should communicate directly with the COLT so the laser can be turned on at the best time. Delaying designation until the last 10 seconds of weapon flight is ideal. A low-level laser-guided bomb (LLLGB) does not have the LGB early lock-on characteristic.

Designator and Seeker Pulse Code

Coding for laser designators and seekers is based-on pulse repetition frequency. This system uses either three- or four-digit numbers made up of the numbers 1 through 8. The three- and four-digit devices are compatible. When a mix of three- and four-digit equipment is used, the first digit of the four-digit code is always 1. For example, a three-digit code of 657 would be set as 1657 on a four-digit code system. To go from a four-digit code to a three-digit code, drop the first number. For example, a four-digit code of 1246 would become a three-digit code of 246.

The joint force headquarters has overall responsibility for code management. Corps FSE manages ground switch settings and provides blocks of settings to divisions (div arty). Brigade FSE is the lowest echelon that manages code settings. It ensures that FDCs

and lower FSEs have positive coordination of assigned codes. When COLTs designate for Air Force delivery systems, the FAC receives the designator code from the pilot and passes it to the COLT.

NOTE: The lower the PRF, the faster the lase pulse and the better the paint of the target. Lower codes should be assigned to the priority COLT.

Using two or more COLTs in different locations, on the same target, and on the same code offers some advantages when attacking high-payoff targets. The main advantage is that if one designator fails, the round will still have reflected energy from another laser to guide it. The LGW locks on and tracks for the designator with the strongest reflected energy.

Employment Options

The COLT is primarily used as the designator for 155-mm artillery-delivered Copperhead. However, it can be used to optimize Air Force and other aviation systems by providing target designation and laser guidance for air-delivered munitions. The COLT gives the commander a powerful capability to attack hard and point targets as well as area targets if the delivery systems are available. To maximize the effectiveness of the COLT while minimizing the mobility limitations of the ground designator, positioning must be carefully considered. Positioning factors include the following:

Ž Ability to support the commander's intent.

- Intelligence preparation of the battlefield.
- Angle T consideration for each potential shooter.

Ž Altitude as close as possible to that of the expected target. (Minimize vertical angle of attack.)

Ž Survivability of the COLT.

- Desirability of survey.
- Maintenance of good communications.

COLTs are positioned by the FSCOORD or his representative to support the maneuver commander's overall intent. The commander approves the COLT's positioning as meeting his intent during the rehearsal and/or as part of the published operation plan and/or order. The FSCOORD must consider two aspects in the COLT positioning decision—tactical and technical. The technical aspect concerns positioning to accomplish the commander's intent on the basis of where he wants to engage targets or target sets. The technical aspect concerns the angle T target engagement parameters of the Copperhead.

COLTs assigned to div arty may be task-organized to subordinate artillery battalions or retained centrally. In task-organizing COLTs, all fundamentals of organization for combat should be considered. To provide the best coverage and to allow the greatest survivability for the COLT, COLTs often are employed in pairs. This allows continuous COLT coverage during the operation. Since the COLT is a limited, valuable asset, careful consideration must precede a decision to decentralize the COLTs below brigade level. Any decentralization should be for a designated period of time, not as a matter of SOP.

Considerations in the offense are as follows.

Ž Recommend to the commander appropriate targets for laser-guided munitions.

- Consider using COLTs for both marking and designating operations.

Ž Consider using a COLT as an independent observer when LGMs are undesirable or unavailable.

Considerations in the defense are as follows.

- Consider using COLTs in pairs to ensure coverage in depth.
- Survey COLT positions as a high priority in the survey plan.
- Consider using COLTs to survey in obstacles and to cover obstacles by observation.
- Consider using COLTs with night sights as an early warning system.

Current and Projected Laser Systems

The tables on the following pages show:

- Current and projected laser spotter tracker systems, their general functions, and their characteristics.
- Descriptions of each laser designator system.
- Descriptions of laser-guided weapons.

GLOSSARY FOR TABLES

AGM = air-ground missile

ARBS = angle rate bombing system

DD = destroyer

DDG = guided missile destroyer

FAC = forward alr controller

FIST = fire support team

GBU = glide bomb unit

G/VLLD = ground/vehicular laser locator designator

LANTIRN = low-altitude navigation and targetng infrared for night system

LGB = laser-guided bomb

LGW = laser-guided weapon

LLLGB = low-level laser-guided bomb

LMAV = Laser Maverick

LST = laser spot tracker

LTD = laser target designator

MMS = mast-mounted sight

MULE = modular universal laser equipment

NA = not applicable

NGF = naval gunfire

NOS = night observation system

TADS = target acquisition system and designation sight

TRAM = target recognition attack multisensory

UAV = unmanned aerial veheicle

USMC = United States Marine Corps

USN = US Navy

LASER SPOTTER TRACKERS

SYSTEM	SERVICE	LASER SPOT TRACKER OR ACQUISITION SYSTEM	TARGET DESIGNATION SYSTEM	LASER-GUIDED MUNITION	EMPLOY-MENT PLATFORM	PRF CODE DIGITS	IN-FLIGHT SELECTABLE
TADS	Army	X	X		AH-64A	4	Yes
Pave Penny	Air Force	X			A-7, A-10	4	Yes
TRAM	Navy USMC	X	X		A-6E	4	Yes
MULE	USMC		X		Ground (hand-held or tripod)	3	NA
G/VLLD	Army		X		Ground (tripod or vehicle mount)	3	NA
LTD	Army		X		Ground (hand-held)	3	NA
Pave Spike	Air Force		X		F-4D, F-4E	4	Yes
Pave Tack	Air Force		X		F-4E, RF-4C, F-111F	4	Yes
LANTIRN	Air Force		X		A-10, F-15E, F-16	4	Yes
MMS	Army	X	X		OH-58D	4	Yes
Aquila	Army		X		UAV	3	Yes
NOS	USMC		X		OV-10D	3	Yes
Hellfire	Army USMC			X	AH-64A, UH-60, AH-1	4	Yes
Copperhead	Army USMC			X	155-mm howitzer	3	NA
Paveway I, II (LGB), and III (LLGB)	Air Force Navy			X	Any attack or fighter aircraft	4	No
Laser Maverick	USMC			X	A-4, AV-8, A-7, F/A-18	4	Yes

LASER SPOTTER TRACKERS (CONTINUED)

SYSTEM	SERVICE	LASER SPOT TRACKER OR ACQUISITION SYSTEM	TARGET DESIGNATION SYSTEM	LASER-GUIDED MUNITION	EMPLOY-MENT PLATFORM	PRF CODE DIGITS	IN-FLIGHT SELECTABLE
5-Inch Semiactive Laser-Guided Projectile	Navy			X	DD- and DDG-class ships	4	No
ARBS	USMC	X			A-4M, AV-8B	4	Yes
AGM-123A Skipper II	Navy USMC			X	A-6E, A-7	4	No
Laser Spot Tracker	Navy USMC	X			F/A-18	4	Yes

LASER DESIGNATOR SYSTEMS

GROUND/VEHICULAR LASER LOCATOR DESIGNATOR (ARMY)	
Description	Long-range laser range finder and designator Can provide azimuth and vertical angle
Function	Designates targets or areas that can be detected by aircraft equipped with LST and LGWs set to same code as G/VLLD
Platform	Mounted: In M981 FIST vehicle Dismounted: On tripod
Employment	Located in company and troop FISTs and in COLTs
PRF codes	111 through 888 (see previous discussions)
Target nominal range (for standard target 2.3 x 2.3 meters)	Stationary: 5 km (Copperhead) Moving: 3 km (Copperhead)
System-unique capabilities	Uses night sight Two-man portable for short distances Can be mounted on the M113A1 Interim FIST vehicle
Limitations	Limited mobility

LASER DESIGNATOR SYSTEMS (CONTINUED)

LASER TARGET DESIGNATOR (ARMY)	
Description	Battery-operated, lightweight, hand-held
Function	Designates targets that can be detected by aircraft equipped with LST and LGWs set to same code as LTD
Platform	Hand-held
Employment	Used by fire support personnel in airborne, ranger, and special operations forces
PRF codes	111 through 888 (see previous discussion)
Target nominal range (for standard target 2.3 x 2.3 meters)	Stationary: 1 km (Copperhead) point target Stationary: 3 km (Copperhead) area target Moving: 3 km (Copperhead)
System-unique capabilities	Easily transportable
Limitations	Cannot establish range to targets Cannot provide direction and vertical angle Limited laser-on time because of battery life
MODULAR UNIVERSAL LASER EQUIPMENT (MARINE CORPS)	
Description	Man-portable LTD and range finder
Function	Accurately locates targets and provides terminal guidance for LGWs
Platform	Man-packed, tripod-mounted
Employment	Gives forward observers, NGF spotters, and FACs the capability to accurately determine location and range to targets
PRF codes	111 through 888 (see previous discussion)
Target nominal range (for standard target 2.3 x 2.3 meters)	Stationary: 5 km Moving: 3 km
System-unique capabilities	Consists of three basic modules: • Laser designator range finder module provides the basic laser designator and ranging equipment • Stabilized tracking tripod module provides stabilization for the tracking of moving targets and targets at extended ranges • North-finding module provides a true north reference
Limitations	Subject to visibility restrictions of line of sight, clouds, darkness, smoke, dust, and so forth
OH-58D MAST-MOUNTED SIGHT (ARMY)	
Description	Electro-optical system incorporating television visual and thermal imaging systems and laser range finder, designator, and LST

LASER DESIGNATOR SYSTEMS (CONTINUED)

Function	Sight system to laser-designate for other weapon systems
Platform	OH-58D
Employment	Provides day, night, and adverse weather target acquisition and laser designation capability
PRF codes	All codes; in-flight selectable
Target nominal range (for standard target 2.3 x 2.3 meters)	Stationary: 10 km Moving: 10 km
System-unique capabilities	MMS LST facilitates handoffs from other laser designators Tracks targets manually or automatically
Limitations	Subject to visibility restrictions of line of sight, clouds, darkness, smoke, dust, and so forth

LASER-GUIDED WEAPONS

COPPERHEAD (ARMY AND MARINE CORPS)	
Description	Laser seeker in nose of projectile which homes in on laser energy reflected from the target during the final portion of trajectory
Function	Used in conjunction with a ground or airborne laser designator
Platform	Fired from M109 155-mm self-propelled howitzers and M198 155-mm towed howitzers
Employment	Used primarily to attack high-payoff moving or stationary hard point targets
PRF codes	111 through 888
Target nominal range (for standard target 2.3 x 2.3 meters)	Stationary: Minimum range 3 km, maximum range 16 km Moving: Minimum range 3 km, maximum range 16 km
System unique capabilities	Point target accuracy Large footprint within which round can acquire target
Limitations	Requires continuous laser designation during the final 13 seconds of projectile flight
HELLFIRE MISSILE (ARMY AND MARINE CORPS)	
Description	Third-generation air-launched antiarmor laser-guided missile
Function	Used on conjunction with a ground or airborne laser designator
Platform	AH-64 helicopter

LASER-GUIDED WEAPONS (CONTINUED)

Employment	Employed against armor or other hard point-type targets Autonomous designation or *buddy lasing* for other launch platforms
PRF codes	All codes; in-flight selectable
Target nominal range (for standard target 2.3 x 2.3 meters)	Stationary: 5 km Moving: 5 km
System-unique capabilities	Can launch by use of direct or indirect method Can employ single, rapid, or ripple firing techniques Seeker lock-on options are lock-on after launch and lock-on before launch
Limitations	Subject to visibility restrictions of line of sight, clouds, darkness, smoke, dust, and so forth
LASER MAVERICK AGM-65E (MARINE CORPS)	
Description	A short-range, laser-guided, rocket-propelled air-to-surface missile
Function	Used in conjunction with ground or airborne laser designators
Platform (with modifications	A-4M and A-6E, F/A-18, AV-8B, A-7 (USN)
Employment	Intended for use against fortified ground installations, armored vehicles, and surface combatants Employs 125-pound warhead or 300-pound Maverick alternate warhead with selectable delay fuze
PRF codes	Classified; cockpit selectable
Target nominal range (for standard target 2.3 x 2.3 meters)	Stationary: Yes Moving: Yes Minimum: Safety considerations only Maximum: Missile seeker; searches a sector 7 miles across and over 10 miles ahead
System-unique capabilities	If missile loses laser spot, missile goes ballistic and flies up and over target Warhead does not explode; it becomes a dud Cockpit-selectable laser coding and fuzing (delay or quick)
Limitations	Subject to visibility restrictions of line of sight, clouds, darkness, smoke, dust, and so forth
LASER-GUIDED BOMB PAVEWAY I OR II (NAVY, AIR FORCE, AND MARINE CORPS)	
Description	500-pound (GBU-12) or 2,000-pound (GBU-10) warhead marked with laser guidance Two generations, Paveway I and II, compatible with all US ground and airborne designators
Function	Bomb released after aircraft is within delivery envelope
Platform	Bomb begins terminal guidance upon laser energy acquisition
Employment	All aircraft capable of employing conventional weapons of same weight class Level or dive for Paveway I bombs; also loft for Paveway II bombs Optimum against hard point targets

LASER-GUIDED WEAPONS (CONTINUED)

PRF codes	Some set at factory; some set before takeoff
Target nominal range (for standard target 2.3 x 2.3 meters)	Stationary: Up to 6 km Moving : Yes Function of designator-to-target range, designator output, and ballistic delivery range
System-unique capabilities	Accuracy gives high probability of target kill against point targets
Limitations	Early laser lock-on during a loft or shallow delivery angle tends to cause a miss short Requires ballistically accurate delivery and continuous laser energy during last 10 seconds of time of flight Target must subtend 1 mil (at designator-to-target range) Very limited low-altitude capability When delivered from a low-altitude loft maneuver, restricts lase on target to last 10 seconds of flight time
LOW-LEVEL LASER-GUIDED BOMB PAVEWAY III (NAVY, AIR FORCE, AND MARINE CORPS)	
Description	Designated *GBU-24* (2,000-pound bomb) No 500-pound version Third-generation LGB
Function	Same as Paveway I or II
Platform	Same as Paveway I or II
Employment	Expanded delivery envelopes allowing very low-altitude, relatively low-ceiling, longer-range weapon releases
PRF codes	Retains dive delivery option
Target nominal range (for standard target 2.3 x 2.3 meters)	Same as Paveway I and II Same as Paveway I and II
System-unique capabilities	Improved accuracy capability over LGB GBU-10 or 12 Highly resistant to countermeasures Blind launch capability from extended ranges If LLLGB does not detect laser energy, it will maintain level flight and fly beyond the target
Limitations	Requires continuous laser energy during last 8 seconds of time of flight Target must subtend 1 mil (at designator-to-target range)

APPENDIX J

ENVIRONMENTAL AND TERRAIN CONSIDERATIONS FOR FIRE SUPPORT

Mountain Operations

Characteristics

In combat operations, mountains generally are characterized by rugged, compartmented terrain; steep slopes; and few natural or man-made lines of communication. The weather spans the entire spectrum from extreme cold, with ice and snow, to extreme heat in some areas. Vegetation can vary from dense jungle to barren waste. Variability of weather over short periods of time and of vegetation from area to area significantly influences both maneuver and fire support operations.

