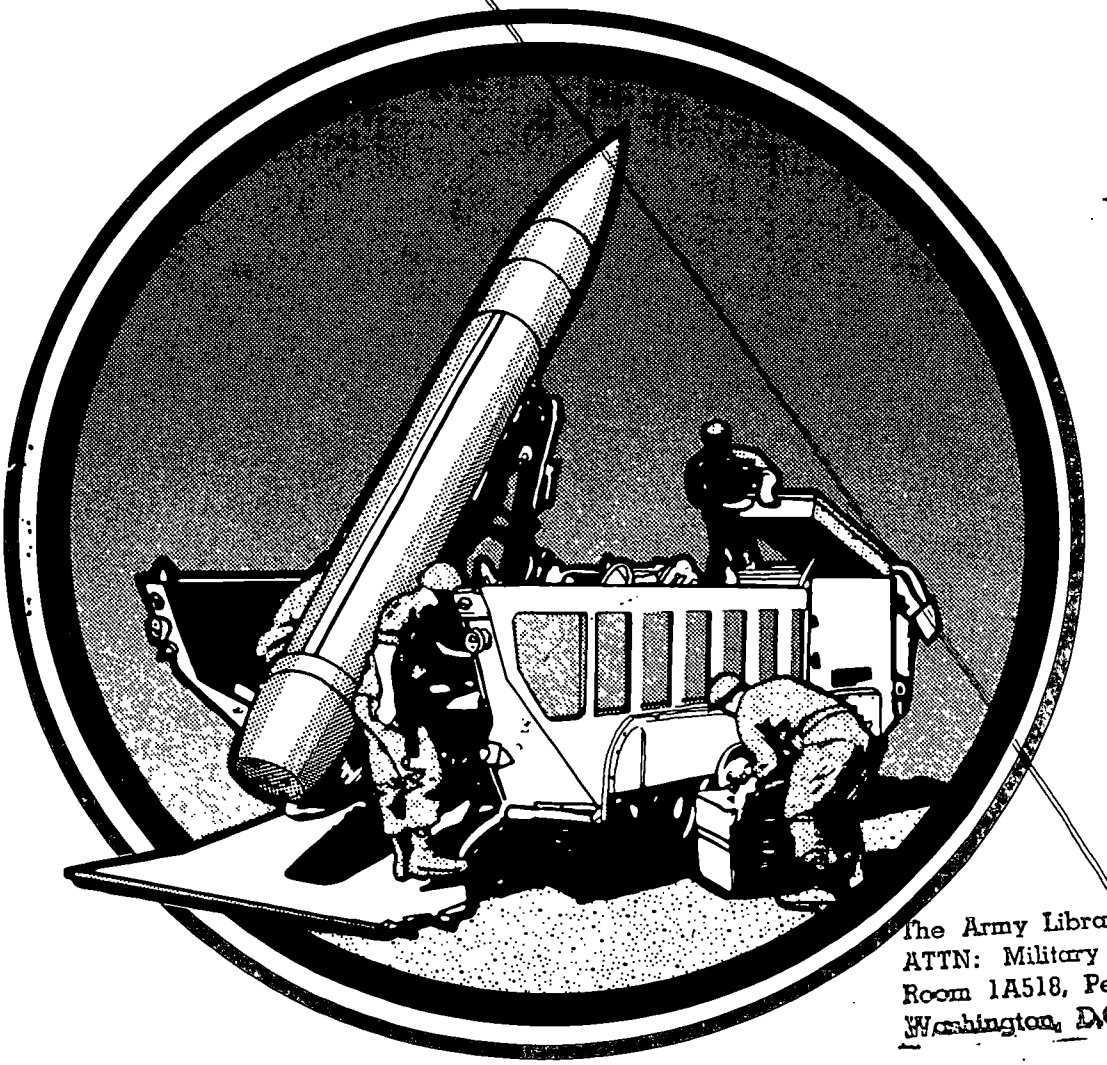
FM 6-42

FIELD ARTILLERY BATTALION, LANCE

Studies



HEADQUARTERS DEPARTMENT OF THE ARMY

Reference

CHANGE
NO. 1

FM 6-42
C1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 29 December 1980

FIELD ARTILLERY BATTALION, LANCE

FM 6-42, 30 August 1978, is changed as follows:

1. New or changed material is indicated by a star (★).
2. Remove old pages and insert new pages as indicated below:

Posted
1/21/81
MCR

REMOVE	INSERT
iii and iv	iii and iv
2-1 through 2-4	2-1 through 2-4
3-1 through 3-6	3-1 through 3-6
6-9 and 6-10	6-9 and 6-10
7-5 and 7-6	7-5 and 7-6
7-9 and 7-10	7-9 and 7-10
7-13 and 7-14	7-13 and 7-14
7-17 and 7-18	7-17 and 7-18
8-3 and 8-4	8-3 and 8-4
8-15 and 8-16	8-15 and 8-16
8-19 and 8-20	8-19 and 8-20
8-25 through 8-28	8-25, 8-26, 8-26.1, 8-26.2, 8-27, and 8-28
A-1 through A-4	A-1 through A-3

3. File this change in the front of the publication for reference purposes.

Change 1, FM 6-42

29 DECEMBER 1980

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

DISTRIBUTION:

Active Army and USAR: To be distributed in accordance with DA Form 12-11A, Requirements for Field Artillery Tactics (Qty rqr block no. 39); Field Artillery Missile Gunnery (U) (Qty rqr block no. 39); Field Artillery Missile Gunnery (U) (Qty rqr block no. 47); and Field Artillery Battalion, HONEST JOHN (Qty rqr block no. 53).

ARNG: None.

Additional copies can be requisitioned from the US Army Adjutant General Publications Center, 2800 Eastern Boulevard, Baltimore MD 21220.

*FM 6-42

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 30 August 1978

Field Manual
No. 6-42

FIELD ARTILLERY BATTALION, LANCE

PREFACE

This revised manual has been prepared to serve as a single source reference document for Lance battalion operations and training. It is a how-to-train and how-to-fight manual to be used by all levels of command from corps to the platoon. The manual sets forth doctrine pertaining to the organization, tactics, techniques, and procedures used by the Lance battalion in combat and establishes guidelines for training the battalion in peacetime to meet its combat requirements.

A principal theme that pervades this manual is that the Lance battalion is a corps weapon by which the commander can influence the battle by nonnuclear and/or nuclear fires. Accordingly, chapter 6 emphasizes a range of considerations involved in the employment of the weapon system at corps level. Extensive explanation has been provided in the areas of command and control, response postures, weapons mix, and physical security.

Chapters 7 and 8 complete the picture by discussing battalion and battery level operations. Of significance are the explanations covering survey and communications. Fourth-order survey control is now provided to the Lance battalion by the corps engineer topographic company. In the absence of such control, the addition of the survey instrument, azimuth gyro, lightweight (SIAGL) and the infrared electronic distance measuring device (SEDME-IR) will expedite the emplacement of hasty survey control as explained in chapter 8. The communication capability of the battalion has been upgraded on each end of the chain of command. Doctrine now establishes dedicated very high frequency (VHF) equipment for the communications link between the corps and the battalion. At the battery level, the FM (frequency modulated) radio net to the firing platoons will be secure, thereby reducing the requirement for coding of radio traffic.

It is important to acknowledge that certain personnel and equipment are not currently authorized by TOE (table of organization). Approval of the doctrine contained in this manual will be the basis for TOE change.

Finally, the revision of this manual is in line with recent changes in field artillery doctrine. Extensive reference to FM 6-20, *Fire Support in Combined Arms Operations*, is made throughout.

*This FM together with (C) FM 6-42-1, 30 August 1978, supersedes FM 6-36, 30 April 1973; and (C) FM 6-42, 14 June 1964, including all changes.

FIELD ARTILLERY BATTALION, LANCE

***Table of Contents**

The words "he," "him,", "his," and "men," when used in this publication, represent both the masculine and feminine genders, unless otherwise specifically stated.

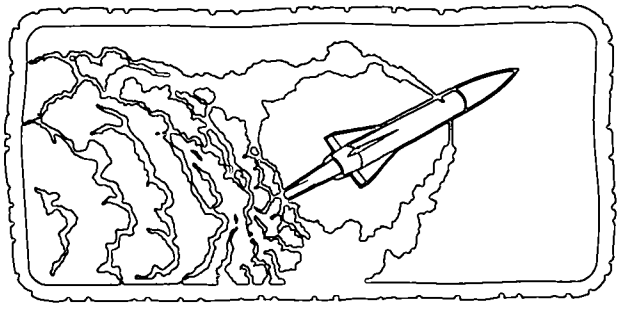
INTRODUCTION

LANCE

GENERAL

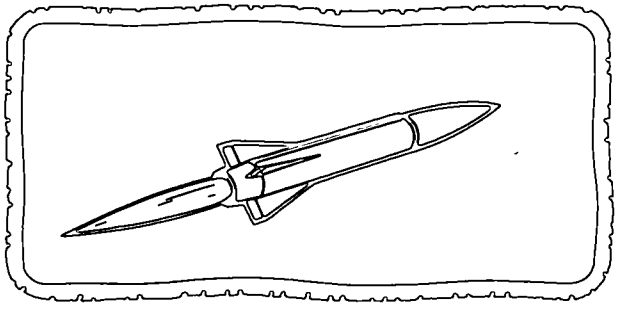
WHAT IS LANCE?

Lance is the corps commander's primary long-range artillery. It is for his use to influence the battle in a timely and decisive fashion.



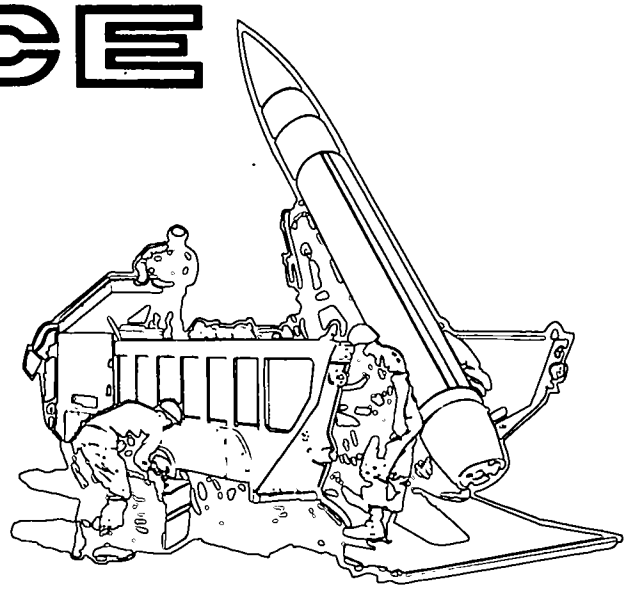
WHAT DOES LANCE DO?

Lance provides massive and accurate long-range nuclear/nonnuclear fire support to the combined arms team.



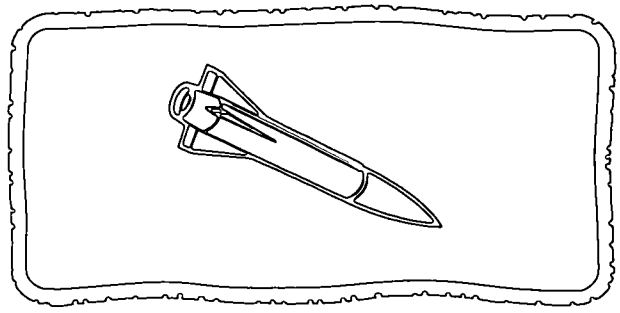
WHERE DOES LANCE FIGHT?

Lance is normally positioned in or near the division rear area; however, Lance has the mobility to fight anywhere on the battlefield.



WHEN DOES LANCE FIGHT?

Lance fights any time, day or night, in any weather in either a conventional or nuclear environment. It will be used against high-priority targets, such as command posts, logistical elements, troop concentrations, transportation elements, chokepoints (defiles, bridgeheads, road junctions), missile units, forward airfields, and fixed air defense sites. It is a significant contributor to the corps nuclear weapons "package."



HOW DOES LANCE FIGHT?

A Lance unit is best employed by maximizing its capabilities and minimizing its limitations. Lance adds depth to combat with

its ability to engage targets beyond the range of cannon artillery. Because Lance can reach deeper into enemy territory, the battalion can position itself back from the forward edge of the battle area (FEBA) beyond the range of the enemy's artillery and target acquisition capabilities. The high mobility of a Lance launcher allows it to be positioned rapidly practically anywhere on the battlefield to launch a missile. Low track pad pressure and an amphibious capability facilitate cross-country movement with the self-propelled launcher (SPL). When time or terrain restrictions hamper displacement, the launcher design allows rapid conversion to a lightweight configuration that can be transported by cargo helicopter. The survivability of the system is enhanced by its low detection profile and its ability to hide, with proper positioning and employment. Barns, tree lines, and lightweight screening systems can conceal the presence of the firing platoon. Movement from one firing position to another is accomplished over the most concealed routes. Minimum time is spent on the firing point. Upon firing of the missile, the firing platoon rapidly displaces to avoid counterfire. The platoon may then either occupy another firing point or hide position or return to the battery area.

PURPOSE AND SCOPE

The purpose of this publication is to describe the basic concepts used to train and fight Lance. It is designed to explain the missions, organization, and tactical doctrine required by commanders at all levels to employ Lance effectively on the battlefield. In addition, this manual provides guidance on the planning and implementation of unit and individual training programs. Adherence to the fundamentals as outlined in this publication will optimize system effectiveness while increasing system survivability. In this manner, Lance will be able to provide timely and accurate fire support to the supported force.

CHANGES

Classified information necessary for the use of the manual is listed in FM 6-42-1. This supplement will be published as a classified document under a separate cover. Additional references pertaining to Lance are listed in appendix A.

Users of this publication are encouraged to recommend changes and submit comments for its improvement. Comments should be keyed to the specific page, paragraph, and line of the text in which the change is recommended. Reasons will be provided for each comment to insure understanding and complete evaluation. Comments should be prepared by using DA Form 2028 (Recommended Change to Publications) and forwarded direct to the Commandant, United States Army Field Artillery School, ATTN: ATSF-WD, Fort Sill, Oklahoma 73503.

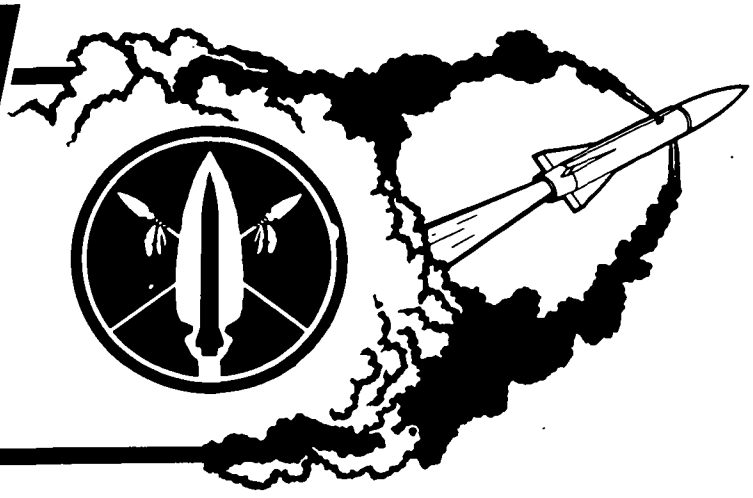
REFERENCES

NOTES

1. This manual applies to units organized under the 06-595H series tables of organization and equipment.
2. This manual uses the word "he" to include both the masculine and feminine gender and any exception will be noted.
3. An asterisk (*) after a statement indicates that further information can be found in the classified supplement, FM 6-42-1.

CHAPTER 1

Environment



Section I. ROLE OF LANCE IN THE FIRST BATTLE

US surface-to-surface missile systems have never been tested in combat; consequently, their employment on the battlefield is a matter of speculation. Nevertheless, doctrine for the employment of the Lance missile system has been devised, evaluated, and found to be sound in regard to what we do know about combat. The purpose of this section, therefore, is to present the various methods of Lance employment in a scenario-type format to show how the system universality lends itself to either a defensive or offensive role.

1-1. The Buildup

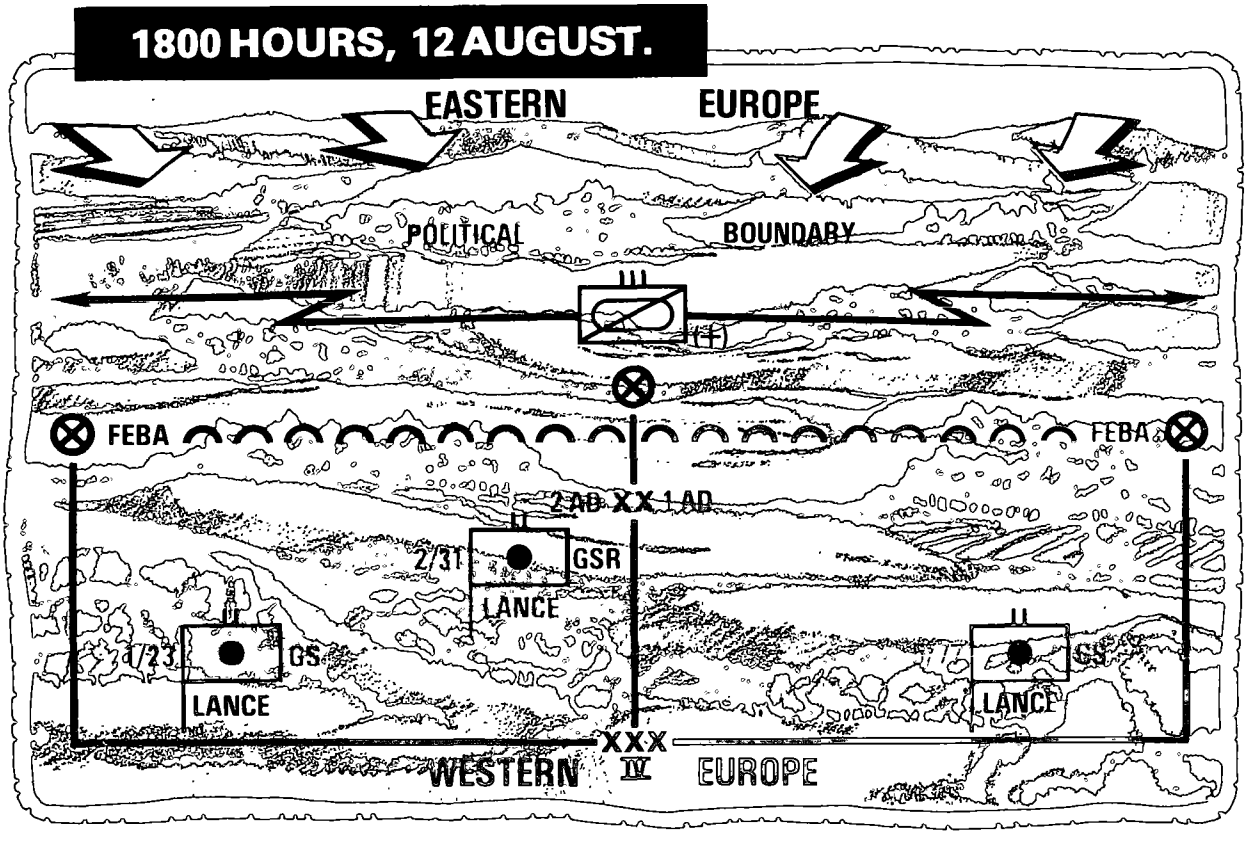
Situation.

On 12 August, the Allied Forces were deployed along the border of the opposing forces homeland. Intelligence sources indicated that the opposing forces would invade Western Europe with the initial objective of destroying Allied Forces before they could be reinforced. When Western Europe had fallen, the opposing forces would then opt for a political settlement, which they believed would be accepted, to end hostilities.

To achieve their objectives, speed and maximum destruction of Allied Forces were the primary considerations. The opposing force therefore planned to attack in summer to take advantage of the excellent trafficability afforded by dry ground. In addition, clear weather would allow maximum use of observed artillery fire and would allow them to capitalize on their considerable superiority in artillery. Moreover, good weather would also allow extensive use of high-performance aircraft with which they expected to maintain air superiority over the battlefield, and facilitate the use of aviation, airmobile, and airborne forces that could be employed in friendly rear areas. Operational planners emphasized the need for speed to move vast quantities of materiel and personnel resources to overwhelm Allied Forces and to maintain momentum and the initiative to accomplish their mission within a matter of a few days.

COVERING FORCE POSITION

The US Corps, alerted to the possible invasion, closed into its covering force position at 1800 hours on 12 August. The corps' two armored divisions deployed to their initial deployment positions in preparation for the imminent attack. An armored cavalry regiment with attachments was deployed as the corps covering force. In addition, the corps commander had three Lance battalions under his control to assist him as his long-range artillery.



Discussion.

The corps commander decided to position one Lance battalion in the division zone where the main enemy thrust was expected. This battalion was assigned a general support reinforcing (GSR) mission and was responsible for providing a quick-fire channel to the division artillery in the critical zone of action. The remaining two Lance battalions were given the mission of general support (GS) to the corps. The corps commander believed that he must maintain a high degree of centralized control of his Lance battalions in this defensive situation because he could not predict accurately when and where the enemy would strike. He believed that he must retain the "strings" on these battalions so that they would be immediately responsive to him for use in influencing the battle.

Upon alert notification, all three Lance battalions deployed to their defensive positions. Assembly and transport sections were dispatched to special ammunition supply points (SASP), and they loaded a predetermined number of nuclear and nonnuclear warheads as specified by the corps commander. In this case, the GSR battalion picked up a higher number of nonnuclear Lance (NNL) rounds than the GS battalions, since the GSR battalion would be initially reinforcing the division with conventional fires. The GS battalions, on the other hand, were supplied with a greater number of nuclear warheads. The GS battalions were to remain well concealed and were to be used conservatively in the nonnuclear role in preparation for the eventuality that they would be needed to participate in the execution of a "nuclear package."

During initial deployment operations, Lance units were especially cautious of opposing forces intelligence gathering agencies. The Lance commander knew that foreign agents were operating among the local populace. These agents were even disguised as Allied troops and were monitoring loose talk, gathering information on posted maps and jeep windshields, and stealing written materials improperly safeguarded.

Unit commanders made certain that their units moved under complete radio silence, that all Lance vehicles were equipped with covers and bows, and that all vehicle markings were covered. Movement around initial defensive positions was held to a minimum. Even though hostilities had not yet started, these defensive positions were camouflaged expertly and noise and light discipline was strictly enforced. The commanders believed that the opposing forces would be targeting Lance units aggressively during the initial deployment phase. Commanders were also aware that saboteurs and partisans were actively seeking nuclear field storage sites as lucrative targets. Opposing forces intelligence and subversive attempts failed, however, because Allied units were using effective operational security measures.

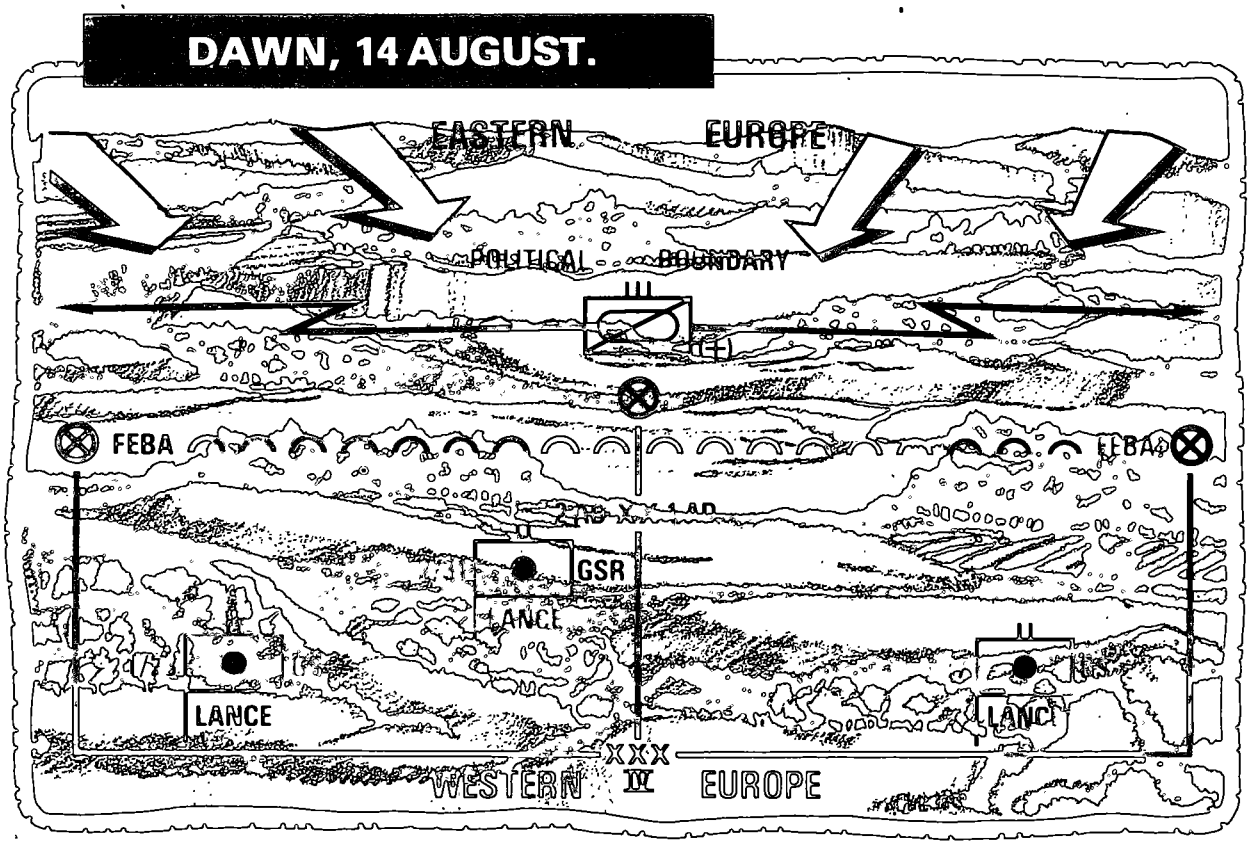
1-2. The Corps Covering Force

Situation.

The mission of the armored cavalry regiment and attached units was to fight the covering force battle, causing the enemy to commit his main attack prematurely, thus allowing forces on the FEBA to determine where major enemy thrusts would occur and provide the necessary time to make the tactical adjustment to meet identified threats.

During the forward deployment of the corps, aircraft from the aerial exploitation battalion were committed on an around-the-clock basis to provide the corps with observation, surveillance, and electronic intelligence of the battlefield. Because of specific tasking by corps HQ, crews, technicians, and image interpreters were being especially alert for opposing troop concentrations, logistic supply centers, air defense command and control centers, forward airfields, and other deep targets beyond cannon artillery range but well within the range of Lance.

At 2330 hours, 13 August, Allied intelligence detected massive forward movement of opposing forces on the eastern side of the political border. By 0330 hours the next day, communications jamming was experienced across the entire front. By dawn, the opposing forces had invaded Western Europe.



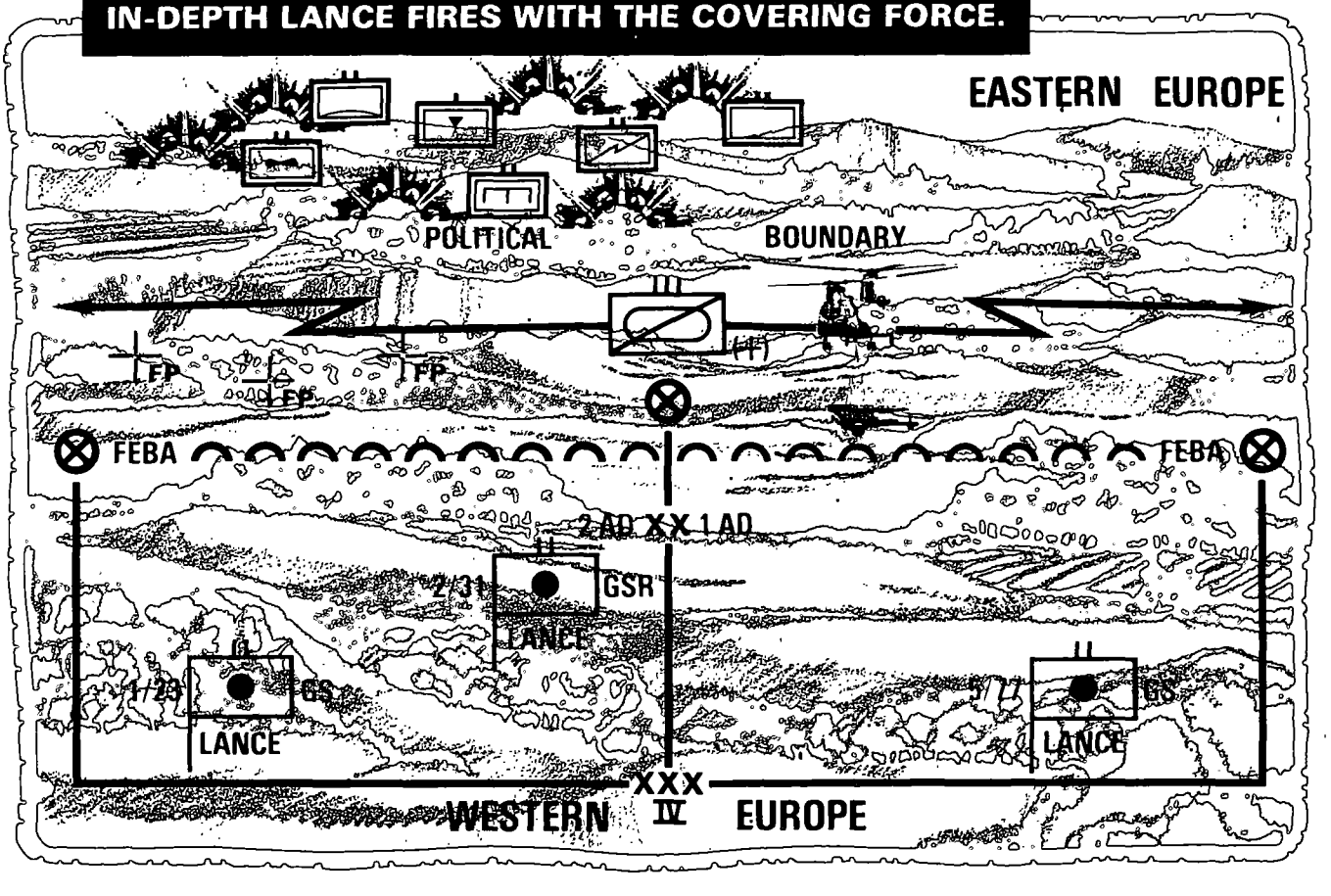
As expected, their sheer mass prevailed and Allied elements were forced back. To a great extent, darkness and field artillery suppression had limited the enemy's ability to create an effective coordinated attack; however, with the coming of daylight, the attack began to gain momentum. Fighting became especially intense in the division zone of action supported by the GSR Lance battalion. Because of poor visibility, minefields, and wooded areas, many of the opposing force's march columns in this area of operation were channeled into chokepoints at river crossing sites and road intersections. These points presented lucrative targets for attack by the GSR battalion firing nonnuclear Lance. By attacking these targets, Lance was able to inflict casualties and create confusion and disorganization among opposing forces personnel. The opposing

forces continued, however, to pour overwhelming and massive forces into the attack, causing US forces to suffer losses of personnel and equipment. Coordinated attacks against the covering force (CF) caused it to withdraw to successive positions. Withdrawal continued until a passage of lines was completed at 1300 hours.

Discussion.

By taking advantage of the relative degree of security offered by the covering force, the corps commander decided to position his GSR Lance battalion closer to the FEBA than normal. This allowed the firing platoons to move forward rapidly to the vicinity of CF elements to engage those deep targets they had previously not been able to reach and targets in support of the CF. Since the CF elements were positioned well forward, helicopter transport was the most effective means of transporting the firing platoons to and from the firing points. By attacking targets such as command and control units, logistical elements, and chokepoints, Lance fires helped to disorganize, delay, and weaken the opposing forces, as well as deceive them of the location of our primary line of defense. Upon mission completion, Lance launchers were able to return rapidly to the battery area to avoid detection and to reload in preparation for additional missions from corps or in support of the covering force.

IN-DEPTH LANCE FIRES WITH THE COVERING FORCE.



During helicopter movement to forward firing points, the battalion must minimize its vulnerability to:

Ground fire
Air defense detection and attack
Ground attack while occupying firing points

Lance units operating in support of the covering force were extremely vulnerable to ground fire and air defense detection and engagement while being transported to the distant firing point by helicopter. Once on the ground, the firing element was also vulnerable to ground attack. Commanders were able to overcome these vulnerabilities, however, by not going beyond the FEBA unless it was absolutely necessary and by carefully planning all airmobile operations to limit ground time at the firing point to the minimum amount of time necessary to accomplish the mission. Commanders also considered using the less responsive internal loading of the launcher zero length (LZL) in order to prevent detection en route.

1-3. The Defense

Situation.

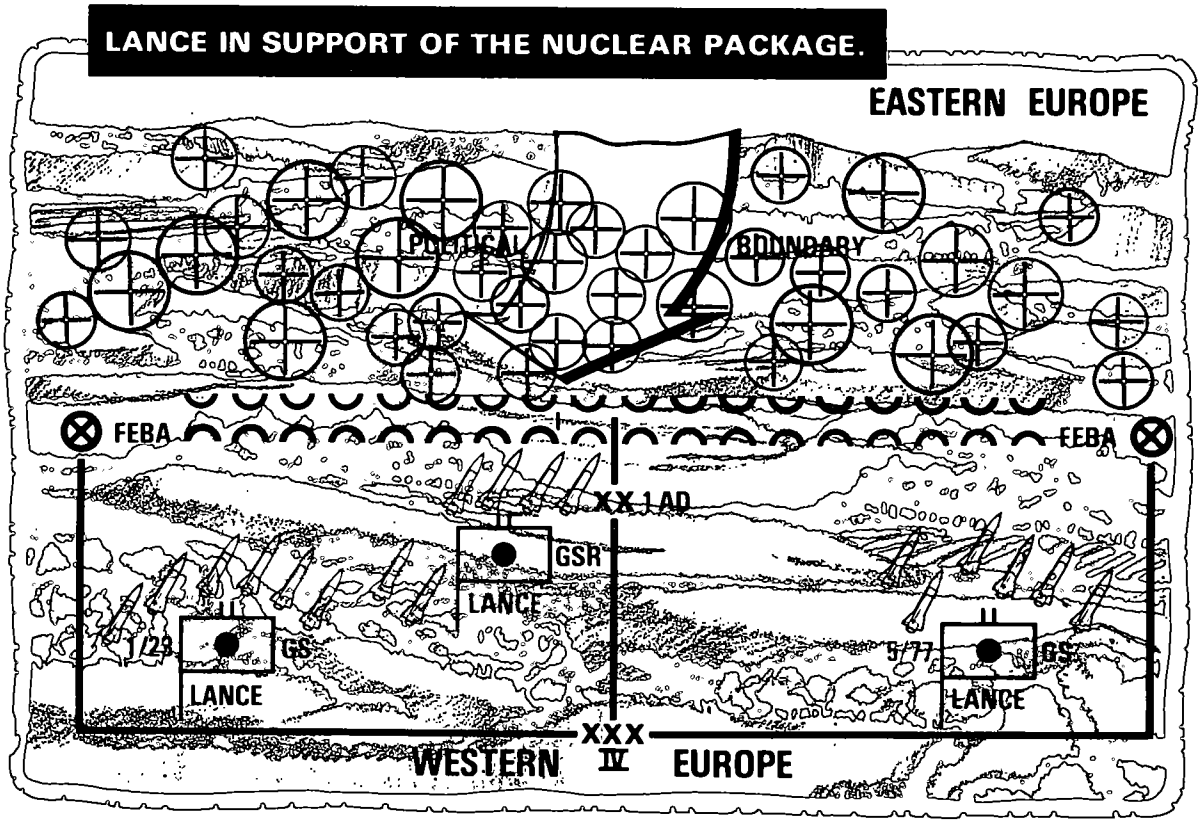
Even though the opposing forces had sustained heavy losses during the covering force operation, their attack in the main battle area gained considerable momentum because of the arrival of fresh reinforcements. Enemy units were massing along the FEBA and the possibility of a penetration existed in several critical locations. Enemy tank and mechanized units were inflicting heavy casualties to friendly forces in these areas. Enemy aircraft and long-range artillery were also inflicting heavy damage to units operating in the rear areas. Because of their sophisticated radio intercept and direction-finding capabilities, many important targets were located and engaged. Several of the more important targets were attacked with aircraft using chemical munitions.

As the situation worsened, the corps commander became concerned that his units might become too weak to halt the opposing forces' attack. One of the criteria to be followed in requesting release of nuclear weapons is that the overall defensive capability not be allowed to deteriorate to the point where available forces cannot conduct effective conventional or nuclear follow-on

operations after the strike. Based upon this rationale, the corps commander submitted his request to his higher headquarters to fire a nuclear weapons package.

While awaiting approval, the corps commander issued a warning order to his various subordinate commands to be prepared to fire assigned nuclear missions. The GS Lance battalions were among the first units prepared to fire since their mission had been to be prepared for this eventuality. The Lance units that had been fighting the conventional battle were also able to assume a nuclear response posture rapidly.

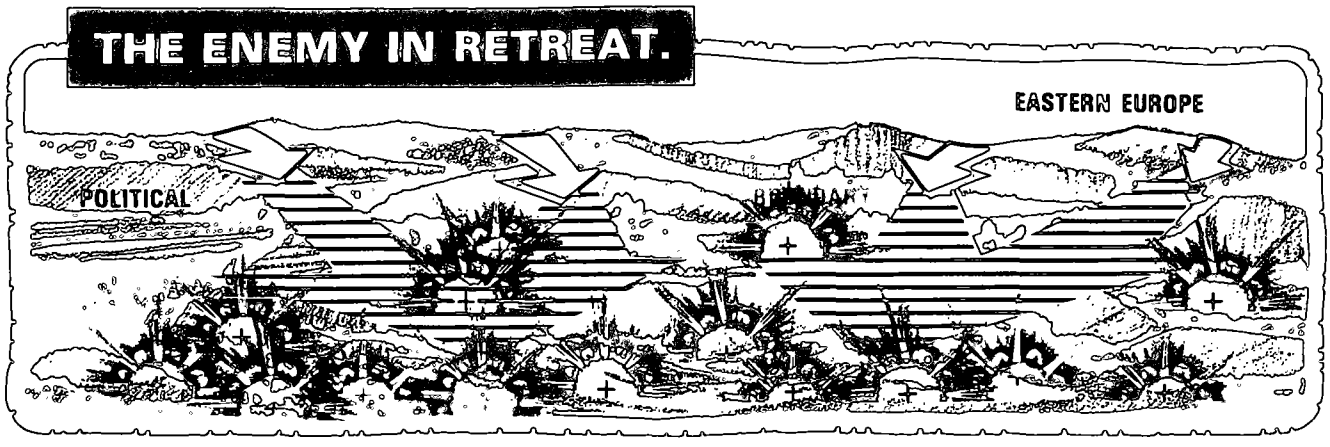
Approval was received and the nuclear weapons package fired, achieving the desired effect. The enemy's offensive advantage was destroyed and his objectives were denied. Realizing that they no longer would be assured an easy victory, the opposing forces pulled back, dug in, and attempted to consolidate their gains.



Discussion.

During the battle, Lance units were able to maintain a great degree of flexibility for the commander because of the weapon system's dual capability. The Lance battalion fighting in the zone of the division supplemented cannon artillery by firing extensive nonnuclear warheads on soft, relatively stationary targets found in the opposing forces rear areas. Several batteries of the GS battalions were also used to fire NNL on priority targets as they were acquired. Although heavily engaged in fighting a conventional battle, these units retained the capability to shift to a nuclear role.

Anticipating some losses in those units firing NNL, the corps commander had placed several units from the GS battalions in



abeyance with orders to remain undetected until the time when a nuclear weapons package would be executed. Considering all the weapon systems available to him for firing the "package" and their roles on the battlefield, the corps commander decided that Lance would in all likelihood be the only system that would be free and fully capable of executing its nuclear mission. The decision was a correct one.

Lance units were able to deliver their "Sunday punch" during this defensive battle because of their high state of training and preparedness. More importantly, the Lance units remained well hidden during this operation and maintained a low detection profile. Throughout the battle, the enemy attempted to locate Lance units by radio direction finding, photographic intelligence, and by infrared devices. By effectively using their lightweight screening systems and natural camouflage and by practicing communications security (COMSEC) and electronic security (ELSEC) techniques, the Lance units were able to counter the enemy's location attempts.

By careful positioning on the battlefield, Lance units were also able to stay beyond the range of the opposing forces long-range artillery. Additionally, by careful movement under the forest canopy and by firing from well concealed positions, the Lance units were able to avoid detection and engagement by enemy aircraft. Catastrophic losses were also prevented on several occasions by proper nuclear, biological, and chemical (NBC) protective measures when operating in the chemical warfare environment on the battlefield.

1-4. Offense

Situation.

Immediately after firing the nuclear package, the corps commander felt that he could inflict disabling losses on the opposing forces by launching an attack before troops had sufficient time to consolidate their forces and conceal their defenses. Because the opposing forces were caught by surprise by this immediate counterattack, the Allied forces were able to shock and overwhelm the opposing forces defenses. To aid in the attack, Lance units fired NNL on enemy rear positions beyond the range of cannon artillery. Lance targets were fired in depth along the entire corps front. The effectiveness of the attack and Lance firepower were felt by the opposing forces, and their lines began to collapse.

Before long they began to retreat back to their original boundaries. Realizing that they no longer would be assured an easy victory, the opposing force government negotiated for peace.

Discussion.

During the attack, the corps commander was able to effectively disrupt enemy command and control, interrupt the flow of fuel and ammunition, and interfere with enemy air defense by attacking those targets with NNL. Lance units that were used to fire the

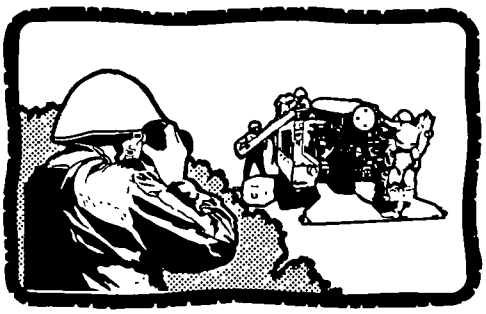
nuclear package were able to switch back immediately to a nonnuclear response posture to support the counterattack with conventional firepower.

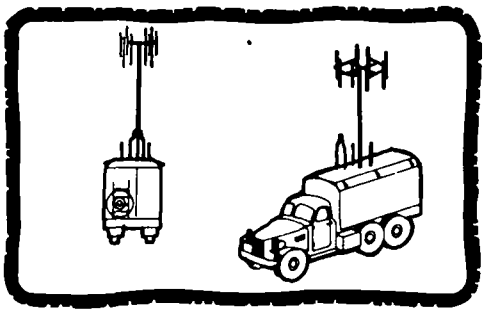
Section II. ENEMY CAPABILITIES

In any major conflict of the future, United States forces can expect to be outnumbered by both personnel and equipment. Furthermore, highly trained opposing forces may possess equipment equal or superior to ours in sophistication and capability. To be able to counter the effects of an opposing force attack, we must be familiar with the characteristics and capabilities of their doctrine and equipment as well as our own. This section gives a brief description of opposing force capabilities as they relate to a Lance unit. Additional information on the opposing force can be found in FM 30-102, *Opposing Forces Europe*. By knowing how the opposing force operates, the Lance battalion commander can effectively avoid or conceal those operations which could give an opposing unit any additional advantage.

1-5. Detection/Acquisition

The enemy will employ various methods in an attempt to learn about our plans and capabilities in order to gain a tactical advantage. These categories of intelligence collection include human intelligence (HUMINT), signal intelligence (SIGINT), electronic warfare (EW), and photographic intelligence (PHOTINT).





HUMINT.

Using people to gather intelligence. These resources include:

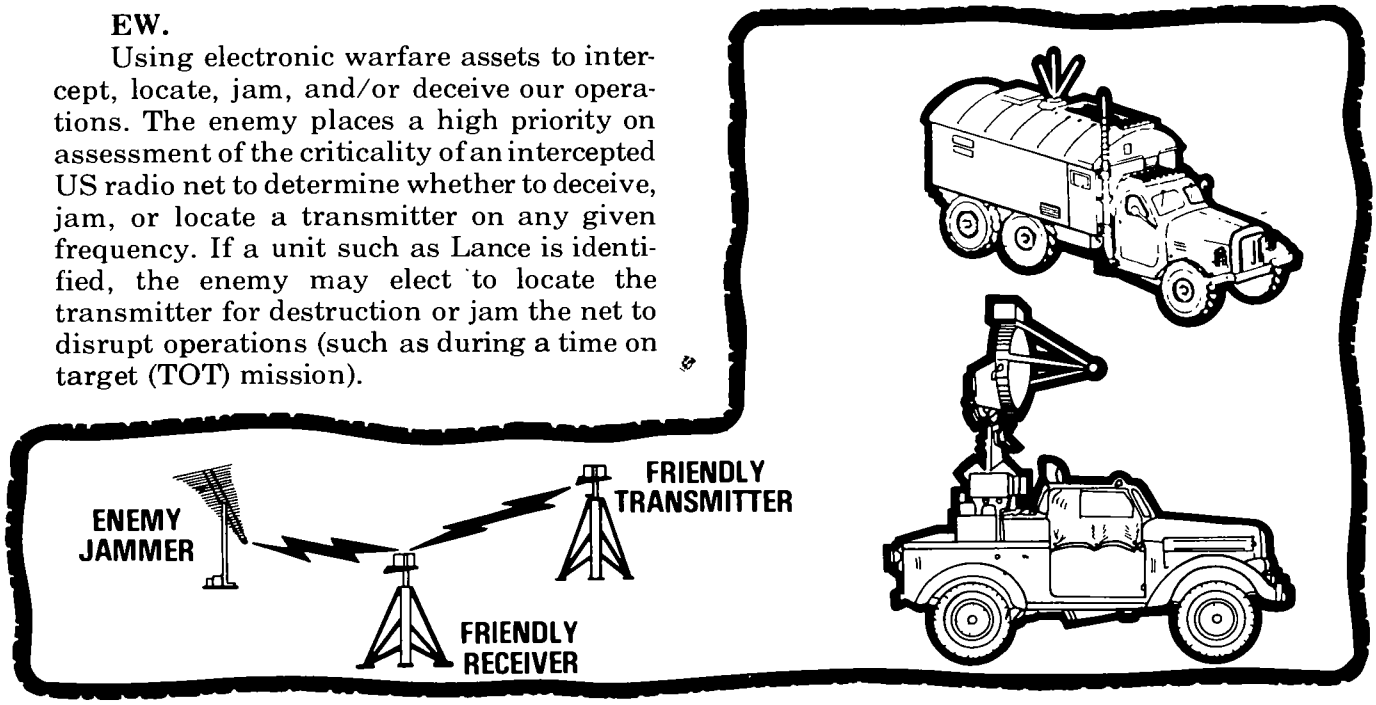
- Local population (sympathetic indigenous personnel)
- Intelligence agents (disguised as friendly personnel)
- Reconnaissance patrols
- Aerial reconnaissance (pilots reporting targets of opportunity)
- Infiltrators
- Map reconnaissance (firing on typical or probable locations)

SIGINT.

Using devices to intercept our radio communications and other electronic signal emitters. These methods include frequency scanning or selective monitoring of radiofrequencies and wiretapping of unsecured lines (such as wire lines between a multichannel area signal center and a battery position).

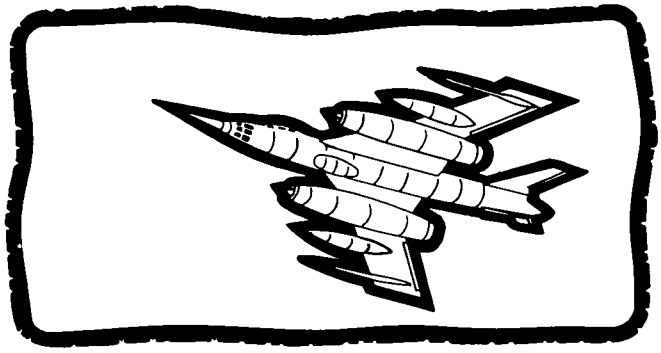
EW.

Using electronic warfare assets to intercept, locate, jam, and/or deceive our operations. The enemy places a high priority on assessment of the criticality of an intercepted US radio net to determine whether to deceive, jam, or locate a transmitter on any given frequency. If a unit such as Lance is identified, the enemy may elect to locate the transmitter for destruction or jam the net to disrupt operations (such as during a time on target (TOT) mission).



PHOTINT.

Using photographic equipment aboard aircraft and other airborne platforms (such as satellites) to gain information. The enemy employs a vast array of highly sophisticated multispectral sensors that are capable of producing targetable images regardless of time of day, atmospheric conditions, and—in some cases—overhead cover. These information gathering sources may pose the greatest threat to a Lance unit.



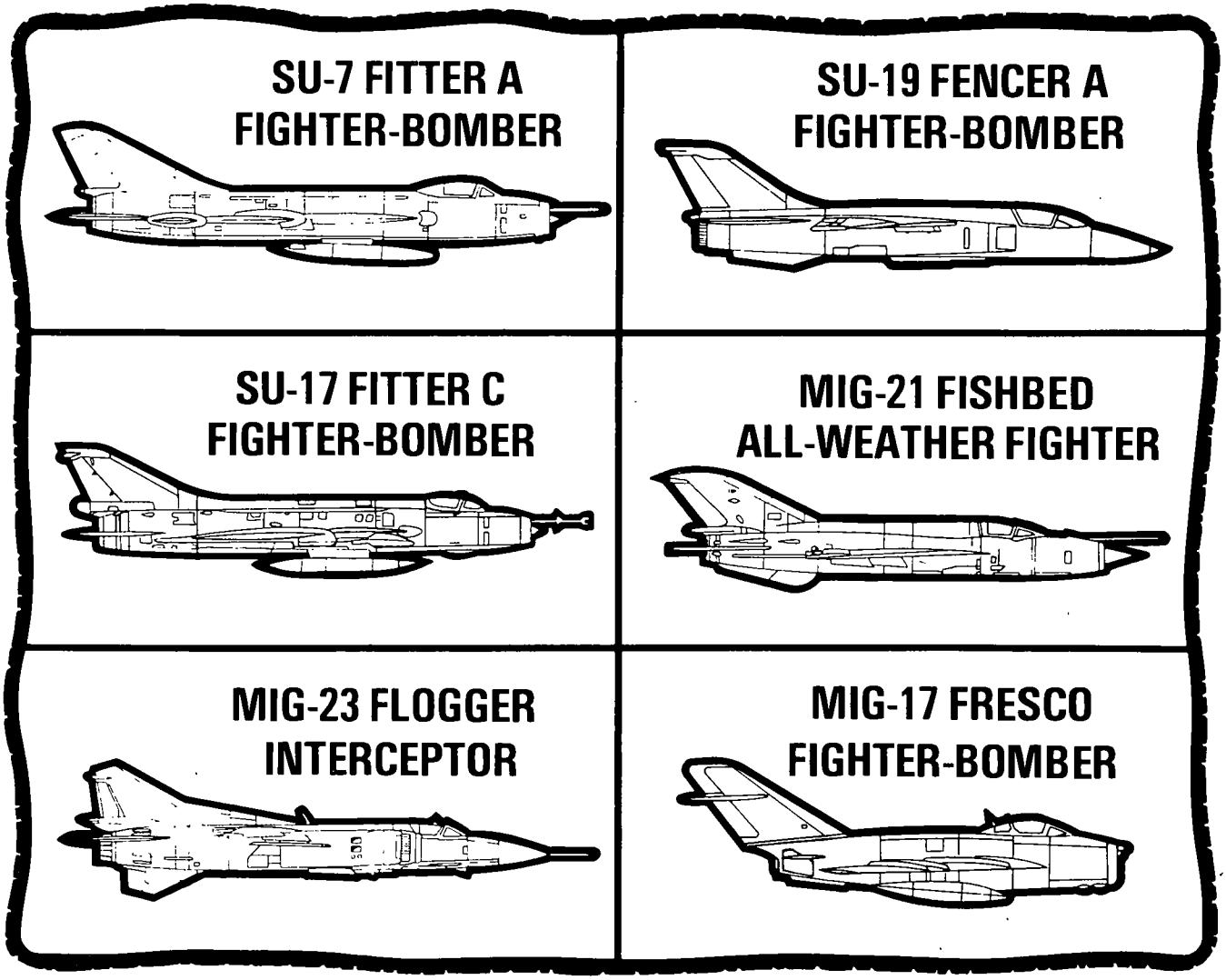
The first priority of threat reconnaissance is the location of our nuclear delivery weapons and ammunition stockpiles. They will look for:

- Camouflaged launchers and missiles
- Large numbers of special purpose vehicles (e.g., 5-ton extra length wheelbase (XLWB) trucks)
- Prepared, covered positions
- Approach routes to firing positions
- Large numbers of radios and signatures of their operation

The threat operates under the assumption that radio is the primary means for controlling tactical nuclear weapon units. According to threat doctrine, nuclear capable delivery units are to be annihilated immediately upon detection. Annihilation, as opposed to mere neutralization, is defined as a minimum 50- to 60-percent loss in men and equipment.

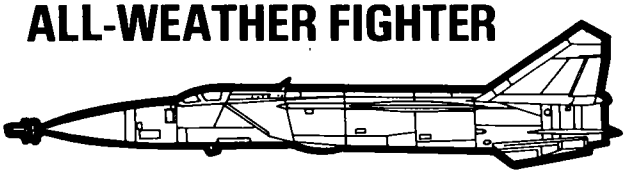
1-6. Aviation

In all probability, our future foe will have more aircraft than our forces and his aircraft will be equal to ours in quality. Opposing forces aircraft are equipped with a wide variety ot weapon systems to include bombs, missiles, rockets, and cannons. The enemy will take full advantage of the inherent flexibility of his air forces. He must be expected to use the capability to attack our maneuver forces and their support elements. The opposing forces concept for air support considers airstrikes as an extension of field artillery and places great emphasis on tactical air support of ground operations. To carry out this concept, they will employ ground attack aircraft capable of executing strikes against such targets as tactical nuclear delivery systems, command posts, and communications elements whose suppression and neutralization are necessary. Lance units will be a high-priority target for air attack.



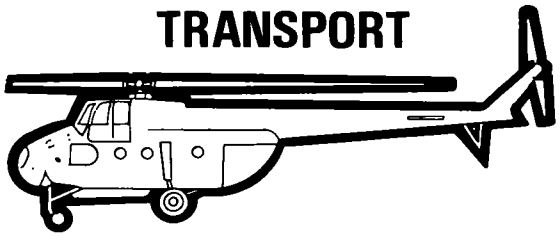
It is probable that opposing forces will employ reconnaissance aircraft to operate with ground attack aircraft, with the aim being to strike worthwhile targets of opportunity. Reconnaissance aircraft are equipped with sophisticated photographic and electronic sensors that are capable of monitoring tactical operations in daylight, darkness, and inclement weather.

MIG-25 FOXBAT
ALL-WEATHER FIGHTER



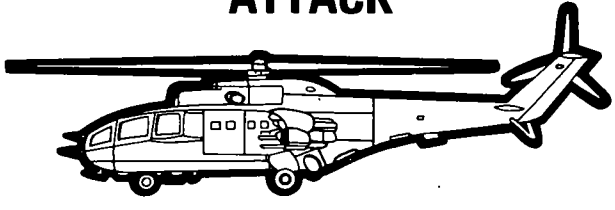
YAK-26
RECONNAISSANCE

MI-4 HOUND
TRANSPORT

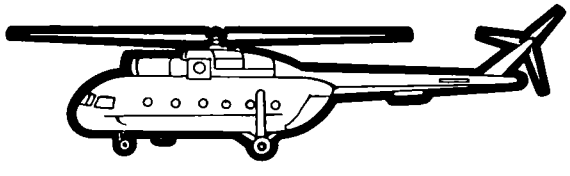


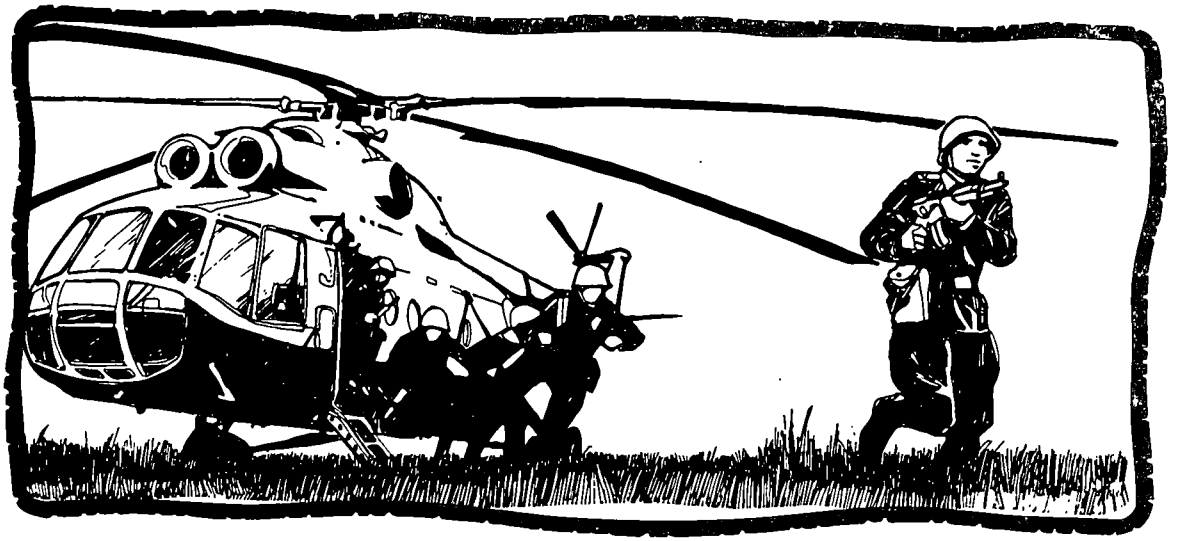
In addition to ground attack and reconnaissance aircraft, the threat also employs armed helicopters. The threat has the most heavily armed helicopters in the world today. These helicopters also have the capability of remaining on station with significant ordnance capability after discharging a squad in an assault role.

MI-24 HIND A
ATTACK



MI-8 HIP
TRANSPORT





1-7. Ground

Although a Lance unit is generally a rear area weapon system, this does not mean it is not susceptible to ground attack. Today's unconventional warfare techniques will almost guarantee that the enemy will be able to attack practically any place he chooses with both day and night operations.

The battalion must be prepared to defend against a limited ground attack. An adequate perimeter defense, to include the proper placement of crew-served weapons and the ability to call in friendly cannon protective fires, is essential to the survivability of a battery. A continuous monitoring of all intelligence sources should be maintained to insure adequate warning of the possibility of an air-ground assault or conditions that would foster guerrilla/insurgent operations.

Airborne/Airmobile Operations.

A large number of enemy paratroopers may be airdropped by transport aircraft to either perform a concentrated ground attack or to break into a number of smaller bands to carry out commando-type raids. Smaller numbers of troops may be similarly airdropped or landed by assault or transport helicopters.

Guerrilla/Partisan Operations.

Guerrilla and insurgent activity will be prevalent throughout the corps zone. These forces will consist of small numbers of personnel who will generally conduct sabotage, sniping, and intelligence gathering activities. These activities are conducted by either enemy personnel who have infiltrated the FEBA or sympathetic members of the local populace. Both groups will conduct extensive night operations. Local sympathizers will generally be harder to detect because of their intimate knowledge of the surrounding countryside.

Armor Operations.

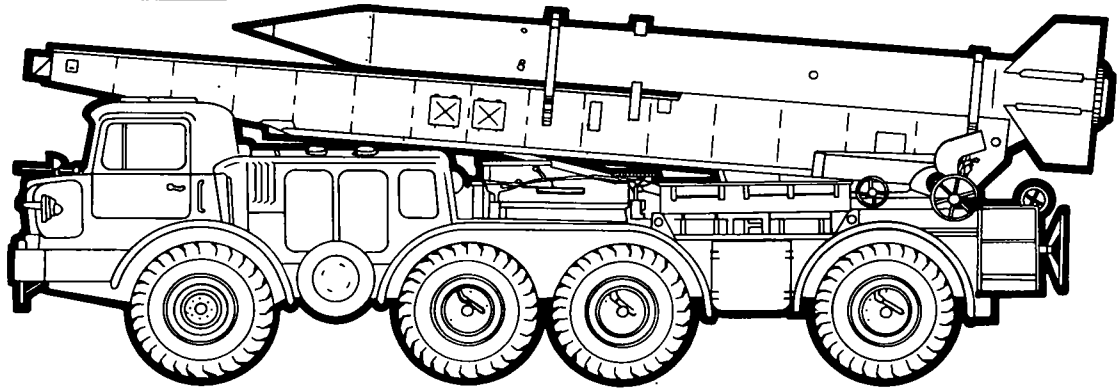
One of the principal offensive operations used by opposing forces is the "breakthrough" tactic. The purpose of this tactic is to rupture our forward defense to permit the passage of exploitation forces. Under this condition, the situation might deteriorate so rapidly that threat reconnaissance elements equipped with armored vehicles (see appendix B) may penetrate well enough into the division zone to locate a Lance battery. The occurrence of this event may seem remote; however, the predicted dynamics of the battlefield indicate that a wise commander will prepare himself and his unit for such an eventuality (see chapter 8, section III).

1-8. Artillery

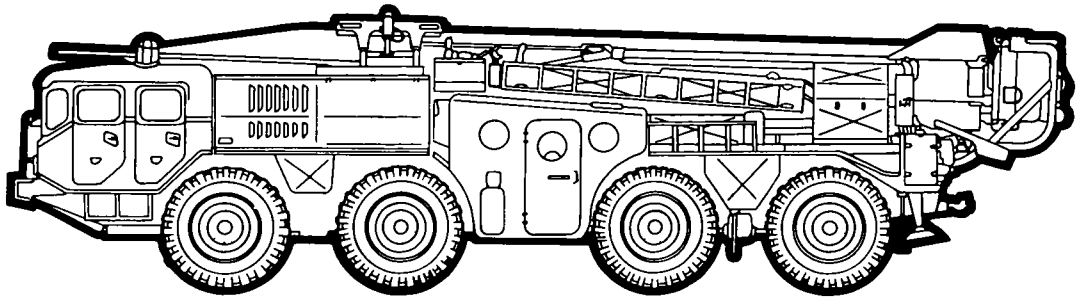
If Lance battalions or batteries are correctly deployed, they will generally be out of range of enemy cannon artillery. Firing points may be closer to the FEBA, however, and be within range of longer range artillery such as the 130-mm field gun or 180-mm field gun. It is mandatory, therefore, that a firing point be evacuated as soon as possible after firing to preclude artillery counterfire.

If a Lance unit has been located by air reconnaissance or photo interpretation, the opposing commander may decide to employ the FROG 7 missile system against the unit. The FROG 7 is the latest in the free rocket series and has a minimum range of 11 kilometers and a maximum range of 70 kilometers and may carry either a nuclear or a nonnuclear warhead. The much larger and longer range SCUD missile may also be employed.

FROG-7



SCUD



1-9. Electronic Warfare Operations

Electronic warfare encompasses signal collection, intercept, direction finding, jamming, and deception of communication and noncommunication devices. All Lance personnel, as well as unit commanders, need to be aware of the fact that the opposing forces have assigned a high priority to disrupting and disorganizing our use of radios or any electronic emitter used in command and control of a Lance unit. An opposing force can locate, identify, and exploit rapidly all types of electronic transmitters over a wide range of frequencies. The opposing forces include special purpose electronic warfare units with both airborne and ground based electronic warfare equipment to include electronic emitters and infrared detectors.

Enemy Electronic Warfare Objectives:

TO INTERCEPT AND OBTAIN INTELLIGENCE
TO LOCATE AND TARGET
TO DECEIVE AND DELAY
TO JAM AND DISRUPT

Intercept Operations.

Intercept operations are conducted to determine the composition of our forces and electronic order of battle and to gain electronic information regarding our emitters in order to plan effective countermeasures. The enemy is very adept at locating, recording, and analyzing the technical characteristics of intercepted signals, as well as the specific operating procedures employed in our nets. These enemy activities are particularly effective when our communications operations are careless or imprecise or when our operations are conducted under pressure, as in a combat situation. Any electronic emission can be monitored by the enemy.

We can expect opposing forces to fire on a direction-finding fix alone. They set a high priority on fixing emitters associated with command and control and weapons systems. Once a transmitter is located, their artillery will fire a barrage to cover a wide area at the suspected transmitter location. According to their doctrine, the expense of ordnance is worth the possible gain despite the possibility

of a deception operation. We can expect their priorities to be:

1. TO DESTROY
2. TO DECEIVE
3. TO JAM

Deception and Jamming.

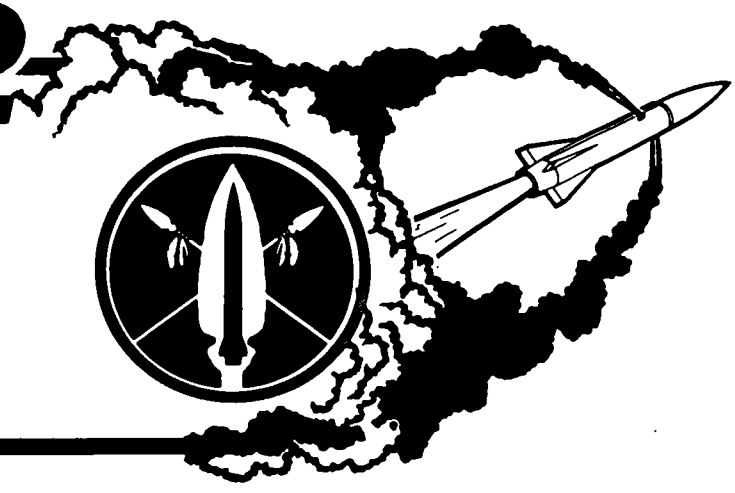
Deception and jamming will deceive, disrupt, and harass communication and electronic systems with the overall aim of degrading or denying our use of such systems. Enemy doctrine advocates these operations to complement firepower and maneuver capabilities. Deception and jamming operations will be directed at communication nets in which signals are weak, where there is natural background interference, where there exists an atmospheric disturbance, or where there exists an atmosphere of confusion. The opposing forces also possess a significant capability to direct electronic deception operations against radio communication circuits and electromagnetic radiations emanating from noncommunication emitters. In deception operations, they will emphasize taking us by surprise, intruding into the most important communication nets, and concentrating on the most critical phase of a combat operation.

Opposing EW units will use either spot (narrow band), sweep, or barrage (broad band) jamming of tactical radio nets when jamming is more desirable than the intelligence that can be obtained from monitoring the nets. Even though these units possess specialized jamming equipment, they capitalize on the fact that any transmitter is a potential jammer. Jammers are displaced from the FEBA to rear areas according to the strength of the jammer.

A jamming effort by operators usually involves a period of jamming followed by a brief listening period to determine how effective the jamming has been. Their doctrine is based on the principle that jamming is most effective when the opposing force does not know about it; therefore, operators are trained to increase jamming gradually instead of relying on sudden bursts of power.

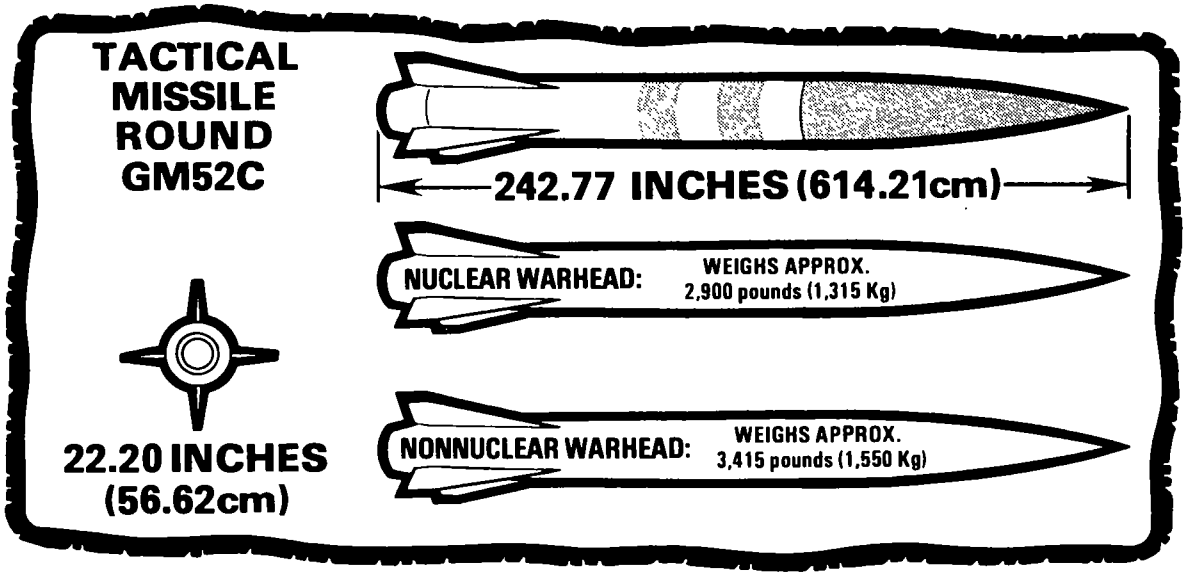
CHAPTER 2

System Description



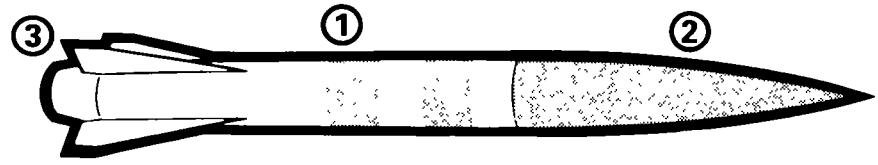
★ The Lance missile system provides the force commander with an effective, long-range, all-weather, day/night, nuclear/conventional weapon system to engage priority targets within the corps zone of operations. The system has excellent range capabilities. At sea level, the range of the system in the nonnuclear configuration is between 8 and 75 km and in the nuclear mode, between 8 and 115 km. If the firing point or launcher altitude is greater than 1,000 meters, the maximum ranges are extended to 81 km for the nonnuclear mode and 133 km for the nuclear mode. Whatever the case, because of its greater range, Lance can be positioned outside enemy cannon range and can engage targets far beyond the range of conventional artillery.

2-1. Missile Description



LANCE MISSILE

THE MISSILE IS COMPOSED OF THREE MAIN SUBSECTIONS: THE MISSILE MAIN ASSEMBLAGE, THE WARHEAD SECTION, AND FOUR CONTROL SURFACES.



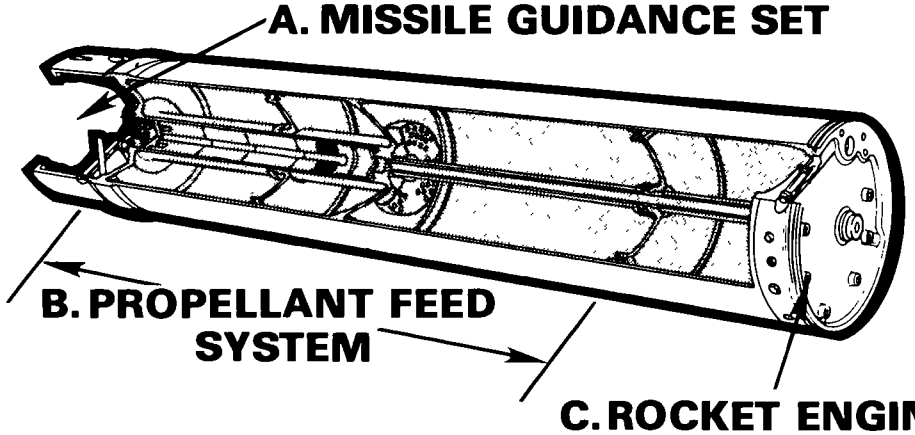
1. MMA

2. WARHEAD SECTION

3. CONTROL SURFACES

Guided Missile Main Assemblage (MMA) M-5.

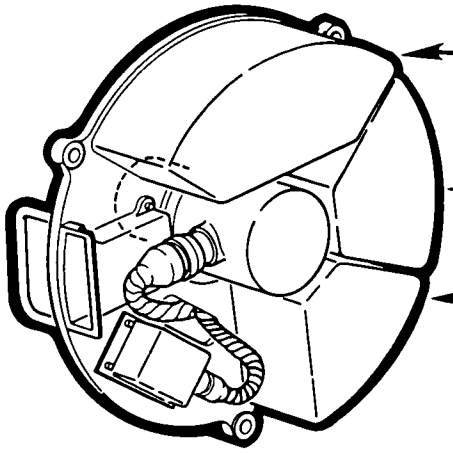
The MMA is composed of three major subassemblies:



MISSILE GUIDANCE SET (AN/DJW-48)

A. MMA ①

FWD



DIRECTIONAL CONTROL ELECTRONICS (DCE)

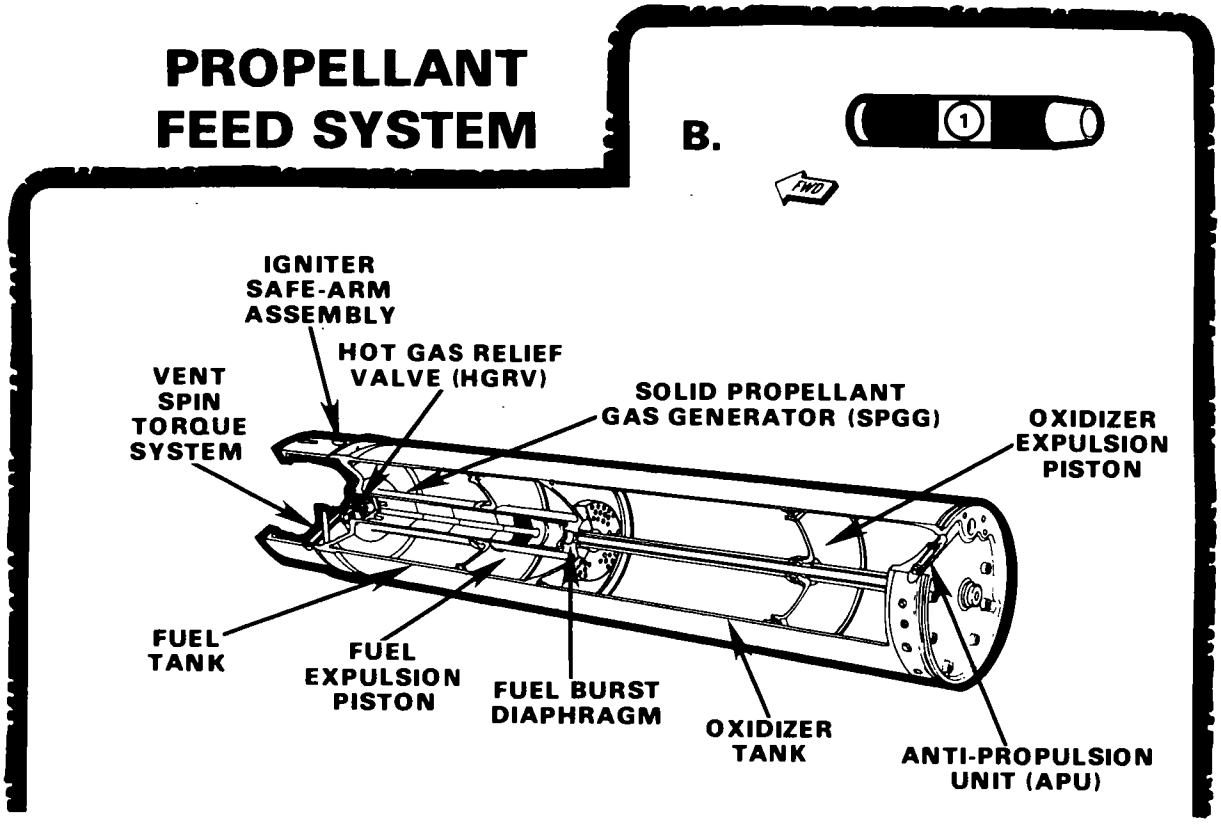
POWER SUPPLY ELECTRONICS (PSE)

VELOCITY CONTROL ELECTRONICS (VCE)

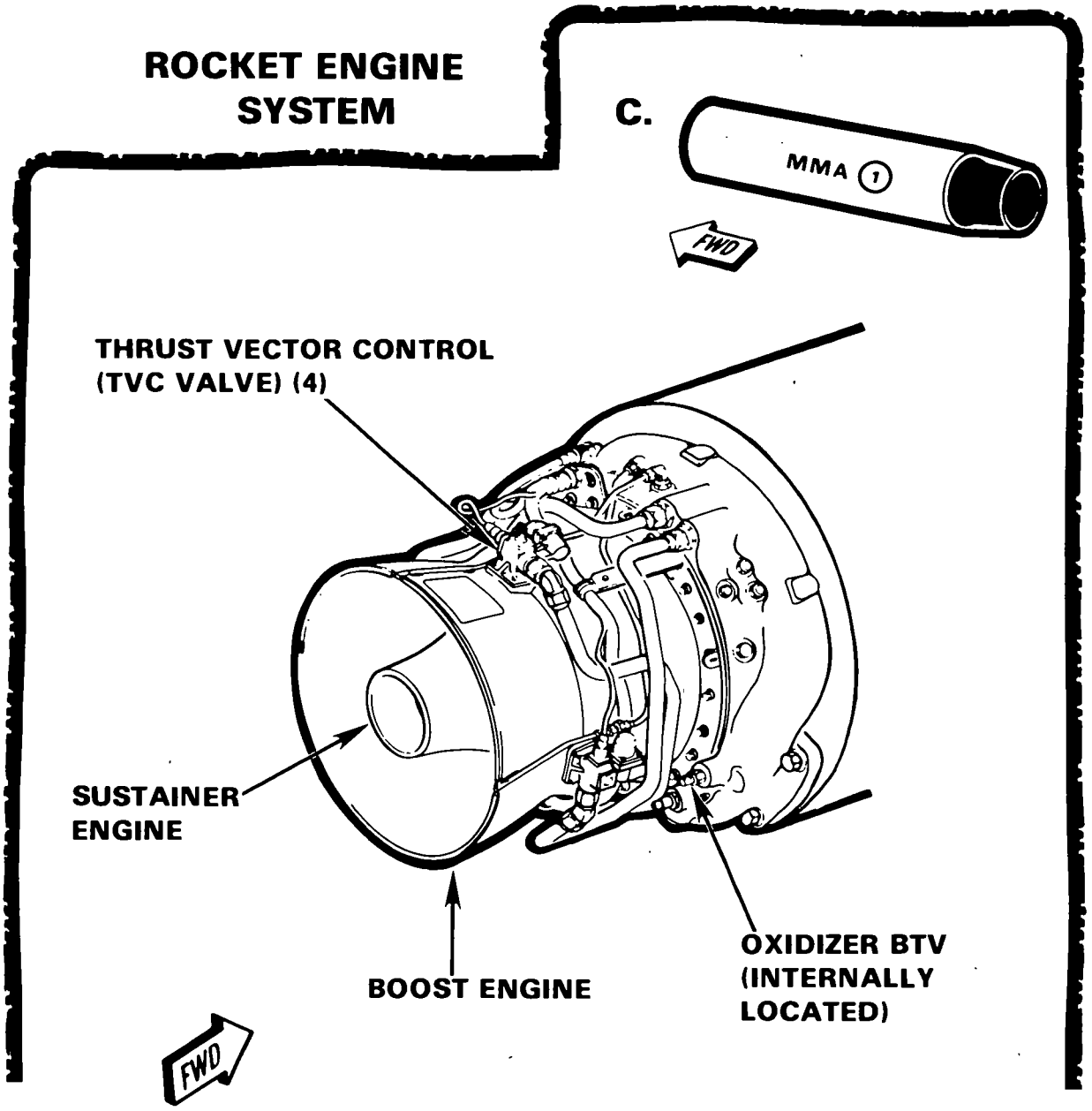
Missile guidance set, AN/DJW-48. The Lance missile is kept on its intended trajectory by the directional control, automatic meteorological compensation guidance system or, more simply, the DC-AUTOMET. The DC-AUTOMET consists of three major subsystems: directional control electronics (DCE), ★ velocity control electronics (VCE), and power supply electronics (PSE). All electronic modules are hermetically sealed and are mounted to a circular aluminum support located just behind the warhead/missile interface. The entire guidance set weighs only 36 pounds. Its modular construction allows for easy replacement of defective subassemblies or the entire guidance set in a matter of minutes.

During the boost phase of flight, a gyroscope senses attitude (pitch and yaw) errors caused by external forces such as wind, air density, and humidity. The resulting output signals are converted by the DCE to commands that open and close the appropriate thrust vector control valves. The resultant alteration of the main thrust vector causes side thrust to cancel the effects of the external forces and thus keep the missile on the intended trajectory. Directional control ceases at boost termination.

