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Employment of Army Aviation Units in a High Threat Environment

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"Until recently, helicopters played a secondary role on the battlefield. They were employed for providing various types of support for the ground forces. However, the situation at the present time, as borne out by the foreign press, is quite different. The need for effective air operations in destroying mobile and small targets, particularly tanks, has revived interest in helicopters. . .

"The air defense methods to be employed against helicopters will depend upon the nature of the actions carried out by the latter, the number of antiaircraft subunits and also upon their fire potential. . .

"In view of the fact that the helicopters will rarely be used at middle altitudes, the antiaircraft gunners must master the art of destroying targets flying at altitudes of just several meters above the ground. Here a considerable amount of importance is attached to anticipating the course to be followed by the helicopters and the targets of their strikes. If it is determined that the deployment of the antiaircraft subunits is not in keeping with the interests of air defense, then the deployment should be changed to insure that the helicopters will appear within the range of effective fire of the PVO (air defense) weapons. . . ."

V. Gatsolayev
Lieutenant General of Artillery
Soviet Army

"Extracted from *Military Herald*, No. 11, 1973, pp 65-70"

EMPLOYMENT OF ARMY AVIATION UNITS IN A HIGH THREAT ENVIRONMENT

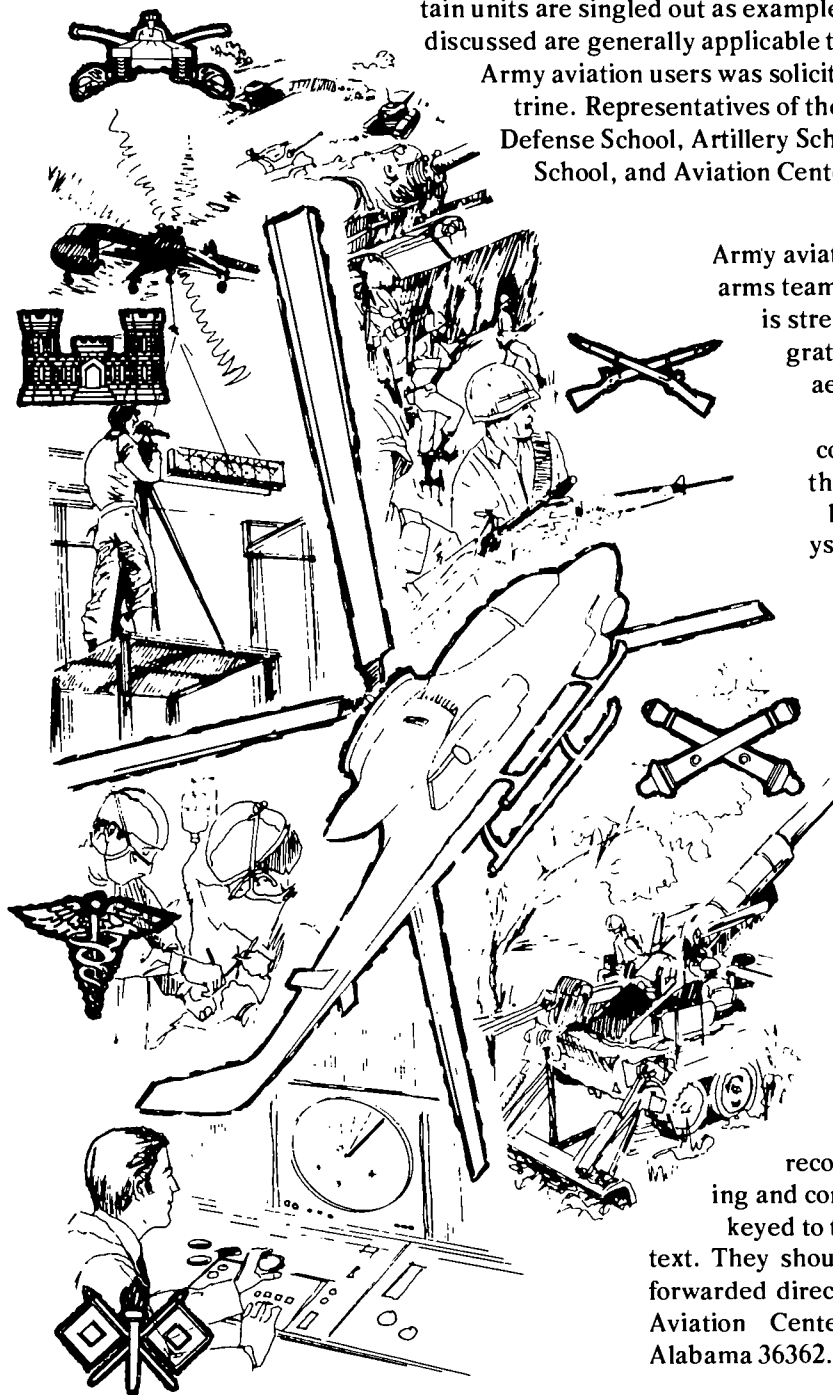
INTRODUCTION

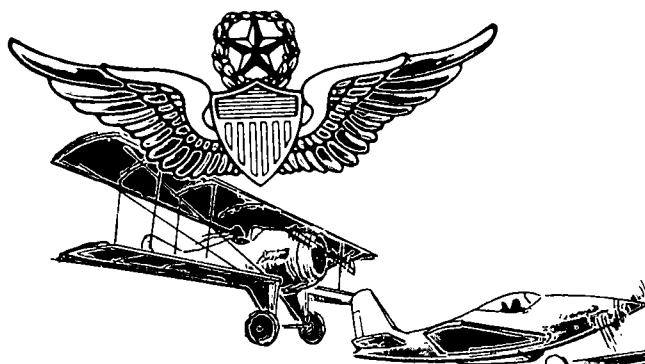