Munitions

Munitions effects are affected by the terrain. IPB helps determine where and what munitions are most effective. Considerations of munitions employment and effect are discussed below.

In snow—

- FASCAM may settle into the snow off-vertical. At temperatures lower than -15° C, very little settling occurs. Settling may cause the antihandling devices to prematurely detonate the munitions.

Ž VT and time fuzes are most effective in most cases.

Ž THE-PD, HE-delay, and ICM are ineffective because at least 40 percent of the effects are muted by the snow.

Ž The phosphorus in WP can burn undetected in snow for up to 4 days.

Ž Nuclear blast damage. radii for hard materiel targets can increase by as much as 20 percent at temperatures of -50°F. Snow will reduce dynamic pressure. Thermal radius of safety is increased by 30 percent in snow and cold weather.

In rocky terrain—

Ž HE-PD is very effective because it produces extra fragmentation from splintering rocks.

Ž VT and time fuzes are very effective because the burst covers a larger area than HE-PD on reverse slopes.

Ž ICM are effective; however, when fired into forested areas, they can hang up in trees.

Ž FASCAM is effective to deny the enemy the use of narrow defiles, valleys, roads, and usable terrain.

Copperhead is effective and should be planned along roads, defiles, and valleys.

When smoke and illumination are used—

Ž Swirling winds make smoke employment very difficult to adjust and maintain.

Ž Close coordination is required with adjacent elements to ensure that their vision is not obscured or that they are not highlighted.

Mortars are ideal because of their high-angle fires. They can deliver fires on reverse slopes and over intermediate crests.

Airbursts on reverse slopes are extremely effective.

Target Acquisition and Observation

The following are considerations when forward observers are involved in mountain operations:

Ž The FOs should be positioned on high ground and spread out to overcome terrain masks and compartments.

Ž The FOs may need mountaineering equipment to get to the best positions, or they may be airlifted.

- Terrain sketches and visibility diagrams are essential to deliver fast, accurate fires and to identify blind spots.

Ž Heavy fogs or low clouds may obscure observation.

Ž Observers looking up tend to underestimate range, whereas observers looking down tend to overestimate range.

Ž Sunglasses may be required if terrain is covered with snow.

Aerial observers—

Ž Are very effective to observe beyond terrain masks, in deep defilade, and on reverse slopes.

- Complement the FOs.
- Can be used to detect deep targets

Ž May be confined to valleys and lower elevations because thin air at high elevations makes flying difficult.

Radar considerations in mountain operations are as follows:

Ž Radars should concentrate on terrain that can be occupied by artillery and mortars (as determined by IPB).

- Terrain masks can degrade the effective range of the radar.

Ž Additional use of ground surveillance radars and remote sensors may be required.

- More extensive use of shelling reports (SHELREPs) is required.

Targeting

The S2's IPB should identify the following:

Ž Routes that can be used by the enemy to attack, withdraw, and resupply.

Ž Likely position areas for indirect fire assets, command and control elements, CSS assets, and observation posts.

- Terrain that is subject to snows slides, rockslides, or avalanches. These may deny the enemy use of roads and trails and may destroy elements in defilade.

Positioning

Usually, position areas for mortars and artillery are limited and access thereto may be restricted. Because of the need to fire high angle, it is important that the mortars and artillery be positioned in defilade. to increase their survivability. Positioning considerations are as follows:

- Helicopters should be used to airlift artillery into position areas. These air assets also may be required to provide ammunition resupply.
- Helicopters may be useful in performing survey by use of Doppler radar.
- Positioning along dry river beds is hazardous because of the danger of flash flooding.
- Towns and cities usually have flat areas (school yards, parks, stadiums, and so forth) that can accommodate firing batteries. However, these towns and cities are often enemy objectives and may be targeted.

Ž Most mountainous flat land is farmland and is difficult for towed artillery to negotiate from spring to fall. However, in winter, if the ground is frozen, farmland provides good firing positions for mortars and artillery.

Close Air Support

Because the terrain forces the enemy to concentrate his forces along roads, valleys, reverse slopes, and deep defilades, CAS is very effective. However, the terrain also restricts the attack direction of the CAS strikes. The enemy also conducts an IPB to determine the likely direction of the CAS strikes and will weight his air defenses along those routes. The FSO must aggressively identify the enemy air defense systems and target them to enhance the survivability of the CAS assets.

Communications

Communications considerations in mountain operations are as follows:

Ž Place antennas on sides of hills or mountains.

- Make maximum use of directional antennas.
- Plan to use retransmission capabilities.

Jungle Operations

Characteristics

Usually, jungle operations are carried out by light forces. Fire support may be limited to indirect fires and air support. Because small-unit operations are commonplace, greater challenges accrue to the FSCOORDs at company and battalion levels.

Munitions

In jungle terrain, most contact with the enemy is at extremely close range. If the friendly force has a substantial advantage in fire support, the enemy will most likely try to come in as close as possible and maintain that close contact. Thus, the friendly force commander cannot use his fire support advantage without inflicting casualties on his own troops. Therefore, a knowledge of the type of munitions best suited for the terrain and how to employ them is vital. For example, in triple-canopy jungle—

Ž HE-delay penetrates the treetops and splinters the trees, creating additional fragmentation (splintering effect).

Ž Smoke has limited effectiveness.

- WP is effective as a marking round and in initial adjustments.

Target Acquisition and Observation

The triple-canopy jungle makes observation beyond 25 to 50 meters very difficult. The jungle also makes map reading, self-location, target location, and friendly unit location very difficult.

Forward Observers. Experience from World War II (WWII) and Vietnam showed that FOs must be able to adjust mortar and FA fire by sound, because often they cannot see the rounds to adjust them. This sound adjustment is very difficult and requires experience. Greater accuracy can result from the recommended adjustments of two or more FOs. The battery FDC can help by announcing **SPLASH** to let the FO know when the round should impact. The FO then counts the seconds until he hears the round detonate. By multiplying the seconds by the speed of sound, the FO can estimate the range to impact. The speed of sound is approximately 350 meters per second. The speed of sound varies according to temperature, wind speed and direction, relative humidity, and air density; but 350 meters per second should be used as a start point.

The FO must determine his location and ensure that the battery FDC has it plotted. The FO then determines the direction to the target and selects a target grid 1,000 meters along the direction to the target. Using that direction and target grid, he sends a call for fire to the FDC. He adds 1,000 meters to his position location for safety.

When the initial adjusting round impacts, the FO uses that impact as a known point. He

determines the direction to the round, measures the difference between the direction to the target and the impact of the initial round, computes the lateral correction, and makes a range correction, if necessary. Using the shift from a known point call for fire, he sends the data to the FDC, reporting the new direction.

If the FO's position location is way off, the initial round will be way off too. The FO can use the initial round to redetermine his location. For example, the FO in his call for fire told the FDC to fire grid 123456, direction 0200. The round impact is nowhere near the target. The FO then determines the direction and range to the burst. He plots a back-azimuth from the burst and estimates range along that direction to replot his position. Then, using his new position location, he reinitiates the mission.

Vietnam and WWII also showed that the first round in adjustment should be WP. Because the FO is not sure of his own location or those of other friendly elements, WP was usually fired first to avoid inflicting casualties on friendly personnel. (Using a 200-meter height of burst [HOB] can help the FO see the first round.)

Creeping fires were also used extensively in Vietnam and WWII. The FO adds 300 to 400 meters to his target location in case his own position location is wrong. Then he makes corrections of no more than 50 meters until the fires are on target. In Vietnam, this process sometimes started with an aerial observer and was taken over by the ground observer once he was able to see the rounds. The aerial observer was often required to relay fire requests from the ground because the terrain severely limited the ranges of radio communications. The creeping method of adjustment is used exclusively during danger close missions. The observer makes range changes by using corrections of 100 meters or less and creeping the rounds to the target. The observer must know where all friendly troops are to avoid endangering them. All weapons that will fire for effect are used in adjustment. For battalion missions, batteries should be adjusted individually.

Marking rounds can be fired to help the FO determine his own location. The use of marking rounds also helps ensure that the FDC knows in what area the friendly unit is, which ensures more responsive fires. A marking round is usually WP fired 300 to 400 meters forward of friendly units at 200 meters HOB. The FDC plots a target, fires a WP round, and sends the grid of the WP impact to the FO. The FO then has a known position on which to orient.

Because of the close combat, laser range finders may not be of great use; however, night vision devices are extremely critical.

Aerial Observers. Aerial observers could be important in jungle warfare. They can detect enemy movements that ground forces have no way of seeing. They can act in concert with ground observers to deliver accurate fires on enemy elements in close contact with friendly forces. Also, the aerial observers can relay calls for fire from ground elements to the FDC.

Aerial observers could help direct CAS assets against enemy targets. Because ground observers cannot see the whole battlefield, the aerial observer marks targets for the CAS sortie (by use of flares, WP, or smoke). Caution must be taken, and positive identification of the target must be made.

Field Artillery Radars. Radars are extremely effective in the jungle, since most indirect fires are high-angle fires.

In a guerrilla war, most targets detected by the radars are fleeting in nature (shoot and move) and the radar must be tied in with an indirect fire support asset to ensure quick counterfires.

Also, most enemy indirect fires will be directed against friendly unit positions; therefore, the radars should be oriented so as to locate those enemy fires.

Ground surveillance radars and remote sensors must be used.

SHELREPs may not be as effective because the enemy shoots and moves quickly.

Targeting

Targeting is very difficult because of the triple canopy and the fluid nature of the conflict. Experience with the particular enemy will provide some targets indicated by his past performance and techniques.

Targets should be planned—

Ž To support the scheme of maneuver.

Ž Along roads and trails.

Ž At likely ambush sites.

Ž Around clearings.

- At river or stream crossings.
- Around built-up areas.

Also, isolated units will prepare 360-degree defenses. FPFs must be planned to support that defensive posture.

Consider recommending to the DS battalion commander a munition-specific RSR to support the operation.

Positioning

Often, firing positions for field artillery and mortars are very limited; and some positions may be inaccessible by roads. While mortars may be dismounted and airlifted into position, artillery will be severely limited in its movement and ability to position. Platoons may have to be widely separated, increasing the difficulty of mutual defense and resupply. Each position must have 6,400-mil firing capability, regardless of weapon types. Remember that a position occupied too long is subject to ground attack. Also, the enemy will quickly determine the range of weapons in that position and stay out of their range. Consider using a helicopter-mounted PADS or Doppler radar to survey air-inserted mortar positions inaccessible by road.

Close Air Support

Close air support can be effective in the jungle but hard to control because of the inability of the pilot to see the friendly ground elements. Also, because the combat is usually of such close nature, the delivery of the munitions must be closely controlled to avoid injuring friendly personnel.

Pyrotechnics should be used to mark friendly forces and the target area, An aerial observer, if available, should control the air strike. It is extremely important that the method used for this marking not be duplicated by the enemy. Strict security is required.

Heavy bombs (2,000 to 3,000 pounds) with fuze extenders can clear away the jungle canopy.

Many Air Force cluster munitions are designed to penetrate jungle canopy. Depending on the type and quantity delivered, bomblets are effective against area targets consisting of personnel, light materiel, and armor.

Communications

The following are communications considerations for jungle operations:

Ž Remember that communications in a triple-canopy jungle are severely degraded.

- Elevate antennas above the canopy, when possible.
- Use aerial observers or airborne command and control platforms as relay stations.

Ž Consider using directional antennas.

Ž Plan to use retrans assets.