Boost termination is affected by the VCE. An accelerometer measures the missile's acceleration. Once the velocity necessary to achieve the desired range is obtained, a signal is sent to the rocket engine causing the booster termination valves to operate. Throughout the sustain portion of flight, the accelerometer maintains the desired velocity (or a thrust equals drag condition) by regulating the amount of fuel and oxidizer flowing to the variable thrust sustainer engine. This is one of the main advantages of liquid propellants. At a preset time, a signal from the warhead routed through the VCE shuts down the sustainer engine (SCO) to prevent random fuel burnout, thus terminating the powered portion of flight.



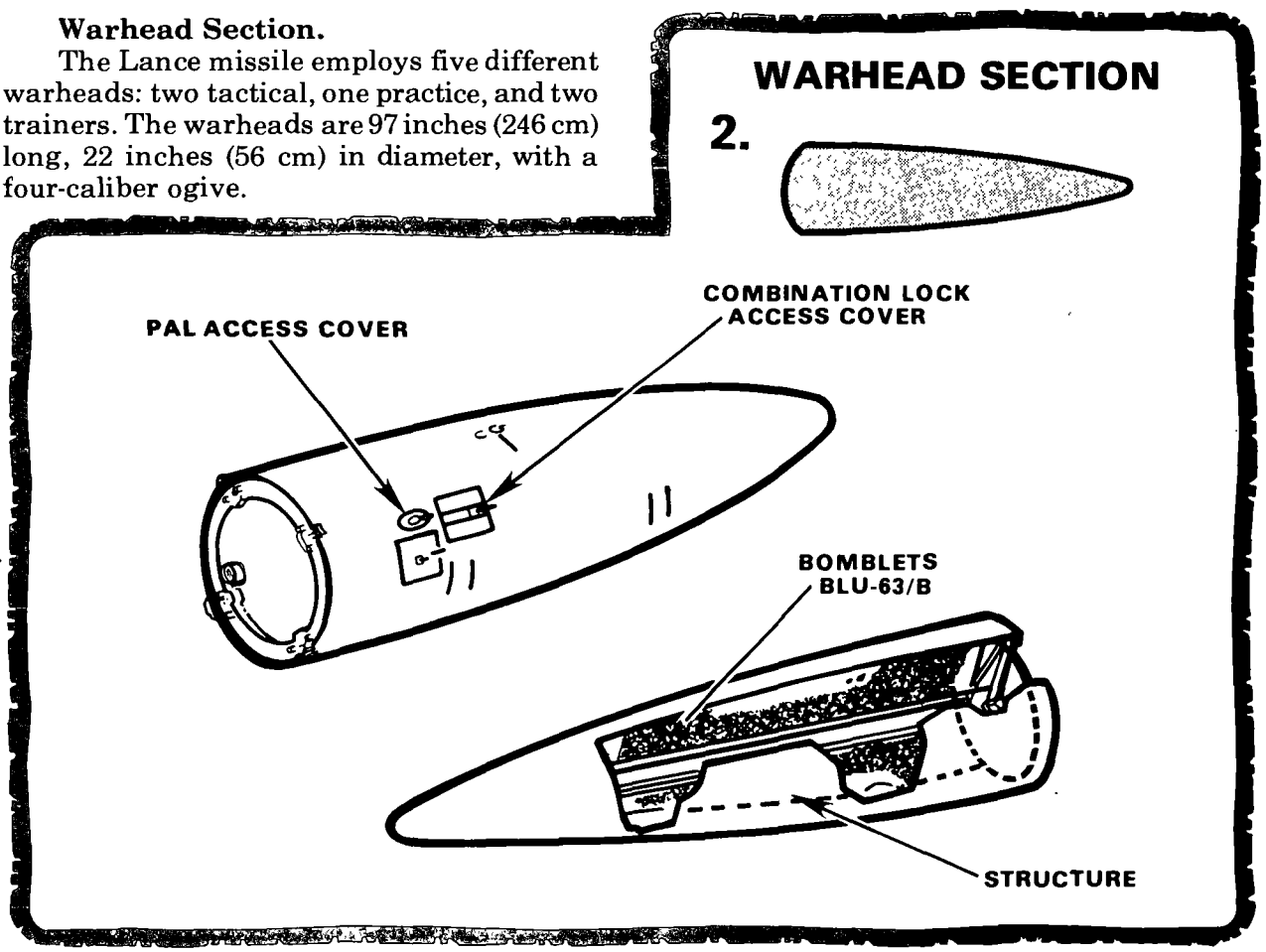
The propellant feed system. The propellant feed system includes the subsystems and components necessary to store and deliver fuel and oxidizer to the rocket engine system and the necessary safety devices to be sure of safe missile handling and to preclude inadvertent launch. The propellant feed system consists basically of two cylindrical aluminum tanks welded in tandem with a common internal bulkhead. The forward tank contains approximately 375 pounds (166 kg) of fuel (unsymmetrical dimethyl hydrazine (UDMH)), and the rear tank contains approximately 1,107 pounds (502 kg) of oxidizer (inhibited red fuming nitric acid (IRFNA)). During storage, the propellants are isolated in their respective tanks by aluminum static seals and high pressure burst diaphragms. When the launch sequence is initiated, the propellants are forced through the diaphragms and into the rocket engine system by the action of two pressure driven pistons, one in each tank. Pressure to drive the pistons is provided by a solid propellant gas generator (SPGG), which is regulated by the hot gas relief valves (HGRV). High pressure gas is further expelled through a vent spin torque system to impart a stabilizing spin on the missile. Two safety devices are built into the propellant feed system to prevent unintentional arming of the missile. The SAFE-ARM igniter assembly is a mechanical blocking device that prevents ignition of the solid propellant in the SPGG by displacing the firing squibs and an intermediate charge. When in the SAFE position, a spark is prevented from reaching the SPGG. The antipropulsion unit (APU) is a steel shank assembly located behind the burst diaphragm between the oxidizer tank and the rocket engine. With this shank in place, it is highly improbable that the oxidizer will enter the engine and mix with fuel should the system become pressurized.



Rocket engine system. The Lance rocket engine is essentially two engines combined in one: A sustainer engine surrounded by a concentric booster engine. During the initial boost phase of flight, both engines burn to provide a combined thrust of 48,500 pounds. Raw fuel dumped into the flame plume by the thrust vector control valves causes the plume to divert resulting in the desired attitude corrections. Upon signal from the guidance set, the boost termination valves operate, cutting off fuel and oxidizer to the booster engine. Throughout the sustain portion of flight, the throttleable sustainer engine is capable of variable thrusts between 100 and 4,650 pounds to keep the missile traveling at the desired constant velocity.

Warhead Section.

The Lance missile employs five different warheads: two tactical, one practice, and two trainers. The warheads are 97 inches (246 cm) long, 22 inches (56 cm) in diameter, with a four-caliber ogive.



The M234 nuclear warhead weighs approximately 465 pounds (210 kg) and is of aluminum construction. Because of its relatively light weight, it is subject to greater atmospheric friction than the nonnuclear round. It is therefore covered with an ablative skin that burns off in layers cooling the warhead. The warhead is secured with a permissive action link (PAL) that precludes unauthorized arming of the warhead. Additionally, it has a nonviolent command disable system (CDS) that will render it inoperable when the correct code is entered. The warhead is RF (radiofrequency) shielded making it invulnerable to electronic countermeasures.

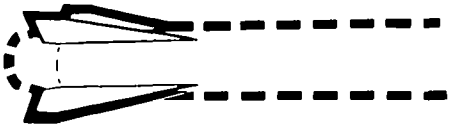
The M251 nonnuclear warhead carries a payload of approximately 830 BLU-63 bomblets that are dispersed over the target area. Each bomblet weighs approximately 1 pound and is filled with a composition B explosive filler. Upon detonation, each bomblet breaks up into a large number of high-velocity steel fragments that are effective against soft targets and some hard targets such as truck tires, missile rounds, and radar antennas.

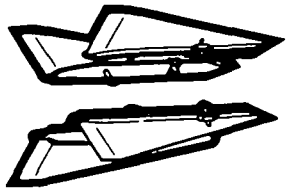
The service practice round (M252) is ballistically identical to its tactical counterparts and is used for annual service practice firings.

The two training warheads (M240 and M201) are also ballistically identical and have the same controls as their tactical counterparts, but are used only for practical and maintenance training.

CONTROL SURFACES

3.





Control Surfaces.

The four control surfaces provide aerodynamic stability to the missile by maintaining axial spin during flight. This is accomplished by a 3-degree cant on the trailing edge. Two sizes of control surfaces are used, depending on the warhead. The M29 large control surfaces are used with the M234 nuclear warhead. These control surfaces, like the nuclear warhead, are also covered with ablative material. The M30 small control surfaces are used with the M251 nonnuclear warhead. The control surfaces are issued with the warhead at the SASP.

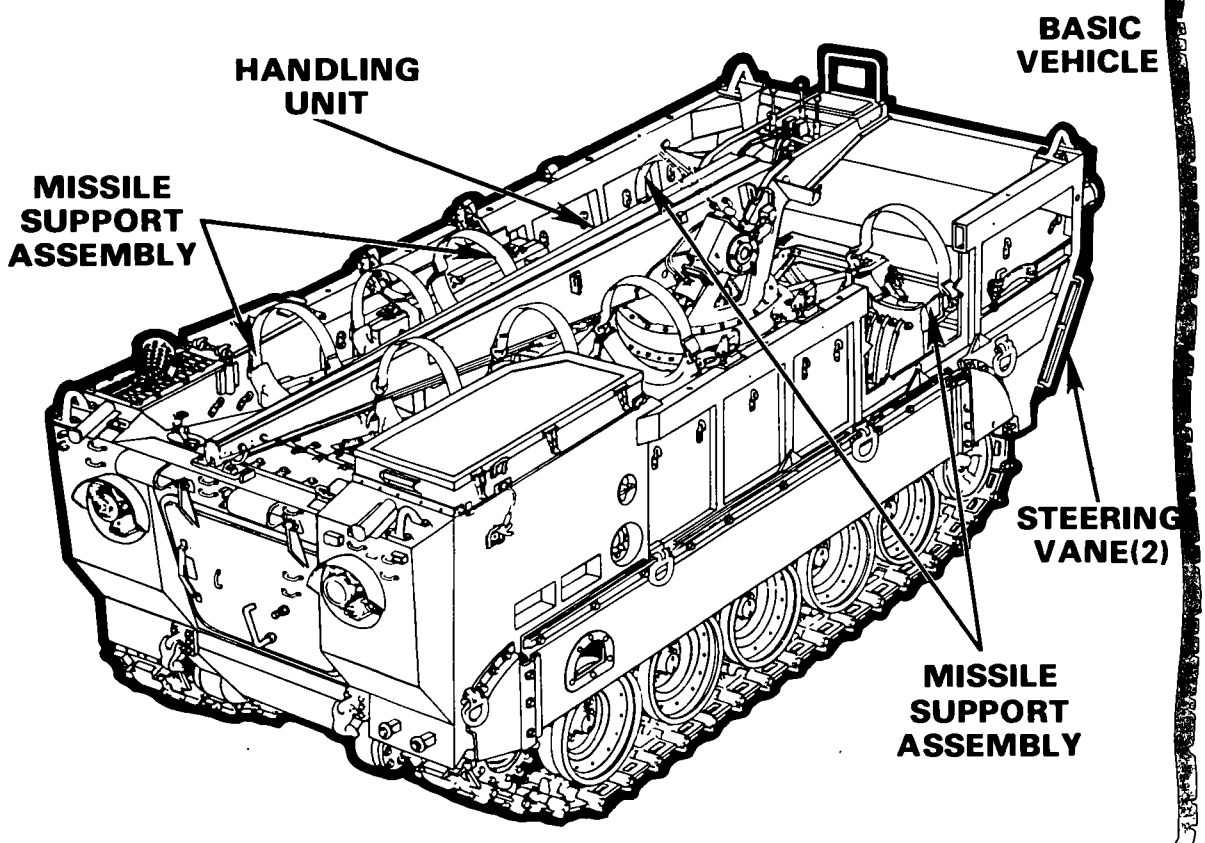
2-2. Ground Support Equipment

General.

The major items of ground support equipment are the loader-transporter (LT), the self-propelled launcher (SPL), and the launcher zero length (LZL). The LT and SPL are amphibious tracked carriers of which the basic vehicle is the guided missile carrier M667. The vehicle is powered by a liquid-cooled, V6-53 diesel engine and has the same basic power train as the M113 with a Lance-peculiar hull. Other items of ground support equipment are the monitor-programmer, the firing device, and the guided missile main assemblage shipping and storage container. The lightweight and heavy warheads come in two separately designed guided missile warhead shipping and storage containers. Additionally, the mobility kit, the azimuth laying set, the tripod hoist unit, and the sling beam are items of ground support equipment. The characteristics and capabilities of the ground support equipment are discussed in the following paragraphs.

GROUND SUPPORT EQUIPMENT

LOADER-TRANSPORTER (LT) M688

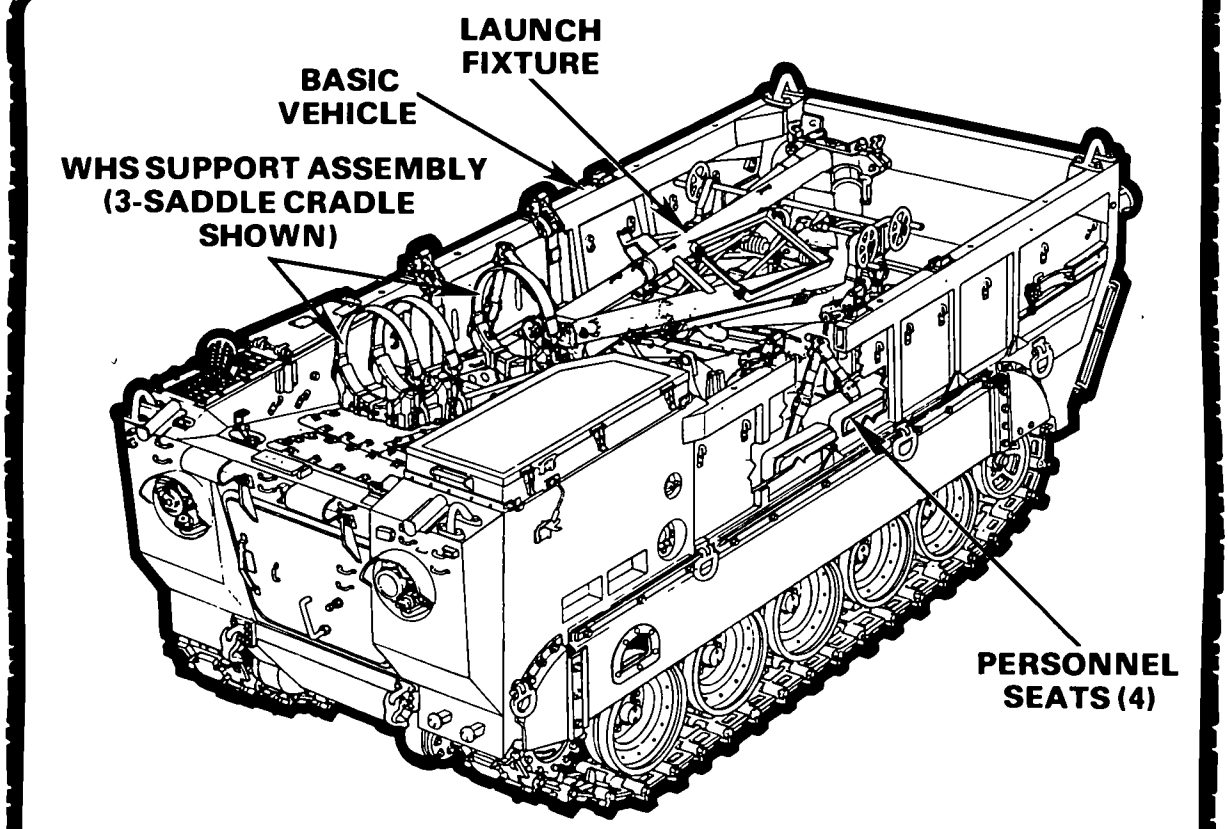


Loader-Transporter (LT) M688.

Mounted on the basic vehicle (M667) are a handling unit, supports, and cradles for two complete missiles or two main assemblage sections less warhead, and storage for auxiliary equipment. The handling unit, M39, is a constant pressure, hydraulically operated boom crane with the base secured to the support brackets in the rear of the LT. The boom has a 4,200-pound lift capacity and is controlled by three manually operated control valves that permit the operator to control boom elevation and depression, 360° traversing, and cable reel-in and -out operations. The missile support assemblies are structural castings attached to the vehicle to provide safe storage and transportation facilities for two complete missiles or missile assemblages. The auxiliary equipment stowed on the LT consists of a missile handling sling, handtools, and basic issue items from the basic issue items list (BIIL). The LT has storage brackets for transporting two complete sets of control surfaces. The LT's primary function is to mate, load, and transport mated missiles or main assemblages. The LT is equipped with a suspension lockout system to provide a stable loading platform.

GROUND SUPPORT EQUIPMENT

SELF-PROPELLED LAUNCHER (SPL) M752

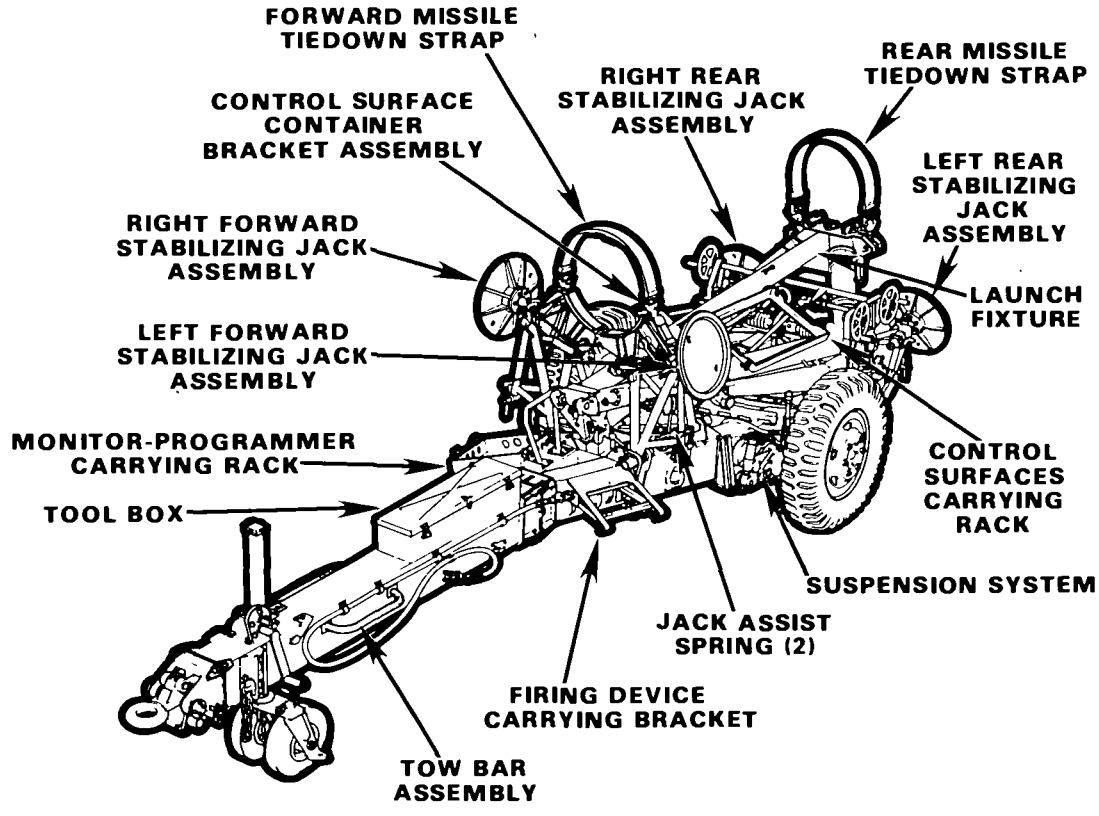


Self-Propelled Launcher (SPL) M752.

The Lance self-propelled launcher consists of the missile launch fixture and basic M667 carrier. The basic launch fixture functions as part of the SPL, serving as a missile launcher on a highly mobile base. The basic launch fixture is securely attached to the SPL but can be removed quickly and easily. By attaching the mobility kit components to the launcher fixture, it is converted into a lightweight, highly mobile, towed launcher. The SPL has storage brackets for the basic issue items and miscellaneous crew equipment. Seating space is provided for four crewmembers in the cargo area and for two in the tandem cab to accommodate a total crew of six. The SPL also carries a set of control surfaces (fins) for the missile it transports.

GROUND SUPPORT EQUIPMENT

LAUNCHER ZERO LENGTH (LZL) M740



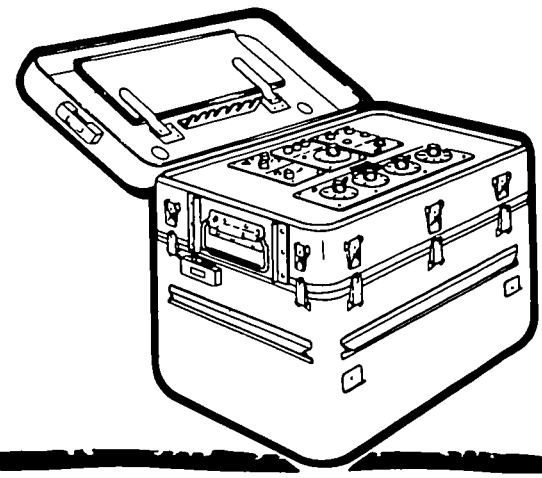
Launcher Zero Length (LZL) M740. The M740 is a lightweight configuration of the basic launcher that is intended for use in special operations such as airmobile missions. The LZL is composed of the basic launch fixture from the SPL coupled with components of the mobility kit: a towbar, suspension arms, wheel assemblies, and four stabilizing jacks with pads. Auxiliary equipment carried on the LZL are the monitor-programmer, firing device, aiming equipment, and the control surfaces. The LZL, complete with missile, can be towed by any standard Army vehicle or transported internally or externally by cargo-type helicopters. It can also be maneuvered manually over short distances.

SPECIAL SUPPORT EQUIPMENT

Special Support Equipment.

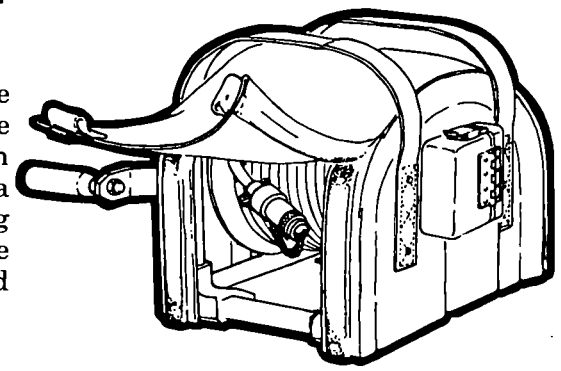
Monitor-programmer (MP), missile guidance set, AN/GJM-24. The MP is a self-contained electronic unit, which is stowed on a bracket mounted on the launch fixture. The functions of the MP are to perform prefire checkout, insert range information into the missile guidance system, and to control the missile firing sequence. Up until umbilical disconnect, the MP will interrupt the system checkout or firing sequence if critical MP or guidance system circuitry is not functioning properly.

MONITOR-PROGRAMMER



Missile firing device M91. A portable firing device is used to arm and fire the missile from a safe position 100 meters from the launcher. It consists of a firing cable, a handle assembly, a cable reel, web carrying straps, and a firing box. During prefire testing, the firing device circuitry is checked by the monitor-programmer.

FIRING DEVICE



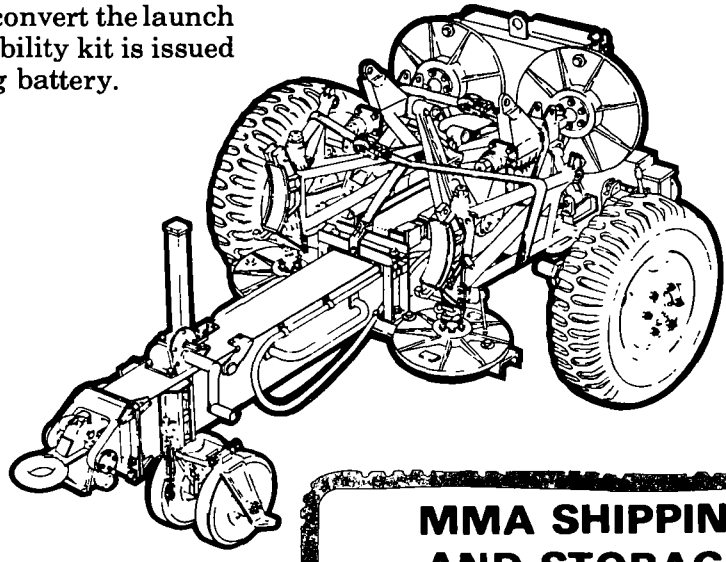
Nickel-cadmium (NICAD) battery. The primary power source for the Lance ground support equipment and the ground power source for the Lance missile is a 24-volt, nickel-cadmium battery. The battery is housed in its own separate container on the launch fixture.

Sighting and laying equipment. The sighting and laying equipment is used to boresight and orient the missile on the desired azimuth of fire and proper firing elevation as determined by the fire direction center. Standard artillery reciprocal laying techniques are used to lay the missile. Equipment in the set includes a gunner's sight unit (GSU) consisting of a modified T-2 theodolite mounted on a sight bracket and a forward mirror bracket that is inserted into the missile guidance set for optical alinement.

SPECIAL SUPPORT EQUIPMENT

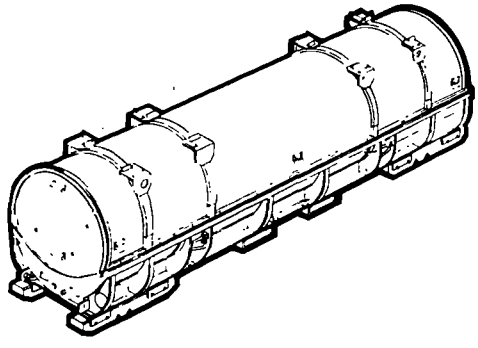
MOBILITY KIT

Mobility kit M234. The mobility kit provides a convenient, towed configuration for those items required to convert the launch fixture to the LZL. The mobility kit is issued on a basis of one per firing battery.



MMA SHIPPING AND STORAGE CONTAINER M599

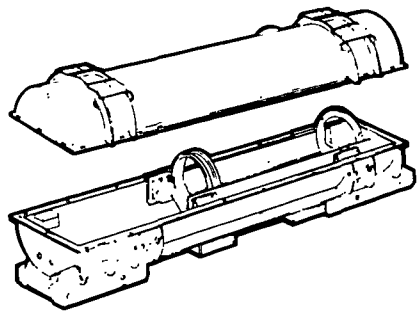
Main assemblage shipping and storage container M599. This container secures and protects the missile main assemblage from inclement weather and rough handling during shipment and storage. The shipping and storage container is of steel construction and has skids for towing short distances. The container can be lifted by hoist or forklift and is stackable.



SPECIAL SUPPORT EQUIPMENT

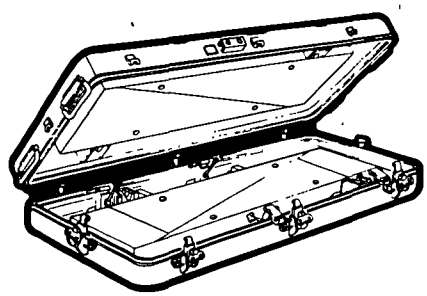
WARHEAD SHIPPING AND STORAGE CONTAINER

Warhead shipping and storage containers M544 and M511. Both of these containers are of steel construction, are skid mounted, and are stackable. The M511 nuclear warhead container is environmentally sealed, RF shielded, and pressure and humidity controlled. It provides quick access to the warhead CDS and cabling to monitor or lock/unlock the warhead PAL device without opening the container. Warheads and containers are not interchangeable; e.g., an M234 nuclear warhead cannot be placed in an M544 nonnuclear container and vice versa.



CONTROL SURFACE SHIPPING AND STORAGE CONTAINERS

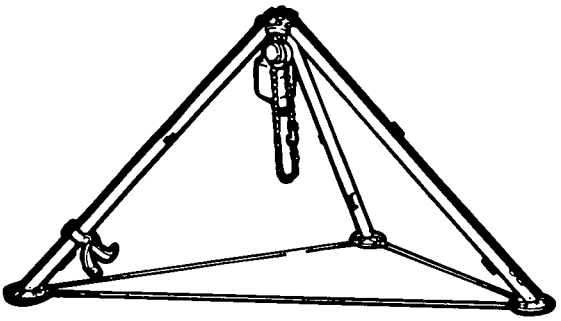
Control surface shipping and storage containers M596 and M597. These containers are carrying cases used to protect the missile control surfaces from damage before they are installed on the missile.



SPECIAL SUPPORT EQUIPMENT

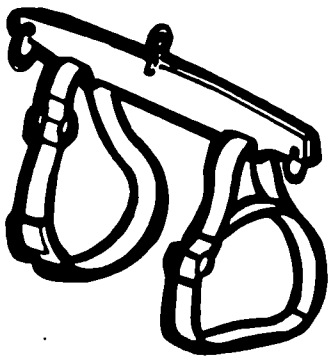
Tripod hoist M38. The tripod hoist is used with the LZL in airmobile operations. The hoist is relatively light in weight and has a hoist capacity of 4,000 pounds (1,814 kg). It provides the capability to lift a complete missile to a height necessary to position the LZL under the missile for loading, and may also be used for warhead section mating when the main assemblage is mounted on the LZL or in its container. Because of the manual procedures involved, it is much more time consuming and should only be used when no other means are available (LT or 5-ton wrecker).

TRIPOD HOIST



Sling beam assembly M22. The sling beam is a multipurpose handling device used with the loader-transporter and the tripod hoist. The sling beam serves as a spreader bar with shackles at either end to attach long and short cables to be used in the lifting of the main assemblage container, warhead section container, or the launch fixture. By removing the cables and attaching heavy nylon straps around the spools on the lower edge of the beam, the sling becomes a handling device for a complete missile, main assemblage, or warhead section. The sling is carried on the LT during movement.

SLING BEAM



2-3. Additional Descriptions of Equipment

Complete descriptions and illustrations of equipment peculiar to the Lance missile system are included in TM 9-1425-485-10-1 and -2, and the appropriate warhead manuals.

CHAPTER 3

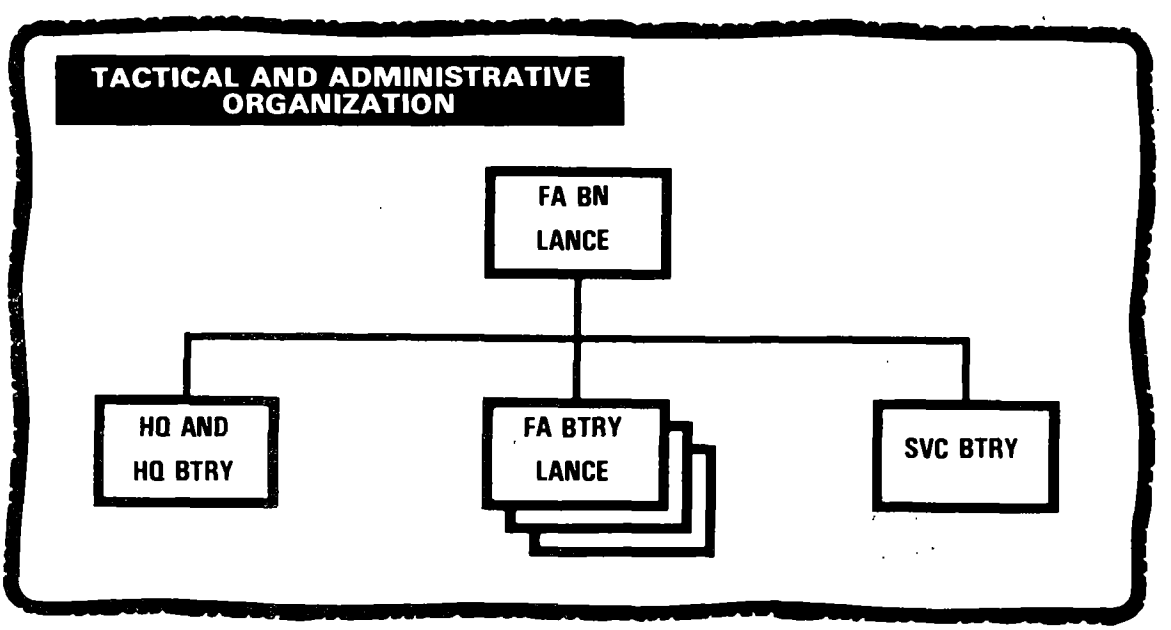
Organization

Section I. ORGANIZATION AND MISSION

3-1. Field Artillery Battalion, Lance

The field artillery battalion, Lance, is normally assigned to a corps. The battalion's mission is to provide field artillery nuclear and nonnuclear missile fires in support of the Army corps.

The Lance battalion is organized as a self-sustaining tactical and administrative unit composed of a headquarters and headquarters battery, a service battery, and three identical firing batteries.



3-2. Headquarters and Headquarters Battery (HHB)

The mission of the headquarters battery is to assist the battalion commander and his staff in the performance of their duties by providing the personnel, equipment, and facilities to operate the headquarters and to provide administrative, logistical, maintenance, and communication support to the elements of command. The Lance headquarters and headquarters battery is ★organized into seven major elements: the battalion headquarters, the battery headquarters, the headquarters support section, the operations and fire direction sections, the communications platoon, the medical section, and the air defense section.

★ ① *The battalion headquarters* consists of the battalion commander and the necessary staff to control and coordinate battalion functions and activities.

② *The battery headquarters* is supervised by the battery commander. The 1SG is his principal enlisted assistant and assists the commander in areas such as discipline, morale, supply, security, maintenance, and administration.

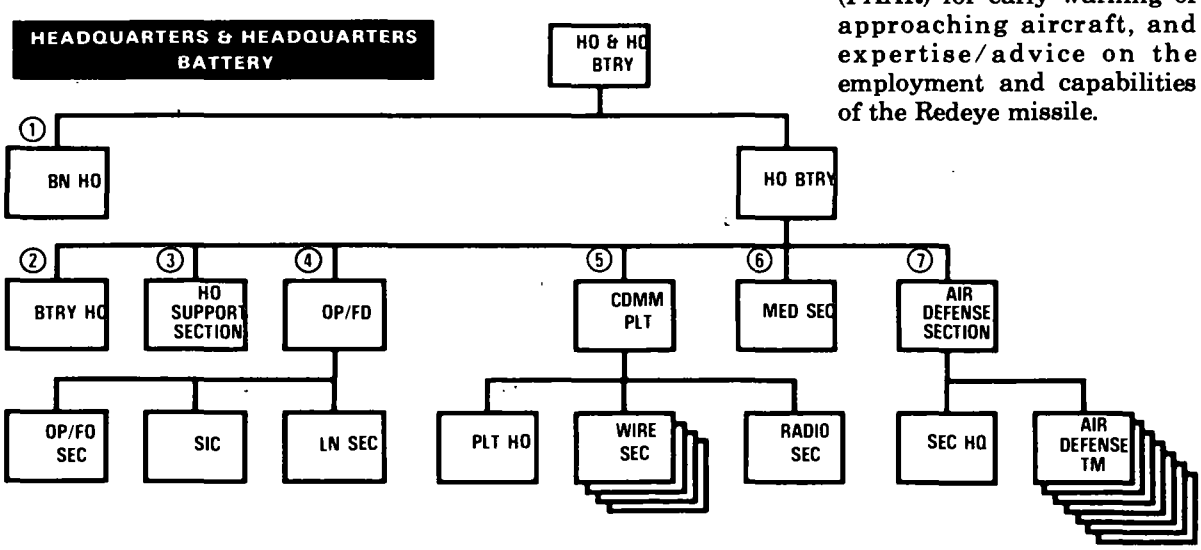
③ *The headquarters support section* is supervised by the battalion S1. The section is responsible for administrative correspondence, legal support, management of combined administration at battalion level (CABL), and general health and welfare of the troops.

④ *The operations and fire direction sections* are supervised by the S3. Responsibilities include tactical and technical fire direction, intelligence operations, plans, and training. Also, the battalion SIC and liaison sections are under the control of the S3.

⑤ *The communications platoon* consists of a platoon headquarters, a radio section, and wire sections. The platoon installs, operates, and maintains the battalion communications system under supervision of the communications-electronics staff officer (CESO). The platoon headquarters also acts as the battalion message center.

⑥ *The medical section* establishes the battalion aid station under supervision of the enlisted medical supervisor. The section provides sick-call, dispensary-type medical service, emergency medical treatment for patients who require further evacuation, and definitive treatment to those who can be treated within the battalion and returned to duty.

⑦ *The air defense section* consists of a section headquarters and seven air defense teams. The section provides the battalion with an organic air defense capability, access to the forward area alert radar (FAAR) for early warning of approaching aircraft, and expertise/advice on the employment and capabilities of the Redeye missile.



3-3. Service Battery

The mission of the Lance service battery is to procure and distribute all classes of supplies to the units of the battalion, maintain supply records, provide ammunition service, and perform organizational maintenance not within the capabilities of the batteries. The battery is divided into four sections to carry out this mission.

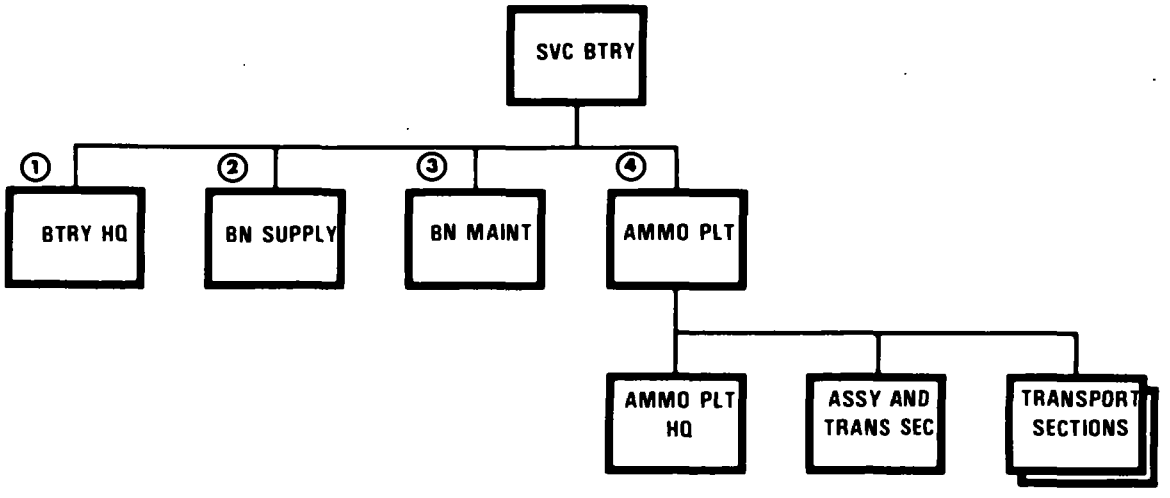
SERVICE BATTERY

① *The service battery headquarters* performs command, administrative, mess, supply, communications, and maintenance functions for the battery.

② *The battalion supply section* performs supply functions for the battalion. It maintains battalion property records, consolidates requisitions and turn-ins, procures and issues supplies, and assists the batteries in all matters concerning supply.

③ *The battalion maintenance section* performs all organizational maintenance functions that are not within the capability of, or authorized to be performed by, the batteries. Organizational maintenance of Lance-peculiar equipment and the turn-in of items for periodic calibration are also functions of the maintenance sections.

④ *The battalion ammunition platoon* has one assembly and transportation section and two transport sections and is organized to perform both conventional and special ammunition supply and resupply to the batteries of the battalion.



3-4. Firing Battery

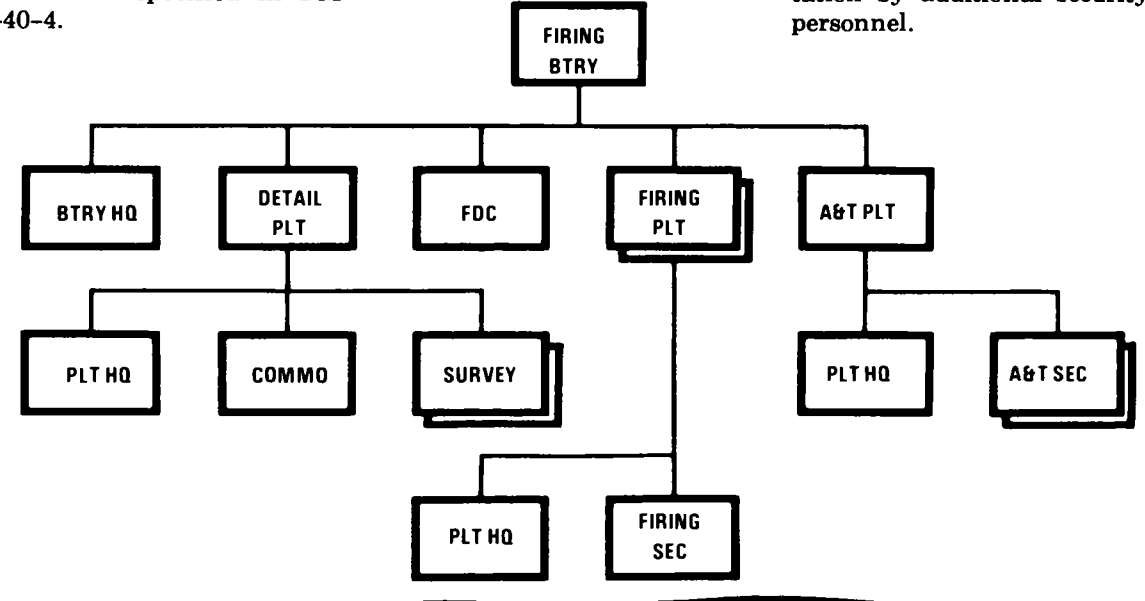
The mission of the firing battery, Lance, is to provide the firing component of the Lance battalion. The battery is composed of the battery headquarters, detail platoon, fire direction center, two firing platoons, and the assembly and transport platoon. Each firing platoon consists of a platoon headquarters and one firing section with one launcher. The functions performed by the Lance battery are the same as those for other artillery organizations, with the following modifications:

FIRING BATTERY, FIELD ARTILLERY BATTALION, LANCE

The field artillery batteries depend on the support elements of the battalion for administrative support. The batteries are responsible for internal communications, survey, and battery maintenance. The firing battery is capable of performing its tactical mission as a firing unit if it is provided with the elements contained in the call for fire as specified in FM 6-40-4.

The assembly and transport platoons of each firing battery are responsible for receiving, loading, transporting, and storing Lance missiles and for assembling those missiles relatively close to the firing section. This platoon is composed of a platoon headquarters and two assembly and transport (A&T) sections. Each section is capable of supporting one firing platoon.

Individuals of this organization can engage in effective, coordinated defense of a unit's area of installation. However, simultaneous defense of the perimeter and performance of the unit mission cannot be accomplished. Additionally, perimeter defense and field storage sites require augmentation by additional security personnel.



Section II. DUTIES OF KEY PERSONNEL

The duties of key personnel closely parallel those in other artillery organizations. The following paragraphs list some of the major duties of key personnel of the Lance battalion and are not intended to be all inclusive. Those duties peculiar to Lance are printed in ***italics***.

3-5. Battalion Commander

The battalion commander is responsible for everything his command does or fails to do. Assisted by his staff, he controls all the tactical, logistical, and administrative activities of the battalion. He makes provisions for uninterrupted perpetuation of the chain of command in his organization by prescribing the succession of command for all contingencies. He is responsible for the accomplishment of his command's assigned mission.

Tactical responsibilities.
The commander establishes policies and plans and supervises the tactical employment of his battalion to include:

- Reconnaissance, selection, and occupation of position (RSOP).
- Fire direction, detailed coordination, and integration of available fire support with the plan of operation of the supported unit.
- Maintenance of liaison with the supported or reinforced commander by direct contact or by representation.
- Provision of continuous reconnaissance for routes and position areas.
- Maintenance of current information concerning the enemy situation and the situation of the supported force.
- Security of nuclear weapons.
- Communications and electronic security.
- Readiness of his battalion to operate in an NBC environment.

Training.
The battalion commander is responsible for the training of his unit. He directs the training program for the battalion and, assisted by his staff, coordinates the training of his unit with the next higher headquarters. He supervises the training by making frequent personal inspections and by analyzing the reports of inspections conducted by his staff officers and battery commanders.

Discipline.
The battalion commander instills discipline in his battalion by leadership and by personal example. He closely supervises the mental, moral, and physical training of his men.

Morale.
By personal action and through his staff and subordinate commanders, the battalion commander gives close attention to building and maintaining the morale of his unit. He prescribes a fair and uniform policy governing promotions, leaves of absence, decorations and awards, and duty assignments, and insures the efficient operation of the personnel support system. Through appropriate staff elements, he obtains for his battalion the best available quarters and rations, recreational equipment and programs, religious services, postal facilities, and services of the various welfare agencies. By means of personal inspections, and with the assistance of the battalion medical personnel, he controls sanitation, personal hygiene, and health.

Administration.

The battalion commander organizes and employs his staff to insure efficient administration of his battalion. The staff relieves the commander of the preparation of records and reports. The commander makes frequent inspections to insure that his administrative policies are followed, that the unit dining facilities are sanitary and properly operated, that living quarters are adequate, and that workload priorities are established.

Supply and maintenance.

Proper supply and maintenance procedures assist the battalion commander in maintaining the combat efficiency of his unit. The battalion commander normally discharges his supply responsibilities through the S4. The commander supervises supply activities, however, to see that his supply policies are followed, that supply discipline is maintained, and that his battalion is supplied with the appropriate classes of supplies in the correct amounts. He provides for the training of all personnel in supply economy. He insures that ammunition supply is adequate and that basic loads are maintained. By means of command inspections, he insures that the authorized weapons, vehicles, and other equipment are on hand and properly maintained. In addition, he may request technical inspections and technical assistance from supporting combat service support organizations.

★3-6. Battalion Staff

The semi-independent operations, level of deployment, the complex technical equipment, and the importance of the mission of the Lance battalion combine to require a high degree of professional military and technical skill.

The battalion commander's staff is composed of the executive officer, S1, S2, S3, S4, assistant S3, CESO, liaison officer, surgeon, chaplain, reconnaissance and survey officer, and command sergeant major. Duties of these staff members are the same as those of any field artillery battalion staff, with the following considerations:

In addition to his specific staff duties, *the S3 transmits fire mission data to Lance firing batteries and an alternate battery, if appropriate, and perform technical and tactical fire direction as required. He also coordinates the survey activities in the battalion with the reconnaissance and survey officer and coordinates the battalion's survey requirements with higher or adjacent headquarters.*

The command sergeant major is the battalion commander's senior enlisted adviser. Because of the large separation distances between units, the battalion commander will seldom have time to visit his units. Therefore, he must rely on the CSM as his second pair of eyes.

3-7. Battery Commander

The battery commander is responsible for everything his command does or fails to do. When a battery is not under the command and control of a field artillery battalion, the responsibilities of the battery commander are comparable to those of a battalion commander. When a battery is under the command and control of a field artillery battalion, the battery commander is responsible for:

- Insuring that the battery accomplishes its mission.
- Training the battery for combat readiness in conformance with the battalion training program and for attaining the prescribed training objectives.
- Maintaining materiel and equipment.

- Maintaining high standards of discipline and morale.
- Preserving the health and physical fitness of battery personnel.
- Insuring adherence to proper safety precautions.
- Insuring that the battery functions in accordance with regulations and policies of higher commanders.
- Keeping the battalion commander and the personnel of his battery informed of the current situation.
- Establishing and maintaining a high degree of nuclear, communications, and electronic security.
- Managing his personnel assets in accordance with established personnel programs.

In carrying out his command responsibilities, the battery commander will:

- Personally plan, participate in, and supervise training to the maximum extent consistent with his other duties.
- Make frequent inspections to insure that his orders are being carried out; that living quarters are adequate and well policed; that food is appetizing, properly prepared, and served on time; and that routine work is equitably distributed.
- Make himself available, under appropriate conditions, for conferences with battery personnel on matters of a personal nature.
- Administer military justice.
- Give attention to the assignment of personnel to insure placing the right man in the right job.
- Insure the responsiveness of the personnel support system to the needs of the individual.
- Instruct and cross-train key subordinates in their duties.
- Maintain a troop information program.
- Emphasize the maintenance and proper use of all equipment.
- Insure application of the principles of supply economy.
- Delegate authority to his officers and noncommissioned officers consistent with their positions and the efficient operation of the battery.

The plans and orders of the battery commander are based on those received from the next higher commander. The plans set forth a logical sequence of steps that must be taken by each subdivision of the battery at appropriate times to enable the battery to perform its mission properly. Brief and informal oral orders are employed by the battery commander. They should fit each specific situation, not merely refer to a checklist or repeat standing operating procedure (SOP).

3-8. Battery Officers

The platoon leaders throughout the battalion perform all the command functions normally required at the platoon level, to include important tactical, technical, and supply functions. It is imperative that officers assigned these responsibilities be technically qualified in all of the tasks of their sections and be able to perform their duties with a minimum of supervision. Additional duties unique to Lance battery platoon leaders are discussed below.

***The detail platoon leader** is responsible for and supervises the establishment of all internal and external communications. Additionally he is responsible for all of the battery's survey requirements. During combat operations he normally assists the commander with survey reconnaissance.*

***The assembly and transport platoon leader** is responsible for the resupply of ammunition and missiles and for missile assembly.*

***The firing platoon leader** has specific responsibilities during firing, which include*

verification of the lay of the missile, warhead settings, monitor-programmer setting, and arming of the missile.

3-9. Noncommissioned Officers

The duties of key noncommissioned officers are comparable to those in similar positions in other field artillery units. The following responsibilities require emphasis.

The first sergeant, as the battery commander's senior NCO, coordinates all activities in the battery position, advises the commander on tactical and personnel matters, and assists in RSOP operations. In addition, working directly with the executive officer, he plans, coordinates, and supervises battery defensive operations.

The firing platoon sergeant coordinates platoon operations, assists the platoon leader in performing his duties, *and is responsible for technical operations required to lay the missile.*

The assembly and transport platoon sergeant coordinates platoon operations and assists the platoon leader in performing his duties. He is responsible for the inspection and maintenance of the equipment organic to the platoon headquarters.

The firing section chief is responsible for:

- Training and efficiency of the firing section personnel.
- Performance of duties in section drill outlined in TM 9-1425-485-10-2, appendix C.
- Inspection and maintenance of all section equipment.

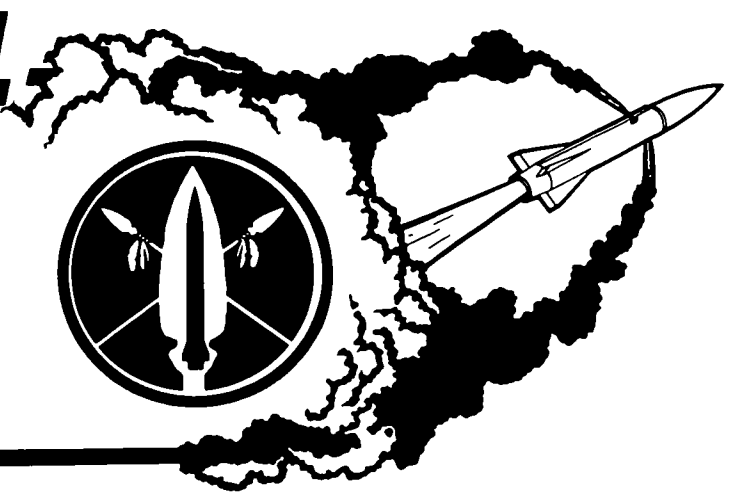
The assembly and transport section chief is responsible for:

- The training and efficiency of A&T section personnel.
- *Receiving, storing, transporting, and assembling missiles and converting from one launcher configuration to another (SPL to LZL), and assisting the firing section in loading or offloading the launcher.*
- Inspection and maintenance of all section equipment.
- Performance of those duties prescribed in TM 9-1425-485-10-2, appendix C.

The detail platoon sergeant will function as the reconnaissance NCO.

CHAPTER 4

Tactical Considerations



4-1. Fundamentals of Offense

The ultimate outcome of any combat is determined by offensive operations. To be successful, the attacker must concentrate superior combat power at the decisive time and place. Lance, because of its immense firepower, can be a key ingredient to that combat power.

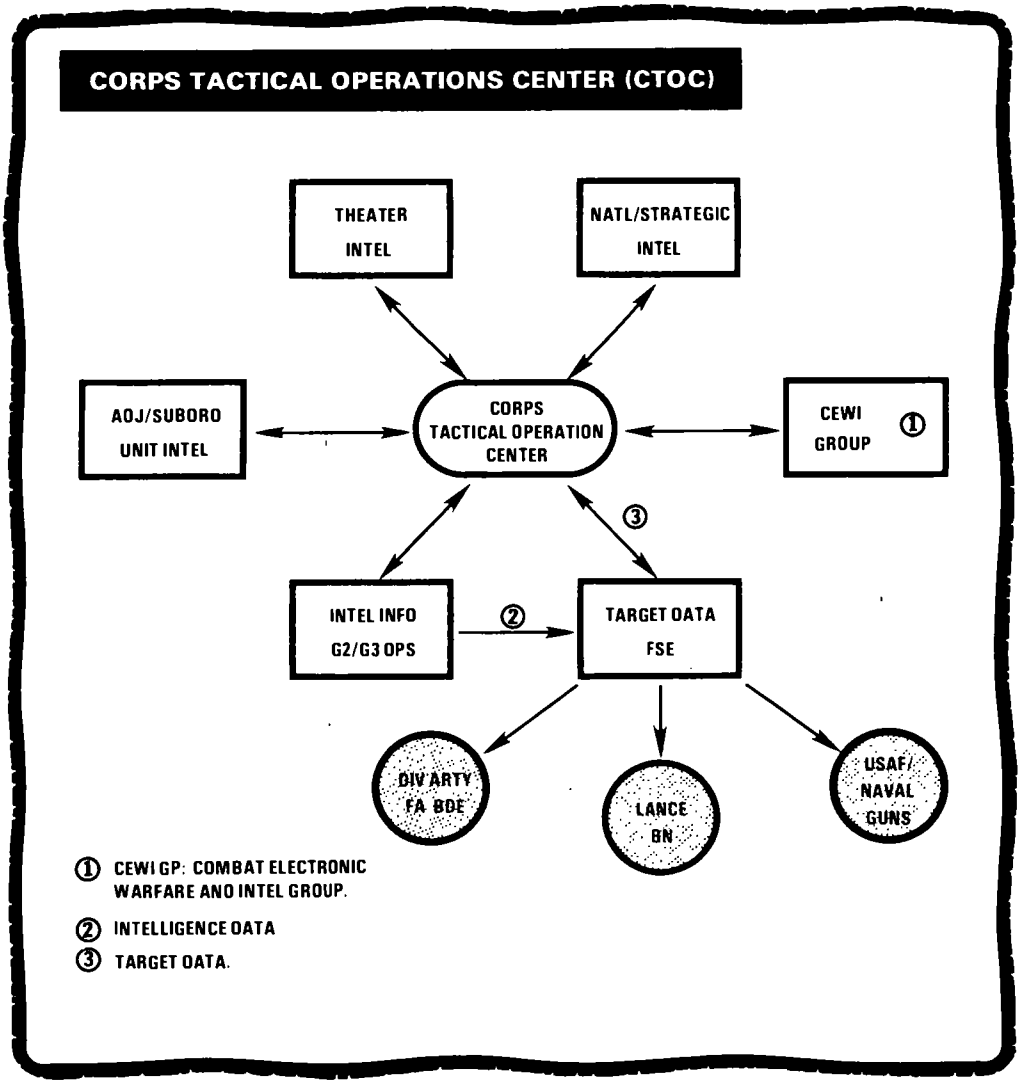
To employ Lance effectively on the battlefield, the system must use the same rules of combat as the maneuver force. Each of these common fundamentals will be addressed as they apply to Lance.

- **See the Battlefield**
- **Concentrate Overwhelming Combat Power**
- **Suppress Enemy Defensive Fires**
- **Shock, Overwhelm, and Destroy the Enemy**
- **Attack Deep Into Enemy Rear to Destroy His System of Defense**
- **Provide Continuous, Mobile Support**
- **Maintain Operational Security**

See the battlefield.

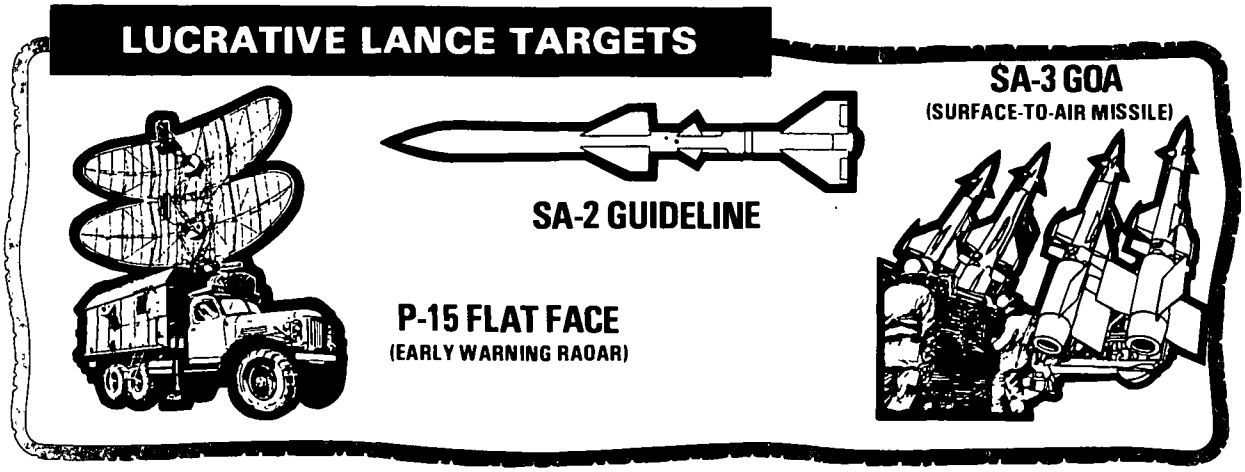
Successful employment of Lance will depend on the reliable, timely, and aggressive acquisition of appropriate targets. Target acquisition agencies must actively and aggressively seek suitable targets for engagement by Lance. Because of its range, acquisition of targets beyond the capability of forward observers is necessary; therefore, sound and flash ranging will be an important

tactical consideration. The Lance target acquisition effort will focus on the corps tactical operations center (CTOC). At the corps and division fire support elements (FSE), the individual responsible for extracting target data from these agencies is the artillery intelligence officer. He is the keyman in the targeting effort. Personnel responsible for acquisition of Lance targets must understand system capabilities thoroughly and must be able to identify appropriate targets for attack.



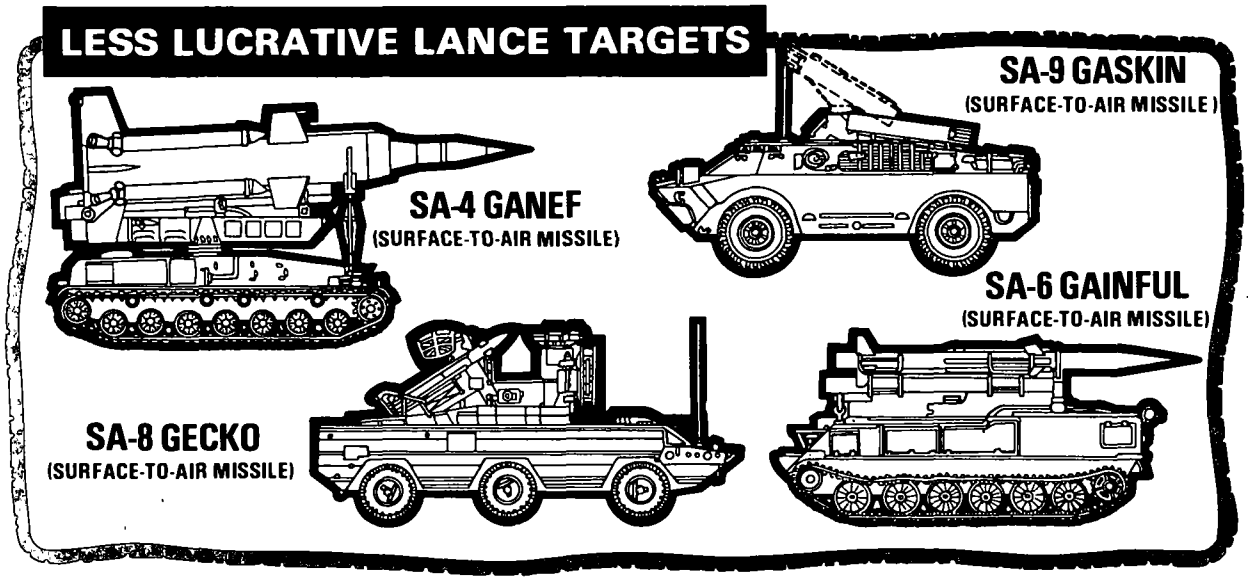
Concentrate overwhelming combat power.

Lance makes a critical contribution to the concentration of combat power. The range of the system can be exploited to achieve mass firepower. Several Lance firing units could provide time on target: massive engagement of individual targets or groups of targets. Massing of fires would be appropriate for attack of a target by NNL and individual targets of a group may be simultaneously fired upon with nuclear Lance.



Suppress enemy defensive fires.

Concentrated attack forces are vulnerable to enemy firepower. Accordingly, the attacker must make suppressive strikes of such intensity and duration as to substantially degrade the effectiveness of enemy weapons in the critical area. Air defense suppression is a prerequisite to close air support. Thus, Lance units can aid in the suppression of air defense targets. Lance can be employed effectively against relatively stationary ADA facilities such as target acquisition radar sites, stationary missile sites such as SA-2 and SA-3 plus ADA command and control elements. Normally, Lance should not be considered for engagement against highly mobile ADA targets (SA-4, SA-6, SA-8, or SA-9 launchers) unless launchers have been massed around relatively stationary facilities such as river crossing sites or forward prestock points. Lance also has the capability to engage enemy surface-to-surface missile sites. Known position areas can be engaged effectively, but it is reasonable to assume that launch points will be transitory and probability of damage will be limited.



Shock, overwhelm, and destroy the enemy.

Lance units firing out of carefully selected, secluded, and concealed firing points can surprise the enemy with violent and destructive firepower.

Attack deep into enemy rear to destroy his system of defense.

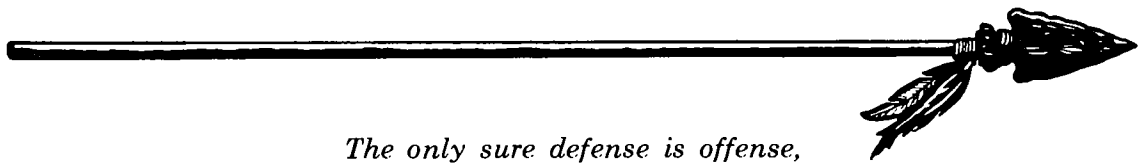
Because of the system's long range and high mobility, Lance can effectively support this fundamental of the offense. In the conventional role, Lance units can attack relatively soft and deep targets such as enemy combat support, engineer, signal, and artillery units and command and control facilities. Attacks of this nature will disrupt enemy command and control, interrupt the flow of fuel, ammunition, repair parts, food and other necessities, and interfere with enemy air defense and artillery support. As a bonus, these attacks will affect the morale of the enemy, increase the burden on the enemy medical and transportation systems in support of wounded, and cause rear area units to take additional defensive measures. In the nuclear role, Lance can attack any lucrative target on the battlefield.

Provide continuous, mobile support.

Continuous fire support for the offense can be provided because of the excellent range capability of the system. The Lance commander can position firing points in such a manner as to provide continuous support for the maneuvering elements. The system is also highly mobile. However, constant movement may result in enemy detection of position areas or engagement of march units during convoy operations. Movement, when necessary, should be conducted under the cover of darkness, fog, or inclement weather. It is not advisable to move Lance units during daylight when likelihood of discovery is high.

Maintain operational security.

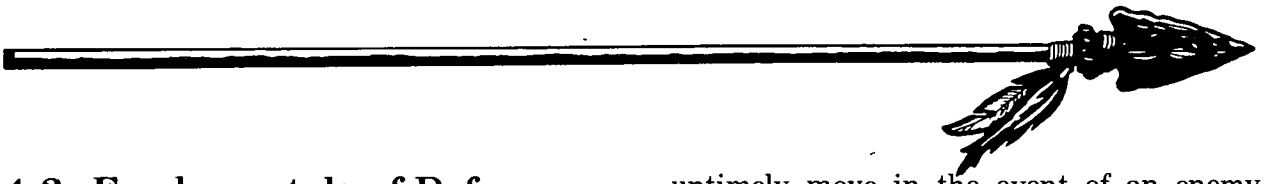
In offensive operations, the battalion must decrease vulnerabilities to enemy intelligence and target acquisition and maintain the elements of surprise and security. To this end, the commander must consider all means of operational security (OPSEC). The Lance commander must frustrate the enemy's ability to collect information about this battalion by careful use of terrain, camouflage, night operations, and communication security. Additionally, unit and platoon displacements must be carefully planned and executed to prevent detection of the battalion by the enemy. A detailed discussion of OPSEC is included in chapters 7 and 8.



The only sure defense is offense, and the efficiency of the offense depends on the warlike souls of those conducting it.
—GEN George S. Patton, Jr.

OFFENSIVE CONSIDERATIONS

MANEUVER	TARGETS	EMPLOYMENT CONSIDERATIONS	EMPLOYMENT RESTRAINTS
Movement to Contact.	Suppressive fire on enemy fire support and fixed air defense sites.	Launcher platoons over firing points, boresighted, and laid in general direction of suspected targets. Fast suppressive fires can be delivered.	1. System has an on-carriage traverse limitation of 285 m with the nuclear warhead and 400 m NNL. Any change of target outside of traverse limits will require repositioning of the launcher. 2. Premature use of Lance could expose unit locations, thus preventing their use for the main attack. 3. Not considered appropriate for use below division.
Hasty/Deliberate Attack.	Mass fire on second echelon forces: Army or Div Reserves, airfields, FROG, Scud, and Cannon units, C&C elements.	1. Firing positions must be selected well forward in order to support the main attack and breakthrough. 2. Target locations should be determined and published in advance to allow Lance commanders maximum flexibility in selection of position areas. 3. Preplanned targets are best suited for engagement by Lance. 4. The FSCOORD can use Lance to "weight the main attack." 5. Excellent range gives the commander maximum flexibility to mass fires.	1. Lance cannot be effectively used against fleeting targets. 2. Because of CEP, Lance cannot be effectively used for targets on or near the FEBA.
Exploitation.	Swiftly attack enemy choke points such as river crossing sites and road intersections.	1. Commanders must select positions well forward. 2. Excellent range can be used to deliver fire on targets deep within enemy territory; targets that may be beyond the range of conventional artillery.	1. Resupply of missile rounds is an important consideration especially NNL. 2. Fleeting targets cannot be effectively engaged. 3. Prior to conducting air mobile operations, commander must consider use of forward firing points.
Pursuit.	(Same as above)	(Same as above)	The fast moving situation may limit the selection of appropriate firing points and prevent accurate targeting.



4-2. Fundamentals of Defense

An enemy attack can be made to fail with a well-conceived, vigorous, active defense that maximizes combat power. Again, just as the maneuver forces use the following fundamentals in their plan for defense, commanders and fire support coordinators must understand them as they apply to Lance.

- **Understand the Enemy**
- **See the Battlefield**
- **Concentrate at Critical Times and Places**
- **Exploit the Advantages of the Defender**
- **Fight as a Combined Arms Team**

Understand the enemy.

Section II of chapter 1 describes the opposing force we are likely to face both in Europe and other parts of the world. Regardless of the enemy faced, commanders and staff officers must study the enemy's weapons, tactics, and techniques for using them.

See the battlefield.

To offset the numerical superiority of the attacker, our Army must "see" the battlefield accurately. An outnumbered defender must know where the enemy is making his main effort. Only then can he concentrate his combat power at the decisive place and time. The coordination of intelligence gathering and the use of all-source intelligence is the commander's personal responsibility.

Concentrate at critical times and places.

During the defense, Lance units should be positioned well to the rear to prevent an untimely move in the event of an enemy penetration. In placing the Lance battalion, commanders must take advantage of the system's long-range capability. To reach targets deep in the enemy rear, several firing points may be established well forward. Unit positions, however, must be well to the rear in carefully selected areas. These positions must allow for good cover and concealment. Selection of positions along suspected enemy avenues of approach should be avoided. By preventing untimely moves, Lance firepower will always be available at the critical time and place.

Exploit the advantages of the defender.

The advantages that naturally accrue to the defender stem from his ability to know the terrain and to use it to his advantage. Therefore, commanders should position Lance units in such a manner that they can engage the attacker with mass fires. In addition, Lance commanders should take advantage of the static situation existing during the defense and insure that all firing points have been surveyed using the best possible control. Naturally, if survey control is available, it should be used. Directional control should also be doublechecked if time permits.

Fight as a combined arms team.

Enemy air defense sites can be suppressed by Lance units to allow friendly aircraft to attack more lucrative targets, thus emphasizing the role of Lance as a member of the combined arms team. Lance units cannot be employed effectively against fleeting targets such as ADA mobile launchers. Stationary radar sites, ADA command and control elements, and fixed launch sites are excellent targets for Lance.

4-3. Lance Fire Support Requirements in the Defense

Centralize control of Lance fire support.

Because of the vagueness of the initial situation, the defending commander must control sufficient firepower to influence the battle. In this situation, Lance units are normally maintained under corps control because of their excellent range capability. The force commander must retain control of these units in order to maximize the capability to deliver rapid, massive fire support to the critical portion of the battlefield. Additional discussion of tactical missions suitable for Lance battalions is included in chapter 5.

Use Lance's mobility.

The system possesses excellent mobility to move rapidly throughout the battlefield. Commanders must realize, however, that continuous unit displacement may increase vulnerability to enemy attack and degrade overall responsiveness. Lance units can more effectively support defensive operations and avoid detection by limiting displacement and by using good camouflage techniques. Lance may become the force commander's "ace in the hole," meaning that all possible measures must be taken to insure the survivability of the system. Rather than unit displacement, the commander may want to take advantage of the system's ability to evacuate a firing position rapidly after a round has been fired and move to another firing point—the "shoot and scoot" technique. A well-trained firing crew can perform post-firing checks and march order in a matter of minutes after firing. The firing unit can then rendezvous with a loader-transporter, reload, and move to a subsequent firing position in preparation for another mission. In this situation unit commanders must select many external firing points at distances from the battery position that prevent enemy detection of the position area and maintain a high level of unit responsiveness.

Engage targets on the basis of the commander's priorities.

Lance units should not be wasted on low priority targets. The fire support coordinator (FSCOORD) must take special care to insure that Lance is used to attack only the most lucrative targets.

Engage the enemy as far forward as possible.

Lance possesses excellent capability to engage targets at great range. Lance units can be used to engage the enemy in his staging areas as he prepares for the attack and at chokepoints along his routes of attack.

4-4. Lance Tactical Considerations in Covering Force Operations

Positioning.

A representative number of Lance firing elements can be positioned near the FEBA to provide the covering force with adequate fire support. Lance has the capability to be airlifted to firing points forward of the FEBA to engage long-range targets. However, increased security risks, inadequate communication, availability of surveyed firing points, and lack of logistical support limit use of this method. All necessary tactical and logistical support will be provided by the parent battery that is operating behind the FEBA. Under no circumstances should complete Lance firing batteries be moved forward of the FEBA.

Control of Lance in support of covering force.

The corps commander may elect to give up some of the control of his Lance assets by assigning a Lance battalion a mission of GSR to the covering force artillery. This would provide the CF commander a quick-fire channel for Lance fire support. The corps commander may also consider a nonstandard mission such as "dedicating" the fires of a single Lance battery to support the CF, or he

TARGET LIST

LANCE TARGETS IN SUPPORT OF THE COVERING FORCE

- **Enemy main thrust**
- **Second echelon enemy forces**
- **Enemy supplies**
- **Ammunition supply points**
- **POL points**
- **Indirect fire support**
- **Air defense installations**

may designate an ammunition allocation for the CF. When dedicating Lance fires, the force commander must exercise caution due to the scarcity of Lance assets. In a rare circumstance, he might reinforce the CF artillery with a Lance battalion. In this case, he would give up control of his long-range artillery with a major battle developing.

4-5. Lance Fire Support in the Main Battle Area (MBA)

The force commander must focus his fire support effort on the threat's main thrust when and where it occurs. Accordingly, he must position Lance units in such a manner as to give adequate coverage of the entire MBA. He may, however, weight a portion of the MBA if he feels the major battle will be fought there. The commander and the FSCOORD use these considerations when employing Lance in the defense.

Centralized control of fire support.
During the defense, the vagueness of the initial situation dictates that the commander maintain control of sufficient fire support means to react quickly when he discovers the enemy's main thrust. This means that the commander must retain sufficient control of his long-range artillery by assignment of a GS mission to the battalion. A GSR mission is also appropriate; however, the corps commander may want to control ammunition expenditures. By giving the division an ammunition allocation, he insures that adequate ammunition is retained for his own use.

Lance targets in the MBA.
Long before the covering force fight begins, the FSCOORD will develop recommendations for Lance MBA support. He must wargame the enemy's main thrust against the front. During covering force

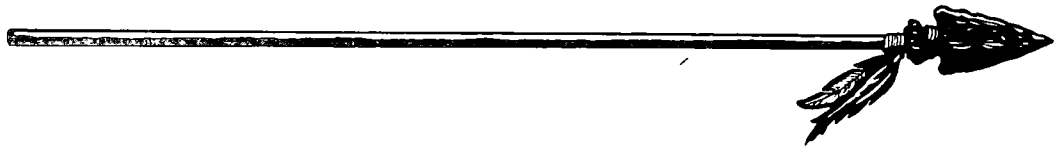
operations, he will obtain the locations of terrain that will support relatively large enemy targets. Potential chokepoints, critical road intersections, and river crossing sites should be analyzed as possible Lance aiming points. As the main battle develops, the FSCOORD will update these aiming points with current intelligence to insure that targets actually exist on the selected points. Again, target information must be forwarded to the Lance battalion to update their planning efforts. The target list on page 4-8 is also representative of the types of MBA targets.

Other considerations for Lance support of the MBA.

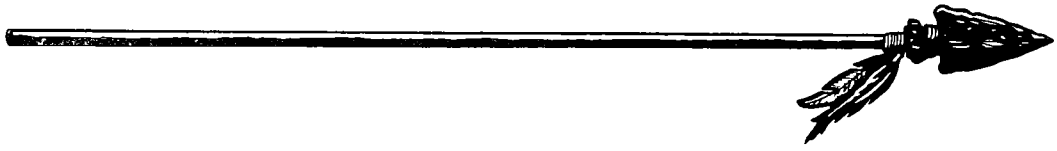
If the enemy penetrates our lines, the commander should consider using Lance in conjunction with close air support to isolate the enemy's first echelon and prevent the second echelon from joining the fight. Lance can also be planned for use in a counterpreparation. The commander can also use Lance to disorganize command and control, break up second echelon formations, and impair the enemy's offensive spirit.

DEFENSIVE CONSIDERATIONS

DEFENSE OPERATIONS	TARGETS	EMPLOYMENT CONSIDERATIONS	EMPLOYMENT RESTRAINTS
Covering Force.	Second echelon elements, chokepoints, mass troop concentration, ADA site (fixed), indirect fire weapons.	1. Select firing points well forward near the FEBA. 2. Allow the CF commander representative Lance artillery support by a quick fire support channel, allocation, or dedication. 3. Lance aiming points can be developed.	Lance firing batteries should not be moved forward of the FEBA. Firing elements rarely will need to move forward of the FEBA.
Defense in Sector.	In addition to the above: Counterpreparation and isolate enemy in the penetration.	1. Centralize control. 2. Position units to provide coverage of the entire MBA. 3. Refine targets determined in CF operations. 4. Position units to the rear.	Indiscriminate use of NNL could result in enemy location and targeting of unit location. See chapter 6 on the use and discussion of Lance response postures.
Economy of Force.	Attack deep targets. Same criteria as above.	Target information must be forwarded to Lance commander in advance to allow preparation of fire support into the economy of force sector.	Lance units have limited use in this role. Engagement of long-range targets is appropriate but close support would not be practical.
Retrograde.	Same as above.	1. Position well to the rear to prevent untimely moves. 2. Units must be given timely displacement orders to insure continuous fire support and establishment of firing points.	Hasty moves during daylight make the unit extremely vulnerable to air attack and may disrupt fire support.



The best protection against the enemy's fire is well directed fire from our own guns.
—ADM David G. Farragut



4-6. Summary

Because of the system's excellent mobility, range, and flexibility, Lance can be successfully employed in most tactical situations. The system's capabilities can be greatly enhanced by careful employment techniques. Some of the important considerations mentioned in this chapter have been positioning, appropriate targeting, and command and control. The Lance missile system is designed to supplement other fire support assets by providing effective long-range nuclear and nonnuclear fires to the battlefield. To that end, commanders and FSCOORDs must realize that the considerations for its employment are separate and distinct from that of cannon field artillery.

CHAPTER 5

Tactical Missions

5-1. Lance Tactical Missions

Fire support responsibilities for Lance battalions are designated by the tactical mission assigned. These missions are assigned by the force commander on the recommendations of the force field artillery commander and are published in the force's operations order and fire support annex. With few exceptions the standard field artillery tactical missions that apply to cannon FA apply also to Lance battalions.

General support (GS).
Due to its greater range capability and its massive destruction potential, a Lance unit is normally assigned the mission of general support. This mission allows the force commander to exercise maximum control of the system's capabilities—both nuclear and nonnuclear. It also insures that the force commander will have a weapon system immediately available to him to add depth to the battlefield and/or influence the battle.

General support reinforcing (GSR).
Lance units are also suited for the assignment of a general support reinforcing mission, specifically to augment the fires of an artillery brigade or division artillery. By assigning a Lance unit the GSR role, the force commander has relinquished some of his control over the unit in order to provide his subordinates the means to fire Lance rounds allocated/assigned to their commands.

Reinforcing (R).
The mission of reinforcing will rarely be assigned to a Lance unit. However, if the situation dictates that it is to the force commander's advantage to give up control of his primary long-range artillery, the Lance battalion is capable of fulfilling the inherent responsibilities associated with a reinforcing mission.

Direct support (DS).
A direct support mission is inappropriate for Lance. Destructive power potential, larger circular errors probable (CEP), and relatively

slower rates of fire preclude a Lance unit from providing the type of fire support required by committed maneuver units.

5-2. Considerations in Mission Assignment

When assigning Lance battalions a tactical mission, some unique characteristics must be considered:

Calls for fire will be initiated by the fire support element of the supported force (corps). The FSE will transmit the call for fire to the battalion over the command/fire net. Normally, the battalion will select the battery to fire. However, in some instances the FSE may designate the battery to fire in order to achieve a specific effect on the target. The call for fire is in turn transmitted to the firing platoon.

With respect to the *zone of fire,* the Lance battalion may be required to fire beyond the zone of action of the supported force. For example, higher headquarters may call for fires across unit boundaries into the area of an adjacent force or forward of their area of influence. Because of longer range capabilities, this possibility is much greater for missile units.

Although *liaison* is not required, it is a definite advantage to establish liaison with the corps FSE when the battalion is given a GS mission. Through the liaison officer, recommendations on capabilities and limitations of the unit can be given to the corps commander and staff. The liaison officer also provides information to the battalion on the future plans of the supported force, changes in present situation, and other information to keep the battalion up to date and responsive. A liaison officer will *always* be provided to the reinforced unit when the battalion is given a GSR mission.

As applied to Lance, there is no inherent requirement to establish external *wire communications;* however, a definite need exists for a radio link between the battalion and its supported force headquarters or the reinforced FA unit.

Positioning of units is critical due to their high priority as a target and their limited ability to defend themselves. Recommendations provided by the Lance battalion commander through the battalion liaison officer are used by the force FA commander in the selection of general position areas. It is then the responsibility of the battalion to select specific battery locations and firing points. These battery locations are forwarded to the force FSE for its use.

Normally, the *fires* of Lance battalions will be planned by the FSE of the supported force. These fires, whether nuclear or nonnuclear, are included in the force fire support plan. On occasion, targets of opportunity may be engaged dependent upon the unit's state of readiness. Input from the reinforced FA unit will be incorporated into fire support plans as appropriate.