As its title indicates, this manual is intended to describe how Army aviation units can make a major contribution to land combat in the high threat environment. In addition, it is designed to provide a broad doctrinal foundation for future publications which will be specifically oriented toward employment of type aviation units, operating as branch proponent elements. Even though certain units are singled out as examples, the concepts, tactics, and techniques discussed are generally applicable to all aviation units. The assistance of all Army aviation users was solicited to insure the applicability of our doctrine. Representatives of the United States Army Armor School, Air Defense School, Artillery School, Transportation School, Intelligence School, and Aviation Center wrote this manual.

Army aviation units are a member of the combined arms team, therefore combined arms employment is stressed throughout this manual. Total integration of the broad spectrum of ground and aerial capabilities provides commanders a wide variety of tactical alternatives. The complexity of future battlefields indicates that multiple solutions to demanding challenges will be required. In the final analysis the unique advantages aviation provides as part of the combined arms combination may well be the key to success.

This manual is unclassified, therefore threat information contained in this publication is in some instances general, imprecise, and incomplete to promote use at unit level. Where detailed, precise planning is required, authoritative threat sources should be consulted.

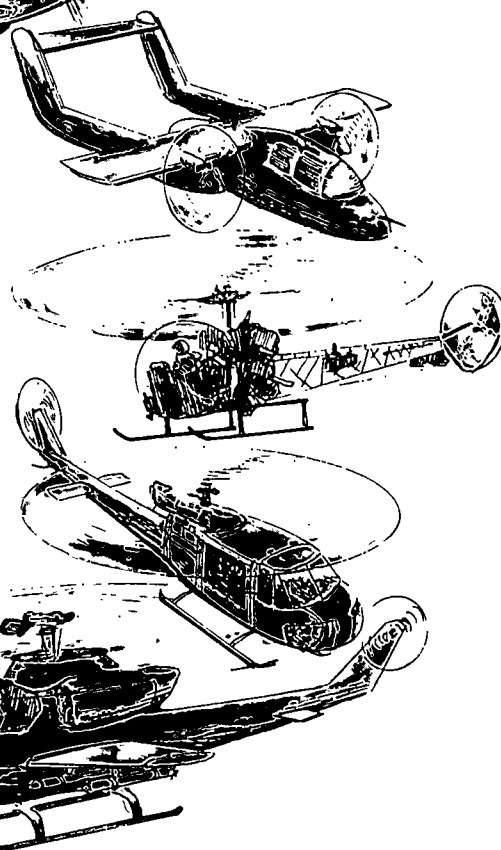
Readers are encouraged to submit recommended changes and comments to improve the publication. Reasons as well as a *substitute statement or paragraph* should be provided for each recommended change to insure understanding and complete evaluation. Comments should be keyed to the specific page, paragraph, and line of text. They should be submitted on DA Form 2028 and forwarded directly to Commander, United States Army Aviation Center, ATTN: ATZQ-TD, Fort Rucker, Alabama 36362.