Desert Operations

Characteristics

The three types of desert terrain are mountainous, rocky plateau, and sandy or dune-type desert. Fire support planning and considerations vary significantly between operations in each type of desert terrain. Often, those considerations resemble those for other environments, such as arctic and mountain. The type of terrain in the area of operations must be analyzed before effective fire support planning can be performed. Tactics, techniques, and employment of munitions are greatly affected by the different terrain characteristics. Restricted desert terrain can offer significant disadvantages for movement and emplacement of indirect fire systems, depending on the trafficability of the surrounding valley areas.

Munitions

Mountain Deserts. Munitions effectiveness in mountain deserts is the same as in any mountainous region except that the considerations involving snow usually do not apply. The following are added considerations:

- HE-PD is very effective because of the extra fragmentation created by splintering rocks.

Ž ICM are very effective.

- FASCAM is very effective and should be used to deny the enemy the use of roads, valleys, narrow defiles, and level terrain.
- Copperhead is extremely effective.
- Smoke and illumination may be degraded by swirling winds. They must be closely coordinated with adjacent units to ensure that the vision of adjacent troops is not obscured or troops are not highlighted. Both smoke and illuminating shells can be used to silhouette the enemy.

Ž Airbursts on reverse slopes are extremely effective.

Rocky Plateau Deserts. The following are munitions considerations in rocky plateau desert operations:

- HE-PD is extremely effective. It creates extra fragments by splintering rocks.
- VT and time fuzes are effective.
- ICM are very effective.

Ž FASCAM is very effective and should be employed with the natural terrain to force the enemy into unnavigable terrain.

Ž Copperhead can be very effective.

- Smoke and illumination may be degraded by high winds but may be used to silhouette the enemy.

Sandy or Dune Deserts. In sandy or dune deserts, the following are munitions considerations:

Ž HE with PD or delay fuze is smothered by deep sand, which makes it ineffective.

Ž VT and time fuzes are very effective.

Ž ICM and FASCAM are smothered by deep sand, which makes them ineffective.

- Copperhead is very effective.
- Smoke and illumination are effective and can be used to silhouette the enemy.

Target Acquisition and Observation

Forward Observers. Determining location is often very difficult in rocky plateau and sandy or dune deserts. Maps are often inaccurate, dunes shift, and heat waves hamper distance estimations. Use of pace count or odometer readings is essential for day and night navigation. Resection from available key terrain features in desolate regions may be the best of a few options for self-location. OH-58Ds can also be used.

Laser range finders must be used, especially when heat waves degrade distance estimating by conventional means.

FOs can detect targets by observing dust clouds created by moving enemy forces.

Dust clouds created by impacting rounds sometimes make subsequent adjustments difficult. Usually, adjustment of fires by an FO is enhanced when the initial round impacts beyond the target.

The FO should consider using smoke behind the enemy to silhouette him. The sameness of colors in the desert makes specific targets hard to spot. At night, illumination burning on the ground behind the enemy has the same effect.

Laser range finders may need to be adjusted several times a day because of temperature changes.

COLTs should be employed to engage the enemy at maximum distances.

Most open desert terrain allows a faster or an unimpeded approach and more maneuver space for mechanized forces. Use of trigger points and long-range observation capabilities is critical for effective engagement with available fire support systems. Fast-moving formations are best engaged with TACAIR assets and attack helicopters.

Increased equipment failure can be expected as a result of heat, sand, and dust. Especially susceptible are radios, Vinson equipment, and other electronic equipment.

Aerial Observers. Aerial platforms for target acquisition, coordination of fire support, and adjustment of fires are critical in flat terrain or in a desert of rolling sand dunes. The difficulty of aerial navigation in flat desert terrain is a disadvantage that must be planned for.

The absence of terrain features in an open desert makes aerial platforms more vulnerable to enemy air defense.

Because of the ability to see great distances and the featureless terrain of an open desert, positive identification of friendly troops requires special measures. More than usual coordination may be required, with prearranged signals and procedures established for friendly force locations. Maintaining continuous communications on fire support and/or command nets with aviation elements operating in sector is even more critical.

Radars. Radars are highly effective in the desert. However, they may have to be repositioned more often because the flat terrain does not provide adequate screening crests.

Targeting

A thorough IPB must be conducted—

- To identify passable terrain for wheeled and tracked vehicles.
- To identify likely mortar and artillery positions.
- To assess the impact of wadis, gulches, and other significant terrain on friendly and enemy mobility.
- Ž To identify likely enemy forward observation positions.

Targets should be planned as follows:

- ICM and FASCAM for roads in restricted Terrain.
- Ž FASCAM to deny the enemy navigable terrain and to try to force him into wadis and gulches.
- Ž VT on reverse slopes.
- VT and time fuzes on targets in deep, sandy deserts.
- Smoke during the day and ground-burning illumination at night to silhouette the enemy.
- Smoke and WP against likely enemy OPs.
- HE-PD on targets in rocky terrain.
- Ž ATGM systems and enemy air defense systems as priority targets.

Positioning

Common Grid. Terrain association techniques (map spots) may be inadequate for positioning indirect fire systems.

Concealment. The artillery and mortars should move under cover of darkness, because enemy observers can detect the movement or at least the dust from the movement of vehicles.

Resupply should also be conducted at night, preferably en route between positions.

Emplacement in wadis and gulches offers the best concealment. However, it entails some degree of risk as the result of unexpected flash flooding (size of wadis is relative to degree of risk). Appropriate color of equipment and camouflage systems is essential for effective concealment of firing positions. Sand painting of vehicles and equipment is an alternative.

Movement. Trafficability through the dunes may be severely degraded. The absence of roads in the direction of our movement will further slow moves.

Positioning on rocky soil away from roads reduces the dust hazard during air assault operations. Use of helicopter on-board navigational systems (Doppler) can help in locating gun positions. However, these systems must be updated with accurate grid locations at the pickup zone (PZ).

Position Area Selection. Sandy deserts usually are a problem for mortars and towed artillery. Solid ground to secure baseplates for the M102 howitzer may be rare in certain areas.

Close Air Support

Air support aircraft may be more vulnerable because of the lack of covered approaches. However, the greater visibility common in most deserts allows target engagement from better standoff ranges.

Panels or other visual or electronic signatures are required to help the pilot differentiate between friend and foe.

SEAD is very important.

Detailed planning for CAS is important because of wide dispersion of units.

Night Operations

Reasons for Night Combat

Some specific reasons for night combat include—

- To achieve surprise and to avoid heavy losses which might be incurred in daylight operations over the same terrain.
- To compensate for advantages held by an enemy with superior forces or air superiority.
- Ž To counter the enemy night operations.
- Ž To retain the initiative or freedom of action.
- Ž To exploit the technological advantage Of our forces at night over a less sophisticated enemy.

Maneuver

Movement and direct fire are the two areas most affected by the reduced visibility inherent in night operations.

Movement. Movement and land navigation are much more difficult at night. This is largely because of problems with terrain recognition. Maintaining direction while moving is extremely difficult at night.

Direct Fire. Target acquisition and engagement ranges are limited to the capabilities of night vision devices (NVDs). Ground surveillance radars can be used for early target acquisition and for directing engagement by indirect or direct fires. Controlling the direct fires is critical at night. Control requires effective communications to ensure engagement of the correct targets.

Fire Support

The main consideration in supporting night combat with field artillery, mortars, tactical aircraft, and naval gunfire is the ability to detect the target and coordinate the attack. Several considerations are critical.

Illumination and smoke assets probably will be in short supply. If their use is critical to the success of an operation, the FSO must know the specific area in which the commander desires to use smoke and illumination and for what purpose. If inadequate amounts are on hand, action must be taken to alleviate the shortfall well in advance.

At night, the adjustment of fires without the aid of radars, artificial illumination, or sound ranging is virtually impossible. Critical targets should be adjusted during daylight if possible, or target acquisition assets should be allocated for adjustment of fires.

Smoke should be planned at night to degrade enemy night vision capabilities.

The FSO plays a critical role if CAS or attack helicopters are used in night operations. These weapon platforms may not be equipped with adequate night vision equipment. Their effectiveness will depend on the ability of the force to illuminate targets. Additional coordination between the FSO, maneuver S3 or G3 air, and ALO is needed to integrate sorties and plan illumination for their use.

Night Offensive Operations

In planning a night attack, the commander must decide what type of attack to conduct. His decision is based on the required fire support.

Illuminated and Nonilluminated Attacks. An illuminated attack is used when the possibility of achieving surprise is remote, when the enemy has NVDs, and where control of units overrides the need for stealth.

The nonilluminated attack is made by using stealth to achieve surprise in closing with the enemy before he discovers the attack. Even though an attack is to be nonilluminated, illumination is always planned. It is executed only on the commander's authority.

Execution of Planned Fires. Stealth and surprise may be more important to the attack objectives than the effects expected by preparation fires. Use of preparation fires alerts the enemy to the objectives of the attack and may compromise any night advantages. However, these fires should always be planned.

The nonilluminated attack with on-call fires offers a better opportunity for surprise.

Night Offensive Fire Support Considerations. In addition to the planning and coordination considerations for daylight offensive operations, the considerations discussed below apply.

Fires should be planned to disrupt or destroy enemy command and control facilities.

Prearranged visual signals such as hand-held flares can be used for initiating or canceling fires (air support and schedules of fire such as groups). Applicable SOI should be used.

When fires are shifted, they should be moved beyond the friendly unit limit of advance.

Illuminating fires may not be fired but should be planned. Illumination over the objective should be timed to burn out approximately 300 meters above the ground. Illumination beyond the objective should be allowed to burn on the ground to silhouette the defenders on the objective and to provide a heading reference for friendly forces. Also, illumination can be placed on several locations over a wide area to confuse the enemy as to the exact place of the attack. Once used, illumination should probably be continuous, because friendly troops will have temporarily lost their night vision.

Smoke can be used to degrade enemy NVDs. It should be placed in front of the enemy, Smoke also can be used when key terrain is to be bypassed. However, smoke on the objective during the final assault conceals enemy locations. Only thermal devices can see through smoke.

Fire support coordinating measures should be placed on identifiable terrain. Permissive measures should be placed well in front of friendly forces. Restrictive measures should be used minimally and must provide the safety required yet not complicate clearing fires at night. These measures must be disseminated and understood by all friendly elements.

Suppressive fires are planned for the final assault to the objective.

Fires are planned beyond the limit of advance to stop enemy force retreat or reinforcement.

Night Defensive Operations

The effective employment of fire support is critical to the successful night defense. As with the offense, daylight planning and coordination considerations are used in addition to considerations for night defense, which are as follows:

Ž On-call fires should be used to engage enemy forces as they attack or probe the defense.

Ž Use of illumination must be planned. The approving authority for defensive illumination should be retained by the appropriate maneuver commander. This is to preclude accidental illumination of recon patrols, engineer activities, and so forth. When used, illumination should be dropped above and behind attacking forces to silhouette them.

- Fires, especially FPFs, should be adjusted during daylight, if possible.

Ž Smoke may be used to slow, confuse, and disorient attacking forces.

- FASCAM maybe planned by the engineer to separate forces, disrupt formations, and plug gaps in the defense.

Ž Permissive fire support measures should be planned as close to friendly troops as possible; however, measures should be placed on positively identifiable terrain.

- Restrictive measures, if required, should be planned and placed on easily identifiable terrain to provide safety to friendly elements.

Psychological Aspects of Night Operations

The psychological or mental factors that affect soldiers most during night operations are those that tend to lessen confidence, cause fear, and increase the perception of isolation.

Fear. Fear is a normal experience in battle, and night intensifies this emotion. Since there is a tendency to doubt things that cannot be seen, fear of the unknown or of an unseen enemy may increase at night.

Isolation. AirLand Battle Doctrine often requires units to be dispersed on the battlefield. At night, that dispersion seems even greater. At night and during periods of reduced communications, even small distances between individuals, crews, or units seem exaggerated. There is a tendency for one to think "I'm alone out here."

Continuous Operations

Physiological aspects of continuous operations include those factors that degrade the soldier's physical ability to function. Sleep loss and fatigue induced by night operations magnify stress.

Sleep Loss

After 48 hours of sustained activity, loss of sleep becomes the most significant degrader of soldier performance on the battlefield. As sleep loss begins to accumulate, both physical and mental effects are observed in varying degrees.

Most of the following effects can occur after 24 hours without sleep:

- Tasks may be omitted as a result of a momentary lapse into sleep (falling asleep with eyes open).
- Vigilance decreases rapidly, resulting in missed critical signals.
- Ability to focus on a task for more than a brief period decreases noticeably.
- Memory becomes faulty, particularly short-term memory. This makes it difficult to learn new information, follow instructions, or remember recent decisions.
- Response to events or instructions slows. One seems to be operating in a daze.
- The ability to formulate and make sense from information becomes severely degraded. It takes longer to perform simple tasks such as encoding or decoding messages or plotting grid coordinates. Accuracy suffers.
- The ability to reason logically is degraded, which may result in snap judgments.
- Problems with communication arise. One has difficulty understanding or articulating even simple messages.
- A wide range of mood changes, characterized by depression, anger, lack of patience, and euphoria, is experienced.

Sleep loss is cumulative over time. The number of hours needed to recover is directly related to the number of hours sleep was deprived. As a rule of thumb, a minimum of 6 hours rest is required for every 24 hours without sleep.

The following are recovery and adjustment times:

- 12 hours sleep or rest before a prolonged work period.
- 12 hours sleep or rest after 36 to 48 hours acute sleep loss.
- 24 hours sleep or rest after 36 to 48 hours sleep loss with high work load (12 to 16 hours a day).
- 2 to 3 days off after 72 hours or more acute sleep loss.
- 3 to 5 days to initiate biological adaptation and return to normal day-night cycle from night shift.
- 3 to 4 weeks for full adaptation of biological rhythms to a typical work-rest schedule (as in night shift work).