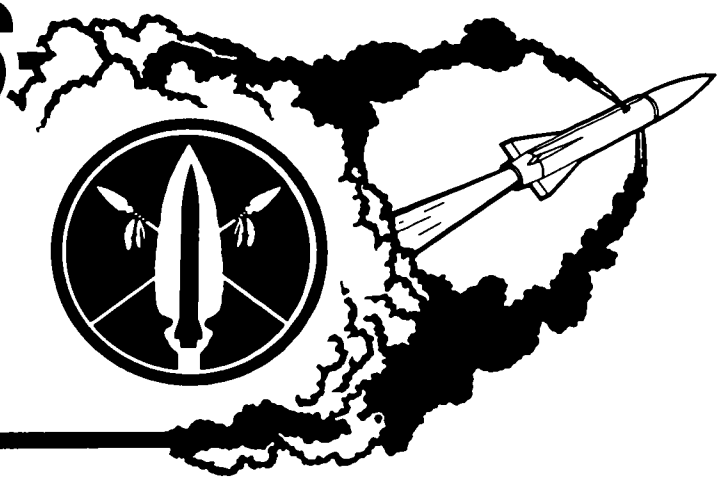
LANCE FIELD ARTILLERY TACTICAL MISSIONS (INHERENT RESPONSIBILITIES)

A Lance unit with a mission of—	Reinforcing (R)	General Support Reinforcing (GSR)	General Support (GS)
1. Answers calls for fire in priority from—	1. Reinforced FA unit 2. Force FA HQ	1. Force FA HQ 2. Reinforced FA unit	Force FA HQ
2. Has as its zone of fire—	Zone of fire of reinforced FA unit	Zone of action of supported unit that will include zone of reinforced FA unit	Zone of action supported unit
3. Furnishes fire support team (FIST)—	N A	N A	N A
4. Furnishes LO—	To reinforced FA unit HQ	To reinforced FA unit HQ	*To supported unit (optional)
5. Establishes communications with—	Reinforced FA unit HQ	Reinforced FA unit HQ	
6. Is positioned by—	Reinforced FA unit or as ordered by corps	Force FA HQ or reinforced FA unit if approved by force FA	Force FA HQ
7. Has its fires planned by—	Reinforced FA unit HQ	Force FA HQ	Force FA HQ

*Inherent responsibility altered for Lance.

CHAPTER 6

Lance Employment: Corps Level



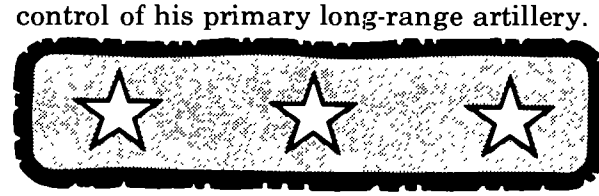
The primary responsibility of the corps commander is to bring about a winning concentration of force at the point of actual combat. He must be concerned with force ratios and the means of altering them in his favor. The firepower of the Lance missile unit is but one of the many resources available to him to accomplish this task. It allows him to concentrate overwhelming combat power and to decisively engage the enemy when and where he chooses. This chapter describes the tactical and logistical considerations that are important for the corps commander and his staff to understand in order to employ the Lance weapon system effectively.

6-1. Command and Control

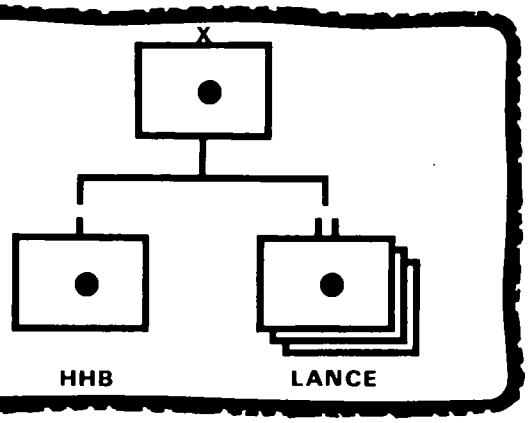
Based on the corps mission, one to five Lance battalions may be assigned to a corps. In addition to the corps field artillery section (FAS), field artillery brigades will be available within the corps to provide command and control for the Lance battalions as appropriate. Depending on the supported force's mission, the target acquisition capabilities of that force, and the organizations available for control, Lance units may be organized for combat as follows:

Corps.

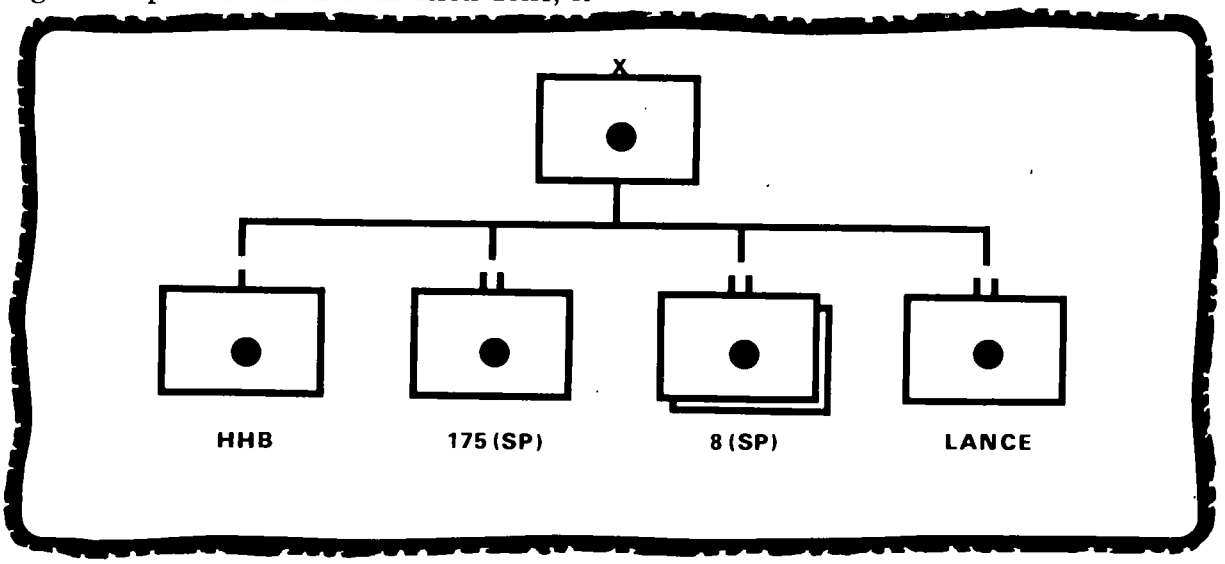
Separate battalion. When a Lance battalion(s) is assigned to the corps and not further assigned to a field artillery brigade or to subordinate maneuver units, the battalion is under the control of the corps field artillery officer (07). To assist him in accomplishing his tasks, there is a corps field artillery section organic to the corps HHC. The FAS has operational control over the battalion along with the responsibility for planning and coordinating fires. Tactical missions normally assigned to a Lance unit are *general support* or *general support reinforcing*. When assigning missions at this level, the primary consideration is whether or not it is to the corps commander's best interest to relinquish control of his primary long-range artillery.



Lance attached to a field artillery brigade. Lance battalions may be attached to field artillery brigades to facilitate the process of organizing for combat as well as reducing the corps field artillery officer's span of control.



A field artillery brigade tailored to the extent that its attached units are all Lance battalions should be assigned the mission of *general support* of the corps. With the assignment of this mission, the corps field artillery officer has decreased his span of control while retaining the responsiveness of his long-range artillery. If a battalion of this brigade is positioned in a division zone, it may be appropriate to modify the brigade's mission to accommodate calls for fire from that division. In this event, the corps commander may desire to limit in some way the number of rounds expended at the division level to insure that some are available for his own use. Priority of fires would be retained at corps in any event.



A field artillery brigade consisting primarily of cannon artillery units with a minority number of Lance units attached would normally be attached to a division or given the mission of GSR or reinforcing a division artillery. From the standpoint of the Lance battalions, attachment to a division or reinforcing a division artillery is not a desirable tasking, since the capabilities of the battalion become focused on a relatively small zone of action. The availability of targets at division level suitable for attack by Lance is also to be considered. Nevertheless, if it is the intention of the corps commander to weight the attack/defense in a particular division zone with missile fires, the Lance

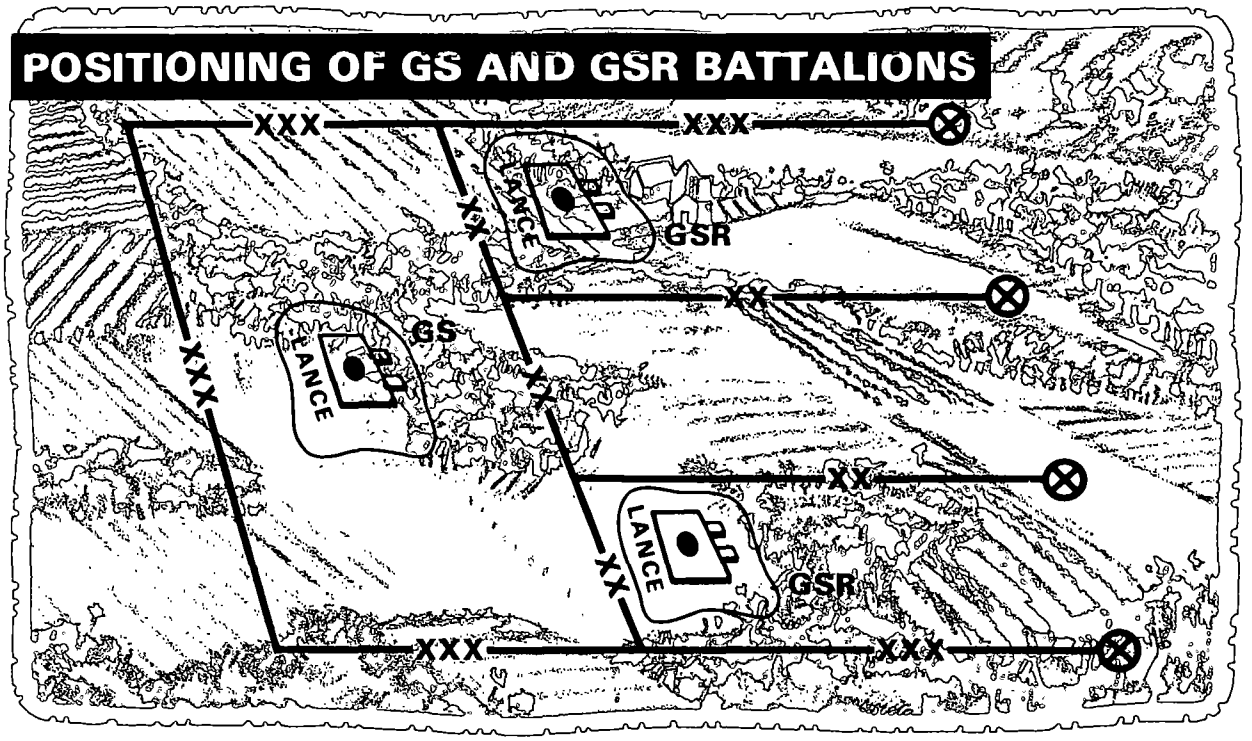
battalion has the capability to meet the requirements of this role.

Division.

Normally, a Lance unit is attached to a division *only* when the division is operating as an independent force. In this case, the Lance battalion operates under the command and control of the division artillery much as any other field artillery unit organic to the division. The mission of *general support* to the division is the only appropriate mission for Lance under these circumstances.

6-2. Positioning

In addition to organizing for combat, positioning of a Lance battalion is critical for its effective employment. It is the responsibility of the corps field artillery section to coordinate general position areas for the battalion when it is operating as a separate battalion or as part of a field artillery brigade retained under corps control. Since Lance units may operate within a division zone, close coordination with the division fire support element is important.



Selection of the battalion position area, as defined in the traditional "goose egg," is governed mainly by the mission, terrain, communication limitations, nature of tactical operation, and the need for dispersion as a protective measure. Also of importance is the fact that the Lance battalions are high in priority on the enemy's target list and thus may draw undue attention to neighbor organizations. Not so critical, but nevertheless a consideration for positioning, is the battalion's limited ability to defend itself against ground attack. Because of its capabilities, the Lance battalion may be singled out for extraordinary efforts by the enemy to put the organization out of action, and thus it is conceivable that air assault, airborne, or partisan units may be directed to attack a discovered Lance unit. Awareness of these factors is an important aspect of positioning.

6-3. Fire Support Planning and Coordination

The fires of the battalion are planned, coordinated, and integrated with other fires and with maneuver elements in accordance with existing principles for the employment of fire support as set forth in FM 6-20. There are, however, some principles/concepts that require further explanation and/or emphasis.

Organizations Involved.

When Lance has its normal tactical mission of general support, fire planning for conventional and special munitions is accomplished by *force field artillery headquarters* and the *force FSE,* as appropriate. The fire support coordination will be accomplished by the force artillery FSE. As the tactical mission changes, planning and coordination will be accomplished in accordance with the appropriate inherent responsibilities of that mission (see chapter 5).

At corps level, the field artillery section is responsible for planning and coordinating fires for Lance battalions operating as separate battalions or as part of the field artillery brigades under corps control. The FAS has the responsibility of providing guidance and supervision for the planning and execution of fire support. Specifically, the fire support element of the FAS receives and processes target acquisition information from all sources. This information is used to develop targets that are analyzed and then, based on the commander's guidance, assigned as appropriate for attack by Lance.

Normally, a field artillery brigade will do *no* fire planning or fire support coordination for its attached Lance battalions. For these functions, the brigade acts as a relay between the corps FAS and the battalion.

The fire planning and fire support coordination function of the Lance battalion is advisory in nature and is based on the tactical mission assigned to the battalion. In addition, the battalion is the "doer" of the process. At this level, fire plans are translated into specific assignments, such as which platoon will fire and from what firing point.

Planning.

Since Lance battalions generally remain under the control of corps, fire planning will be accomplished at corps level. It is the responsibility of the fire support element of the field artillery section to plan the use of Lance fires—both nuclear and nonnuclear. Fires are planned on all targets of interest to the corps as well as those that are beyond the capability of the divisions.

Critical also to the planning process will be the commander's guidance for the employment of nuclear and nonnuclear warheads of the Lance missile system. For nuclear employment of Lance, the commander's guidance should include:

- Tactical circumstances under which a request for Lance fires would be initiated.
- Yields to be expended.
- Desired effect on the enemy.
- Collateral damage preclusion criteria, troop safety criteria, and other employment constraints.
- Changes from the corps standing operating procedures (SOP).

In addition, guidance should be provided for the development of a "package" of nuclear weapons. See chapter 9 for a further discussion of this concept. For the employment of nonnuclear Lance, the commander's guidance is established essentially under the same criteria as used for nuclear employment except for such obvious items as yields and preclusion criteria.

Paragraph 3 of an OPORD will outline *how* the commander wants to use the firepower of Lance. If required, the *how* may be amplified by a fire support annex and appropriate appendixes. For example, the planning data for nuclear fire support may be published as the *nuclear support plan.* Since nonnuclear Lance warheads, like nuclear weapons, require an allocation and authori-

zation for expenditure and an announcement of the ammunition load for a specific operation, this planning data may require additional explanation in the format of an appendix to the fire support annex.

Coordination.

Fire planning is of little practical value if the coordination necessary to insure the successful execution of a plan has not been accomplished. Coordination is keyed on established principles (see FM 6-20). Some of these principles require further explanation as they relate to the Lance missile system.

Consider use of all available fire support means. Each FSCOORD considers the fire support available at his and higher levels and the command guidance for its use. Ideally, the weapon best suited for the job is selected for employment on a specific target. Sometimes, however, it will be necessary to use the most available system even though it is not the most effective system. This puts fires on the target "now." In the case of Lance fires, specifically NNL, the FSCOORD should not stereotype his thinking and discount the use of the missile because of CEP and reaction times. Some targets normally considered appropriate for attack by cannon artillery may, in terms of psychological effect, be successfully engaged by Lance. For example, Lance firepower could be used to attack enemy maneuver units confined to a small area because of a chokepoint.

Airspace coordination. The trajectory of the Lance missile is such that the firing of the weapon creates a hazardous condition to friendly aircraft over the battlefield. For this reason, the FSCOORD must provide input to those agencies and personnel engaged in airspace management at corps.

Provide rapid coordination. Because it is a missile system, Lance requires more time to engage a target than a cannon unit. Therefore, the FSCOORD must know the capabilities of Lance; he must have immediate information on the availability of Lance; he must insure that coordination channels are established and are functioning smoothly; and he must stay abreast of the battle as it develops in order to resolutely attack planned targets and targets of opportunity by Lance. Adherence to all of the preceding criteria enhances the reaction time for the missile system. Frequent use of warning orders to the Lance battalion will also insure timely use of the weapon.

Response Times.

Another key element in fire support planning and coordination of Lance fires is the time required to launch a missile. The time factor is dependent upon the method of employment, status of equipment, weather conditions, status of communications, training, and morale of personnel. Reduced visibility or extreme environmental conditions also increase the amount of time required to fire a mission.

The battalion commander is responsible for keeping the appropriate higher commander informed of the readiness status of the battalion. Information most critical to successful firing, planning, and coordination concerns firing battery positions, operational status of launchers, and availability of missiles and warheads.

For a more detailed discussion of response times, see chapter 7 and FM 6-42-1.

Fire Direction.

Corps FAS or the field artillery brigade will designate and transmit target information to the battalion over fire direction channels. Data furnished the battalion will include the elements contained in the call for fire specified in FM 6-40-4. For highly important targets, it may be appropriate for two sections to be assigned to one target—one section as the primary launch element with

the other as backup. For example, the target may be an enemy follow-on division that is temporarily stalled at a chokepoint. These additional reinforcements may be important enough to determine the outcome of the battle and their destruction *must* be guaranteed.

The Lance battalion S3, fulfilling his responsibility to provide tactical fire direction, normally will designate the battery to fire the mission. Computations required to convert firing data into fire commands are normally computed by the designated battery to fire but may also be accomplished by the battalion FDC.

Usually the battery commander will designate the firing position and the firing section to engage the target if not previously designated. The battery FDC will furnish the fire commands and other required data to the section in accordance with FM 6-40-4.

6-4. Weapons Mix

The term "weapons mix" as it pertains to Lance is the ratio of nuclear to nonnuclear warheads that will be transported by the Lance battalion as part of its basic load. In addition, weapons mix describes that number of weapons that will be available in the ammunition supply channel to replace missile ammunition expended by the battalion in prolonged combat.

Ammunition directly influences tactical operations. Therefore, tactical commanders must plan their operations and commit their forces with full awareness of the support capabilities of the ammunition service support structure. Likewise, combat service support commanders must establish, stock, and employ ammunition service units with full awareness of the operational plans of the supported tactical commanders. An imbalance of either tactics or ammunition service may decisively influence operations. Thus, weapons mix is a function of tactics and combat service support.

To determine the appropriate weapons mix in the battalion and in the supply channel to the battalion, the following must be considered:

Availability of Lance warheads and missiles. The theater commander is responsible for stating operational requirements for special weapons to the Joint Chiefs of Staff. Approval or modification of the stated requirements establishes special ammunition stockages, special ammunition loads, and special ammunition allocations for the corps. These assets are the basis for weapons mix determination.

Mission of the corps. On completion of his mission analysis, the corps commander provides his staff with his initial planning guidance. A critical element of the planning guidance is the commander's concept on the use of nuclear as well as nonnuclear Lance warheads during the forthcoming tactical operations.

Operational requirements. Weapons mix is also determined by the type of combat action anticipated. For example, in a defensive posture, we might plan to fire a nuclear package thereby requiring a greater proportion of nuclear weapons to be positioned with the Lance battalion.

Availability of launchers. The commander and his staff must also consider the number of Lance launchers available for use in any future operations. As an adjunct to this concept, the sustained rate of fire must also be considered. (Refer to FM 6-42-1.)

Command decision. The supply of missiles is a logistical action; however, expenditure is a matter of tactical command decision. The commander must decide whether to commit his supply of missiles or to hold it for future commitment based on his estimate of the situation. Nowhere is this concept more evident than in the firing of Lance. Consider the dilemma the commander

must face: Whether to expend his nonnuclear warheads early in the battle or to wait and use them at a time when the situation becomes more critical. Consider also the contention that using Lance launchers to fire nonnuclear warheads exposes the launch capability to early destruction by the enemy and thereby precludes their use if a decision is made to fire a nuclear package.

Unique class of supply. Missiles and missile warheads have many characteristics that distinguish them as a unique class of supply. For example, extensive security measures must be exercised to safeguard nuclear warheads. Tactical commanders and logistic planners must appreciate the significance of these characteristics and the influence that they exert on missile and warhead supply and expenditure control.

Priority of supply. Once a force is committed to combat, ammunition is the only means the tactical commander has to destroy the enemy. All other classes of supply and the remaining logistical effort merely support the tactical commander's ability to bring fire on the enemy by enhancing and coordinating the mobility of his forces. Considering the destruction potential of the Lance missile system and the capability it provides the commander to influence the battle, priority within the supply system for the Lance battalion is a must.

Response Postures. The organization and missile-carrying capability of a Lance battalion lend themselves readily to various response postures. Through the use of these postures, the force commander has the flexibility to rapidly adjust the ratio of nuclear to nonnuclear weapons positioned forward at the firing platoon level. For example, a series of response postures might be as follows:

Phase I: Maximum Nonnuclear Response. All launchers and loader-transporters within the firing batteries are loaded with missiles armed with nonnuclear warheads. In addition, 50 percent of the firing battery's 5-ton XLWB trucks are carrying nonnuclear rounds. The remaining trucks carry two nuclear rounds per launcher. Service battery maintains the capability to resupply firing batteries with nonnuclear rounds while simultaneously transporting the remainder of the battalion prescribed nuclear load (PNL).

Phase II: Increased Nuclear Response. Once the authority to mate nuclear weapons has been received by the battalion, one nuclear round per launcher is repositioned from the 5-ton trucks to each loader-transporter. In this manner a higher degree of nuclear response is obtained because a major portion of preparation required to launch a missile has already been accomplished. Concurrent with mating operations at the firing battery level, the ammunition platoon of service battery is prepared to move additional nuclear weapons forward to the firing batteries.

Phase III: Immediate Nuclear Response. As release of nuclear weapons becomes more imminent, nuclear rounds are positioned forward on a predetermined percentage of launchers. The remaining launchers would still carry nonnuclear rounds thereby retaining a dual capability. Service battery will begin to reposition nuclear weapons from its field storage location (FSL) to the firing battery areas so that the warhead sections are immediately available to the firing platoon. Any remaining nonnuclear rounds will be transferred to service battery.

Phase IV: Maximum Nuclear Posture. This posture is essentially a reversal of phase I. All loader-transporters and self-propelled launchers are loaded with nuclear rounds. So that a dual capability is maintained, one or two nonnuclear rounds per launcher are carried on 5-ton XLWB trucks in the battery position while the remaining trucks carry nuclear rounds. Any excess nonnuclear rounds resulting from the

change in postures would be repositioned to the service battery location and placed in reserve.

The above mentioned phases reflect, but are not necessarily limited to, actions at the firing platoon level. If the corps commander deems it appropriate, different response postures could be assigned to individual batteries within a battalion or the various Lance battalions within the corps/brigade. For example: One battery within a battalion may be in a maximum nuclear posture and well hidden, while the other two batteries may be in any of the other response postures. The same illustration may be drawn at the corps/brigade level with one Lance battalion at maximum nuclear response, while the others are either at immediate, increased, or maximum nonnuclear response levels.

6-5. Targeting

During conventional/nuclear operations, the conventional battle is fought while nuclear weapons are employed in such a way that the timing and location of the attack produce a dramatic change in the conventional battle to the advantage of US forces. The Lance missile system is an ideal weapon for the corps commander to use in this type warfare. The system is capable of providing either nuclear or nonnuclear fires. As a result, the commander has available a weapon that may be used to attack a variety of targets.

Nuclear Operations.

Lance may be used to deliver nuclear fires during the following tactical actions:

Offense.

- Attack defensive positions.
- Attack fire support systems.
- Attack command and control centers.
- Prevent reinforcement of the defense.
- Counter counterattacks.
- Protect the flanks.
- Isolate selected terrain.
- Attack supply installations.

Defense.

- Attack committed frontline and breakthrough forces.
- Seal penetrations.
- Attack reserves.
- Attack second echelon lead elements.
- Attack fire support systems.
- Deny enemy access to critical terrain or avenues of approach.
- Attack command and control centers and prestocked supply points.

Nuclear weapons package. A nuclear weapons package contains the total number of nuclear weapons required to support any one of several anticipated tactical contingencies. Lance can be used in the role of attacking the deeper targets of the package or to stand off at a greater distance from the FEBA to attack the nearer targets of the package. Whatever the case, the rate of fire and the variety of yields available for Lance make it a weapon quite suitable for the nuclear package concept. (See chapter 9.)

Target analysis concepts for Lance. The targeting process for Lance involves various functions each of which is a responsibility of some agency within the several levels of command. As a result, the time required to place fires on a target may be overly long in some cases. Therefore, the target analyst must make every attempt to use the most efficient means of analyzing a nuclear target for Lance engagement. He must consider two concepts when processing a fire mission for Lance. Both of these procedures should be addressed in the corps SOP and the desired method amplified.

When time and circumstances permit, the analyst at the FSE may use the distance between the target and the Lance battery as a

range to target. Using this method, a no greater than (NGT) range will be sent to the battalion. The NGT range will serve notice to the battalion that only those firing points at a range to the target less than the NGT range will be used to fire the mission. In this manner, the Lance battalion has complete flexibility and control in designating which of its subordinate units will fire the mission while insuring no degradation of desired effects on the target.

When precision target analysis procedures are required, it may be necessary for the analyst to use an actual firing point location. This will cause the FSE to designate the firing point to be used.

Nonnuclear Lance.

Lance may also be used to deliver conventional fires in support of offensive/defensive operations.

Attack criteria. Targets appropriate for attack by nonnuclear Lance are those that are relatively stationary and "soft"; i.e., primarily personnel and/or light materiel.

Targets for nonnuclear Lance. Lance units can provide conventional fires to:

Supplement cannon artillery. Typical threat offensive tactics during massing for a breakthrough will present more targets than there are weapons systems to attack these targets. It is during this period of intense combat that Lance firepower can be used to supplement cannon artillery. Committed maneuver units and close support artillery will be heavily engaged. Most of their fires will be directed against targets acquired by maneuver forces as they fight the battle. At this critical time there is little firepower remaining to attack those targets that are not yet an immediate threat to the command, but should be attacked as their destruction, neutralization, or suppression contributes greatly to a successful defense at the FEBA. Under these conditions, the following are appropriate targets for Lance:

- Cannon and missile batteries
- Command and control elements
- Logistical elements
- Chokepoints
- Forward airfields
- Air defense sites

Provide depth to combat. Nonnuclear firepower of the Lance missile can also be used by the commander to influence the battle in greater depth. The type of targets to be fired upon under this concept are:

- Command posts
- Cannon batteries
- FROG batteries
- Forward airfields
- Logistical elements
- Chokepoints

6-6. Communications

Corps-to-battalion communication responsibilities are based upon the manner in which the corps commander organizes corps level artillery for combat. When organizing for combat, each battalion is placed within a tactical organization and assigned a tactical mission. The inherent responsibilities of the assigned mission specify the communications requirements. This is true of both standard and nonstandard tactical missions.

Separate Lance battalion. When a Lance battalion is assigned to the corps and not further attached to a field artillery brigade or to subordinate maneuver units, the tactical mission normally assigned to the battalion is general support to the corps or general support reinforcing to a division artillery. With retention of the battalion under corps command, regardless of the assigned mission, the corps will maintain a direct communications link with the battalion. In cases of a GSR or reinforcing mission, the Lance battalion must establish a communications link with the reinforced artillery.

Lance attached to a field artillery brigade. The corps commander's decision to attach a Lance battalion to a field artillery brigade will cause communications to be relayed through the brigade to the Lance battalion. The mission assigned the field artillery brigade will determine the degree of responsiveness Lance will have to the corps commander. A fire mission will be communicated to the field artillery brigade from corps. In this role the corps-to-battalion communication link is through field artillery brigade, the corps being responsible to maintain communications with the field artillery brigade, and the field artillery brigade with its subordinate battalions.

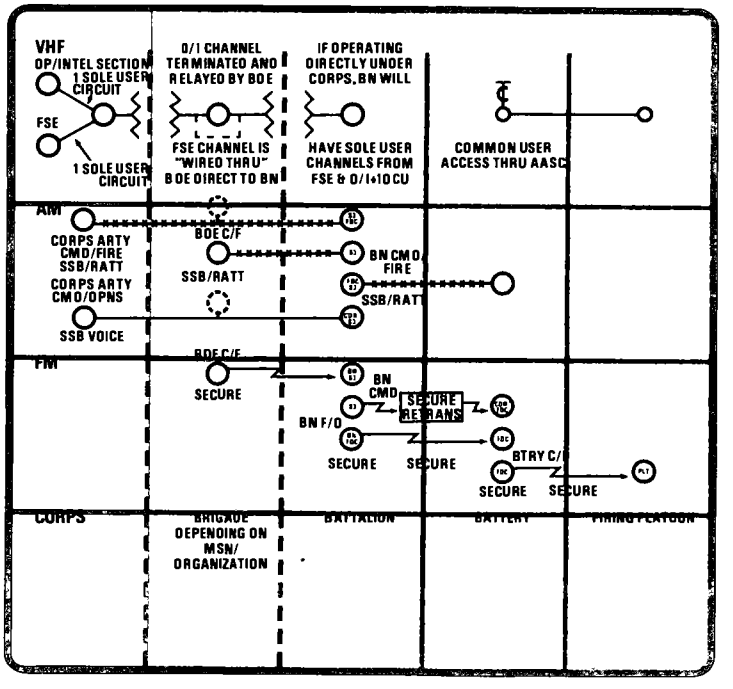
Lance attached to a division. In this case, Lance operates under the command and control of the division and has no communication responsibility to the corps.

Since the corps field artillery section does not operate a command/fire FM net, FM communications between corps and a Lance battalion will only be possible through the battalion liaison section when established at corps. The battalion does have, however, an organic AM/SSB-voice capability that is designed for use in the corps artillery command/operations net, and teletype equipment for operation on the corps artillery command/fire direction net (AM/SSB-RATT).

The missile support platoon of the corps radio battalion is responsible for providing multichannel terminals for each Lance battalion in the corps. In addition, they will also provide a terminal to field artillery brigades controlling Lance units. These VHF terminals will provide the battalion with one sole user circuit from the fire support element and one from the operations/intelligence (O/I) element of the FAS. An additional channel may be designated as a common user circuit.

If Lance battalions are operating under a field artillery brigade, the O/I channel will be terminated at the brigade and necessary information extracted and relayed to the battalions. The FSE channel will go direct to the battalions and brigade simultaneously to expedite fire mission traffic.

CORPS COMMAND SYSTEM, VHF MULTICHANNEL



★ **Note.** *If secure capability is lost on the battalion fire net, the battalion FDC may be required to operate three dedicated fire nets to handle the large volume of encrypted traffic.*

6-7. Survey Requirements for a Lance Battalion

The accuracy of the Lance missile system depends largely on the initial directional control imparted to the missile at the firing point during sighting and laying procedures. Because of the relatively long range of the missile, it is necessary that an accurate direction and surveyed location be determined for each firing position. Each firing position should be surveyed using procedures that will insure an accuracy ratio of 1:1000 for position closure, ±2 meters in altitude, and an azimuth of the orienting line (AZOL) accurate to ±0.3 mil.

In central Europe, this type of control is generally readily available through use of presurveyed survey control points (SCP) that have been compiled into "trig lists." This is not the case in most areas of the world however. If the Lance battalion is positioned such that survey control is not readily available, and if time permits, the corps engineer topographic company will establish a survey control point (3d or 4th order) within 1,000-1,500 meters of each battery position and will provide an orienting azimuth accurate to ±0.06 mil (3d order astronomic) from which battery survey personnel will extend horizontal and directional control to the firing positions.

Another survey option available to a Lance battalion, when positioned in a division zone of action, would be to coordinate survey control with the division artillery target acquisition battery. However, it should be noted that the division artillery has no responsibility to a Lance battalion to provide survey support, unless that battalion is assigned the mission of reinforcing or is attached to the division artillery. The survey elements of the division artillery will then establish battery SCPs (4th order accuracy) for the Lance battalion.

Where there is no survey control available to Lance units, it may be necessary to establish hasty control that can be accomplished with little loss in accuracy using hasty survey techniques discussed in chapter 8, section II.

6-8. Security

Lance units, by TOE and mission, are not organized to defend themselves for any length of time against a deliberate ground attack by the enemy. In addition, Lance units have limited capability for defense against air attack. The problem of local security is a critical one for a Lance organization. If the corps commander is to have nuclear fire support from Lance, he must protect the units capable of providing it. The enemy can be expected to use every possible means to counteract nuclear weapons—the most effective being to prevent the missiles from being launched. Accordingly, he will concentrate his resources (including sabotage, guerrilla action, infiltration, and special striking forces) to weaken our ability to deliver nuclear fires. It is therefore incumbent on the employing headquarters to provide a reasonably secure environment for Lance missile units. There are a number of ways that this can be accomplished:

Routine Measures.

Lance units should be given priority consideration in the assignment of areas.

Units should be moved only during the hours of darkness or periods of poor visibility.

Lance units will be expected to exercise their capability for local security to the greatest extent possible. If the units are to accomplish the security function successfully, however, they must be provided the appropriate logistical support (small arms ammunition, engineer material, mines, etc.) as well as be kept informed of the local tactical situation (e.g., guerrilla attacks). Command emphasis is required in these two areas because the Lance battalion, as a result

of its positioning in the rear areas, can be easily categorized among the lesser priority combat service support units.

Close attention should be given to the development and execution of a sound deception plan for Lance.

Augmentation.

The tactical situation may require that the Lance battalion be augmented by combat units and/or military police units. The addition of these security forces is necessary to enhance the missile unit's ability to prevent special ammunition and classified material from falling into enemy hands.

Ideally, each Lance battalion should be assigned a security force of infantry company size. As a minimum, the service battery and each of the firing batteries should have a rifle squad attached for special weapons protection.

The mission of the security forces is to bolster the self-defense capabilities of the battalion. Specifically, these forces would be fully integrated with elements of the battalion to defend position areas and exclusion areas, and during road marches. Of special importance is the requirement to protect special weapons convoys.

Rear Area Security.

Definition. Rear area security (RAS) as a function of rear area protection (RAP) is another concept that may be used for the protection of Lance units. Again, command emphasis is the key to successful operations along this line.

Principles. Rear area security includes all actions to prevent or neutralize attacks on units, activities, and installations in rear areas. Normally, these actions do not include active air defense operations.

Within the rear area, all commanders are responsible for local security for their own units.

Rear area security is a territorial command responsibility. Therefore, when a Lance battalion is operating in the rear area of a division, the unit is under the RAS authority of the division support command (DISCOM) commander or the division G3 as appropriate. When positioned in the corps rear area, the Lance battalion is integrated into the RAS plans formulated, executed, and under the control of the corps support command (COSCOM) commander. In some cases, support groups assigned as COSCOM elements will have RAS responsibilities for subareas of the corps rear area.

Responsibility for the coordination of RAS activities belongs to the area commander. However, since a Lance battalion is relatively transitory within any given area, it is to the battalion commander's best interests to contact the area commander and finalize mutual security requirements.

6-9. Combat Service Support

Overview.

The corps commander must insure that his combat force has the necessary means to fight effectively at the outset of the battle and to fight continuously thereafter. This concept is particularly true in the employment of a Lance battalion. When the corps commander concentrates his forces at the critical time and place, he is in effect concentrating weapon systems. Therefore, in order to use Lance effectively, he must also concentrate his combat service support resources to insure that the Lance battalion remains armed, fueled, maintained, and manned by soldiers capable of doing the job. The agency that assists the commander in accomplishing this task is the corps support command.

Corps Support Command.

The corps support command provides the required combat service support for the corps force. It has the responsibility to provide

direct support (DS) and general support (GS), supply, maintenance, field services, personnel and administration, transportation, and health service support to nondivisional units such as the Lance battalion.

Ammunition Support.

The responsible agency for ammunition support within the corps zone is the ammunition group under the control of the COSCOM. This group is structured to accommodate a variable number of ammunition battalions assigned conventional and special ammunition companies. The number and type of companies under the battalion is dependent upon the size of the supported force. The Lance battalion, as a nondivisional unit, will receive its ammunition support from these units. Specifically, the battalion will draw conventional ammunition (small arms) from an ammunition supply point (ASP) established by the ammunition company conventional (TOE 9-38) operating in a DS/GS role. Special ammunition is drawn from a special ammunition supply point (SASP) established by a special ammunition company DS/GS (TOE 9-48).

Supply point distribution will be the normal method of providing ammunition to all using units. Therefore, the assembly and transport sections of the Lance battalion will draw missile and warhead sections in containers from the SASP and transport them to the battalion area. These sections will also be responsible for drawing and transporting conventional ammunition from the ASP.

Maintenance Support.

Conventional maintenance.

The direct support forward maintenance company (TOE 29-207) provides direct support maintenance and repair parts supply for mechanical, armament, and communications equipment in the Lance battalion. If positioned further into the rear area, the battalion will be provided DS maintenance services from the rear DS maintenance company (TOE 29-208).

General support maintenance services for the battalion are provided by two units: light equipment GS maintenance (TOE 29-134) and the heavy equipment GS maintenance company (TOE 29-137). These organizations are oriented to repair of smaller end items (e.g., calibration instruments) as well as larger end items such as wheeled vehicles.

Missile-peculiar maintenance. The principal source of support for missile-peculiar equipment (less warhead section (WHS)) is the rocket and missile support detachment (TOE 9-550). This unit is capable of, and may be assigned, a direct or general support role. These missile support teams will provide missile direct support service for Lance FA battalions and special ammunition supply points. These teams are 100 percent mobile and their prime responsibilities are to provide command, control, and overall supervision of maintenance by using the land combat support system (LCSS); provide technical control and supervision in the inspection, testing, modification, and repair functions; perform inspection, testing, modification, and repair functions; and provide on-site component repair or replacement. Teams EG and EJ are the two units within TOE 9-550 whose prime responsibility is support of Lance.

Other Services.

Services, other than those already described, are provided to the Lance battalion by various battalions, companies, detachments, and cellular organizations assigned to the COSCOM. These units are deployed throughout the corps to provide nondivisional units the following types of support:

Personnel, morale, and administrative—provided by the personnel and administration battalion.

Finance—provided by teams from the finance service organization.

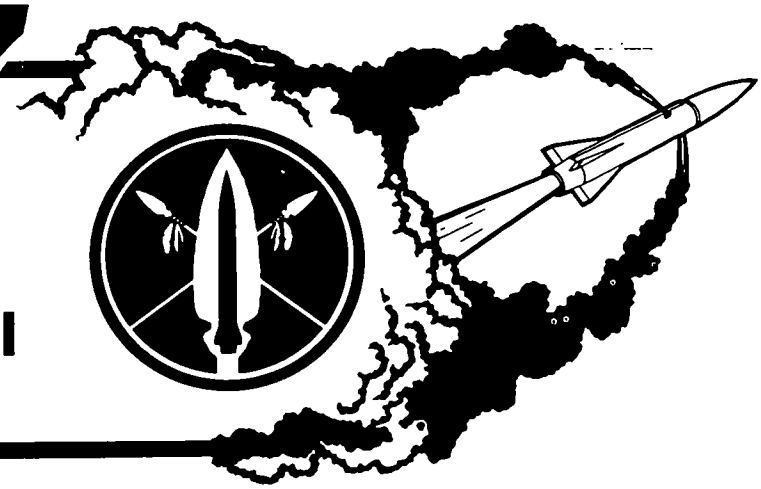
Supply and field services—provided by the supply and services battalion. Supply

activities include receipt, storage, and issue of all classes of supply except class V (ammunition) and class VIII (medical material). Field services support includes laundry, bath, clothing exchange, bakery, clothing renovation, salvage, post exchange sales, and provision of general duty labor.

Medical support—provided by the medical brigade on an area basis. Troop clinic type services are provided to nondivisional troops by medical clearing companies or medical detachments.

CHAPTER 7

Lance Employment: Battalion Level



Section I. RECONNAISSANCE, SELECTION, AND OCCUPATION OF POSITION (RSOP)

The Lance battalion commander must employ his weapon systems at their fullest effectiveness, reduce his vulnerability by using cover and concealment, deliver timely and accurate fire support, and move decisively on the battlefield. To obtain the full capability of each, he must implement and practice a highly developed standing operating procedure. Development of this system will facilitate rapid dissemination of orders, conduct of necessary reconnaissance, early movement of units and the fastest, most effective execution of missions. To this end, this chapter on Lance employment at battalion level will provide information on RSOP, operations, and service support.

"You never can do too much reconnaissance."
—GEN George S. Patton, Jr.

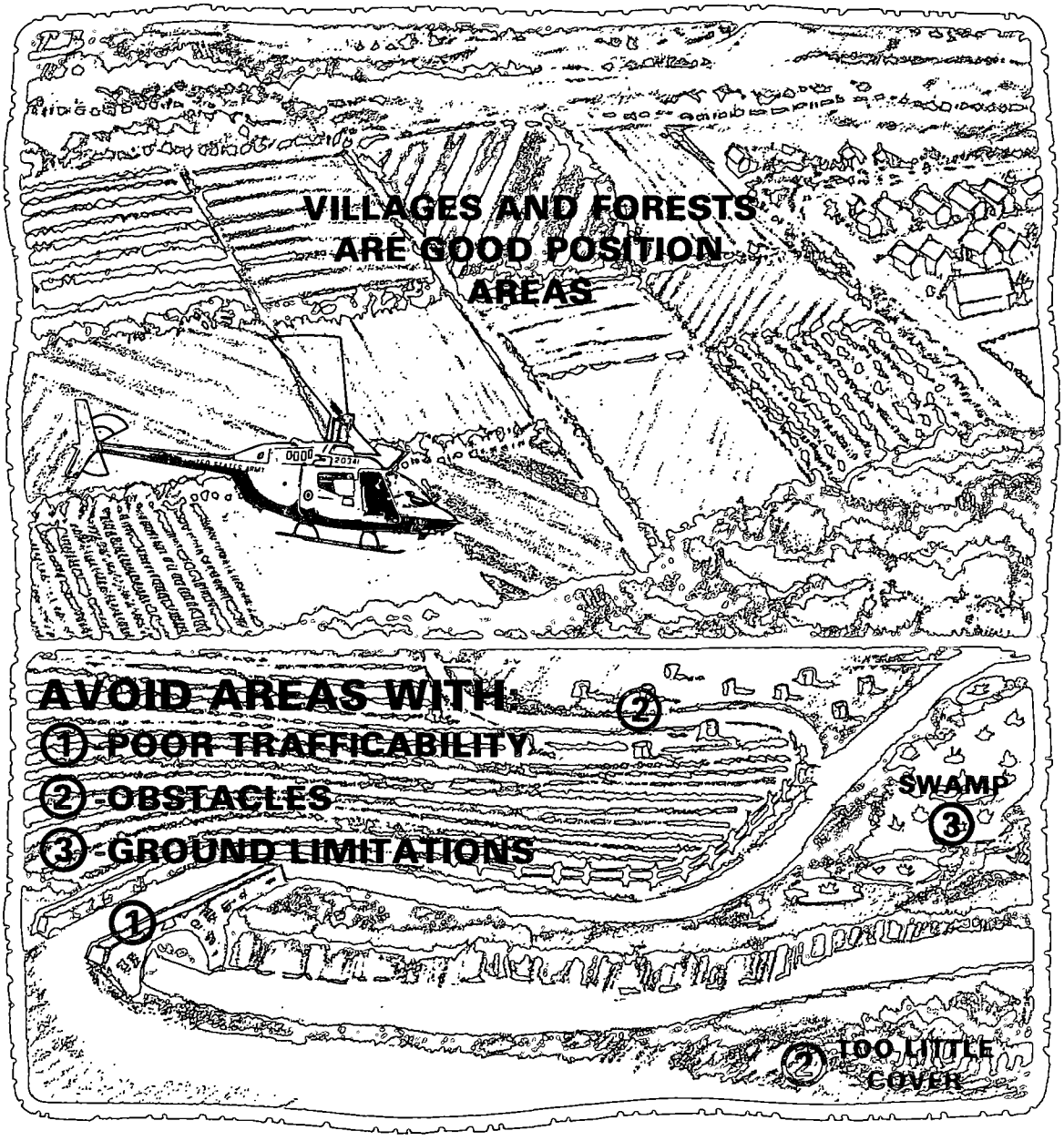
7-1. Reconnaissance

On the battlefield, a sophisticated enemy is capable of locating and engaging the Lance battalion in a number of ways. To survive, we must be able to move quickly and efficiently. The key to a successful movement will be timely and continuous reconnaissance, careful position area selection, and expeditious occupation of position. Based upon the tactical situation, the commander must anticipate his next move. Because of the separation distances between units, the Lance battalion commander can seldom use standard reconnaissance techniques. He uses, therefore, a combination of several methods.

Map reconnaissance. The commander and his staff must continuously analyze proposed areas and travel routes by the effective use of map reconnaissance. Considerable ground or air reconnaissance time can be saved by first insuring that tentative areas of operations have wooded areas or overhead cover for concealment of battery positions and firing points, ground slope limitations for Lance-peculiar equipment have not been exceeded, adequate survey control is available, and terrain or obstacles between positions have been considered. Aerial photographs can be used to update and provide more detail to the map reconnaissance.

Air reconnaissance. Because of the large area of operation, air reconnaissance is

considered the most feasible method available to determine unit areas of operations, "battery goose eggs," and travel routes. Air reconnaissance is by far the fastest and most desirable method available; however, considerable skill is required to obtain a true indication of surface conditions. To assist him in analyzing the terrain, the battalion commander should take with him members of his staff or even battery commanders.



Ground reconnaissance. On the future battlefield, seldom will there be time or security for the Lance battalion commander or his staff to conduct a lengthy ground reconnaissance. Ground reconnaissance techniques for the battery commander are explained in chapter 8.

After completion of the reconnaissance the commander may meet with his staff and battery commanders to discuss the selection of the new position areas. He may, however, elect to send his battery commanders an order initiating movement to, or reconnaissance of, the new position area.

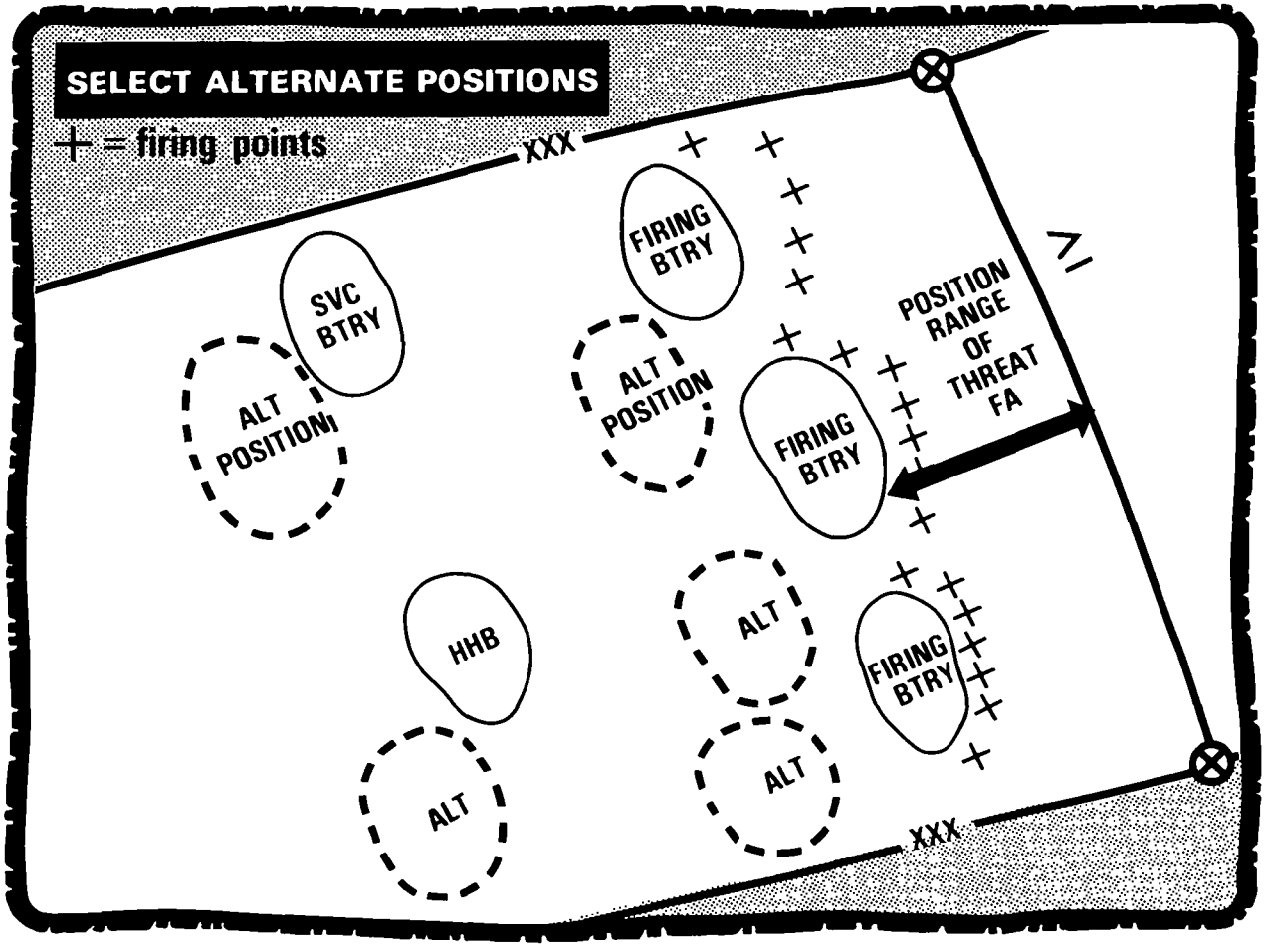
7-2. Selection of the Battalion Position

After completing the reconnaissance of the area of operation, the battalion commander must consider the selection of position areas for his batteries. In making his decision, he must consider both primary and alternate battery positions. The primary position must allow for the accomplishment of the tactical mission. The alternate position must provide a place where the battery can move if the primary position becomes untenable or unsuitable. The alternate position must be close enough to the primary position to permit rapid displacement but distant enough to prevent its being rendered untenable by the same action that affects the primary position. In selecting both primary and alternate positions, it is important that both of these positions provide maximum tactical flexibility. For instance, during offense operations, positions should be selected well forward toward the FEBA to avoid early and untimely displacements in order to keep up with advancing elements. Conversely, positions in the defense must be located far to the rear to insure continued fire support if the enemy makes a penetration. In either posture, maximum use can be made of the excellent range capability of the Lance system, thus preventing frequent and unnecessary moves. In any situation, the battalion commander must take into consideration the radio assets of the battalion and the transmission capabilities and limitations of his communication systems. Normally, battery position areas should be located no closer to the FEBA than the range fired by threat's cannon artillery.

Lance firing batteries deploy to three separate position areas. The method of deployment for the headquarters and service batteries depends primarily on the tactical situation; thus two options are available to the commander: collocation or separate position areas. During periods when maximum dispersion between units is necessary, it would be appropriate for the headquarters and service batteries to occupy separate battery positions. This method also may be used when it is necessary to locate the service battery nearer to the SASP or other support facilities. However, the commander must realize that when he uses this option he does not have ease of access to his logistical expertise and he must provide service battery with adequate communication assets to establish necessary internal and external AM and FM radio nets. When the threat of ground attack and command and control are the basic considerations, collocation of HHB and service batteries would be advantageous. This method provides additional physical security for critical battalion facilities and increases the communication support available to the service battery. The commander would also be able to more efficiently manage and more effectively use his logistical support. The increased size of the combined location, on the other hand, increases the likelihood of detection and provides a more lucrative target for the enemy.

A special consideration for the Lance battalion commander is the location of rear area installations. Corps and division support facilities will be located in or around the battalion area of operation. The mission and characteristic signature of these units do not

lend themselves to good camouflage techniques and the location of a nearby Lance battalion may be discovered inadvertently. Advance liaison prior to occupation of position areas could prevent untimely moves or disclosure of a position area.



7-3. Movement

One of the essential ingredients in the successful occupation of a position area is the efficient movement of the battalion. The battalion movement must be accomplished quickly, with stealth and security. The battalion displaces when the battalion commander considers displacement necessary or when ordered by the force artillery commander. The displacement is dictated by the scheme of maneuver of the force commander. To this end, when displacement is necessary the battalion commander coordinates the movement of the battalion with the supported unit and establishes the:

- Method of displacement.
- Time displacement will begin.
- Location of the new position area.
- Expected time of completion.

Based primarily upon the tactical situation, the battalion can move by one of three methods of displacement.

Battalion displacements are conducted when there is no possibility of enemy attack. This is the least desirable method and seldom will be used by Lance units.

Movement of one battery at a time is another method to displace the battalion. Use of this method, again, makes individual units extremely vulnerable to enemy attack. The advantage of command and control, on the other hand, lends its use to night moves.

Echelon movement is the most feasible method of movement to be used by Lance. Advantages are:

- Provides the least vulnerability to hostile observation.
- Deceives the enemy as to the size of the unit.
- Provides passive defense against air and ground attack.

When the battalion moves by echelon, a portion of each battery will move separately, but under battalion operational control. Echelon march elements should be designated in the unit standing operating procedures. Command and control and lack of security are some disadvantages that would limit the nighttime use of this method.

Whether the battalion moves by battery or by echelon, there should be no interruption in the operation of fire direction. While the battalion fire direction center (FDC) is moving to the new position, battalion fire direction control can be maintained by a designated firing battery FDC. The local SOP should specify FDC control measures to be used during displacement.

Continuous fire support must also be available during displacements. The movement of firing platoons should be coordinated to allow continuous coverage. To insure coverage, units or platoons should be moved successively to new positions (leapfrogged).

Because of the separation distances between units, command and control measures during displacements require detailed planning and execution. Methods should be rehearsed during training and included in the battalion SOP. Control of battalion displacements can be achieved by the use of helicopters, checkpoints, and road guides. In moves over great distances, radio relay stations should be established to insure continuous communications. The order of march should be such that march elements do not pass one another in order to get to the new position. There should also be an adequate interval between units to insure dispersion of critical elements, thus preventing the development of a lucrative target for threat aircraft or artillery.

Supporting artillery or aircraft should be available to provide coverage during ground movement of the Lance battalion. Liaison with nearby fire support units can be extremely beneficial to insure adequate coverage is provided. Radiofrequencies, call signs, point of contact, and unit SOPs are areas that should be addressed.

7-4. Occupation and Organization of Battery Positions

For discussion of the occupation and organization of the battery position, see chapter 8, section I.

Section II. BATTALION OPERATIONS

The mission of the Lance battalion is to destroy, neutralize, or suppress the enemy by missile fire. To provide effective and timely Lance fires and to execute his mission, the battalion commander must understand the Lance system. Fire direction, survey, communications, and security are some of the

key elements of the system that the commander must harmoniously integrate in order to achieve the maximum effectiveness of his battalion.

7-5. Fire Direction

There are four fire direction centers with the capability to perform technical fire direction within the battalion: one in headquarters battery and one in each firing battery. The battalion fire direction center, under control of the operations officer, has the primary function of tactical fire direction, although it can perform technical fire direction if necessary. The battalion S3 will assign the battery to fire and may also assign the firing point if not previously assigned by higher headquarters. Computations required to convert the fire mission into firing data are normally computed by the designated firing battery. The battalion fire direction center may act to verify and/or back up the ★computation if the firing battery has lost its capability to doublecheck its own data. The primary method used to compute firing data is the field artillery digital automatic computer (FADAC), which takes approximately 3 minutes to process data. The secondary method used to compute firing data is the field artillery computer set, missile or general (a programable hand-held calculator), which takes approximately 3 to 5 minutes to process data. If neither of these methods is available to a firing battery, it is preferable to use another battery FDC or battalion FDC to compute firing data rather than have the firing battery use manual computations. If necessary, manual computations may be used, but this technique requires 15 to 20 minutes to determine data. A more detailed discussion of fire direction procedures is in FM 6-40-4.

Lance Fire Mission.

Execution. The corps tactical operations center (CTOC) or division main command post receives and processes target acquisition information from national, strategic, and tactical data sources to obtain lucrative targets. These targets are developed, analyzed, and where appropriate, assigned for attack by Lance based on the commander's guidance. Once a target has been designated for attack, the corps FSE will transmit the mission via secure, point-to-point communication to the Lance battalion. After the battalion receives the fire mission, it will assign the mission to a firing battery and transmit it by either FM secure or radioteletypewriter (RATT) to the appropriate firing battery FDC for the computation of firing data. The battery FDC will alert the designated firing platoon with a warning order which will include the firing point, approximate direction of fire, time to fire, and warhead type. As soon as the firing data is computed, it is immediately transmitted to the firing platoon for completion of the mission.

Response time/states of readiness. To have an appreciation of Lance capabilities and limitations, the battalion commander must fully understand system responsiveness. A complete discussion of system responsiveness is found in FM 6-42-1.

The battalion commander must actively seek a desired response posture from the supported unit FSE to allow him to achieve the proper states of readiness for his battalion.

7-6. Liaison

The primary responsibility of the liaison section is to provide timely tactical information to the battalion and to represent the battalion commander at the FSE on all Lance matters of employment to include posture, capabilities, and limitations. The liaison officer must have a good understanding of Lance fire support planning and coordina-

tion techniques (para 6-3), system responsiveness (FM 6-42-1), nuclear operations (chap 9) and the unit SOP. A standing operating procedure must be developed with the battalion S3, where a free flow of information is passed between the elements. The liaison officer (LO) must have a current situation report of the battalion at all times. He must *know* unit locations, the status of launchers, and ammunition. On the other hand, the LO must *pass* tactical information to the battalion on the current situation, target location, and the type of warheads to be used. He must be *alert* for any change in the situation that may cause the battalion to go to an increased nuclear or nonnuclear posture. Also during nuclear operations, the LO must provide timely information on aiming point refinement to the battalion. As the Lance fire support coordinator, the LO must insure that his communication link with the battalion is properly maintained. In addition to a good understanding of proper communication techniques and procedures, the liaison section must have good operational radio equipment. By providing timely information between the battalion and the FSE, the liaison section is a vital link in the processing of Lance fire support.

7-7. Lance Battalion Survey

The mission of Lance battalion survey personnel is to provide timely survey control within prescribed accuracies to the firing platoons. Lance battalions are normally furnished control by the corps topographic units, or when operating in a division zone by the TAB of the division artillery. This control consists of grid coordinates and altitude of the survey control point and an azimuth mark. Surveys that establish control points for Lance elements must be performed using procedures and techniques that insure horizontal closure of 1:3000 (fourth order), and ±2 meters altitude closure. The grid azimuth provided at the control point to an azimuth mark must be accurate to ±0.15 mil. Each firing battery will be provided at least one of these control points. Survey control will then be extended to the firing points by the two survey sections of the battery. These survey sections are required to survey firing points to fifth-order accuracy using techniques described in detail in paragraph 8-15. Each battery position will have at least six surveyed firing points established in such a manner. *Firing point survey* should be accomplished prior to a battery occupation of a new position to enable the unit to be immediately responsive without having to wait for survey control to be established. In addition, the battalion commander must insure that adequate reconnaissance of possible future positions has been accomplished and that a timely movement warning order is given to the unit. This is necessary to provide the survey parties with sufficient time to accomplish a *position area survey* prior to occupation.

Responsibilities.

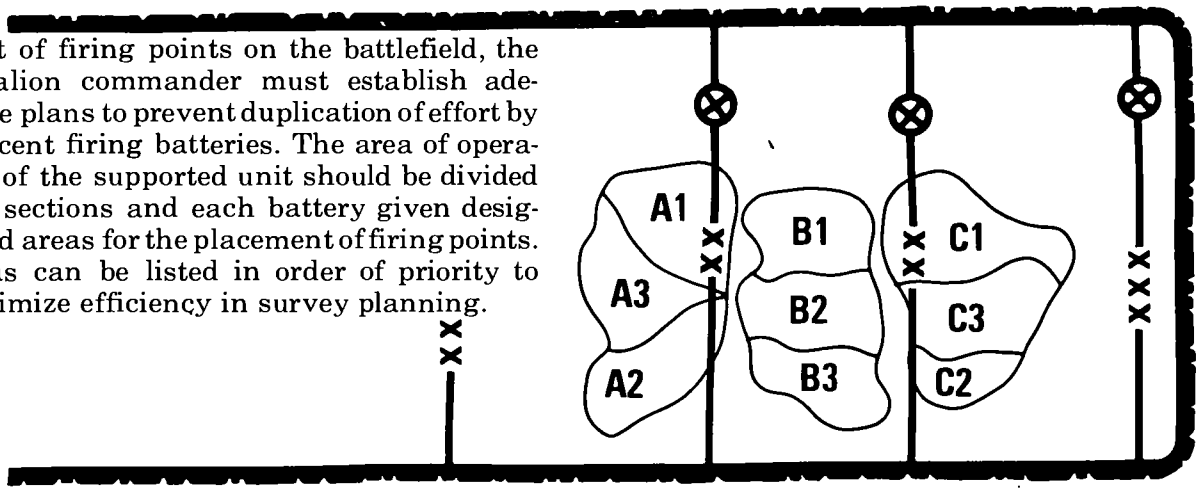
The battalion S3 serves as the principal adviser to the battalion commander on all matters pertaining to survey. The RSO works directly under the S3 and does the detail survey planning, supervises battalion survey assets, and maintains liaison with other agencies.

The battalion survey information center (SIC) is composed of a reconnaissance and survey officer (RSO), a chief surveyor, and a survey computer. The primary mission of the SIC is the collection of all available survey data that might be used by the battalion, the maintenance of files containing this data, and the timely dissemination of this data to the battery survey elements.

Firing Point Coordination.

To prevent confusion in the establish-

ment of firing points on the battlefield, the battalion commander must establish adequate plans to prevent duplication of effort by adjacent firing batteries. The area of operation of the supported unit should be divided into sections and each battery given designated areas for the placement of firing points. Areas can be listed in order of priority to maximize efficiency in survey planning.



7-8. Communications

General.

The ability of the Lance battalion to provide its highly destructive firepower at the critical time and place depends on a responsive communications system able to survive on the battlefield. The ability of Lance to communicate is an essential element of its command and control. Since Lance is normally the commander's personal artillery for influencing the battle, communications assume an even greater degree of importance. Total dependence should never be placed upon any one means, since the reliability of communications systems is greatly enhanced by the use of more than one means. Generally, the communications means employed in a given situation are those that provide the maximum reliability, flexibility, security, and speed.

The Lance battalion has the inherent capability to employ wire, radio (AM/SSB and FM), and messenger communications. With additional support from the corps radio battalion, VHF or multichannel can also be employed. A further discussion of communications equipment, systems, procedures, and techniques is included in the 11-series FMs and TMs and in the 24-series field manuals. A discussion of field artillery communications procedures, systems, and techniques is contained in FM 6-10 and FM 11-92.

Communications security measures in the Lance battalion include, but are not limited to, the protection of military information and materiel against destruction, capture, theft, espionage, interception, direction finding, traffic analysis, cryptoanalysis, and imitative deception. For detailed information on communication security, see FM 32-5.

Cryptographic security is that part of communication security that deals with encode/decode material, authentication systems, cypher devices, and machines used for encrypting/decrypting messages. Due to the amount of cryptographic material used in the Lance battalion, every precaution must be taken to protect such material against enemy action and to prevent access to the material by unauthorized personnel. See AR 380-40, AR 380-51, and AR 380-52 for additional information on cryptographic security.

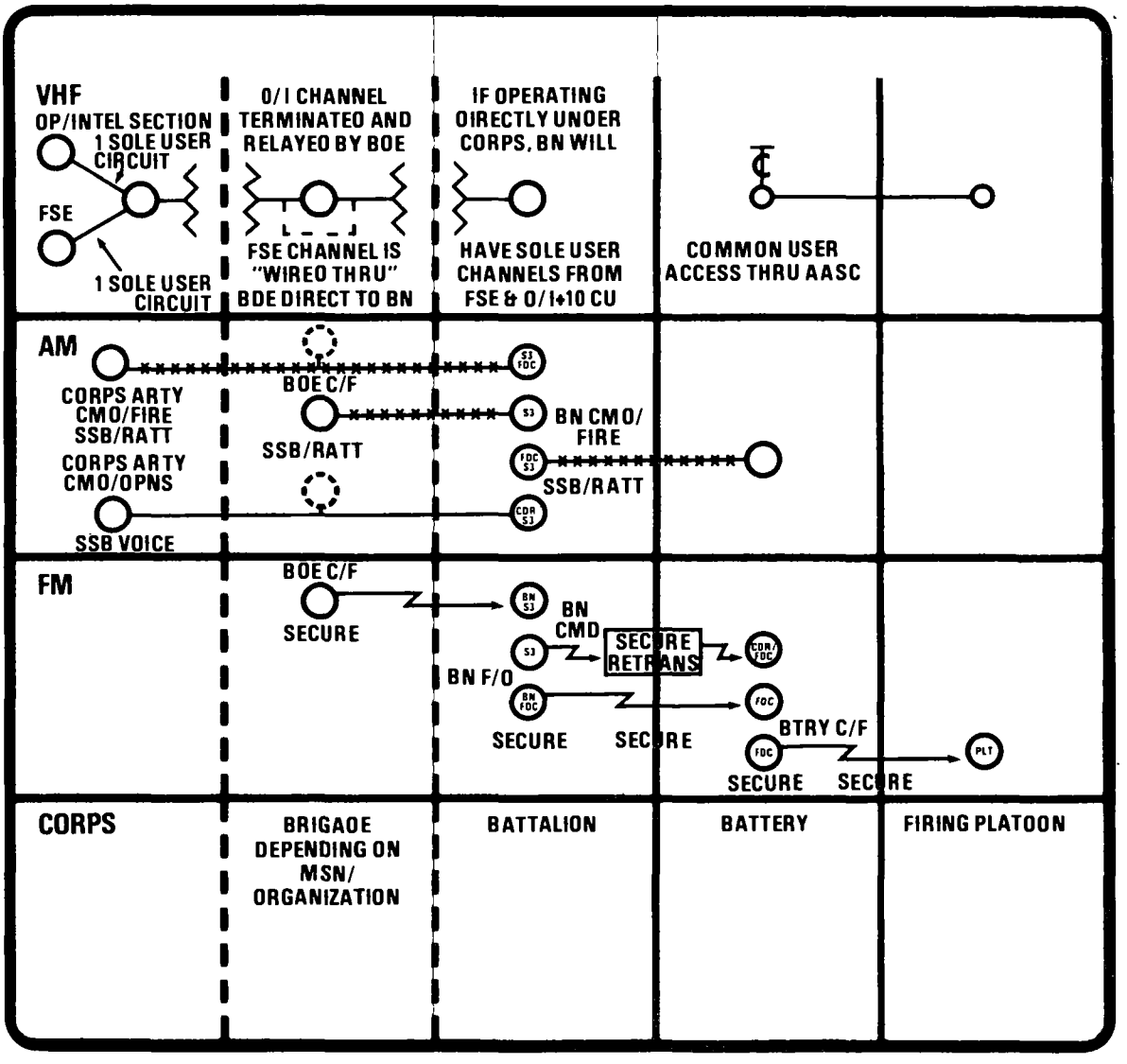
Lance Battalion Radio Systems.

Radio communications requirements of the battalion are met through the use of organic voice radios and radioteletypewriter equipment. The radio systems of the battal-

ion satisfy both internal and external radio requirements.

External communications. External communications are those by which a unit maintains communications with its next higher headquarters, adjacent units (as required), and supported or reinforced units for the purpose of receiving data and other information necessary for the unit to accomplish its mission. The battalion's mission will determine the type of external communications required.

LANCE BATTALION COMMUNICATION SCHEME



★**Note:** *If secure capability is lost on the battalion fire net, the battalion FDC may be required to operate three dedicated fire nets to handle the large volume of encrypted traffic.*

- External FM nets. If the battalion is GS to corps, external FM communications are not required since the corps FAS does not operate a command/fire (C/F), FM net. This will allow greater flexibility in the use of battalion FM radio assets. However, the battalion commander must be prepared to operate in an *external FM net* in the event of a change of mission. When the Lance battalion is operating under the control of a field artillery brigade or a division artillery, the battalion commander and the battalion operation/FDC section must have the capability to operate in the brigade or div arty command/fire direction net, FM secure.

The battalion reconnaissance and survey officer (RSO) along with survey personnel in the firing batteries operate in an FM survey channel that is common among all surveyors throughout the corps area. This survey channel does not require a secure radio.

- External AM nets. The Lance battalion must maintain separate AM/SSB radioteletypewriter (RATT) capabilities in the command/fire direction net of the battalion's higher headquarters and the C/F net of the reinforced unit, if the battalion is in a GSR or reinforcing role. These nets provide the battalion with operational and intelligence data and fire mission information, along with administrative and logistical data.

When the battalion has a communications responsibility to corps, the organic AM/SSB voice radios will operate between the battalion commander/operations section and the corps field artillery officer on the artillery command operations net.

- VHF, multichannel systems. Each Lance battalion, in accordance with the signal doctrine outlined in FM 11-92, will be furnished a multichannel terminal by the corps radio battalion, which will provide a sole user circuit to the corps FAS, corps FSE, and—if appropriate—an FA brigade. In addition to the sole user circuits this terminal provides, it offers the Lance battalion switched common user telephone service with any unit that lays a wire line into an area or command multichannel terminal, since both the area and command system are fully integrated.

Internal radio nets. The Lance battalion operates three battalion level radio nets along with an integrated wire system where possible. These nets use organic communication equipment and are used to pass administrative, operations, intelligence, and fire mission traffic. Because of the critical nature of some elements of data that may be passed, these nets will be secure to preclude compromising the type of unit.

- Internal FM nets. The battalion command (CMD) net is used for internal command and critical administrative and intelligence needs of the battalion. This net will be established between the battalion commanders, battalion operations/intelligence section, and the battery commanders. Stations in this net will operate secure when possible.

The battalion fire direction (FD) net is composed of the battalion fire direction center (NCS) and the three firing battery FDCs only. All fire missions and fire support coordination requirements will be accomplished on this net. Because of the critical and easily identifiable nature of FDC traffic, this net must be secure.

The service battery commander will be the battalion NCS on a battalion administrative/logistics net. Firing batteries with traffic of this nature will switch to this frequency when required. Ammunition convoys will normally be coordinated on this or another corps designated common user frequency (e.g., NAICP).

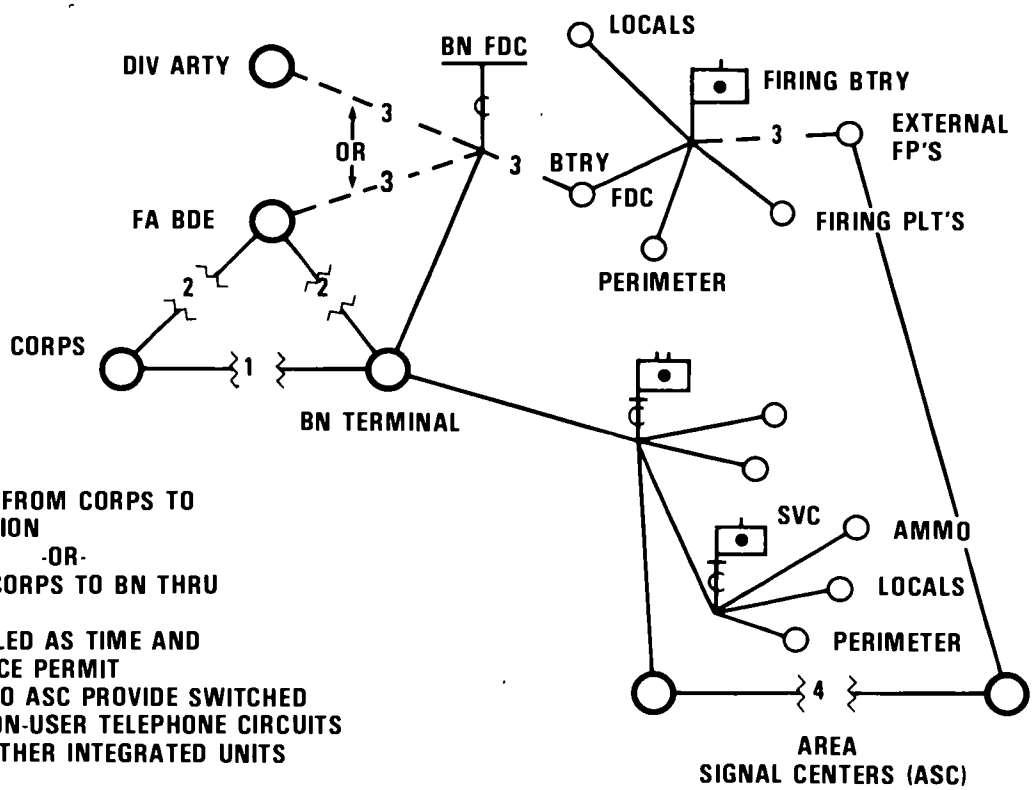
- Internal AM net. The Lance battalion will operate on internal AM/SSB radioteletypewriter (RATT) command/fire direction net. This net will be between the battalion headquarters and the firing batteries. This net is used to augment the FM CMD and FD nets and is used to pass bulk traffic primarily. In instances when the batteries and/or battalion are unable to communicate by FM radio due to terrain or distance, this

net may represent the only communication link available for transmission of traffic.

- Battalion wire system. The Lance battalion wire system provides another means for command, administration, and fire control. Due to the wide dispersion of the Lance batteries, the battalion may not be capable of establishing direct field wire command and control circuits between the battalion headquarters and the Lance batteries. However, these circuits can be established by wire interface with the corps multichannel system. The priority circuits of the wire system are those necessary for fire control and for communication with the supported force.

The installation of the complete battalion wire system must always be the goal. Realistically, however, the extent of the system installed will depend on the mission and deployment of the battalion and the length of time the battalion is in position. Wire circuits, once installed, will normally be used in lieu of the radio nets they parallel.

BATTALION WIRE CIRCUITS.



1. DIRECT FROM CORPS TO BATTALION
   -OR-
2. FROM CORPS TO BN THRU BDE
3. INSTALLED AS TIME AND DISTANCE PERMIT
4. LINES TO ASC PROVIDE SWITCHED COMMON-USER TELEPHONE CIRCUITS WITH OTHER INTEGRATED UNITS

7-9. Intelligence

Combat intelligence is information collected locally or provided by higher headquarters. These elements include enemy, weather, and terrain. Lance units are particularly concerned with intelligence relating to threat guerrilla/insurgent operations, air capabilities, and long-range artillery.

Section III. SECURITY

Organization of the Lance battalion's security plan consists of those measures that the battalion commander can directly control and those he influences such as active defense of the battery (chap 8, sec III) and integration of the battalion into the rear area security plan. He influences the active defense of the battery by the allocation of resources, enforcing security discipline, and by sound tactical deployment of his units. The battalion commander cannot directly control the protection that he will receive from adjacent rear area units, but he can enhance or influence his security plan by aggressive and timely coordination with these units. This is especially important because of the limited ability of the battalion to defend itself. The battalion commander must insure that full advantage is taken of resources available to him and the assimilation of each into an all-round defense system.

7-10. Operations Security (OPSEC)

General operations security is a command responsibility of the Lance battalion commander. Since the S3 assists the commander in the overall planning and execution of operations, he also has primary supervision for the OPSEC function. The commander must insure that in all staff intelligence, communications-electronics, logistics, maintenance, and administration efforts, OPSEC is considered in order to provide maximum protection for an operation. OPSEC can assist the commander in achieving surprise and security—vital elements to battlefield success. Batteries and staff must practice OPSEC and other coordinated acts to deny operational information to the enemy. Failure to use OPSEC effectively can endanger survivability on the battlefield.

OPSEC Concept.

OPSEC includes all security measures that allow us to maintain surprise. Used successfully, it keeps the enemy from learning about information leading to a specific operation (the plan); information about why and/or how a specific operation is being carried out (the execution); and/or information about the success of an operation (the afteraction). OPSEC consists of four main categories of security measures. All are interrelated and must be considered simultaneously for each operation.

Deception. Deception misleads the enemy about our current or intended operations. Deception also includes measures that prevent the enemy from spotting a pattern or stereotyping our actions. Siting, discipline, and construction of camouflage are the three principles employed by a battalion to eliminate the factors of recognition. The battalion commander is in a good position to influence the siting and maintenance of camouflage discipline. The battery commander, on the other hand, is primarily concerned with construction of concealment as covered in chapter 8. The siting is a very important consideration in deployment of Lance. To achieve effective concealment, positions must be selected to conceal signs of tactical activity. To achieve effective concealment, the terrain must be used to our advantage. Terrain is generally divided into four patterns: urban, rural, wooded, and barren. Of these, wooded and urban are considered best suited for use by the Lance battalion. Urban terrain offers several important advantages. The battalion, because of its large vehicles and generators, is potentially a high infrared-emitting source. Detection of a unit

through its IR signature effect would be reduced considerably in a built-up area because of assimilation into normal emissions. Vehicles and equipment can be readily moved into barns, warehouses, and large buildings thus eliminating the need for camouflage nets or natural cover. The use of wooded terrain is also ideal for occupation by a Lance battalion and provides several important advantages. By using natural materials and the lightweight screening system, the battalion can camouflage itself very effectively. Heavily wooded areas with high overhead make aerial detection of resupply and fire mission movement extremely difficult. Wooded areas also offer excellent locations to conduct fire missions.

Physical security. Physical security is protecting operational information or activity by using security forces (listening posts, observation posts, patrols, guards), barriers (wire, antitank ditches), and anti-intrusion devices (mines, signal flares). These means deny or limit enemy access to facilities, areas, equipment, materiel, documents, and personnel.

Signal security. Signal security protects operational information through the practicing of good communications security (COMSEC) techniques and electronic security (ELSEC) techniques. Operating patterns or procedures that identify the battalion *must be eliminated.* Communication traffic must be kept to a minimum. Use of messengers, wire, and speech security equipment must be emphasized. Additionally, commanders must insure that personnel are properly trained on the use of communication codes, secure voice equipment, and radio telephone operator (RTO) procedures. The use of radio silence and proper positioning of antennas are also important ELSEC measures.

Information security. Information security prevents disclosures of operations through written or verbal communications. To safeguard against unintentional release of data important to the enemy, restrictions are placed on personnel and the release of operational information and documents.

Staff Responsibilities.

Estimating the hostile intelligence threat is done by the S2 once the S3 has stated the mission. The S2 coordinates with the communications-electronics officer, supporting Intelligence and Security Command (INSCOM) elements, and other sources to find answers to two questions: "What are the enemy's intelligence collection capabilities?" and "What are the intelligence collection resources of the enemy commander in our area of operation?" The S2 will try to determine the impact of those capabilities the enemy is using in the immediate area. A few examples are:

- Partisans/guerrilla reconnaissance patrols.
- Civilian espionage agents.
- Radio direction finding units.
- Reconnaissance by all types of airborne platforms.
- Sensoring devices.
- EW forces.

Determining the sensitive aspects of the operation is a joint task of the S3 and S2. They must answer the question: "If known by the enemy, what information in what time frame could compromise the operation?" These items are commonly referred to as essential elements of friendly information (EEFI). A few examples are:

- Survey operations.
- Hide areas.
- Reconnaissance.
- Airmobile operations.

Determining OPSEC vulnerabilities is done by the S3. He coordinates and reviews staff actions necessary to accomplish the mission. He must answer the question: "If known by the enemy, what staff actions in

what time frame could provide EEFI?" A few examples of these staff actions are:

- Increased requests for replacements.
- Special weapons convoys.
- Requests for maps and trig lists of a certain area.
- Publication of movement orders.

7-11. Rear Area Security

The battalion commander must insure that the battalion is integrated into either the corps or division rear area security plan. Direct coordination, where possible, with the agencies involved will assure the highest level of security against a given enemy threat.

Fire Support.

Measures should be taken to insure integration of Lance units into the rear area fire support plan. Artillery support when available should be integrated into the battalion defense plans. Prior coordination can be made with adjacent artillery units to obtain radiofrequencies, weapon characteristics, and unit SOP for calls for fire. In addition to artillery support, coordination can be made with attack helicopter units and forward air controllers for USAF support.

Ground Support.

Adjacent military police, engineer, reserve, or civilian police units can be contacted to provide support in the event of a ground attack or for additional security during displacement and for FSL security.

★Air Defense.

Normally, the Lance battalion will be deployed under the protective umbrella of long- and medium-range air defense artillery. Chaparral and Vulcan units may be allocated directly to the battalion by corps for close-in protection of battalion elements against air attack. By siting the battalion in proximity of a Hawk unit (within 5 to 10 km), the commander also enhances his protection against low- and medium-altitude air attack. Communications are normally established between AD units providing defense to a specific unit and that unit or its elements. Through this link, the battalion will receive warning of an air attack. Often, however, the battalion will have to rely on passive measures, small-arms fire, and organic Redeye missile assets as the primary means of close-in air defense. Specific procedures are discussed in section III of chapter 8 and FM 44-23, *US Army Air Defense Artillery Employment, Redeye.*

Section IV. COMBAT SERVICE SUPPORT

Combat service support consists of the total logistical and administrative effort required to maintain the Lance battalion's capability to fight. Involving provision of a *service, an item,* or *technical assistance,* combat service support is a critical element of combat power. Indeed, the ability of the battalion to accomplish its assigned mission will vary directly with the effectiveness of the combat service support system in arming, fueling, fixing, and manning of the weapon systems in the firing batteries. The proper employment of combat service support troops and resources will be vital to success on the battlefield. The Lance battalion commander and his staff officers must know and apply certain key principles in the planning and execution of combat service support. The thrust of combat service

support within the battalion must be *forward* support to the firing batteries through the *austere* supply, *proper* application, and *efficient* use of resources available.