Purpose and Aviation Objectives

In the future, Army aviation units will fight as part of the combined arms team in a high threat environment. While much has been written and said concerning how we will fight the next war, this is the foundational doctrinal document that sets forth concepts of employment for Army aviation units against a sophisticated enemy who will confront us with highly advanced air defense and electronic warfare threats. Materiel developments have outpaced doctrine, and the firepower and mobility of the Cobra TOW, aerial scout, and the troop carrying helicopter have not been doctrinally exploited when marshaled against this type of enemy.



This manual has been written with a dual purpose in mind.

First, to provide basic concepts that will help the commander to get the most out of his aviation assets as he performs the functions of land combat in the high threat environment.

Second, to inform everyone associated with Army aviation units about the threat as well as providing concepts, techniques, and procedures for combating the threat while achieving Army aviation unit objectives.

ARMY AVIATION OBJECTIVES

- 1st** To augment the capability of the Army to conduct prompt and sustained land combat.
- 2nd** To provide the commander with the mobility, firepower, and staying power needed to win the first battle.
- 3rd** As a member of the combined arms team, to win while outnumbered.

Historical Perspective

Historically, man has attempted to enhance his combat effectiveness and to achieve tactical advantage over his adversaries through innovations in equipment or imaginative tactics. History indicates his success in these efforts. Such innovations as the spear, lance, stirrup, long bow, machine gun, tank, and airplane have all contributed to the furtherance of ground combat. Likewise, great military leaders such as Alexander, Hannibal, Napoleon, Patton, and MacArthur had the unique ability to take the resources available and use them to gain tactical superiority. We continue this same effort today.

In the early 1950's, the Korean War provided the first combat proving ground for United States Army helicopter units. The impressive lifesaving record of the medical evacuation helicopters, as they rescued wounded from among the grueling Korean ridgelines, bolstered the morale of the footsoldier and earned for the OH-13 its nickname of "Korean Angel." The untapped potential of the helicopter was ready to unfold.

With the introduction of the cargo and the utility type helicopters after the Korean War, the United States Army planners developed doctrine and techniques to employ increasingly more capable fixed- and rotary-wing aircraft as part of the ground commander's plan of fire and maneuver. Specially formed aviation units were equipped, manned, and tested for mid-intensity combat. Aviation training was focused on mid-intensity combat as it was then visualized. The term "nap-of-the-earth flight" was coined; however, in the combat subsequently encountered, the enemy's air defense capability did not force us to practice that tactic.

Our early experience in Vietnam allowed us to temporarily lay aside some of our newly evaluated aviation doctrine in favor of techniques that were more suitable against an unsophisticated enemy. Our biggest threat was from enemy small arms and automatic weapons. Flights at altitudes slightly above the effective range of small arms fire eased this threat.

However, the picture changed toward the end of our involvement in that conflict. Two historical examples of airmobile warfare in a high threat environment came from the Vietnam War. The Cambodian Operation 29 April—30 June 1970, when United States and South Vietnam forces made a division size airmobile assault into Cambodia, was the first example contributing to our experience. Lifting four airmobile infantry battalions into Cambodia combined with an armor task force linkup, the assault proved to be an outstanding success. Tactics were employed that might be employed today in Europe or the Middle East. Formations of helicopters at the treetops or in folds of the ground followed routes carefully coordinated to take maximum advantage of terrain and the enemy situation. Available firepower was used to suppress known and suspected enemy antiaircraft weapons en route. Firepower included all means organic to the division as well as supporting tube and aerial rocket artillery. Close air support, including B52 bombers dropped high explosives within 1,000 meters of friendly troops. The known enemy situation presented a grim picture and large numbers of antiaircraft weapons were anticipated. Enemy troops were dug into well-prepared permanently constructed fortifications. U.S. forces simply smothered enemy resistance by employing all aspects of airmobility, in one of the most successful operations of the Vietnam War.

The second exposure to a high threat environment was an assault into Laos by United States and South Vietnam elements in the spring of 1971 called Lam Son 719. The operational area, home territory for the North Vietnamese Army (NVA), was a long occupied, extensively developed, heavily defended base area, staging area, and communications and transportation center. NVA forces opposed Allied air and airmobile operations with heavy antiaircraft fire from an extensive, well-camouflaged, and sophisticated air defense system. They were equipped with a wide variety of modern antiaircraft weapons ably supported by fires from infantry weapons. The threat, which did not include enemy aircraft or electronic warfare, consisted of 12.7mm and 14.5mm machine guns

and 23mm, 37mm, and 57mm antiaircraft weapons with the mobile 12.7mm guns employed in multiple and mutual support positions. In addition, Lam Son 719 was a combined action conducted under unique circumstances. The operation penetrated an international boundary which sharply and significantly defined roles of the two participating parties. The Republic of Vietnam (RVN) provided and commanded the ground forces, while the United States provided and commanded the aviation and airmobile assets and the bulk of the supporting firepower. Normal U.S. ground fire support did not accompany the Vietnamese across the Laotian border.