Fatigue

Fatigue is the result of excessive work and sleep loss. The latent effects of fatigue may linger for about 3 days following sleep deprivation of 48 hours or more.

Military Operations on Urban Terrain

Characteristics

Because conflict on urban terrain is becoming more likely, the FSO at any level must be aware of the special considerations for fire support on urban terrain. Specific characteristics of MOUT are as follows:

- The defender has the advantage.
- Freedom to maneuver within the urban area is greatly restricted.

Ž Visibility is reduced because of buildings.

Ž The attacker and the defender have considerable cover and concealment.

Ž Unit boundaries are much smaller.

- Small-unit operations predominate.

Munitions

The following are considerations involving the use of various munitions in urban terrain:

Ž Careful use of VT is required to avoid premature arming.

- Indirect fires may create unwanted rubble.

Ž The proximity of friendly and enemy units requires careful coordination.

Ž WP may create unwanted fires and smoke.

Ž Fuze delay should be used to penetrate fortifications.

- Illuminating rounds can be effective; however, friendly positions must remain in shadows and enemy positions must be highlighted. Tall buildings may mask the effect.

- VT and time fuzes and ICM are effective for clearing enemy positions, observers, and antennas off building tops.

Ž Swirling winds may degrade smoke operations.

Ž FASCAM may be used to impede enemy movements.

Target Acquisition and Observation

Forward Observers. The following are considerations in the employment of forward observers on urban terrain:

Ž Ground observation is limited because of the buildings.

- Consider placing FOs on tops of buildings.

Ž Adjustment of fires will be difficult because buildings block the view of adjustment rounds.

Forward observers must be able to determine where the dead space is and how large it is. Dead space is the area in which indirect fires cannot fall because of buildings, and it is therefore a safe area for the enemy. For low-angle artillery, the dead space is generally five times the height of the building. For mortars and high-angle artillery, it is generally one-half the height of the building.

Aerial Observers. Aerial observers are very effective to see behind buildings immediately to the front of friendly forces. Aerial observers can also relay calls for fire when communications are degraded because of power lines or building mask.

Radars. Because most indirect fires in urban terrain will be high angle, radars will be able to locate many enemy positions. The radars must not be sited too close behind tall buildings, or they will lose some effectiveness.

Targeting

Targeting is very difficult on urban terrain, because the enemy has many covered and concealed position areas and movement lanes. The enemy may be on rooftops, in buildings,

and in sewer and subway systems. Aerial observers are extremely valuable in the targeting process. They can see deep to detect movements, rooftop positions, and fortifications. Targets should be planned on major roads, road intersections, and known or likely enemy fortifications. They should be planned on rooftops to clear away enemy FOs and communications and radar equipment. Consider employing artillery in the direct fire mode to destroy fortifications.

Positioning

Because of the predominance of concrete surfaces, finding positions for artillery and mortars on urban terrain may be difficult. The following are some positioning considerations:

- Parks, school yards, and other obvious choices for positions are obvious to the enemy also and will be targeted.
- Positions for howitzers within buildings (garages, warehouses, and so forth) provide cover and concealment but may negatively affect high-angle fires.
- Movement between positions may be hampered by street rubble.
- Commanders must have the flexibility to provide survey control by use of conventional means, as the use of PADS maybe limited.
- Mortar baseplates on concrete surfaces may be stabilized by use of sandbags.

Close Air Support

The following are considerations in the use of CAS:

- Enemy fortifications should be reduced with precision guided munitions. The presence of tall buildings degrades this capability.
- CAS may create unwanted rubble. Attack enemy units moving in and out of the built-up area.
- The presence of civilians or key facilities may limit the use of air weapons.
- Limited ground observation may require that airborne FACs control strike aircraft.

Communications

The following are communications considerations in MOUT:

- Radio communications are degraded by tall buildings.
- Wire should be routed through sewers and buildings for protection.
- Messengers should be used.
- Local civilian telephone and wire communications facilities, if available, should be used for unsecure communications.

Cold Weather Operations

Fire planning for cold weather operations is no different than that required for more temperate regions. However, the fire support planner must consider the limited ground mobility of artillery weapons and ammunition supply and increased time of operation.

Characteristics

Extreme conditions of weather can be dramatic and can severely impact on observation, mobility, and delivery of fires. Specific weather phenomena with which the fire support personnel must be concerned are whiteout, grayout, and ice fog.

Whiteout. The observer appears to be in a uniformly white glow. Neither shadows, horizon, nor clouds are discernible. Depth perception and orientation are lost. Only very near dark objects can be seen. Whiteouts occur over an unbroken snow cover and beneath a uniformly overcast sky. Blowing snow can cause the same effect on aerial observation.

Grayout. Grayout is similar to whiteout, except that the horizon is distinguishable under grayout conditions. It occurs over a snow-covered surface during twilight conditions or when the snow is close to the horizon. There is an overall grayness to the surroundings; and when the sky is overcast with dense clouds, there is an absence of shadows, which results in a loss of depth perception.

Ice Fog. This is common around inhabited areas during cold weather below 35° F. Water vapor created by humans and by vehicle exhausts may appear around soldier and equipment concentrations. Ice fog obscures vision and discloses locations by presenting a visible cloud to the enemy. Artillery batteries may create ice fog when firing.

Munitions

The following are considerations in the employment of various munitions in cold weather operations:

- Make maximum use of airburst munitions.
- HE-PD, HE-delay, ICM, and FASCAM are ineffective in deep snow and unfrozen muskeg. At least 40 percent of the blast from these munitions is smothered by the snow.

Ž Smoke (HC) is not effective because canisters are smothered in the deep snow.

Ž WP is effective; however, phosphorus may burn undetected in the snow for up to 3 to 4 days and may be a hazard to friendly troops subsequently moving through the area.

Ž Overall, VT is a good fuze for cold weather operations. However, snow and ice may cause it to detonate prematurely. Also, extreme cold causes a higher number of duds among VT fuzes. The new improved VT fuze has reduced this problem.

Ž Extreme cold weather will affect the range of weapons.

Ž Low temperature may cause illuminating rounds to malfunction as the result of freezing the parachute and its components.

Target Acquisition and Observation

Forward Observers. The following are considerations in FO employment in cold weather operations:

- 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.

Ž Bright sunlight reflecting off a snow-covered landscape causes snow blindness. Amber filters on binoculars and observation devices reduce the incidence of snow blindness.

- Ground bursts may be difficult to observe because of deep snow.

Aerial Observers. Aerial observers are valuable because they can see deep and are not as prone to disorientation as are ground observers. However, weather conditions may reduce the availability of aircraft.

Radars. The following should be considered when radars are used in cold weather operations:

- Extremely cold weather may degrade their operations.

Ž Ground surveillance radars are effective.

- Remote sensors are not effective when used in deep snow.

Targeting

Because of terrain and weather phenomena, target detection is difficult. However, ice fogs and snow clouds created by moving enemy

formations will reveal targets. Also, tracks in the snow may indicate enemy positions.

Close Air Support

The following are considerations in the use of CAS in cold weather operations:

Ž Frequent poor weather reduces the availability of CAS.

Ž The sameness of the terrain makes the marking of targets critical.

Ž Panels or pyrotechnics must be used to indicate friendly locations.

Communications

Effective communications are hampered by—

• Electronic interference.

Ž Weakened batteries. Conventional dry-cell batteries are 40 percent effective below 0° F, 20 percent effective below -10° F, and 8 percent effective below -30° F. A similar problem exists for nickel-cadmium (NICAD) and lithium batteries.

Ž Frost from human respiration forms in the mouthpiece. Cover it with cloth or a sock.

Survey

Extreme cold in arctic and subarctic regions adversely affects survey equipment operability. Accuracies may be degraded and impact on transfer data, massed fire, and unobserved fire.

Field Artillery Movement

The following must be considered in FA movement in cold weather operations:

• Consider route reconnaissance in FA ground and air.

• Ice thickness and load-bearing capacity must always be determined before the FA crosses frozen lakes and rivers.

Ž A vehicle may be required to position artillery weapons used in air assault operations.

• Maximum use of aerial resupply should be planned.

APPENDIX K

AERIAL FIRE SUPPORT OBSERVER AND OH-58D EMPLOYMENT

Description of the OH-58D Helicopter

The OH-58D is a division or corps aerial platform capable of conducting multiple tactical missions in a relatively short time. Because of its mobility and on-board systems, this helicopter gives the commander the ability to seize the initiative and remain extremely flexible in a tactical environment.

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 advanced avionics cockpit. The crew consists of one pilot and one aerial fire support observer.

Modified Airframe

Improvements to the airframe include the following:

- A 650 shaft horsepower (SHP) turbine engine with flight endurance of 2.5 hours.
- Hover out-of-ground effect (OGE) at 4,000 feet at 95°F.
- Vertical climb of 500 feet per minute.
- Foward airspeed of 119 knots.
- Rearward and sideward airspeeds of 35 knots.

Advanced Avionics Cockpit

This cockpit contains a complete digital programmable system readout with aircraft statistics, frequencies, location, and TACFIRE messages; one VHF radio, one UHF radio, and two FM radios; and the capability for adding an HF radio.

Airborne Target Hand-Over System

The ATHS gives the operator the capability to interface with Army aviation aircraft (UH-60, AH-64) and Air Force aircraft (F-16, A-10, and A-7). It also gives the unit an automated communications link with artillery systems through TACFIRE.

Mast-Mounted Sight System

The MMS is above the rotor system and houses the optics for the AFSO and pilot. Contained in the sight system are the laser range finder and/or designator, the optic telescope, the thermal imaging sight, and the boresighting system. With these systems, the AFSO has the capability for day or night target acquisition and recognition and the ability to laser range and designate targets well beyond 5 kilometers.

Attitude and Heading Reference System

This system is similar to the conventional PADS. It is capable of giving the pilot an eight-digit grid location of the aircraft during flight. The system must be updated with survey points throughout the routes of the aircraft.

Crew

The pilot and the aerial fire support observer are the flight crew of the OH-58D. The pilot is the primary operator of the aircraft. The AFSO performs navigation assistance, tactical coordination with the supported element, and digital communication with the artillery units. He performs lasing, designation and hasty fire planning; reports to higher headquarters; and is the secondary operator of the aircraft in an emergency.

Capabilities of the OH-58D

The OH-58D helicopter has the following capabilities:

Ž Target acquisition capability in day or night visibility and in limited visibility through the use of a thermal image system (TIS).

- Eight-digit target location capability based on the accuracy of position location equipment,
- Ability to supplement and use Army aviation, Air Force, and other ground target acquisition assets.

Ž Laser target designation and range-finding capability. The OH-58D is compatible with munitions such as the Pave Penny, Copperhead, and other *smart* munitions of all services.

- Provides a digital link to any TACFIRE artillery unit and its relay systems.
- Can deploy, detect, recognize, and guide munitions to a target and send target intelligence reports without exposing more than the MMS to the enemy threat.
- Provides rapid mobility throughout the battlefield.
- Capable of communications with all Air Force aircraft and Army assets.

Ž Can fully support a combat aviation unit with aerial fire support coordination during tactical operations.

- In the future, aircraft will be mounted with Stinger and antiaircraft missile pods for use as a self-defense weapon system.

Limitations

The OH-58D is a line-of-sight system. It cannot see over the horizon or through foliage.

If the weather or environment defeats the laser, it may defeat the system. Defeating conditions could include conditions such as smoke, dust clouds, fog, and ice. Because of safety restrictions, the system cannot be flown in icing weather conditions.

The aircraft is not certified for instrument flight rules (IFR). That means the aircraft can be flown by instruments in bad weather, but only in emergency situations.

Preflight operations require 35 to 50 minutes to program systems for a mission. Navigation information, communications, and ATHS data must be entered before executing a mission.

Crew endurance is limited. The division has only six of these aircraft; approximately four are available at any one time because of downtime for maintenance. For this reason, missions for these systems must be well-planned and briefed.

Fire support coordination is possible but difficult to perform while target acquisition and/or attack is being conducted simultaneously. Limited space and no hard-copy capability in the aircraft make scheduling and planning difficult. The AFSO can digitally transmit only limited fire support planning information. Transmission of fire plans will be limited to the capabilities equivalent to those of a company FSCOORD.

Missions

The OH-58D is designed to perform a variety of missions as described below.

Target Acquisition

Target acquisition capabilities of the OH-58D include —

Ž Acquiring deep targets for supported units and counterfire assets.

Ž Collecting and reporting battlefield information.

Ž Early warning surveillance.

Target Engagement

The OH-58D is capable of firing targets with all fire support assets, including smart munitions.

Fire Support Planning and Coordination

When no other capability is available, the OH-58D can—

Ž Perform rear area fire support

- Augment combat aviation brigade fire support operations with the AFSO.