7-12. Combat Service Support Channels

To understand the functions of key personnel and the employment of sections within the battalion in providing support to the batteries, it is necessary to place the battalion in the overall combat service support perspective. The logisticians of the Lance battalion will habitually deal both with higher tactical headquarters and with higher echelon support units. As stated in chapter 5, the Lance battalion will normally be retained under control of the corps field artillery section or be attached to a field artillery brigade headquarters. Similarly, a field artillery brigade with Lance units may operate directly under the corps field artillery commander or may be attached to a division.

> *Note.* Although the status of attachment to a division traditionally includes the provision of combat service support to the attached unit or force, corps artillery units, such as Lance battalions, will continue to receive their combat service support from the COSCOM. This modification to convention is designed to avoid an unnecessary logistical burden on the division, but requires increased coordination among corps and division logisticians at all levels.

For a more comprehensive treatment of combat service support within the corps and the division, see these publications:

FM 54-2, *The Division Support Command and Separate Brigade Support Battalions*
FM 54-9, *Corps Support Command*
FM 54-10, *Logistics*
FM 100-5, *Operations*

7-13. Supply Operations

Supplies are those items required to equip, maintain, or operate a military force. Supply operations involve the determination of requirements and the requesting, procuring, storing, and distributing of items to fulfill those requirements.

To facilitate supply management, supplies are grouped into 10 major classes. The following paragraphs provide a general discussion of the classes of supply as they pertain to the Lance battalion. FM 38-24, *Classes of Supply,* provides an amplification of classes and subclasses of supply prescribed in AR 11-8.

Class I consists of all subsistence items. Normally, rations are automatically requested for the entire battalion by the supply and service battalion of the COSCOM support group based on the daily strength report submitted by the S1 to higher headquarters.

Class II consists of supplies and equipment (except cryptographic) prescribed by tables of organization and equipment (TOE), tables of allowances (TA), and prescribed load lists. When a class II item is lost, destroyed, or worn out, the batteries request replacements through the S4, who consolidates requests and forwards them to the appropriate COSCOM direct support unit. COMSEC equipment is requested and distributed through cryptographic channels. This

is normally accomplished by coordination between the battalion cryptocustodian and the custodian at the next higher headquarters.

Class III consists of petroleum fuels, oils, lubricants, and related items. Most class III items do not require formal requisitioning; empty fuel vehicles and containers presented at a distribution point are sufficient to obtain POL. Fueling in position by battalion POL trucks is the normal procedure for the firing batteries.

Class IV consists of items for which allowances are not prescribed, such as construction, camouflage, barrier, and fortification materials. Requisitions normally require command approval and are submitted through command channels.

Class V consists of ammunition of all types. Of primary interest to the Lance battalion are warhead and main missile assemblages fired by the firing sections. Supply procedures for special ammunition are described in the FM 101-31 series and in FM 9-6.

Class VI consists of personal demand items sold through COSCOM post exchanges (PX). Requests for support are submitted through S1/G1 channels to the appropriate exchange officer.

Class VII consists of major end items, such as vehicles and launchers. Class VII items are issued based on daily battle loss reports or formal requisitions.

Class VIII consists of medical material, including medical-peculiar repair parts. These items are requisitioned by the battalion medical section from the appropriate medical supply support echelon.

Class IX consists of repair parts, less medical-peculiar items.

Class X consists of nonstandard items, intended for the support of nonmilitary programs such as agriculture and economic development. Those not included in classes I-IX are requested, obtained, and delivered by the S4.

Conservation of all types of supply must be a matter of emphasis for all leaders. Supplies can be conserved by—

- Recovering, repairing, and salvaging damaged or inoperative equipment.
- Carefully storing supplies to protect them from weather, rodents, etc.
- Safeguarding them from pilferage.
- Insuring economical and efficient use.
- Allowing controlled substitution of parts from vehicles and equipment only as authorized by the commander.

7-14. Ammunition Operations

The resupply of missiles to the firing batteries is one of the most vital combat service support operations performed, since ammunition—the lifeblood of the field artillery—is a primary ingredient of combat power. The S4 has staff responsibility for class V operations, but the ammunition officer directly controls the resupply effort. He must also be the battalion's expert in the storage, handling, and accountability of all types of class V supplies.

The ammunition platoon of service battery must perform all required inspections to insure reliability of missile rounds prior to delivery to the firing units. Whenever possible, the contact team supporting the battalion should test the missiles with the guided missile test set (GMTS) as part of these reliability checks.

7-15. Maintenance Operations

Maintenance involves all actions taken to keep material in a serviceable condition or to restore it to serviceability. A successful maintenance program is, therefore, dependent upon the concentrated efforts of all personnel of the Lance battalion. Although the S4 is charged with staff supervision of

maintenance, the battalion motor officer has direct supervision of the battalion maintenance effort.

Maintenance management in the battalion is facilitated by a constant analysis of the eight critical factors affecting the maintenance effort:

- Personnel
- Time
- Tools
- Repair parts
- Records
- Publications
- Facilities
- Command emphasis

Continued evaluation of these factors as they affect the battalion's maintenance posture serves to identify problem areas and suggest corrective actions. Viewed in the context of the mission and tactical situation, they also enhance the establishment of priorities required by personnel and time limitations.

FM 29-2 is a single-source reference for the battalion commander and his staff on the planning, managing, and evaluating of the organizational maintenance program. The principles, procedures, and techniques contained therein should be the basis for the battalion's maintenance operations, and for a concise SOP that defines the maintenance responsibilities of personnel throughout the battalion.

7-16. Maintenance of Lance-Peculiar Equipment

★ Lance-peculiar equipment is authorized in only two elements of the battalion—the firing battery and the service battery ammunition platoon. A Lance missile maintenance technician (warrant officer, MOS 214G) is assigned to the battery headquarters of service battery and is responsible for advising the battalion commander on Lance-peculiar equipment maintenance and providing guidance or assistance to unit personnel performing maintenance on Lance-peculiar equipment.

Organizational Maintenance.

Organizational maintenance is the maintenance normally authorized for, performed by, and the responsibility of the using organization on equipment in its possession. This maintenance consists of cleaning and repair functions within the capabilities of authorized personnel using skills, tools, and test equipment prescribed in appropriate DA tables of organization and equipment (TOE) or tables of distribution (TD). Maintenance not authorized at this level will be reported to the next higher supporting level of maintenance or service. During tactical operations, the normal practice is to remove a faulty missile from the launcher immediately and replace it with a serviceable one, rather than attempt maintenance at the firing position. Unserviceable missile components can be evacuated to the special ammunition supply point (SASP) as a defective class V item.

★ Maintenance performed by operators and crewmen on missiles or missile-peculiar items such as a firing device or monitor-programmer will be supervised by their section chief with the guidance or assistance of the Lance missile maintenance technician. This maintenance will be limited to inspection, cleaning, lubrication, replacement of lamps, minor paint touch-ups, and missile prelaunch checkouts with the monitor-programmer. Operator and crewmen maintenance of common-type items (loader-transporter, launcher, azimuth laying set, sling, and tripod hoist) will be no different from that performed on like hardware items currently in the Army inventory. Maintenance of the nickel-cadmium (NICAD) batteries used to power the monitor-programmer will be limited to charging the battery from the slave receptacle of the Lance basic vehicles.

The service battery will be responsible for that phase of organizational maintenance in support of the battalion's operators and crewmen. Service battery and firing battery maintenance personnel will guide and instruct operators and crewmen in their performance of organizational maintenance and scheduled maintenance on the battalion's equipment, will handle organization-level parts replacement, and will perform minor repairs and adjustments.

Support Maintenance.

Support maintenance consists of all maintenance functions of direct support (DS) and general support (GS) organizations. Conventional items of the system will be supported by maintenance *equipment* common to today's field army. The principal equipment for support of the missile-peculiar items consists of the AN/TSM-84 test set and the land combat support system (LCSS). Maintenance of nickel-cadmium batteries and retention of spare batteries will be functions of the rocket and missile support detachment. All tools, test equipment, and charging equipment for nickel-cadmium battery maintenance will be allocated to the Lance missile contact team attached to the battalion.

Direct support maintenance. Direct support maintenance is that degree of maintenance normally not authorized to organizational elements but accomplished in immediate support of those elements. Essentially, direct support responsibilities include limited parts supply; in-storage monitoring; and replacing, repairing, exchanging, and returning to the user, after repair, those items that are beyond the maintenance capability of organizational maintenance personnel. Lance battalions will obtain conventional direct support maintenance from the corps support brigade's light maintenance company. Conventional direct support maintenance for common-type end items will be no different from that performed on like hardware items currently in the Army's inventory.

The principal support organization for missile-peculiar equipment (less warheads and warhead sections) is the rocket and missile support detachment. This organization is capable of performing and may be assigned a direct support or general support role. In the direct support role, missile support detachments will provide missile direct support service for Lance artillery battalions and special ammunition supply points (SASP). These detachments are 100 percent mobile and their primary responsibilities are to provide command, control, and overall supervision of maintenance and contact team detachments; provide support maintenance by using the LCSS; provide technical control and supervision of inspection, testing, modification, and repair functions; and provide on-site component repair or replacement.

Lance maintenance contact teams provide on-site checkout and repair or replacement of missile components, missile-peculiar test equipment, and training missiles. These contact teams also provide technical assistance as required by the using units and special ammunition units supporting the Lance missile system. Augmented by class V personnel of the special ammunition companies and using AN/TSM-84 test sets, these teams will perform 6-month in-storage monitoring of all missiles in ammunition supply points and artillery battalions.

General support maintenance. General support maintenance is the support authorized to, and performed by, a designated support organization with specially trained personnel repairing items of equipment for return to local supply stocks. These repairs are accomplished by replacing assemblies, subassemblies, parts, and modules; fabricating parts from bulk material; and repairing end items, assemblies, subassemblies, and modules.

The basic unit for general support of Lance-peculiar electronic items is the rocket and missile support detachment, TOE 9-550. Using the LCSS test set, this detachment will repair all electronic items to the lowest authorized level. This includes replacing subassemblies, modules, cards of the monitor-programmer and the AN/TSM-84 test set, and the subassemblies of the guidance set. The general support missile support detachment team EJ will provide electronic and other missile maintenance support to the area special ammunition general support companies stocking Lance class V material.

The special ammunition general support

company has a limited Lance maintenance repair mission of class V items; e.g., replacement of the safe-arm igniter. The main Lance support service for this organization is storage and resupply of missile main assemblages and warhead sections for the SASP and the artillery battalions. Class V items not repairable by this organization will either be evacuated to CONUS depot facilities for renovation or be destroyed under existing regulations. Visual inspection and surveillance of the ammunition stockpile is the assigned function of the company.

Conventional general support maintenance for common-type end items of the system will be provided by the heavy equipment maintenance company of the corps support brigade.

Calibration.

Calibration services will be performed in accordance with AR 750-25. Rocket and missile support detachment personnel will use the AN/TSM-84 test set to perform level C (maintenance) calibration of the monitor-programmer. Level C (maintenance) calibration of the test set will be performed using the land combat support system. Level A calibration of conventional tools and test equipment (e.g., torque wrenches, multimeters, etc.) will be performed by personnel of the calibration company (TOE 29-277G). The forward mirror bracket (part of the azimuth laying set) will be supported by a secondary reference lab on a turnaround basis. Spare brackets will be provided to the using unit.

7-17. Personnel and Administrative Support

Those combat service support functions relating directly to personnel—the ultimate ingredient of the battalion's combat staying power—come under the staff supervision of the S1. He supervises and coordinates administrative support of the battalion by processing personnel actions moving from the batteries to the battalion or through the battalion to higher headquarters, and by coordinating with the rest of the staff on such matters as strength, replacements, morale, discipline, law and order, PWs, and medical services. He is assisted in these duties by the members of the personnel administration center (PAC), who also perform routine personnel management functions.

To accomplish his combat administrative support mission, the S1 evaluates SIDPERS input, the personnel daily summary (PDS), daily strength messages, periodic personnel reports, casualty reports and, if appropriate, radiation dosage reports to determine the battalion's replacement needs.

The S1 insures that the battalion receives the proper number and type of replacements through thorough cross-checking of all administrative and operational strength or loss reports and by coordinating assignment priorities with the commander and S3.

The maintenance of discipline, law, and order is a responsibility of the S1. He supervises such matters as control and disposition of stragglers and the administration of military justice.

The S1 is responsible for PW handling. He fulfills this responsibility by coordinating with the S2.

Collection, identification, safeguarding of personal effects, and evacuation of dead from the battle area are unit responsibilities monitored by the battalion S1.

7-18. Medical Support

Medical support within the battalion is accomplished primarily by the medical section through acquisition of the sick and wounded from battery areas, provision of rapid emergency medical treatment following acquisition, and patient evacuation as necessary. The section administers the battalion aid station, located as far forward as the tactical situation permits.

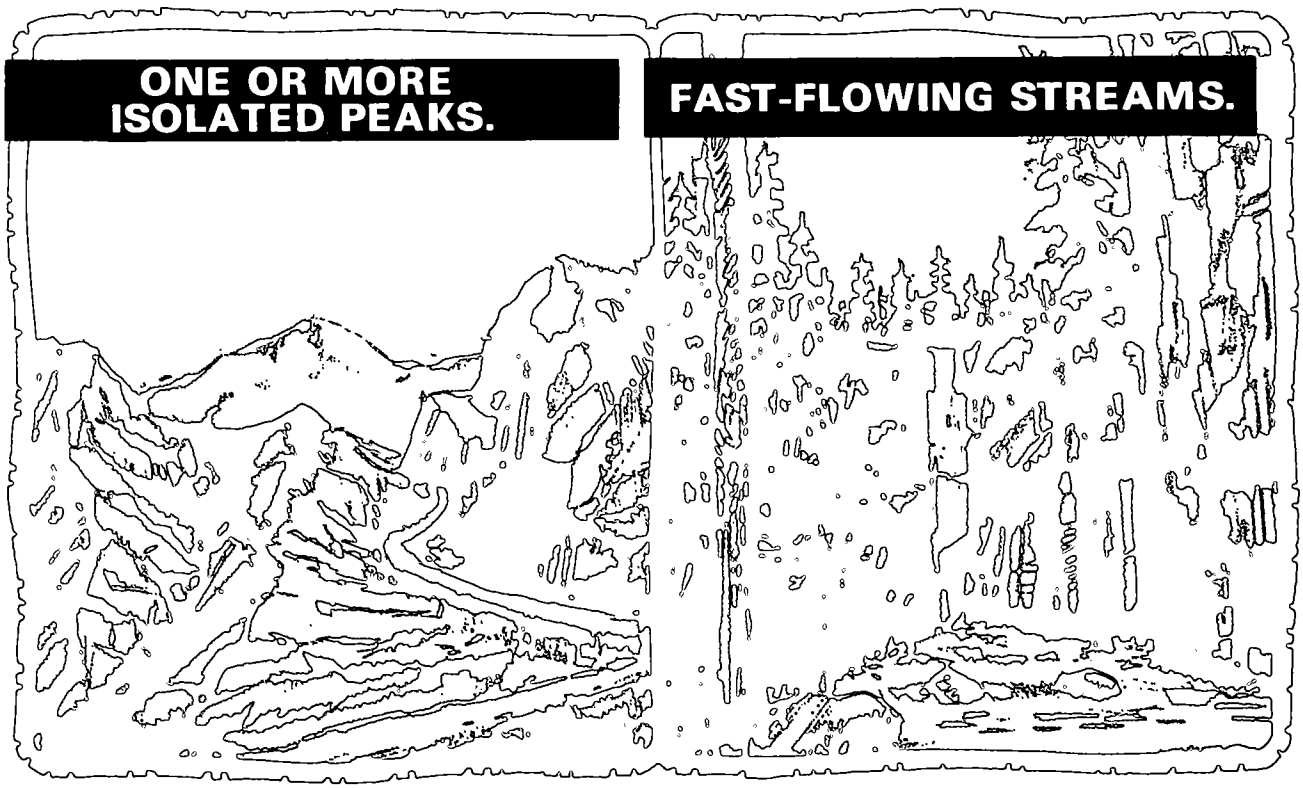
Each battery is provided an aidman, who administers routine or emergency medical treatment within his capabilities and insures that those casualties who must be evacuated for further treatment are properly prepared and promptly moved. The battery aidmen essentially perform triage—the sorting of casualties to determine who needs further treatment and who can be returned to duty.

7-19. Managing Combat Service Support

The success of the Lance battalion's tactical operations is directly related to the quality and timeliness of the support provided by its combat service support elements. Therefore, the management of support functions and operations in the battalion by the S1, S4, or any other supervisor must be closely coordinated with the tactical operations. A continuous exchange of information among combat service support (CSS) managers, the S3, and battery commanders is essential to the success of both tactical and logistical plans.

ity of firing into mountain peaks between the target and launch point should be considered when choosing firing points in valleys or low-lying areas. Conversely, firing from altitudes above 1,000 meters increases the maximum range of the system.

Because of the probability of encountering narrow, restrictive roads and trail nets, often hampered by the presence of snow and icy conditions, the mobility of Lance units will be seriously degraded unless vehicle and track drivers are proficient in operating under such conditions. Driver training to develop skills under adverse weather conditions on mountain roads with steep grades, sharp turns, and switchbacks should be comprehensive and extensive. To enhance Lance mobility in mountains, it will be necessary to use helicopter airlift as much as possible. Commanders should insure that their units are proficient in all aspects of loading, transporting, offloading, and rapid emplacement of Lance firing sections transported by air. (See chapter 10.)



Maintenance.

Aside from the possible requirement for carburetor adjustment for high-altitude operation of gasoline-fueled vehicles and generators, maintenance requirements do not differ substantially from normal requirements. Additional cold weather maintenance requirements are discussed in paragraph 11-4.

Communications.

Irregular terrain masses and extensive forested areas will reduce the range and reliability of FM radio transmissions. They will also inhibit the use of wire. To increase the effectiveness of radio communications, the use of special antennas, and radio relay and repeater stations must be maximized.

11-4. Northern Regions

The northern regions, including arctic and subarctic, comprise about 45 percent of the North American continent and 65 percent of the Eurasian landmass. This area has potential importance to United States national interests. Lance units must, therefore, maintain the capability to conduct military operations in this environment. The probability of large-scale combat operations under extreme arctic conditions is unlikely. In arctic regions (the polar icecap, for example) so many resources are needed just for the survival of the force that little remains for accomplishing anything militarily useful. Therefore, the likelihood of large forces being committed to such an extreme environment is small.

It is quite possible, however, that the US Army could be called upon to commit large numbers of troops to combat operations in the northern, subarctic regions of Europe, Asia, or North America. This discussion, therefore, focuses on these subarctic northern regions.

Environmental Effects.

Northern regions are characterized by extreme cold and deep snow during the winter months. Seasonal effects differ between winter, summer, and particularly the transition periods (spring breakup and fall freeze-up). The summer months have long periods of daylight; the winter has long nights. Aside from the purely climatic effects, military operations are also influenced by the vast distances and isolation common to these areas.

Certain weather phenomena are peculiar to these regions. Whiteouts and greyouts cause a loss of depth perception, which increases the possibility of becoming lost and increases driving hazards. Ice fogs can form over a body of troops, bivouac areas, motor parks, convoys, etc., and disclose their locations.

One of the most important environmental effects is the impact upon mobility. Mobility varies considerably according to the season. The most suitable time for ground operations is from midwinter to early spring before the breakup period. The worst period is during the spring thaw when the ground becomes saturated, roads become flooded—often disintegrating—and low-lying areas are turned into a morass of mud. Air mobility provides the most effective method of movement for Lance firing platoons year round. Tracked vehicles possess generally good mobility, except during the transition periods. Generally, wheeled vehicles and trailers are not suitable for subarctic operations.

Another important environmental effect is the impact of extremely low temperatures on weapons. In extreme cold, metal becomes brittle and increased parts breakage occurs in all types of weapons. Many weapons create ice fog which, on a still day, may obscure the gunner's vision, thus requiring movement to alternate positions after firing. Care must be taken not to bring a weapon into a warm shelter where condensation will cause the weapon to freeze and malfunction when taken back into the outside cold temperatures. Firing platoons will face particularly serious problems from ice fog and soft snow covering equipment after a launch.

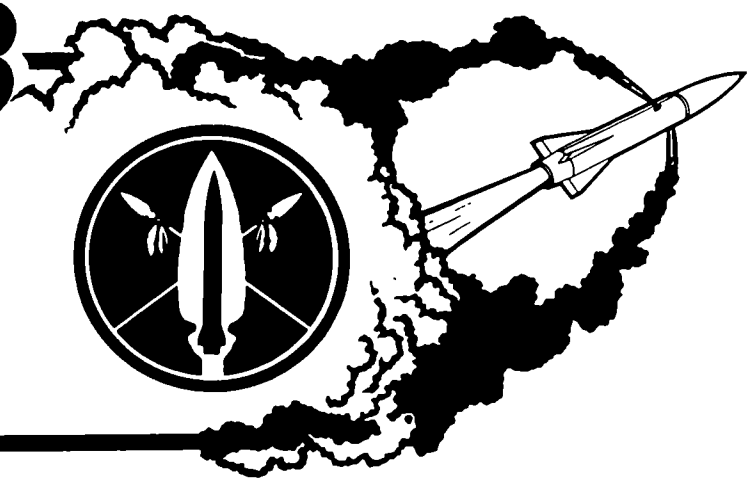
The northern environment significantly increases the time required to perform even simple tasks. Experience has shown that five times the norm may be required. For example, starting and warmup times of tracked vehicles may approach 2 hours in temperatures of -50° F. When changing a battery position in extremely cold weather, additional time is required for striking shelter, loading equipment, etc., because of decreased personnel efficiency.

Employment.

During summer months, long periods of daylight permit enemy observation practically around the clock, further compounding the problem of undetected unit movement and survivability. Wheeled vehicle mobility will be severely limited because terrain in the subarctic regions is characterized by poor to

CHAPTER 8

Lance Employment: Battery Level



The effective employment of a Lance battery will determine how well the battalion as a whole will perform its mission. The Lance battery commander controls one-third of the battalion's firepower which, if improperly utilized or employed, may influence the outcome of the battle to our disadvantage. Many routine functions in a Lance battery closely parallel those of a cannon battery. Therefore, many procedures discussed in this chapter are similar to those given in FM 6-50, modified for Lance applicability.

In section I, certain areas of the RSOP and other battery operations, which vary from traditional artillery practices, are discussed as they apply to Lance. The key to survival of a Lance battery lies in its ability to avoid detection. The battery commander can enhance this survivability through proper reconnaissance of prospective position areas, selection of the one offering the best natural cover and concealment in conjunction with defensible terrain features, an orderly and well-planned movement between positions, an efficient occupation of position, and proper employment of OPSEC techniques. This not only enhances protection of the battery during a period when it is most vulnerable, but also decreases the amount of time the unit is "nonoperational" because of a change in position.

Section II of this chapter describes the functions of the various organizations within the battery and how they contribute to the overall operation of the battery.

In section III the defense of the battery position is discussed. If a battery's location has been compromised, the commander must be able to preserve his firing capability and nuclear weapons at all costs. The old adage that artillery must provide continuous fire support even when under fire does not always hold true in the case of a nuclear delivery unit such as Lance. Because of the battery's inherent lack of security, the battery defense should provide for security against a surprise attack or random engagement. Because threat doctrine dictates that nuclear fire capabilities will be annihilated when discovered, it is the battery commander's responsibility to avoid a major engagement to the point of withdrawal if necessary. The survivability of the firing platoon should not be jeopardized. Loss of a firing platoon or launcher could represent a significant portion of the force commander's nuclear firepower capability that he can most likely not afford to lose.

Section I. BATTERY RECONNAISSANCE, SELECTION, AND OCCUPATION OF POSITION (RSOP)

On today's battlefield, a sophisticated enemy is capable of locating and engaging a battery in a variety of effective ways. To survive we may be required to move frequently. Frequent movement, however, reduces responsiveness and necessitates greater reliance on other batteries assuming the mission during displacement. To minimize movement time, all key personnel must be capable of *performing* the reconnaissance, selection, organization, march, and occupation tasks *quickly* and *efficiently*. The keys to successful reconnaissance, selection, and occupation of position (RSOP) are discipline and team effort that come from frequent and effective training.

8-1. Movement Considerations

The headquarters controlling the movement of the battery directs the essential elements of the movement *when, where,* and *how*. These elements of movement may be specifically spelled out in an SOP or operation order, or may simply be implied in the mission assigned.

Depending upon the tactical situation, the control headquarters may delegate to the battery the responsibility for any one or all of the essential elements of the movement. The battery commander must anticipate movement. He must plan in advance for displacement to new or alternate positions and announce movement techniques to be used. The battery commander should advise the controlling headquarters of any factors that they need to consider in determining the *who, when, where,* and *how* of the movement.

It is desirable that all key personnel of the battery understand the considerations involved in movement. The unit must be prepared to move—

To maintain optimum firing capabilities. The unit should be aware of changes in the FEBA, moving forward as it advances to retain depth of fires and displacing to the rear as enemy advances to preclude engagement. Changes in the unit's mission or movement of the supported unit may also dictate battery displacement. Considerations that may dictate movement in this case could include communications limitations, combat service support, and target acquisition resources. The battery commander must know the tactical situation, anticipate when a displacement is needed, select positions in advance, reconnoiter when possible, and recommend to the commander when and where the battery should displace.

During lulls in action. If the battery needs to move because of a change in the FEBA, it may be best to move during a lull in combat action. A lull may not last long, so caution must be exercised.

When the position becomes untenable. The battery should move whenever it cannot operate effectively because of enemy ground, air, or artillery attack. Depending upon the tactical situation, the battery may displace to its previously selected alternate position. Again, anticipation is the key to minimum disruption. For further discussion of the tactical considerations in displacement and positioning, see FM 6-20.

8-2. Reconnaissance

Reconnaissance is defined as the examination of terrain to determine its suitability for accomplishment of the battery mission.

8-3. Receipt of Order

The battery commander may receive displacement orders ranging from a five-paragraph operation order to a simple authenticated radio message from higher headquarters. He is given the general location of his new position, the time to depart and/or be in the new position, and the routes to be used.

8-4. Methods of Reconnaissance

Before the battery commander can adequately plan for displacement, he should know the three methods of reconnaissance.

Map reconnaissance. All anticipated moves should begin with a map reconnaissance of the proposed position area and the routes to be traveled. Map reconnaissance is not totally reliable, as terrain features may have changed since the map was printed and true surface conditions cannot be determined. However, a map reconnaissance of tentative routes and proposed position areas should be made before a ground reconnaissance is conducted. Aerial photographs are usually more current and provide more detail of the area than maps.

Air reconnaissance. If the assets are available and the situation permits, an air reconnaissance can be made. The information gained from an air reconnaissance can be useful in the selection of specific route(s) to be used and areas to be occupied. Air reconnaissance is a fast method, but may not be advisable at battery level because true surface conditions may not be distinguishable or may appear distorted. The pilot must be careful that his flight plan does not compromise the route or the new position area.

Ground reconnaissance. A ground reconnaissance is the best method of determining the suitability of routes to be traveled and positions to be occupied. The actual condition of the route(s) to, and the terrain pattern within, the proposed area are seen as they exist. This method, however, is more time consuming than either the map or air reconnaissance.

Each method of reconnaissance offers the battery commander a different but complementary perspective of the best route to the best position. If the situation permits and time is available, all three methods may be used. In most instances, the battery commander performs a map reconnaissance, selects a tentative route, and then conducts a ground reconnaissance.

8-5. Organization of the Reconnaissance Party

Depending on the amount of time available to perform the reconnaissance, either a hasty or deliberate reconnaissance will take place.

★ A deliberate reconnaissance will be conducted by the battery commander with a minimum number of personnel. The detail platoon leader or platoon sergeant, depending on his location, will either accompany the battery commander with his vehicle or rendezvous with him at a predetermined location.

A hasty reconnaissance should only be conducted when there is very little lead time from receipt of movement order to the start point time. The hasty reconnaissance party is similar to the deliberate reconnaissance party and includes members of the advanced party (see paragraph 8-8 for a discussion of the advanced party).

8-6. Execution of the Reconnaissance

Prior to departure, the battery commander must give key information to his executive officer (XO) and advanced party personnel to provide continuity if he becomes a casualty. As a minimum, the battery commander should identify:

- The tentative location of the new battery position.
- The time of displacement (SP time).
- The method of march.
- The route of march.
- The location of the release point (RP).
- The location of adjacent units.
- The general enemy situation.
- The mission.

The battery commander should also determine the tentative order of march if not already outlined by unit SOP. He may also designate an alternate route in the event the primary route cannot be used.

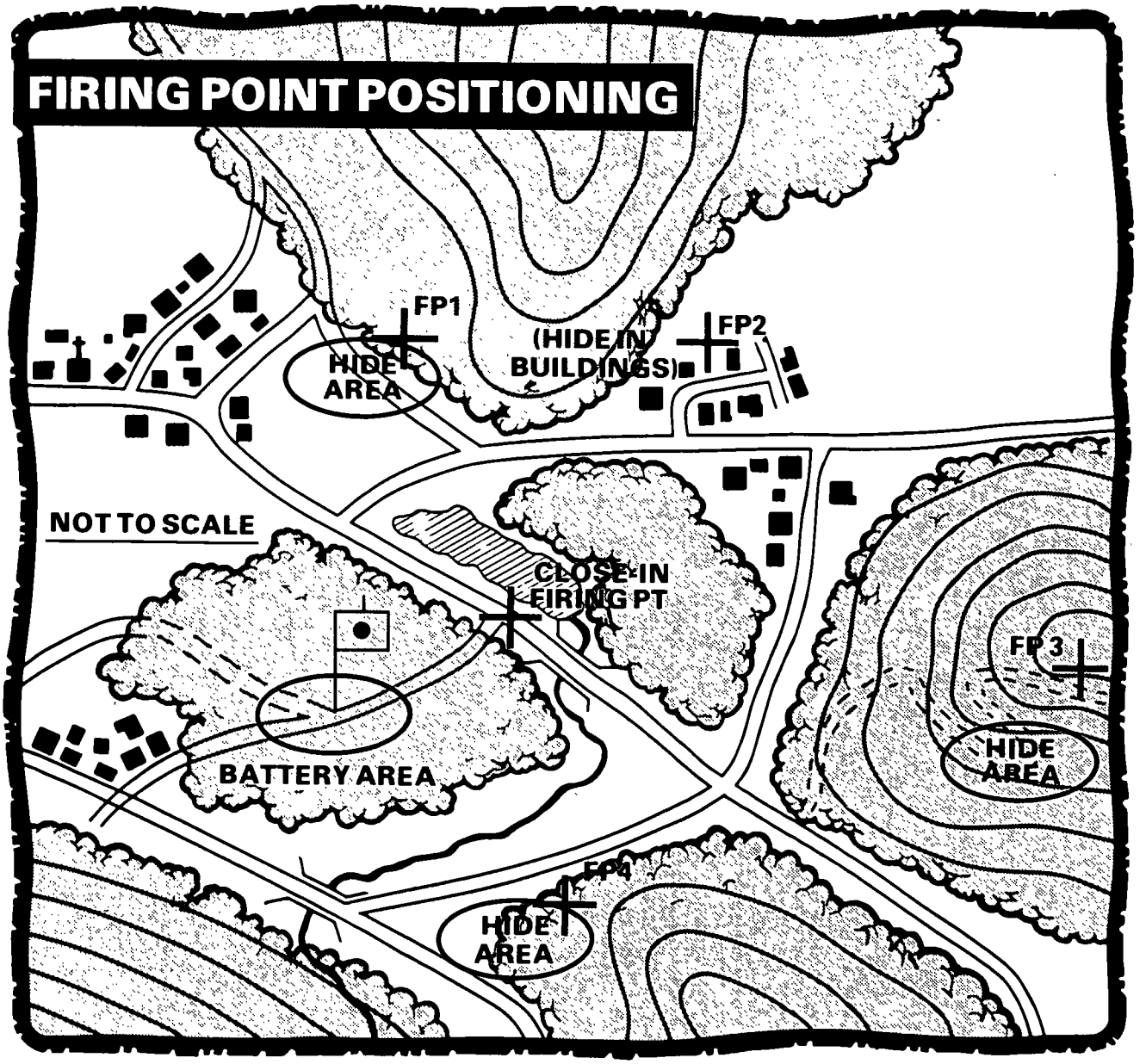
After making a map reconnaissance, completing his planning, and briefing necessary personnel, the battery commander is ready to proceed. While moving, he verifies the suitability of the primary route. He also checks cover and concealment, location of obstacles, likely ambush sites (preplan suppresssive fires as required), the distance, and the travel time required.

Upon arrival in the vicinity of the new location, the battery commander should check for a suitable location as outlined in paragraph 8-7 and begin selecting firing points for this position. A minimum of six firing points should be selected forward of the battery position.

Additional firing points may be selected as time allows.

Hide areas will be selected in the immediate vicinity of the firing point. Additionally, a close-in firing point may be selected for use on backup fire missions which, as stated in

chapter 7, should be rarely assigned. Proper planning at all levels, corps to battery, will insure that firing elements have sufficient time to occupy external firing points to perform all missions.



Note. Use of close-in firing points will normally cause the battery to displace to avoid detection and destruction. Displacement causes the unit to be in great danger, since the missile firing has already focused attention on the area and the unit movement could be easily seen and attacked by enemy aircraft.

Upon completion of the reconnaissance, the battery commander should return to the battery using the alternate route, checking for those items given above for the primary route. The detail platoon leader and sergeant return to the survey sections and implement survey operations on the new firing points as soon as possible.

In the event of a "hasty" displacement, the above operations will be carried out concurrently with those procedures outlined in paragraph 8-10 for an emergency occupation.

8-7. Selection of the Position

After the battery commander has reconnoitered various possible positions, final position selection is based on the criteria in the following paragraphs.

Selection Considerations.
The following items should be taken into consideration when selecting a position:

- Mission
- Tactical situation
- Communications
- Defensibility
- Trafficability
- Terrain

Mission. The position should provide for maximum coverage of the zone of responsibility of the supported force if possible.

Tactical situation. The tactical situation will largely dictate the location of the position area, positioning of firing points, and the use of terrain in defense of the battery.

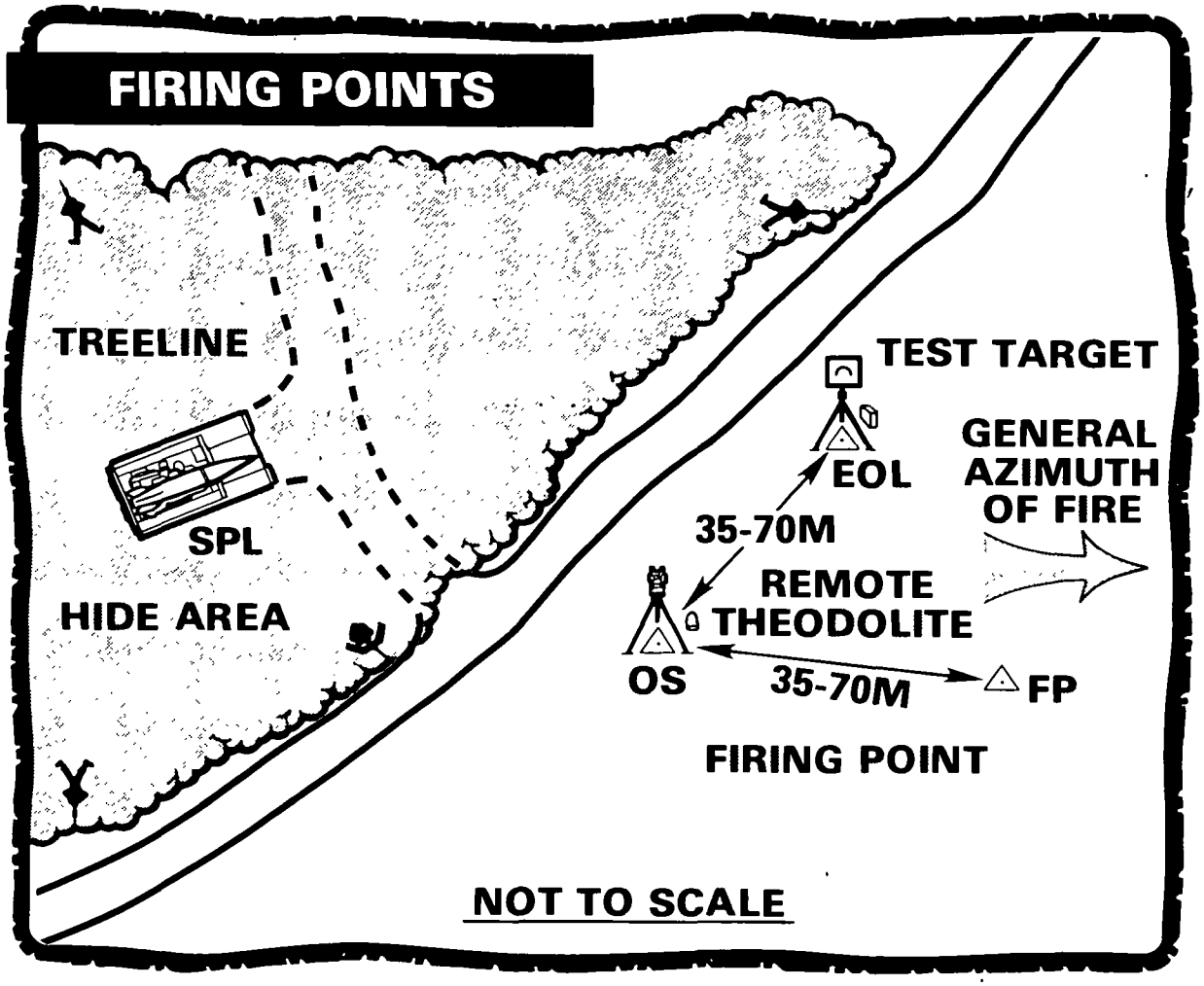
Communications. The position should generally be in electronic defilade in respect to the FEBA and facilitate good communications with higher headquarters and the firing points. However, due to line of sight requirements for FM communications, electronic defilade may not always be possible.

Defensibility. The position should facilitate both active and passive defense so that it:

- Can be entered without enemy observation.
- Offers effective cover and concealment with emphasis on concealment.
- Avoids high-speed avenues of approach into the position from the FEBA.
- Has more than one entrance and exit route, preferably to the rear of the position.

Trafficability. There should be an adequate road network both outside and inside of the position that will allow firing platoons and ammunition convoys easy access to the position. The use of narrow roads with sharp turns or closely spaced trees that would constrict movement of the 5-ton XLWB trucks should be avoided. The soil within the position should be firm enough to allow off-road positioning for all of the battery vehicles (especially loaded ammunition trucks and tracked vehicles).

Terrain. Ideally, a position should be selected for battery occupation that would allow around 30-50 meter dispersion between each vehicle. Less than optimum terrain, cover and concealment considerations, or a high density of trees may dictate that the area be smaller. Firing point locations should offer good cover and concealment in the hide area, be within traverse distance of a survey control point (if available), and have not more than a 5° (89 mil) ground slope. Ideally a firing point would be a "hole in the woods" or a position on a tree line that is concealed from ground observation by a tree nursery, hill mass, or brush. Farmyards, bombed-out buildings, warehouses, or other desirable firing locations could be used in a built-up area.



Positions.

For each location considered, the battery commander should select both a primary position and an alternate position.

The primary position is the one from which the battery will accomplish its assigned mission. It should meet most of the position selection requirements.

The alternate position is one to which the entire battery moves if its primary position becomes untenable or the battery has to move for other reasons. Since the battery will continue its mission from the alternate position, it must meet the same requirements as the primary and should be far enough away that the battery can escape the effects of enemy attack on the primary position. It should be reconnoitered and prepared for occupation as time permits. Each section chief must know the route to the alternate position because movement to that area may be accomplished by section.

8-8. Preparation for Occupation of the Position

Once the new battery position has been selected and the order to move has been

received, the battery commander assembles the advanced party in preparation for the move. The organization of the advanced party should be tailored for the performance of specific duties. The battery commander takes to the new position only the route guides, personnel, and equipment necessary for the preparation of the position for occupation. A standard nucleus of advanced party personnel and equipment should be established by SOP. The equipment required to prepare the position should be preloaded (if possible) or identified and maintained in such a manner that it can be located and loaded on the prescribed vehicle without delay. Equipment needed for the occupation includes mine detection, radiological monitoring, and chemical detection equipment.

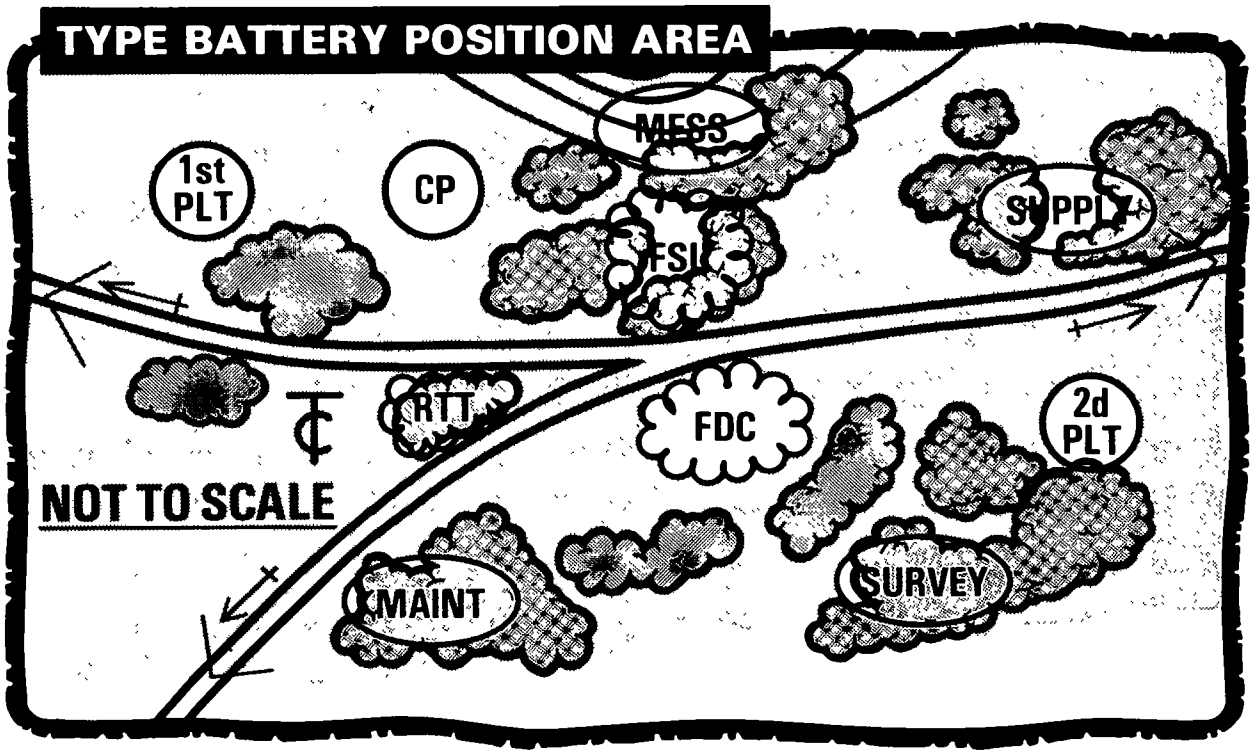
Arrival at the New Location.

Upon arrival at the new position area, the advanced party should rapidly dismount and sweep the area to be occupied. The sweep is made to insure that the area is free of enemy troops, boobytraps, mines, and nuclear, chemical, and/or biological contamination. Care must be exercised at all times to keep the advanced party and its vehicles concealed. As the advanced party sweeps the area, a skeletal perimeter is established. The sweep should cover the proposed position and also the surrounding terrain from which the enemy could attack. Observation posts should be established after the initial sweep and maintained until occupation of the position is terminated.

Selection of Installation Positions.

After the position has been secured, the battery commander will select the tentative positions that each section of the battery will occupy. Areas that require specific considerations include:

- The fire direction center.
- The field storage location.
- The communications complex.
- The firing platoon and A&T areas.
- The battery CP.
- The service area.



The fire direction center. The FDC should be located somewhere near the center of the battery position. It should be on relatively high and level ground, and have good communications with both battalion FDC and the firing points.

The field storage location (FSL). The FSL should be located in the most defensible part of the battery area consistent with the availability of natural concealment and access routes. Requirements for establishing the FSL are found in AR 50-5 and FM 100-50.

The communication complex. This area will be generally located in the vicinity of the FDC to facilitate rapid message transmissions. It should be on relatively high and level ground. Consideration should be given to tree coverage that may interfere with the radiating patterns of the various types of antennas.

The firing platoon and A&T areas. These platoons should be located where they have easy access to the road network. The turning radius of the 5-ton XLWB trucks must be taken into consideration.

The battery CP. The battery CP should be located where it can best control all of the activities in the battery area.

The service area. Battery support vehicles should form around the perimeter of the battery area. These installations include maintenance, mess, and supply. They should be on firm ground, have good drainage (especially the mess section), and be well concealed.

Duties of Key Personnel.

Once the position has been established and the locations of the various sections determined, key personnel begin preparation for the arrival of the main body.

The battery commander. The battery commander indicates the primary entrance and exit points and gives the 1SG guidance on the development of the battery track plan.

The first sergeant. The first sergeant establishes the track plan, organizes the dispersion of vehicles throughout the area, and plans the perimeter defense of the position. In forming the track plan, he considers:

- Use of existing roads and trails.
- Locating the entry point to the position where foliage, trees, or other growth meets the main trail or road.
- Provision for separate entry and exit routes.
- Having routes follow natural terrain features such as gullies and tree lines to take advantage of natural cover and concealment.
- Briefing vehicle guides on the track plan. If concealment is critical, the first sergeant may dictate the exact route each vehicle is to follow. Situations in which sharp pivoting will disrupt ground cover *must be avoided.*

FDC personnel. FDC personnel on the advanced party should set up the RC-292 antenna in the designated FDC location so that the FDC will have immediate communications capability upon occupation of the position. Generator emplacements may be dug in and spoil camouflaged.

Section guides. Section guides should familiarize themselves with the route that their sections must take from the entrance to the position to the section location. They should be able to lead vehicles to their positions in both daylight and darkness.

Preparation for Night Occupation.

In addition to what has already been discussed, the following tasks should be performed as time permits to facilitate a smooth and orderly night occupation.

Tentage used in the battery should be erected prior to darkness if possible. A check for light leaks must be made. If daylight shows inside the tent, artificial lights will show outside the tent at night.

Light sets and their generators may be brought forward, installed, and checked prior to darkness.

For a night occupation, *every* vehicle must be guided into position. Guides should be thoroughly briefed and should pace their routes before and after darkness. They should be equipped with filtered flashlights (with cones if possible, especially for the tracks) or have reflective tape on the back of their helmets to guide the vehicles. Assistant drivers may be used as ground guides for their individual vehicles after arriving at the position. They will follow the person in their section who came forward with the advanced party to the final position.

Main Body Preparations.

In the old position, the battery XO will begin preparations for the main body move. Preparation for the move may include:

- Periodically starting vehicles to insure they are capable of operation.
- Uncovering wire or removing it from trees (do not disconnect critical installations or the security hot loop until the last possible moment).
- Replacing section equipment in proper storage locations.
- Reloading off-loaded ammunition and containers.
- Removing camouflage nets, except from Lance-peculiar equipment.
- Completely loading all service elements such as mess, maintenance, supply, etc.
-Taking down tentage.

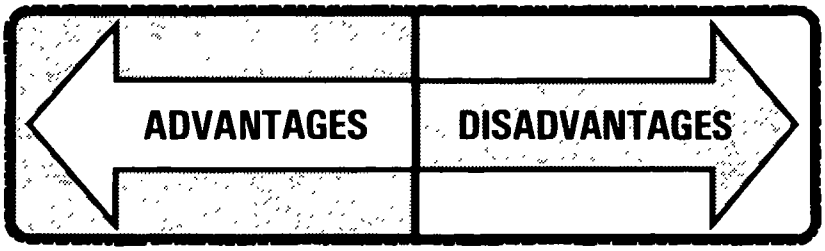
Note. The XO must know how long the above actions will require. He should plan back from the SP time and initiate march order procedures accordingly. Do not begin march order too soon.

8-9. Marches and Movements

One of the essential ingredients in the delivery of timely and accurate fire is being in the right position at the right time. Getting to that position can be a difficult task. The movement of the battery must be accomplished quickly, with stealth and security. Making such a move requires considerable team training and discipline. The object of this paragraph is to present information to assist in tactical vehicular marches of Lance batteries.

Tactical Marches.

A tactical march is the movement of a unit or element of a unit under actual or simulated combat conditions. As previously mentioned in chapter 7, the battery may move as part of a battalion march unit, as a battery, or by echelon. Whatever the case, one of several techniques may be used based on the tactical situation. Each technique has its specific advantages and disadvantages. It is up to the commander to decide which method or combination of methods is best in any particular situation.



Open column road movement. The open column is used for normal daylight movements. It is used whenever there is an adequate road network that is not overcrowded, when enemy detection is not likely, when time is an important factor, and when there is considerable travel distance involved. Vehicle interval in an open column is generally 100 meters.

ADVANTAGES

- **FASTEST METHOD OF MARCH.**
- **REDUCED DRIVER FATIGUE.**
- **IMPROVED VISION ON DUSTY ROADS.**
- **EASE IN PASSING INDIVIDUAL VEHICLES.**
- **EASE IN DISPERSING VEHICLES.**
- **LESS CHANCE OF THE ENTIRE UNIT BEING AMBUSHED.**

DISADVANTAGES

- **GREATER COLUMN LENGTH.**
- **OTHER TRAFFIC BECOMES INTERSPERSED IN THE COLUMN.**
- **COMMUNICATION WITHIN THE COLUMN IS DIFFICULT.**

Closed column movement. This method of movement is quite similar to the open column, except that the vehicle interval is less than 100 meters. The close column is used when there is a need for maximum command and control; e.g., during periods of limited visibility or when moving through built-up or congested areas. At night each driver can observe the "cat's eyes" of the blackout markers on the vehicle in front of him and maintain an interval of 20 to 50 meters. If the driver sees two marker lights, the interval is too great. If the driver sees eight marker lights, he is too close. If the driver sees four marker lights, he is maintaining the proper interval. During daylight, the column is kept as compact as possible, consistent with driving safety.

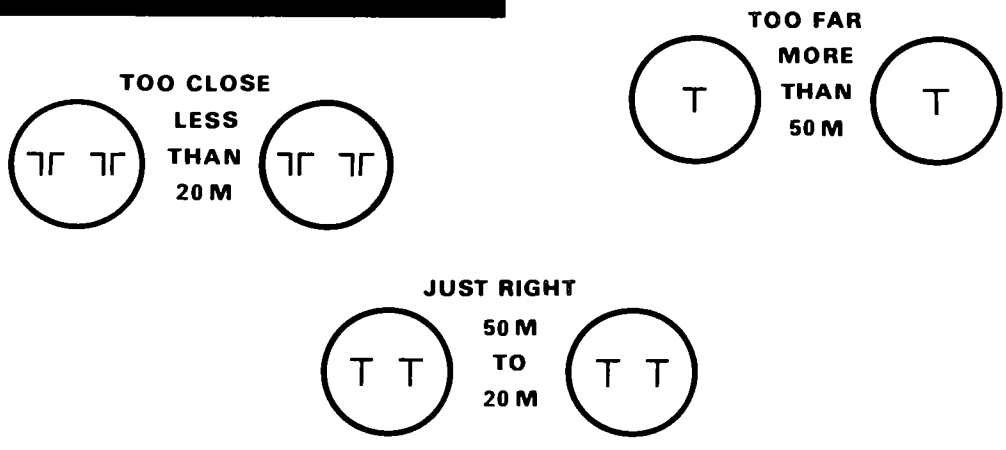
ADVANTAGES

- **IT OFFERS THE MOST EFFECTIVE COMMAND CONTROL.**
- **REDUCED COLUMN LENGTH.**
- **CONCENTRATION OF DEFENSIVE FIREPOWER.**

DISADVANTAGES

- **IT IS VULNERABLE TO ENEMY OBSERVATION OR ATTACK.**
- **STRENGTH AND NATURE OF THE COLUMN ARE APPARENT TO ENEMY OBSERVERS.**
- **CONVOY SPEED IS REDUCED.**
- **INCREASED DRIVER FATIGUE.**

BLACKOUT MARKERS



Infiltration. When the battery moves by infiltration, vehicles are dispatched individually or in small serials without reference to a march table. This technique is time consuming and vehicle movement is hard to control. It is used when the enemy has good target acquisition means and quick reaction capabilities. Whenever the battery mission requires stealth in moving to a new position, infiltration is the recommended method of movement.

ADVANTAGES

- IT IS THE LEAST VULNERABLE TO HOSTILE OBSERVATION.
- IDEAL FOR COVERT OPERATIONS.
- PROVIDES PASSIVE DEFENSE AGAINST AIR AND ARTILLERY ATTACK.
- DECEIVES THE ENEMY AS TO THE SIZE OF THE UNIT.

DISADVANTAGES

- TIME CONSUMING.
- MOST DIFFICULT TO COMMAND AND CONTROL.
- SMALL ELEMENTS ARE MORE VULNERABLE TO ATTACK.

Echelon movement. The Lance battery commander can increase his chance of survivability by displacing his unit by echelon. Movement of small units exposes only a portion of the battery at a time thus breaking up the definition of the battery to enemy intelligence gathering sources. The composition of each march element must be specified in the unit SOP and exercised during training. Each echelon must be provided with adequate radio vehicles and organized to provide for even distribution of critical vehicles. Echelon leaders must be thoroughly briefed and knowledgeable of the routes of march. Start times and convoy speeds become critical during echelon movement. Control measures such as road guides and road markers should be used to prevent various elements from becoming lost.

ADVANTAGES

- INCREASED SURVIVABILITY.
- DECEIVES THE ENEMY OF THE UNITS SIZE AND DESCRIPTION.
- ALLOWS FOR UNINTERRUPTED OPERATION.

DISADVANTAGES

- INCREASED COMMAND AND CONTROL.
- NOT SUITED FOR NIGHT MOVEMENT.
- INCREASED POSSIBILITY OF ELEMENTS BECOMING LOST OR SEPARATED.
- REDUCES SECURITY CAPABILITY.

Terrain march. The terrain march is an off-road movement to reduce vulnerability of the battery and to avoid traffic tieups. A Lance unit cannot afford to get caught in a traffic delay. A unit using this type of movement should travel close to hill masses. A terrain march should be conducted when enemy observation or interdiction by artillery fire or air attack is likely. A battery may move safely on a road for some distance and change to a terrain march at a point where enemy observation becomes likely or vehicle congestion provides the enemy an inviting target. The terrain march should be considered for traveling to the alternate position.

ADVANTAGES

- DECREASED POSSIBILITY OF ENEMY OBSERVATION.
- MAY PROVIDE THE SHORTEST ROUTE BETWEEN TWO POINTS (ALTHOUGH NOT NECESSARILY THE FASTEST).
- ALLOWS FOR BYPASSING OF OBSTACLES.

DISADVANTAGES

- MOST DIFFICULT TO CONTROL.
- DISPLACEMENT TIME INCREASED.
- SOIL AND WEATHER CONDITIONS MAY COMPLICATE MOVEMENT.
- COORDINATION WITH ADJACENT UNITS IS REQUIRED.
- IMPROPER MOVEMENT WILL LEAVE WHEEL OR TRACK MARKS INTO THE NEW POSITION.
- NOT FEASIBLE FOR WHEEL VEHICLES IN RUGGED TERRAIN.

Orders.

The details given in a march order depend on the time, the tactical and traffic situations, and the completeness of the unit SOP. (In a fast-moving, hostile situation, many orders will be verbal.) The order may be supplemented by strip maps, sketches, and march tables. The principal items that should be included in a march order are:

- Situation.
- Mission.
- Destination.
- Organization, to include order of march and composition of the column.
- Instructions to the air observer (when applicable), reconnaissance parties, and route marking and control groups. Instructions should include place and time of departure, mission, special instructions for communications, and time of rejoining the main body.
- Instructions to the main body to include the start point (SP), control points (CP), and release point (RP) and times for arrival at, and clearance of, these points; rate of march; and the route.
- General instructions regarding restrictions on use of roads, maximum speed of march units, catchup speeds, alternate routes and detours, restrictions on use of lights, and special instructions regarding march discipline or defense against air or ground attack.
- Communication instructions regarding the use of radio, messengers, flags, whistle or horn signals, pyrotechnic signals, and hand and arm signals.
- Start point and/or release point time.

Organization of the Column.

The organization of the battery column varies according to the tactical situation, the threat, and the position area to be occupied. The following points should be considered:

- The column should be organized so that the lead vehicle will occupy the deepest position in the new area.
- If feasible, there should be two air guards per vehicle. One scans the sky forward of the vehicle while the other scans the sky rearward.
- Machineguns should be distributed evenly through the column and should be aimed alternately to the left and right sides of the route of march.
- Canvas should be removed to allow personnel to have their individual weapons poised to return fire if attacked.
- Key personnel should be dispersed throughout the column to preclude losing a disproportionate number of these persons as a result of enemy action.

Loading Plans.

A loading plan prescribes efficient loading of personnel and equipment for movement. Each vehicle should have one. Loading plans are particularly important in sustained combat because soldiers get tired and inattentive and misplace equipment. A good loading plan is insurance that a unit will close into the new position with all its equipment. The loading plan for a vehicle must be such that the equipment most essential to the mission will be loaded last. The loading plan should be recorded and graphically portrayed. Use of the loading plan is an indicator of training, discipline, and esprit de corps. If a loading plan is not prepared or specified by battalion headquarters, each battery should prepare its own. Personnel responsible for devising loading plans should consider the mission, personnel, SOP, and equipment of the battery. Steps in preparing the loading plan include:

- Examining the battery table of organization and equipment (TOE) to determine the personnel, equipment, and vehicles authorized for each section.
- Examining all non-TOE property that must be transported by the battery. This equipment should be carried by the section responsible for its use.

- Listing the personnel and equipment to be carried in each vehicle. Equipment should be located to facilitate identification under blackout conditions.
- Conducting practice loadings to test the validity of the loading plan and adjusting the procedures if necessary.
- Establishing a list of the items that must be removed from the vehicle and carried forward if the vehicle becomes disabled during movement.

The unit should habitually load all TOE equipment during training. Equipment that is not essential to job performance or not ★frequently used should be left loaded. The more equipment left loaded, the less loading time is required and the less likely equipment will be lost during movement. (A place for everything and everything in its place.)

Convoy Control Measures.

The following control measures assist in the movement of the battery.

The start point is normally a geographical feature identifiable on the ground and on a map. The first vehicle of a battery convoy must cross the SP at the specified start time. The battery is responsible for determining the route to the SP and the time it will take to get there. If the battery is displacing as part of a battalion move, the SP is also the point at which control of the marching element is normally assumed by the battalion.

A checkpoint is normally a geographical feature identifiable on the ground and on a map. It is used in reporting progress along the route of march.

The release point is normally a geographical feature identifiable on the ground and on a map. The last vehicle of a battery convoy must cross the RP at the specified time. The battery is responsible for determining the route from the RP to the new position area. If the battery is displacing as part of a battalion move, the RP is also the point at which control of the marching element is regained by the battery. The battery commander may send a vehicle from the advanced party to the release point to lead the battery into the new position area.

Route marking aids in the move. The route marking detail marks the route by posting signs and/or personnel at those critical locations where elements of the march might make a wrong turn. Provisions are made to insure the prompt pickup of the route markers/guides when they are no longer needed. Details concerning traffic control and route marking are presented in FM 55-30 and FM 19-25.

March Discipline.

Officers and noncommissioned officers ride where they can best control and supervise the march of their units. They usually ride where they can control the vehicle driver. The senior person in each vehicle is responsible for insuring that all orders concerning the march are carried out. To supervise the move, commanders and other designated personnel may require their vehicles to pass other vehicles in the column. All other vehicles maintain their positions until otherwise directed or until circumstances dictate otherwise.

The column must keep moving. The unit SOP should indicate who stops to pick up mission-essential personnel and equipment if a vehicle breaks down. In most cases, the driver stays with the vehicle and the maintenance section stops to assist. If the disabled vehicle cannot be repaired in a reasonable time or recovered by the battery, the position and condition of the vehicle are reported to battalion for recovery. The maintenance section must be prepared to proceed along the route of march independently as soon as possible in order to be available to the remainder of the battery. Accordingly, the maintenance section must have a map and must be thoroughly briefed concerning the route of march.

Each vehicle commander is responsible for watching for signs, markers, signals, and other traffic. He is also responsible for

insuring that the driver is alert at all times.

March discipline is attained through training and through internal control within the marching unit. The specific objective of march discipline is to insure intelligent cooperation and effective teamwork by march personnel. Teamwork includes:

- Immediate and effective responses to all signals.
- Prompt relaying of all signals.
- Obedience to traffic regulations and to the instructions of traffic control personnel.
- Use of cover, concealment, camouflage, dispersion, radio listening silence, blackout precautions, smoke, and other protective measures against air, ground, armor, or chemical, biological, and nuclear attack.
- Maintenance of correct speeds, positioning, and intervals between vehicles within the column.
- Ability to recognize route marking signals/signs.
- Use of correct procedures for handling disabled vehicles.

Halts.

During administrative marches, halts are made at regular intervals or at selected sites to rest personnel, to service the vehicles, and to check the loads. Halts are not normally scheduled for tactical marches.

During an extended vehicle march (1 or 2 days) to a battle area, wooded areas and winding roads should be selected as halting places, since they provide concealment and do not present a straight line of vehicles for attack by enemy aircraft. During extended marches, halts should be made where vehicles can be dispersed off the road. Crossroads, railroads, and other identifiable terrain features should be avoided. A column should be halted in an area that provides a 200-meter clear view of approaching traffic at each end of the column.

The March Column Under Indirect Fire.

The immediate action in defense against hostile artillery fires is to move out of the danger area, report the situation to higher headquarters, and request immediate counterfire. If a battery expects hostile artillery fire during the march, it can reduce its vulnerability by:

- Moving by open column or infiltration.
- Moving under the cover of darkness or during other periods of reduced visibility.
- Moving by terrain march.

The March Column Under Air Attack.

When enemy aircraft are observed, the convoy commander may take one of three actions, depending upon the situation. He may order:

- The convoy to continue to march at increased speed.
- Vehicles to stop and move to the shoulders of the road.
- Vehicles to disperse and seek cover and concealment.

Roadblocks.

If the battery is halted by a roadblock, it should use such force as is necessary to clear the roadblock, including preplanned suppressive fires and concentrated fire by available automatic weapons. An attempt to crash through a roadblock with vehicles before it is checked for mines may result in unnecessary loss of equipment and personnel and a complete blocking of the road by disabled vehicles.

Ambush.

There are two types of ambushes—blocked and unblocked. If the route is *blocked,*

maximum available fire should immediately be placed on the attacking forces. Personnel in the kill zone should immediately dismount and attack as infantry. Staying in the kill zone is the worst thing to do. The portion of the battery that is not in the kill zone must also *react immediately*. All available firepower should be brought to bear to break up the attack. This includes the use of machineguns, light antitank weapons (LAW') and small arms set for automatic fire. In an *unblocked* ambush, the battery should increase its speed and move through the ambush area while placing the maximum amount of small arms and automatic weapons fire on the attackers. The rear of the column should be notified.

If the area was identified during the map inspection as a likely ambush site, preplanned suppressive fires should be called in. Otherwise, a fire request is sent immediately to supporting units.

If the ambush or any other enemy action is of such magnitude as to cause the column to be broken up, individual elements should proceed to the new position or designated rally points on their own.

8-10. Occupation of Position

The manner in which the position is occupied depends on the reconnaissance party and the movement techniques used, as well as on the type of occupation itself.

Deliberate Occupation.

A deliberate occupation, as the term implies, is one that has been planned. An advanced party precedes the unit and prepares the position in advance. The occupation may be during daylight hours following a daylight preparation, at night following a daylight preparation, or at night following a nighttime preparation. A common error in a deliberate occupation is allowing too much activity during preparation, thereby risking compromise before the position is ever occupied. As a general rule, the number of vehicles allowed to go forward should be limited. When the tactical situation allows, a very good method of occupying a new position is to perform the reconnaissance prior to darkness and the movement at night. Nighttime movement following a nighttime reconnaissance is often necessary, but it is very time consuming. The following tasks are accomplished during a deliberate occupation:

- A guide meets the battery at the release point and leads the battery to the entrance of the position area, where the vehicle guides are waiting to lead each vehicle to its selected location.
- A firing platoon is able to occupy a firing point as soon as possible after occupation so that the battery can remain as responsive to fire missions as possible.
- The FDC installs the antenna cable from the RC-292 erected by the advanced party and establishes FM communications with battalion headquarters. An operational check is performed on the FADAC and all other critical section equipment as soon as possible.
- An FSL is established for nuclear load carrying vehicles immediately upon arrival.
- If wire has not already been laid, each section runs a line to the battery switchboard in, or near, the CP.
- The battery commander takes the firing platoon leaders and/or platoon sergeants on a reconnaissance of the new firing points.
- The first sergeant directs the augmentation of the security and defense of the battery area as personnel become available.
- After the maintenance section has been positioned, has camouflaged its equipment, and has prepared its portion of the defensive position, the motor sergeant or a mechanic contacts the section chief or drivers of each section to determine any maintenance needs resulting from the move. The battery commander and executive officer are in-

formed of any major problems and the estimated time needed to correct the faults.

Additional considerations for night occupations are:

- **Light discipline.** Adequate preparation for a night occupation should minimize the need for lights. Vehicle blackout drive and blackout marker lights should be turned OFF as soon as the vehicle is in position.
- **Time requirement.** The time for occupation is greatly increased.
- **Noise discipline.** Noise can be heard at greater distance at night.
- **Prearranged signals.** Filtered flashlights should be used to gain the attention of the executive officer at the RP and to lead the vehicles into the position.
- **Order of march.** Each vehicle guide should know where his vehicle is in the order of march. This will enable the battery to move smoothly into position without halting the column while guides attempt to identify their vehicles.
- **Movement.** Vehicles should not be allowed to move within the position without a guide.

Hasty Occupation.

The hasty occupation allows little or no time for reconnaissance and advance preparation. It differs from the deliberate occupation mainly in the amount of time available for reconnaissance and preparation. It generally results from unforeseen circumstances and highlights the importance of the battery commander planning ahead and selecting tentative positions and routes to them.

In a hasty occupation, day or night, the battery will require more time to occupy the position, as some preparatory tasks cannot be performed during the limited time available for the reconnaissance and selection phase. The battery commander should insure that vehicles do not bunch up at the entrance to the battery position causing additional confusion during the occupation.

When the advanced party has to prepare a new position at night, the procedures for deliberate occupation at night are used, but less time may be available and fewer tasks may be performed.

Emergency Occupation.

An emergency occupation will be performed when the battery must evacuate the old position rapidly because of hostile enemy actions.

An emergency occupation will generally be accomplished at a preselected alternate position that may or may not have been previously prepared.

All actions taken during a deliberate occupation should be eventually performed. Priority of activities should be:

- Establish security.
- Establish communications.
- Conduct a casualty report and submit to battalion.
- Those other actions required to become operational.

Sustaining Actions.

The training and teamwork of the unit in performing the RSOP will culminate with the battery ready to provide timely fires in a minimum amount of time after moving.

Once the occupation is completed and the battery is ready to answer calls for fire, sustaining actions begin. They are continuous until the position is vacated. These actions include completing the position defense and those actions necessary for the battery to remain and fire from the position for an extended period of time. These actions include but are not limited to:

- Hardening of critical elements.
- Resupply of ammunition.
- Camouflage improvement.
- Maintenance.

- Refueling.

Care must be exercised in the manner in which ammunition resupply and refueling are conducted, for they can reveal the location of the battery. If possible, the tasks should be accomplished at night.

Members of the reconnaissance party and advanced party should always be prepared to leave at a moment's notice.

Section II. BATTERY OPERATIONS

Battery operations can be broken down into six functional areas that cover daily routine operations on a sustained basis. These functional areas are concerned with the operations of the battery headquarters, the fire direction center, the assembly and transport platoon, the firing platoon, the survey parties, and the communications section.

8-11. Battery Headquarters

The battery headquarters or CP is controlled by the battery commander and first sergeant. The CP coordinates and requests all of the administrative and logistical requirements of the firing battery.

Administration.
Through periodic personnel status reports outlined in unit SOPs, the first sergeant should report all SIDPERS transactions and personnel actions to battalion S1. Additionally, all class VI requests should be submitted to the S1 for consolidation. Class V small arms ammunition and perimeter defense items such as Claymores, trip flares, etc. should be requested from the battalion S4.

Supply.
Class II and class IV requests are formulated and submitted to the battalion S4. The supply section will issue protective clothing to battery personnel upon receipt of the proper directive. The supply section also maintains unit issue and hand receipt records.

Maintenance.
The battery maintenance section will compile all classes III, VII, and IX requests for submission and maintain all battery automotive equipment and repair parts.

Mess.
The battery mess section will submit class I requests, pick up and prepare rations, and maintain a potable water supply for battery personnel.

Medics.
Medics provided to the battery by battalion will perform emergency first aid procedures when required and request and maintain those class VIII supplies that are authorized.

NBC.
The battery NBC NCO and/or NBC officer will issue and maintain protective masks, decontamination supplies and equipment, and radiological and toxic detection and monitoring equipment. They will be responsible for organizing and training detection and monitoring teams and decontamination squads.

8-12. Fire Direction Center Operations

The battery fire direction center will be organized for 24-hour operations. Personnel should know Lance gunnery procedures given in FM 6-40-4. The battery FDC is

capable of computing and verifying accurate firing data. Verification of this data by an outside source (another battery FDC or battalion FDC) is not a requirement but may be directed in unit SOPs in some cases.

Upon occupation of position, the FDC must establish secure communications with battalion FDC and other FDCs immediately. Simultaneously, an operations check should be made on the FADAC and generators to insure they were not damaged by the move. A restricted area should be established around the FDC as soon as possible. Camouflage nets will be erected.

FDC personnel should be familiar with authentication and release procedures and the "two-man" rule requirements. Procedures for transmitting nuclear release, mating orders, and fire missions, etc. must be established.

Firing point information should be transmitted to battalion FDC as it becomes available. If at all possible, firing point information for a new position should be transmitted prior to departing an old location. Firing point data should also be transmitted to other batteries so that they may assist in fire mission computations if necessary. Firing point data should be transmitted using the fastest and most secure means of communication available (FM secure or AM-SSB/RATT).

★ Fire missions should be computed, verified, and disseminated to the firing platoons as rapidly as possible. Radio communications will *not* be used to notify the platoon if it is in the battery area and wire lines have been established. The battery commander or his designated representative will assign the firing platoon and firing point if not assigned by battalion. When a battery FADAC is not operational, data will be computed using two field artillery computer sets, missile or general. If neither of these methods is available, manual computations should be initiated and a request for computational assistance transmitted to battalion FDC.

Firing platoon response postures, states of readiness, and mission statuses will be maintained and reported to battalion FDC as changes occur. Prearranged message formats should be established by unit SOP to cut down on radio transmission time.

The battery FDO will keep track of ammunition expenditures and report to battalion FDC as required by SOP.

The FDC should maintain a 1:50,000 operation map of the area of operation. Battery positions (present, proposed, alternate), firing points, adjacent friendly forces, and the location of possible or confirmed threat forces (guerrilla, insurgents, etc.) in the local area that may affect the unit should be plotted on this map. In addition, a 1:250,000 situation map should be maintained showing maneuver boundaries, FEBA, and overall friendly and enemy operations. Targets and fallout/contamination prediction or location should be maintained on this map. A horizontal chart may be used to plot targets in relation to firing points, using plotting procedures outlined in FM 6-40, to determine rough azimuth of fire and range to target.

The battery FDC will notify battalion FDC when it begins to march order in preparation for a move. Battalion FDC should at that time divert fire missions to other batteries if possible. The FDC track should be organized so that items of equipment are used where they are march ordered as much as possible to preclude undue loading and unloading times when changing positions. If properly set up, an FDC can be operational almost immediately upon occupation.

8-13. Assembly and Transport Operations

The A&T platoon will maintain a mixture of nuclear and nonnuclear weapons based on the unit's response posture. Nuclear weapons must be properly safeguarded in a field storage location (FSL). Upon receipt of

proper authentication and/or release, weapons will be mated and/or unlocked and delivered to the appropriate firing platoons. Loader-transporters may be required to accompany a firing platoon to the vicinity of a firing point to transload rounds after firing. A&T personnel should be prepared to set up security and concealment in the hide/rendezvous area. The A&T platoon will perform necessary inspections to insure reliability of missile rounds prior to their transfer to the firing platoons. Time permitting, each round should be loaded on a launcher and a system check performed when assembled. If a Lance contact team is available, all missiles in the basic load should be checked with the guided missile system test set (GMSTS). Empty warhead, MMA, and control surface containers will be returned to service battery when being resupplied new rounds. The most expedient method of doing this is to have the empty containers loaded on the 5-ton XLWB trucks and simply exchange vehicles with the resupply convoy. Strict vehicle operator maintenence must be maintained with this method to preclude neglect of the vehicle. A&T operations in the battery area should be carried out under good natural overhead concealment or camouflage nets. LTs and 5-ton trucks will be camouflaged while in position and travel with canvas covers or bows installed and tied down to prevent observation of the missile rounds that would immediately identify the unit.

8-14. Firing Operations

The firing platoon leader will verify release and receive fire missions prior to departing the battery area for a firing point when possible. The firing point should not be occupied until the last possible moment to preclude enemy detection. Where time allows, the launcher and crew should remain concealed in a hide position in the immediate vicinity of the firing point while the point is being prepared and instruments set up by selected personnel. Even though the firing platoon conducts a system checkout as soon as a missile is loaded on the launcher, if time allows, another system checkout may be performed in the hide area to insure system reliability. Additionally, security should be established around the point.

If after occupying the point, the position comes under attack, every effort should be made to fire the round, particularly if the mission is part of a schedule of fires. The position should only be abandoned to preclude the loss of the launcher or section personnel.

In the event of a hangfire/misfire or a NO GO, battery FDC should be notified immediately. On a schedule of fires it may be more expedient to load another round on the launcher after waiting the required amount of time (para 2-36, TM 9-1425-485-10-2) and firing, than it would be to alert another firing platoon that would require computing another set of data, loading a round (if not already loaded), traveling to another firing point, and performing the mission. In some circumstances, reloading would be the only alternative short of not firing the mission.

If, during a nuclear fire mission, communications are lost anywhere in the chain of command, the round will *not* be fired. Because of the nuclear weapons package concept, absolute control must be maintained up to the last possible moment, since a sudden change in the tactical or political situation may dictate a "check fire." Once the missile has been laid, the firing platoon leader must check with the FDC to insure that the mission is still a "GO" before firing. If communications have been lost, he must not fire until they can be reestablished and an authenticated "GO" is received.

If communications are lost during a nonnuclear fire mission, a decision on whether to fire should be based on whether or not the mission was part of a schedule of fires (TOT) or an ASAP/target of opportunity mission. If a TOT mission, and communica-

tions have been made since occupying the point, the platoon leader should consider firing the round at the scheduled time. If, however, the mission is not time critical, an attempt should be made to reestablish communications.

Airmobile fire missions will generally be conducted as a two-part operation. An advanced party will prepare the firing point and establish security while the crew prepares the launcher for the mission in the rear area. Once it is prepared, the firing platoon will move forward to the firing point to complete the mission. The platoon leader should insure that the platoon is not on the ground any longer than necessary to accomplish the mission to preclude detection and engagement.

8-15. Battery Survey Operations

Organization.

Each Lance firing battery is authorized two six-man survey parties, each of which is equipped with a 0.002-mil (T-2 56) theodolite, an azimuth gyro (SIAGL), and an infrared electronic distance measuring device (SEDME-IR) along with other survey associated equipment.

Survey Requirements.

The relative long range of the missile with either a nuclear or nonnuclear warhead and the inertial guidance system requires that accurate surveyed locations be determined for each launcher position and an accurate direction be provided for orientation of the missile. Each launcher position should be surveyed using procedures that will insure an accuracy ratio of 1:1000 for position closure, ±2 meters in height, and an orienting azimuth accurate to ± .3 mil.

Survey Techniques.

The method of determining firing point location varies depending on availability of survey control and the amount of time available to establish control prior to occupation of the point by the firing platoon to accomplish its mission (e.g., an airmobile mission).

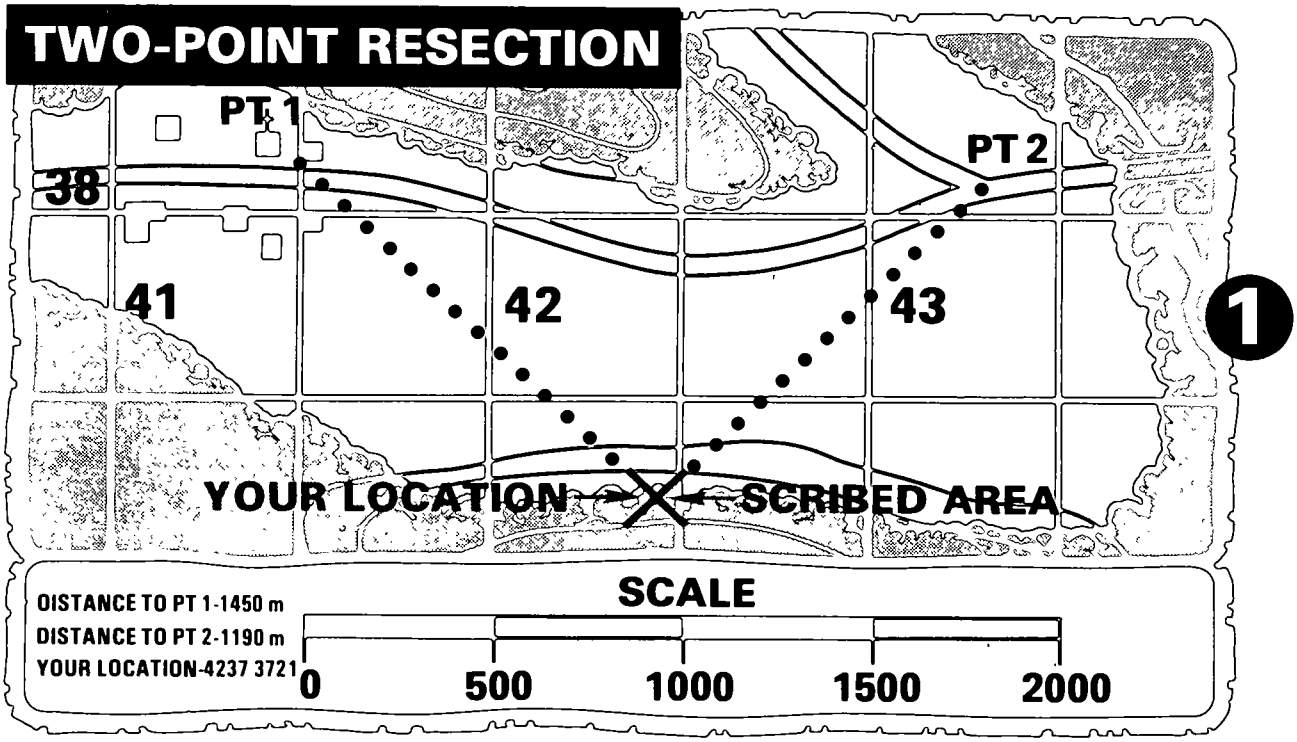
If survey control is available (either through use of trig lists, or provided by the corps topographic unit or the div arty target acquisition battery), the battery commander will select firing positions that are readily accessible to the control provided. The survey section must in turn extend horizontal control to the firing point turning no more than 25 stations without checking the azimuth (using a fourth-order control point).