The helicopter proved remarkably rugged and survivable in the hostile air defense environment of Lam Son 719 and aided the RVN ground commander in the accomplishment of his mission. The enemy was thrown into consternation, his supplies were disrupted, and his troops had to be redispersed in anticipation of other similar operations. Later when South Vietnamese forces withdrew from Laos, helicopters were used extensively to shore up a deteriorating South Vietnamese ground situation.

For every 1,000 sorties during Lam Son 719, the helicopter loss rate was only one-quarter of one helicopter.

In the North Vietnamese offensive of 1972, air defense weapons became more sophisticated, with surface-to-air missiles playing an increasingly important role. However, United States involvement in the war ended before this particular threat became widespread. Nevertheless, the aviation units that operated where these weapons were employed quickly saw the need to develop techniques and procedures to defeat the threat. For example, the technique of terrain flying soon became standing operating procedure for operations in the vicinity of this threat.

In October 1973, a short intense war in the Middle East demonstrated a formidable air defense threat that emphatically confirmed the terrain flying doctrine development in Vietnam. Even though neither side used the helicopter

extensively, this war provided a vivid picture of the sophisticated threat weapon environment within which Army aircraft can expect to operate in the future. Highly sophisticated equipment was used in vast quantities with emphasis on antiaircraft and antiarmor weapons. The Egyptian and Syrian forces were equipped for night and chemical operations, and while they did not fully exploit these capabilities, the threat was there. Further, they demonstrated significant electronic warfare capabilities.

Israeli training more than paid for itself. Even though both sides had fine equipment, the better trained Israeli soldiers held an edge. Once the numerically inferior Israeli forces were fully mobilized and committed, their well-trained personnel and combined arms tactics paid off handsomely. The Middle East War of 1973 was an example in which one side sought completely to deny the airspace over the battlefield to the other side.

The United States currently has a favorable international advantage in the field of combat airmobility and aerial firepower. In order to retain this advantage, we cannot allow tactical doctrine for Army aircraft to suffer the same fate as tank doctrine following World War I. The tank in 1917 offered promise of freeing the battlefield from the confines of trench warfare and restoring movement to land battle. The United States, United Kingdom, and France emerged from this war the most knowledgeable and experienced in tank operations, yet in subsequent years the Western Powers resorted to fixed defenses such as the Maginot Line. Germany capitalized on use of tanks and mechanized carriers through new doctrine and developments. As a result, an astonished world watched the German Army in 1939 exploit its new means of tactical mobility and firepower as it raced across Poland.

Similarly, we must capitalize on what we have learned about firepower, mobility, and the air defense threat from the Vietnam War and the 1973 Middle East War.