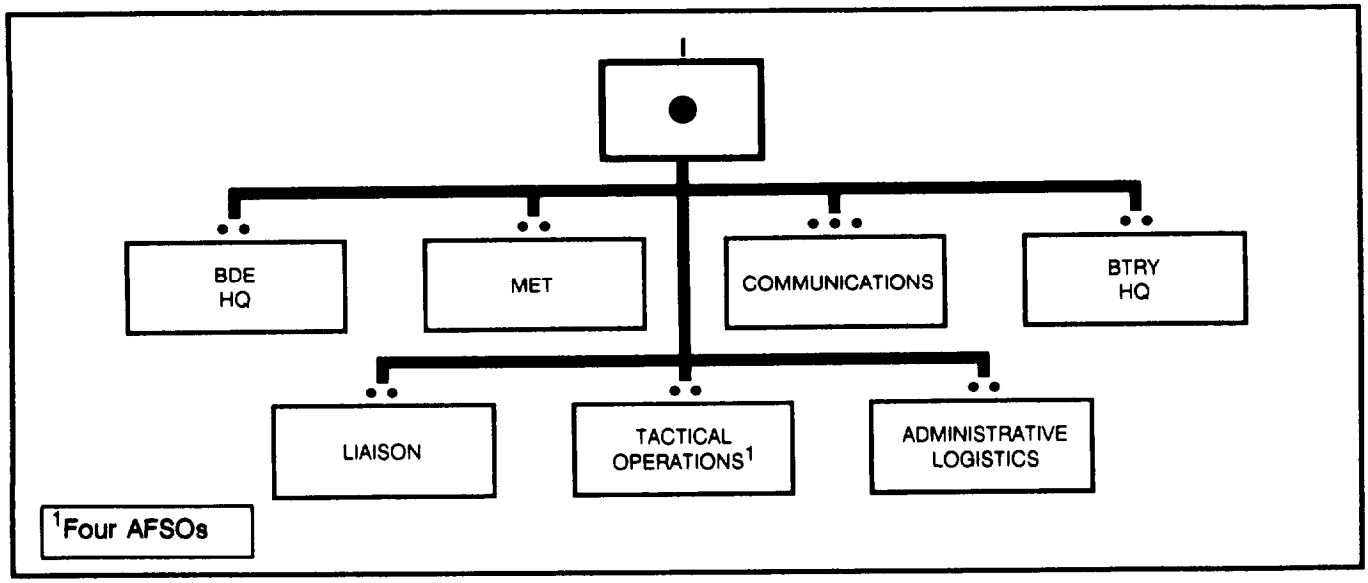
Organization

At each level of command, assets from the field artillery and the aviation brigade combine to form the OH-58D system.

Corps

Four AFSOs are assigned to the headquarters and headquarters battery (HHB) of each field artillery brigade.

HEADQUARTERS AND HEADQUARTERS BATTERY, FA BRIGADE

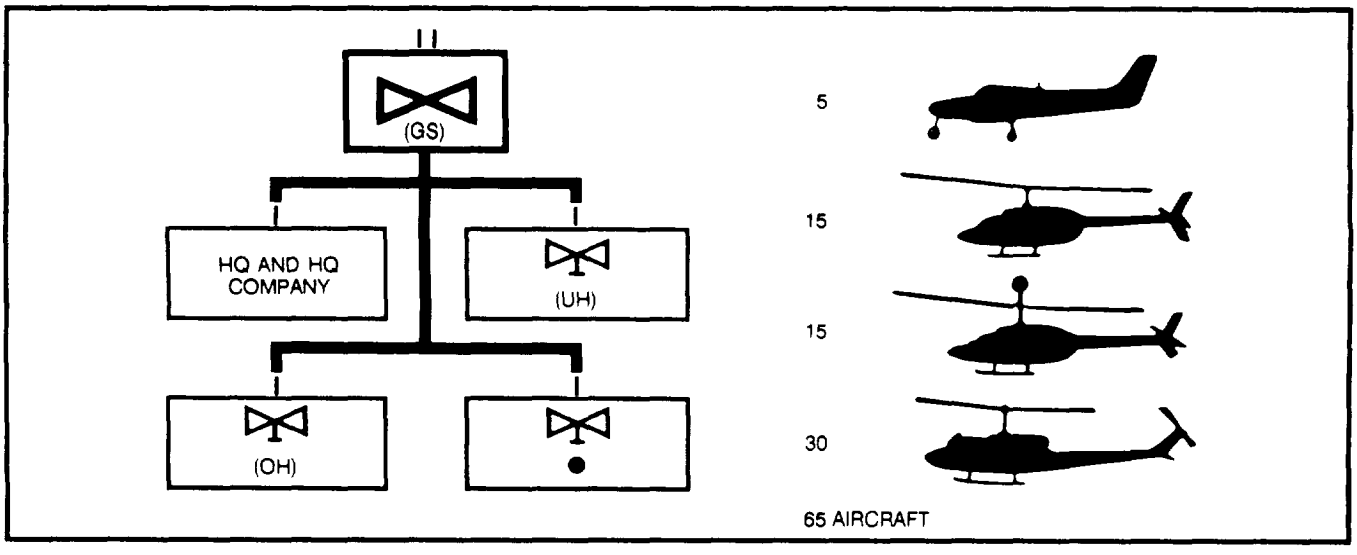


Fifteen aircraft and pilots are assigned to the target acquisition and reconnaissance company, command aviation battalion, corps aviation brigade.

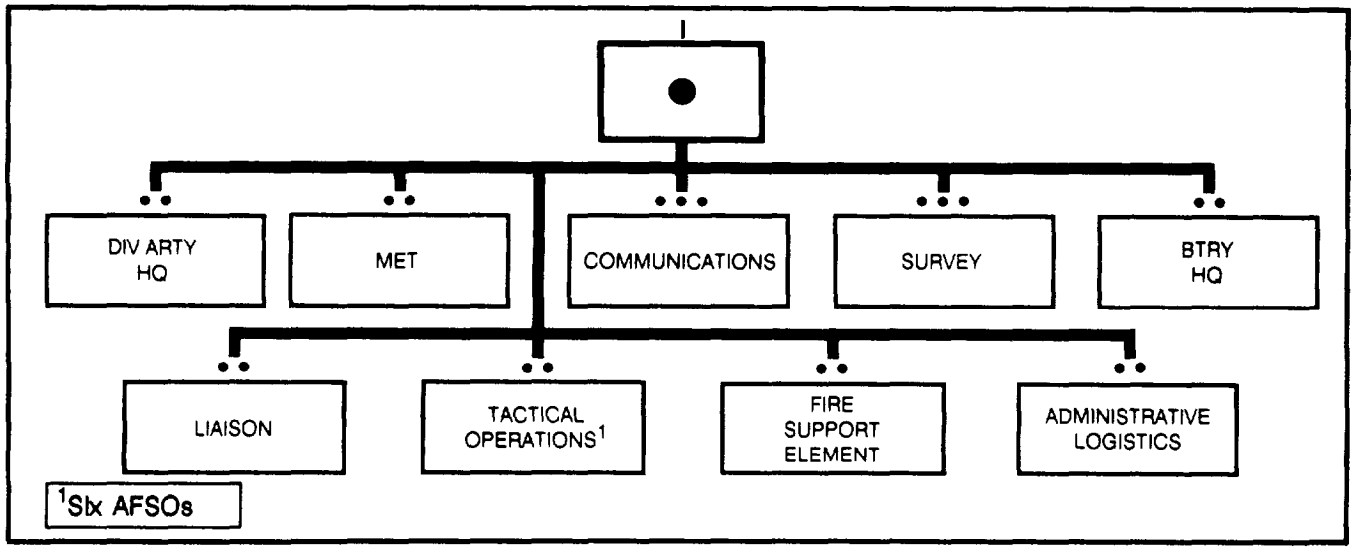
Division

Six AFSOs are assigned to the HHB, division artillery.

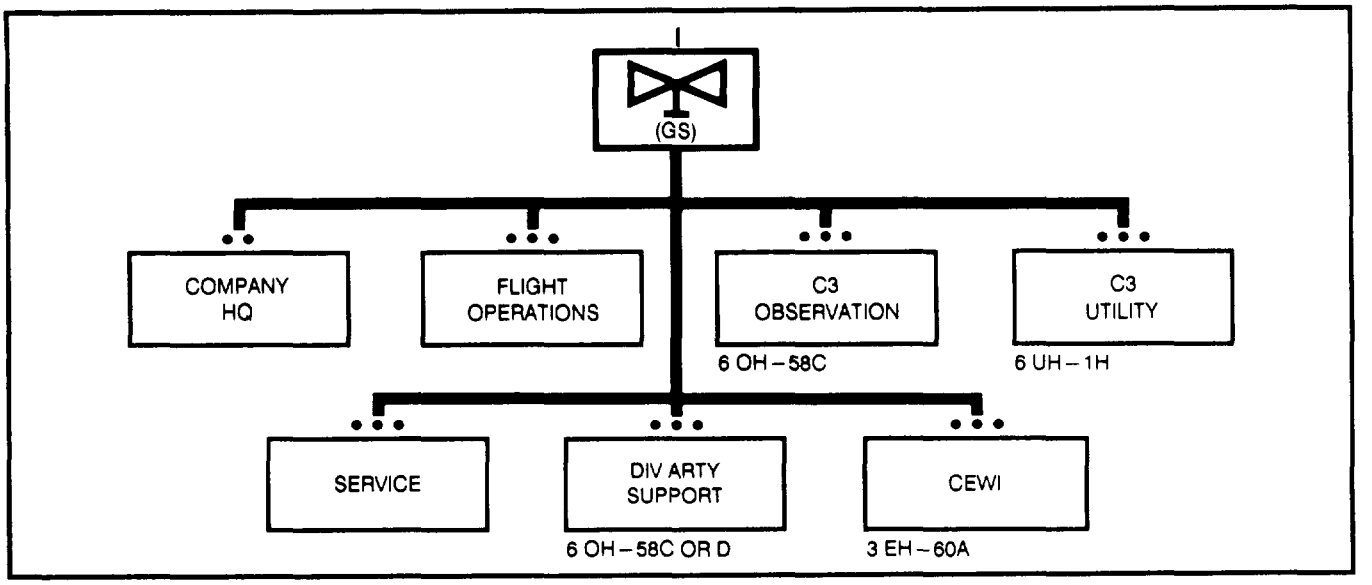
COMMAND AVIATION BATTALION, AVIATION GROUP, AVIATION BRIGADE, HEAVY CORPS



HEADQUARTERS AND HEADQUARTERS BATTERY, HEAVY DIVISION ARTILLERY



COMMAND AVIATION COMPANY, AVIATION BRIGADE



Six aircraft and pilots are assigned to the div arty support platoon of the command aviation company of the aviation brigade.

Employment Considerations

Because of its limited numbers, multipurpose utility, and requirement for target attack and TA systems support, the OH-58D system requires detailed planning and execution at all echelons within the fire support structure. Use of the OH-58D should be based on the factors of METT-T and the commander's intent.

On the basis of the mission, IPB, resources, TVA, and the commander's concept and intent, the FSCOORD at each echelon of command recommends to the supported commander the priority of employment, appropriate munitions mix, supporting and supported units, and selection and disposition of appropriate sensors. Determinations made on OH-58D employment are reflected in the task organization and fire support paragraph or annex of the appropriate operation order.

To provide the accuracy and responsiveness required by the OH-58D system, target acquisition and designation systems provide immediate target location capability and the ability to interface with the fire support C3 system. Targets are initially located by acquisition systems that can see deep. They are then refined by other systems as the targets move closer. When contact is established, the target is identified by the maneuver company FIST, the COLT, or the OH-58D. The link between these other acquisition systems and the OH-58D will be the TACFIRE, or when fielded, the advanced field artillery tactical data system (AFATDS).

OH-58D missions require prior planning and coordination between the AFSO of the OH-58D system, the unit to be supported, and the units supporting the system. Special requirements include maintenance, fuel, TACFIRE subscriber codes, TACFIRE device designation (such as observer with laser), survey locations, and so forth. Although digitally interfaced with the fire support C3

system, the AFSO cannot effectively transmit a fire support plan digitally. Therefore, transmission of the fire support plan is, for the most part, manual. When placed under the operational control of an FA unit, the OH-58D moves to the designated rendezvous point and contacts the FS cell of the supported unit. The FS cell is responsible for coordinating the requisite C3 for employment. The OH-58D is integrated into the unit fire support plan and positioned accordingly. Normally a direct link is established between the OH-58D and the fire unit supporting it. When a target is detected, the system moves to a vantage point, coordinates the delivery of fires on the target, provides target attack assessment, and reengages the target if necessary.

The aircraft requires significant survey support in order to maintain the accuracy of its target-locating system. The system must be initialized every 15 nautical miles or 15 minutes. Less than adequate survey degrades first-round fire-for-effect capability. Div arty is responsible to provide survey control reference points.

Operationally, the system can be employed by itself when it is performing target acquisition and targeting. The ideal situation, however, would be to employ another aircraft, such as another OH-58D or an OH-58C, to enhance survivability and mission performance. Two aircraft will facilitate continuous coverage when one goes to refuel.

Division Control

OH-58D assets available to the division can be employed in support of the division as a whole or can be further allocated to subordinate units. The division FS cell normally controls employment of OH-58D systems retained under divisional control. These systems are directed toward areas of particular interest to meet the commander's intent. Missions include augmenting target designation and target acquisition assets for surge requirements in close, rear, and limited deep operations. Under division control, the AFSO is assigned missions by the division FS cell and provides an acquisition capability and the ability to call for and adjust indirect fire support. The AFSO receives initial artillery support through the div arty. A quick fire channel can be established to a GS artillery unit, such as the MLRS battery. The AFSO talks to div arty or the division FSE on the div arty command net (voice) or operations/fire direction net 1, 2, or 3 (digital). For artillery support, the AFSO contacts a designated artillery unit on its operations/fire direction net (digital). The OH-58D may be OPCON to a rear area operations center (RAOC) or a tactical combat force to support rear operations, In this contingency, the OH-58D will be assigned missions by the RAOC fire support officer. The AFSO receives artillery support through the artillery unit assigned the mission to support rear operations. The AFSO talks to the FSE on the FSE net or on the supporting artillery unit command net (voice). The AFSO calls for artillery support on the supporting unit FD net (digital).