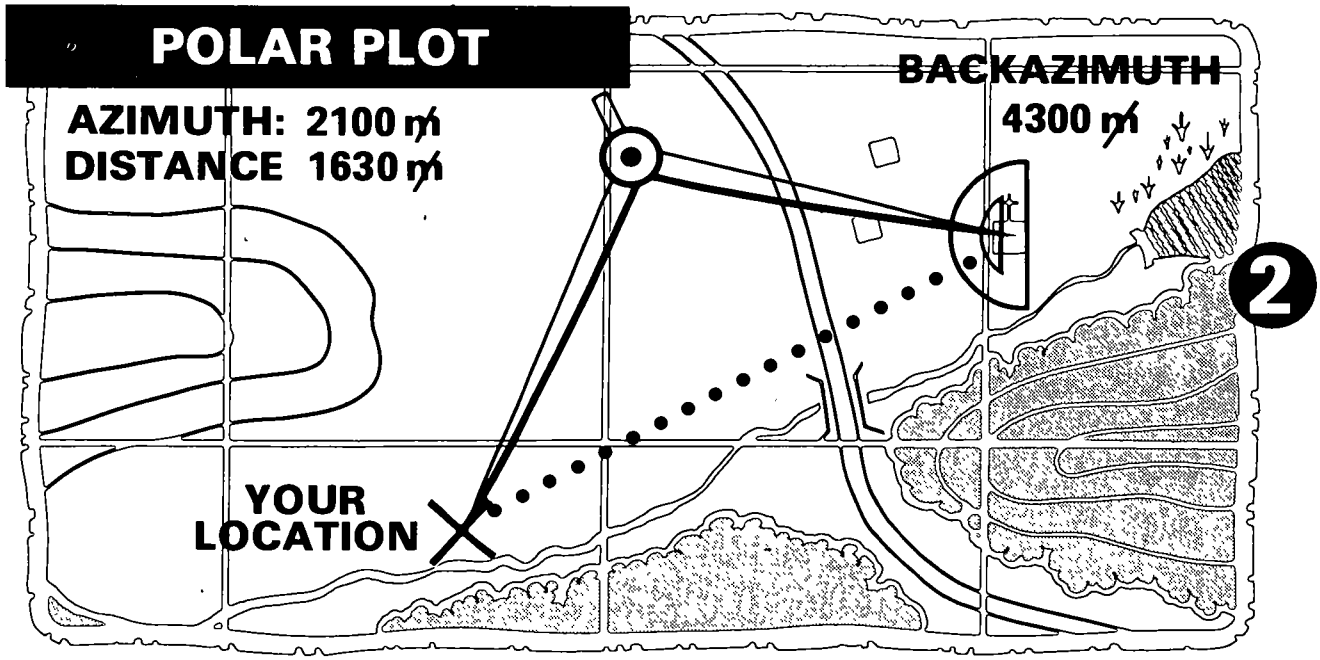
When survey control is not available, the firing position can be map inspected from a large scale standard "A" map (1:50,000 or larger). A map spot will normally produce a position which is 50-60 meters in error. The detail platoon leader or chief of party can eliminate some of this error by careful map inspection and common sense. Easily identifiable terrain features (stream or trail intersections) and manmade objects (bridges, RR crossings, etc.) appearing both on the ground and on the map can work to the advantage of the surveyor.

❶ One such procedure is to select two such features (designated point 1 and point 2) within 1,600 meters of the position and measure the distance to each with the SEDME-IR. Take a compass and measure off the distance given on the distance measuring equipment (DME) to point 1 on the map scale. Set the point of the compass on point 1 and scribe an arc on the map. Do the same for point 2. The intersection of the two arcs is the unknown position. Using a coordinate scale with map laid on flat surface, determine coordinates of unknown position. For best results, the two points should form an approximate right angle.

❷ A second possibility is to use one point meeting the criteria outlined for the two points above. Use SIAGL and SEDME-IR to determine azimuth and distance (polar coordinates) from unknown station to visible point. Identify some point on map; using protractor,

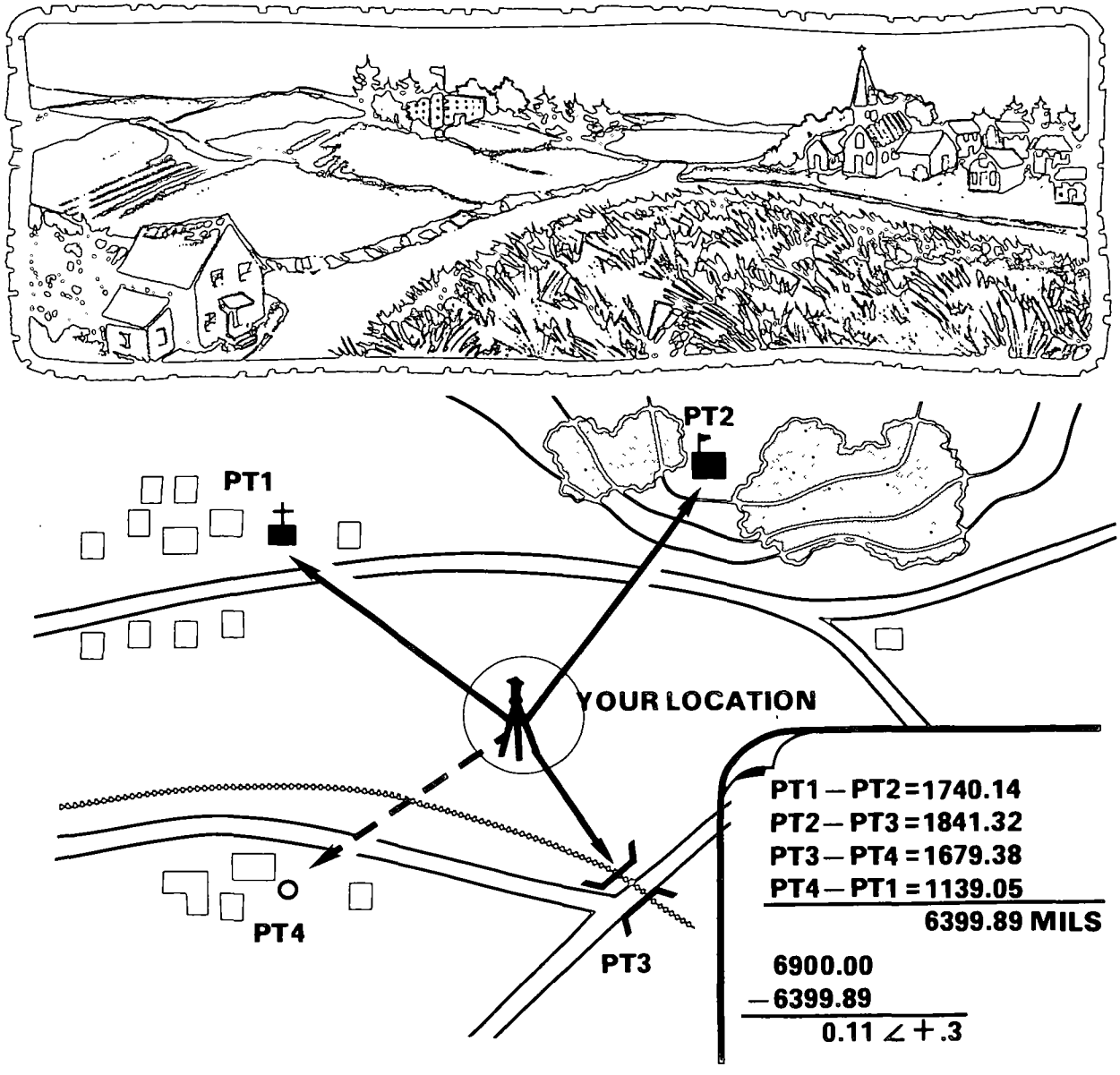
plot off back azimuth; using the compass, measure off the distance given by the DME on the map. The resulting point is the unknown location.





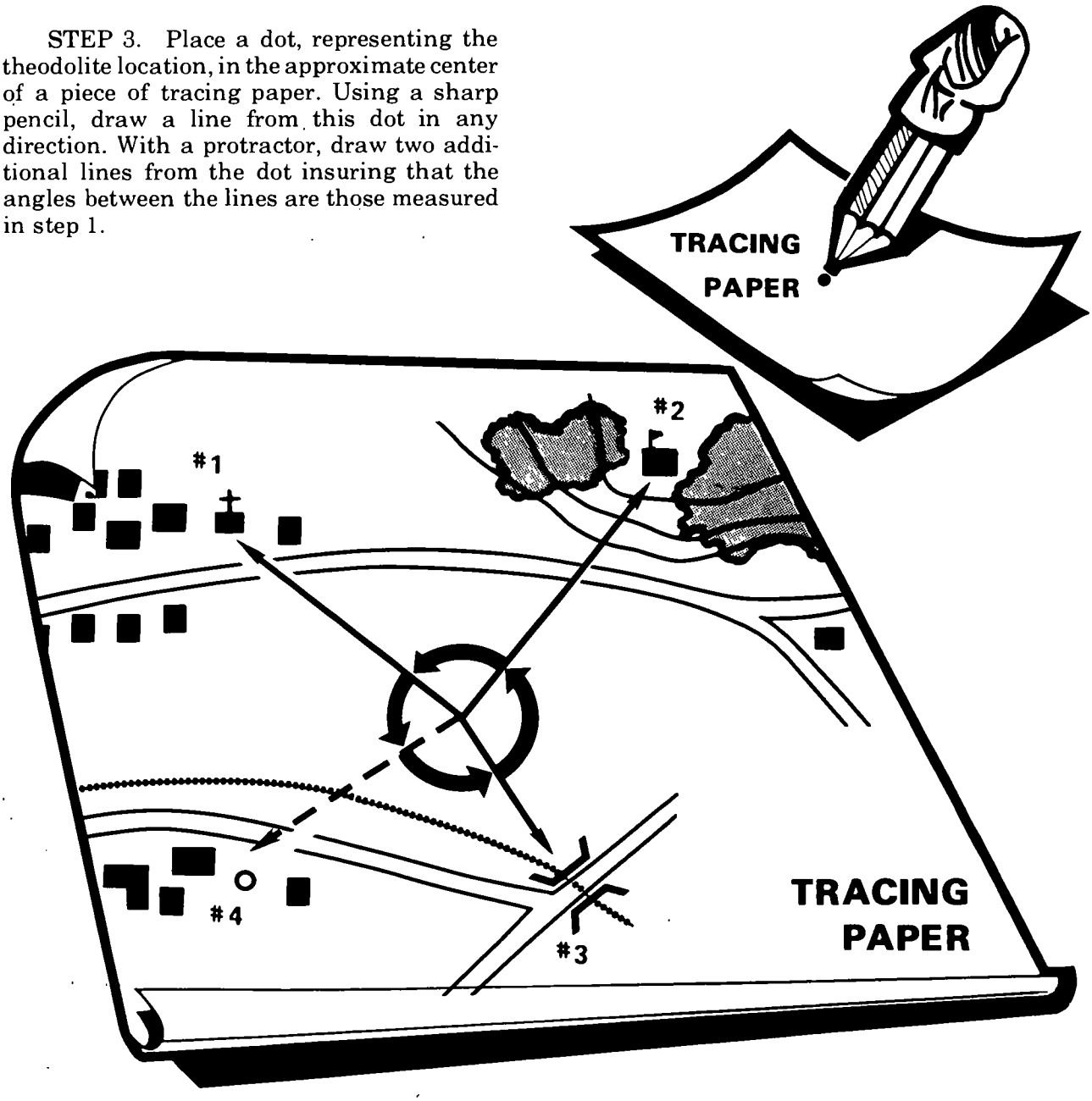
The procedure that will net the best location (within 20 meters) is called the *graphic resection* (3 point) procedure; however, because of its requirements, it cannot always be used. The procedure is as follows:

STEP 1. Select three distant visible points which are readily identifiable both on the ground and on the map. With a theodolite, measure the horizontal angles between points. The third angle is measured to provide a check on angle measurement. If a fourth point is available, a second graphic 3 point resection is possible, thus checking the solution of the first resection. Plot the known locations on a 1:25,000 firing chart.



STEP 2. Add the values of the measured angles: The sum must be 6400 ±0.3 mil.

STEP 3. Place a dot, representing the theodolite location, in the approximate center of a piece of tracing paper. Using a sharp pencil, draw a line from this dot in any direction. With a protractor, draw two additional lines from the dot insuring that the angles between the lines are those measured in step 1.



STEP 4. Place the tracing paper over the chart and position it so that the three penciled rays pass through their respective distant points. The center dot represents the location of the theodolite on the chart.

Note. If tactical or time considerations force extension of survey control from the resected point, the starting point inaccuracy should be kept in mind and conversion to the common grid must be accomplished as soon as possible.

The 0.3-mil azimuth requirement for the orienting line of a Lance firing point can be satisfied using several techniques. Time available to determine azimuth is the critical factor however. Recommended methods of determining azimuths, listed according to priority, are as follows:

1. SIAGL.

2. Astronomic observation (altitude method). Astronomic observations must meet the following specifications to obtain the prescribed accuracy:

- Horizontal and vertical angles. Three sets of observations are made; each set of horizontal angles is measured in one direct and in one reverse position.
- Rejection limits. Azimuths are computed from the three sets of observations. When observations are made from the orienting station, any computed azimuth that disagrees with the mean azimuth by more than plus or minus 0.3 mil is rejected. When observations are made from stations other than the orienting station, any computed azimuth that differs from the mean by more than plus or minus 0.15 mil is rejected. The final azimuth must be determined from at least two usable sets.

3. Simultaneous observation (0.002-mil theodolite). Simultaneous observation of a celestial body by two or more stations allows transfer of directional control from the master station, where control is available, to distant station(s), where it is not. This method requires each station to have a radio and clear observation of the sky. Specific procedures for simultaneous observations are spelled out in FM 6-2, *Field Artillery Survey.*

4. Directional Traverse. If conditions are such that traverse must be used to extend directional control to the launchers, attention must be paid to specific limitations for angular measurements. To achieve the required accuracy at the firing position where the starting azimuth is accurate to within ±0.06 mil, no more than nine station angles can be turned to give the final required 0.3-mil accuracy. All angles must be measured in two positions. When the value of the angle determined from the second position differs by more than 0.025 mil from the value of the mean angle, both angles are voided and remeasured.

★8-15.1. Recovery of Firing Point Survey

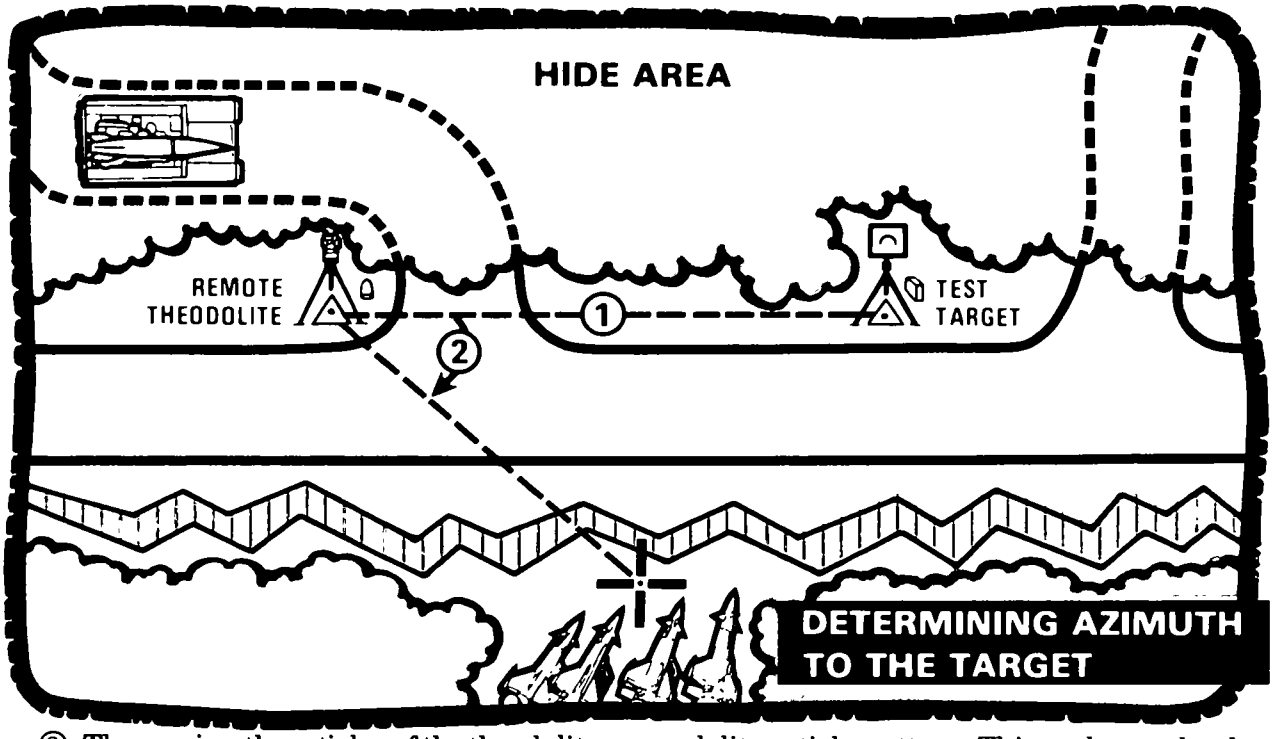
When a firing platoon occupies a firing point and discovers that the survey marker has been removed or destroyed, the point can be recovered using the "floating firing point" technique. This technique should be used only in an emergency, when time constraints or the tactical situation does not permit the firing platoon to displace to another point, the mission to be assigned to another platoon, or the firing point to be recovered by a battery survey party.

To use the floating firing point technique, the survey markers for the orienting station and the end of the orienting line must be intact, and the grid of the orienting station must have been previously determined. The battery FDC computes an azimuth to the target to the nearest 0.01 mil, converts this to an orienting angle, and transmits this data to the firing platoon.

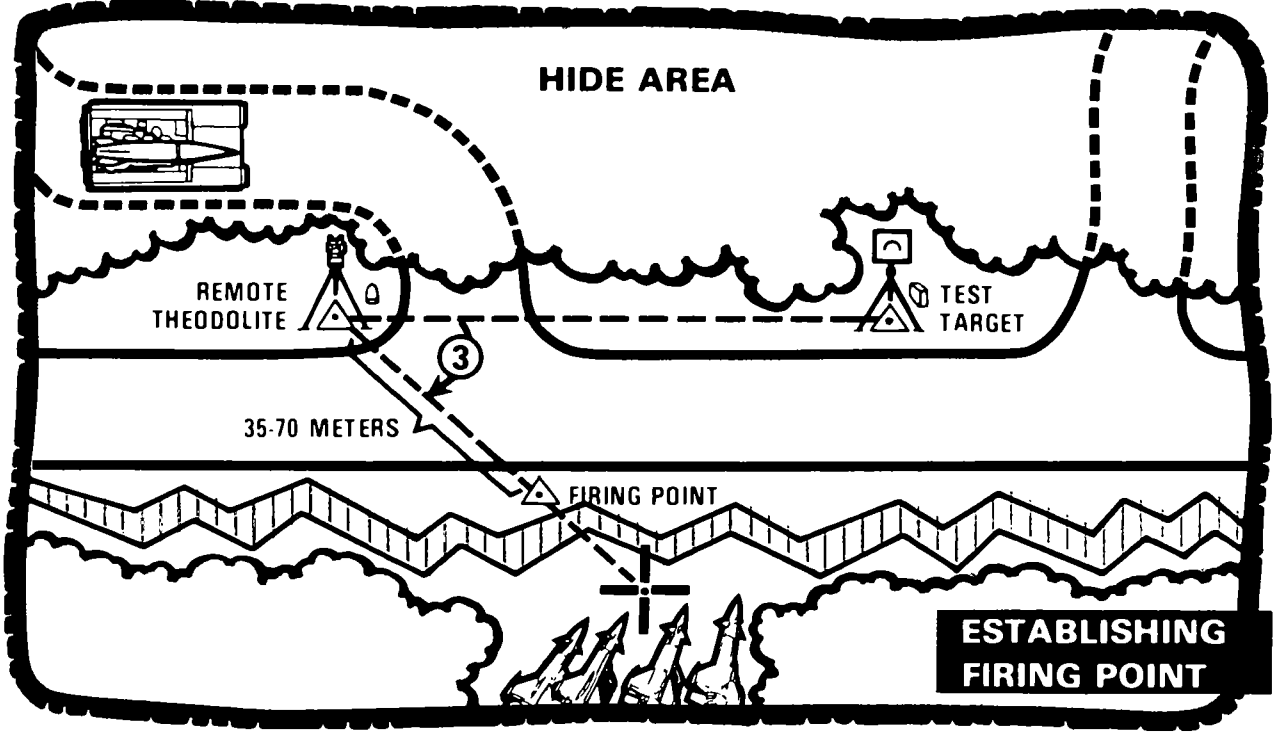
Note. *This orienting angle is used only to recover the firing point survey and not to lay the missile.*

① The firing platoon leader emplaces his remote theodolite over the orienting station, sights on the end of the orienting line (test target), and sets off the orienting angle received from the FDC on the horizontal scale.

② He then rotates the head of the theodolite clockwise until a scale reading of 0.0 mils is reached.



③ Then, using the reticles of the theodolite, he directs the emplacement of a stake 35 to 70 meters from the orienting station and exactly centered on the vertical hairline of the theodolite reticle pattern. This stake marks the new firing point. He may also direct the emplacement of the azimuth tapes for guiding the launcher over the firing point at this time.



★ The firing platoon leader then sends to the FDC the distance that the stake was displaced from the orienting station. The FDC computes a new grid for the new firing point and new firing data for the target based on this grid and transmits the new data to the firing platoon. From this point, the fire mission continues in the normal manner.

★ The battery FDC can compute firing data concurrently with the establishment of the floating firing point if the distance that the stake is displaced from the orienting station is an SOP item (e.g., always 50 meters).

8-16. Firing Battery Communications

A Lance firing battery operates in three battalion-controlled radio nets and one battery net. In addition, the battery is responsible for external and internal wire lines to the extent described.

★ • Battalion command/fire direction net, AM/SSB (radioteletype)

★ • Battalion command net, FM secure

★ • Battalion fire direction net, FM secure

★ • Battery command/fire direction net, FM

Battalion Command/Fire Direction Net, AM/SSB (Radioteletype).

This is an AM net between the battalion headquarters and the firing batteries. It is used to supplement the FM nets and is used for passing bulk traffic such as reports, firing point lists, etc. Fire mission traffic, if passed on this net, will have priority over all other traffic.

Battalion Command Net, FM Secure.

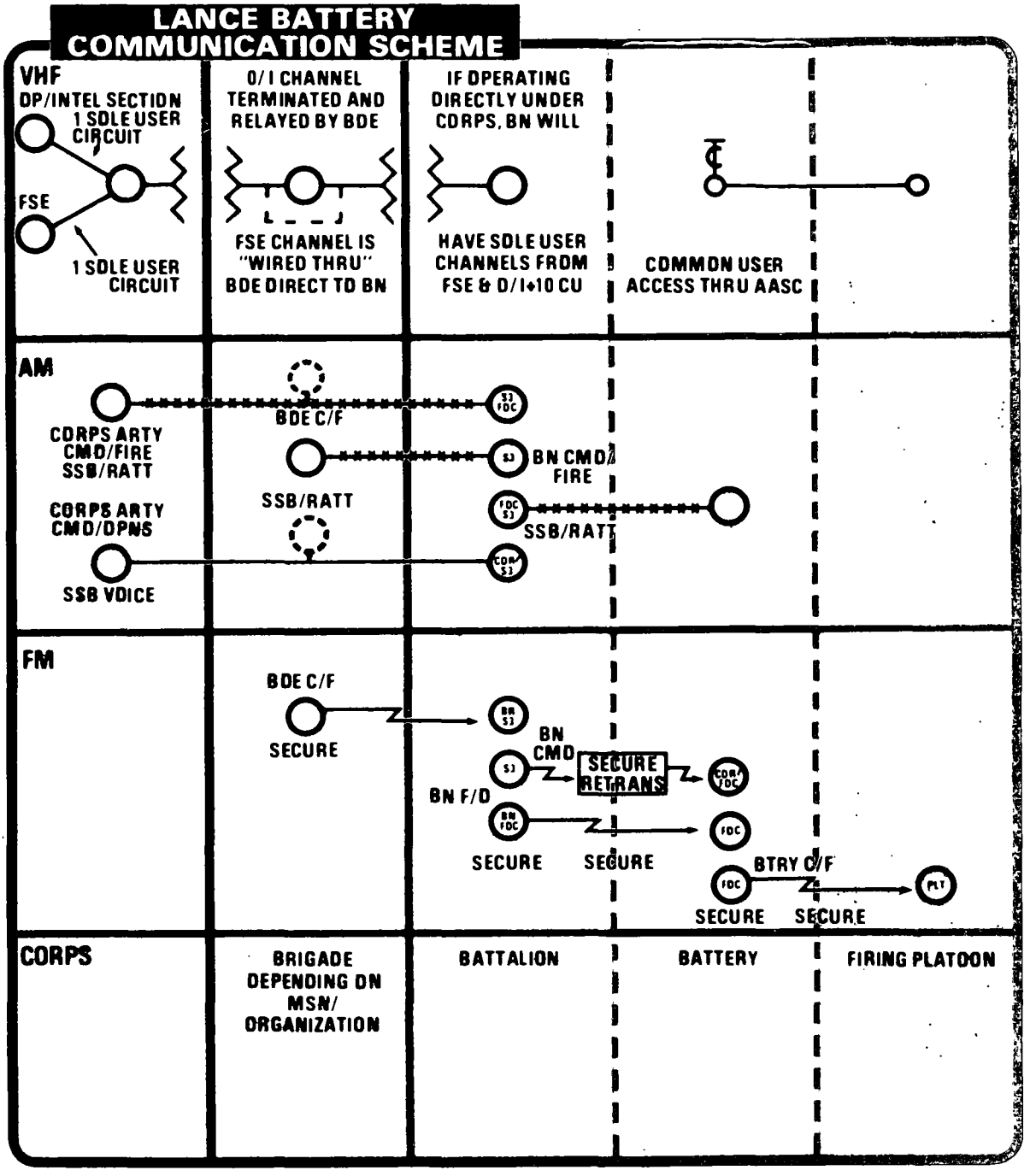
Stations in this net include the battalion commander and operations section, the battery commanders, and the battery FDCs. This is a battalion controlled net and is used to pass command, operations, and critical administrative traffic. Due to the critical nature of traffic passed on this net, all stations must have a secure capability.

Battalion Fire Direction Net, FM Secure.

This net is used to pass all fire mission data and fire support coordination requirements along with firing point information and target lists not passed on the battalion C/F, AM/SSB, or RTT net. Battalion FDC and the three firing battery FDCs are the only stations in this net.

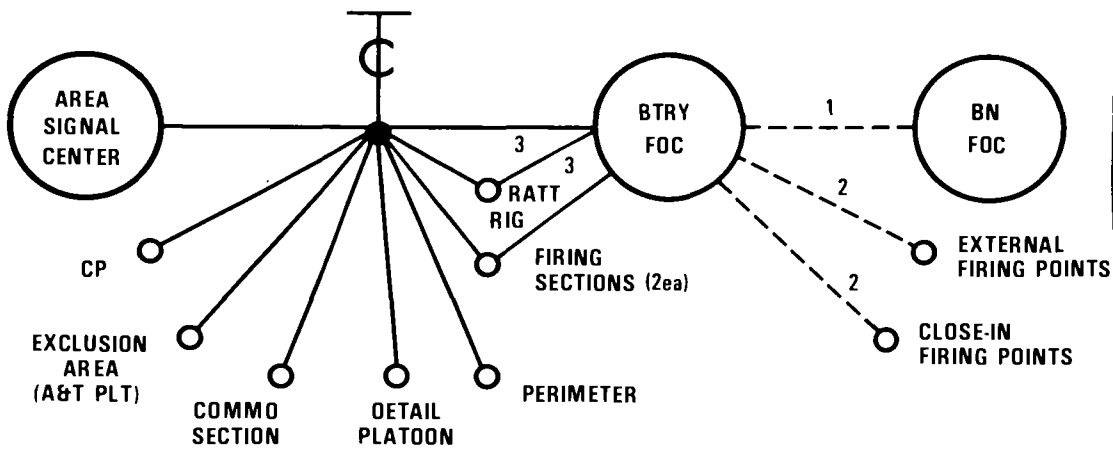
Battery Command/Fire Direction Net, FM.

Each firing battery has its own C/F net to facilitate command and control of various battery elements when they are not in the battery area. This net is also used to transmit fire mission data between the battery FDC and the firing platoon. Because of the characteristic nature of this data, these two stations will be secure. Unsecure stations in the battery C/F net should listen for the characteristic "beep and rush" emitted by secured station radios before transmitting in order to avoid interrupting critical message flow. Net control station (NCS) for this net is the battery FDC.



★ **Note.** *If secure capability is lost on the battalion fire net, the battalion FDC may be required to operate three dedicated fire nets to handle the large volume of encrypted traffic.*

FIRING BATTERY WIRE DIAGRAM.



① ESTABLISHED AS TIME & DISTANCE ALLOW (1ST PRIORITY)

② ESTABLISHED AS TIME & DISTANCE ALLOW (2d PRIORITY)

③ DIRECT LINE TO FOC

Battery Wire Circuits.

The Lance battalion TOE authorizes four wire teams per battalion under control of the battalion communications platoon. Of these four teams, one will be retained at battalion to lay the wire interface from the Lance battalion to the multichannel command terminal, lay an interface line to an area terminal for routing flexibility, and lay required internal wire lines for the headquarters and headquarters battery complex. If service battery is located in a separate position, this team will also tie them into either the HHB switchboard or an area signal center, whichever is closer. The remaining three teams will be used to connect each firing battery into the multichannel system by laying a wire line to the nearest Army area signal center (AASC). Once the batteries have been integrated with the AASC, telephone communications with the battalion and other units through common user circuits can be established with proper routing.

Although telephone communications are less vulnerable to enemy detection than FM, they are not entirely secure because of the possibility of wire intercept. Classified material should be properly safeguarded for transmission in accordance with the tactical situation and COMSEC SOP.

Establishing an internal battery wire net is the responsibility of each individual section upon occupation of position. The battery communications chief or his representative will supervise the installation of battery wire between each section and the battery switchboard. Improvement of the battery wire installation will be accomplished by the wire team once a line with the AASC has been established.

Section III. DEFENSE OF THE BATTERY AREA

To provide continuous and responsive fires for the supported force, a Lance battery must be able to survive in a hostile environment. Because Lance represents the force commander's primary tactical nuclear weapon system, the threat's highest priority is the location of these units. When and if Lance units are located, they can expect the enemy to attempt to destroy them. The keys to survival then, are avoiding detection and, if necessary, self-defense. Successful hiding and self-defense can be accomplished only by sound planning, intensive training, and vigorous execution. Survival can and will be improved if we will train as we intend to fight.

8-17. Responsibilities

Whether active or passive, basic fundamentals of defense apply. Planning, preparing, rehearsing, and position hardening are the key elements of defensive operations in the battery area. Planning, coordination, and control of the battery defense are the responsibility of the battery commander. The executive officer manages the defense plan. The first sergeant supervises the defense plan by preparing, rehearsing, and directing execution of the final plan.

When formulating the plan, the executive officer and the first sergeant consider the potential enemy threat, the unit personnel status, and the time available to determine the type and extent of defensive positions to be prepared. The first sergeant determines the final location for crew-served and antitank weapons, defines fields of fire, locates observation and listening posts, and insures that the communications required to support the plan are installed, checked, and functioning properly. After developing the battery defense plan, it should be checked by the battery commander at the first opportunity. However, preparation of the position should not be delayed until the battery commander's approval is received. Once position preparation has begun, the first sergeant supervises continuous improvement of the positions and reinforcement of the defense plan. He also insures that the small-arms and crew-served weapons ammunition resupply plan is prepared and fully understood by all.

8-18. Battery Defense Plan

A Lance battery must be able to avoid detection and/or surprise by the enemy and be able to defend itself in depth and in all directions to provide adequate reaction time against both air and ground attacks. When establishing a perimeter defense, it is critical to coordinate with adjacent units to provide mutual support and to preclude firing into an adjacent friendly position.

Considerations.

The primary consideration in selection of a battery position is accomplishment of the mission. The defense plan must take maximum advantage of the available terrain. Fundamental terrain considerations include the following:

- Key terrain must be occupied or denied the enemy. Occupying key terrain offers an advantage to either combatant. If occupation is not feasible, key terrain must be covered by fire and observation.

- Avenues of approach for both ground and air attacks must be covered by fire with predetermined kill zones. Air avenues of

approach will probably be along the linear axis of the battery or down natural lines formed by valleys or ridge lines. Roads, trails, or highways leading into, or nearby, the position will offer the enemy good avenues of high-speed approach and should be kept under observation.

- Good observation provides information and aids in early warning. It denies the enemy the element of surprise and should be coordinated within the unit and between adjacent units when possible.

- Interlocking fields of fire are necessary to insure that no portion of the perimeter is left unguarded. This is especially important to prevent infiltration operations.

Initial Actions.

A Lance battery is highly vulnerable to attack, especially when it is occupying a new position. The first order of business in establishing a defense must be to provide early warning for the battery to deny the enemy the element of surprise. Initially, this will most likely consist of establishing observation posts and listening posts around the perimeter. The security system is strengthened as time permits.

Observation Posts/Listening Posts.

These positions must be located a sufficient distance from the battery to provide early warning to give the battery time to react to a threat. They will generally not engage the enemy. OP/LPs are established along probable avenues of approach outside of direct observation of the battery area. OPs are used primarily during daylight hours and should be well concealed from enemy observation. LPs are used during periods of darkness or limited visibility and will generally be closer to the battery position. OPs and LPs will be interconnected with the battery CP via a hot loop and/or radio, and will be manned by at least two personnel whenever possible. Early warning devices such as trip flares, rocks in tin cans, tanglefoot, booby-traps, and mechanical ambushes should be used along with outposts.

Air Defense.

The battery commander should take full advantage of the terrain for concealment and coverage to reduce the effectiveness of enemy aircraft. If attacked by aircraft, the firepower of the battery's machineguns and rifles should be directed at the aircraft. Enemy pilots must be able to see and identify a target in order to attack it. The effectiveness of high-performance aircraft is greatly reduced when units take full advantage of terrain for concealment and cover. Units of the battalion should:

- When stopped, occupy positions which offer natural cover and concealment. Camouflage vehicles that are exposed. When moving, travel by concealed routes.

- Dig in dismounted positions and camouflage them. If vehicles must occupy positions visible from the air, improve cover by scooping a hole or building up protection on the sides, or both.

- Disperse vehicles as much as possible, not only to make detection difficult, but so that if detected, an aircraft on a single pass can only attack one vehicle.

- Wipe out, as far as possible, track marks made when moving into position.

- Require air guards on vehicles when moving into each position established by the unit.

- Establish an air warning system in the SOP. Include both visual and audible signals.

Ground Defense.

One of the most effective means of defending a battery against all types of ground attack is through the use of the hasty protective minefield as discussed in chapter 5 of FM 20-32. As stated earlier, the primary ground threat to a Lance battery will probably be from small bands of insurgents/guerrillas or long-range reconnaissance patrols. In very rare circumstances, we may incur a mounted attack. In any event, protective minefields and mechanical ambushes, coupled with effective positioning of outposts, offer an expeditious and

reliable means of enemy detection. Additionally, personnel armed with the M72 LAW and M203s with the M433 high explosive antitank (HEAT) round can be positioned along avenues of approach to provide protection against a mounted assault.

8-19. Battery Area

While the battery position is being occupied and external security established, the executive officer, along with the first sergeant, must establish perimeter security. Defensive procedures are carried out simultaneously throughout the battery.

Weapons Emplacement.

A ring of weapons fire is placed around the battery perimeter to provide integrated coverage in all directions. M60 machineguns and organic weapons should be positioned so that they will have overlapping, mutually supporting fires and final protective fires. Machinegun fire is most effective when it hits the enemy flank. This flanking fire should surprise the enemy by hitting him from an unexpected direction. M203 grenade launchers should supplement machineguns to provide fire in defilade positions not covered by machinegun grazing fires. Maximum use of natural cover should be used in these positions, supplemented with manmade fortifications where necessary. M203s armed with the M433 dual purpose round (HEAT) should be placed along avenues of approach near the entrances to the battery area to act as antivehicular defense.

Exclusion Areas.

Exclusion and limited areas around the field storage locations (FSL) and operation and communication complexes will be established as soon as possible after occupation of the position. Specific defense measures for these areas are discussed in TM 160-50 and provided in the unit SOP. In the event of an all-out attack, defense of the FSL is an untenable concept. If destruction or overrun of the battery is imminent, emergency evacuation, disablement, or emergency destruction (ED) procedures should be employed.

Obstacles.

Obstacles are used to delay, stop, divert, or canalize an attacking force. Natural obstacles such as fallen trees, ditches, boulders, etc., should be integrated into the defense plan. Hasty protective minefields, as discussed earlier, may be employed effectively against all types of ground threat. Mechanical ambushes may be used to provide early warning of enemy activity and as a defensive measure.

Fortification.

Fortifications are those measures taken to reinforce or harden existing cover. Again, natural cover and fortification materials should be used wherever possible to aid in concealing the position, as time may not be available to permit elaborate position improvement. In fast-moving situations, hardening might be limited to digging foxholes on the perimeter, burying wire, constructing shelters for prone individuals, and placing sandbags around items of equipment vulnerable to weapon fire. Individual shelters must make maximum use of natural cover and obstacles of the terrain. The commander must exercise caution when hardening a battery position by digging. Care must be taken with the disposition of spoil so that the camouflage effort is not disturbed.

Camouflage.

A battery that is concealed or cannot be recognized has greatly increased chances for survival. The following principles of concealment lead to better camouflage:

Siting. All terrain has a distinguishable pattern, either natural or manmade. Select the positions for equipment and personnel that will be camouflaged with an eye toward blending camouflage materials with the natural pattern.

Camouflage construction. Use natural and/or manmade material to extend the natural pattern of the area over and around equipment, personnel, and areas of activity. Vegetation can be used effectively for this purpose, but remember:

- Natural vegetation should be cut from the areas away from the battery position. Freshly cut stumps and limbs encircling the battery area draw attention to the area. Mud can be used to conceal fresh cuts.
- Cut vegetation must be replaced as often as practicable.
- Pine limbs do not grow in oak thickets: Make sure the vegetation *matches* what is naturally in the battery area.
- Camouflage nets are excellent if used properly. Vehicles in an open area under a camouflage net are easily seen (though they may not be readily identifiable). That same vehicle between two trees and under a camouflage net will probably *not* be seen.
- Remember the natural pattern and blend with it. In urban areas, try to get equipment into buildings or at least in the shade of buildings. Camouflage nets may not blend with buildings, but canvas stretched over a frame will.

Camouflage discipline. Avoid changing the appearance of the area. Each individual in the battery must be careful not to disclose the presence of military activity. Noise and light discipline are two of the more common areas. They both are particularly important at night. Noise draws attention and can be identified. Light leaking from a tent is a target for direct fire weapons.

Camouflage should begin immediately upon occupation of position. Lance-peculiar equipment *must* be the first items to be camouflaged. These include (in order) the SPL, LT, 5-ton XLWB trucks, and the M577 CP carrier. Remaining vehicles are camouflaged as soon as possible thereafter.

The most common signs of military activity in an otherwise well camouflaged area are tracks, spoil, debris, and movement. The BC must enforce his track plan. Use existing roads and trails. If none are available, create some with heavy vehicles to give the appearance that a unit has moved *through* the area (the roads and trails must have logical starting and terminating points). Spoil from position hardening must be camouflaged. Debris from the mess area must be policed up and camouflaged. Shine from headlights, windshields, mirrors, and mess equipment can easily be eliminated with scrap canvas, sandbags, and paint, as appropriate. Even the signature of smoke generated by the mess section's stoves can be reduced by only using them around dawn and dusk. Camouflage discipline is each individual's responsibility.

Transmission Security.

One of the primary methods of compromising a battery position is the violation of transmission security. Because Lance units rely heavily on radio communications, a significant electronic signature is produced. Radio transmissions should be as limited as possible, as short as possible, and made at the lowest power possible. Emitters should be in electronic defilade with respect to the FEBA. Wire communications should be used for *all* internal battery communications. Firing platoons located in the battery area should *not* be notified of a fire mission over the radio if wire lines have been established.

Defense Diagram.

Upon occupying a position, each section must have a predetermined sector of responsibility that makes maximum use of the section's primary weapon(s). As soon as practical, the battery commander/first sergeant should evaluate the defensive plan by studying the defense diagram.

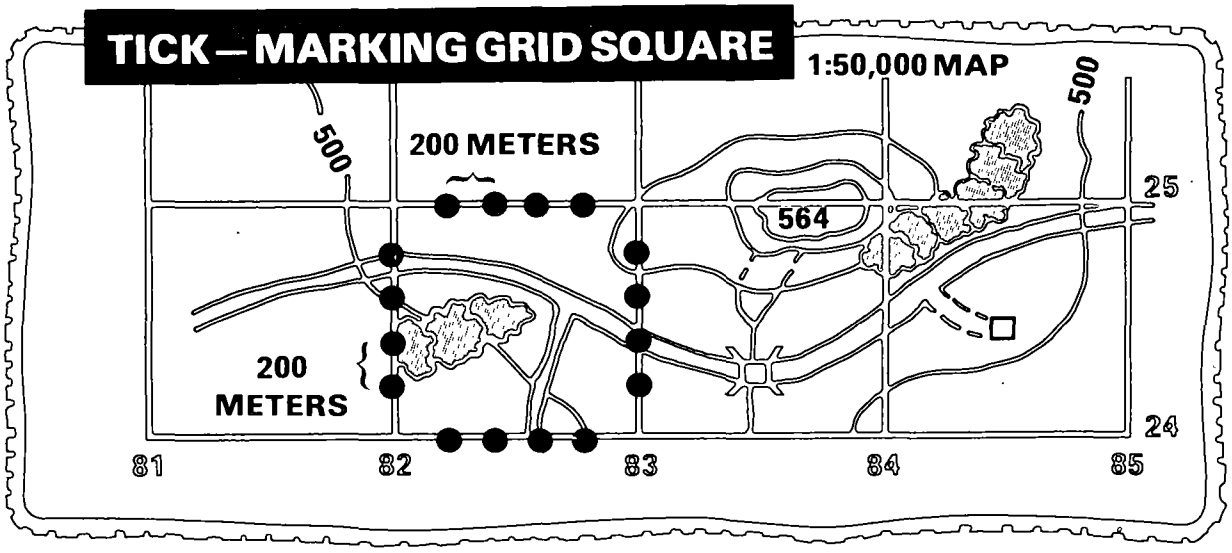
The defense diagram is a sketch, drawn to scale, of the battery defensive resources and is based on the data from the ground reconnaissance and machinegun range card. It includes the fields of fire for other weapons such as grenade launchers, antitank

weapons, and individual weapons. The diagram is prepared by the first sergeant and approved by the battery commander. A copy is provided to the battalion command post.

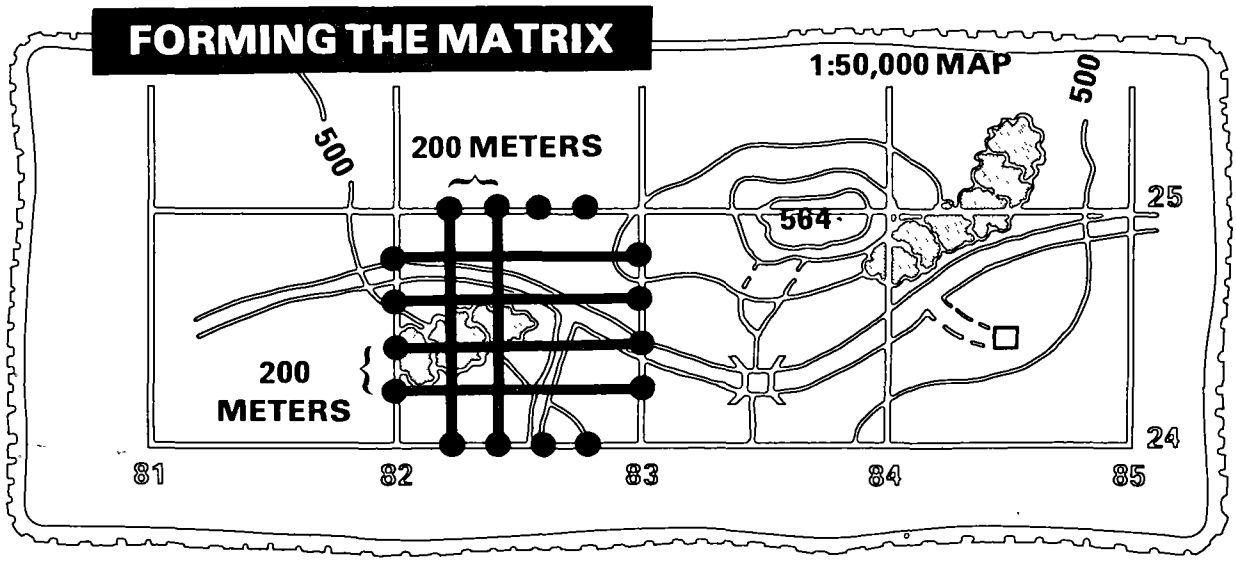
Equipment required. To construct the defense diagram, you must have a 1:50,000 map of the area, a coordinate scale, a protractor, overlay paper, and a blank 1:25,000 grid sheet that can be obtained from the FDC.

Construction of the matrix. Locate the battery center on the 1:50,000 map. Identify the grid square or squares that contain the terrain features that influence the defense of the battery position.

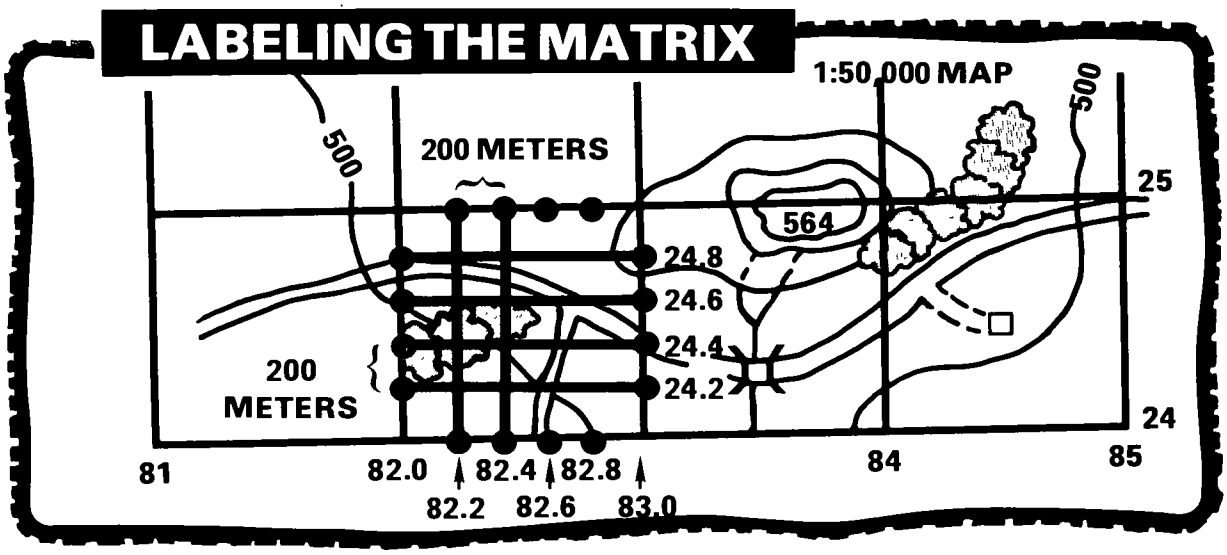
Place tick marks at 200-meter intervals along the sides of the selected grid squares.



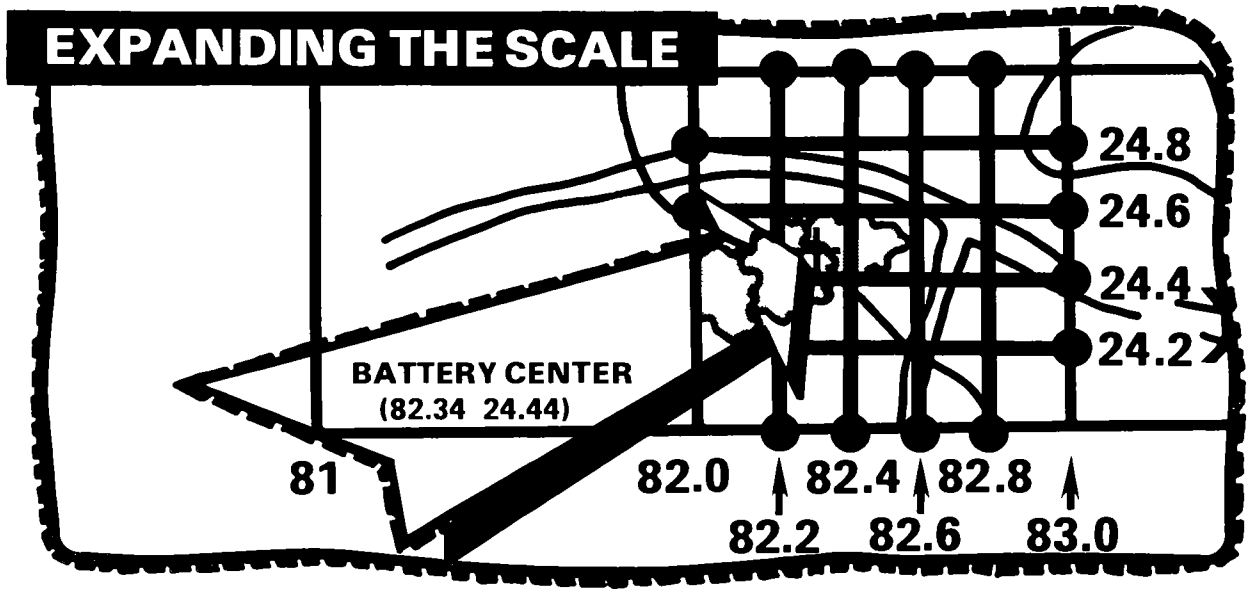
Connect the tick marks to form 200- by 200-meter squares within each grid square.



Label the squares beginning at the lower left of the grid square. Number the lines to the right and up, as you would read a map.

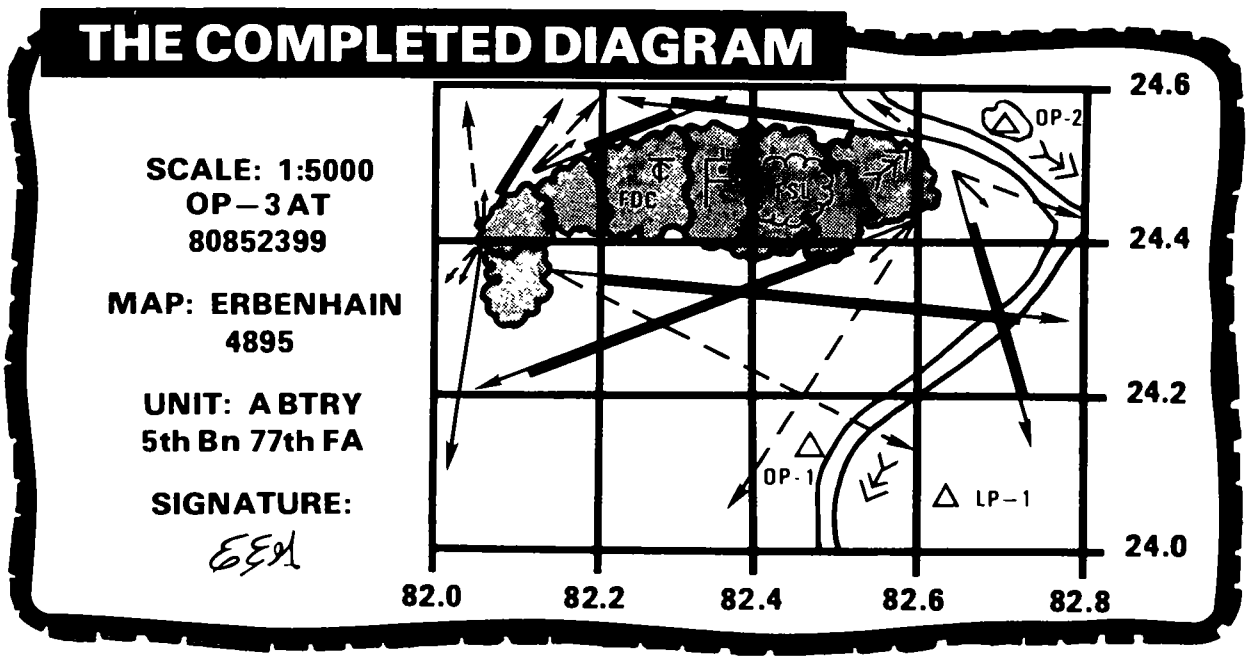


Expand the scale to 1:5,000 by using a blank 1:25,000 grid sheet. In expanding the scale to 1:5,000, each 200- by 200-meter block within the matrix correlates with a 1,000-meter grid square on the 1:25,000 grid sheet. Determine which 200- by 200-meter block on the matrix contains the battery center. In the illustration, it is 82.2 24.4. Next, select a square near the center of the blank grid sheet, label this square the same—82.2 24.4. You have identified and labeled the 200- by 200-meter block where the battery center is located. From this point, duplicate the labeling from the matrix on the grid sheet.



Reproduce key terrain. Examine the 200- by 200-meter blocks on the 1:50,000 map that contain key terrain features that influence the defense. Sketch what you visualize in these blocks on the corresponding squares of the 1:5,000-scale grid sheet. The result will be a map reproduction minus the contour lines and other data not pertinent to the defense of the battery. However, contour lines representing hills or depressions may be included if they are deemed pertinent.

Plotting on the diagram. Use the coordinate scale to plot coordinates and to measure distance on the 1:5,000-scale grid sheet by dividing the indicated graduations on the coordinate scale by 10; e.g., the 1,000-meter graduation is read as 100 meters. Use the protractor for measuring azimuths or direction. Locations should be plotted within 10 meters and directions within 10 mils. On the diagram, the actual location of a weapon is indicated by the base of the stem of the weapon symbol.



- Plot the locations of OPs, LPs, special defense teams, and weapon emplacements indicating their sectors of fire. Insure that sectors of fire overlap.

- Plot the location of obstacles or barriers, mines, and other key defense positions.

- Show the general location of key installations and sections within the battery area.

- Plot a series of protective artillery fire targets on key terrain features and avenues of approach around the battery area. This target list should be submitted to supporting artillery units.

- Machinegun range cards indicate the location (distance and direction from battery center or other known point) and the azimuths of the left and right limits and/or final protective line (FPL). The range card is prepared for all crew-served weapons. It is a record of firing data necessary to engage preselected targets within the sectors of fire during periods of limited visibility. The range card may also be used as a reference to engage targets and to aid in the preparation of the defense diagram. Details on preparing machinegun range cards are in FM 23-67.

Priorities of Defense.

Often only a small percentage of the battery's personnel are actually located in the battery position. Survey parties are normally operating away from the battery position. Additionally, if both firing platoons are out on a mission, a portion of the A&T personnel on a resupply run, and the battery commander out on a reconnaissance, it is conceivable that there may only be 25 to 30 people left to defend the entire battery area. If this is the case, it should be SOP that defenses be pulled in to alternate positions so that personnel resources are not too spread out. Key installations that *must* be defended are the field storage location, FDC, and communication complex. If the position is to be overrun, those critical items such as warheads and documents *must* be destroyed to preclude capture by the enemy.

8-20. Firing Point Defense

The small size of the firing crew makes it imperative that the platoon remain *well hidden* prior to actually beginning firing operations. This is normally accomplished in a hide position in the immediate vicinity of the firing point. Maximum use must be made of natural cover and concealment so that response times are not decreased because of artificial camouflage. Security personnel should be stationed near avenues of approach to the position when possible to give warning of an approaching threat.

If the platoon is detected prior to beginning a fire mission, every effort should be made to evacuate the position to avoid engagement. If detected during a fire mission while over the firing point, especially by hostile aircraft, an immediate decision must be made as to whether to continue the mission or withdraw.

8-21. Defensive Actions

A key to a responsive and successful defense, as previously stated, is early warning. Monitoring intelligence channels provides one of the best sources of expected enemy activity in the area. Depending on the tactical situation, the commander can be especially watchful for either air attacks, air assaults, subversive or guerrilla activity, or motorized rifle or armor attack.

Air Attack.

The greatest threat to a Lance unit will lie in aerial detection and engagement. Highly sophisticated aircraft are capable of both detecting Lance units with a vast array of sensors and engaging the unit with a high volume of fire. Enemy helicopters also pose a significant air threat by providing a high volume of fire on a unit. In the event of an air attack, personnel should disperse, take cover, and return fire with small arms and automatic weapons. Weapons should be fired straight up to form a "wall of bullets" through which the aircraft will fly. Chances of obtaining a hit are increased if everyone in the area shoots. TC 23-44 provides excellent guidance on how to engage attacking aircraft with small arms fire. If Chaparral or Vulcan units are allocated to provide air defense of the battery, advance warning of air attack may be received over an alert warning system.

Ground Attack.

Dismounted forces will often conduct operations at night or during adverse weather conditions. Attacks on a Lance battery will generally consist of:

- Infiltration with attempts at sabotage.

- Sniping activity.
- Ambush of elements entering or leaving the battery area.

These will most likely be carried out by small bands of sympathetic indigenous personnel, insurgents, or guerrillas. These groups would probably not be strong enough to take on the battery as a whole, but can effectively disrupt operations and damage equipment and report our locations to those forces who are able to decisively engage the unit.

Another particularly effective technique that may be employed is to set brush or forest fires around the battery area and engage personnel as they flee the area. In this way a very small number of personnel can disrupt/neutralize very large units.

If the battery has correctly deployed OPs/LPs and other protective measures previously discussed, the enemy should be detected prior to reaching the perimeter, giving sufficient time for the first sergeant to alert and position his reaction force in the direction of the attack. The remainder of the battery will man predesignated defensive positions around the perimeter. The reaction force is drawn from the various sections that are in the battery area and should be established by SOP. The force must be thoroughly briefed and well rehearsed to insure speed and teamwork. The reaction force should engage the enemy as he comes into view and should not pursue the enemy beyond the battery perimeter.

> *Note.* Reconnaissance patrols will initially only have the mission of *relocating* and *reporting* your position. If the tactical situation precludes any other method of engagement, they may be ordered to return and neutralize your position. These forces are manned by elite personnel highly skilled in their jobs. *They must be detected early,* and engaged as discussed above.

Although the probability of a mounted attack against a Lance battery is small, the possibility exists. In a breakthrough, armored elements may be advancing rapidly through the area. Initial elements would not be specifically looking for Lance units, but if detected, would either attempt to overrun the position, or report the location to second echelon elements. The best defense against a mounted advance is to avoid detection.

If not engaged after detection, it would be judicious to relocate the unit as rapidly as possible. If the enemy elects to attack, however, protective minefields covered by fire and employment of personnel with LAW and M203s armed with the HEAT rounds would offer the best defense. Restrictive terrain features around the battery area such as rocks, ditches, and closely spaced trees may canalize an attack effectively or prevent effective enemy maneuver actions.

Defense Against Indirect Fire.

Because of the battery's location behind the FEBA, it will generally be out of the range of enemy cannon artillery fire. In cases where the tactical situation is deteriorating and the enemy is rapidly advancing, it is possible that enemy artillery fire could be received. Other forms of indirect fire that may be encountered are mortar and rocket fire. The enemy's 60-mm, 81-mm, or 120-mm mortars can be easily transported by ground personnel to within range of the battery position.

Upon receiving "incoming," an immediate determination must be made as to whether the unit is under "observed fire" or merely sustaining a random barrage attack. If the battery is receiving directed fires, the position should be evacuated immediately

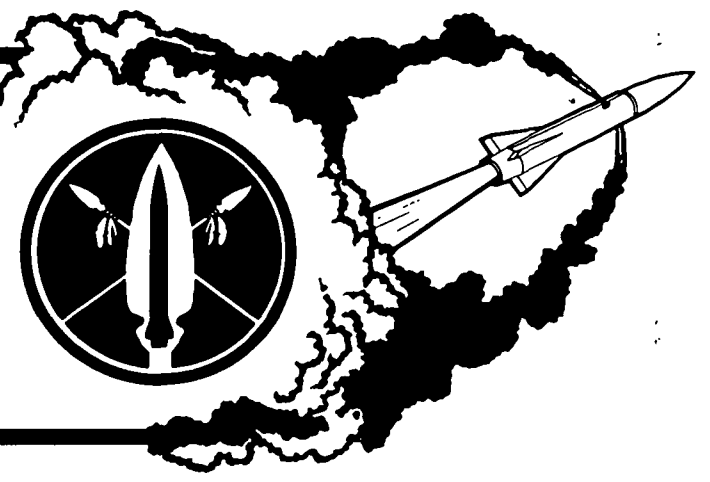
and the alternate position occupied to preclude further engagement. With random fires, the commander may opt to take cover or move the battery as the situation/mission may dictate.

Nuclear, Biological, and Chemical (NBC) Defense.

The Lance battalion must be capable of performing its mission while under a nuclear, biological, or chemical attack. FM 21-40 and FM 21-41 provide guidance relative to the protective measures against the effects of chemical or biological agents and nuclear weapons. These manuals also establish and describe the standards of proficiency for the protective measures employed by the individual and the unit to survive a nuclear, biological, or chemical attack. Defensive measures normally taken by an artillery unit will provide some degree of protection against an NBC attack.

CHAPTER 9

Tactical Nuclear Operations

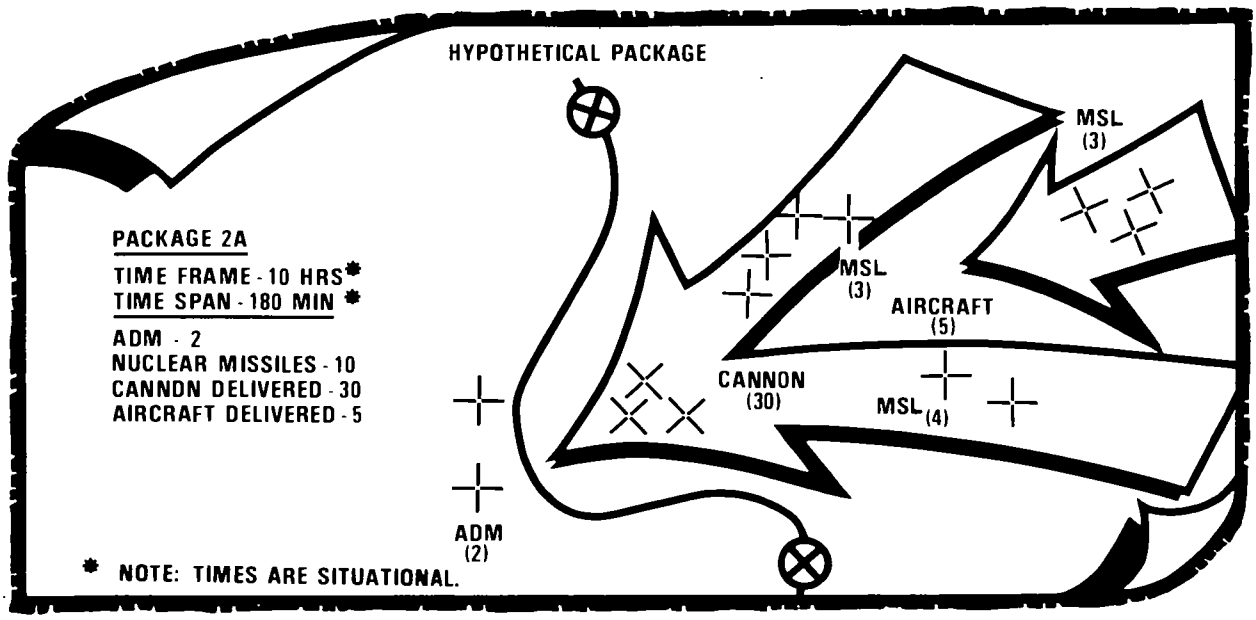


The threat of nuclear warfare will exist as long as potential adversaries have the capability to use these weapons. Nations equip themselves with nuclear weapons because of their tremendous casualty- and damage-producing capability and hence the tactical and strategic leverage they can provide. Our purpose in employing nuclear weapons is *to decisively alter the tactical situation or terminate the battle.* Our nuclear capability, as perceived by a potential enemy, also serves as a *deterrent to aggression.* If a potential enemy knows that we have both the capability and the will to meet or exceed the intensity of his nuclear strike, he will not be encouraged to employ nuclear weapons.

9-1. Tactical Nuclear Doctrine

Current nuclear doctrine, as contained in FM 6-20, FM 100-5, FM 100-50, and FM 101-31-1, describes the methodology for providing nuclear battlefield support and for conducting operations in a nuclear conflict. Tactical employment means the use of nuclear weapons by the battlefield commander, usually at corps or below, in support of the maneuver forces in his command.

The corps nuclear weapons "package" is a basic element of tactical nuclear doctrine, and is most likely to be used along with the restraints imposed by selective release. The package employment concept is based upon a "most probable" defensive situation in which target acquisition resources cannot provide targets fast enough to make attack of individual targets practical. In most cases, employment of nuclear weapons is *planned prior to hostilities,* and is *refined during hostilities* to obtain the best tactical effect. Aimpoints are planned on the periphery of civilian population centers in areas that we feel the enemy *must use* to accomplish his mission. To convey that nuclear weapons are being employed in a *limited* manner, all weapons in a package are fired in the shortest possible time. Division subpackages are subelements of a corps package and will be executed only as part of a corps package. A single package or several packages may comprise all or part of a more widespread theater or strategic employment plan.



Nuclear packages are planned using a nuclear target analysis technique known as preclusion-oriented analysis. This technique does not analyze individually identified targets as in target-oriented analysis. Preclusion-oriented analysis precludes excessive damage to population centers while employing the largest yields on probable enemy locations within the remaining areas. Probable enemy locations are identified by considering the terrain, enemy doctrine, and friendly operations. As more intelligence becomes available, aimpoints are *refined* to obtain the best tactical effect. Target-oriented analysis is an appropriate technique for known or fixed individual targets. In conditions of *general nuclear warfare,* package fire planning techniques will continue to be used to support the scheme of maneuver. Targets of opportunity will also be engaged, however. Nuclear weapons alone will probably not be decisive on the battlefield despite their lethality. Conventional firepower and maneuver *must be integrated* with nuclear firepower to achieve decisive results. Lance units must also be prepared to deliver conventional fire support throughout the package.

9-2. The Battlefield Decision

Corps is the lowest level that will originate a formal request for authority to employ nuclear weapons. Corps is the most appropriate command echelon to weigh the risks of using nuclear weapons against the tactical necessity demanding their use.

THE CORPS COMMANDER MAY REQUEST NUCLEAR RELEASE WHEN HE CONCLUDES THAT:
- the corps cannot accomplish its mission if nuclear weapons are not used.
- if the corps continues its mission without nuclear weapons, it would be too weak to carry out conventional operations. **The corps commander must use all available indicators so that he requests nuclear release before his forces have been so weakened that they cannot continue operations conventionally after nuclear weapons are fired.**

9-3. Controls on Nuclear Release

Release, or the authority to use nuclear weapons, will be conveyed via a sealed authentication system from the National Command Authority (NCA). National command authorities are the President and the Secretary of Defense. To dampen the escalatory effects of using nuclear weapons, release will normally be approved for *preplanned packages* of weapons to be fired *within a specified time frame,* and *within specified geographical areas.* To convey to the enemy that we are using nuclear weapons in a limited manner, all weapons in a package will be fired in the *shortest possible timespan.* Approval to employ nuclear weapons is granted after consideration of the predicted military effect, the anticipated political impact, and after consultation with allies.

9-4. Lance Nuclear Employment

Lance targets should be carefully selected for use within the nuclear weapons package or subpackage. Aimpoints selected for tentative engagement by Lance firing elements should be selected on terrain features that would support relatively stationary targets such as command and control elements, service support facilities, reserve or follow-on units, stationary air defense sites, or long-range artillery. During the initial planning sequence, information, as it develops, should be forwarded to supporting Lance units as soon as possible. The Lance battalion liaison officer must be alert for any changes or refinement in information and immediately transmit these changes to his battalion. The commander will in turn use this information to locate his battalion effectively and to establish sufficient firing positions to provide flexible and responsive execution plus maximum coverage of the target areas.

After the package is approved for employment, Lance aimpoints will be further refined within the employment constraints imposed by the corps commander. These may include moving the aimpoint, reducing yields, or changing time to fire. Target list information must be continuously updated and forwarded to the battalion. The responsiveness of the system can be greatly enhanced by the free flow of current information between the liaison officer and the battalion. Effective fire support channels of communication will be necessary during the refinement process and a prerequisite for a missile launch. In addition to preplanned targets within the package or subpackages, the Lance battalion may be required to fire on targets of opportunity that develop within the battle. Commanders must develop operating procedures that will allow the responsiveness required to fire on these types of targets.

During the refinement phase, it may be necessary to change firing data because of aimpoint refinement. Changes in data prior to occupation of the firing point will simply result in recomputation of the data, reorientation of the reference theodolite, and repositioning of the firing tape, but will not affect the standard reaction time. Aimpoint refinements received after occupation of the firing point will increase response time, since firing data will have to be recomputed and new settings applied to the missile. The launcher will have to be repositioned if the aimpoint adjustment results in an azimuth deviation greater than 285 mils left or right of the original azimuth of fire (400 mils for nonnuclear warhead). This will result in a significant increase in reaction time. If the change is within traverse limits, the missile will still have to be depressed to make new warhead settings and then relaid in the new direction of fire.

9-5. Opposing Force Nuclear Doctrine

Opposing force nuclear doctrine includes the following considerations:

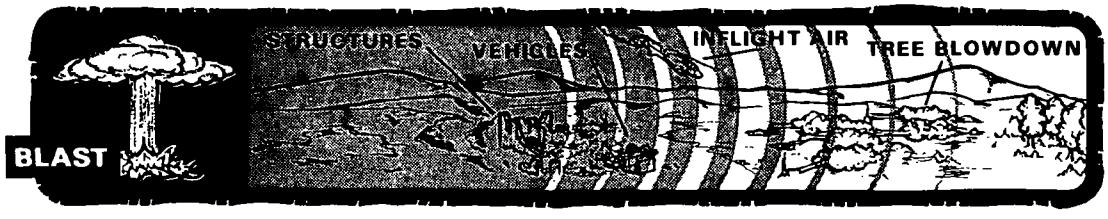
- The decision to fire is made at the highest political levels. A decision to retaliate against first use by an opposing force *may* be made by the theater commander.
- Surprise and massed nuclear fires in depth are stressed.
- Weapons with much larger yields than those employed by the US are used. They will normally be employed in airbursts.
- Units may be withdrawn to allow close support strikes. *This would be a good intelligence indicator for US forces.*
- Nuclear weapons are integrated with and supplement conventional and chemical fires to achieve surprise massed fire support.
- Opposing force nuclear delivery means are the first priority targets.

Forces we could fight in the Far East consider the following factors:

- Planning and decisionmaking are done at the General Staff Department in consultation with Army and higher headquarters.
- Employment will be in response to the first use of nuclear weapons by an opposing force.
- Strategic missiles and bombs may be used to support ground forces. Atomic demolition munitions (ADM) may also be used.
- Opposing force nuclear delivery means are the first priority targets.

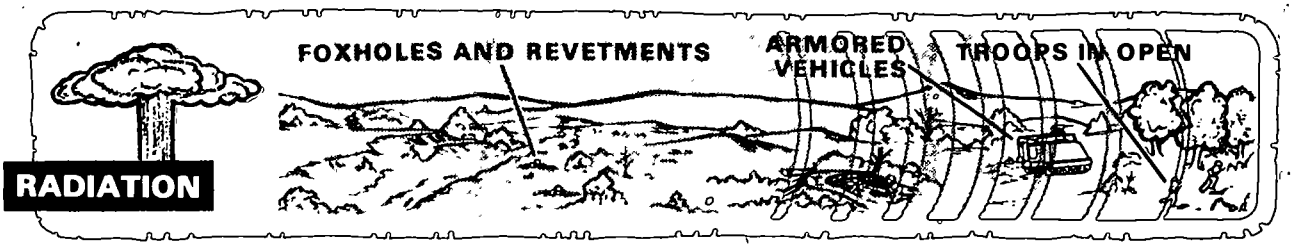
9-6. Nuclear Weapons Effects

There are several distinct nuclear weapons effects. Blast effect is vastly increased over conventional weapons. Both initial and residual radiation have a significant effect on troops. Thermal output is an added danger to unprotected soldiers. Flash can cause temporary or permanent blindness. The electromagnetic pulse that emanates from a nuclear burst can seriously impair command and control communications. Most casualties and damage on the nuclear battlefield are caused by some combination of these effects rather than a single one.



Blast.

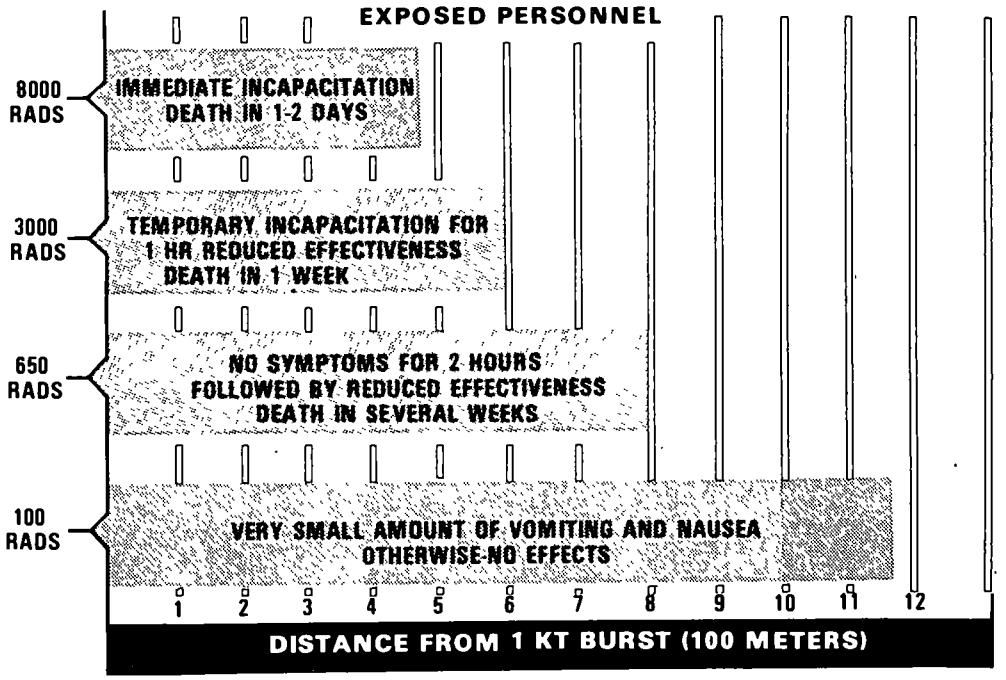
For a "typical" nuclear weapon, approximately 50 percent of its yield is produced as a blast when detonated at a low burst height. Materiel targets are damaged either by the crushing action or by the tumbling, tearing action of the blast wave. In addition, trees may be blown down and debris scattered about the battlefield creating obstacles to movement. Personnel may become casualties when subjected to crushing overpressures, flying debris hazards, or even being physically "blown away."



Initial Nuclear Radiation.

This radiation, which is emitted from the detonation during the first minute, is highly penetrating and may produce a lethal hazard to a distance of several kilometers from the nuclear burst. This type radiation is normally measured in terms of the "radiation absorbed dose" or "rad." Biological response in the average person due to various radiation doses is shown in the graph.

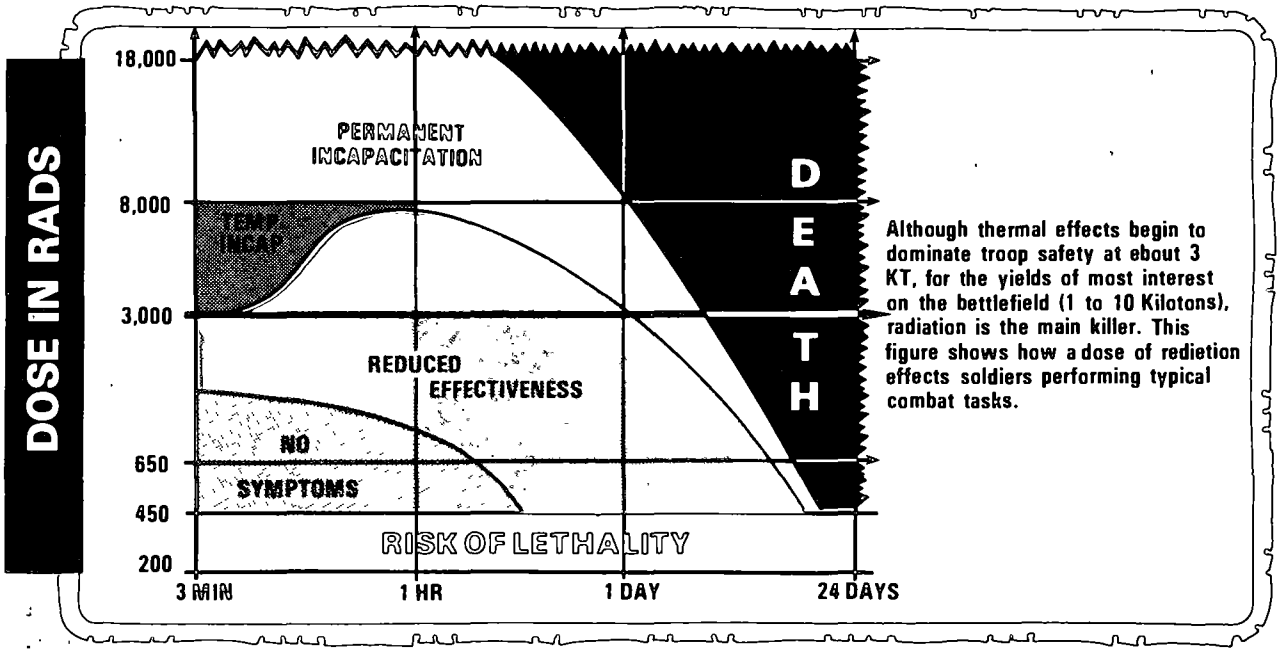
RADIATION EFFECTS FOR A 1 KILOTON (KT) NUCLEAR WEAPON

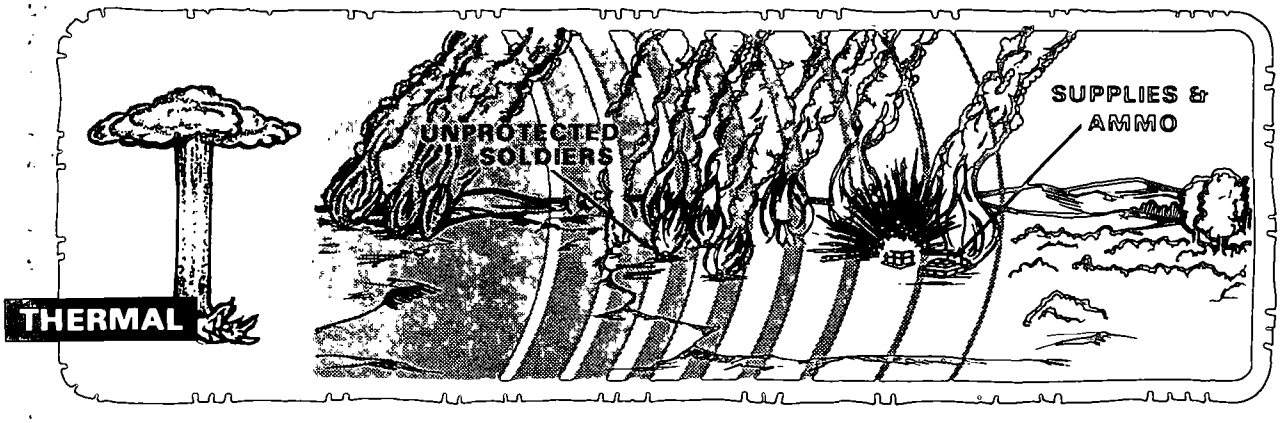


The intensity of initial redietion is reduced by the protection provided by tanks and foxholes, and also by each 100 meters of distence from the burst. For example, this figure shows thet a 1 KT burst incapecitates exposed soldiers (within five minutes) out to 600 meters. It only does so out to 500 meters for troops in tanks or foxholes. The 1 KT nucleer weepon causes reduced effectiveness to exposed soldiers (efter two hours) out to about 800 meters. Soldiers in tenks or foxholes are usually sefe beyond about 1,100 or 1,200 meters. Ten-KT weepons ere ebout 50 percent more effective then 1 KT weapons; however, the sefe distance increeses to ebout 5,500 meters due to the thermal effects coming from larger weepons.

Residual Nuclear Radiation.

This radiation consists of induced radiation and fallout. Induced radiation is caused by the initial neutron radiation interacting with the soil. It occurs in a relatively small circular area directly below the nuclear detonation. Casualties can normally be avoided by restricting operations within a radius of 1 kilometer of a detonation until radiological survey teams have determined the actual radius of significant hazard. A surface or subsurface burst vaporizes large quantities of soil and forces it into the atmosphere. When sufficient cooling has occurred, fallout particles are distributed by the prevailing wind as they return to the ground. Because fallout contamination may cover large areas and present major operations problems, deliberate use of surface burst is tightly controlled by higher authority.



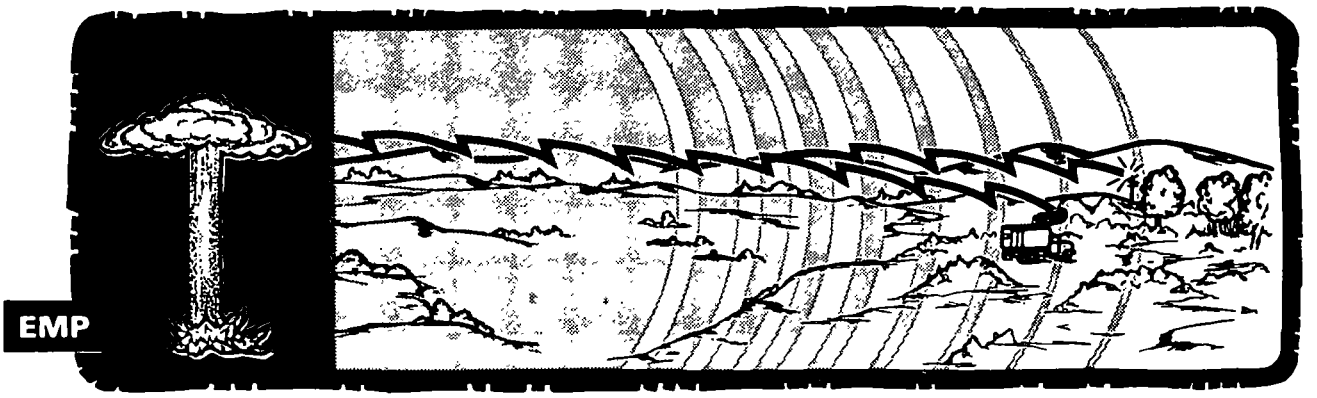


Thermal Radiation.