Doctrine, Technology, Threat, and Training

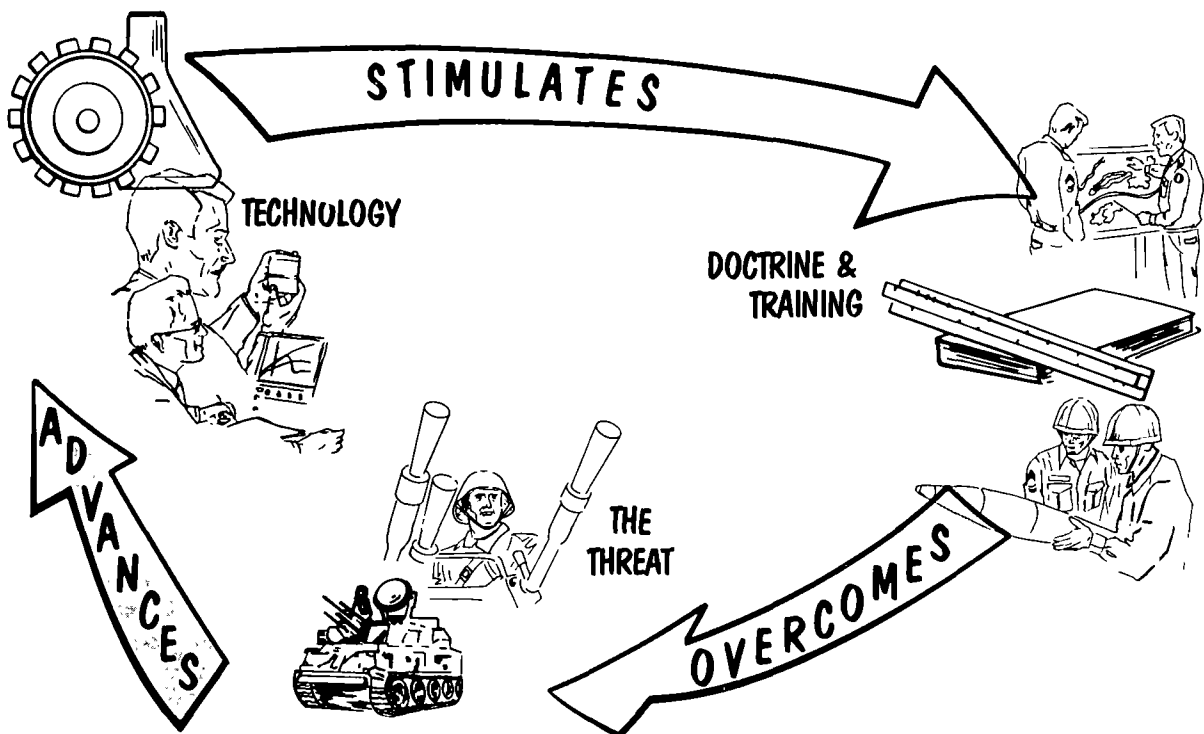
In the force structure of military forces, the interplay of **doctrine** and **technology** has "the chicken and the egg" aspect. Frequently the product of technology stimulates the doctrinal planners to field military forces with substantially increased combat capability. On other occasions the inventiveness of the planner presses the engineer and scientist to produce technological innovations.

In the case of Army aviation the doctrinal planner utilized available fixed-wing technology and applied the philosophy of decentralization to put the first light observation aircraft into the force structure. In fact, the Piper Cubs of World War II were off-the-shelf commercial aircraft. Nonetheless, the doctrine for their employment greatly increased the capability of the artilleryman to put fire on the enemy. Even though light fixed-wing aircraft were utilized in a number of different roles such as improvised medical evacuation, command and control, and wire laying, they did

not have the technical capability to perform airmobile air assault operations.

At this point in time, technology stepped in to improve the capability of Army aircraft to perform land combat tasks. The helicopter provided an aircraft much better suited to most Army frontline battlefield tasks. In fact, by the early 1960's rotary wing technology gave the ground commander a capability to perform all five functions of land combat. The helicopter could not only maneuver and deliver firepower, plus the other supportive tasks of command and control, reconnaissance, and logistics, but it could also live and operate in a frontline environment. Furthermore, it could also be assigned to battalion and company level in cases where the commander had a full-time need for it.

In Vietnam, and not without considerable initial scepticism as to its ability to survive in the jungle environment, the helicopter became central to most major ground combat actions and was used extensively by all frontline unit commanders.



However, doctrine and technology alone are not the sole determinants in force structuring. Both are influenced to a major degree by the threat. While the threat in Vietnam changed and grew more severe, particularly in the last year of the war when sophisticated air defenses affected helicopter operations, the forces in the field adjusted accordingly. The ground forces were still effectively supported by helicopters in accomplishing their missions.

Following the termination of United States involvement in Vietnam combat, a major reorientation has taken place to prepare Army aircraft to survive and fight effectively against potential enemies posing a more significant threat than was found in the last days of Vietnam. This type of threat would be found in Europe, the Middle East, or anywhere else that firstline defensive and offensive military hardware might be deployed. The 1973 Middle East War provides a baseline in sophisticated equipment against which the capabilities of Army aviation assets can be measured. Middle East combatants employed large numbers of armored vehicles together with a complete family of modern air defense weapons and tactical fighter aircraft. Electronic warfare and weapons were employed with effective results. While they were not extensively used, night vision devices were a part of Egyptian and Syrian equipment indicating that future battles undoubtedly will be fought on an around-the-clock basis.

In the face of a threat this severe, we must add a fourth major factor to the doctrine—technology—threat equation. This factor is training. Given modern sophisticated equipment, appropriate doctrine and tactics, and an appreciation of the threat, the commander must train his forces to get the most combat capability out of his equipment and personnel. He must recognize that military history is based on the contest between firepower and mobility—to put it another way, on the contest between lethality and survivability.