Maneuver Brigade Control

The OH-58D system should be used primarily for augmenting the brigade organic target designation and target acquisition assets rather than for fire support coordination. The OH-58D system normally is used to augment the brigade FISTs and COLTs. Because it can see deeper than most other target acquisition systems in support of the brigade, the OH-58D also augments target acquisition assets supporting the brigade and provides timely and accurate battlefield information. In any case, the OH-58D is under the direction of the brigade FS cell.

Aviation Brigade Control

When the aviation brigade exercises direction of the OH-58D systems, it normally places the

systems under the operational control of either the divisional cavalry squadron or an attack helicopter battalion (AHB).

In support of the cavalry squadron, the OH-58D system is employed in much the same manner as in support of maneuver units. It can also be used to support the cavalry squadron air cavalry troops individually as an aerial FIST. The OH-58D function in such a role is to provide fire support planning and coordination, to implement the air commander's concept and intent, to provide target acquisition, and to designate targets for attack helicopters.

When the OH-58D is OPCON to an attack helicopter battalion, the AHB commander may choose to retain control of the OH-58D rather than further allocate the system to subordinate units. This is particularly true when the battalion is given a mission requiring the employment of the battalion as a whole. The OH-58D system is one of the few elements under the commander's control that is capable of providing effective fire support planning and coordination.

EXAMPLES OF EMPLOYMENT OPTIONS

EMPLOYMENT OPTION	MISSION	TASKS	CONTROLLED BY	FIRE SUPPORT FROM
Division control: GS	Observer	Target acquisition and engagement	Division through FS cell	Div arty or quick fire channel to GS unit
Division Control: GS	Observer	Target acquisition and engagement	RAOC through its FSE (nonstandard mission)	Unit providing support to RAOC
Maneuver brigade or battalion control: OPCON to or R the DS FA battalion	Observer	Target acquisition and engagement	Maneuver brigade or battalion through brigade or battalion FSE	DS battalion
Covering force HQ Control: OPCON to or R the covering force artillery HQ	Observer	Target acquisition and engagement	Covering force HQ through its FSE	DS battalion
Attack helicopter battalion control:OPCON to or R the AHB	Observer and/or fire support coordination	Target acquisition and engagement and/or fire support planning	AHB through AHB FSO	AHB initially; GS artillery secondarily
Cavalry squadron control: OPCON to or R the cav squadron	Observer and/or fire support coordination	Target acquisition and engagement and/or fire support planning	Cavalry squadron through squadron FSO	Air cavalry troop initially; GS artillery secondarily

APPENDIX L

REPRODUCIBLE FORMS AND TEMPLATE PATTERNS

DA Forms

Reproducible copies of the following forms are provided for local reproduction:

- DA Form 4655-R, Target List Work Sheet.
- DA Form 4656-R, Scheduling Work Sheet.
- DA Form 5032-R, Field Artillery Delivered Minefield planning Sheet.

Ž DA Form 5368-R, Quick Fire Plan.

Template Patterns

Patterns for the Copperhead Coverage Template and the Field Artillery Mine Safety Template are printed here with special care to maintain tolerances for use with 1:50,000-scale maps. **Photocopying these template patterns Introduces errors** which would make the templates **unsatisfactory** for use. However, local Training Aids Support Centers (TASCs) may use the printed copies as blueprints to locally fabricate the templates for unit use. Before their use, all locally fabricated templates must be checked against 1:50,000-scale maps for accuracy.

FIELD ARTILLERY DELIVERED MINEFIELD PLANNING SHEET

For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC.

SECTION A-MINEFIELD DATA

1 TARGET NUMBER	2 PRIORITY	3 REQUESTER

4 MINEFIELD END POINTS (COORDINATES)
FROM TO

5 MINEFIELD DEPTH	6 MINEFIELD WIDTH
7 ADAM (APERS) DENSITY	8 RAAMS (AT) DENSITY
9 SELF DESTRUCT TIME SHORT ☐ LONG ☐	10 SCHEDULED MINEFIELD _____ HRS _____ MIN ON CALL ☐

11 CAUTION NLT EMPLACEMENT TIME	12 APPROVAL AUTHORITY	13 DATE TIME GROUP (DTG)

14 REMARKS

SECTION B-G3/S3/ENGR

15 DTG RECEIVED	16 DTG SAFETY ZONE DISSEMINATED

17 REMARKS

SECTION C-FSE/FSO

18 DTG TO UNIT	19 DTG FROM UNIT	20 DTG TO G3 S3 ENGR

21 REMARKS

SECTION D-FDC DATA

22 TARGET NUMBER	23 FIRING UNIT	24 RANGE TO MINEFIELD CENTER

25 TRAJECTORY ADAM ☐ HIGH ☐ LOW RAAMS ☐ HIGH ☐ LOW	26 DELIVERY TECHNIQUE MET + VE TRANSFER ☐ OBSERVER ADJUST ☐

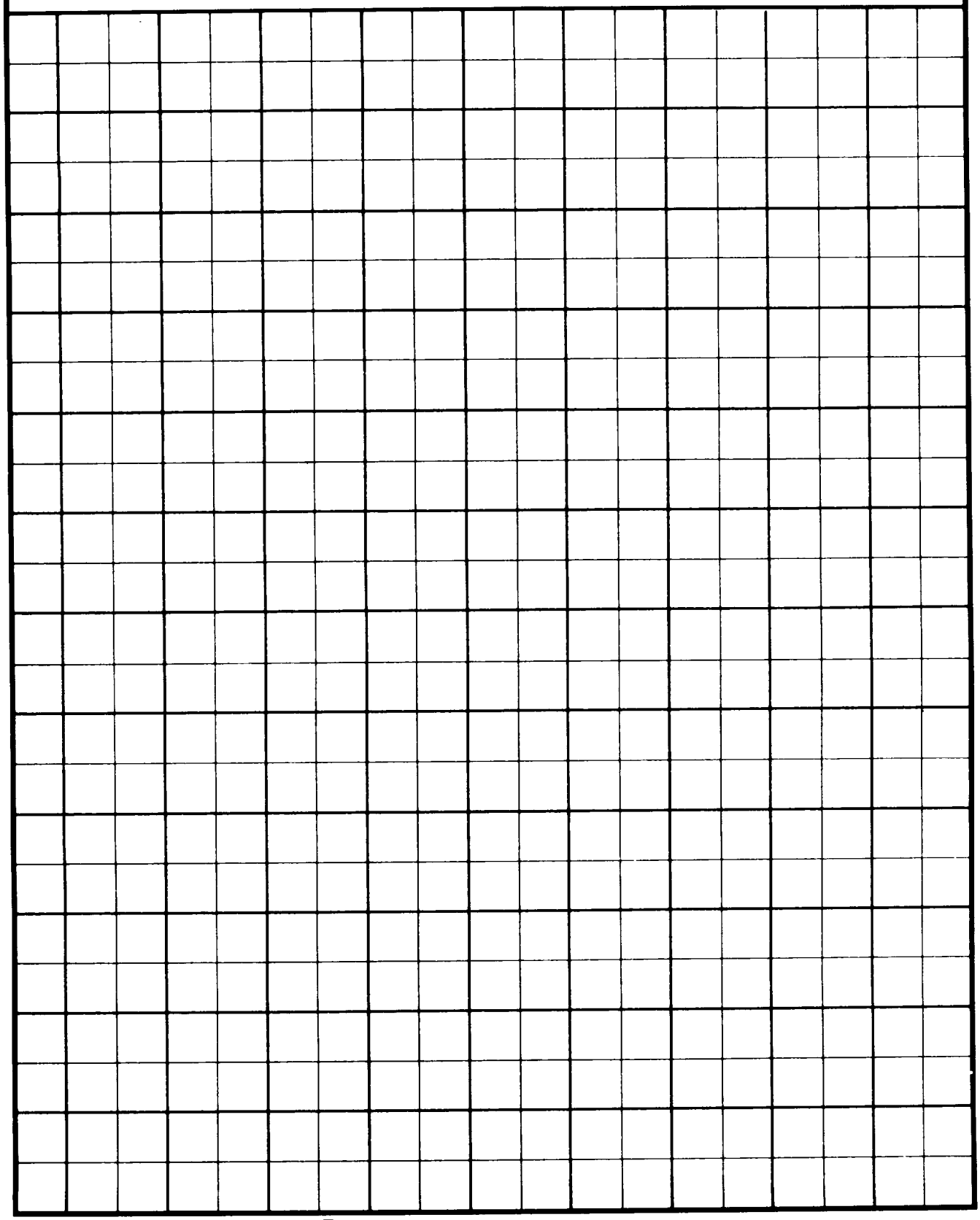
27 AIMPOINT COORDINATE(S) (LEFT AND RIGHT OR SINGLE)
ADAM FROM _____ TO _____ RAAMS FROM _____ TO _____

28 DTG MISSION COMPLETED

29 REMARKS

DA Form 5032-R, Jan 82

SECTION E-MINEFIELD SKETCH WORK SHEET (SCALE 1:50,000)



REVERSE OF DA FORM 5032-R

QUICK FIRE PLAN

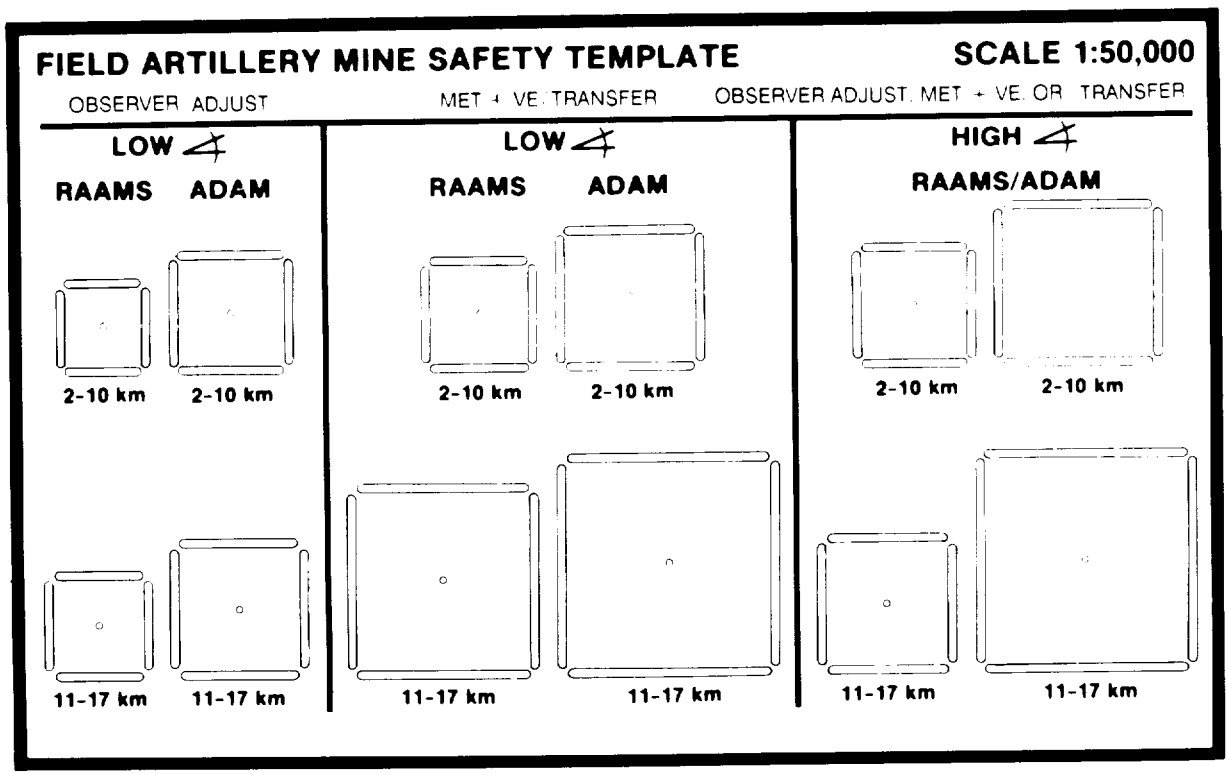
For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC.

FIRE PLAN	SUPPORTING	ORIGINATOR	MODIFICATIONS BY
H-HOUR	SHEET	OF	DATE TIME GROUP

TARGET INFORMATION

LINE	TARGET NUMBER (a)	DESCRIPTION (b)	LOCATION (c)	ALTITUDE (d)	REMARKS (e)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

DA Form 5368-R Dec 84


FIELD ARTILLERY MINE SAFETY TEMPLATE
SCALE 1:50,000
OBSERVER ADJUST
MET + VE TRANSFER
OBSERVER ADJUST, MET + VE OR TRANSFER
LOW
RAAMS
ADAM
2-10 km
2-10 km
11-17 km
11-17 km
LOW
RAAMS
ADAM
2-10 km
2-10 km
11-17 km
11-17 km
HIGH
RAAMS/ADAM
2-10 km
2-10 km
11-17 km
11-17 km

TARGET LIST WORK SHEET

For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC.