Thermal energy (heat and light) may travel in sufficient intensity to burn troops and start land fires at considerable distances from the point of detonation. Terrain, vegetation, buildings, fog, haze, and smoke will

reduce the range of such effects.

The brilliant flash of a nuclear burst can cause "dazzle" (temporary blindness) or permanent retinal burns at ranges (up to 50 km at night) where all other casualty producing effects are insignificant. All damage is done before the 0.15 second normally required to blink an eye. Facing away from the burst or closing the eyes will not always eliminate dazzle.



Electromagnetic Pulse (EMP).

Electrical and electronic equipment including radios, generators, night vision devices, and computers may be damaged or temporarily disrupted from the EMP emitted by a detonation.

9-7. Survival on the Nuclear Battlefield

General.

Despite their tremendous lethality, nuclear weapons may not be completely decisive against ground targets. Damage will be lessened by target location error, weapons system limitations, and defensive countermeasures. Three important countermeasures are shielding, dispersion, and EMP countermeasures.

Shielding. Shielding is physical protection that reduces the vulnerability of personnel and materiel to nuclear weapons effects. Any form of shelter that increases protection against small arms, mortars, or conventional artillery fires will normally increase the protection against the effects of nuclear weapons. Terrain itself can provide protection.

Dispersion. Dispersion is the separating of units to reduce their vulnerability to nuclear attack. Well-dispersed units are less vulnerable because of the increased distance between elements of the unit. In addition, a well-dispersed unit is more difficult to detect. The extent of dispersion is a function of the mission, local security available, the enemy's target acquisition capabilities, and the likelihood of nuclear strikes.

Electromagnetic pulse countermeasures. Protective measures can be taken that will reduce the probability of EMP damage to a piece of equipment. These include using larger antennas (such as the RC-292) only when absolutely necessary, reduced remoting of radios, and removal of antennas and cables when radios are nonoperational. Additionally, pieces of equipment with long cable runs such as the FADAC and monitor-programmer must be disconnected when not in use. Where possible, all other interconnecting signals or power cables,

should be of short length and all winds should be eliminated. Burial of cables such as communication lines and light/power cables to a depth of at least 1 foot will substantially reduce the induced power levels of EMP. Reducing EMP vulnerability also has the benefit of reducing unit electronic profile in electronic warfare (EW) operations.

Individual and Unit Protective Measures.

The Lance unit that is well trained and properly prepared will be able to operate as effectively in a nuclear environment as it might in a conventional environment. Operations in an active nuclear environment place a premium on use of skills that an effective unit will use in a conventional environment. The principal difference will be one of degree—the unit and individual soldier must be capable of planned, sustained, independent action with little or no outside support or guidance. This means that before the first nuclear weapon is used, the individual must be thoroughly trained and capable of taking the required actions for his own survival immediately and reflexively; the unit must have a comprehensive and well-rehearsed set of actions to protect itself and enable itself to continue the mission. More than ever, reliance must be placed on rigorous and realistic training at the unit level—the small unit commander's responsibility.

Individual protective measures. The individual protective measures against a nuclear detonation are similar in many respects to those that must be taken against the effects of conventional weapons. The effects of a nuclear weapon are more intense; however, anything that affords protection from the effects of conventional fires will provide some protection from nuclear weapon effects. The best protection available in the field against initial weapons effects is a properly prepared foxhole with some sort of overhead cover. Troops must be trained to dig in routinely. A deep, covered foxhole provides excellent protection against blast and thermal radiation and shields the individual from as much as 90 percent of the initial nuclear radiation from the nuclear burst.

If a prepared position is not available, troops caught in the open should drop to the prone position and take advantage of any shielding available such as drainage ditches, culverts, etc. However, they should be trained *not* to seek shelter behind or within structures or vehicles and equipment that might collapse or be translated by the blast wave. Likewise, they must be trained to react immediately. Shelter must be reached within only a few seconds if it is to be effective. All exposed skin areas must be covered and, if the individual is prone on the open ground, the individual should be on his stomach with his feet toward the burst. This position minimizes exposure of the softer portions of the body to missiles, exposure of body surfaces to translational effects of the blast wave, and exposure of skin surfaces to thermal radiation. If the individual is mounted in a lighter vehicle such as a CP carrier, SPL, or LT and time permits, he should dig in or seek shelter outside the vehicle.

When the firing platoon is operating independently and away from the battery position for long periods, individual shelters should be prepared in the hide position. At a minimum, a survey of the surrounding terrain should be made to identify material or manmade protection. Drainage ditches, culverts, and basements provide protection from blast effects as well as radiation.

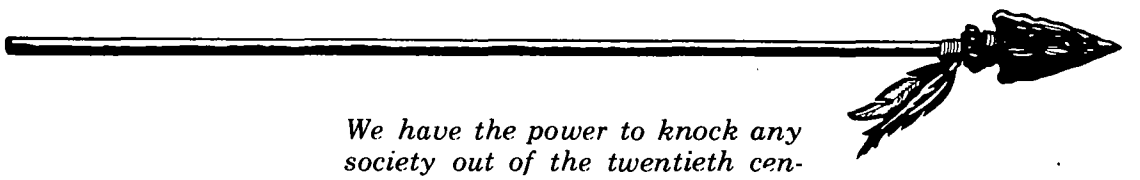
After the burst, the individual soldier must act on his own initiative to administer first aid to the injured, decontaminate himself and his equipment by brushing or washing, perform essential maintenance on his equipment, reestablish contact with his leaders, and prepare to continue his mission. Once again, initiative, speed, and individual proficiency are essential because operations must resume immediately after the burst either to exploit the effects of a friendly

nuclear strike or defeat the enemy's attempt to exploit the effects of his nuclear attack.

Unit protective measures. The unit must have established and rehearsed procedures for dealing with the effects of a nuclear blast. If the unit is not organized for and proficient in nuclear, biological, and chemical (NBC) defense before the nuclear burst, it certainly will not be organized afterward.

Procedures to safeguard unit equipment from nuclear effects must be established and responsibilities assigned. For example, antennas should be taken down and long cable runs disconnected from electronic equipment if circumstances permit. Electronic equipment must be grounded. Optical devices such as theodolites, GSUs, and target sets should be protected from the direct effects of thermal radiation. Loose material in the unit area must be secured to reduce missile hazards.

Standing operating procedures must provide for automatic issue and use of radiac survey meters and dosimeters. The SOP should consider the probable location of radiac equipment within the battery area, and if detection or monitoring operations are required, the impact of the loss of monitoring team personnel on unit operations. Decontamination procedures should be established and rehearsed. Personnel must know how to implement and understand fallout prediction methods and reporting procedures. Treatment and handling of casualties must be prearranged, if possible. Personnel outside the battery area such as firing platoon and survey parties must act independently to deal with the situation, must reestablish contact with the battery headquarters, and must report their condition. The battery must reestablish communications with the battalion and prepare to resume its mission immediately. To expect unit officers or personnel to have the time and presence of mind to establish and implement procedures in the aftermath of a nuclear strike is absurd. The response of the unit must be automatic and the result of thorough and realistic preparation and training.

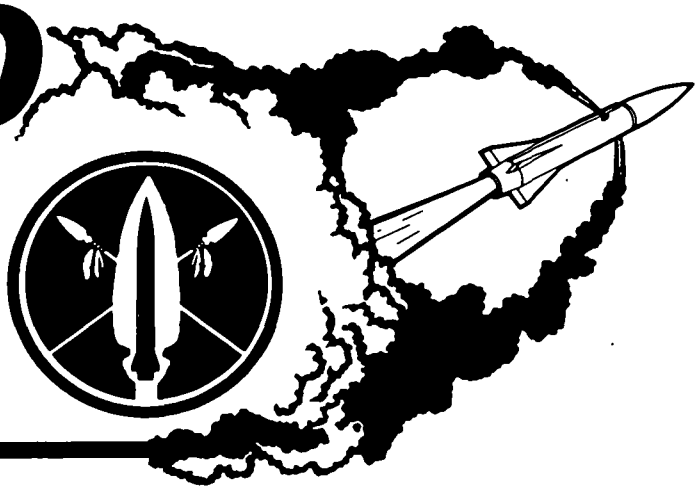


We have the power to knock any society out of the twentieth century.

—Robert S. McNamara

CHAPTER 10

Air Movement



Because of the design of the Lance launcher, the firing platoon may choose almost any place on the battlefield as a launch site consistent with certain considerations. If the position cannot be reached by ground, the launcher converted to its lightweight configuration can be airlifted to whatever firing position allows the depth of fires desired. On a much larger scale, the force commander or theater commander may desire to move a Lance firing battery or an entire battalion from one battle area to another or to an entirely different continent to influence the tactical or strategic situation to our own advantage. The purpose of this chapter is to discuss these capabilities.

10-1. Airmobile Operations

Airmobile operations for Lance are defined as operations in which Lance firing platoons with their ancillary equipment move about the battlefield in cargo helicopters under the direction of the force commander to fire upon deep targets that cannot be engaged from normal battery positions. Airmobile operations are characterized by detailed planning and coordination, aggressive execution, speed of displacement, and operation with minimum essential personnel and equipment for periods of short duration.

Considerations.

Advantages of an air displacement must be weighed against ground movement of a firing platoon along with other factors described below prior to undertaking an airmobile mission. Factors to be taken into consideration should include:

- The advantages gained through airmobile movement must outweigh the relative vulnerability of troops and equipment to enemy air defense capabilities.
- Availability of aircraft and time delay anticipated prior to the arrival of air support.
- Availability of survey control at the distant firing point. If there is no survey control available, time must be allowed to accomplish hasty survey techniques and establish accurate directional control. This will generally require 45 minutes to 1 hour.
- Number of rounds to be fired. Resupply of the LZL at an airmobile location should

be accomplished only in a relatively secure area because of time-consuming manual operations and the amount of helicopter groundtime required.

- The amount of time required to perform a conversion. It may take longer to convert the self-propelled launcher to the air transportable lightweight launcher (LZL) and fly to the position than it would to travel by ground.

- Proximity of friendly/enemy troops. Because of Lance's characteristic signature effect on firing, positions of friendly elements in the immediate area may be compromised and exposed to a greater risk of counterfire or attack by air. Operations in the vicinity of enemy activity should be undertaken only if adequate security for the firing element can be provided. A Lance battery cannot provide adequate security for airmobile operations and simultaneously maintain rear area operations and security.

Application.

Corps aircraft assets must perform a variety of missions throughout the corps. Lance airmobile operations may be dependent upon availability of these aircraft and should be limited to movement of platoons to achieve greater depth of fires in enemy territory. The following examples demonstrate (but are not necessarily limited to) how Lance may be employed in an airmobile configuration:

Covering force operations. If the force commander deems it appropriate, Lance firing elements may be transported up to the planned FEBA or beyond in order to achieve a greater penetration into enemy territory where, for example, massed forces assembled for an offensive operation might be encountered. An operation of this nature should be attempted only if adequate security is available for defense of the platoon or if only very limited contact has been made in the covering force area. A sustained operation for example would not be feasible because of difficulty in ammunition resupply.

To support fast-moving, ground-gaining elements. In vigorous allied offensive operations, rapid advances of friendly ground forces could conceivably move the FEBA far enough forward to necessitate rapid deployment of Lance firepower forward to maintain depth of fires.

To overcome battlefield obstacles. Significant battlefield obstacles may hinder movement of a firing section between firing points and/or the battery position. Air movement of a firing section over obstacles such as radiological or toxic contamination, barriers such as flooding or destroyed bridges/roadways, or areas of intense fighting or enemy troop concentrations would limit personnel and equipment risk and reduce response times.

Preparation.

In preparation for a Lance airmobile operation, the basic planning sequence outlined in FM 57-35 should be considered. This is an inverse planning sequence and is generally accomplished in four phases: planning, loading, movement, and occupation. Planning is materially enhanced by the development and rehearsal of SOPs and by frequent briefings.

Execution.

The technical aspects of an airmobile operation are discussed in TM 55-1115-485-12-1 and TM 55-1425-485-15-1. There are two basic types of airmobile operations that can be performed—the airmobile fire mission, and air convoy/resupply mission.

Airmobile fire mission. An airmobile fire mission is generally carried out in three phases.

In the first phase of the operation, an advance party moves forward to secure and prepare the firing position. The advance party will generally be under the control of the firing platoon sergeant and consist of an instrument operator, survey personnel, and

security personnel. Pathfinder personnel will be required for night operations and may be utilized for daylight missions. Utility-type aircraft may be used to deliver and pick up the advance party and may act as an air retrans so that radio contact can be maintained with the battery. Radiological survey and chemical agent detection equipment should be used on initial occupation of the firing point.

If the firing position has not been previously surveyed, it will be necessary to accomplish hasty survey techniques to establish horizontal control. Directional control can be imparted through use of astronomic techniques or through the use of the survey instrument, azimuth gyro, lightweight (SIAGL). Because of its relatively small size and weight, the SIAGL can be transported in utility helicopters. Approximately 1 hour should be allowed for the preparation of a previously unsurveyed firing point. If the firing point has already been established, less time will be required.

If necessary, conversion from SPL to LZL and/or rigging may be accomplished concurrently with the advanced party's occupation of position. The LZL should not be exposed at the pickup zone (PZ) until just prior to the arrival of the mission aircraft to preclude detection.

Cargo-type helicopters will be used to transport the launcher and crew to the firing position. Attack helicopters from the attack helicopter company may provide overwatch or security for the air movement. Aircraft should employ terrain flying techniques along a preselected route to the firing position to avoid detection by enemy observation or air defense radar. If transporting a nuclear round, an alternate load-carrying aircraft with the required guard force will accompany the mission aircraft. Final approach and identification of the firing point may be facilitated through the use of radio vectoring or visual signaling/identification or a combination of both.

Because of the short reaction time of the firing section once at the position, the mission aircraft sets down in a hide position in the vicinity of the point with its engines running during the actual accomplishment of the mission.

If no more rounds are to be fired from that position, extraction is accomplished as rapidly as possible after firing to avoid detection and counterfire.

Air convoy/resupply mission. If more than one round will be fired from an airmobile position, or if a firing platoon/firing battery is isolated from normal resupply trains, it will be necessary to air transport missile rounds, ammunition, equipment, etc., to the detached element. Air convoy operations will generally consist of a scout aircraft to fly reconnaissance and the mission aircraft with winch capability. If nuclear warheads are being transported, an alternate load-carrying aircraft with the required guard force will accompany the mission aircraft. Attack helicopters, if available, should provide overwatch for the convoy.

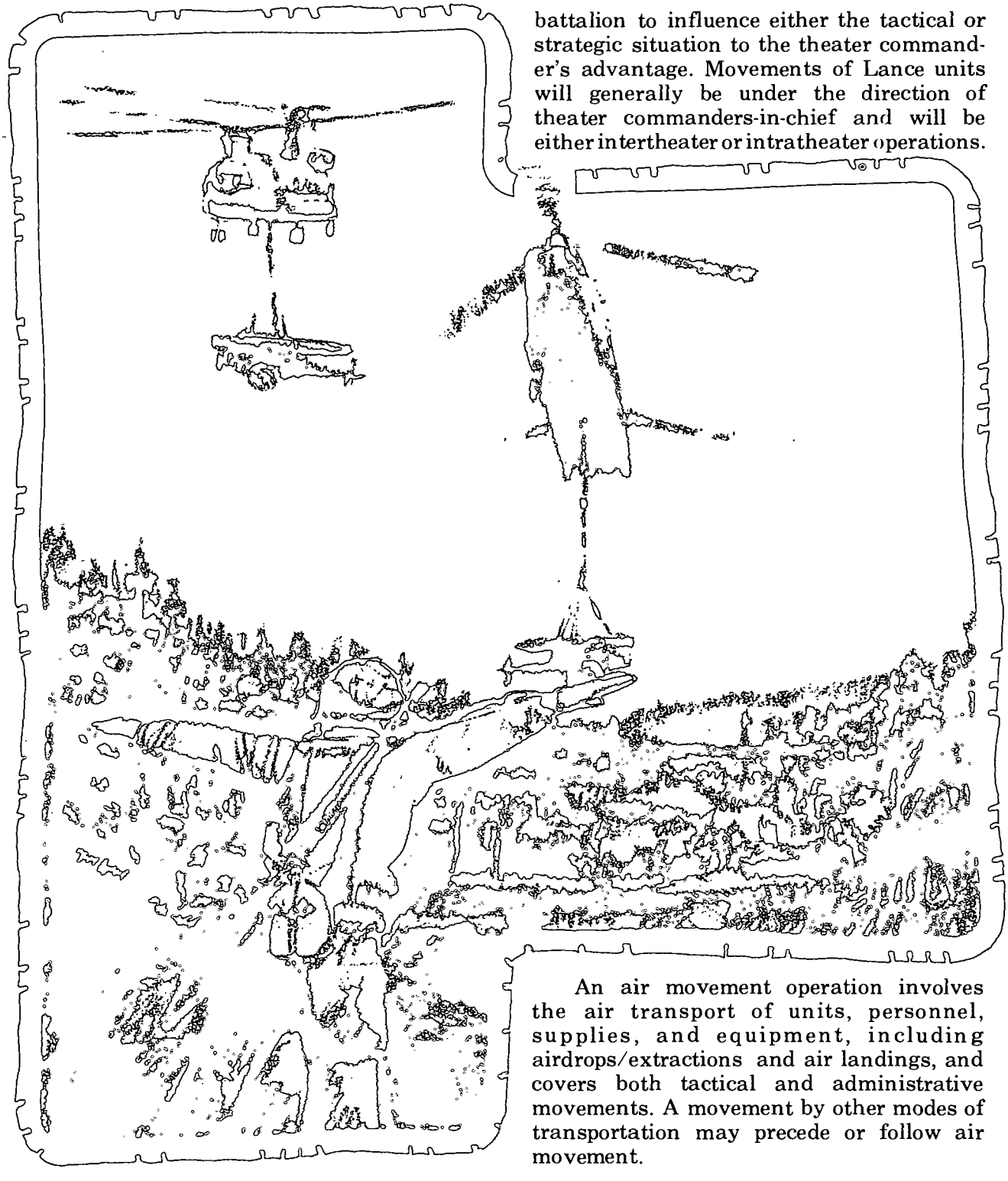
Note. Rounds and equipment will be loaded and unloaded IAW procedures outlined in the appropriate TMs.

Upon arrival at the destination, the mission aircraft will be unloaded and reloaded with empty containers (where applicable) as rapidly as possible to preclude extended helicopter groundtime. Mating and transloading operations with the tripod hoist are more time consuming than normal operations with the loader-transporter because of the manual procedures involved.

10-2. Air Transportability

The lightweight configuration of the Lance launcher allows it to be transported using Army assets across the battlefield to influence the tactical situation. On a higher level, circumstances can arise necessitating the movement of an entire Lance battery or

battalion to influence either the tactical or strategic situation to the theater commander's advantage. Movements of Lance units will generally be under the direction of theater commanders-in-chief and will be either intertheater or intratheater operations.

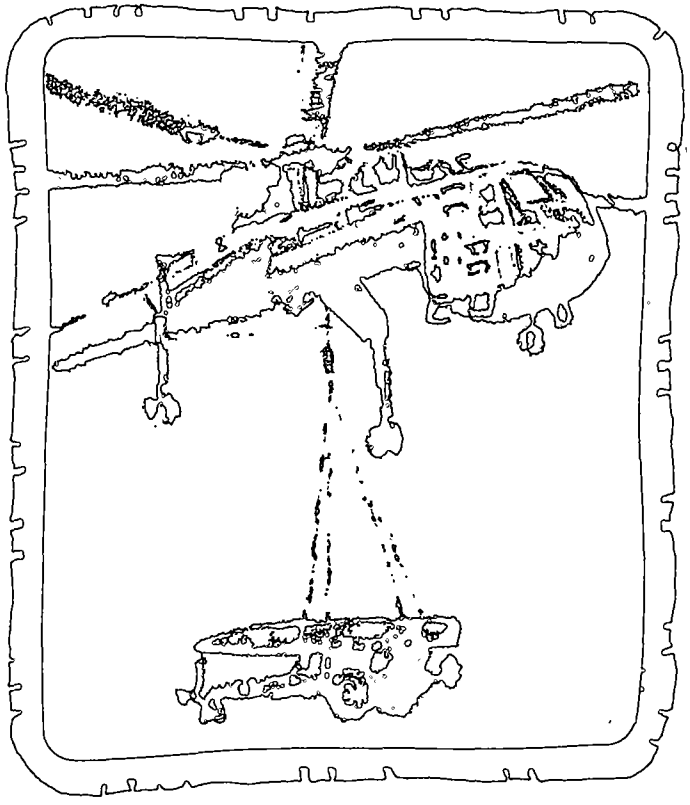


An air movement operation involves the air transport of units, personnel, supplies, and equipment, including airdrops/extractions and air landings, and covers both tactical and administrative movements. A movement by other modes of transportation may precede or follow air movement.

To have a successful joint airlift operation involving two or more services in the movement and delivery of a Lance unit by air into an objective area, the enemy's capability to employ offensive or defensive weapons must be sufficiently reduced to permit the conduct of airlift operations without first incurring unacceptable losses, or the probability of his employing these weapons must be sufficiently low to justify the risk, or the risk must be accepted.

Airlift operations require detailed planning and close coordination among Army and Air Force forces. The feasibility of an operation must be closely weighed with particular emphasis given to the adequacy of total resources to achieve the objectives. Close relationships and coordination between participating units are continued during planning, briefing, aircraft loading, movement, and the assault phase and until the joint operation is terminated.

Lance units with an airlift contingency may be strategically or tactically deployed (i.e., moved or relocated by air) on short notice, to any land area within the delivery capability of the aircraft force, and employed as a deterrent or combat force. The strategic mobility of Lance units would permit their rapid employment to meet emergencies in a variety of conflict environments anywhere in the world. Lance airlift operations provide a means by which a commander can decisively influence the tactical situation by both long and short range movements. Strategic surprise can be obtained by rapid shifts of Lance units over great distances; tactical surprise is achieved by the sudden, unexpected delivery of these units into an objective area. This would constitute an effective means of providing show of force in furthering national interests, since their presence would furnish an impressive display of US capabilities. Lance units may be transported to an area of operations by large strategic airlift aircraft and reloaded to tactical airlift aircraft for further deployment to the objective area. If air movement is to be fully exploited,



careful plans must be made to accomplish rapid in-transit reloading. Under certain conditions, Lance units may be loaded on the tactical airlift aircraft, which will deliver them directly to the objective area. Where transloading is necessary, units should be formed into suitable tactical aircraft increments prior to the initial air movement.

Air movement has several limitations as discussed below.

Elements of an air movement are particularly vulnerable to enemy air defense measures that must be neutralized, suppressed, or avoided. Air superiority en route to and over the objective area is essential for airlift operations.

After delivery, the force is vulnerable to air, armor, nuclear, chemical, and biological agent attacks. Adequate lightweight antitank and air defense weapons, air interdiction, tactical air support, use of chemical/biological/radiological protective measures, and proper selection and utilization of terrain will reduce this vulnerability.

Unfavorable weather, including low visibility, low ceiling, and high winds, may restrict airlift operations. The limitations imposed by bad weather can be offset in varying degrees by appropriate use of electronic navigational and landing aids.

Physiological limitations associated with acclimatizing troops deployed over long distances involving extreme climate and altitude changes may appreciably reduce the initial effectiveness of air insertions. The initial loss of individual efficiency due to change in environment should be considered during the planning stage of airlift operations.

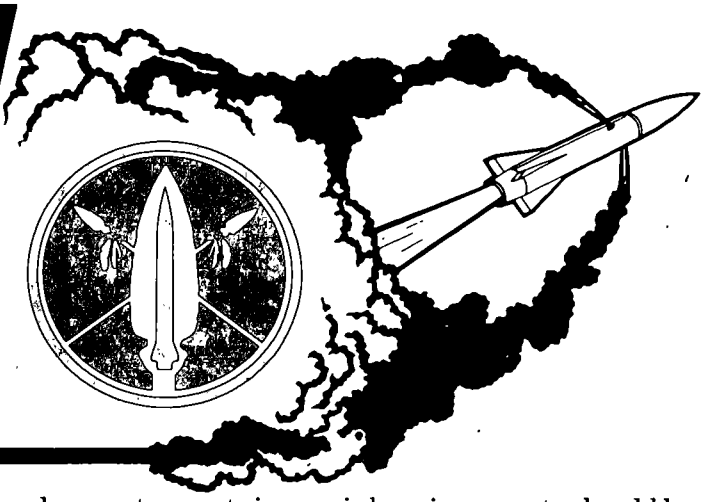
The theater commander being reinforced will be responsible for providing ammunition either from existing theater stocks or through special provisions for resupply using Air Force, Naval, or commercial resources.

Target acquisition may be a limiting factor upon occupation of a new area because capabilities to acquire lucrative deep targets may not be available.

For more comprehensive procedures involving airlift operations, consult FM 55-10, FM 55-12, FM 55-15, TM 55-602, and FM 57-1.

CHAPTER 11

Operations in Special Environments



The Lance commander who must operate in special environments should be aware of the problems that can develop because of extreme conditions of terrain and weather. These conditions can combine to degrade weapons system capabilities and impose severe limitations on the personnel operating and maintaining the equipment. While the Lance unit's mission will not change, the employment of the unit must be tailored to the particular environment. Key considerations that must be included in planning and preparation for operations in a special environment are:

What is the enemy threat and what effect will the environment have on enemy tactics and techniques?

How can the basic elements of Lance doctrine be best applied in view of environmental characteristics?

What effect will the environment have on normal maintenance procedures?

What effect will the environment have on normal weapon system employment and functioning?

What effect will the environment have on personnel (special clothing, medical supplies, food, soldier fatigue)? What effect will this have on normal supply requirements? Can acclimatization be conducted prior to operations?

What special combat service support will be required?

The effects of special environments on communications and surveying procedures may greatly influence tactical operations. Since these areas are not within the scope of this manual, refer to FM 6-2, *Field Artillery Survey,* appendix N, and FM 24-18, *Field Radio Techniques,* section IV.

11-1. Jungle Environment

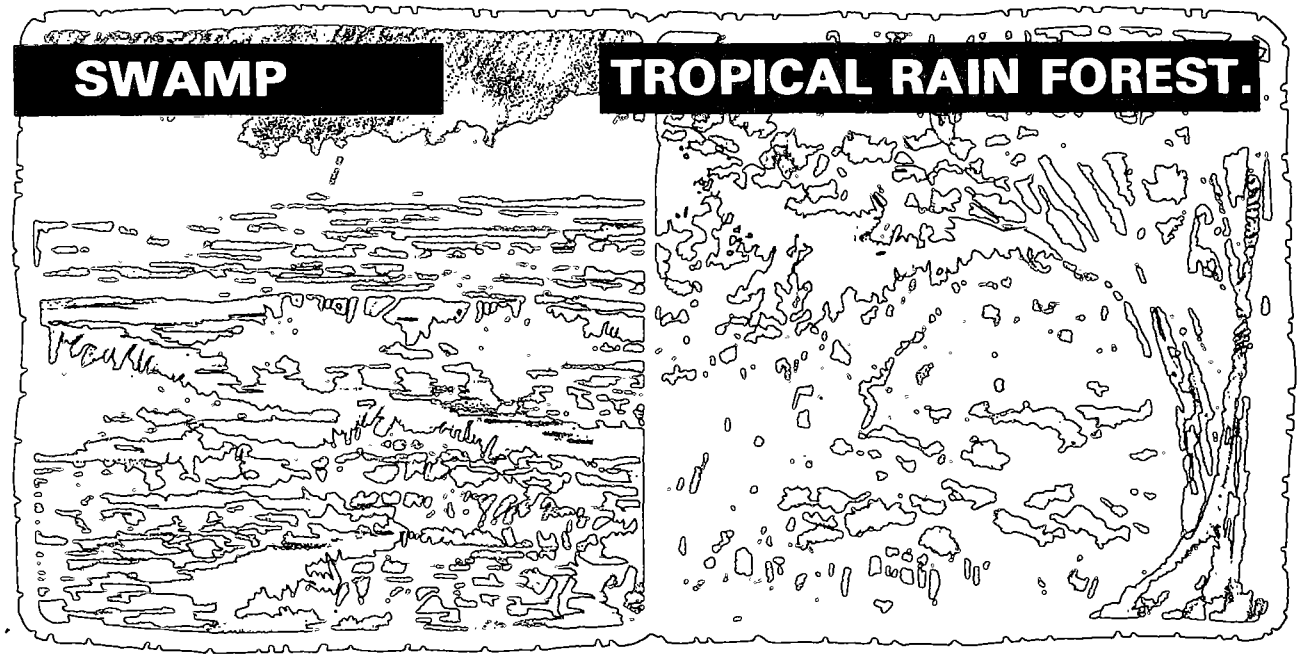
The jungle regions of Asia, Africa, and the Western Hemisphere are potential battlefields. Past wars have provided valuable experience for the US Army in the conduct of jungle operations. Lance's extended range and airmobile capability are valuable assets in jungle warfare. Close air support is essential.

Environmental Effects.

Jungles are areas located in the humid tropics wherein the land is covered with such dense vegetation that it impedes military operations and tends to obstruct military lines of communication. Types of jungles vary from tropical rain forests and secondary growth forests to swamps and tropical savannas. The dominating features of jungle areas are thick vegetation, high and constant

temperature, heavy rainfall, and humidity. Seasonal variations in rainfall have highly significant impact on military operations.

Military operations in jungles are affected primarily by two factors—climate and vegetation. These two factors combine to restrict movement, observation, fields of fire, communications, battlefield surveillance, and target acquisition. However, these factors favor military operations by providing excellent cover and concealment in jungle terrain.



The jungle climate contains numerous health hazards for troops, particularly unacclimatized soldiers who have little or no resistance to many of the endemic diseases. Thus, an increased disease rate from diarrheal diseases and fungus infections may occur. Protection is required against mosquitoes, flies, fleas, leeches, and other parasites. If these health hazards are not countered, more troops may become hospitalized during jungle operations because of disease than because of wounds. In a tropical climate, all weapons and equipment will require daily maintenance. Because of the normal scarcity of road and rail networks, combat service support and engineer support requirements will be increased.

According to the type of vegetation, ground observation in jungle areas can vary from a few feet to 20 or 30 meters. Aerial observation is often ineffective because of the jungle canopy and, during the rainy season, because of heavy rain, low-hanging clouds, fog, and haze. The vegetation also severely degrades fields of fire in jungle areas except along trails and roads. However, the dense vegetation does provide excellent concealment. While camouflage is enhanced in the jungle, vegetation does not protect the soldier from enemy fire. Troops must not mistake concealment for cover. For example, in most jungle areas, trees will not provide extensive coverage. Cover in jungle areas is provided by surface irregularities, such as ravines, gullies, and large rocks.

The jungle environment is a serious obstacle to movement. Dense vegetation, gullies, steep hills and cliffs, rivers, unfordable streams, and swamps hinder movement. Normally, vehicular movement is canalized, impeded, or impossible. Cross-country movement by foot is slow and difficult. Mobility in jungle areas is attained most effectively by air movement.

Employment.

Because of the dense overhead canopy, poor ground mobility, lack of tactical control, and poor communications, combat service support, and maintenance, the use of Lance units in many jungle areas may be impractical, if not impossible. The only logical employment of Lance units is in relatively open areas adjacent to or within the jungle, such as grasslands or cultivated areas. In such areas Lance units may be employed to compensate for lack of mobility among cannon units due to terrain and/or weather by providing in-depth coverage of those targets that conventional artillery cannot reach. In any case, because of the constant local security threat, great emphasis must be placed on unit defense.

Maintenance.

The combination of heat, high humidity, and frequently heavy rainfall will cause metals to rust, electronic equipment to corrode, and fungus to grow on all types of material. Weapons, vehicles, radios, and fabrics will wear out faster. Equipment availability will decrease and commanders will have to use equipment that is in less than peak condition and serviceability. Measures that can help are:

- Keep electronic equipment such as the monitor-programmers and FADAC turned on as much as possible. The self-generated heat of components will hold down excessive moisture, corrosion, and fungus growth.
- Monitor humidity indicators frequently and change dessicant/reject equipment as required.
- Keep all equipment as clean as possible (especially theodolites).
- Do not open sealed warhead and MMA containers until ready to mate.
- Check individual items of clothing and equipment frequently.
- Take along only those items of equipment and repair parts that are essential for a particular mission.

Communications.

Terrain features combined with dense vegetation, heavy rain, and high humidity can reduce effective range of radio communication up to 25 percent. Operators must be trained in the use of proper techniques when employing radio and/or wire communications plus the most effective use of supplementary gear such as antennas, radio relay and repeater stations, and telephone amplifying devices. Helpful measures include:

Train operators to copy weak signals.

Use special purpose and quarter wavelength antennas.

- When possible, install antennas above jungle canopy.
- Use frequencies that minimize interference and atmospheric noise.

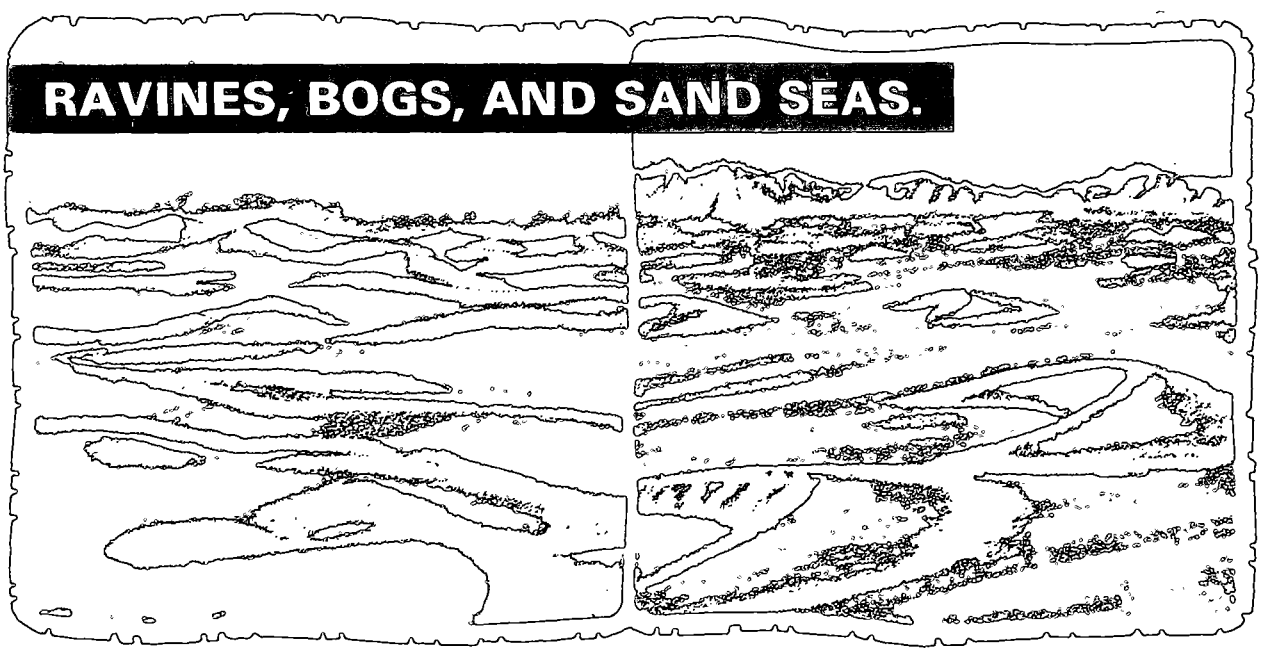
11-2. Desert Operations

Many desert areas of the world are potentially vital to the national interest of the United States. For a wide variety of factors—strategic location, natural resources, assistance to an ally, deterrence of aggression, etc.—the US Army may be called upon to fight in desert regions. Lance is suited for desert operations because of its mobility both on ground and in the air, and the fact that it can provide in-depth target coverage. For the initial lodgment, airlift forces may be used to secure an area followed by an air insertion of a Lance unit.

Environmental Effects.

Deserts are semiarid and arid regions containing a wide variety of soils in varying relief. Characteristically, deserts exhibit frequent environmental extremes. Temperatures often range from 30° F to 130° F. Clear days with unequaled visibility and excellent weather conditions quickly change to raging sandstorms that can halt all military operations. Long periods of drought are interrupted by sudden rains bringing flash floods and mud but little relief from water shortages. Large areas of generally excellent trafficability are interspersed by insurmountable ravines, bogs, and sand seas.

Those desert areas where there is a general absence of pronounced terrain features have a significant effect on military operations. Generally, the enemy will make large scale use of mines and obstacles to canalize movements because of the lack of existing terrain features. Although a scarcity of large terrain features decreases the available cover, small indentions and wrinkles in the ground do provide cover for the battery and individual launchers. The battery commander must make every effort to capitalize on existing cover and concealment. The generally easy observation and long fields of fire make undetected enemy advances and withdrawals extremely difficult.



Deception measures of all types (e.g., feints, ruses, decoy equipment) become mandatory to preclude unit detection. Movement at night or during sandstorms while maintaining strict communication security assumes enormous importance in order to conceal unit movements and locations. Engagements are often fought at long ranges, thus placing a premium on accurate, long-range weapon systems such as Lance. The scarcity of prominent terrain features severely increases the problem of land navigation. Dead-reckoning techniques must be used.

Because of the sparse vegetation, concealment in the desert is more difficult than in many other environments, but it is absolutely necessary. The proper use of camouflage nets, pattern and mud painting, covering of reflective surfaces, and other techniques are used to insure survivability on the desert battlefield.

The desert environment has a debilitating effect on troops who have not been properly acclimated or trained. Continued exposure to the sun's rays causes profuse sweating, sunburn, dehydration, cramps, heat exhaustion, and even heatstroke. Proper field sanitation and personal hygiene must be emphasized by commanders to prevent dysentery and other diseases. The psychological impact of the environment induces mental fatigue, impaired perception, and depression which, coupled with pressures of combat, can overwhelm the soldier and render him ineffective. Acclimatization and proper training can defeat these environmental effects.

Employment.

The characteristic lack of vegetation in desert regions causes significant problems in providing adequate cover and concealment for a Lance unit. In such an environment, the unit commander must use his ingenuity to devise imaginative and effective camouflage techniques to hide his unit. Pattern painting vehicles using the desert's scheme of colors is a must, especially for the launchers that must leave the camouflage of the battery area to fire from external positions.

While many desert areas provide excellent trafficability for tracked and wheeled vehicles, areas of deep sand can impose a severe drawback. In such instances, it may be advisable to use aviation assets to airlift Lance firing elements and other necessary equipment. Usually helicopters can land on desert terrain with little or no landing site preparation. Whatever the movement method used, units must be prepared to displace rapidly if they are to minimize the threat imposed by high-speed, mechanized enemy forces that are typically used in desert warfare.

Maintenance.

Extreme temperature differences between day and night operations require a high degree of emphasis be placed on equipment maintenance. Excessive heat causes deterioration of plastic and organic materials. Heat also adversely affects engine cooling systems, particularly in vehicles carrying heavy loads traveling at relatively slow speeds. Sand and dust accumulate and damage delicate mechanisms if special protective measures are not taken. Areas where lubricants are required are particularly susceptible to sand and dust accumulations.

Fuel, lubricants, and intake air are easily contaminated, resulting in ruined engines and eroded components. Intense command supervision is required to insure continuous availability of these three precious commodities—clean air, fuel, and lubricants. Vehicle cooling and electrical systems are vulnerable to desert extremes of temperature.

Water is scarce in the desert and must be conserved. A leak in a vehicle cooling system of only one drip per second can lose 7 gallons in a 24-hour period.

Tracks, tires, and suspension systems suffer a great deal of abuse in the desert. Sand and rocks literally grind away rubber tracks, while thorns repeatedly puncture tires. Thus, a larger supply of spare parts is required in

the desert than in more moderate environments.

Special precautions should be instituted to insure that all required preventive maintenance procedures be emphasized at unit level.

Communications.

Because of the long distances between units and control echelons, radio is the essential element of communications. Special problems with radio communications arise in desert areas. Thermal heating during the hotter portions of the day can cause VHF (FM) radios to have their ranges reduced by as much as 50 percent. The intense desert heat can quickly cause communications equipment to overheat and malfunction.

Deserts also contain "dead spots" due to certain subsurface mineral deposits; more extensive use of radio relay and repeater equipment may be required to maintain communications. "Dead spot" problems can sometimes be eliminated by relocating an antenna relatively short distances from the original location.

Radio operators must be well acquainted with these problems and trained to overcome them. Proper operation of equipment, as well as proper preventive maintenance, are required to insure effective communications.

11-3. Mountainous Environment

Mountainous terrain exists throughout the world from northern regions to the tropics. The Lance battalion must, therefore, be prepared to operate in this type of terrain.

Environmental Effects.

Mountainous terrain, as discussed here, is not the extremely high, severe alpine-type peaks, but rather the lower, more mature mountains typical of southern Italy or Korea. Thus, the effects of altitude on troops are not a major consideration in this environment.

Mountains are defined as landforms that exceed 500 meters elevation above the surrounding plain. They may consist of one or more isolated peaks, single elongated ridges, or complex ranges extending for thousands of kilometers. Mountains are characterized by steep slopes of 30° or more, vertical or overhanging cliffs and precipices, and may contain fairly large and level meadows as well as canyons and heavily forested areas, interspersed with fast-flowing streams and rivers.

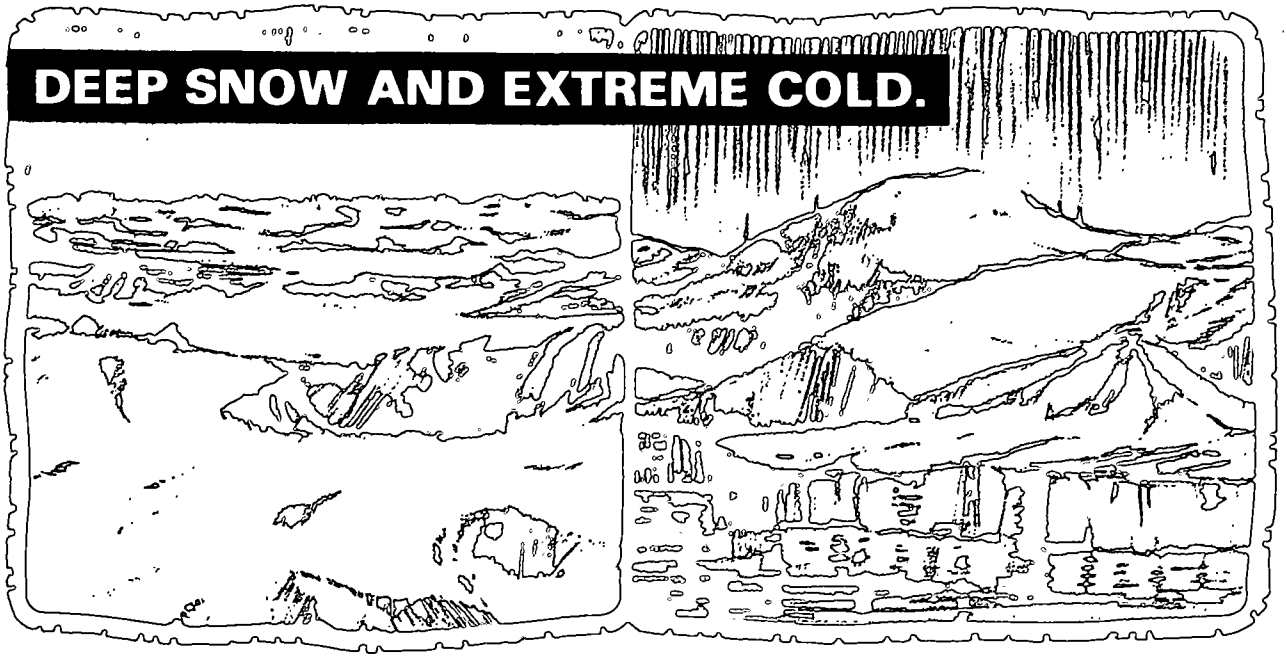
Most mountainous areas obstruct free movement of vehicles and generally favor the conduct of defensive operations. Mobility in mountains is extremely difficult if only ground movement is considered. Highways usually run only along the valley floor; existing roads and trails are normally few and primitive; and cross-country movement, particularly across terrain compartments, is particularly arduous. The extensive use of the helicopter, however, can normally overcome these difficulties. Although subject to the limitations posed by the enemy air defense, weather, and density-altitude considerations, the helicopter is by far the principal vehicle for moving Lance units and/or firing elements.

Mountain weather is changeable and unpredictable. It can be a dangerous obstacle to operations, or a valuable aid, depending on how well it is understood and how much advantage is taken of its peculiarities.

Employment.

Lance employment problems in mountainous regions focus around the lack of suitable terrain to conduct firing operations. Mountains degrade control, limit the choice of firing positions, degrade communications because of masking problems, and complicate combat service support problems.

In mountainous terrain, particularly under winter conditions, it will be difficult to prepare suitable battery and firing positions. Firing positions should be prepared prior to occupation whenever possible. The possibil-



nonexistent road nets, mountains, impassable areas caused by spring and summer thaws, and numerous rivers and lakes, bogs, mud, and slush. As in some other environmental areas, Lance units may have to rely primarily on the use of helicopters and maximum engineer support for required mobility.

Although basic employment principles for Lance do not change, their application must be altered to fit the environment. Problems discussed in mountain operations are also applicable to Lance employment in northern regions since these regions usually contain extreme mountainous terrain.

Prior to conducting operations in northern regions, it is imperative that intensive training programs be inaugurated to familiarize personnel with the effects of extreme cold weather on personal health and survivability. Personnel must also be familiar with the effects of extreme cold on metals, plastics, glass, canvas, paint, POL, and individual and crew-served weapons. Equipment must be winterized and modified as necessary, using approved procedures contained in the appropriate manuals.

Maintenance.

In cold weather operations, personnel must expend considerable time and energy in self-preservation, and the efficiency of personnel in the operation and maintenance of equipment is reduced accordingly. Efficiency is further hampered by the bulk and clumsiness of cold weather clothing.

Extreme and prolonged cold has an adverse effect on all weapons systems and associated equipment. Sluggish operation, malfunctions, and broken parts are common. Maintenance will consume a large proportion of the total effort since more time is required to perform tasks, and increased quantities and types of maintenance equipment are needed to support combat operations. In most cases, the Lance missile will operate satisfactorily in cold weather; however, the appropriate technical manuals should be consulted to determine temperature firing limits. Regardless of the difficulties involved, all prescribed maintenance procedures must be followed. Special fuels and lubricants as well as specified winterizing equipment should be available and pretested for operability. Problems can be minimized by insuring that all

personnel are familiar with the problems *and that they follow prescribed procedures.*

In cold weather, individual and crew-served weapons operate sluggishly and have a particularly high rate of breakage and malfunction. These problems can be held to a minimum by:

- Using only approved lubricants for cold weather operations.
- Firing weapons at a reduced rate until parts are warmed up.
- Keeping working parts as free of snow and ice as possible.
- Carrying additional spare parts on or with each weapon.
- Training personnel in probable stoppage causes and the application of immediate action.

Communications.

Radio communications in a Lance battalion are significantly influenced by atmospheric activity such as magnetic storms, aurora borealis (northern lights) and ionospheric disturbances, which are common to subarctic regions. Line of sight communications such as FM and VHF are only slightly affected because they do not depend on the atmosphere for transmission. AM communications, both voice and RTT, and long-range VHF where tropospheric scatter is employed, will be greatly disrupted. The higher frequencies are affected more than lower frequencies. Operators can work around atmospheric interference, however, with experience and training and by using techniques such as CW (morse code) transmissions.

While extreme cold impairs the operations of electrical components that make up radio sets, its most serious effect is on the batteries used to power certain radios such as the AN/PRC-77 and AN/GRA-39. For these radios, only batteries designed for cold weather operations should be used. Most of the unit's radios will operate satisfactorily in northern regions if proper maintenance procedures are followed with special emphasis placed on operator preventive maintenance.

11-5. Operations in Built-up Areas

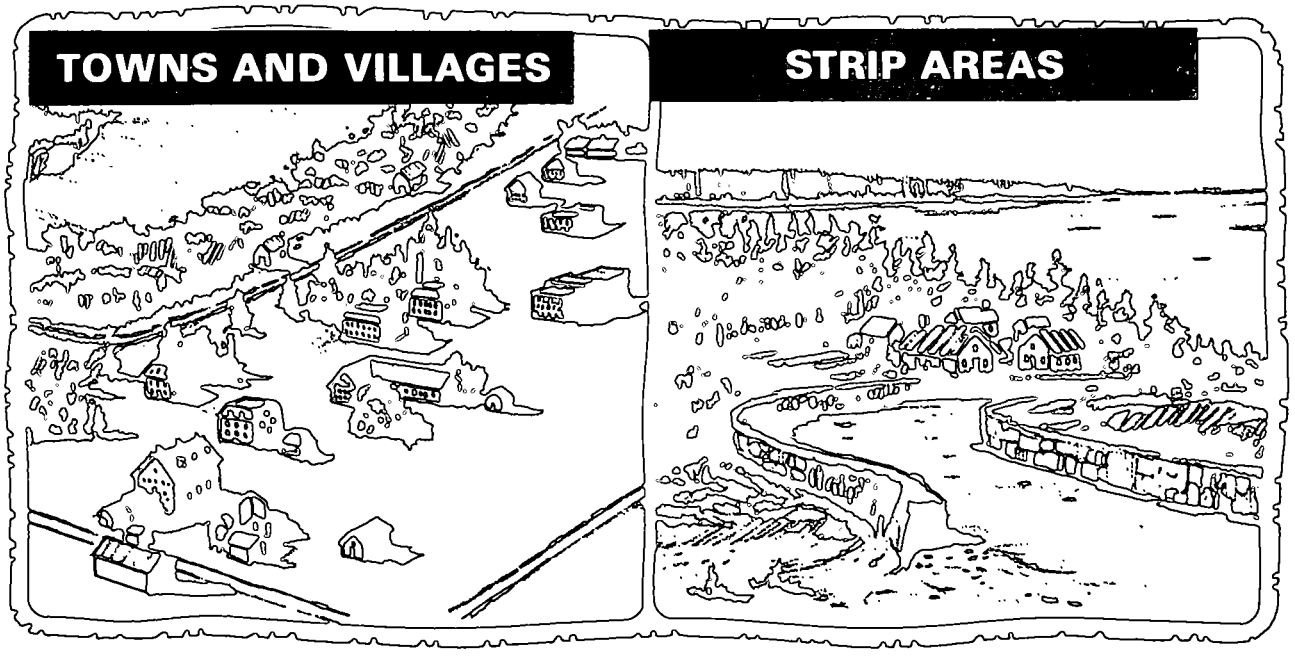
Many areas of the world have experienced a massive growth in built-up areas and manmade changes to the natural landscape. These changes significantly affect potential battlefields. Avoidance of built-up areas is no longer possible. Rather, military operations in built-up areas are an integral part of combat operations and present special opportunities and challenges to commanders at all levels.

Environmental Effects.

Built-up areas and manmade changes to the terrain take a variety of forms. New highway systems have opened up areas previously considered unsuitable for fast mobile operations. While these roads are generally restrictive, the areas they cross require a greater degree of attention than in the past. Major cities have lost their well-defined nature and have spread out over the nearby countryside and into suburbs. Highways, canals, and railroads have been built to connect population centers and have themselves attracted industries, and directed urban growth in strip cities. More agricultural land is being converted to urban use, which reduces terrain suitable for fast-moving armor operations. Rural areas, while losing some of their population, have retained their previous character. Small farming communities are scattered every few kilometers throughout the more open areas. These villages are generally located along streams and have an extensive network of secondary roads. It is within this type environment that Lance operations are best suited.

There are four basic types of built-up areas with each one presenting the unit

commander a different problem: Villages with a population of less than 1,000; strip areas, or interconnecting built-up areas between villages and towns along roads and villages; towns and small cities with populations of up to 100,000 that are not part of a major urban complex; and large cities with associated urban sprawl and industry. These cities can have populations up into the millions and cover an area of 100 or more square miles. Of these four types of areas, the Lance battalion and battery commanders will be most concerned with the first two—villages and strip areas.



Employment.

Small villages and strip areas, such as those common in Europe and areas of the United States, offer excellent cover and concealment for elements of the entire Lance battalion. An entire battery can be well hidden in a village where vehicles can be driven into barns or warehouses, and the noise and infrared emissions from generators, etc., can be assimilated with those of the surrounding area.

Batteries located in villages can very easily defend their position if discovered. Thick walls protect from direct fires; positions on first floors and in basements protect from some effects of indirect fires. Antitank and antiaircraft missiles can be fired from within buildings if sufficient space exists.

Villages are often 2 to 4 km apart. Antitank guided missile (ATGM) and Redeye teams may well be able to cover the open areas between villages and provide mutual support to other villages.

Firing platoons and A&T platoons can easily conduct assembly operations inside of buildings and can easily establish and secure the FSL. Firing operations can be accomplished from small courtyards but are generally advised to fire from external firing positions (areas outside of the village) to preclude compromising the battery location.

Some disadvantages of using a village as a position area should also be considered when selecting a position. Villages are easily located and targeted by the enemy allowing him to easily adjust indirect fires onto the position. Villages are easily infiltrated at

night by outside forces and are prone to subversion by sympathetic indigenous personnel.

Maintenance.

Battery maintenance procedures in village areas should not be any different from those in normal operations. They may in fact be easier through the use of local garage facilities.

Communications.

Built-up areas can reduce communications effectiveness because of masking and "dead spots" caused by large metallic structures. This can be countered to some extent by placing antennas on tall buildings or remoting them to external positions.

11-6. References

For additional information on operations in special environments, consult the following manuals:

FM 90-3 *Desert Operations*

FM 31-35 *Jungle Operations;* (FM 90-5)*

FM 31-50 *Military Operations in Built-up Areas;* (FM 9-10)*

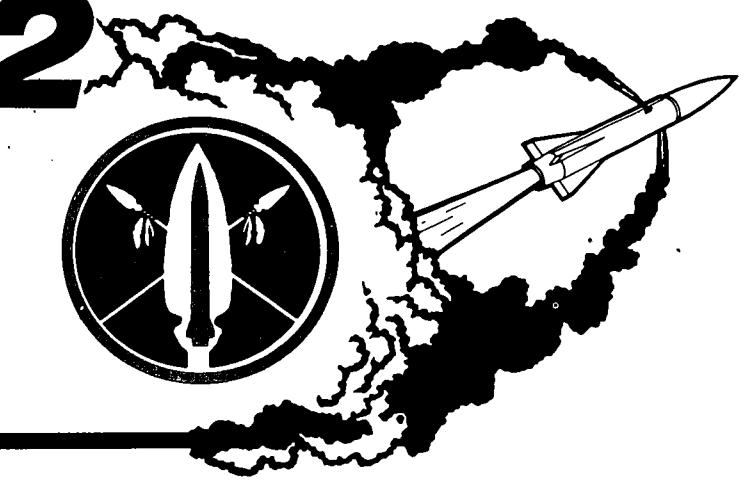
FM 31-71 *Northern Operations;* (FM 90-11)*

FM 31-72 *Mountain Operations;* (FM 90-6)*

*These manuals are currently under revision and will be republished under the numbers in parentheses.

CHAPTER 12

Developing the Training Program



Section I. INTRODUCTION

The Army training mission is to attain and maintain the state of operational readiness required to conduct combat or other operations in accordance with assigned mission.

Preparing and conducting training properly is one of the commander's most difficult, but most important, duties. Lance units are actively engaged in various administrative and support functions that divert their energies from training in their fighting skills. On-duty education, peacetime nuclear weapons requirements, ceremonies, and community/post support can seriously detract from time available for training. The purpose of this chapter is to present ideas and tools to assist the commander in overcoming these training diversions.

12-1. Training Responsibilities

Senior Commanders (Group and Higher).

- State objectives and set priorities based upon training guidance and tactical and administrative missions from higher headquarters.
- Provide broad mission-type guidance based on the above. For example, each Lance battalion will train its firing batteries to perform all level 2 missions contained in Army Training and Evaluation Program (ARTEP) 6-595.
- Allocate time and provide training support. Assist in obtaining additional resources required by units to attain specific training levels.
- Evaluate the effectiveness of the training programs of subordinate units. Insure feedback to training institutions, training managers, and trainers.

Battalion Commanders.

The battalion commander is the principal training manager. Based on his higher commander's guidance, the ARTEP, soldier's manuals, and the available training resources, he is responsible for developing and implementing a battalion training program designed to prepare his unit and individual soldiers to meet or surpass the applicable standards of performance specified in the ARTEP and soldier's manuals.

Battery Commanders.

The battery commander works with the battalion commander and his staff in devel-

oping and implementing the battery training program (see section III for additional information on how to develop training programs). This includes making recommendations concerning battery training needs based on battery and section training objectives contained in the ARTEP and soldier's manuals. In addition, battery commanders should provide specific instructions to subordinate trainers (NCO) to assist them in preparing and conducting training using the training objectives in the ARTEP and soldier's manual (see FM 21-6 for information on how to formulate commander's training guidance).

Officers and NCOs.

These leaders work with their commanders to insure that their platoons and sections can perform ARTEP training objectives successfully. This includes assisting the battery commanders and staff in identifying training needs and assisting trainers in obtaining the necessary training resources. Each officer and NCO should be thoroughly knowledgeable of the soldier's manual tasks and applicable portions of the ARTEP for personnel in his section/platoon. Particular emphasis should be placed on understanding the standards of performance that sections must meet. When collective and/or individual training needs are identified, this information must be passed up the chain of command to the commander.

The battery officers are oriented toward collective training and the unit's operational mission. Staff officers are also oriented toward collective training of the battery and battalion, plus individual training of personnel in their respective staff sections. The NCO is the key player in the individual training system. Individual training in units demands decentralizing the responsibility for training of the men to the NCOs. Thus, the NCO is the principal individual trainer.

12-2. Army Training Philosophy

The best form of welfare for the troops is first-class training.

—John J. Pershing.

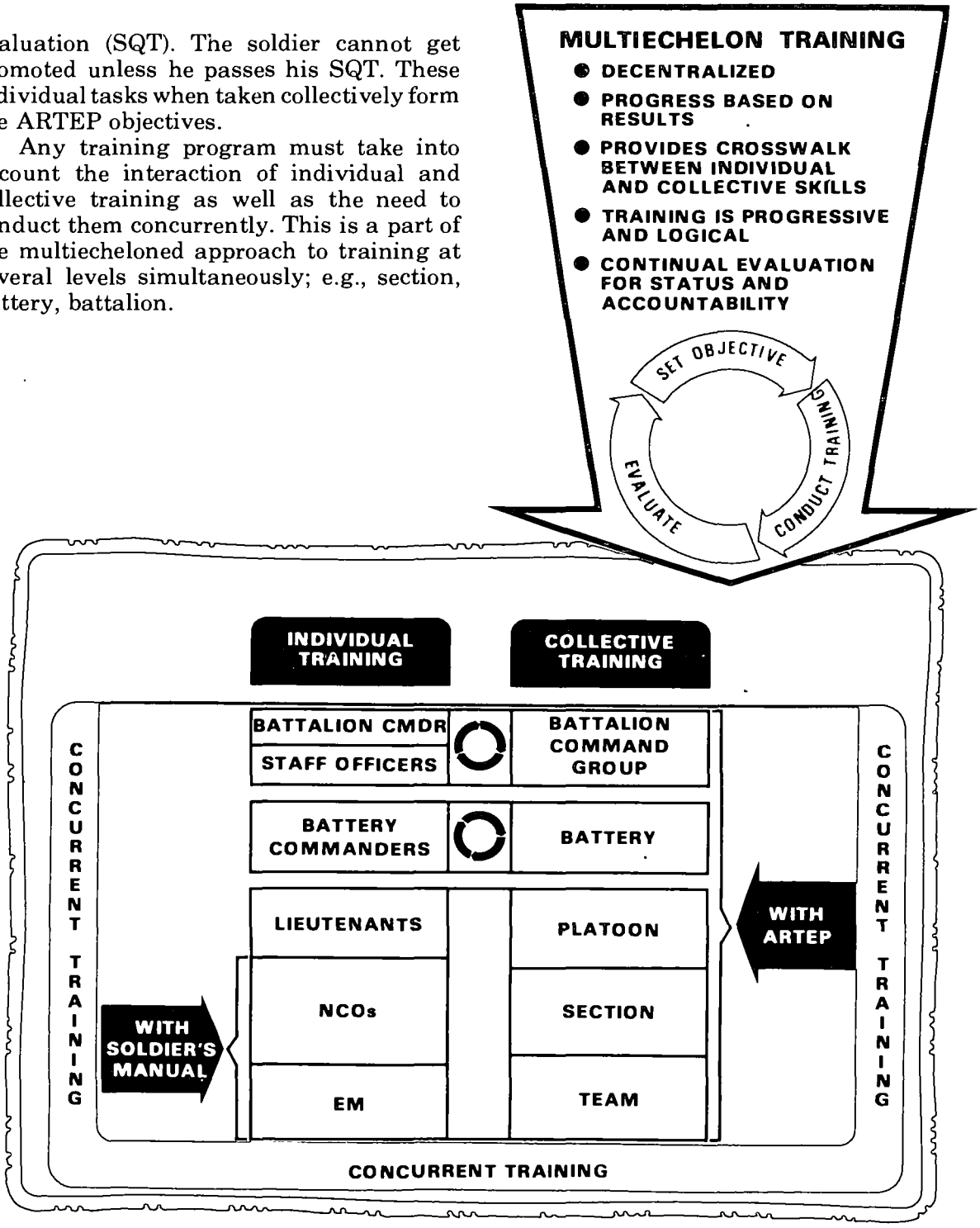
Under the Army training philosophy, the authority and responsibility to organize, conduct, evaluate, and supervise training is delegated to the battalion or separate battery level. Decentralized training focuses all training effort at or below the battery level, where the job is actually performed. This means the battery commander and his section chiefs must be able to determine specific training objectives based on unit mission, the battalion commander's goals and guidance, the available training resources, and the present level of training.

The Army Training and Evaluation Program serves as a basis for developing field artillery battalion and battery training programs. It provides a listing of critical combat tasks in the form of training and evaluation outlines that contain the tasks Lance field artillery battalions, batteries, and sections may be required to perform. These tasks are expressed in the form of collective training objectives that specify the task to be performed, the conditions under which the task is performed, and the standards of accepted performance. With objectives stated in these terms, commanders can better determine the specific training needs of their units.

While the ARTEP is critical to the unit, the skill qualification test (SQT) is critical to the individual soldier. The soldier's manual describes what is expected of each soldier at each skill level for that MOS and is the basis for the SQT. It contains steps necessary to master new skills, lists references, and explains the standards that must be met for

evaluation (SQT). The soldier cannot get promoted unless he passes his SQT. These individual tasks when taken collectively form the ARTEP objectives.

Any training program must take into account the interaction of individual and collective training as well as the need to conduct them concurrently. This is a part of the multiecheloned approach to training at several levels simultaneously; e.g., section, battery, battalion.



12-3. Training Publications

The following is a list of those key training publications that form the basis for any battery training program. These publications must be understood and used by all supervisors involved with training or training management.

- The Lance Army Training and Evaluation Program (ARTEP) 6-595.*
- The Soldier's Manuals and Commander's Manuals for appropriate MOSs.
- Lance User's Manuals.
- FM 6-40-4, *Lance Gunnery.*
- FM 6-42, *The Field Artillery Battalion, Lance.*
- FM 21-6, *How to Prepare and Conduct Military Training.*
- TC 21-5-7, *Training Management in Battalions.*

Section II. PERFORMANCE-ORIENTED TRAINING

To understand how the ARTEP should be used in the development of a training program and the preparation and conduct of training, it is necessary to understand the performance-oriented training philosophy. Performance-oriented training focuses on critical tasks to prepare soldiers for combat. This must guide training managers as they develop training programs and trainers as they prepare for and conduct training. Unfortunately, this concept of training is frequently submerged or obscured. Often commanders and soldiers have witnessed training that has little or no relationship to the duty needs, assigned or anticipated. Such training wastes the limited training resources available and often adversely affects the morale and motivation of the soldiers.

The crucial first step is to recognize the purpose of training–preparation for combat. Once this idea becomes ingrained, both training managers and trainers can proceed with the development of training that serves the needs of the unit and the soldiers being trained.

12-4. Performance-Oriented Training Objectives

The key to effective training is the development of performance-oriented training objectives. Because of their nature and structure, these objectives facilitate clear and concise thinking about training for combat. These objectives must contain a precise statement of the task to be performed, the condition(s) under which the task is performed, and the training standard(s) of acceptable performance. This structure contrasts markedly with traditional training objectives that are vague and hard to measure.

*To be published

12-5. Traditional Training Objectives Versus Performance-Oriented Objectives

It has long been common practice to write a training objective such as the following example:

Traditional Training Objective

"To insure that the fire direction computers are proficient in FADAC computation of a nuclear fire mission."

By contrast, a performance-oriented training objective for the same skill might read as follows:

Performance-Oriented Training Objectives

Task: Each fire direction computer will compute firing data for a nuclear (M234) mission using FADAC.

Conditions: You will be provided a programmed FADAC, set up and properly operating, in which all target and firing point data has been entered, a copy of the fire order, and FM 6-40-4(C).

Standard: Compute the firing data and obtain a printout copy of the mission data within 3 minutes.

The development of performance-oriented training objectives entails a great deal of thought and effort, but there are many valuable payoffs from this process. These payoffs are described in terms of the training and evaluation equation:

$$\text{Training Objective} = \text{Training} + \text{Evaluation}$$

In other words, a precisely written training objective actually outlines task, conditions, standards, and is the evaluation for that training.

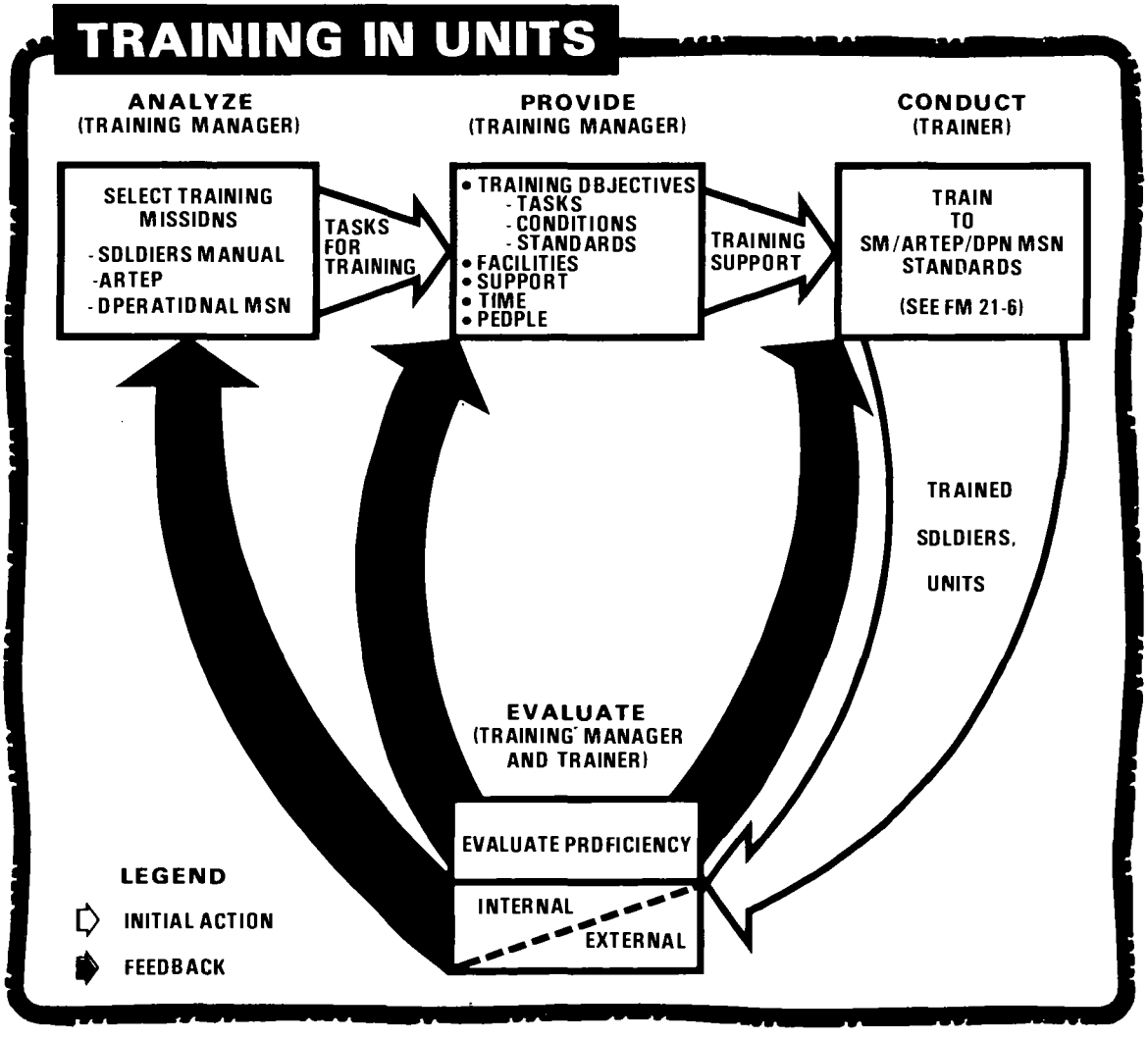
Moreover, the training process is clarified and should be governed by the detailed objective. With objectives stated in these precise terms, one is less likely to waste training time. *The principle of the training and evaluation equation is that we teach and train for the realities of combat.* This is sometimes a difficult concept for people to understand. Perhaps this issue can best be clarified by reference to nonmilitary activities. Take the case of the football or basketball team that is preparing for a game. In effect, the coach teaches and trains to win the game. He does this by developing a playbook that clearly defines tasks (the plays) that he wants his team to perform. He establishes appropriate conditions and standards for his practice (training) sessions. Similarly, the ARTEP can be thought of as the artillery commander's playbook. By specifying in performance terms what the battalion, battery, and sections must be capable of doing, the ARTEP provides the basis for developing training programs and includes much of the information that the trainers need to prepare for and conduct better combat training.

It is important to remember that inherent in the conduct of performance-oriented training is an evaluation. For example, if a firing section has conducted training on a particular ARTEP training objective, and they achieve the published standard, they in effect have been evaluated. Personally monitoring ongoing training and receiving reports from subordinates will help keep the commander aware of current training status without dedicating his limited resources to an "evaluation" or "test." Also, the commander should be aware that training proficiency is exceedingly perishable. Evaluation, therefore, must be a continuous daily affair and revision of the unit training program will occur almost as often.

Section III. THE TRAINING PROGRAM

TC 21-5-7, *Training Management in Battalions,* has been written specifically for training managers. It describes a four-step process that explains how to develop training programs and amplifies the training philosophy upon which the process is based. This publication should be used with the ARTEP and soldier's manual in developing the training program.

The four-step process is a logical process that allows selecting of training goals, helps in planning for the conduct of training to achieve these goals, and insures that the training is properly supported. It will also show when to evaluate the results of training to permit adjustment of the program to better achieve training goals. In a diagram, the process of training management looks like this:



The training process is never finished. As the diagram indicates, training management is an unending, *continuous process.* At unit level it depends on "cut and fit" methods and on trial and error in matching what the commander wants to do against what the unit has the time and other resources to accomplish. Every time the unit receives a new mission, or has a significant change in its personnel, or conducts an evaluation that reveals a need for additional training, the "training program" will have to be adjusted. The objective is to *build* and *sustain* readiness in the unit to perform its assigned missions: Readiness of individuals, readiness of sections, and readiness of the battery.

12-6. Training Program Analysis

During this phase a determination must be made of where the unit should go in training, where the unit is now in training, and what training is needed for the unit to get where it is going.

Determining Where the Unit Should Go in Training.

This determination will guide the commander toward establishing individual and unit performance objectives that if attained, will insure the ability to perform the assigned mission satisfactorily. This requires the development of the same type of performance-oriented training objectives as those contained in the ARTEP. Their development provides the answers to the question—"Where should the unit and its sections be with respect to performing successfully in combat?" For example, the FDC objective discussed in paragraph 12-4 is one of the training objectives contained in ARTEP 6-595. It describes one of the fundamental combat capabilities required of the fire direction center. By using the ARTEP as a source document for training objectives, commanders will find that the ARTEP has largely completed this step and that the development of the unit's training program can proceed.

Determining Where the Unit is Now in Training.

The next step in the analysis phase is for the commander to determine the current level of individual and unit proficiency in the training objectives identified in the first step. Ideally, the commander would conduct a realistic field training exercise (FTX) based on the ARTEP to make this determination. In most battalions, however, the training resources to conduct FTXs are not readily available. In such cases, subjective evaluations might be made by the commander of the current unit proficiency by examining past performance results and consulting with officers and NCOs as to the training proficiency of their personnel. If a more objective field evaluation *can* be done, do it.

At battery level, many good commanders lack confidence in the information received from subjective evaluations. Although it might be impossible for them to conduct a battery level diagnostic field evaluation, it is certainly within the capability of an imaginative battery commander to conduct *section level* diagnostic field evaluations. Since the ARTEP lists critical section tasks which, when taken collectively, equal battery level ARTEP tasks, evaluation/training sections based on the ARTEP section training objectives would be the *next best thing* to evaluating the entire battery. These section level diagnostic evaluations can serve as the basis for the unit training program in garrison during those periods when resources preclude unit level field training exercises.

If the commander and his subordinate leaders have limited training resources, the following methods can be employed in conducting evaluations of the battery elements:

- Battery A&T and firing platoons can be evaluated with a minimum amount of

resources by using evaluation standards out of ARTEP 6-595. Unit officers or nonparticipating NCOs with MOS 15D could easily evaluate a section. This evaluation could be conducted in the local training area or on a unit hardstand.

- Survey and communications sections can also be evaluated, using the standards out of ARTEP 6-595. Unit officers can give the evaluation or evaluators from battalion can evaluate these sections.

- Fire direction center evaluation should also be based on the ARTEP. A complete evaluation of the FDC can be accomplished by adapting the evaluation outlines into a tactical scenario. All that is needed (in addition to the FDC's TOE equipment) is an area large enough for the FDC to occupy and "canned" missions/situations fed into FDC over wire or radio by an evaluator. The battalion FDO and chief computer can evaluate a battery FDC using this system.

In some cases, the battery's state of training and resources might make it difficult to conduct diagnostic evaluations even at the section level. The commander and battery leaders should then conduct evaluations at the *individual* level. These evaluations should be based on the tasks listed in the soldier's manual (SM). For example, when there are not enough people in a firing section to run a complete firing operation, individual skills such as those of the gunner or launcher specialist can be evaluated using the tasks listed in the SM. Since the individual training objectives listed in the soldier's manuals are critical combat tasks which, when taken collectively, equal section level ARTEP tasks, evaluating/training individuals based on the SM training objectives would be the *next best thing* to evaluating each section based on the ARTEP training objectives. The SM could be used as the source for creating a series of performance-oriented test stations. The number and organization of the test stations would depend on the MOS of the soldiers being evaluated and the creativity of the evaluator.

The commander should use the skill qualification test (SQT) results as a training management tool in determining specific areas of individual training weakness. The SQT is a performance test that permits the individual soldier to demonstrate proficiency in a sampling of tasks extracted from his soldier's manual. This test is given every year but must be taken and passed by the individual only once every 2 years. If tasks cannot be performed by several tested individuals, this probably indicates a battery level training weakness.

WARNING: **There is always a temptation for training managers to use the traditional sequential training approach; i.e., evaluate/train individuals, then sections, then batteries, then battalions, etc.** ***THE HOSTILE TRAINING ENVIRONMENT WILL NOT TOLERATE THIS APPROACH!*** **There is not enough time in a typical unit's schedule to support an annual sequential training cycle. Commanders should make a judgment of what is the *HIGHEST* level at which meaningful multiecheloned decentralized training can be conducted, and begin their evaluation at those levels.**

Determining Training Needs for Unit to Get Where It Is Going.

Individual and unit training needs can be determined simply by using the following equation:

WHERE UNIT SHOULD GO IN TRAINING
MINUS
WHERE UNIT IS NOW
EQUALS
TRAINING NEEDED

For example, ARTEP 6-595 established the level of proficiency for laying the SPL for direction as 5 minutes after the SPL is

positioned over the firing point. During an evaluation of the two battery firing platoons, the battery commander might discover that one of his two firing platoons cannot meet this standard, which indicates that additional training is needed in SPL crew drill.

When the commander finishes evaluating his section (or individuals) on all applicable training objectives identified in the ARTEP (or SM), he will have identified strengths and weaknesses in his unit that will help him formulate a training program.

IMPORTANT: When it has been determined that units cannot perform successfully in one or more ARTEP training objectives, it is necessary to determine the exact reason for failure. During the pretraining evaluation, the evaluator should attempt to identify training deficiencies at a level *one echelon below* the level at which he is evaluating. For example, if the commander is conducting an evaluation of a firing platoon's ability to conduct a fire mission, any training shortcoming should be identified to a specific individual (launcher specialist, gunner, RT operator).

12-7. Providing Resources for Training

After identifying his training needs, the commander must determine what resources are available to support these training requirements. These resources are:

- Human resources, the soldiers available for training and those available as trainers.
- Physical resources, the equipment, buildings, and training areas available for use in training.
- Financial resources, those funds allocated for conduct of training activities and for purchase of training aids/devices and/or other material to be used for training.
- Time, perhaps the most limited of all training resources.

By analysis of the training calendars, the commander will realize quickly that most of his time and resources have already been allocated for him. Limited training resources, however, should never be the scapegoat for ineffective training. With innovation, imagination, and proper management of the resources that they do control, commanders can always do some effective training. The following are some tips to help the commanders get the most from limited resources:

Use the resources of your local Training and Audiovisual Support Center (TASC). In addition to the motion pictures and related audiovisual aids indexed in DA Pamphlet 108-1, your local TASC can obtain training devices listed in DA Pamphlet 310-12. These devices include terrain boards, weapon mockups, graphic training aids, and realistic training ammunition.

Make use of the US Army Field Artillery School (USAFAS) and other schools. USAFAS provides commanders with a number of means of preparing and conducting professional training programs and classes. Among the resources available are:

- Class packets for conducting formal platform instruction.
- Programmed texts adaptable for performance-oriented training.
- Video tapes useful for conducting formal instruction.
- Correspondence courses for individual or group study.

Use the Training Extension Course (TEC) Program. The TEC lessons are geared to soldier's manual tasks and designed so that the individual soldier can use one of three approaches—audiovisual, audio only, or printed material. TEC is targeted at the individual soldier or small groups. Each lesson is performance oriented and allows the soldier to take an active part in the presentation. With TEC, a unit learning

center can be set up and tailored to the individual soldier's need for self-paced training in basic MOS-related skills.

Enforce a firm policy of prime time for training. Many commanders have succeeded in marking off established periods of time devoted exclusively to training. This can be done on a daily, weekly, monthly, or quarterly basis (e.g., 4 hours each day, 2 days each week, or 1 month each quarter). Administrative absences can be limited to times other than prime training time. Utilization of block leave policies help enforce prime time training by making better use of available training time.

Establish policies within the unit to maximize training time. Assign entire *batteries/sections* duties instead of detailing from various sections. This promotes better use of training time and promotes better battery/section training. A duty battery calendar can be published well in advance to notify the battery commander and section chiefs. At battery level, the section chief should know exactly where every section member is at all times. The section chief must conscientiously attempt to use all bits of training time. When he has only a portion of his section for duty, it might be appropriate for them to clean protective masks, crew-served weapons, or section equipment, or to work on individual TEC lessons. Trips to the post exchange, quartermaster sales, a barbershop, etc., should be consolidated and planned so that they do not interfere with meaningful training during prime time.

Only after carefully identifying the resources available can the commander determine which performance objectives he can accomplish. Expecting a unit to do too much with too few resources is a common failing.

12-8. Conducting Training

Determine Training to be Conducted.

During this phase, the commander must determine the training to be conducted, program the training, and then conduct the training.

Ideally, the commander would select for training all of the performance objectives he previously determined during the analysis phase. This will probably not be possible, so he should consider available resources and focus on the objectives that make the greatest contribution to accomplishment of the unit mission. He can do this by using the following three-phase process:

Establish training priorities. The performance objectives for which training is needed should be ranked in the order of their contribution to mission readiness. This listing must reflect guidance on priorities established by higher headquarters as well as judgment of the battery commander. The following might assist in establishing priorities.