Although the Middle East battlefield was extremely lethal, neither side employed sufficient helicopters for us to draw valid conclusions as to their survivability. However, extensive field tests and evaluations conducted by the Army clearly indicate that the helicopter can make a significant contribution on the high threat battlefield. When suitably integrated into the traditional Army combined arms team, the Cobra attack helicopter fitted with the highly accurate and reliable tube-launched, optically tracked, wire-guided (TOW) missile provides the commander a capability of defeating most frontline armor and antiaircraft weapons. However, *the helicopter crewmen must utilize the protection afforded by terrain and vegetation and minimize their exposure to enemy weapons.*

The five-member Army helicopter family is ideally suited and equipped not only to kill enemy point targets for the ground forces, but to carry the combat formations into enemy territory with efficiency and dispatch. Envelopment of enemy forces through use of terrain flight techniques can provide for early exploitation and pursuit without the bruising head-on contact normally associated with penetration operations. However, no operation such as this will be feasible unless it is planned in detail and carefully integrated with all other combat elements available on the battlefield.

If this type of operation is to be carried out, *Army aviation elements must be trained with the ground forces to operate around-the-clock, to include training in adverse weather conditions so that the staying power of aviation units is increased.* We can possess this capability only through extensive training in low-level night flight, tactical instrument flight, and operation in severe electronic warfare environments. Training to deliberately enhance the staying power of the Army aircraft and aviator will provide the ground commander a substantial advantage over an enemy armed for the high threat battlefield.

Firepower and Mobility

Throughout the history of warfare, the side enjoying the edge in firepower and mobility—the ones who got there “fustest with the mostest”—usually have emerged victorious on the battlefield.

The Vietnam War was to see the first significant increase in battlefield mobility and firepower since World War II—troop-carrying and armed helicopters. In Vietnam, during 11 years of war, the validity of the concept of airmobility was proven as the helicopter became the key to most combat actions. The troop-carrying assault helicopter freed the ground commander from the tyranny of terrain that had restricted his activities since the beginning of warfare. Not only did the helicopter give this long-sought freedom, but its armed configuration protected the aircraft carrying the infantry into a hostile area, suppressed the enemy, and became an airborne extension of ground fire as the commander availed himself of its considerable firepower and complete mobility.

The closing days of the war saw the introduction of a new dimension in firepower—the helicopter-borne antitank guided missile system. While not employed in numbers, this antitank weapon system, which exceeded the tank in mobility, achieved firepower victories in a light air defense environment and demonstrated a highly significant potential for land combat heralding innovative concepts for combined arms operations.

At the present, **the Army stands on the threshold of a new era in firepower and mobility resulting from the antitank guided missile on the attack helicopter.** When we consider the 1973 Middle East War in which armor weapons proliferated, an exciting combat capability emerges. Again, as in the beginning stages of Vietnam but against a more sophisticated threat, the question of survivability begins to arise. The helicopter, although not employed in great numbers, did survive and more could have been used. If a combined arms commander had a weapon of unrestrained mobility such as the Cobra TOW to destroy armor, he could move

these weapons from one point of decision to another, massing his fires and achieving real battlefield impact. Employed in a brigade-sized force, it is conceivable under certain circumstances that the Cobra TOW, as an integral member of the combined arms team, could assist breakthrough or circumnavigate the front and exploit the enemy's rear areas, destroying reserve logistics and headquarters, much in the same manner as massed armor did in World War II and the Middle East. Likewise, the commander could use the air cavalry units to patrol wide areas and to suppress antiaircraft, antitank, and antipersonnel weapons. Properly employed, the Cobra TOW could keep the enemy off balance, attrite his forces, and dry up his sustaining ability. An enemy force cannot continue to hold terrain if it cannot be resupplied and reinforced.

When the ground commander has a utility tactical support helicopter that can lift his infantry squad with their weapons even at high density altitudes, his assaults will retain their tactical integrity regardless of outside air temperature. In short, he will be almost as effective on a hot summer day at Fort Carson as in the winter at Fort Richardson. Not only will the helicopter free the commander from terrain obstacles but also from the domination of climate. For the first time, his squad-carrying *assault helicopter* will be *capable of lifting its design payload of 11 troops and three crewmembers from a landing zone 4,000 feet above sea level when the temperature is a hot 95° F.* This payload capability is available at sea level at even higher temperatures. With this helicopter, insufficient power and reduced payloads resulting from high density altitudes will no longer plague the aviator and shortchange the ground commander.