SHEET _____ OF _____

LINE NO	TARGET NO *a*	DESCRIPTION *b*	LOCATION *c*	ALTITUDE *d*	ATTITUDE *e*	SIZE		SOURCE / ACCURACY *h*	REMARKS *i*					
						LENGTH *f*	WIDTH *g*							
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

DA Form 4655-R, Jan 83 replaces DA Form 4655, Oct 77, which is obsolete.

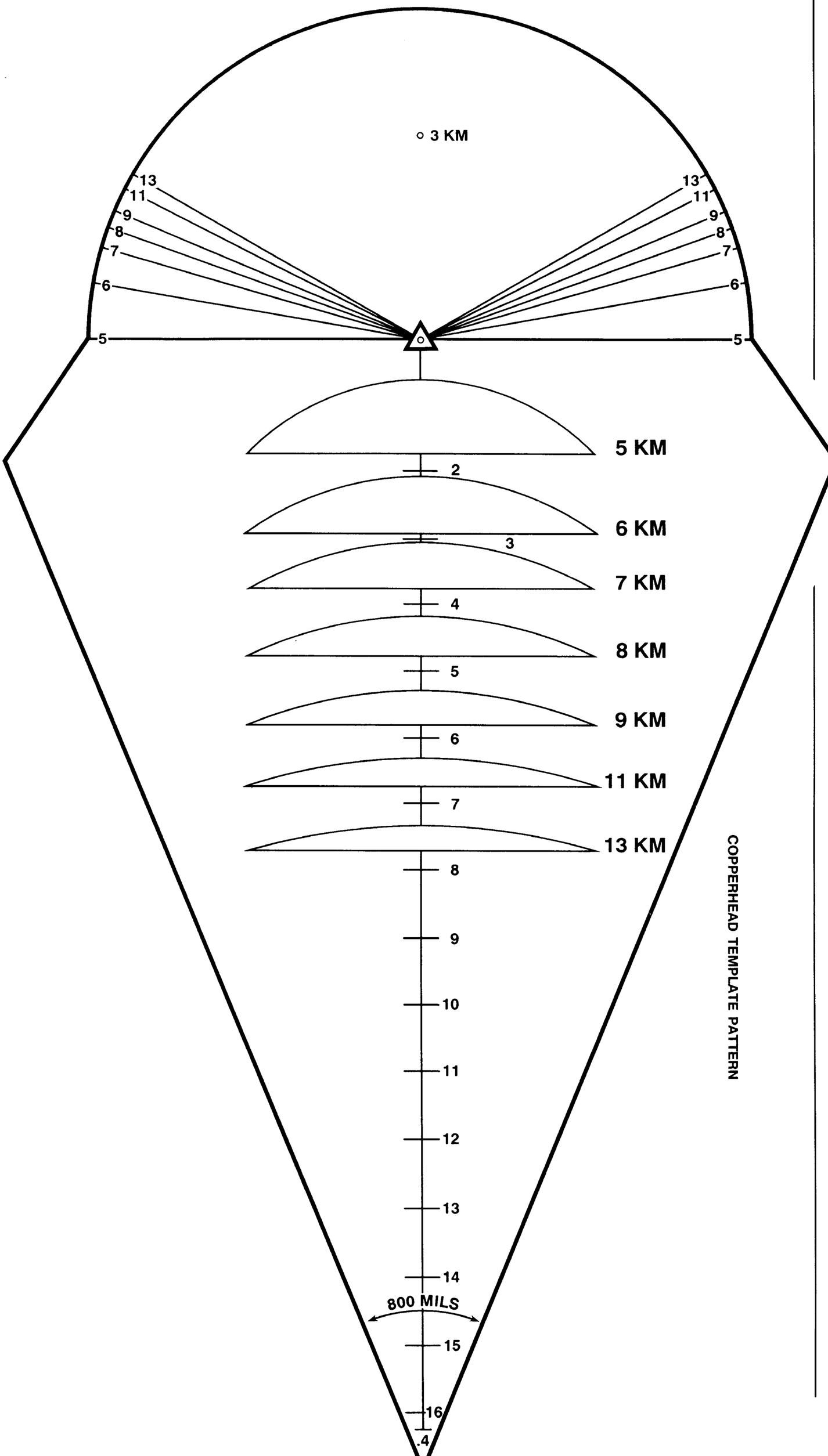
( ) **SCHEDULING WORK SHEET**

For use of this form see FM 6-20-40 or FM 6-20-50; the proponent agency is TRADOC.

SHEET_____ OF _____

LINE NO	ORGANIZATION AND CALIBER	FIRING UNITS																REMARKS

DA Form 4656-R, Jan 83 replaces DA Form 4656, Oct 77, which is obsolete.



COPPERHEAD TEMPLATE PATTERN

GLOSSARY

A

A	as acquired (attack matrix)
AA	assembly area
AAA	antiaircraft artillery
AAGS	Army air-ground system
AATF	air assault task force
AATM	air assault team
ABCA	Australia, Britain, Canada, America
ABP	air battle position
A/C	aircraft
ACA	airspace coordination area
ACE	Allied Command Europe
ACR	armored cavalry regiment
ACRV	artillery command and reconnaissance vehicle
AD	air defense
ADA	air defense artillery
ADAM	area denial artillery munition
admin/log	administrative/logistics (radio net)
ADO	air defense officer
AFAC	airborne forward air controller
AFATDS	advanced field artillery tactical data system
AFSO	aerial fire support observer
AGM	air-ground missile
AHB	attack helicopter battalion
AHRS	attitude and heading reference system
AI	air interdiction
ALD	airborne laser designator
ALO	air liaison officer
AM	amplitude modulated
AMC	air mission commander
AMF (L)	Allied Command Europe Mobile Force (Land)
ammo	ammunition
ANGLICO	air and naval gunfire liaison company
anx	annex
AO	area of operations
AOF	azimuth of fire
AP	antipersonnel
APC	armored personnel carrier
APDS	armor-piercing discarding sabot
APFSDS	armor-piercing, fin-stabilized,discarding sabot
API	armor-piercing incendiary
armd	armored
ARBS	angle rate bombing system
ARPD	army mobile transport battalion (Soviet)
arty	artillery
AS	Australia
ASOC	air support operations center
ASP	ammunition supply point
ASPS	all-source production section
AT	antitank
ATF	amphibious task force
ATGM	antitank guided missile
ATHS	airborne target hand-over system
ATI	artillery target intelligence
ATO	air tasking order
ATP	ammunition transfer point
AVLB	armored vehicle-launched bridge
avn	aviation
az	azimuth

B

BAI	battlefield air interdiction
BCE	battlefield control element
BCS	battery computer system
BDA	bomb damage assessment
bde	brigade
BE	Belgium
BECS	battlefield electronic CEOI system
BGU	basic generation unit
BHOL	battle handoff line
BIFV	Bradley infantry fighting vehicle
BLT	battalion landing team
BMA	battery-minefield angle
BMP	Soviet amphibious infantry combat vehicle
bn	battalion
BOS	battlefield operating system
BP	battle position
BSA	brigade support area
BSO	battalion signal officer
BTR	Soviet amphibious armored personnel carrier
btry	battery

C

C2	command and control
C3	command, control, and communications
CA	Canada
CAA	combined arms army
CAB	combat aviation brigade
CAS	close air support
CATF	commander amphibious task force
cav	cavalry
CBU	cluster bomb unit
CCP	communications checkpoint
CCT	combat control team
cdr	commander
CEOI	communications-electronics operation instructions
CEWI	combat electronic warfare intelligence
CF	command/fire (radio net)
CFA	covering force area
CFL	coordinated fire line
CFV	cavalry fighting vehicle
CFZ	critical friendly zone
CGI	control group intercept
Chap	Chaparral
CHEMWARN	chemical warning
CI	count erintelligence
CLF	commander landing force
CLGP	cannon-launched guided projectile
CM	countermobility (mission)
cmd	command (radio net)
cmd/ops	command/operations (radio net)
cml	chemical
CNR	combat net radio
co	company
COLT	combat observation'lasing team
comm	communications
COMSEC	communication security
COP	command observation post (Soviet)
counterprep	counterpreparation
CP	command post
CPhd	Copperhead
CPT	captain
CRP	combat recon patrol
CRTA	chief of rocket troops and artillery (Soviet)
CS	combat support

CSR	controlled supply rate
CSS	combat service support
CTOC	corps tactical operations center

D

D	destroy (attack matrix)
(D)	digital (radio net)
DAG	division artillery group
DARM-4	mobile artillery repair shop complex (type)
DBA	deep battle area
DD	destroyer
DDG	guided missile destroyer
def	defense
det	detachment
DF	direction finding
DISCOM	division support command
div	division
div arty	division artillery
DLIC	detachment left in contact
DMD	digital message device
DPICM	dual-purpose improved conventional munitions
DS	direct support
DSA	division support area
DTG	date-time group
DZ	drop zone

E

EA	engagement area
ECCM	electronic counter-countermeasures
ECM	electronic countermeasures
EEFI	essential elements of friendly information
EIR	essential intelligence requirements
EN	electronic notebook
ENG	engineer (attack matrix) (TACFIRE)
engr	engineer
EPW	enemy prisoners of war
ERP	engineer reconnaissance patrol (Threat)
ETAC	enlisted terminal attack controller
EW	electronic warfare
EWS	electronic warfare section

F

FA	field artillery
FAAR	forward area alerting radar
FAC	forward air controller (see ALO, ETAC, and AFAC)
FAIO	field artillery intelligence officer
FASCAM	family of scatterable mines
FAST	forward area support team
fax	facsimile
FCL	final coordination line
FCT	firepower control team
FD	fire direction (radio net)
FDC	fire direction center
FEBA	forward edge of the battle area
FED	forward entry device
FFA	free-fire area
FFE	fire for effect
FID	foreign internal defense
FIST	fire support team
FLIR	forward-looking infrared
FLOT	forward line of own troops
FM	field manual; frequency modulated
FO	forward observer
FPF	final protective fire
frag	fragmentary
FRAGO	fragmentary order
FS	fire support

FSA	fire support area (Navy)
FSB	forward support battalion
FSC	fire support coordinator (Marine)
FSCC	fire support coordination center (Marine)
FS cell	fire support cell
FSCL	fire support coordination line
FSCOORD	fire support coordinator
FSE	fire support element
FSMAA	Fire Support Mission Area Analysis
FSO	fire support officer
FSS	fire support station (Navy)
FSSG	force service support group
fwd	forward

G

GBU	glide bomb unit
GE	Germany
GEMSS	ground-emplaced mine-scattering system
GLO	ground liaison officer
GM	guided missile
GMRD	guards motorized rifle division
gp	group
GP	general purpose
GS	general support
GSR	general support reinforcing
GT	gun-target
G/VLLD	ground/vehicular laser locator designator

H

H	howitzer (high-payoff target list)
HC	hexachloroethane
HE	high explosive
HEI	high explosive incendiary
HEMTT	heavy expanded-mobility tactical truck
HF	high frequency
HHB	headquarters and headquarters battery
HMMWV	high-mobility multipurpose wheeled vehicle
HOB	height of burst
how	howitzer
HP	high payoff
HPT	high-payoff target
HQ	headquarters
HTO	high-technology observer
HUD	head-up display
HVT	high-value target
hvy	heavy
hwy	highway

I

I	immediate (attack matrix)
IAW	in accordance with
ICM	improved conventional munitions
IEW	intelligence and electronic warfare
IEWSE	intelligence and electronic warfare support element
IFR	instrument flight rules
IGB	intergovernmental boundary
HR	imaging infrared
IHFR	improved high frequency radio
illum	illumination
immed	immediate
inf	infantry
lntel	intelligence
inter	intercept
IP	initial point
IPB	intelligence preparation of the battlefield
IR	infrared
ITR	independent tank regiment

J

JAAT	joint air attack team
jet	junction
JTF	joint task force

K

km	kilometer
kmph	kilometers per hour
KT	kiloton

L

LANTIRN	low-altitude navigation and targeting infrared for night system
LAV	light armored vehicle
LC	line of contact
LD	line of departure
LF	landing force
LDO	laser designator operator
LGB	laser-guided bomb
LGM	laser-guided missile
LGW	laser-guided weapon
LIC	low-intensity conflict
LIFT	type of ground transport target (attack guidance matrix)
LLLTV	low-light-level television
LLLGB	low-level laser-guided bomb
LMAV	Laser Maverick
LO	Iiaison officer
LOAL	lock on after launch
LOC	lines of communication
LOG	long-burning illumination marker
LP	listening post
LRRP	long-range reconnaissance patrol
LST	laser spot tracker
LSU	logistics support unit
LT	lieutenant
LTD	laser target designator
LZ	landing zone

M

M	mobility (mission); mortar (high-payoff target list)
MAGTF	Marine air-ground task force
maint	maintenance
MAJ	major
MAN	maneuver (attack matrix) (TACFIRE)
MANT	maintenance (attack matrix mnemonic)
MBA	main battle area
MBC	mortar ballistic computer
MBL	mean burst location
mech	mechanized
met	meteorological
METT-T	mission, enemy, terrain and weather, and troops and time available
MHz	megahertz
MI	military intelligence
min	minute
MLRS	multiple launch rocket system
mm	millimeter
MMO	maintenance management officer
MMS	mast-mounted sight
MOI	message of interest
MOPP	mission-oriented protective posture
mort	mortar
MOUT	military operations on urban terrain
MP	military police
mph	miles per hour
MPI	mean point of impact
MR	motorized rifle (Soviet)
MRD	motorized rifle division (Soviet)