- The commander should insure that his unit can accomplish the fundamental objectives (ARTEP level 2) before undertaking the more difficult performance objectives (level 1).
- Within a given ARTEP level the training objectives designated by an asterisk (*) should be accomplished before the other objectives. The asterisk designates mandatory training objectives for a given training level.

Estimate training resources. The time, personnel, equipment, and training

areas required to meet each of these performance objectives should be estimated.

Allocate available training resources. The resources available to support training should be allocated in accordance with the established priorities.

Here are three obvious benefits to be derived from this three-phase process.

- Having done his homework, the commander can justify his needs for additional resources and can address the mission impact if his requests are denied.
- The process will surface any misunderstandings as to the relative priorities for the unit's various tactical and administrative missions. If the emphasis is incorrect, it should become apparent in the response from higher headquarters to requests for training support.
- A higher headquarters needs a rational basis for allocating its training resources.

This process can be crucial in developing a training program. It can mean the difference between satisfaction and frustration when the commander is dealing with a higher headquarters on matters related to training priorities and support.

Program Training.

In the previous steps, the commander programs and schedules the performance objectives selected for training. He programs these performance objectives on the basis of his determination of:

- When the required resources will become available (firing ranges, local training areas, ammunition, etc.).
- A logical sequence of conducting training from easier to more difficult tasks.

Failure to schedule and program carefully and well in advance can cause problems for both the trainer and the soldiers. The principal documents used by the battery to program and schedule training are the training forecast and the weekly training schedule published by battalion. The training forecast is any type of calendar device used to indicate the performance objective to be taught each day, the time to be devoted to each, and any training mandated by higher headquarters. It is the primary reference in the preparation of the weekly training schedule and normally covers a quarterly period. Long-range planning depicted in the training forecast is general in nature. However, within 1 month of conduct of training, the forecasts should be fairly specific (performance objectives, time, and references should be included).

An important part of scheduling training is the selection and notification of the trainers. Trainers should be alerted as far in advance as possible to permit them maximum time for adequate preparation. To assist them, commanders/training officers should provide them with complete training guidance as described in FM 21-6.

Conduct Training.

The quality of the steps already completed in this system will be clearly revealed during the conduct of training. The common focus of all previous steps is the unit, section, or individual training objective selected for training. The *task, condition,* and *standard* of the performance objective define the conduct of training. Training should consist of problems and exercises that are designed to

insure that the individual, section, or battery can accomplish the training objective.

FM 21-6, *How to Prepare and Conduct Military Training,* was developed for trainers. It was designed to guide the trainer through a step-by-step process in preparing and conducting training. By using FM 21-6 as a general guide and the information in this chapter, all trainers should be able to conduct meaningful performance-oriented training.

Performance evaluation is an integral part of the conduct of each training session. It provides the commander with continuous feedback on learning achieved. This feedback provides valuable information and data for revising the current training program.

12-9. Evaluating Training

Evaluating training is simply an up-to-date report of where your unit is now in training. Specifically, the commander is making another determination if the various individual, section, or unit training objectives can be met.

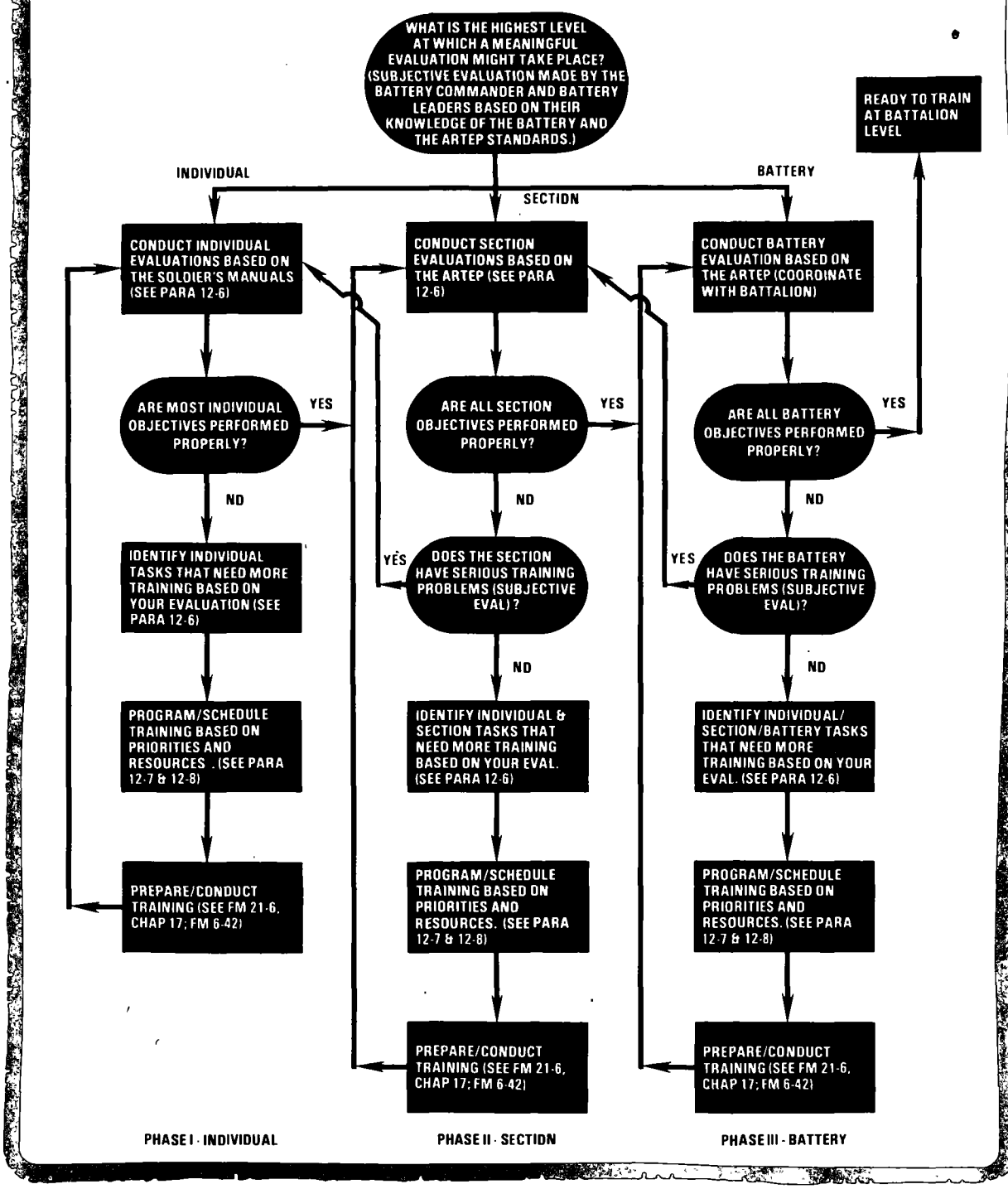
Can the training objectives be met?

One basis for this determination should be the performance evaluation conducted during each training session. The commander is then insuring that he has reached the training level he had set out to reach. If he has not successfully attained his goals, he begins the training cycle again with the new input from his evaluation. If he has accomplished his goals, he begins the cycle again at the next higher level of training. Again much of this is accomplished subjectively as an inherent part of performance-oriented training.

12-10. Summary

The table below is a summary of training at unit level. It shows the relationship between individual, section, and battery level

BATTERY LEVEL TRAINING CYCLE MODEL



training and the training literature that should be used with each step.

A warning, however, is in order. The table is a simplified model that attempts to explain a very complex problem—training in the hostile training environment. There are few, if any, units that have all individuals and sections at exactly the same level of training. For example, a Lance battery commander might find that one of his firing sections needs to undergo individual training/evaluation (phase I), the other section and the FDC are conducting section training/evaluations (phase II), and the battery commander is conducting a certain amount of battery level training (phase III). This multiechelon approach to training recognizes that a strict training cycle in which all sections are at the same training level at the same time is rare. However, the battery commander should be able to fit each of his sections into one of the phases depicted in the table.

Section IV. BATTERY TRAINING TECHNIQUES

The previous sections presented brief explanations of the Army training system, the performance-oriented approach to training, and the training management process. They were written primarily for the battalion and battery commanders, who must plan, organize, conduct, evaluate, and supervise training using the ARTEP and soldier's manuals as the guide. This section will present various techniques that might be used by the battery commander and his trainers (battery officers/NCOs) to prepare and conduct training in the most effective and efficient manner. The discussion in this section is geared primarily toward the training of the battery elements.

12-11. The Trainer's Role

FM 21-6, *How to Prepare and Conduct Military Training,* was developed for trainers. It was designed to be used with TC 21-5-7, *Training Management in Battalions,* the soldier's manuals, and the ARTEP. FM 21-6 describes a three-step backward planning process that trainers should use to prepare and conduct training. These steps are:

Step 1: Describe the desired results of training.
Step 2: Prepare to conduct training.
Step 3: Conduct training to standards.

In step 1, the trainer obtains the battery commander's training guidance describing precisely what the soldier must be able to do at the completion of training (the commander's training objective based on the ARTEP/SM). This guidance should also tell the trainer to whom the training will be given, when and where the training will take place, and why the commander decided that training was needed. When the commander's

guidance is incomplete, the trainer must develop this information himself using FM 21-6, the SMs, and the ARTEP.

In step 2, the trainer develops, if necessary, those intermediate training objectives that will make the training logical and progressive. This is necessary when the commander's training objective is complex in nature. Next, the trainer organizes training by determining the order in which intermediate objectives are taught and estimating the required resources.

In step 3, the trainer actually conducts the training to insure the soldiers meet the training standards established in the commander's objective. In conducting performance-oriented training, the trainer must make every effort to hold lectures and conferences to a minimum. The majority of training time must be devoted to "hands-on" training.

12-12. Three-phase Training Session

This performance-oriented approach lends itself to a training session (a class or block of instruction) consisting of three phases:

Phase I: The trainer states the purpose of the training and explains or demonstrates how the task will be performed. This part should be as brief as possible.

Phase II: The soldiers practice the task under close supervision to acquire the degree of proficiency required by the training standard.

Phase III: The soldiers are tested by performing the task to the established training standard. *Those who meet the standards can proceed to another activity; those who do not should be critiqued on mistakes, continue practicing, and be reevaluated.*

Section V. SECTION TRAINING IN THE BATTERY

The objectives of section training are to train individuals in their principal duties, train the section as a team, and cross-train individuals in various section duties.

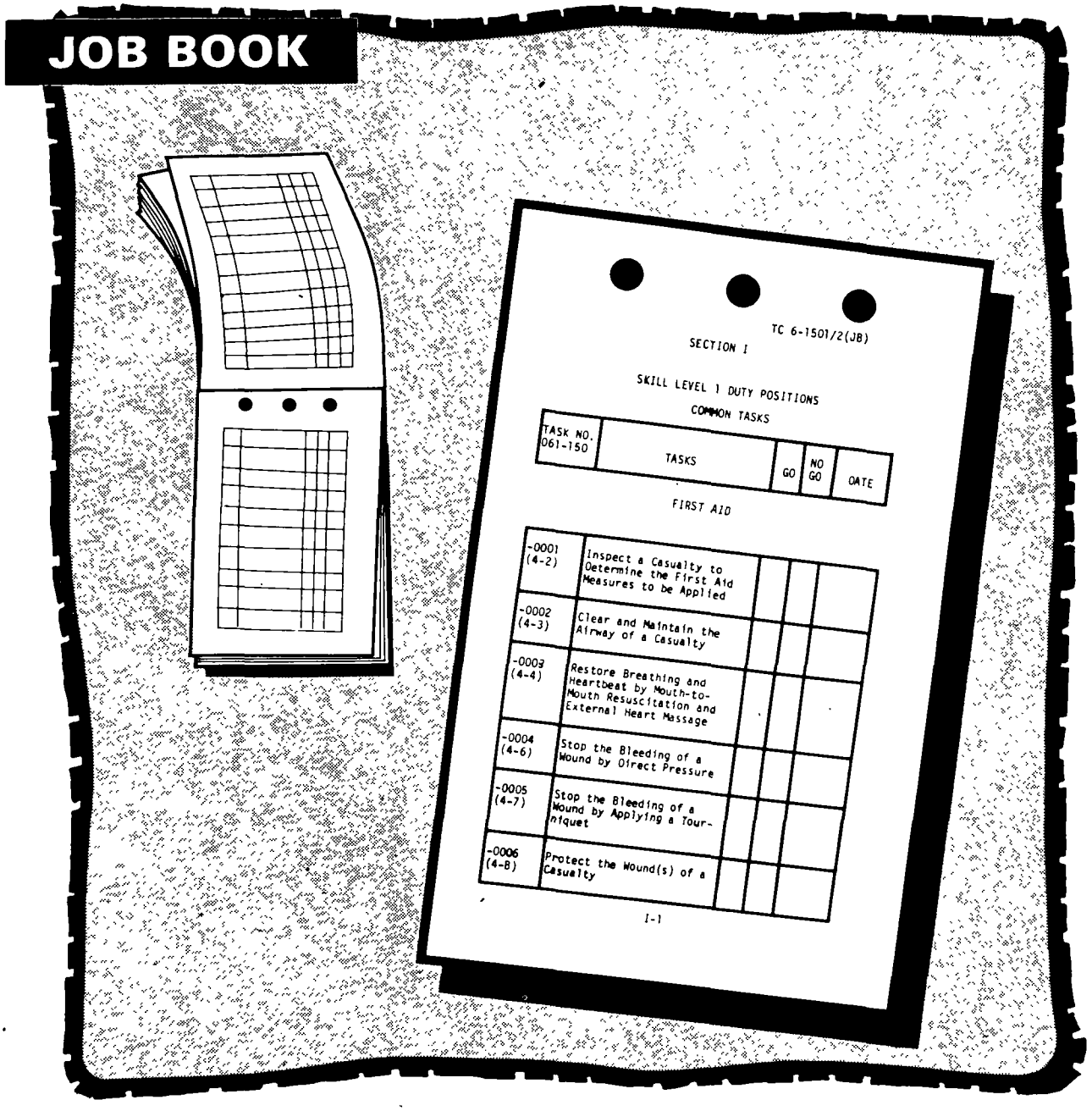
The section chiefs are the principal trainers in the battery during the conduct of section training. By insuring that all section chiefs are qualified to do their job, the battery commander takes a big first step in developing effective section training.

Even though AR 350-1 does not require any formal record of individual or section training in the battery, some system should be established to record the training progress of each individual and each section in the battery. However, care should be taken to prevent the administrative portion of training from becoming overburdensome.

Each section chief could use a notebook in which he keeps an informal daily record of training conducted, individuals present for instruction, performance objectives accomplished, deficient areas noted, and any other remarks pertaining to the training of his section. These records should be examined regularly by the platoon leaders and platoon sergeants to help them evaluate training and program future activities.

Job books are excellent tools for noncommissioned officers or other first line supervi-

sors to maintain a record of each soldier's progressive achievements in individual training. These job books, as they become available, are kept in a pocket-sized binder. The job books list the critical tasks for each man's duty position from his soldier's manual and have columns for the entry of the results of the soldier's most recent evaluation on that task. The entry is made on a GO or NO GO basis with the date and the initials of the trainer. Here is what the job book may look like:



12-13. Training Sections—A Situation

Training any Lance section would be a relatively simple chore if the time, training areas, and logistical support were available to permit frequent, full-scale, training exercises. However, batteries in today's training environment have little, if any, of these valuable resources. The example below concerns a Lance firing battery in Germany where a battery commander is discussing the battery's *present* training challenge with his officers and NCOs. Place yourself in the position of the battery XO, FDO, or platoon leaders.

"I just got out of a staff call with the battalion commander and S3. The brigade will conduct an ARTEP of the battalion in 3 months, near the end of our month-long field training exercise period in the local maneuver rights area. During this training period, the battalion will conduct three separate battalion level field training exercises prior to the evaluation. Because of the limited amount of maneuver time and POL, the battalion commander has directed that the batteries concentrate on battery and battalion level training in the local training area prior to the start of the maneuver period. The battalion commander has also directed that the battery will be given a local evaluation by the battalion evaluation team in just 6 weeks. That means that we do not have any time to waste and we must make every minute count. Prior to the battery evaluation, 2 weeks will be set aside for battery level training. That means that we now have 1 month for platoon/section training, and only 14 days to conduct battery level training prior to the evaluation. I have received the battalion training calendar for the next 6 weeks and we have only 3 days per week for the next 6 in which to conduct training. Training rights have been obtained for the local training area for the next 6 weeks so we will be able to conduct field training as required. I have been reading FM 6-42 and I have some ideas for battery-level teamwork. XO and 1SG, you will both be working with me on this. Platoon leaders and FDO, I want you to organize training within your respective sections *so we can start training as a complete firing battery in 1 month."*

As the XO, FDO, or a platoon leader, where do you go from here?

12-14. Training Lance Sections—A Solution

While the table on page 12-13 shows the relationship between the various levels of training, it can also help the FDO and platoon leaders (PL) with their present training challenge. It suggests a systematic approach toward solving the training mission given by the BC; i.e., to prepare their sections to enter phase III of the training cycle (battery-level training) within the time allotted (1 month).

By examining the table, the FDO and platoon leaders see that they must first determine the present training status of their respective sections. This is necessary in order to identify those tasks that require more training. This determination could be made subjectively; however, an objective evaluation could easily be accomplished by using the evaluations contained in SMs or the ARTEP. Subjectively, the FDO/PLs must determine whether to begin their training cycle with individual (phase I) or section (phase II) evaluations.

There will always be a temptation to employ the sequential building-block approach to training, but there is seldom enough time for this approach. The FDO/PLs must begin their training/evaluations at the *highest possible level.* For other than newly organized units, this initial evaluation should probably occur at section level (phase II).

Assume the FDO/PLs believe that section evaluations might provide meaningful results. Their next step would be to administer the evaluations to all of their sections. This can be done by extracting appropriate training evaluations from the Lance ARTEP 6-595. The evaluation can be done in a local training area with little space and no ammunition. One section can be evaluated at a time or several concurrently, such as FDC and the firing platoons. Perhaps outside assistance can be obtained from battalion to assist in evaluating survey, communications, and FDC. Firing platoons and A&T can be evaluated effectively by the platoon leaders without outside assistance.

The next step is critical. The FDO/PLs must analyze the evaluation results carefully to determine those tasks that require additional training. During this stage, it is important to discuss the evaluation results with the platoon sergeants to enable them to obtain an appreciation of the situation. For example, the evaluation of one firing platoon may indicate that firing operations cannot be conducted correctly because the gunner cannot autocollimate or boresight correctly or that the launcher specialist is having difficulty operating the monitor-programmer. Or perhaps an evaluation of the A&T platoon indicates that emergency destruction procedures were being conducted incorrectly. By examining the results of these evaluations, the FDO/PLs can identify which individual and collective training tasks need more training.

The actual preparation and conduct of training should be accomplished by the section chief. He should be provided with a copy of the section evaluation results and as much flexibility as possible to correct all deficiencies indicated by the evaluation. He should understand that this is his show and that the responsibility is his to get his section prepared. Every effort should be made to give him time to train his section and to have all his personnel available to him during training sessions.

In conducting his section training, the section chief should base each training session on one or more collective tasks that were performed improperly during the section evaluation. The section chief will first want to employ the three-phased approach to train his section in those *individual* skills that were lacking during the section evaluation. By referring to the appropriate soldier's manual, the section chief will know the exact performance objectives for his individual section.

Let's look at our example. The chief of this section knows he must train:

- His gunner to autocollimate and boresight.
- His launcher specialist to operate the monitor-programmer.
- His section to conduct the fire mission.

The section chief will want to correct his individual deficiencies before practicing the section task. By referring to the soldier's manual, he notes that the gunner's shortcoming is covered by Task 061-15D-4526 in the 15D Soldier's Manual (FM 6-15D1/2). Each task (and all tasks listed in the SM) lists a performance objective (task, conditions, and standards) and the training steps needed to teach this skill to the gunner. Also listed is the exact reference to help supplement the information given in the SM. In other words, the SM gives the section chief everything he needs to prepare and conduct his individual instruction.

Likewise, the section chief sees that the launcher specialist's deficiency is covered by Task 061-15D-4531.

The above situation demonstrates why maximum flexibility must be given to the section chief. *Not all sections will have the same training problems.* Why teach all gunners in the battery to autocollimate if only one gunner is deficient in that area? Also the individual section chief is in the best position to determine activities for personnel who are

not actively involved in training. He might want them to cross-train with the gunner and/or launcher specialist or to perform maintenance; or he may need these individuals to meet certain detail commitments. *The point is, the section chief is in the best position to conduct training and employ all section personnel in an efficient and effective manner.*

At the completion of individual training sessions, the section chief should practice the collective task with the entire section using the evaluation outline contained in the ARTEP. This will insure that the section can properly perform their collective team effort.

The battery officers have a definite role during the preparation and conduct of this section training. They should review the section evaluation results with each section chief and jointly map out a plan on how to correct any shortcoming. This plan should include a decision on how to use all available time to correct the errors found during the section evaluations. If the supervisors have a clear understanding of the training needed, there should be little problem with giving the section chief enough time and resources to solve his training problems. Based on this "game plan," responsible officers should observe training sessions to insure that the section chief is using his time and people effectively. They might want to conduct their own intermediate evaluations on selective tasks to check training progress. These intermediate evaluations can help pace the training and keep it moving ahead.

After giving the section chief sufficient time to remedy his training shortcomings, the section evaluation should be repeated. This will give immediate feedback to the supervisors as to whether remedial training was conducted properly. If all tasks are now performed properly, the section is probably ready to be trained at battery level. If all tasks are not performed properly, only the tasks not properly performed should be repeated. This time, however, the supervisor should try to analyze carefully why the deficiency recurred. Was ineffective training conducted? Did personnel change in key positions? Were needed training resources unavailable? Hopefully, underlying problems can be identified and corrected. The method just described can apply to any section in a battery whether it be A&T, communications, FDC, survey, or a firing platoon.

12-15. Cross-training Within Sections

The techniques presented in paragraph 12-14 can be employed to fulfill the first two objectives of section training; i.e., to train individuals in their principal duties and to train the section as a team. However, the third priority of section training is to cross-train individuals in the various duties within the section. Cross-training is extremely important to the overall mission readiness of a firing battery and to the professional development of the individuals in the section. Units will not be able to operate effectively if individuals can perform only one job properly. Individual soldiers will not be able to obtain a passing score on the skill qualification test (SQT) unless they become proficient in all tasks associated with their present and next higher skill levels. Because of these reasons, units must conduct a cross-training program.

A unit can conduct a cross-training program using the soldier's manual and section evaluations contained in ARTEP 6-595 and the techniques presented in previous paragraphs. After progressing through the section training phase (see training cycle model), the firing battery should be prepared to conduct battery-level training. In most cases, however, the time and resources needed to conduct battery-level training will not be available at the exact time the sections are prepared to conduct this training. This is the ideal time to emphasize section cross-training. Platoon leaders or the FDO

might then reenter the section training phase (phase II of the training cycle model) with each person occupying a job one position higher than his normal job position, or someone else's job at the same level. It may be desirable to switch the duty responsibilities of the 15Ds in the firing platoon and the A&T platoon. Crewmen from A&T could switch positions with firing platoon personnel and vice versa. This would allow cross-training for both firing platoon and A&T operations. For example, the firing platoon section chief could be given an entire crew of 15D A&T personnel to train for a certain period. An A&T chief of section could train a crew from one of the firing platoons. The sections could be administered the section evaluation while in this configuration and training would be prepared and conducted by the section chief based on the results of the section evaluation (see para 12-13).

Another cross-training technique that might be used is to evaluate all section personnel at a skill level one step above their present duty positions. For example, a 15J20, fire direction computer, could be evaluated using the tasks identified in the skill level 3, soldier's manual. Since these evaluations are progressive in nature, the evaluation results identify those tasks needing training at the skill level tested and at lower skill levels. In this case, the FDO could identify new skills that need to be taught and old skills that still need refreshing. The chief computer would then prepare and conduct training based on the results of these individual evaluations.

Section drill is another proven method available to the firing platoon to promote cross-training within a section. Section drill can be extremely useful as a training tool to familiarize all section members with the various section duties, especially during emplacement and march order. However, the firing platoon supervisor should realize that section drill can become monotonous and boring quickly, and that it does not drill all individual skills requiring cross-training.

In the long run, the individual soldier must also become personally involved in his own cross-training and skill progression. Never before has the individual soldier had so much quality training literature and so many training devices to assist in his own training. The primary tool that the individual soldier has is his own copy of the soldier's manual. The soldier's manual is designed to help the soldier train himself. In the soldier's manual is a training and evaluation outline for each task the individual is required to master. Each training and evaluation outline states what he must be able to do (task), the equipment he needs to perform the task (conditions), how well he must be able to do the task (standards), the best method of performing the task (training steps), and references to help teach the task in detail. The soldier can use this manual with TEC and correspondence courses to build his own proficiency in his present and next higher skill levels. The commander can be of assistance in this effort by insuring that each individual has a soldier's manual, knows precisely what it contains, and knows how to use it.

12-16. Preparing Soldiers for the Skill Qualification Test

The skill qualification test (SQT) is a performance-oriented individual evaluation (replacing the MOS test), which the individual soldier will be required to take to validate his proficiency at his present skill level. The introduction to the soldier's manual gives the soldier an excellent description of the composition of the SQT and how to prepare for it. The following important point should be made to the battery commander, executive officer, battery officers, platoon sergeants, and section chiefs concerning SQT preparation:

The soldier's manual is the basis for the skill qualification test. All of the training techniques recommended in this chapter used

the soldier's manual as their basis. By following these techniques (or your own unique techniques based on the soldier's manual) you will eliminate the need for a period of feverish preparation before the SQT. In addition, the soldier's perception will be that the battery's training program is geared to help him meet the requirement of the Enlisted Personnel Management System—and *he will conclude that his training is meaningful.*

12-17. Preparing Section Chiefs to be Battery Trainers

The section chief is the primary trainer in the Lance field artillery battery. The battery commander must be assured that the Lance section chief has the appropriate technical expertise. The skill level tasks in the soldier's manual can be used to help identify any of the section chief's weaknesses. The executive officer and battery officers can then set up a training program to teach the needed skills.

Once minimum proficiency is attained, a system must be established to insure that all section chiefs maintain their proficiency in their duties and prepare themselves for the next higher grade. One of the best methods to increase the MOS proficiency of a section chief and to help him advance in his career is to prepare an individual training program based on correspondence courses and/or the appropriate soldier's manual.

Besides maintaining the appropriate job skills needed to be a firing battery trainer, the section chief must be able to prepare and conduct training properly. While many section chiefs have received some formal training in "methods of military instruction," many of them have not received training in how to prepare and conduct performance-oriented training in accordance with the concepts and procedures emphasized in FM 21-6.

Section VI. INDIVIDUAL TRAINING IN THE BATTERY

Section V of this chapter presented some techniques for training various sections in a battery in which the personnel normally train and function as a group under the supervision of their section chiefs. However, the mission of the individuals in the battery headquarters and staff sections (cooks, mechanics, clerks, etc.) is day-to-day support of the entire battalion or battery. Normally, these personnel do not participate in collective training except for field exercises and mandatory personal knowledge classes. Therefore, it is most practicable to set up an individual OJT (on-the-job training) program for these individuals who must actively support the unit during most garrison training and who are not part of the normal battery collective training program. Various units set up on-the-job training programs in different ways. The following three paragraphs will present two different OJT techniques that might be used and a brief discussion of training in personal knowledge subjects.

12-18. Conducting Individual OJT Programs Using the Soldier's Manual

The individual OJT programs, for those MOSs with soldier's manuals already published, should be based upon this invaluable training manual. A program using the SM as its basis can have all of the advantages of a program based solely on correspondence courses, while combating the inflexibility and incompleteness of a system.

The Soldier's manual helps the soldier train himself.

As previously explained (para 12-4), the soldier's manual is designed to help the soldier train himself. In addition to listing all critical performance objectives (in an explicit task/condition/standard format), the SM lists the training steps/performance measures that the soldier must master to perform the objective properly. All appropriate training media (DA publications and TEC) are listed for each performance objective, giving the individual and his supervisor flexibility in selecting the most appropriate training medium for learning the task. By knowing the individual's military schooling history, his daily job requirements, and his total MOS skill requirements, the battery commander, first-line supervisor, and the individual can mold an individual training program that is beneficial to both the battery and the soldier.

The Commander's manual is a management tool.

The commander's manual (CM) published for each MOS can be an excellent management tool for the battery commander and supervisor in preparing and conducting an individual OJT program. The extract of one of the task lists appearing in the commander's manual for MOS 82C is shown in the table. This task list contains the critical tasks for the MOS arranged in skill level order. Within each skill level, the tasks are organized into the functional categories used in the soldier's manual. Each task statement is followed by a list of training references and the skill level of initial training. This is followed by columns used to indicate where this training should take place. The letter "I"

in a column indicates the location of initial training for a task, and the letter "R" indicates the location of refresher training.

EXTRACT FROM COMMANDER'S MANUAL, MOS 82C

TASK NUMBER	TITLE	TRAINING MATERIAL REFERENCE	SKILL LEVEL INIT TNG	RESPONSIBILITY/LOCATION FOR INITIAL TRAINING					
				INSTITUTIONAL				UNIT	
				BCT	AIT	PLC	ANCO	SOJT	SELF
CHAPTER 2: FIELD ARTILLERY SURVEY TASKS									
Section I: Skill Level 1									
-2090 (2-2)	Mark survey stations	FM 6-2, chap 9	1		I			R	R
-2011 (2-3)	Set up/march order an aiming circle	FM 6-2, chap 7	1		I			R	R
-2012 (2-5)	Measure horizontal and vertical angles with an aiming circle	FM 6-2, chap 7	1		I			R	R
-2013 (2-7)	Oeclinata an aiming circle at a declination station	FM 6-2, chap 7	1		I			R	R
-2014 (2-8)	Oeclinata an aiming circle without a declination station	FM 6-2, chap 7	1		I			R	R
-2016 (2-9)	Set up/march ordar a theodolite T2/T16	FM 6-2, chap 7	1		I			R	R
-2017 (2-11)	Measura horizontal and vartical angles with the 0.2 mil theodolita	FM 6-2, chap 7	1		I			R	R
-2018 (2-13)	Measure one position horizontal and vartical angles with the 0.002 mil theodolita	FM 6-2, chap 7	1		I			R	R

12-19. Conducting Individual OJT Programs Using Correspondence Courses

An effective method of establishing and/or maintaining MOS proficiency for the various personnel in the battery headquarters/staff sections (and supervisory

personnel) is by using the correspondence OJT courses offered by the various service schools. These courses can be used to qualify personnel with no prior experience or formal training in MOS, and to maintain the proficiency of school-trained personnel. A list of typical duty positions for which individual OJT programs may be necessary and the correspondence/OJT course available for that program is shown in one table and the next table gives similar information for supervisory positions.

CORRESPONDENCE/OJT PROGRAM

DUTY POSITION	COURSE TITLE	ADDRESS, APPLICATION OR CATALOG
Clerks	Special correspondence course for unit clerks, MOS 75B (any grade) Special correspondence course for company administration (AG-OMP) NC NCO basic correspondence course	Army Correspondence Course Program (ACCP) US Army Training Support Center ATTN: (AG 121) Newport News, VA 23628
Field Wireman	Field wireman correspondence course	Same as above ATTN: (SS 113)
Unit Supply Specialist	Unit and organizational supply basic correspondence course Unit and organization maintenance, repair parts supply and storage correspondence course	Same as above ATTN: (QM 101)
Armorer	Small arms maintenance correspondence course I Maintenance correspondence course II	
Cook	Dining facility operations correspondence course Food service administration and field operations correspondence course	
Mechanic	Wheeled vehicle mechanic correspondence/OJT courses	Same as above ATTN: (OD 091)
Mechanic	Tracked vehicle mechanic correspondence/OJT courses	
TAMMS Clerk	Equipment maintenance clerk correspondence/OJT course	
PLL Clerk	Unit and organizational maintenance repair parts supply, storage correspondence course, course 159	Same as above

Notes:

1. Refer to DA Pamphlet 351-20, Army Correspondence Course Program, for detailed guidance on enrollment, grading, etc.
2. Personnel in grade E-4 who are MOS qualified should also consider enrollment in the NCO basic courses listed on the following page.

CORRESPONDENCE COURSES FOR SUPERVISORY PERSONNEL

DUTY POSITION	COURSE TITLE AND GRADE	ADDRESS
Firing or A&T platoon sergeant, section chief or assistant chief, assistant or FD computer	Field artillery missile NCO basic (E-4 or E-5) Field artillery missile NCO advanced (E-6 or E-7)	Army Correspondence Course Program (ACCP) US Army Training Support Center ATTN: (FA 061) Newport News, VA 23628
Detail Plt sergeant, survey section chief or computer	Combat surveillance and target acquisition NCO basic (E-4 or E-5) Combat surveillance and target acquisition NCO advanced (E-6 or E-7)	
Motor sergeant	Mechanical maintenance NCO basic, E40 (E-4 or E-5) Mechanical maintenance NCO advanced, E42 (E-6 or E-7)	Same as above ATTN: (00 091)
CBR NCO	Unit CBR NCO correspondence course (E-5 or above)	
Supply sergeant	Supply NCO basic correspondence course (E-4 or E-5) Phase I, USAQMS NCO advance correspondence course (E-6 or E-7)	Same as above ATTN: (QM 101)
Mess steward or first cook	Food service NCO basic correspondence course Phase I, USAQMS advanced correspondence course (E-6 or E-7)	Same as above ATTN: (WM 101)
Comm chief (31G)	Tactical electronic equipment maintenance NCO basic course (E-4 or E-5) Tactical electronic equipment maintenance NCO advanced course (E-6 or E-7)	Same as above ATTN: (SS 113)
Comm chief (36K)	Wire, antenna, and central office management NCO basic course (E-4 or E-5) Wire, antenna, and central office management NCO advanced course (E-6 or E-7)	
First sergeant	Special correspondence course for company administrative personnel (any grade)	Same as above ATTN: (AG 121)

The battery commander should consider the following advantages in establishing this type of program.

This program is soldier oriented. The individual can move at his own pace. The supervisor assists in and monitors the instruction rather than controls it.

- The individual is forced to become proficient in all tasks required of his MOS rather than just those he is presently performing in his day-to-day work. This program increases *all* aspects of MOS proficiency and results in improved duty performance and SQT results.

- Additionally, promotion points will be awarded for completed correspondence courses. Thus, the individual and the unit benefit from this individual training program.

A battery commander who uses correspondence courses as the basis for an OJT program may feel that his responsibility for training these individuals has passed to the service school that publishes the individual correspondence courses. This is definitely not the case. AR 350-1 states that "When it (self-study) is mission related, unit commanders should encourage and provide maximum assistance, including obtaining study materials and providing time and facilities, to assist subordinates in self-study." The following are some ways that the commander might enhance an individual OJT program using correspondence courses.

Obtain several copies of the correspondence course catalogs of service schools that offer courses applicable to his firing battery MOSs. He can obtain these by writing to the addresses listed in the tables.

The battery commander/training officer should keep a progress record of all individuals in the battery enrolled in a correspondence/OJT program. Also, the first sergeant should keep a progress record of all NCOs enrolled in a correspondence course, and each section chief should keep a progress record of all section members enrolled in a correspondence/OJT program. By maintaining these records, the battery leaders show their interest in individual progress and have a basis for counseling and encouraging the individual. An example of a format that can be used by the battery commander, training officer, or section chief is shown in the table. It can be changed to suit the tastes of the individual battery commander. One chart can be used for all personnel in correspondence courses. The dates entered indicate when each subcourse was completed. Keeping this data current will be no problem, since the service schools send the battery commander a computer-printed notification after completion of each subcourse and a certificate of completion (or diploma) at the end of an entire course.

The battery commander should provide a place for study and recognize achievement. Many personnel can work on their courses during slack time at their jobs. A room should be established where personnel can study after duty hours in the proper atmosphere. For those batteries that do not have these facilities, an MOS study room containing MOS library and TEC facilities might be feasible at battalion for use by all personnel.

Completion of a correspondence course should be treated in the same manner as graduation from a service school. The certificate of completion or diploma should be presented in an appropriate award ceremony, and the approval of a pass might also be warranted.

A battery commander can best assist an individual in a correspondence program by providing time during duty hours for him to work on his courses. A battery might also schedule 4 hours per week as a "professional period" during training time. This time should be devoted exclusively to individual MOS proficiency.

NAME	COURSE	SUBCOURSE NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	COMPLETION DATE
JONES, R.	SPECIAL CC FOR UNIT CLERKS	5 NOV 76	1 OEC 76	10 OEC 76	7 JAN 77																	
SMITH, T.	SMALL ARMS MAINT CC	20 OEC 76																				
OCHOA, R.	UNIT ANO ORGAN SUPPLY BASIC CC	8 SEP 76	20 OCT 76	1 NOV 76	5 OEC 76																	
ROSS, I.	OINING FACILITY OPERATIONS CC	9 OEC 76	4 JAN 77																			
WRENCH, N.	W. V. MECHANIC CC	3 MAR 76	3 APR 76	10 MAY 76	30 JUN 76	5 JUL 76	7 AUG 76	23 OCT 76	1 NOV 76	20 NOV 76	9 DEC 76											
PEN, C.	EQUIP MAINT CLERK CC	20 OEC 76	5 JAN 77																			
WRENCH, A.	T. V. MECHANIC CC	20 OEC 76	10 JAN 77																			
ROUNO, A.	LANCE FIRE OIRECTION	1 MAY 76	20 JUN 76	1 AUG 76	5 OCT 76	1 NOV 76																
STICK, G.	TRAVERSE SURVEY	1 OEC 76	10 JAN 77																			
WIRE, C.	FIELO ARTILLERY COMMUNICATIONS	8 JAN 77																				

CORRESPONDENCE/OJT PROGRAM PROGRESS RECORD

FOLD IN

12-20. Personal Knowledge Training

There is a certain amount of individual knowledge that *all* soldiers *must* have regardless of rank or MOS. Personal knowledge subjects are specified by AR 350-1 and include the following:

- Military justice (AR 350-212).
- Code of conduct (AR 350-30).
- Survival, evasion, and escape (AR 350-225).
- The Geneva/Hague Conventions (AR 350-216).
- Service benefits (allowances, reenlistment, and honorable discharge).
- Policies in key area (e.g., human relations and drug/alcohol abuse).

The regulations covering these subjects are fairly explicit; however, the battery commander should realize the following points in scheduling instruction in personal knowledge subjects:

The regulation covering military justice training (AR 350-212) is the only regulation covering mandatory personal knowledge subjects that specifies an exact course of instruction. Commanders must take this into account when programing training and must normally program military justice training once every 6 months for those personnel required to attend.

The other regulations covering mandatory personal knowledge subjects (i.e., ARs 350-30, 350-216, and 350-225) do not specify length of instruction or frequency of instruction. They simply state those areas in which the individual soldier must have a working knowledge. A policy of scheduling these subjects when most of the battery already understands them is a waste of training time. Some alternatives are:

- Diagnostic testing of battery personnel every 3 to 6 months on these mandatory subjects and remedial classes for those who are deficient.
- Integration of these mandatory subjects into, for instance, a battery commander's weekly 1-hour seminar.
- Permanently posting copies of lesson plans or fact sheets on these personal knowledge subjects on the battery bulletin board and then using these as a basis for individual questioning during in-rank inspections, guard mounts, soldier-of-the-month boards, and promotion boards. This gets the entire chain of command involved with these subjects constantly.

Section VII. BATTERY LEVEL TRAINING TECHNIQUES

All too often a battery commander takes his entire battery to the field for a field training exercise as soon as he feels each individual section is proficient in its duties. Then he discovers that his radio equipment does not work properly, that the reconnaissance party is disorganized, that priorities for occupation have not been established, that the first sergeant does not know how to organize for defense, or a myriad of other problems. Then 85 soldiers stand around watching "quick-fix" corrections being made. The battery commander must keep in mind that a field training exercise (FTX) *is not the sole method of developing battery teamwork.* When men, training areas, ammunition, and time are limited, the battery commander must

select the tactical exercise that accomplishes the immediate training objective best with the least expenditure of resources. Throughout this manual, training tips are given for teaching certain field artillery skills and procedures. This section presents an overview of a suggested building block technique for molding the various battery sections into a Lance battery team.

12-21. Tactical Exercises Without Troops

The terrain exercise or tactical exercise without troops (TEWT) is a tried method of training. During this exercise, the disposition and/or movement of simulated troops or equipment is planned and discussed at a particular location. A TEWT involves nothing more than a leader taking his subordinates to a predetermined tactical location and discussing application of various tactical principles. Some examples of the application of this technique are:

A TEWT involving a firing battery commander accompanied by executive officer, platoon leaders, first sergeant, and survey NCOs and the communications chief would be the first step in a battery tactical exercise. The battery commander would go with these subordinates to different tentative battery positions and conduct an informal, two-way, question-and-answer discussion of such things as positioning of sections, organization of the position area, installation of communications, entrance routes, placement of the field storage location, location of outposts and listening posts, and employment of crew-served weapons. Problem areas that surface would be resolved prior to a battery-level FTX. The commander does not have to make meticulous preparation of reconnaissance, selection, and occupation of position. In a separate TEWT, the firing battery commander selects firing points with firing platoon leaders and survey sergeants and discusses selection of hide areas, launch points, and instrument locations.

A TEWT can be an educational experience for all persons involved and it permits the battery commander to spend a great deal more time with the battery leaders than would be possible if the entire unit were present. A similar technique can also be used by headquarters or service battery commanders.

12-22. Command Post Exercise

The second step in this recommended training sequence is a command post exercise (CPX). A CPX is a tactical exercise for command and communications personnel of a unit. The purpose of a CPX is to permit leaders at all levels to go through the command and control procedures involved in a battery operation in the same manner as they would in an FTX or in combat. It is recommended that the following personnel take part in a battery CPX:

- The battery commander with vehicle.
- The entire FDC or operation center with all TOE equipment.
- The entire communications section with all TOE equipment.

The commander should develop a scenario that calls for the initiation of fire missions, displacement, and reports similar to those listed in the appropriate ARTEP. The beauty of a CPX is that it can be accomplished in about one-third of the time it would take for a full-scale exercise. The CPX will

help surface procedural errors, communication problems, and unfamiliarity with the field SOP. A fast-moving scenario is the key to a good CPX. Actions should be initiated according to how the situations are presented and how the different sections react. The commander may interrupt at times to offer a critique. The duration of the exercise depends on its value in the eyes of the commander. At the conclusion of the CPX, all participants should gather to discuss the actions in the CPX.

During a subsequent CPX, the firing platoons can also participate. Several close-in firing points can be established using hasty survey techniques. These positions should be good tactical firing points to allow the firing platoon to practice their entire tactical operation to include security, camouflage, and firing operations. Incorporation of firing operations into the CPX allows the battery the opportunity to check out its communication system, use of the field SOP, and teamwork.

12-23. Reconnaissance Party Rehearsal

Rehearsal for the reconnaissance party is the next logical step in sequence. The battery commander should make the rehearsal as realistic as possible—as though it were an actual reconnaissance. Rehearsal should include selection of battery and alternate positions, selection of section positions for use during night occupations, and security. The first sergeant can use this rehearsal to plan, in detail, the battery defense plan.

12-24. Field Training Exercise

A full-scale firing battery field training exercise (FTX) should be the highlight of any battery-level training sequence.

A well-conducted field exercise offers the battery commander two well-defined products. First, it demonstrates the ability of the entire unit to perform under simulated combat conditions and identifies training requirements for future training. Second, it offers a test of those skills and techniques taught during previous exercises.

Successful conduct of a field exercise depends upon a complete scenario based on the ARTEP and good control by battery leaders or higher headquarters.

The FTX should be conducted under complete tactical conditions so that the commander will not waste his time and the time of his men. The commander should allow the battery headquarters to take full part in the tactical play. All TOE equipment should be taken to the field. This exercise is one of the best vehicles the commander has at his disposal for practicing the many aspects of the unit field SOP.

It is nearly impossible to keep all members of the battery gainfully employed during the conduct of an FTX; therefore, the battery commander must give consideration to concurrent slack time training before going out on an FTX. The commander should give priority to those subjects that cannot be thoroughly learned in a garrison-type environment, such as emergency destruction, FSL security, recovery of vehicles, construction of field fortifications, and camouflage.

The battery commander must also give careful consideration to the after-FTX recovery period. Plans should be made before the FTX for the post-FTX maintenance recovery period.

Battery-level training might use the following successive steps in approaching complete mission readiness:

- Tactical exercise without troops.
- Command post exercise.
- Command post exercise with launcher platoons.
- Reconnaissance party rehearsals.
- Field training exercise.

12-25. Summary

The success of the Lance unit on the battlefield will depend heavily on the superiority of its tactics, techniques, and weapons system. Of even more importance will be the proficiency and morale of individual soldiers, sections, and units. The weapons and tactics of the Lance battery will be effective in combat only to the extent that we train our soldiers to exploit their full capabilities. The individual soldier must be totally convinced that we can win. This confidence can come only from training. The commander must find ways to train in today's "hostile training environment" that will improve the effectiveness of his unit.

★APPENDIX A. REFERENCES

A-1. ARMY REGULATIONS (AR)

11-8	*Principles and Policies of the Army Logistics System*
50-5	*Nuclear Surety*
(C) 50-109	*Safety Rules for the Operation of the Lance Nuclear Weapon System (U)*
350-1	*Army Training*
350-30	*Code of Conduct Training*
350-212	*Military Justice*
350-216	*The Geneva Conventions of 1949 and Hague Convention No. IV of 1907*
350-225	*Survival, Evasion, Resistance, and Escape (SERE) Training*
(C) 380-40	*Policy for Safeguarding and Controlling COMSEC Information (U)*
(C) 380-51	*Transmission of Official Information (U)*
385-62	*Regulations for Firing Guided Missiles and Heavy Rockets for Training, Target Practice, and Combat*
750-25	*Army Meteorology and Calibration System*

A-2. FIELD MANUALS (FM)

3-12	*Operational Aspects of Radiological Defense*
5-20	*Camouflage*
6-2	*Field Artillery Survey*
6-15D 1/2	*Soldier's Manual, 15D, Lance Missile Crewman, Skill Levels 1 and 2*
6-15D 3	*Soldier's Manual, 15D, Lance Missile Crewman, Skill Level 3*
6-15D 4	*Soldier's Manual, 15D, Lance Missile Crewman, Skill Level 4*
6-15D CM	*Commander's Manual, 15D, Lance Missile Crewman*
6-15J 1/2	*Soldier's Manual, 15J, Lance Operations/Fire Direction Specialist, Skill Levels 1 and 2*
6-15J 3	*Soldier's Manual, 15J, Lance Operations/Fire Direction Specialist, Skill Level 3*
6-15J 4	*Soldier's Manual, 15J, Lance Operations/Fire Direction Specialist, Skill Level 4*
6-15J CM	*Commander's Manual, 15J, Lance Operations/Fire Direction Specialist*
6-20	*Fire Support in Combined Arms Operations*
6-20-1	*The Field Artillery Cannon Battalion*
6-20-2	*Division Artillery, Field Artillery Brigade, and Field Artillery Section (Corps)**

*To be published

6-40	*Field Artillery Cannon Gunnery*
6-40-4	*Field Artillery Lance Missile Gunnery*
(C) 6-42-1	*The Field Artillery Battalion, Lance (U)*
6-50	*The Field Artillery Cannon Battery*
6-141-1	*Field Artillery Target Analysis and Weapons Employment: Nonnuclear*
(C) 6-141-2	*Field Artillery Target Analysis and Weapons Employment: Nonnuclear (U)*
9-6	*Ammunition Service in the Theater of Operations*
11-50	*Combat Communications Within the Division*
11-92	*Combat Communications Within the Corps*
19-25	*Military Police Traffic Operations*
19-30	*Physical Security*
20-32	*Mine/Countermine Operations at Company Level*
21-6	*How to Prepare and Conduct Military Training*
21-30	*Military Symbols*
21-40	*NBC (Nuclear, Biological and Chemical) Defense*
21-41	*Individual Defense: Nuclear, Biological, Chemical*
21-48	*Planning and Conducting Chemical, Biological, Radiological (CBR), and Nuclear Defense Training*
(C) 23-17A	*Redeye Guided Missile System (U)*
24-1	*Combat Communications*
24-18	*Field Radio Techniques*
24-20	*Field Wire and Field Cable Techniques*
29-2	*Organizational Maintenance Operations*
30-102	*Opposing Forces: Europe*
31-35	*Jungle Operations (TBP as FM 90-5)*
31-71	*Northern Operations (TBP as FM 90-11)*
32-6	*SIGSEC Techniques*
44-1	*US Army Air Defense Artillery Employment*
44-23	*US Army Air Defense Artillery Employment, Redeye*
44-23-1	*Operations and Training, Redeye*
54-2	*The Division Support Command and Separate Brigade Support Battalion*
54-9	*Corps Support Command*
54-10	*Logistics: An Overview of the Total System*
55-10	*Army Movement Management Units and Procedures*
55-12	*Movement of Army Units in Air Force Aircraft*
55-15	*Transportation Reference Data*
55-30	*Army Motor Transport Units and Operations*
57-1	*US Army/US Air Force Doctrine for Airborne Operations*

57-35	*Airmobile Operations*
90-2	*Tactical Deception*
90-3	*Desert Operations*
90-6	*Mountain Operations*
90-10	*Military Operations on Urbanized Terrain (MOUT)*
100-5	*Operations*
100-50	*Operations for Nuclear-Capable Units*
101-10-1	*Staff Officer's Field Manual: Organizational, Technical, and Logistical Data, Unclassified Data*
(S) 101-31-2	*Staff Officers' Field Manual: Nuclear Weapons Employment Effects Data (U)*
(C) 101-60-18	*Effectiveness Data for Guided Missile, Surface Attack, MGM 52C(U)*
704-28	*Classes of Supply*

A-3. TECHNICAL MANUALS (TM)

9-1115-485-12	*Nuclear Warhead Section M234 (Tactical) and M240 (Training)*
9-1336-489-12&P	*Nonnuclear Lance Warhead Section M251 (Tactical) and M201 (Training)*
9-1425-485-10-1	*System Description for Lance Guided Missile System*
9-1425-485-10-2	*Operators Manual: Lance Guided Missile System*
38-750	*The Army Maintenance Management System*
(C)38-50-8	*Emergency Destruct of Nuclear Weapons (U)*
55-1425-485-15-1	*Transportability Guidance: Lance Missile System (All Modes) and Air Transport Procedures for Lance Nuclear Warhead Section by US Army Helicopters*

A-4. TRAINING CIRCULARS (TC)

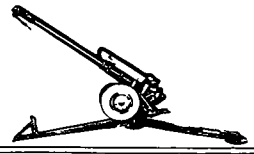
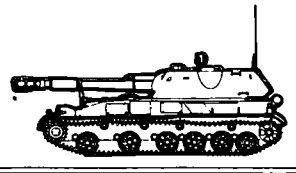
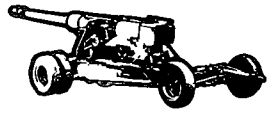
6-10-1	*Field Artillery Communications*
21-5-7	*Training Management in Battalions*

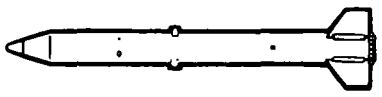
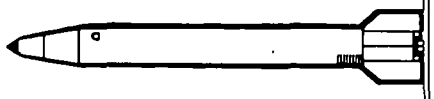
A-5. MISCELLANEOUS PUBLICATIONS

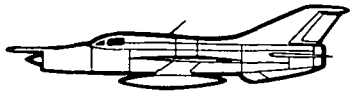
ARTEP 6-595	*Lance, the Field Artillery Battalion*
TOE 6-595H4	*Field Artillery Battalion, Lance*
(C) FTR LANCE A-1	*Firing Table for Warhead Section Atomic M234 and Warhead Section, GM, Practice: Lightweight, M252 (U)*
(C) FTR LANCE B-1	*Firing Table for Warhead Section, GM, HE: M251, and WHS, Practice: M198 (U)*
(C) FTR LANCE-ADD-A-1	*Firing Table Addendum to FTR LANCE B-1 for Warhead Section, GM, HE: M251 (U)*

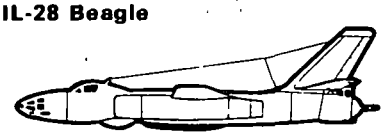
APPENDIX B. ENEMY EQUIPMENT CHARACTERISTICS

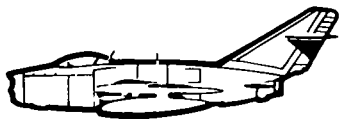
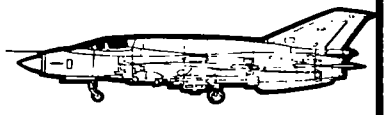
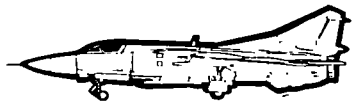
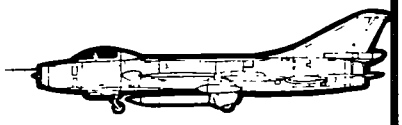
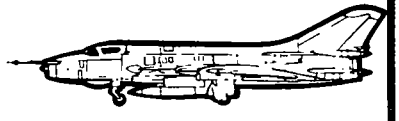
The information contained in this appendix is provided to supplement the discussion included in chapter 1, section II, Enemy Capabilities. These tables describe the general characteristics of various types of combat vehicles and aircraft that could be employed against a Lance unit. It is realized that a Lance battalion could conceivably be attacked by any type of armament found in the opposing forces' arsenal. However, it is believed that this equipment represents a good cross section of the primary weapon systems that the Lance battalion would face.

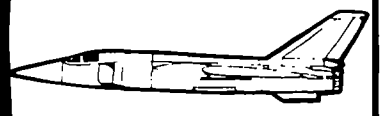
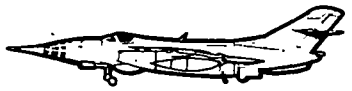
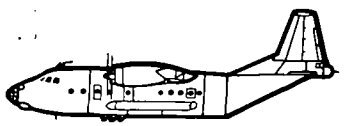
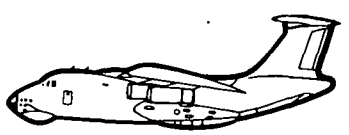
a. CANNON ARTILLERY	RANGE AND CAPABILITY	RATE OF FIRE	PROJECTILE WT
122mm Howitzer (D-30) 	Range: 15,300 m Elevation: -7° to +70° Traverse: 360°	7 to 8 rounds per minute (rpm)	46 lbs. 21.8 kg.
122mm SP Howitzer 	Range: 15,300m 360 traverse Combat redius 250 km	4-6 rpm est 40 rds store speed 30 kph x-ctry 65 kph hwy	Same as above 12.7mm Mg 4-man crew emphibious erm prot; sm erms
152mm Howitzer (D-20) 	Range: 17,300 m Elevation: -5° to +48° Traverse: 58°	3-4 rpm	43.6 kg. 96 lbs.
152mm Gun-Howitzer 	Range: 18,500m Combat redius 250 km	4-6 rpm speed 25 kph x-ctry 55-65 kph hwy	Same as above. 5-man crew 12.7 mm MG
130mm Field Gun (M46) 	Range: 27,490 m Elevation: -2° to +46° Traverse: 360°	5-6 rpm	33.4 kg. 73 lbs.
180mm Gun-Howitzer (S-23) 	Range: 30,000 m Elevation:-0° to+60° Traverse: 44°	Less then 1 rpm	102 kg. 225 lbs.

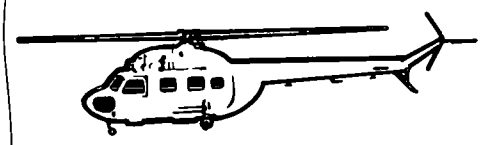
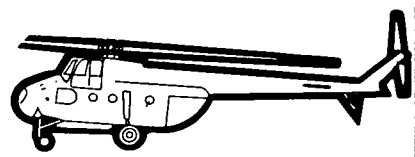
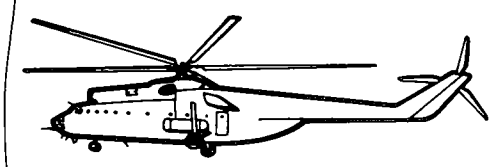
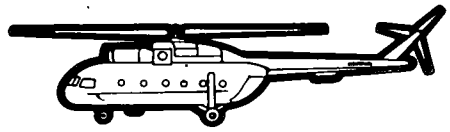
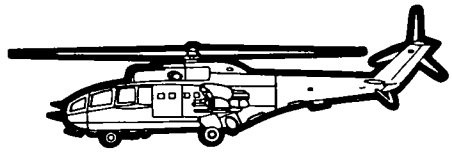
SURFACE TO SURFACE MISSILE	MISSILE RANGE	GUIDANCE	LAUNCHER
FROG-7 	11-70 KM	Free Flight	Tracked Vehicle similar to Lance/HJ.
SCUD-B (SS-1) 	280 KM	Radio or Inertial Probable	Tracked Launcher similar to sergeant

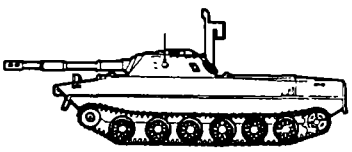
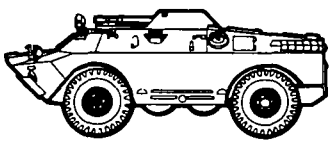
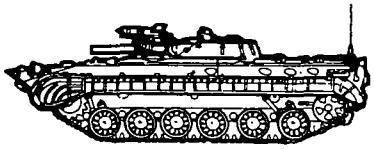
c. RECONNAISSANCE/ SURVEILLANCE AIRCRAFT	TYPE / SPEED	COMBAT RADIUS	ARMAMENT/NOTES
YAK-24 Mangrove 	Tactical Reconnaissance. 544 Knots 627 MPH	1220 Km 760 Mi	Single 30 mm gun NOTE: Data estimated.
MIG-21 Fishbed H 	Tactical Reconnaissance. 1200 Knots 1383 MPH	1100 Km 683 Mi	23 mm guns air to air ATOLL msls 57 mm rocket packs 1100 or 550lb bombs or 5 to 24 240mm air-surface msls

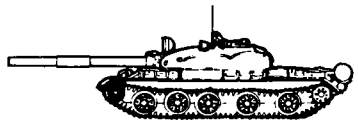
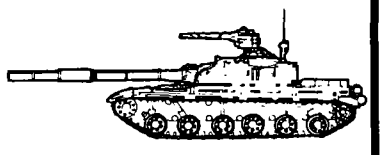
d. RECONNAISSANCE/ ATTACK AIRCRAFT			
MIG-25 Foxbat 	Reconnaissance/ fighter. 1835 Knots 2115 MPH	800 Km 700 Mi	Four hardpoints and internal weapons bay. NOTE: Capable of attacking opportunity targets.
IL-28 Beagle 	Reconnaissance/ Tactical Bomber. 485 Knots 559 MPH	2260 Km 1400 Mi	Four automatic cannon (Two 20 mm., two 23 mm) Bomb load: 4,500 lbs

Ground Attack Aircraft	TYPE / SPEED	COMBAT RADIUS	ARMAMENT/NOTES
MIG-17 Fresco 	Ground attack fighter. 608 Knots 711 MPH	320-480 Km 200-300 Mi	37 mm, two 23 mm cannon, rocket pads or two 550 lb bombs.
MIG-19 Farmer 	Ground attack fighter. 783 Knots 902 MPH	685 Km 425 Mi	Rocket packs and bombs drop tanks, etc. Three 30 mm cannon.
MIG-21 Fishbed 	Multi-rate tactical fighter. 1203 Knots 1385 MPH	1100 Km 683 Mi	Underwing pylons for weapons or drop tanks, rocket packs, etc. twin barrel 23 mm cannon.
MIG-23 Flogger 	Ground attack fighter Interceptor. 1233 Knots 1420 MPH	960 Km 600 Mi	Bombs, CBU's; one 23 mm turn cannon rack.
SU-7B Fitter A 	Close Air Support Introduction. 1040 Knots 1196 MPH	320-480 Km 200-300 Mi	Rocket packs and bombs, usually two 1650 lbs and two 1100 lbs; 30 mm cannon.
SU-17/20 Fitter C 	Close Air Support Introduction. 1040 Knots 1196 MPH	320-480 Km 200-300 Mi	Rocket packs and bombs 30 mm cannon.

Ground Attack Aircraft (cont)	TYPE / SPEED	COMBAT RADIUS	ARMAMENT/NOTES
SU-19 Fencer A 	Heavy fighter/ light bomber. / 1545 Knots	200-400 Km 125-250 Mi	57 mm unguided rockets air to surface missiles 6 external load stations each with 2750 lbs capability.
YAK 28 Brewer 	Tactical strike/ attack. / 636 Knots 733 MPH	1430-2575 Km 1200-1600 Mi	Internal bomb bay 30 mm cannon.
YAK 36 Forger 	Ground attack fighter. / Subsonic	265-325 Mi	23 mm gun pods and up to 1000 lbs bombs. NOTE: V/STOL type aircraft.
f. Cargo/Assault Aircraft			
AN-12 Cub 	Cargo/freight assault. / 297 Knots	1943 Naut Mi	Two 23mm guns in tail NOTE: Can carry cargo up to 44090 lbs or drop 100 paratroopers in 1 minute.
IL-76 Candid 	Cargo / 460 Knots	2694 Naut Mi	Gun turret in tail NOTE: Can carry 88185 lb payload.

Threat Helicopter	TYPE / SPEED	COMBAT RADIUS	ARMAMENT/NOTES
MI-2 Hoplita 	Utility 113 Knots 130 MPH		NOTE: Can carry 6-8 men used for commando raid.
MI-4 Hound 	Transports and ganaral utility. 113 Knots 130 MPH		Machina gun and air-to-surface rockets NOTE 1. Can carry 12-18 men. 2. Air Cav assault or commando raid.
MI-6 Hook 	Haavy transport and assault halicopter. 162 Knots 186 MPH	350 Naut Mi	Nose gun in some NOTE 1. Can carry 60-70 man. 2. Air Cav assault or commando raid.
MI-8 Hip 	Madium transport and assault. 135 Knots 155 MPH	222 Naut Mi	Can be equipped with four 57 mm rockat pads. NOTE 1. Can carry 12-24 man. 2. ABN Cav assaultor commando raid.
MI 24-Hind A 	Assault/ attack halicoptar. 145 Knots 165 MPH	260 Naut Mi	Thraa waapon stations on wings: anti armor missilas and rockat pads. One automatic cannon.

h. THREAT ARMORED VEHICLES	TYPE	SPEED/ RANGE	VULNERABLE POINTS	ARMAMENT
PT-76 	Amphibious reconnaissance vehicle	50 Kmph (30 mph)		76 mm mein gun 7.62 Coax MG 12.7 mm AD MG
BRDM 2 	Amphibious Scout car used for Recon, et Command end NBC	100 Kmph (62 mph) 750 Km (520 Mi)	Undercarriage, rear tires	14.5 mm and 7.62 mm MG SAGGER ATGM'S
BMP 	Multipurpose armored personnel carrier (APC)	55 Kmph (33 mph) 300 Km (180 Mi)	FRONT: Center SIDE: Forwerd ¼ above treads	73 mm AT-Gun 7.62 mm Coax MG
T-55 	Mein bettle tank (similar to the US M-48)	50 Kmph (30 mph) 500 Km (300 Mi)	Undercarriage, side above treads,	100 mm Main gun 7.62 Bow MG Coex 7.62 MG 12.7 mm AA MG (not on all vehicles)

h. THREAT ARMORED VEHICLES Cont.	TYPE	SPEED/ RANGE	VULNER-ABLE POINTS	ARMAMENT
T-62 	Main battle tank (similar to the US M60 AL)	50 Kmph (30 mph) 500 Km (300 Mi)	Same as above.	115 mm Main Gun 7.62 Coax MG 12.7 mm AA MG NOTE: IR and snorkel for night and fording operations
T-72 	Medium Main Battle Tank	Probably similar to T-62. Has improved x-ctry mob/agility	Unknown protective skirt gives good fwd protection	Main gun improved over T-62, w/ auto loader est 40 rds basic load optical, electro-optical laser rg finder
ASU-85 	Airborne assault gun (similar to M551)	45 Kmph (27 mph) 250 Km (150 Mi)		85 mm Main Gun 7.62 mm Coax MG

FM 6-42

30 AUGUST 1978

By Order of the Secretary of the Army:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

Active Army and USAR: To be distributed in accordance with DA Form 12-11A, Requirements for Field Artillery Tactics (Qty rqr block no. 39); Field Artillery Missile Gunnery (Qty rqr block no. 47); and Field Artillery Battalion, Honest John (Qty rqr block no. 53).

ARNG: None.

Additional copies can be requisitioned (DA Form 17) from the US Army Adjutant General Publications Center, 2800 Eastern Boulevard, Baltimore, MD 21220.

☆U.S. GOVERNMENT PRINTING OFFICE: 1978— 735-082:280

S/S

Pages

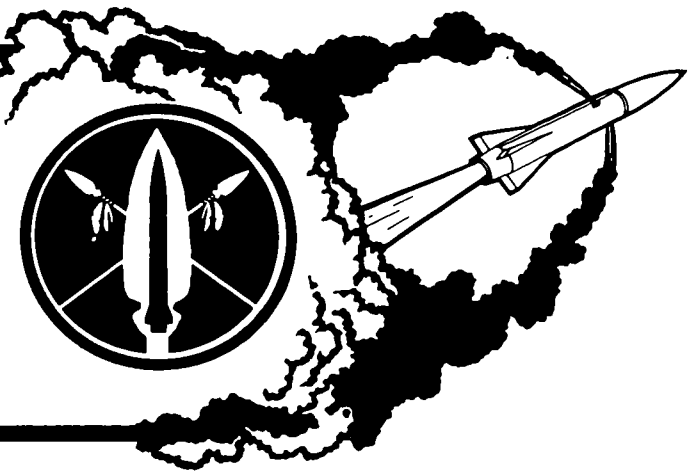
S/S By Chg 1
29 Dec 80

FIELD ARTILLERY BATTALION, LANCE

Table of Contents

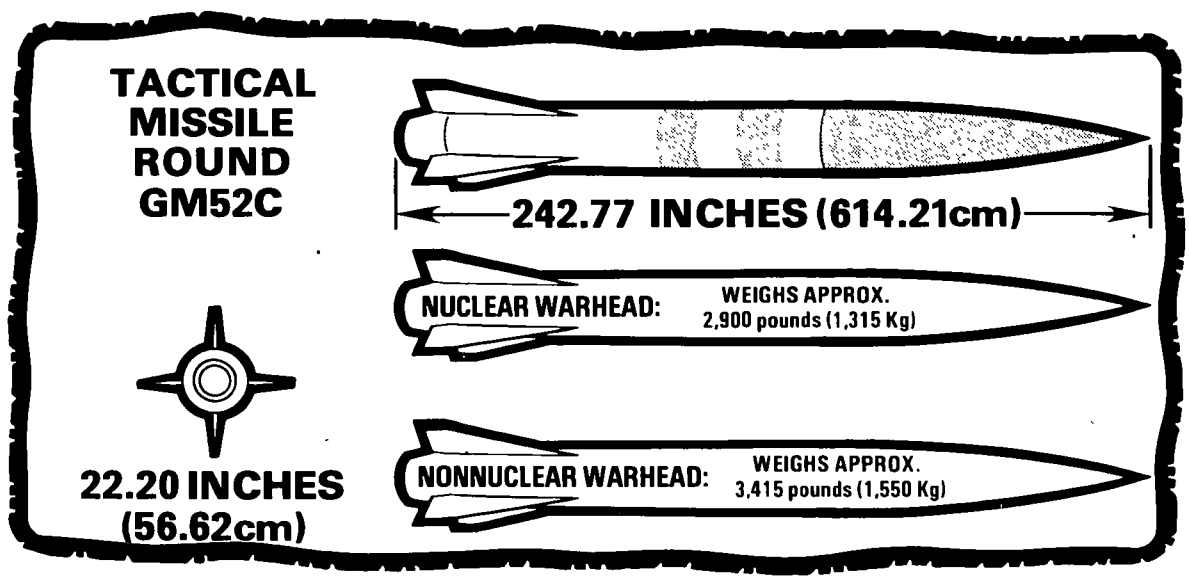
CHAPTER 2

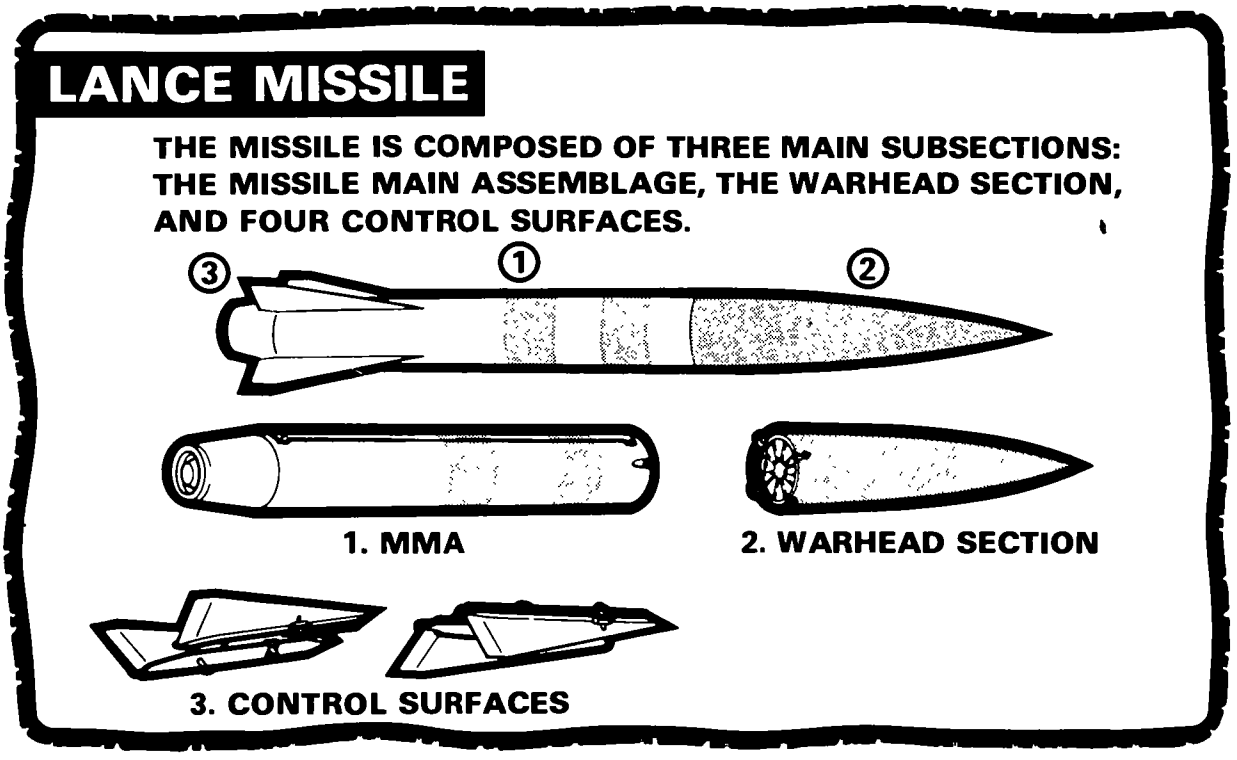
System Description



The Lance missile system provides the force commander with an effective, long-range all-weather, day-night nuclear/conventional weapon system to engage priority targets within the corps zone of operations. The system possesses excellent range capabilities. At sea level, the range of the system in the nonnuclear configuration is between 8 and 65 km(*), and in the nuclear mode, between 8 and 120 km(*). Whatever the case, by using its greater range, Lance can be positioned outside of enemy cannon range and engage targets far beyond that of conventional artillery.

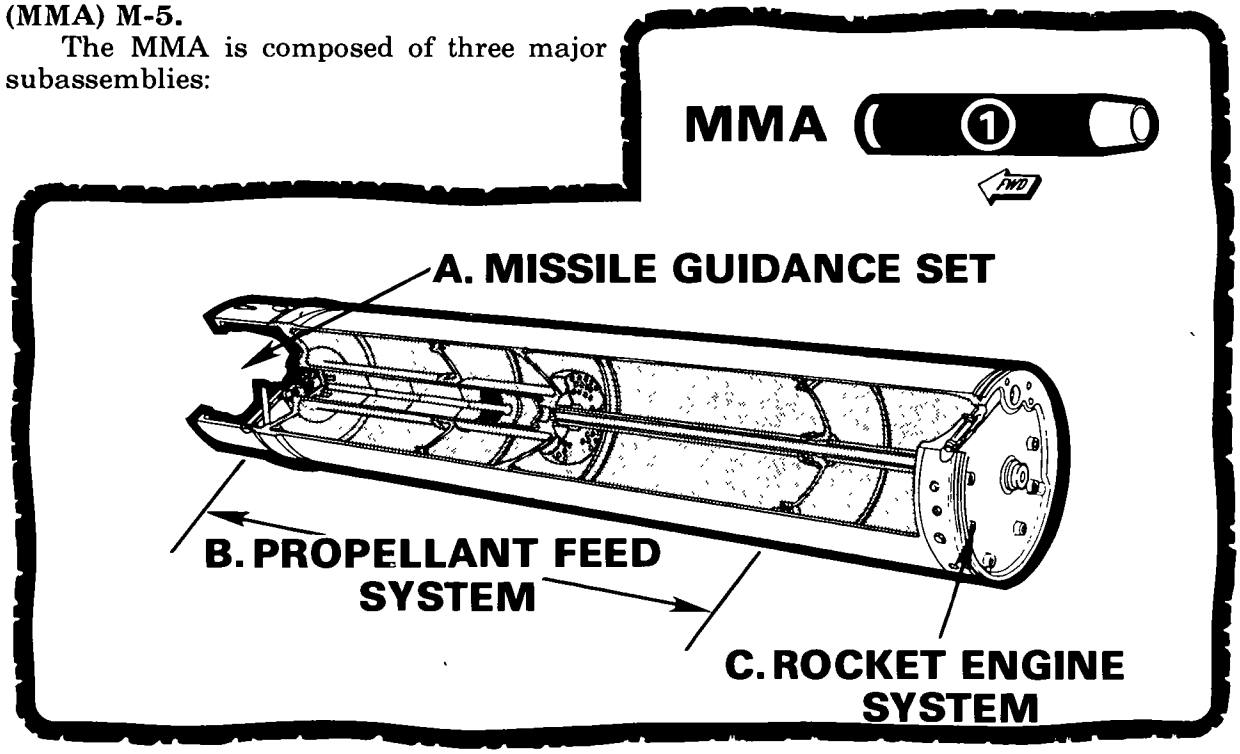
2-1. Missile Description



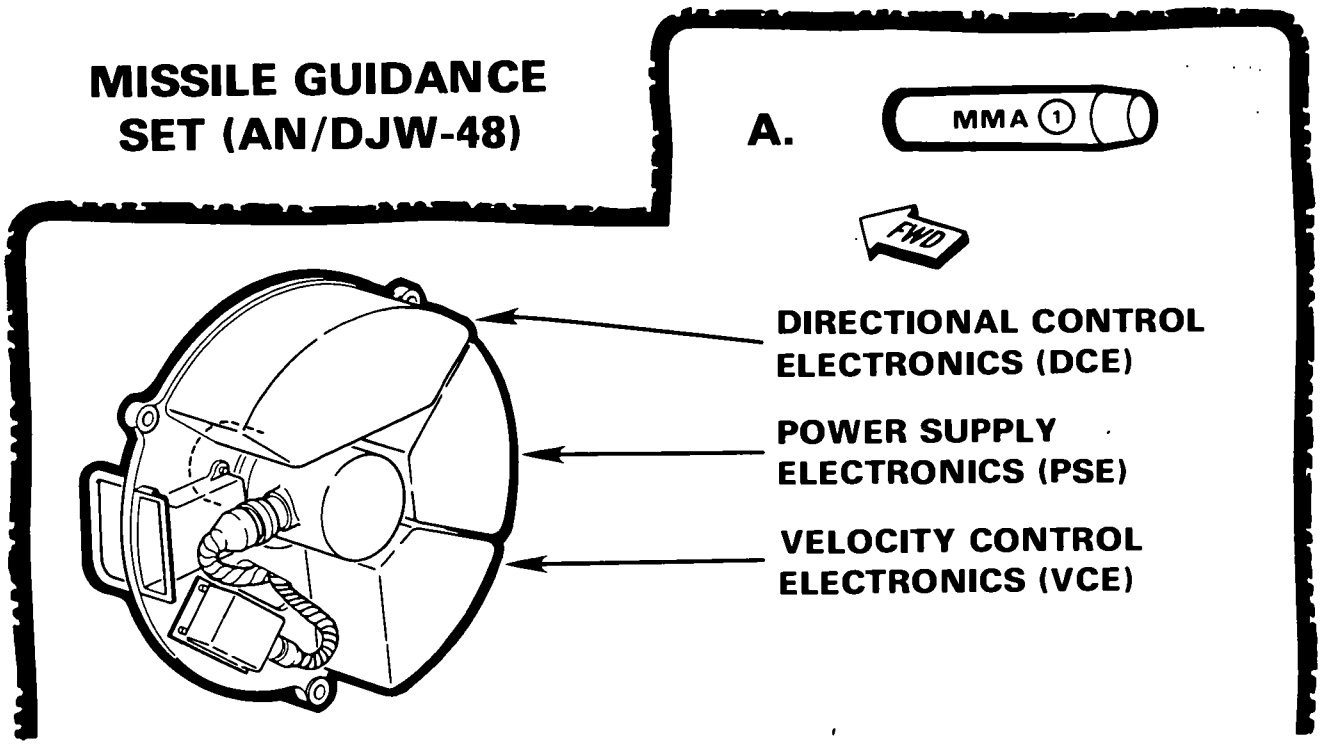


Guided Missile Main Assemblage (MMA) M-5.

The MMA is composed of three major subassemblies:



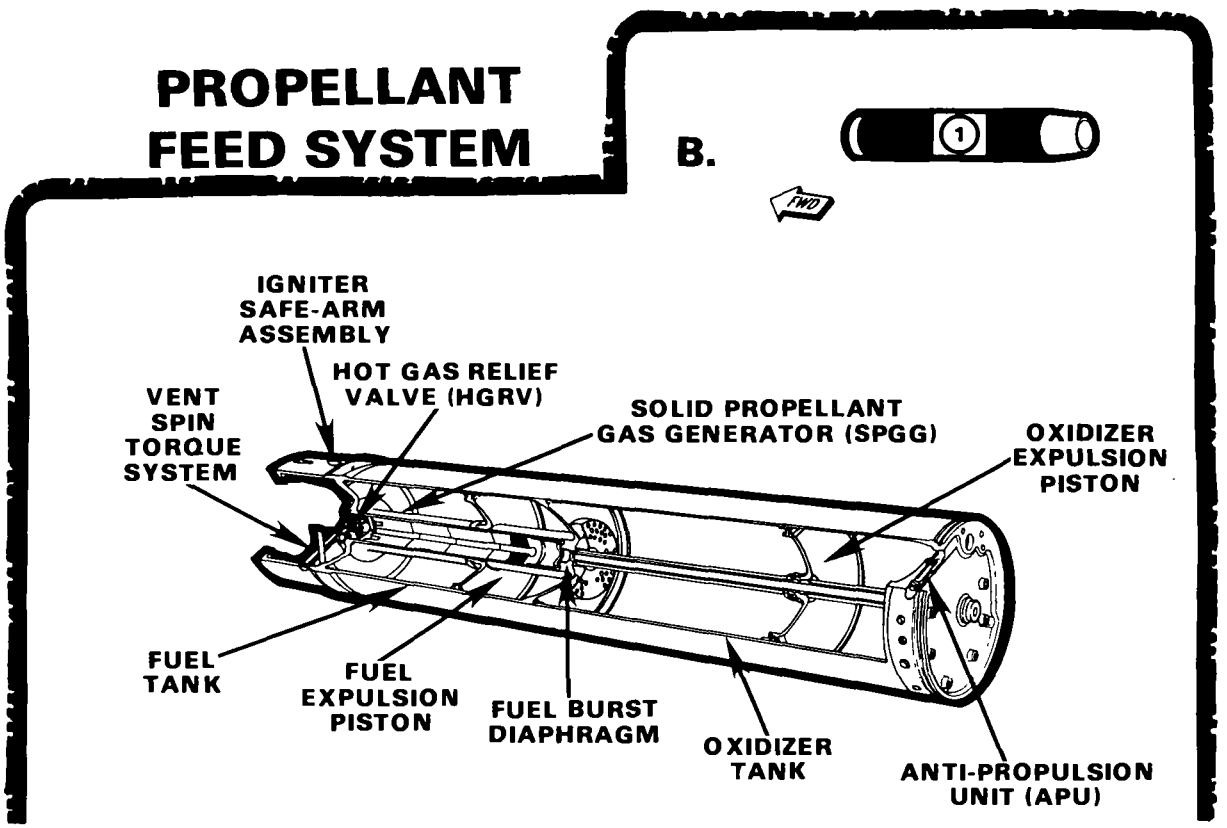
MISSILE GUIDANCE SET (AN/DJW-48)



Missile guidance set, AN/DJW-48. The Lance missile is kept on its intended trajectory by the directional control, automatic meteorological compensation guidance system or, more simply, the DC-AUTOMET. The DC-AUTOMET consists of three major subsystems: directional control electronics (DCE), velocity computer electronics (VCE), and the power supply electronics (PSE). All electronic modules are hermetically sealed and are mounted to a circular aluminum support located just behind the warhead/missile interface. The entire guidance set weighs only 36 pounds. Its modular construction allows for easy replacement of defective subassemblies or the entire guidance set in a matter of minutes.