After new utility aircraft begin to replace current lift ships in assault companies and air cavalry troops, the advanced attack helicopter will be made available with a full suit of weapons, aircraft survivability equipment, and night vision equipment. This weapon system will increase the ground commander's firepower beyond that provided by the Cobra TOW.



Summary

In summary, the objectives of Army aviation units are: (1) to augment the Army's capability to conduct prompt and sustained land combat; (2) to provide the ground commander with the mobility, firepower, and staying power needed to win the first battle; and (3) to help the ground forces win while outnumbered. Historically, amid skepticism about survivability, helicopters have worked well even when the war verged on a high threat environment. The helicopter not only survived but succeeded in accomplishing combined arms force missions. Now that we have developed the doctrine and assuming that we have the equipment developed, are aware of the threat, and are properly trained, helicopters will provide greater capabilities to the ground commander on future battlefields. **As with every other weapon system, the helicopter has a place and a role to play in the major combat elements of the Army as long as it is used properly.** Like the infantryman who is vulnerable to the antitank guided missile, like the airplane which is vulnerable to the surface-to-air missile, the helicopter can operate as long as it is operated in accordance with tactically sound concepts within the framework of the combined arms team.

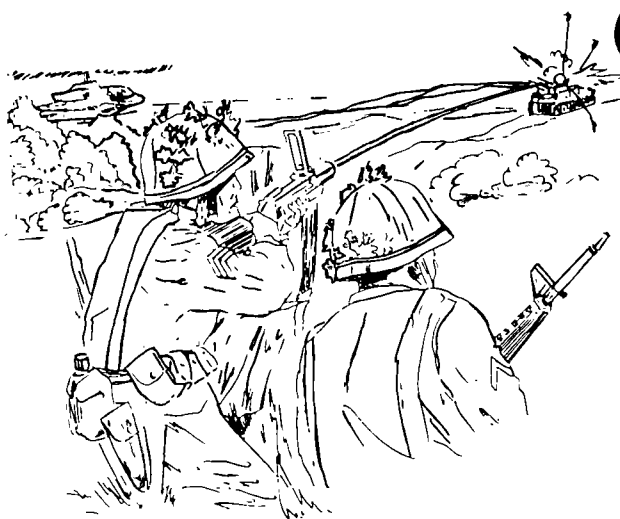
The October 1973 Middle East War confirmed what the Vietnam War taught us about air defense. During the October conflict, mobile antiaircraft weapons as well as armor weapons proliferated in the Soviet-equipped and Soviet-advised Egyptian and Syrian armies. Their antiair and antitank capabilities were designed to counter the tactical air/tank team which had served the Israeli Army so well in the 1967 Six-Day War. Now it is our turn to develop "counter-countermeasures" so that we can survive in a highly advanced threat environment and suppress the enemy's antiaircraft and electronic warfare weapons. Solving this problem is a prerequisite to the successful employment of aviation units on the battlefield and achievement of its objectives. **This is the reason for this manual.**

Before we look at the concepts of employment and the training required for successful employment of aviation units on high threat battlefields, let us examine the high threat environment that is going to influence those concepts and training requirements.

To augment the capability of the Army to conduct prompt and sustained land combat.

To provide the commander with the mobility, firepower, and staying power needed to win the first battle.

As a member of the combined arms team, to win while outnumbered.