MRL	multiple rocket launcher
MRR	motorized rifle regiment (Soviet)
MRR/TR	motorized rifle regiment/tank regiment
MSD	minimum safe distance
MSE	mobile subscriber equipment
MSL	mean sea level
MSR	main supply route
MTB	motor transport battalion (Soviet)
MTO	message to observer
MTOE	modification tables of organization and equipment
mtr	motor
MTR	motor transport regiment (Soviet)
MULE	modular universal laser equipment
mvr	maneuver

N

N	neutralize (attack guidance matrix)
NA	not applicable
NM	named area of interest
NATO	North Atlantic Treaty Organization
NBC	nuclear, biological, chemical
N/CH	nuclear and/or chemical (attack guidance matrix)
NCS	net control station
NCO	noncommissioned officer
NFA	no-fire area
NGF	naval gunfire
NGLO	naval gunfire liaison officer
NGO	naval gunfire officer
NICAD	nickel-cadmium
NOD	night observation device
NOS	night observation system
NUKE	nuclear (spread sheet)
NVD	night vision device
NVG	night vision goggles

O

O&I	operations and intelligence
obj	objective
obs	observation
OCAKA	observation, cover and concealment, obstacles, key terrain, and avenues of approach
off	offense
OGE	out-of-ground effect
O/O	on order
OP	observation post
OPCON	operational control
OPLAN	operation plan
OPORD	operation order
OPSEC	operations security
ops/F	operations/fire (radio net)
ORPD	independent missile transport battalion (Soviet)
OT	observer-target

P

P	plan (attack guidance matrix)
PADS	position and azimuth determining system
PD	point detonating
PFC	private first class
PIR	priority intelligence requirements
PL	phase line
plt	platoon
PMP	heavy folding pontoon (Soviet bridge type)
PNL	prescribed nuclear load
POF	priority of fire
POL	petroleum, oil and lubricants

pos	position
POW	prisoner of war
POZ	mobile obstacle detachment (Soviet)
PP	passage point
prep	preparation
PRF	pulse repetition frequency
PRI TGT	priority target
PRTB	mobile repair tactical base (rocket and missile) (Soviet)
PSNR-1	battlefield surveillance radar (Soviet)
PUP	pull-up point
PZ	pickup zone

Q

QSTAG	quadripartite standardization agreement

R

R	reinforcing
RAAMS	remote antiarmor mine system
RAG	regimental artillery group (Soviet)
RAP	rocket-assisted projectile
RAOC	rear area operations center
RATELO	radiotelephone operator
RATT	radio teletypewriter
RDO	radio deployment order
rd/min	rounds per minute
REC	radio electronic combat
recon	reconnaissance
regt	regiment
REMS	remotely employed sensor
RES	radiation exposure state
retrans	retransmission
RFA	restricted fire area
RFL	restrictive fire line
RP	release point
R/R	radio/radar
RSO	reconnaissance and survey officer
RSR	required supply rate
RSTA	reconnaissance, surveillance, and target acquisition
RT	receiver-transmitter

S

S	survivability (engineer mission); suppress (attack guidance matrix)
SACC	supporting arms coordination center
SAL	special ammunition load
SALT	supporting arms liaison team
SAM	surface-to-air missile
SASP	special ammunition supply point
SEAD	suppression of enemy air defenses
see	second; section
sep	separate
SFC	sergeant first class
SFCP	shore fire control party
SHELREP	shelling report
SHP	shaft horsepower
SIGINT	signal intelligence
SINCGARS	single-channel ground-airborne radio system
SITREP	situation report
SOI	signal operation instructions
SOP	standing operating procedure
SP	self-propelled start point
SPC	Specialist
SPLL	self-propelled launcher-loader
spt	support
SSB	single sideband
SSG	staff sergeant
SSM	surface-to-surface missile

STANAG	NATO standardization agreement
std	standard
STRIKEWARN	nuclear strike warning
subs	subsequent
survl	surveillance

T

TA	target acquisition
tac	tactical
TAC-A	tactical air controller-airborne
TACAIR	tactical air
TACAN	tactical air navigation
TACC	tactical air control center
TACCS	tactical air command and control specialist
TACFIRE	tactical fire direction system
TACP	tactical air control party
TACS	tactical air control system
TADS	target acquisition system and designation sight
TAI	target area of interest
TA/intel	target acquisition/intelligence (radio net)
TASC	Training Aids Support Center
TBP	to be published
TDA	target damage assessment
TF	task force
TFW	tactical fighter wing
tgt	target
tl	time
TIS	thermal image system
TISL	target identifier set, laser
TLE	target location error
tm	team
TMT	total mission time
TOC	tactical operations center
TOE	tables of organization and equipment
TOF	time of flight
TOT	time on target
TOW	tube-launched, optically tracked, wire-guided missile
TPT	total processing time
TR	tank regiment (Soviet)
TRAM	target recognition attack multisensors
trans	transport
TRP	target reference point
TS	time sensitive
TSOP	tactical standing operating procedure
TTC	tactical operations center team chief (attack matrix)
TV	television
TVA	target value analysis

U

UAV	unmanned aerial vehicle
UHF	ultrahigh frequency
UK	United Kingdom
u s	United States
USAF	United States Air Force
USAFAS	US Army Field Artillery School
USMC	United States Marine Corps
USN	US Navy
UTM	universal transverse mercator

V

(V)	voice (radio net)
VBK	German home defense unit
VE	velocity error
VFMED	variable format message entry device
VHF	very high frequency
vic	vicinity

VT	variable time

W

WBK	German home defense unit
WOC	wing operations center
WP	white phosphorus
WWII	World War II

Z

ZF	zone of fire

REFERENCES

Users should frequently consult Department of the Army Pamphlet 25-30 for the latest changes to or revisions of references listed herein and for new publications relating to material covered in this publication.

Required Publications

Required publications are sources that users must read in order to understand or to comply with this publication.

Field Manuals (FMs)

6-20	Fire Support in the AirLand Battle
6-30	Observed Fire Procedures
100-5	Operations
101-5-1	Operational Terms and Symbols

Related Publications

Related publications are sources of additional information. They are not required in order to understand this publication.

Department of the Army (DA) Forms

2026	Recommended Changes to Publications and Blank Forms
4655-R	Target List Work Sheet
4656-R	Scheduling Work Sheet
5032-R	Field Artillery Delivered Minefield Planning Sheet
5366-R	Quick Fire Plan

Field Manuals

1-103	Airspace Management and Army Air Traffic in a Combat Zone
1-111	Aviation Brigade
1-112	Attack Helicopter Battalion
3-3	NBC Contamination Avoidance
(C) 3-10	Employment of Chemical Agents (U)

3-50	Deliberate Smoke Operations
3-100	NBC Operations
5-100	Engineer Combat Operations
6-2	Field Artillery Survey
6-15	Field Artillery Meteorology
6-20-1 (HTF)	Field Artillery Cannon Battalion (How to Fight)
6-20-30	Tactics, Techniques, and Procedures for Fire Support for Corps and Division Operations
6-20-50	Tactics, Techniques, and Procedures for Fire Support for Brigade Operations (Light)
6-121	Field Artillery Target Acquisition
(C) 6-141-2	Field Artillery Target Analysis and Weapons Employment: Nonnuclear (U)
6-161	Field Artillery Radar Systems
7-7	The Mechanized Infantry Platoon and Squad
7-90	Tactical Employment of Mortars
9-6	Ammunition Service in the Theater of Operations
11-50 (HTF)	Combat Communications Within the Division (How to Fight)
17-95	Cavalry Operations
21-26	Map Reading and Land Navigation
24-1	Combat Communications
34-1	Intelligence and Electronic Warfare Operations
34-3	Intelligence Analysis
34-81	Weather Support for Army Tactical Operations
44-1	US Army Air Defense Artillery Employment
71-1 (HT-F)	Tank and Mechanized Infantry Company Team (How to Fight)
71-2	The Tank and Mechanized Infantry Battalion Task Force
71-3	Armored and Mechanized Infantry Brigade
71-100 (HTF)	Armored and Mechanized Division Operations (How to Fight)
90-2	Battlefield Deception
90-3 (HTF)	Desert Operations (How to Fight)
90-4	Air Assault Operations
90-5 (HTF)	Jungle Operations (How to Fight)

90-6	Mountain Operations
90-10 (HTF)	Military Operations on Urbanized Terrain (MOUT) (How to Fight)
90-13 (HTF)	River Crossing Operations (How to Fight)
100-26	The Air-Ground Operations System
100-42	US Army/US Airspace Management in an Area of Operations
101-5	Staff Organization and Operations
101-10-1	Staff Officers' Field Manual: Organizational, Technical, and Logistical Data
101-31-1	Staff Officers' Field Manual: Nuclear Weapons Employment Doctrine and Procedures
(SRD) 101-31-2	Staff Officers' Field Manual: Nuclear Weapons Employment Effects Data(U)
(C) 101-50-1	Joint Munitions Effectiveness Manual: Air-to-Surface: Weapon Effectiveness, Selection and Requirements, Air-Delivered Non-Nuclear (U)
(C) 101-50-20	Characteristics Handbook (JMEM) (U)
(C) 101-60-1	Joint Munitions Effectiveness Manual/Surface-to-Surface: Effectiveness Data for Mortar, 81-mm: M29 (U)
(C) 101-60-2	Joint Munitions Effectiveness Manual Surface-to-Surface: Effectiveness Data for Howitzer, 105-mm, M101A1 (U)
(C) 101-60-3	Joint Munitions Effectiveness Manual: Surface-to-Surface: Effectiveness Data for Howitzer, 155-mm, M109 (U)
(C) 101-60-6	Joint Munitions Effectiveness Manual: Surface-to-Surface: Effectiveness Data for 5-Inch/38-Inch Naval Twin-Gun Mount, MK-28, -32 and With Gun, Fire Control System MK-37 (U)
(C) 101-60-7	Joint Munitions Effectiveness Manual: Effectiveness Data for Mortar: 4.2-Inch, M30 (U)
(C) 101-60-9	Joint Munitions Effectiveness Manual: Surface-to-Surface: Effectiveness Data for Naval Single-Gun Mount, MK42 w/Gun Fire Control System, MK68 (U)
(C) 101-61-3	Joint Munitions Effectiveness Manual/Surface-to-Surface: Ammunition Reliability (U)
(C) 101-62-1	Joint Munitions Effectiveness Manual: Surface-to-Surface: Safe Distances for Fragmentary Munitions (U)
(C) 101-62-3	Joint Munitions Effectiveness Manual/Surface-to-Surface: Manual of Fragmentation Data (U)

Miscellaneous Literature

JCS Pub 1-02	Dictionary of Military and Associated Terms
ATP-27	Offensive Air Support Operations

ATP-35(A)	Land Force Tactical Doctrine
USREDCOM Manual 525-5	Joint Terminal Guidance Operations

Multiservice and Joint Publications

TRADOC PAM 34-3	Joint Laser (J-Laser) Designation Procedures. TACA 50-25/LANTFLT TIP-1/ MCDEC OH 6-2D/USREDCOM Pam 38-1/USAFEP50-25/AACP 50-25/ PACAFP 50-25

NATO Standardization Agreements/Quadripartite Standardization Agreements (STANAGs/QSTAGs)

2014/506	Operation Orders, Annexes to Operation Orders, and Administrative and Logistics Orders
2031/5 15	Proforma for Artillery Fire Plan
2082	Relief of Combat Troops
2099/531	Fire Coordination in Support of Land Forces
2103/187	Reporting Nuclear Detonation, Biological and Chemical Attacks, and Predicting and Warning of Associated Hazards and Hazards Area (ATP-45)
2104/189	Friendly Nuclear Strike Warning to Armed Forces Operating on Land
2147/221	Target Numbering System (Nonnuclear)
2887/217	Tactical Tasks and Responsibilities for Control of Artillery
3736	Offensive Air Support Operations (ATP-27B)

NOTE: STANAGs and QSTAGs can be obtained from Naval Publications and Forms Center, 5601 Tabor Avenue, Philadelphia, PA 19120. Use DD Form 1425 to requistion documents.

Technical Manual (TM)

11-7440-240-10	Operator's Manual for Fire Direction Center, Artillery 0A8389/GSG-10V) (Volumes 1 through 10)

Training Circulars (TCs)

6-40	Field Artillery Manual Cannon Gunnery
6-40A	Field Artillery Automated Cannon Gunnery
6-50	The Field Artillery Cannon Battery

34-130	Intelligence Preparation of the Battlefield
90-7	Joint (Army/Air Force) Tactical Air Control Party/Fire Support Team (TACP/FIST) Close Air Support Operations

Projected Publications

Projected publications are sources of additional information that are scheduled for printing but are not yet available. Upon print, they will be distributed automatically via pinpoint distribution. They cannot be obtained from the USA AG Publications Center until they are indexed in DA Pamphlet 25-30.

FM 6-20-10	Tactics, Techniques, and Procedures for the Targeting Process

INDEX

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DISTRIBUTION:

Active Army, USAR, and ARNG: To be distributed in accordance with DA Form 12-11 E, Requirements for TC 6-20-6, Field Artillery Delivered Scatterable Mines (QTY rqr block no, 1264) and FM 6-20, Fire Support in the Airland Battle (Qty rqr block no. 772).

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