During the boost phase of flight, a gyroscope senses attitude (pitch and yaw) errors caused by external forces such as wind, air density, and humidity. The resulting output signals are converted by the DCE to commands that open and close the appropriate thrust vector control valves. The resultant alteration of the main thrust vector causes side thrust to cancel the effects of the external forces and thus keep the missile on the intended trajectory. Directional control ceases at boost termination.

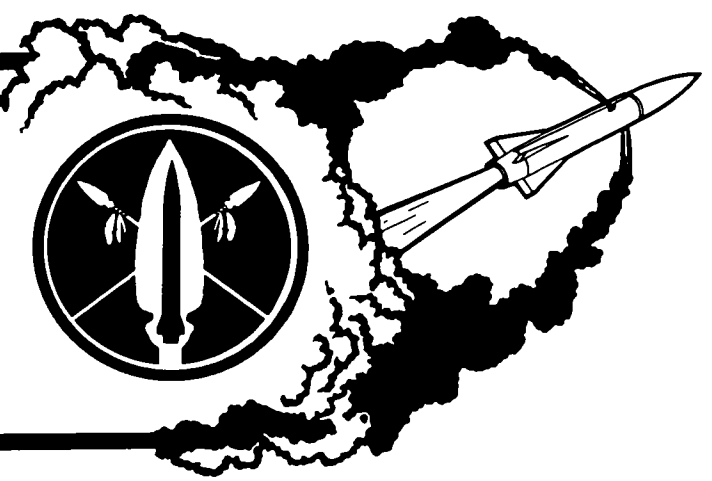
Boost termination is affected by the VCE. An accelerometer measures the missile's acceleration. Once the velocity necessary to achieve the desired range is obtained, a signal is sent to the rocket engine causing the booster termination valves to operate. Throughout the sustain portion of flight, the accelerometer maintains the desired velocity (or a thrust equals drag condition) by regulating the amount of fuel and oxidizer flowing to the variable thrust sustainer engine. This is one of the main advantages of liquid propellants. At a preset time, a signal from the warhead routed through the VCE shuts down the sustainer engine (SCO) to prevent random fuel burnout, thus terminating the powered portion of flight.



The propellant feed system. The propellant feed system includes the subsystems and components necessary to store and deliver fuel and oxidizer to the rocket engine system and the necessary safety devices to be sure of safe missile handling and to preclude inadvertent launch. The propellant feed system consists basically of two cylindrical aluminum tanks welded in tandem with a common internal bulkhead. The forward tank contains approximately 375 pounds (166 kg) of fuel (unsymmetrical dimethyl hydrazine (UDMH)), and the rear tank contains approximately 1,107 pounds (502 kg) of oxidizer (inhibited red fuming nitric acid (IRFNA)). During storage, the propellants are isolated in their respective tanks by aluminum static seals and high pressure burst diaphragms. When the launch sequence is initiated, the propellants are forced through the diaphragms and into the rocket engine system by the action of two pressure driven pistons, one in each tank. Pressure to drive the pistons is provided by a solid propellant gas generator (SPGG), which is regulated by the hot gas relief valves (HGRV). High pressure gas is further expelled through a vent spin torque system to impart a stabilizing spin on the missile. Two safety devices are built into the propellant feed system to prevent unintentional arming of the missile. The SAFE-ARM igniter assembly is a mechanical blocking device that prevents ignition of the solid propellant in the SPGG by displacing the firing squibs and an intermediate charge. When in the SAFE position, a spark is prevented from reaching the SPGG. The antipropulsion unit (APU) is a steel shank assembly located behind the burst diaphragm between the oxidizer tank and the rocket engine. With this shank in place, it is highly improbable that the oxidizer will enter the engine and mix with fuel should the system become pressurized.

CHAPTER 3

Organization

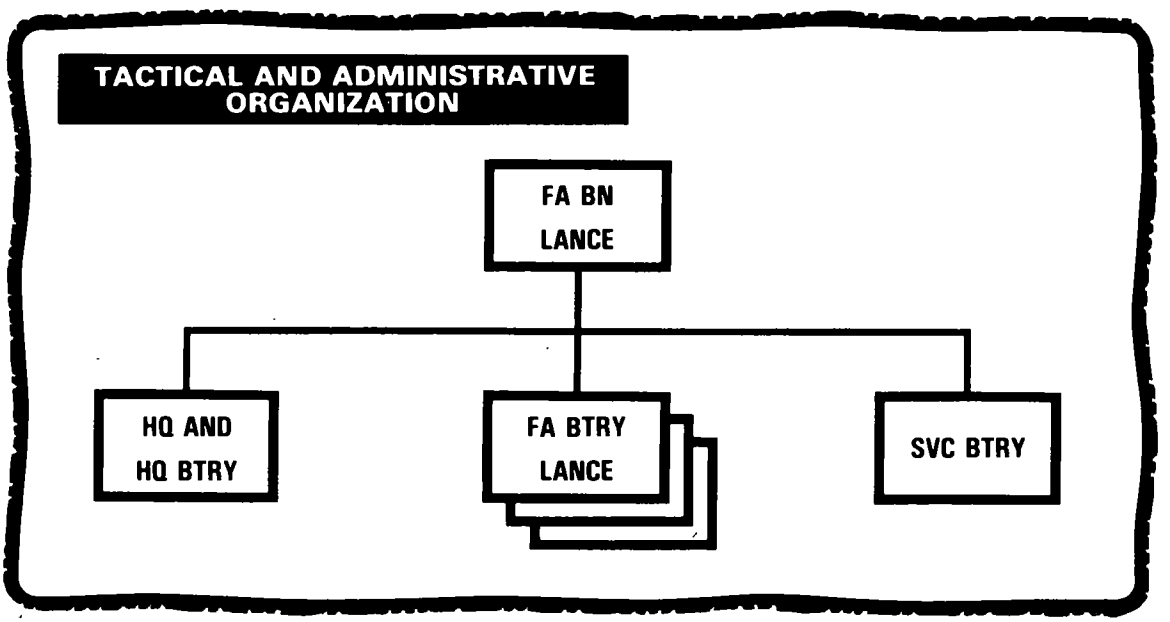


Section I. ORGANIZATION AND MISSION

3-1. Field Artillery Battalion, Lance

The field artillery battalion, Lance, is normally assigned to a corps. The battalion's mission is to provide field artillery nuclear and nonnuclear missile fires in support of the Army corps.

The Lance battalion is organized as a self-sustaining tactical and administrative unit composed of a headquarters and headquarters battery, a service battery, and three identical firing batteries.



3-2. Headquarters and Headquarters Battery (HHB)

The mission of the headquarters battery is to assist the battalion commander and his staff in the performance of their duties by providing the personnel, equipment, and facilities to operate the headquarters and to provide administrative, logistical, maintenance, and communication support to the elements of command. The Lance headquarters and headquarters battery is organized into six major elements: the battalion headquarters, the battery headquarters, the headquarters support section, the operations and fire direction sections, the communications platoon, and the medical section.

① *The battalion headquarters* consists of the battalion commander and the necessary staff to control and coordinate battalion functions and activities.

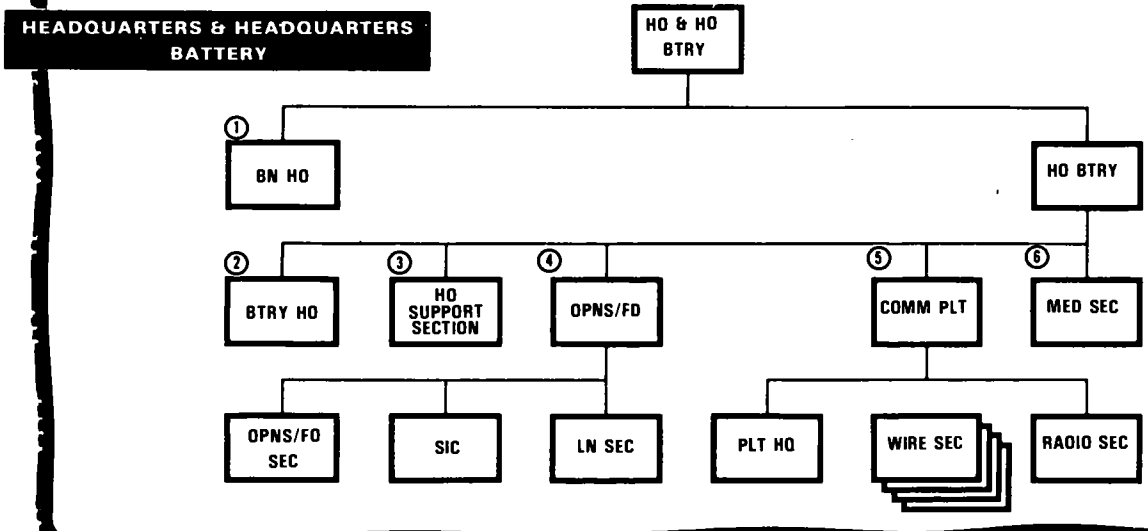
② *The battery headquarters* is supervised by the battery commander. The 1SG is his principal enlisted assistant and assists the commander in areas such as discipline, morale, supply, security, maintenance, and administration.

③ *The headquarters support section* is supervised by the battalion S1. The section is responsible for administrative correspondence, legal support, management of combined administration at battalion level (CABL), and general health and welfare of the troops.

④ *The operations and fire direction sections* are supervised by the S3. Responsibilities include tactical and technical fire direction, intelligence operations, plans, and training. Additionally, the battalion SIC and liaison sections are under the control of the S3.

⑤ *The communications platoon* consists of a platoon headquarters, a radio section, and the wire sections. The platoon installs, operates, and maintains the battalion communications system under the supervision of the communications-electronics staff officer (CESO). The platoon headquarters also acts as the battalion message center.

⑥ *The medical section* establishes the battalion aid station under supervision of the enlisted medical supervisor. The section provides sick-call, dispensary-type medical service, emergency medical treatment for patients who require further evacuation, and definitive treatment to those who can be treated within the battalion and returned to duty.



3-3. Service Battery

The mission of the Lance service battery is to procure and distribute all classes of supplies to the units of the battalion, maintain supply records, provide ammunition service, and perform organizational maintenance not within the capabilities of the batteries. The battery is divided into four sections to carry out this mission.

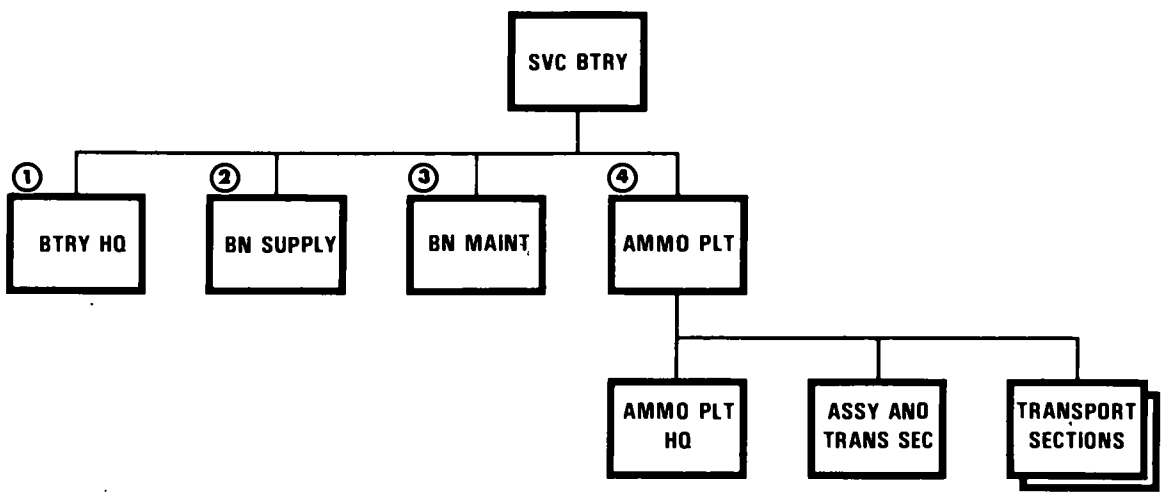
SERVICE BATTERY

① *The service battery headquarters* performs command, administrative, mess, supply, communications, and maintenance functions for the battery.

② *The battalion supply section* performs supply functions for the battalion. This section maintains necessary battalion property records, consolidates requisitions and turn-ins, procures and issues supplies, and assists the batteries in all matters concerning supply. The service battery commander also serves as battalion S4.

③ *The battalion maintenance section* performs all organizational maintenance functions that are not within the capabilities of, or authorized to be performed by, the batteries. Organizational maintenance of Lance-peculiar equipment and the turn-in of items for periodic calibration are also functions of the maintenance section.

④ *The battalion ammunition platoon* has one assembly and transportation section and two transport sections and is organized to perform both conventional and special ammunition supply and resupply to the batteries of the battalion.



3-4. Firing Battery

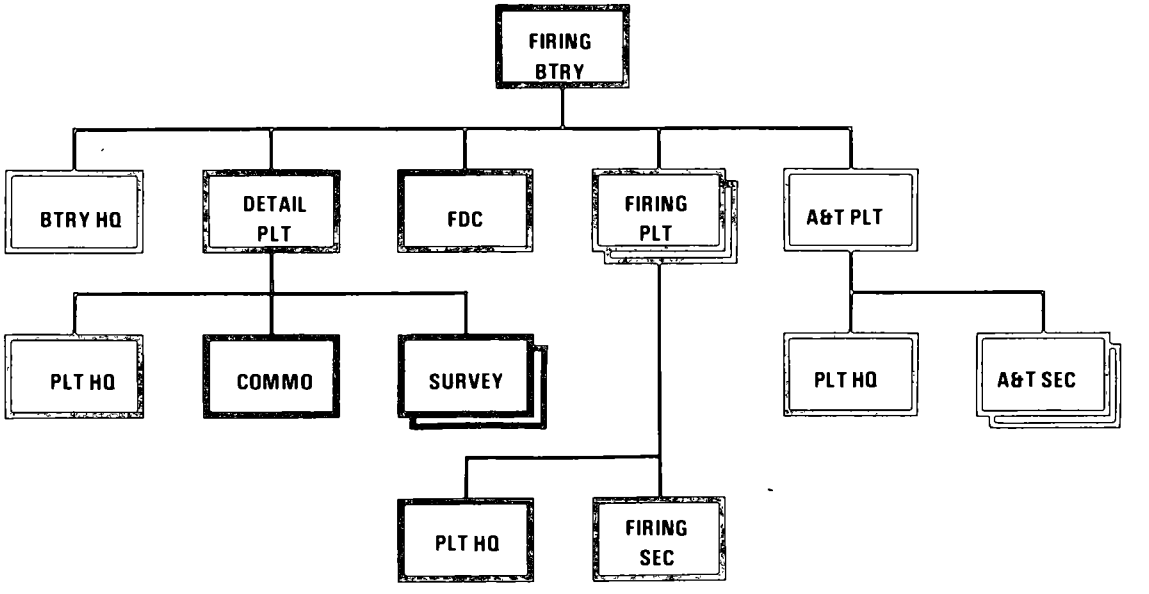
The mission of the firing battery, Lance, is to provide the firing component of the Lance battalion. The battery is composed of the battery headquarters, detail platoon, fire direction center, two firing platoons, and the assembly and transport platoon. Each firing platoon consists of a platoon headquarters and one firing section with one launcher. The functions performed by the Lance battery are the same as those for other artillery organizations, with the following modifications:

FIRING BATTERY, FIELD ARTILLERY BATTALION, LANCE

The field artillery batteries depend on the support elements of the battalion for administrative support. The batteries are responsible for internal communications, survey, and battery maintenance. The firing battery is capable of performing its tactical mission as a firing unit if it is provided with the elements contained in the call for fire as specified in FM 6-40-4.

The assembly and transport platoons of each firing battery are responsible for receiving, loading, transporting, and storing Lance missiles and for assembling those missiles relatively close to the firing section. This platoon is composed of a platoon headquarters and two assembly and transport (A&T) sections. Each section is capable of supporting one firing platoon.

Individuals of this organization can engage in effective, coordinated defense of a unit's area of installation. However, simultaneous defense of the perimeter and performance of the unit mission cannot be accomplished. Additionally, perimeter defense and field storage sites require augmentation by additional security personnel.



Section II. DUTIES OF KEY PERSONNEL

The duties of key personnel closely parallel those in other artillery organizations. The following paragraphs list some of the major duties of key personnel of the Lance battalion and are not intended to be all inclusive. Those duties peculiar to Lance are printed in ***italics.***

3-5. Battalion Commander

The battalion commander is responsible for everything his command does or fails to do. Assisted by his staff, he controls all the tactical, logistical, and administrative activities of the battalion. He makes provisions for uninterrupted perpetuation of the chain of command in his organization by prescribing the succession of command for all contingencies. He is responsible for the accomplishment of his command's assigned mission.

Tactical responsibilities.
The commander establishes policies and plans and supervises the tactical employment of his battalion to include:

- Reconnaissance, selection, and occupation of position (RSOP).
- Fire direction, detailed coordination, and integration of available fire support with the plan of operation of the supported unit.
- Maintenance of liaison with the supported or reinforced commander by direct contact or by representation.
- Provision of continuous reconnaissance for routes and position areas.
- Maintenance of current information concerning the enemy situation and the situation of the supported force.
- Security of nuclear weapons.
- Communications and electronic security.
- Readiness of his battalion to operate in an NBC environment.

Training.
The battalion commander is responsible for the training of his unit. He directs the training program for the battalion and, assisted by his staff, coordinates the training of his unit with the next higher headquarters. He supervises the training by making frequent personal inspections and by analyzing the reports of inspections conducted by his staff officers and battery commanders.

Discipline.
The battalion commander instills discipline in his battalion by leadership and by personal example. He closely supervises the mental, moral, and physical training of his men.

Morale.
By personal action and through his staff and subordinate commanders, the battalion commander gives close attention to building and maintaining the morale of his unit. He prescribes a fair and uniform policy governing promotions, leaves of absence, decorations and awards, and duty assignments, and insures the efficient operation of the personnel support system. Through appropriate staff elements, he obtains for his battalion the best available quarters and rations, recreational equipment and programs, religious services, postal facilities, and services of the various welfare agencies. By means of personal inspections, and with the assistance of the battalion medical personnel, he controls sanitation, personal hygiene, and health.

Administration.

The battalion commander organizes and employs his staff to insure efficient administration of his battalion. The staff relieves the commander of the preparation of records and reports. The commander makes frequent inspections to insure that his administrative policies are followed, that the unit dining facilities are sanitary and properly operated, that living quarters are adequate, and that workload priorities are established.

Supply and maintenance.

Proper supply and maintenance procedures assist the battalion commander in maintaining the combat efficiency of his unit. The battalion commander normally discharges his supply responsibilities through the S4. The commander supervises supply activities, however, to see that his supply policies are followed, that supply discipline is maintained, and that his battalion is supplied with the appropriate classes of supplies in the correct amounts. He provides for the training of all personnel in supply economy. He insures that ammunition supply is adequate and that basic loads are maintained. By means of command inspections, he insures that the authorized weapons, vehicles, and other equipment are on hand and properly maintained. In addition, he may request technical inspections and technical assistance from supporting combat service support organizations.

3-6. Battalion Staff

The semi-independent operations, level of deployment, the complex technical equipment, and the importance of the mission of the Lance battalion combine to require a high degree of professional military and technical skill.

The battalion commander's staff is composed of the executive officer, S1, S2, S3, S4, assistant S3, CESO, liaison officer, surgeon, chaplain, reconnaissance and survey officer, and command sergeant major. Duties of these staff members are the same as those of any field artillery battalion staff, with the following considerations:

In addition to his specific staff duties, *the S3 will transmit fire mission data to Lance firing batteries and an alternate battery, if appropriate, and perform technical and tactical fire direction as required. He also coordinates the survey activities in the battalion with the reconnaissance and survey officer and coordinates the battalion's survey requirements with higher or adjacent headquarters.*

The service battery commander is assigned the additional duties and responsibilities of the battalion S4.

The command sergeant major is the battalion commander's senior enlisted adviser. Because of the large separation distances between units, the battalion commander will seldom have time to visit his units. Therefore, he must rely on the CSM as his second pair of eyes.

3-7. Battery Commander

The battery commander is responsible for everything his command does or fails to do. When a battery is not under the command and control of a field artillery battalion, the responsibilities of the battery commander are comparable to those of a battalion commander. When a battery is under the command and control of a field artillery battalion, the battery commander is responsible for:

- Insuring that the battery accomplishes its mission.
- Training the battery for combat readiness in conformance with the battalion training program and for attaining the prescribed training objectives.
- Maintaining materiel and equipment.

range to target. Using this method, a no greater than (NGT) range will be sent to the battalion. The NGT range will serve notice to the battalion that only those firing points at a range to the target less than the NGT range will be used to fire the mission. In this manner, the Lance battalion has complete flexibility and control in designating which of its subordinate units will fire the mission while insuring no degradation of desired effects on the target.

When precision target analysis procedures are required, it may be necessary for the analyst to use an actual firing point location. This will cause the FSE to designate the firing point to be used.

Nonnuclear Lance.

Lance may also be used to deliver conventional fires in support of offensive/defensive operations.

Attack criteria. Targets appropriate for attack by nonnuclear Lance are those that are relatively stationary and "soft"; i.e., primarily personnel and/or light materiel.

Targets for nonnuclear Lance. Lance units can provide conventional fires to:

Supplement cannon artillery. Typical threat offensive tactics during massing for a breakthrough will present more targets than there are weapons systems to attack these targets. It is during this period of intense combat that Lance firepower can be used to supplement cannon artillery. Committed maneuver units and close support artillery will be heavily engaged. Most of their fires will be directed against targets acquired by maneuver forces as they fight the battle. At this critical time there is little firepower remaining to attack those targets that are not yet an immediate threat to the command, but should be attacked as their destruction, neutralization, or suppression contributes greatly to a successful defense at the FEBA. Under these conditions, the following are appropriate targets for Lance:

- Cannon and missile batteries
- Command and control elements
- Logistical elements
- Chokepoints
- Forward airfields
- Air defense sites

Provide depth to combat. Nonnuclear firepower of the Lance missile can also be used by the commander to influence the battle in greater depth. The type of targets to be fired upon under this concept are:

- Command posts
- Cannon batteries
- FROG batteries
- Forward airfields
- Logistical elements
- Chokepoints

6-6. Communications

Corps-to-battalion communication responsibilities are based upon the manner in which the corps commander organizes corps level artillery for combat. When organizing for combat, each battalion is placed within a tactical organization and assigned a tactical mission. The inherent responsibilities of the assigned mission specify the communications requirements. This is true of both standard and nonstandard tactical missions.

Separate Lance battalion. When a Lance battalion is assigned to the corps and not further attached to a field artillery brigade or to subordinate maneuver units, the tactical mission normally assigned to the battalion is general support to the corps or general support reinforcing to a division artillery. With retention of the battalion under corps command, regardless of the assigned mission, the corps will maintain a direct communications link with the battalion. In cases of a GSR or reinforcing mission, the Lance battalion must establish a communications link with the reinforced artillery.

Lance attached to a field artillery brigade. The corps commander's decision to attach a Lance battalion to a field artillery brigade will cause communications to be relayed through the brigade to the Lance battalion. The mission assigned the field artillery brigade will determine the degree of responsiveness Lance will have to the corps commander. A fire mission will be communicated to the field artillery brigade from corps. In this role the corps-to-battalion communication link is through field artillery brigade, the corps being responsible to maintain communications with the field artillery brigade, and the field artillery brigade with its subordinate battalions.

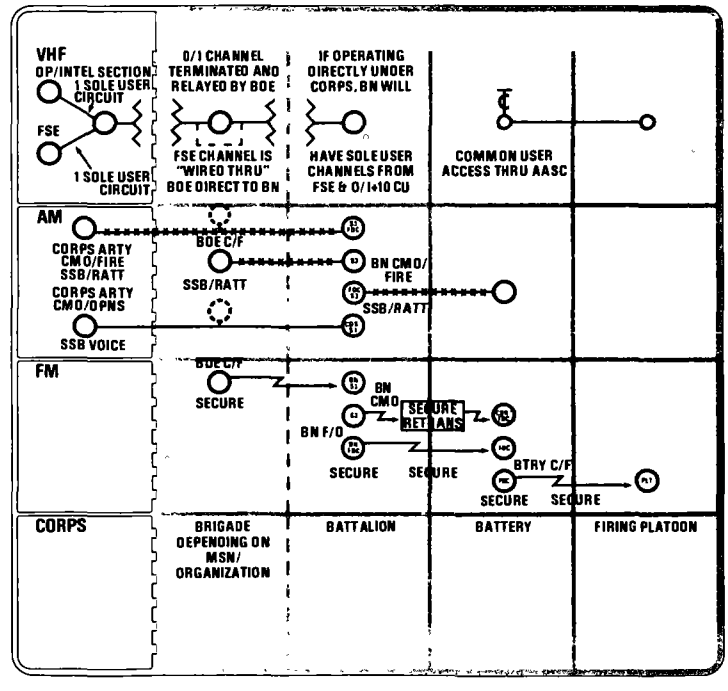
Lance attached to a division. In this case, Lance operates under the command and control of the division and has no communication responsibility to the corps.

Since the corps field artillery section does not operate a command/fire FM net, FM communications between corps and a Lance battalion will only be possible through the battalion liaison section when established at corps. The battalion does have, however, an organic AM/SSB-voice capability that is designed for use in the corps artillery command/operations net, and teletype equipment for operation on the corps artillery command/fire direction net (AM/SSB-RATT).

The missile support platoon of the corps radio battalion is responsible for providing multichannel terminals for each Lance battalion in the corps. In addition, they will also provide a terminal to field artillery brigades controlling Lance units. These VHF terminals will provide the battalion with one sole user circuit from the fire support element and one from the operations/intelligence (O/I) element of the FAS. An additional channel may be designated as a common user circuit.

If Lance battalions are operating under a field artillery brigade, the O/I channel will be terminated at the brigade and necessary information extracted and relayed to the battalions. The FSE channel will go direct to the battalions and brigade simultaneously to expedite fire mission traffic.

CORPS COMMAND SYSTEM, VHF MULTICHANNEL



Battalion displacements are conducted when there is no possibility of enemy attack. This is the least desirable method and seldom will be used by Lance units.

Movement of one battery at a time is another method to displace the battalion. Use of this method, again, makes individual units extremely vulnerable to enemy attack. The advantage of command and control, on the other hand, lends its use to night moves.

Echelon movement is the most feasible method of movement to be used by Lance. Advantages are:

- Provides the least vulnerability to hostile observation.
- Deceives the enemy as to the size of the unit.
- Provides passive defense against air and ground attack.

When the battalion moves by echelon, a portion of each battery will move separately, but under battalion operational control. Echelon march elements should be designated in the unit standing operating procedures. Command and control and lack of security are some disadvantages that would limit the nighttime use of this method.

Whether the battalion moves by battery or by echelon, there should be no interruption in the operation of fire direction. While the battalion fire direction center (FDC) is moving to the new position, battalion fire direction control can be maintained by a designated firing battery FDC. The local SOP should specify FDC control measures to be used during displacement.

Continuous fire support must also be available during displacements. The movement of firing platoons should be coordinated to allow continuous coverage. To insure coverage, units or platoons should be moved successively to new positions (leapfrogged).

Because of the separation distances between units, command and control measures during displacements require detailed planning and execution. Methods should be rehearsed during training and included in the battalion SOP. Control of battalion displacements can be achieved by the use of helicopters, checkpoints, and road guides. In moves over great distances, radio relay stations should be established to insure continuous communications. The order of march should be such that march elements do not pass one another in order to get to the new position. There should also be an adequate interval between units to insure dispersion of critical elements, thus preventing the development of a lucrative target for threat aircraft or artillery.

Supporting artillery or aircraft should be available to provide coverage during ground movement of the Lance battalion. Liaison with nearby fire support units can be extremely beneficial to insure adequate coverage is provided. Radiofrequencies, call signs, point of contact, and unit SOPs are areas that should be addressed.

7-4. Occupation and Organization of Battery Positions

For discussion of the occupation and organization of the battery position, see chapter 8, section I.

Section II. BATTALION OPERATIONS

The mission of the Lance battalion is to destroy, neutralize, or suppress the enemy by missile fire. To provide effective and timely Lance fires and to

execute his mission, the battalion commander must understand the Lance system. Fire direction, survey, communications, and security are some of the key elements of the system that the commander must harmoniously integrate in order to achieve the maximum effectiveness of his battalion.

7-5. Fire Direction

There are four fire direction centers with the capability to perform technical fire direction within the battalion: one in headquarters battery and one in each firing battery. The battalion fire direction center, under control of the operations officer, has the primary function of tactical fire direction, although it can perform technical fire direction if necessary. The battalion S3 will assign the battery to fire and may also assign the firing point if not previously assigned by higher headquarters. Computations required to convert the fire mission into firing data are normally computed by the designated firing battery. The battalion fire direction center may act to verify and/or back up the computation. In most cases this is not necessary because the battery has the capability to doublecheck its own data. Verification procedures can be addressed in the battalion SOP. The primary method used to compute firing data is the field artillery digital automatic computer (FADAC), which takes approximately 3 minutes to process data. If necessary, manual computations may be used but require 15 to 20 minutes. Use of the hand-held calculator will significantly reduce this time. A more detailed discussion of fire direction procedures can be found in FM 6-40-4.

Lance Fire Mission.

Execution. The corps tactical operations center (CTOC) or division main command post receives and processes target acquisition information from national, strategic, and tactical data sources to obtain lucrative targets. These targets are developed, analyzed, and where appropriate, assigned for attack by Lance based on the commander's guidance. Once a target has been designated for attack, the corps FSE will transmit the mission via secure, point-to-point communication to the Lance battalion. After the battalion receives the fire mission, it will assign the mission to a firing battery and transmit it by either FM secure or radioteletypewriter (RATT) to the appropriate firing battery FDC for the computation of firing data. The battery FDC will alert the designated firing platoon with a warning order which will include the firing point, approximate direction of fire, time to fire, and warhead type. As soon as the firing data is computed, it is immediately transmitted to the firing platoon for completion of the mission.

Response time/states of readiness. To have an appreciation of Lance capabilities and limitations, the battalion commander must fully understand system responsiveness. A complete discussion of system responsiveness is found in FM 6-42-1.

The battalion commander must actively seek a desired response posture from the supported unit FSE to allow him to achieve the proper states of readiness for his battalion.

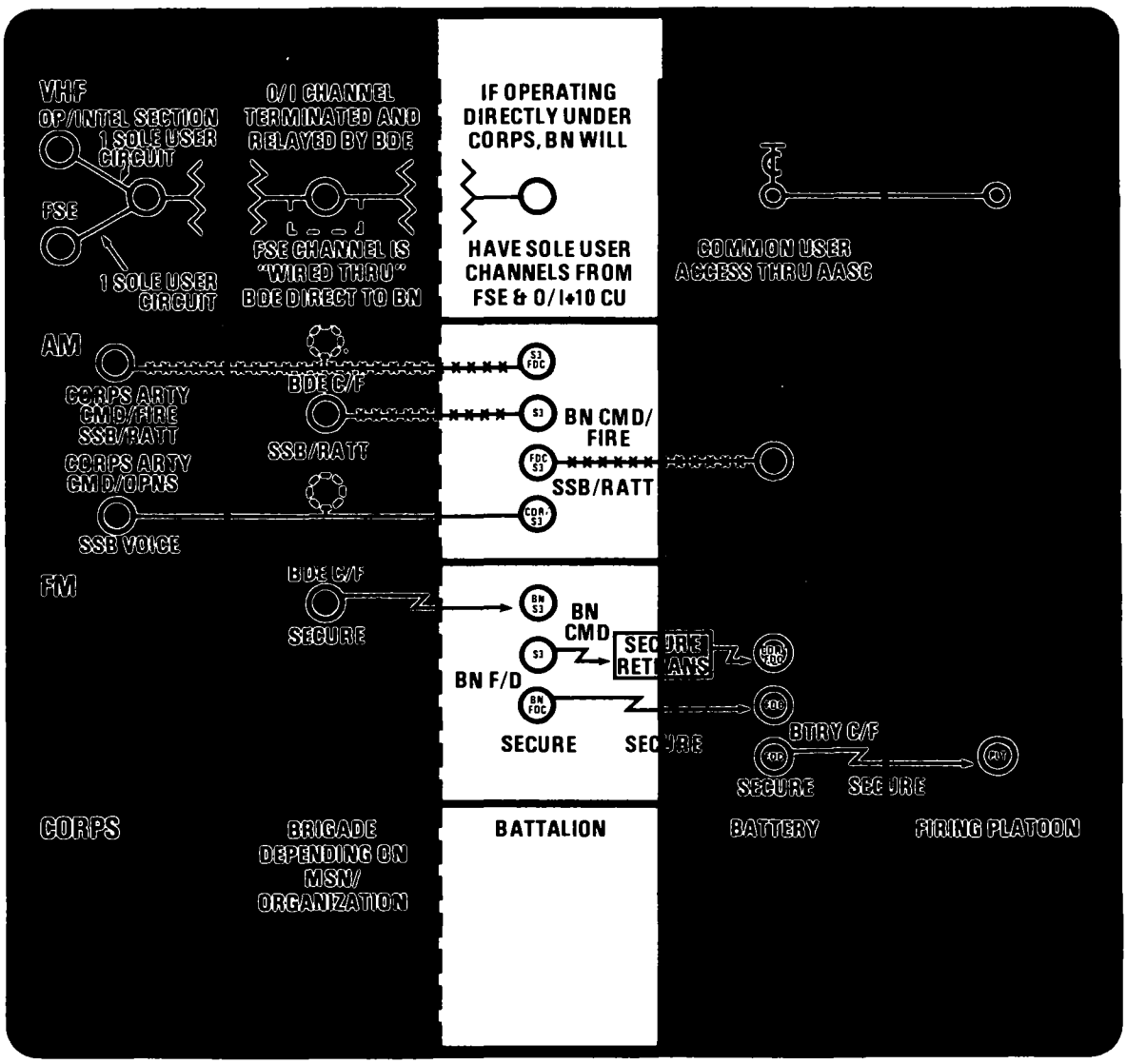
7-6. Liaison

The primary responsibility of the liaison section is to provide timely tactical information to the battalion and to represent the battalion commander at the FSE on all Lance matters of employment to include posture, capabilities, and limitations. The liaison officer must have a good understanding of Lance fire support planning and coordina-

ion satisfy both internal and external radio requirements.

External communications. External communications are those by which a unit maintains communications with its next higher headquarters, adjacent units (as required), and supported or reinforced units for the purpose of receiving data and other information necessary for the unit to accomplish its mission. The battalion's mission will determine the type of external communications required.

LANCE BATTALION COMMUNICATION SCHEME



- External FM nets. If the battalion is GS to corps, external FM communications are not required since the corps FAS does not operate a command/fire (C/F), FM net. This will allow greater flexibility in the use of battalion FM radio assets. However, the battalion commander must be prepared to operate in an *external FM net* in the event of a change of mission. When the Lance battalion is operating under the control of a field artillery brigade or a division artillery, the battalion commander and the battalion operation/FDC section must have the capability to operate in the brigade or div arty command/fire direction net, FM secure.

The battalion reconnaissance and survey officer (RSO) along with survey personnel in the firing batteries operate in an FM survey channel that is common among all surveyors throughout the corps area. This survey channel does not require a secure radio.

- External AM nets. The Lance battalion must maintain separate AM/SSB radioteletypewriter (RATT) capabilities in the command/fire direction net of the battalion's higher headquarters and the C/F net of the reinforced unit, if the battalion is in a GSR or reinforcing role. These nets provide the battalion with operational and intelligence data and fire mission information, along with administrative and logistical data.

When the battalion has a communications responsibility to corps, the organic AM/SSB voice radios will operate between the battalion commander/operations section and the corps field artillery officer on the artillery command operations net.

- VHF, multichannel systems. Each Lance battalion, in accordance with the signal doctrine outlined in FM 11-92, will be furnished a multichannel terminal by the corps radio battalion, which will provide a sole user circuit to the corps FAS, corps FSE, and—if appropriate—an FA brigade. In addition to the sole user circuits this terminal provides, it offers the Lance battalion switched common user telephone service with any unit that lays a wire line into an area or command multichannel terminal, since both the area and command system are fully integrated.

Internal radio nets. The Lance battalion operates three battalion level radio nets along with an integrated wire system where possible. These nets use organic communication equipment and are used to pass administrative, operations, intelligence, and fire mission traffic. Because of the critical nature of some elements of data that may be passed, these nets will be secure to preclude compromising the type of unit.

- Internal FM nets. The battalion command (CMD) net is used for internal command and critical administrative and intelligence needs of the battalion. This net will be established between the battalion commanders, battalion operations/intelligence section, and the battery commanders. Stations in this net will operate secure when possible.

The battalion fire direction (FD) net is composed of the battalion fire direction center (NCS) and the three firing battery FDCs only. All fire missions and fire support coordination requirements will be accomplished on this net. Because of the critical and easily identifiable nature of FDC traffic, this net must be secure.

The service battery commander will be the battalion NCS on a battalion administrative/logistics net. Firing batteries with traffic of this nature will switch to this frequency when required. Ammunition convoys will normally be coordinated on this or another corps designated common user frequency (e.g., NAICP).

- Internal AM net. The Lance battalion will operate on internal AM/SSB radioteletypewriter (RATT) command/fire direction net. This net will be between the battalion headquarters and the firing batteries. This net is used to augment the FM CMD and FD nets and is used to pass bulk traffic primarily. In instances when the batteries and/or battalion are unable to communicate by FM radio due to terrain or distance, this

through its IR signature effect would be reduced considerably in a built-up area because of assimilation into normal emissions. Vehicles and equipment can be readily moved into barns, warehouses, and large buildings thus eliminating the need for camouflage nets or natural cover. The use of wooded terrain is also ideal for occupation by a Lance battalion and provides several important advantages. By using natural materials and the lightweight screening system, the battalion can camouflage itself very effectively. Heavily wooded areas with high overhead make aerial detection of resupply and fire mission movement extremely difficult. Wooded areas also offer excellent locations to conduct fire missions.

Physical security. Physical security is protecting operational information or activity by using security forces (listening posts, observation posts, patrols, guards), barriers (wire, antitank ditches), and anti-intrusion devices (mines, signal flares). These means deny or limit enemy access to facilities, areas, equipment, materiel, documents, and personnel.

Signal security. Signal security protects operational information through the practicing of good communications security (COMSEC) techniques and electronic security (ELSEC) techniques. Operating patterns or procedures that identify the battalion *must be eliminated.* Communication traffic must be kept to a minimum. Use of messengers, wire, and speech security equipment must be emphasized. Additionally, commanders must insure that personnel are properly trained on the use of communication codes, secure voice equipment, and radio telephone operator (RTO) procedures. The use of radio silence and proper positioning of antennas are also important ELSEC measures.

Information security. Information security prevents disclosures of operations through written or verbal communications. To safeguard against unintentional release of data important to the enemy, restrictions are placed on personnel and the release of operational information and documents.

Staff Responsibilities.

Estimating the hostile intelligence threat is done by the S2 once the S3 has stated the mission. The S2 coordinates with the communications-electronics officer, supporting Intelligence and Security Command (INSCOM) elements, and other sources to find answers to two questions: "What are the enemy's intelligence collection capabilities?" and "What are the intelligence collection resources of the enemy commander in our area of operation?" The S2 will try to determine the impact of those capabilities the enemy is using in the immediate area. A few examples are:

- Partisans/guerrilla reconnaissance patrols.
- Civilian espionage agents.
- Radio direction finding units.
- Reconnaissance by all types of airborne platforms.
- Sensoring devices.
- EW forces.

Determining the sensitive aspects of the operation is a joint task of the S3 and S2. They must answer the question: "If known by the enemy, what information in what time frame could compromise the operation?" These items are commonly referred to as essential elements of friendly information (EEFI). A few examples are:

- Survey operations.
- Hide areas.
- Reconnaissance.
- Airmobile operations.

Determining OPSEC vulnerabilities is done by the S3. He coordinates and reviews staff actions necessary to accomplish the mission. He must answer the question: "If known by the enemy, what staff actions in

what time frame could provide EEFI?" A few examples of these staff actions are:

- Increased requests for replacements.
- Special weapons convoys.
- Requests for maps and trig lists of a certain area.
- Publication of movement orders.

7-11. Rear Area Security

The battalion commander must insure that the battalion is integrated into either the corps or division rear area security plan. Direct coordination, where possible, with the agencies involved will assure the highest level of security against a given enemy threat.

Fire Support.

Measures should be taken to insure integration of Lance units into the rear area fire support plan. Artillery support when available should be integrated into the battalion defense plans. Prior coordination can be made with adjacent artillery units to obtain radiofrequencies, weapon characteristics, and unit SOP for calls for fire. In addition to artillery support, coordination can be made with attack helicopter units and forward air controllers for USAF support.

Ground Support.

Adjacent military police, engineer, reserve, or civilian police units can be contacted to provide support in the event of a ground attack or for additional security during displacement and for FSL security.

Air Defense.

Normally, the Lance battalion will be deployed under the protective umbrella of long- and medium-range air defense artillery. Chaparral and Vulcan units may be allocated directly to the battalion by corps for close-in protection of battalion elements against air attack. By siting the battalion in proximity of a Hawk unit (within 5-10 km), the commander also enhances his protection against low- and medium-altitude air attack. Communications are normally established between AD units providing defense to a specific unit and that unit or its elements. Through this link, the battalion will receive warning of an air attack. Often, however, the battalion will have to rely on passive measures and small-arms fire as the primary means of close-in air defense. Specific procedures are discussed in section III of chapter 8.

Section IV. COMBAT SERVICE SUPPORT

Combat service support consists of the total logistical and administrative effort required to maintain the Lance battalion's capability to fight. Involving provision of a *service, an item,* or *technical assistance,* combat service support is a critical element of combat power. Indeed, the ability of the battalion to accomplish its assigned mission will vary directly with the effectiveness of the combat service support system in arming, fueling, fixing, and manning of the weapon systems in the firing batteries. The proper employment of combat service support troops and resources will be vital to success on the battlefield. The Lance battalion commander and his staff officers must know and apply certain key principles in the planning and execution of combat service support. The thrust of combat service

maintenance, the battalion motor officer has direct supervision of the battalion maintenance effort.

Maintenance management in the battalion is facilitated by a constant analysis of the eight critical factors affecting the maintenance effort:

- Personnel
- Time
- Tools
- Repair parts
- Records
- Publications
- Facilities
- Command emphasis

Continued evaluation of these factors as they affect the battalion's maintenance posture serves to identify problem areas and suggest corrective actions. Viewed in the context of the mission and tactical situation, they also enhance the establishment of priorities required by personnel and time limitations.

FM 29-2 is a single-source reference for the battalion commander and his staff on the planning, managing, and evaluating of the organizational maintenance program. The principles, procedures, and techniques contained therein should be the basis for the battalion's maintenance operations, and for a concise SOP that defines the maintenance responsibilities of personnel throughout the battalion.

7-16. Maintenance of Lance-Peculiar Equipment

Lance-peculiar equipment is authorized in only two elements of the battalion—the firing battery and the service battery ammunition platoon.

Organizational Maintenance.
Organizational maintenance is the maintenance normally authorized for, performed by, and the responsibility of the using organization on equipment in its possession. This maintenance consists of cleaning and repair functions within the capabilities of authorized personnel using skills, tools, and test equipment prescribed in appropriate DA tables of organization and equipment (TOE) or tables of distribution (TD). Maintenance not authorized at this level will be reported to the next higher supporting level of maintenance or service. During tactical operations, the normal practice is to remove a faulty missile from the launcher immediately and replace it with a serviceable one, rather than attempt maintenance at the firing position. Unserviceable missile components can be evacuated to the special ammunition supply point (SASP) as a defective class V item.

Maintenance performed by operators and crewmen on missiles or missile-peculiar items such as a firing device or monitor-programmer will be limited to inspection, cleaning, lubrication, replacement of lamps, minor paint touchups, and missile prelaunch checkouts with the monitor-programmer. Operator and crewmen maintenance of common-type items (loader-transporter, launcher, azimuth laying set, sling, and tripod hoist) will be different from that performed on like hardware items currently in the Army inventory. Maintenance of the nickel-cadmium (NICAD) batteries used to power the monitor-programmer will be limited to adding distilled water to the cells and charging the battery from the slave receptacle of the Lance basic vehicles.

The service battery will be responsible for that phase of organizational maintenance in support of the battalion's operators and crewmen. Service battery and firing battery maintenance personnel will guide and instruct operators and crewmen in their performance of organizational maintenance and scheduled maintenance on the battalion's equipment, will handle organization-level parts replacement, and will perform minor repairs and adjustments.

Support Maintenance.

Support maintenance consists of all maintenance functions of direct support (DS) and general support (GS) organizations. Conventional items of the system will be supported by maintenance *equipment* common to today's field army. The principal equipment for support of the missile-peculiar items consists of the AN/TSM-84 test set and the land combat support system (LCSS). Maintenance of nickel-cadmium batteries and retention of spare batteries will be functions of the rocket and missile support detachment. All tools, test equipment, and charging equipment for nickel-cadmium battery maintenance will be allocated to the Lance missile contact team attached to the battalion.

Direct support maintenance. Direct support maintenance is that degree of maintenance normally not authorized to organizational elements but accomplished in immediate support of those elements. Essentially, direct support responsibilities include limited parts supply; in-storage monitoring; and replacing, repairing, exchanging, and returning to the user, after repair, those items that are beyond the maintenance capability of organizational maintenance personnel. Lance battalions will obtain conventional direct support maintenance from the corps support brigade's light maintenance company. Conventional direct support maintenance for common-type end items will be no different from that performed on like hardware items currently in the Army's inventory.

The principal support organization for missile-peculiar equipment (less warheads and warhead sections) is the rocket and missile support detachment. This organization is capable of performing and may be assigned a direct support or general support role. In the direct support role, missile support detachments will provide missile direct support service for Lance artillery battalions and special ammunition supply points (SASP). These detachments are 100-percent mobile and their primary responsibilities are to provide command, control, and overall supervision of maintenance and contact team detachments; provide support maintenance by using the LCSS; provide technical control and supervision of inspection, testing, modification, and repair functions; and provide on-site component repair or replacement.

Lance maintenance contact teams provide on-site checkout and repair or replacement of missile components, missile-peculiar test equipment, and training missiles. These contact teams also provide technical assistance as required by the using units and special ammunition units supporting the Lance missile system. Augmented by class V personnel of the special ammunition companies and using AN/TSM-84 test sets, these teams will perform 6-month in-storage monitoring of all missiles in ammunition supply points and artillery battalions.

General support maintenance. General support maintenance is the support authorized to, and performed by, a designated support organization with specially trained personnel repairing items of equipment for return to local supply stocks. These repairs are accomplished by replacing assemblies, subassemblies, parts, and modules; fabricating parts from bulk material; and repairing end items, assemblies, subassemblies, and modules.

The basic unit for general support of Lance-peculiar electronic items is the rocket and missile support detachment, TOE 9-550. Using the LCSS test set, this detachment will repair all electronic items to the lowest authorized level. This includes replacing subassemblies, modules, cards of the monitor-programmer and the AN/TSM-84 test set, and the subassemblies of the guidance set. The general support missile support detachment team EJ will provide electronic and other missile maintenance support to the area special ammunition general support companies stocking Lance class V material.

The special ammunition general support

8-3. Receipt of Order

The battery commander may receive displacement orders ranging from a five-paragraph operation order to a simple authenticated radio message from higher headquarters. He is given the general location of his new position, the time to depart and/or be in the new position, and the routes to be used.

8-4. Methods of Reconnaissance

Before the battery commander can adequately plan for displacement, he should know the three methods of reconnaissance.

Map reconnaissance. All anticipated moves should begin with a map reconnaissance of the proposed position area and the routes to be traveled. Map reconnaissance is not totally reliable, as terrain features may have changed since the map was printed and true surface conditions cannot be determined. However, a map reconnaissance of tentative routes and proposed position areas should be made before a ground reconnaissance is conducted. Aerial photographs are usually more current and provide more detail of the area than maps.

Air reconnaissance. If the assets are available and the situation permits, an air reconnaissance can be made. The information gained from an air reconnaissance can be useful in the selection of specific route(s) to be used and areas to be occupied. Air reconnaissance is a fast method, but may not be advisable at battery level because true surface conditions may not be distinguishable or may appear distorted. The pilot must be careful that his flight plan does not compromise the route or the new position area.

Ground reconnaissance. A ground reconnaissance is the best method of determining the suitability of routes to be traveled and positions to be occupied. The actual condition of the route(s) to, and the terrain pattern within, the proposed area are seen as they exist. This method, however, is more time consuming than either the map or air reconnaissance.

Each method of reconnaissance offers the battery commander a different but complementary perspective of the best route to the best position. If the situation permits and time is available, all three methods may be used. In most instances, the battery commander performs a map reconnaissance, selects a tentative route, and then conducts a ground reconnaissance.

8-5. Organization of the Reconnaissance Party

Depending on the amount of time available to perform the reconnaissance, either a hasty or deliberate reconnaissance will take place.

A deliberate reconnaissance will be conducted by the battery commander with a minimum number of personnel. The detail platoon leader, depending on his location, will either accompany the battery commander with his vehicle or rendezvous with him at a predetermined location.

A hasty reconnaissance should only be conducted when there is very little lead time from receipt of movement order to the start point time. The hasty reconnaissance party is similar to the deliberate reconnaissance party and includes members of the advanced party (see paragraph 8-8 for a discussion of the advanced party).

8-6. Execution of the Reconnaissance

Prior to departure, the battery commander must give key information to his executive officer (XO) and advanced party personnel to provide continuity if he becomes a casualty. As a minimum, the battery commander should identify:

- The tentative location of the new battery position.
- The time of displacement (SP time).
- The method of march.
- The route of march.
- The location of the release point (RP).
- The location of adjacent units.
- The general enemy situation.
- The mission.

The battery commander should also determine the tentative order of march if not already outlined by unit SOP. He may also designate an alternate route in the event the primary route cannot be used.

After making a map reconnaissance, completing his planning, and briefing necessary personnel, the battery commander is ready to proceed. While moving, he verifies the suitability of the primary route. He also checks cover and concealment, location of obstacles, likely ambush sites (preplan suppresssive fires as required), the distance, and the travel time required.

Upon arrival in the vicinity of the new location, the battery commander should check for a suitable location as outlined in paragraph 8-7 and begin selecting firing points for this position. A minimum of six firing points should be selected forward of the battery position.

Additional firing points may be selected as time allows.

Hide areas will be selected in the immediate vicinity of the firing point. Additionally, a close-in firing point may be selected for use on backup fire missions which, as stated in

- Listing the personnel and equipment to be carried in each vehicle. Equipment should be located to facilitate identification under blackout conditions.
- Conducting practice loadings to test the validity of the loading plan and adjusting the procedures if necessary.
- Establishing a list of the items that must be removed from the vehicle and carried forward if the vehicle becomes disabled during movement.

The unit should habitually load all TOE equipment during training. Equipment that is not essential to job performance or not frequently used should be left unloaded. The more equipment left loaded, the less loading time required and the less likely equipment will be lost during movement. (A place for everything and everything in its place.)

Convoy Control Measures.

The following control measures assist in the movement of the battery.

The start point is normally a geographical feature identifiable on the ground and on a map. The first vehicle of a battery convoy must cross the SP at the specified start time. The battery is responsible for determining the route to the SP and the time it will take to get there. If the battery is displacing as part of a battalion move, the SP is also the point at which control of the marching element is normally assumed by the battalion.

A checkpoint is normally a geographical feature identifiable on the ground and on a map. It is used in reporting progress along the route of march.

The release point is normally a geographical feature identifiable on the ground and on a map. The last vehicle of a battery convoy must cross the RP at the specified time. The battery is responsible for determining the route from the RP to the new position area. If the battery is displacing as part of a battalion move, the RP is also the point at which control of the marching element is regained by the battery. The battery commander may send a vehicle from the advanced party to the release point to lead the battery into the new position area.

Route marking aids in the move. The route marking detail marks the route by posting signs and/or personnel at those critical locations where elements of the march might make a wrong turn. Provisions are made to insure the prompt pickup of the route markers/guides when they are no longer needed. Details concerning traffic control and route marking are presented in FM 55-30 and FM 19-25.

March Discipline.

Officers and noncommissioned officers ride where they can best control and supervise the march of their units. They usually ride where they can control the vehicle driver. The senior person in each vehicle is responsible for insuring that all orders concerning the march are carried out. To supervise the move, commanders and other designated personnel may require their vehicles to pass other vehicles in the column. All other vehicles maintain their positions until otherwise directed or until circumstances dictate otherwise.

The column must keep moving. The unit SOP should indicate who stops to pick up mission-essential personnel and equipment if a vehicle breaks down. In most cases, the driver stays with the vehicle and the maintenance section stops to assist. If the disabled vehicle cannot be repaired in a reasonable time or recovered by the battery, the position and condition of the vehicle are reported to battalion for recovery. The maintenance section must be prepared to proceed along the route of march independently as soon as possible in order to be available to the remainder of the battery. Accordingly, the maintenance section must have a map and must be thoroughly briefed concerning the route of march.

Each vehicle commander is responsible for watching for signs, markers, signals, and other traffic. He is also responsible for

insuring that the driver is alert at all times.

March discipline is attained through training and through internal control within the marching unit. The specific objective of march discipline is to insure intelligent cooperation and effective teamwork by march personnel. Teamwork includes:

- Immediate and effective responses to all signals.
- Prompt relaying of all signals.
- Obedience to traffic regulations and to the instructions of traffic control personnel.
- Use of cover, concealment, camouflage, dispersion, radio listening silence, blackout precautions, smoke, and other protective measures against air, ground, armor, or chemical, biological, and nuclear attack.
- Maintenance of correct speeds, positioning, and intervals between vehicles within the column.
- Ability to recognize route marking signals/signs.
- Use of correct procedures for handling disabled vehicles.

Halts.

During administrative marches, halts are made at regular intervals or at selected sites to rest personnel, to service the vehicles, and to check the loads. Halts are not normally scheduled for tactical marches.

During an extended vehicle march (1 or 2 days) to a battle area, wooded areas and winding roads should be selected as halting places, since they provide concealment and do not present a straight line of vehicles for attack by enemy aircraft. During extended marches, halts should be made where vehicles can be dispersed off the road. Crossroads, railroads, and other identifiable terrain features should be avoided. A column should be halted in an area that provides a 200-meter clear view of approaching traffic at each end of the column.

The March Column Under Indirect Fire.

The immediate action in defense against hostile artillery fires is to move out of the danger area, report the situation to higher headquarters, and request immediate counterfire. If a battery expects hostile artillery fire during the march, it can reduce its vulnerability by:

- Moving by open column or infiltration.
- Moving under the cover of darkness or during other periods of reduced visibility.
- Moving by terrain march.

The March Column Under Air Attack.

When enemy aircraft are observed, the convoy commander may take one of three actions, depending upon the situation. He may order:

- The convoy to continue to march at increased speed.
- Vehicles to stop and move to the shoulders of the road.
- Vehicles to disperse and seek cover and concealment.

Roadblocks.

If the battery is halted by a roadblock, it should use such force as is necessary to clear the roadblock, including preplanned suppressive fires and concentrated fire by available automatic weapons. An attempt to crash through a roadblock with vehicles before it is checked for mines may result in unnecessary loss of equipment and personnel and a complete blocking of the road by disabled vehicles.

Ambush.

There are two types of ambushes—blocked and unblocked. If the route is *blocked,*

Refueling.

Care must be exercised in the manner in which ammunition resupply and refueling are conducted, for they can reveal the location of the battery. If possible, the tasks should be accomplished at night.

Members of the reconnaissance party and advanced party should always be prepared to leave at a moment's notice.

Section II. BATTERY OPERATIONS

Battery operations can be broken down into six functional areas that cover daily routine operations on a sustained basis. These functional areas are concerned with the operations of the battery headquarters, the fire direction center, the assembly and transport platoon, the firing platoon, the survey parties, and the communications section.

8-11. Battery Headquarters

The battery headquarters or CP is controlled by the battery commander and first sergeant. The CP coordinates and requests all of the administrative and logistical requirements of the firing battery.

Administration.
Through periodic personnel status reports outlined in unit SOPs, the first sergeant should report all SIDPERS transactions and personnel actions to battalion S1. Additionally, all class VI requests should be submitted to the S1 for consolidation. Class V small arms ammunition and perimeter defense items such as Claymores, trip flares, etc. should be requested from the battalion S4.

Supply.
Class II and class IV requests are formulated and submitted to the battalion S4. The supply section will issue protective clothing to battery personnel upon receipt of the proper directive. The supply section also maintains unit issue and hand receipt records.

Maintenance.
The battery maintenance section will compile all classes III, VII, and IX requests for submission and maintain all battery automotive equipment and repair parts.

Mess.
The battery mess section will submit class I requests, pick up and prepare rations, and maintain a potable water supply for battery personnel.

Medics.
Medics provided to the battery by battalion will perform emergency first aid procedures when required and request and maintain those class VIII supplies that are authorized.

NBC.
The battery NBC NCO and/or NBC officer will issue and maintain protective masks, decontamination supplies and equipment, and radiological and toxic detection and monitoring equipment. They will be responsible for organizing and training detection and monitoring teams and decontamination squads.

8-12. Fire Direction Center Operations

The battery fire direction center will be organized for 24-hour operations. Personnel should know Lance gunnery procedures given in FM 6-40-4. The battery FDC is

capable of computing and verifying accurate firing data. Verification of this data by an outside source (another battery FDC or battalion FDC) is not a requirement but may be directed in unit SOPs in some cases.

Upon occupation of position, the FDC must establish secure communications with battalion FDC and other FDCs immediately. Simultaneously, an operations check should be made on the FADAC and generators to insure they were not damaged by the move. A restricted area should be established around the FDC as soon as possible. Camouflage nets will be erected.

FDC personnel should be familiar with authentication and release procedures and the "two-man" rule requirements. Procedures for transmitting nuclear release, mating orders, and fire missions, etc. must be established.

Firing point information should be transmitted to battalion FDC as it becomes available. If at all possible, firing point information for a new position should be transmitted prior to departing an old location. Firing point data should also be transmitted to other batteries so that they may assist in fire mission computations if necessary. Firing point data should be transmitted using the fastest and most secure means of communication available (FM secure or AM-SSB/RATT).

Fire missions should be computed, verified, and disseminated to the firing platoons as rapidly as possible. Radio communications will *not* be used to notify the platoon if it is in the battery area and wire lines have been established. The battery commander or his designated representative will assign the firing platoon and firing point if not assigned by battalion. When a battery FADAC is not operational, manual computations should be initiated and a request for computational assistance transmitted to battalion FDC. Hand-held calculators, if available, should be used to assist in speeding up manual computations.

Firing platoon response postures, states of readiness, and mission statuses will be maintained and reported to battalion FDC as changes occur. Prearranged message formats should be established by unit SOP to cut down on radio transmission time.

The battery FDO will keep track of ammunition expenditures and report to battalion FDC as required by SOP.

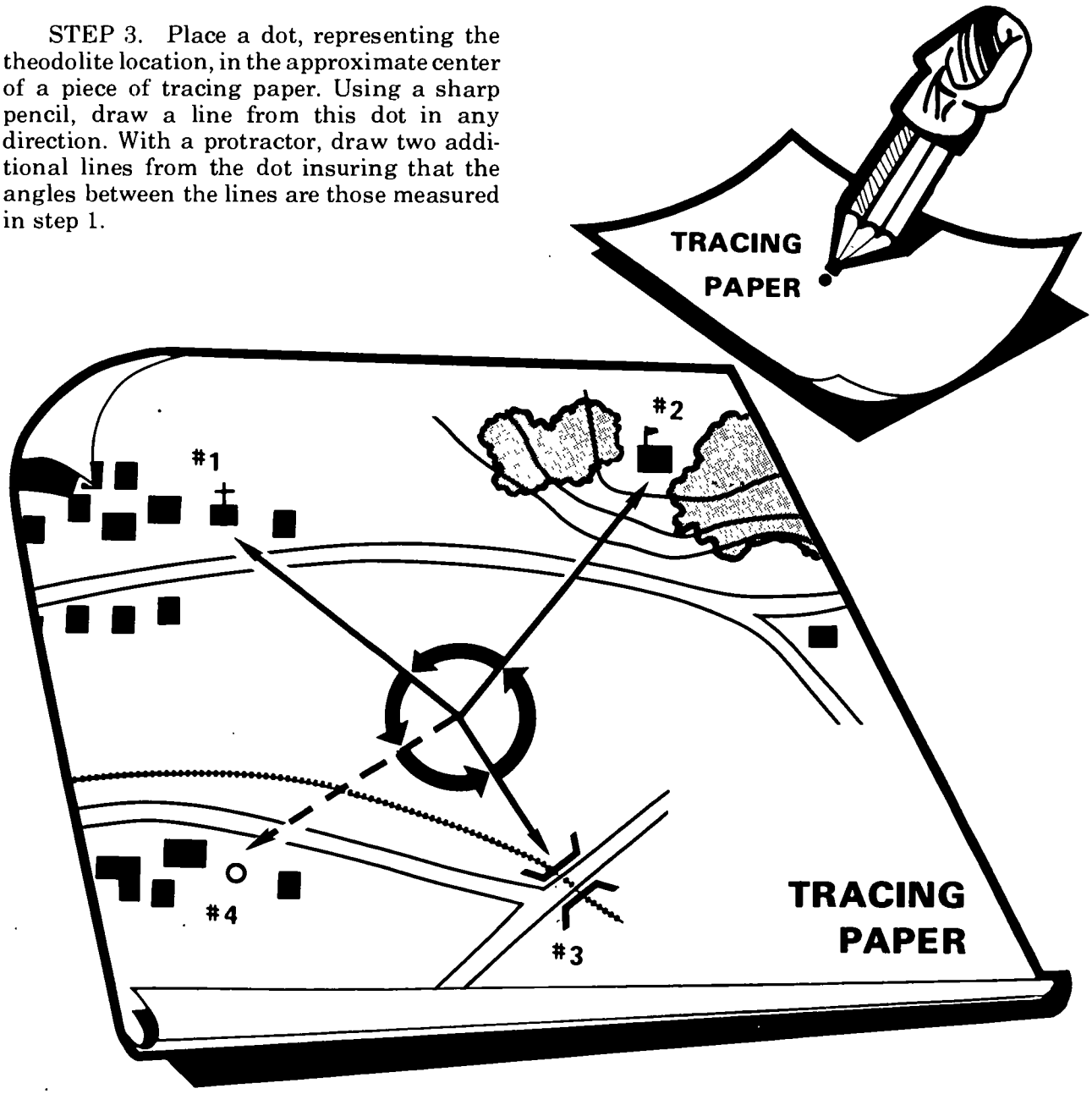
The FDC should maintain a 1:50,000 operation map of the area of operation. Battery positions (present, proposed, alternate), firing points, adjacent friendly forces, and the location of possible or confirmed threat forces (guerrilla, insurgents, etc.) in the local area that may affect the unit should be plotted on this map. In addition, a 1:250,000 situation map should be maintained showing maneuver boundaries, FEBA, and overall friendly and enemy operations. Targets and fallout/contamination prediction or location should be maintained on this map. A horizontal chart may be used to plot targets in relation to firing points, using plotting procedures outlined in FM 6-40, to determine rough azimuth of fire and range to target.

The battery FDC will notify battalion FDC when it begins to march order in preparation for a move. Battalion FDC should at that time divert fire missions to other batteries if possible. The FDC track should be organized so that items of equipment are used where they are march ordered as much as possible to preclude undue loading and unloading times when changing positions. If properly set up, an FDC can be operational almost immediately upon occupation.

8-13. Assembly and Transport Operations

The A&T platoon will maintain a mixture of nuclear and nonnuclear weapons based on the unit's response posture. Nuclear weapons must be properly safeguarded in a field storage location (FSL). Upon receipt of

STEP 3. Place a dot, representing the theodolite location, in the approximate center of a piece of tracing paper. Using a sharp pencil, draw a line from this dot in any direction. With a protractor, draw two additional lines from the dot insuring that the angles between the lines are those measured in step 1.



STEP 4. Place the tracing paper over the chart and position it so that the three penciled rays pass through their respective distant points. The center dot represents the location of the theodolite on the chart.

Note. If tactical or time considerations force extension of survey control from the resected point, the starting point inaccuracy should be kept in mind and conversion to the common grid must be accomplished as soon as possible.

The 0.3-mil azimuth requirement for the orienting line of a Lance firing point can be satisfied using several techniques. Time available to determine azimuth is the critical factor however. Recommended methods of determining azimuths, listed according to priority, are as follows:

1. SIAGL.
2. Astronomic observation (altitude method). Astronomic observations must meet the following specifications to obtain the prescribed accuracy:

- Horizontal and vertical angles. Three sets of observations are made; each set of horizontal angles is measured in one direct and in one reverse position.
- Rejection limits. Azimuths are computed from the three sets of observations. When observations are made from the orienting station, any computed azimuth that disagrees with the mean azimuth by more than plus or minus 0.3 mil is rejected. When observations are made from stations other than the orienting station, any computed azimuth that differs from the mean by more than plus or minus 0.15 mil is rejected. The final azimuth must be determined from at least two usable sets.

3. Simultaneous observation (0.002-mil theodolite). Simultaneous observation of a celestial body by two or more stations allows transfer of directional control from the master station, where control is available, to distant station(s), where it is not. This method requires each station to have a radio and clear observation of the sky. Specific procedures for simultaneous observations are spelled out in FM 6-2, *Field Artillery Survey.*

4. Directional Traverse. If conditions are such that traverse must be used to extend directional control to the launchers, attention must be paid to specific limitations for angular measurements. To achieve the required accuracy at the firing position where the starting azimuth is accurate to within ±0.06 mil, no more than nine station angles can be turned to give the final required 0.3-mil accuracy. All angles must be measured in two positions. When the value of the angle determined from the second position differs by more than 0.025 mil from the value of the mean angle, both angles are voided and remeasured.

8-16. Firing Battery Communications

A Lance firing battery operates in three battalion-controlled radio nets and one battery net. In addition, the battery is responsible for external and internal wire lines to the extent described.

Battalion Command/Fire Direction Net, AM/SSB (Radioteletype).

This is an AM net between the battalion headquarters and the firing batteries. It is used to supplement the FM nets and is used for passing bulk traffic such as reports, firing point lists, etc. Fire mission traffic, if passed on this net, will have priority over all other traffic.

Battalion Command Net, FM Secure.

Stations in this net include the battalion commander and operations section, the battery commanders, and the battery FDCs. This is a battalion controlled net and is used to pass command, operations, and critical administrative traffic. Due to the critical nature of traffic passed on this net, all stations must have a secure capability.

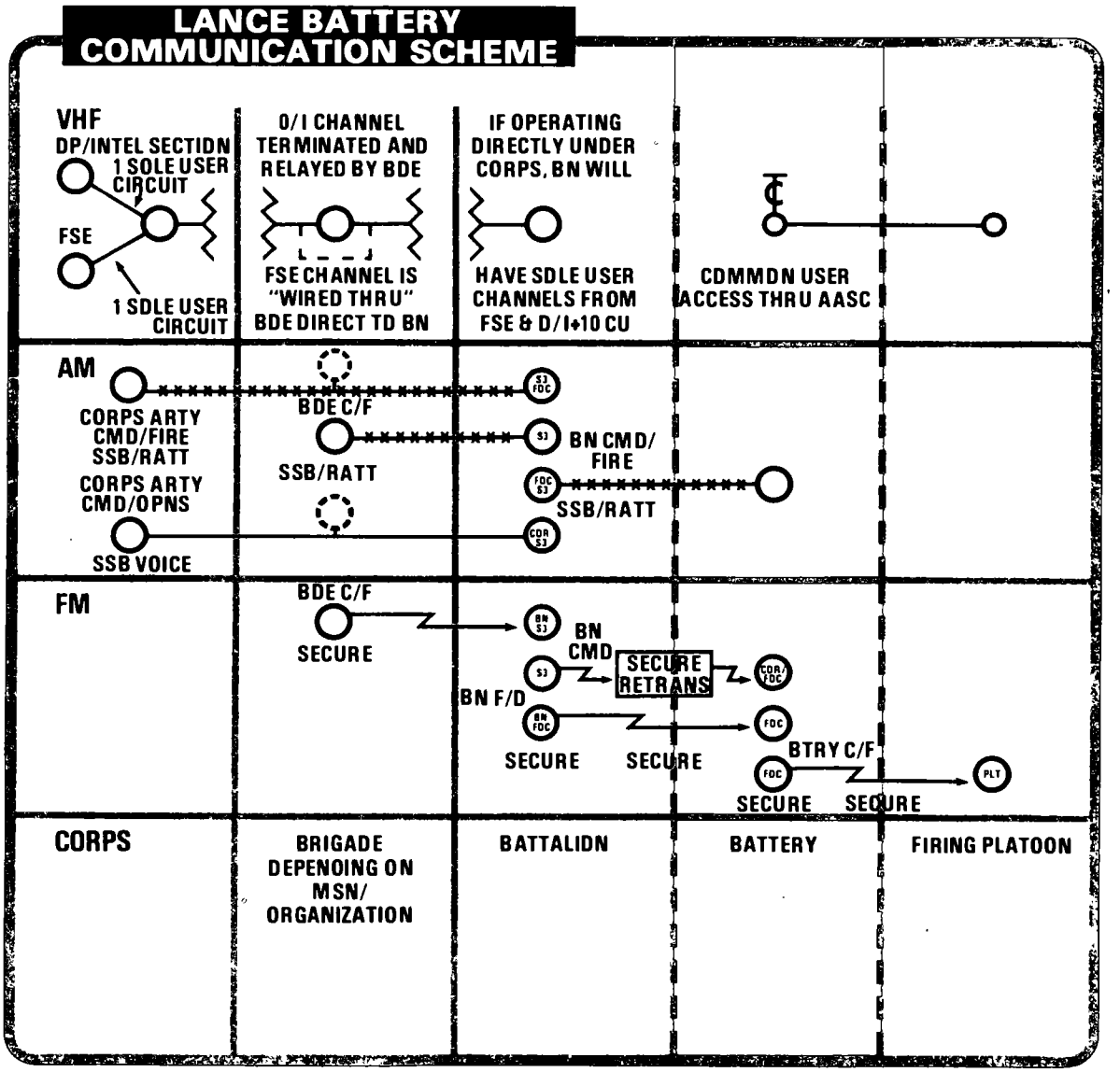
Battalion Fire Direction Net, FM Secure.

This net is used to pass all fire mission data and fire support coordination requirements along with firing point information and target lists not passed on the battalion

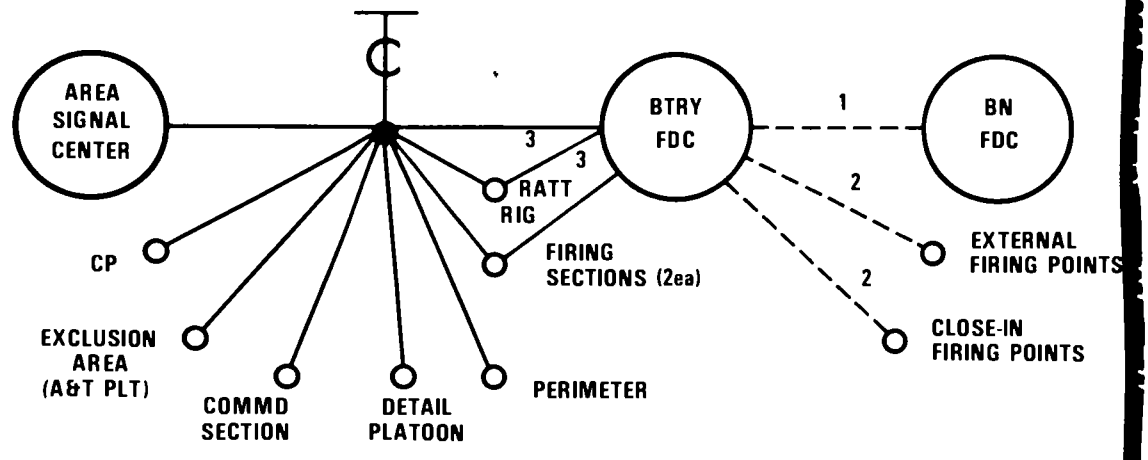
C/F, AM/SSB, or RTT net. Battalion FDC and the three firing battery FDCs are the only stations in this net.

Battery Command/Fire Direction Net, FM.

Each firing battery has its own C/F net to facilitate command and control of various battery elements when they are not in the battery area. This net is also used to transmit fire mission data between the battery FDC and the firing platoon. Because of the characteristic nature of this data, these two stations will be secure. Unsecure stations in the battery C/F net should listen for the characteristic "beep and rush" emitted by secured station radios before transmitting in order to avoid interrupting critical message flow. Net control station (NCS) for this net is the battery FDC.



FIRING BATTERY WIRE DIAGRAM.



Battery Wire Circuits.

The Lance battalion TOE authorizes four wire teams per battalion under control of the battalion communications platoon. Of these four teams, one will be retained at battalion to lay the wire interface from the Lance battalion to the multichannel command terminal, lay an interface line to an area terminal for routing flexibility, and lay required internal wire lines for the headquarters and headquarters battery complex. If service battery is located in a separate position, this team will also tie them into either the HHB switchboard or an area signal center, whichever is closer. The remaining three teams will be used to connect each firing battery into the multichannel system by laying a wire line to the nearest Army area signal center (AASC). Once the batteries have been integrated with the AASC, telephone communications with the battalion and other units through common user circuits can be established with proper routing.

Although telephone communications are less vulnerable to enemy detection than FM, they are not entirely secure because of the possibility of wire intercept. Classified material should be properly safeguarded for transmission in accordance with the tactical situation and COMSEC SOP.

Establishing an internal battery wire net is the responsibility of each individual section upon occupation of position. The battery communications chief or his representative will supervise the installation of battery wire between each section and the battery switchboard. Improvement of the battery wire installation will be accomplished by the wire team once a line with the AASC has been established.

APPENDIX A. REFERENCES

A-1. ARMY REGULATIONS (AR)

11-8	*Principles and Policies of the Army Logistics System*
50-5	*Nuclear Surety*
(C) 50-109	*Safety Rules for the Operation of the Lance Nuclear Weapons System (U)*
350-1	*Army Training*
350-30	*Code of Conduct Training*
350-212	*Military Justice*
350-216	*The Geneva Conventions of 1949 and the Hague Convention #IV of 1907*
350-225	*Survival, Escape, Resistance, and Evasion (SERE) Training*
(C) 380-40	*Department of the Army Policy for Safeguarding COMSEC Information (U)*
(C) 380-51	*Transmission of Official Information (U)*
(C) 380-52	*Cryptosystems and Authentication Systems (U)*
385-62	*Regulations for Firing Guided Missiles and Heavy Rockets for Training, Target Practice, and Combat*
600-200	*Enlisted Personnel Management System*
750-25	*Army Meteorology and Calibration System*

A-2. FIELD MANUALS (FM)

3-12	*Operational Aspects of Radiological Defense*
5-20	*Camouflage*
6-2	*Field Artillery Survey*
6-10	*Field Artillery Communications*
6-15D 1/2	*Soldier's Manual, 15D, Lance Missile Crewman, Skill Levels 1 and 2*
6-15D 3	*Soldier's Manual, 15D, Lance Missile Crewman, Skill Level 3*
6-15D 4	*Soldier's Manual, 15D, Lance Missile Crewman, Skill Level 4*
6-15D CM	*Commander's Manual, 15D, Lance Missile Crewman*
6-15J 1/2	*Soldier's Manual, 15J, Lance FD/OPS Specialist, Skill Levels 1 and 2*
6-15J 3	*Soldier's Manual, 15J, Lance FD/OPS Specialist, Skill Level 3*
6-15J 4	*Soldier's Manual, 15J, Lance FD/OPS Specialist, Skill Level 4*
6-15J CM	*Commander's Manual, 15J, Lance FD/OPS Specialist*

6-20	*Fire Support in Combined Arms Operations*
6-21	*The Field Artillery Cannon Battalion**
6-22	*Division Artillery, the Field Artillery Brigade, and the Field Artillery Section (Corps)**
6-40	*Field Artillery Cannon Gunnery*
(C) 6-40-4	*Field Artillery Lance Missile Gunnery (U)*
(C) 6-42-1	*The Field Artillery Battalion, Lance: Classified Supplement (U)*
6-50	*The Field Artillery Cannon Battery*
6-141-1	*Field Artillery Target Analysis and Weapons Employment: Nonnuclear*
(C) 6-141-2	*Field Artillery Target Analysis and Weapons Employment: Nonnuclear (U)*
9-6	*Ammunition Service in the Theater of Operations*
11-50	*Combat Communications Within the Division (How to Fight)*
11-92	*Combat Communications Within the Corps (How to Fight)*
19-25	*Military Police Traffic Operations*
19-30	*Physical Security*
20-32	*Mine/Countermine Operations at Company Level*
21-6	*How to Prepare and Conduct Military Training*
21-30	*Military Symbols*
21-40	*NBC (Nuclear, Biological and Chemical) Defense*
21-41	*Individual NBC Defense*
21-48	*Planning and Conducting Chemical, Biological, Radiological (CBR), and Nuclear Defense Training*
24-1	*Combat Communications*
29-2	*Organizational Maintenance Management*
30-40	*Handbook on Soviet Ground Forces*
30-102	*Opposing Forces (OPFOR), Europe*
31-35	*Jungle Operations (TBP as FM 90-5)*
31-50	*Combat in Fortified and Built-up Areas (TBP as FM 90-10)*
31-71	*Northern Operations (TBP as FM 90-11)*
31-72	*Mountain Operations (TBP as FM 90-6)*
32-6	*SIGSEC Techniques*

*To be published

38-24	*Classes of Supply*
54-2	*The Division Support Command and Separate Brigade Support Battalion*
54-9	*The Corps Support Command. Part One: Support of the Corps*
54-10	*Logistics*
55-10	*Army Movement Management Units and Procedures*
55-12	*Movement of Army Units and Air Force Aircraft*
55-15	*Transportation Reference Data*
55-30	*Army Motor Transport Operations*
55-31	*Army Motor Transport Units*
57-1	*US Army/US Air Force Doctrine for Airborne Operations*
57-35	*Airmobile Operations*
61-100	*The Division*
90-3	*Desert Operations*
100-5	*Operations*
100-50	*Nuclear Unit Operations in Combat*
101-10-1	*Staff Officers' Field Manual, Organizational, Technical, and Logistical Data, Unclassified Data*
(S) 101-31-2	*Staff Officers' Field Manual: Nuclear Weapons Employment Effects Data (U)*

A-3. TECHNICAL MANUALS (TM)

9-1115-485-12	*Nuclear Warhead Section M234 (Tactical) and M240 (Training)*
9-1336-489-12&P	*Nonnuclear Lance Warhead Section M251 (Tactical) and M201 (Training)*
(C) 9-1425-485-10-1	*Lance Missile System Description (U)*
9-1425-485-10-2	*Operators Manual, Lance Guided Missile System*
38-750	*The Army Maintenance Management System*
(C) 39-50-8	*Emergency Destruct of Nuclear Weapons (U)*
55-1425-485-15-1	*Transportability Guidance for the Lance Missile System in US Army Helicopters*

A-4. TRAINING CIRCULARS (TC)

6-4-2	*The Threat: Organization, Tactics, and Equipment*
6-10-1	*Field Artillery Communications*

21-5-7	*Training Management in the Battalions*
100-1	*Operations Security (OPSEC)*
101-5	*Control and Coordination of Division Operations*

A-5. MISCELLANEOUS PUBLICATIONS

ARTEP 6-595	*Army Training and Evaluation Program: The Lance Field Artillery Battalion, Lance*
TOE 06-595H4	*Table of Organization and Equipment: Field Artillery Battalion, Lance*
(C) FTR LANCE A-1	*Firing Table for Warhead Section Atomic M234 and Warhead Section, GM, Practice: Lightweight, M252 (U)*
(C) FTR LANCE B-1	*Firing Table for Warhead Section, GM, HE: M251, and WHS, Practice: M198 (U)*
(C) FTR-ADD-A-1	*Firing Table Addendum to FTR LANCE B-1 for Warhead Section GM, HE: M251 (U)*

DEPARTMENT OF THE ARMY
US Army AG Publ Center
2800 Eastern Blvd.
Baltimore, Maryland 21220
OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

POSTAGE AND FEES PAID
DEPARTMENT OF THE ARMY
DOD-314
SPECIAL FOURTH
CLASS BOOK RATE

ARMY LIBRARY 0893
ATTN ANRAL-RS
PENTAGON
WASHINGTON DC 20310

DA PUBLICATION/FORM NUMBER			RQN DATE
PUB FM 6 42			
LOCATION	QUANTITY	SPECIAL ACTION	LINE NO
	2	INIT. DIST.	

BAGPC CONTROL NO
8277-00221

TAGO FORM 4-26 9 OCT 75