Next

The Environment

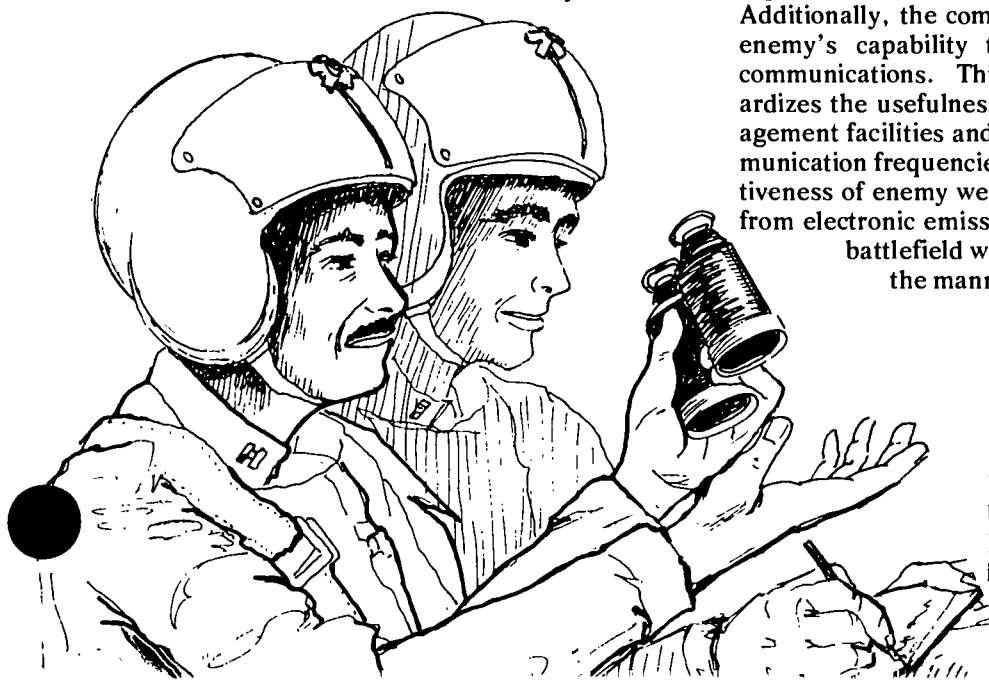
The Environment

The battlefield and warfare has changed, not abruptly, but steadily and rapidly. The range, accuracy, and lethality of the modern tank cannon makes it at least five times as effective as the tank gun of World War II. The antitank guided missile has appeared on the battlefield and is a deadly weapon out to 3,000 meters. Even against rapidly moving crossing targets it can achieve 90 percent first round hits. The Air Force has introduced "smart" bombs and the Army is constantly seeking to improve the ranges and precision of artillery munitions and helicopter launched missiles. Even now the lethality of improved artillery ammunition is four times that of World War II, and the attack helicopter offers even additional lethality. Weapons are equipped with increasingly effective night sights and a variety of sensor devices are employed to detect forces and equipment on the battlefield. Added to the factors of precision and lethality is the emphasis on the concentration of forces and firepower offering mutual support and protection. All this means that individuals and weapons systems which are not employed properly will surely be destroyed. In any event, losses are likely to be high. The collective losses in the October 1973 Middle East War provide conclusive evidence of the mutual destructive power of modern Army forces when locked in violent combat and fighting for high stakes. It is into this battlefield environment that Army aviation units as part of the combined arms team must be projected.

Understanding the Threat

The commander must first understand the threat to employ aviation units effectively. He must know the enemy's situation and capabilities.

He must also be able to evaluate the enemy's probable use of air defense weapons, artillery, high performance aircraft, and helicopters. Additionally, the commander must recognize the enemy's capability to monitor and jam radio communications. This enemy capability jeopardizes the usefulness of friendly air traffic management facilities and command and control communication frequencies while increasing the effectiveness of enemy weapons which acquire targets from electronic emission. Aviation success on the battlefield will be directly proportional to the manner in which we learn to cope with sophisticated enemy capabilities. Each commander must use every available means to defang the enemy air defense and electronic warfare systems. However, before this can be accomplished he must have a thorough understanding of the threat.



The commander has yet another responsibility to make his subordinates aware of the threat. The nature of the threat is such that it makes the way of life in the forward areas different from any previously experienced. We cannot overemphasize the fact that everyone associated with Army aviation units needs to know the threat. If a picture is worth a thousand words, then a visual portrayal of the threat should have more impact and meaning than any number of statistics about effective ranges, altitudes, frequencies, etc., (fig. 2-1).

Armies of today have air defense weapons that have kept pace with advances in other armaments. New guns have been designed that move with and support tanks in the attack. These systems, which can deliver a massive volume of fire from multiple barrels, are often radar controlled with sophisticated optical back-up systems. Emphasis on guns has been in two prime directions: small

caliber with high volume fire, and medium caliber with less volume but more lethality. There is also a continuous effort to improve accuracy.

Also, missile systems have been introduced to the forward battle area in large numbers and several varieties. The gap between shoulder fired AA missiles in the forward foxholes and mammoth systems in the army's rear area has been filled with mobile systems that cover the entire altitude spectrum, above and well forward of the FEBA.

Electronic warfare has also been adapted as a tool of air defense. Aircraft now can expect interference with their communications and electronics systems. In addition to active interference, communication nets will also be subjected to more passive monitoring and more accurate radio direction finding than ever before.

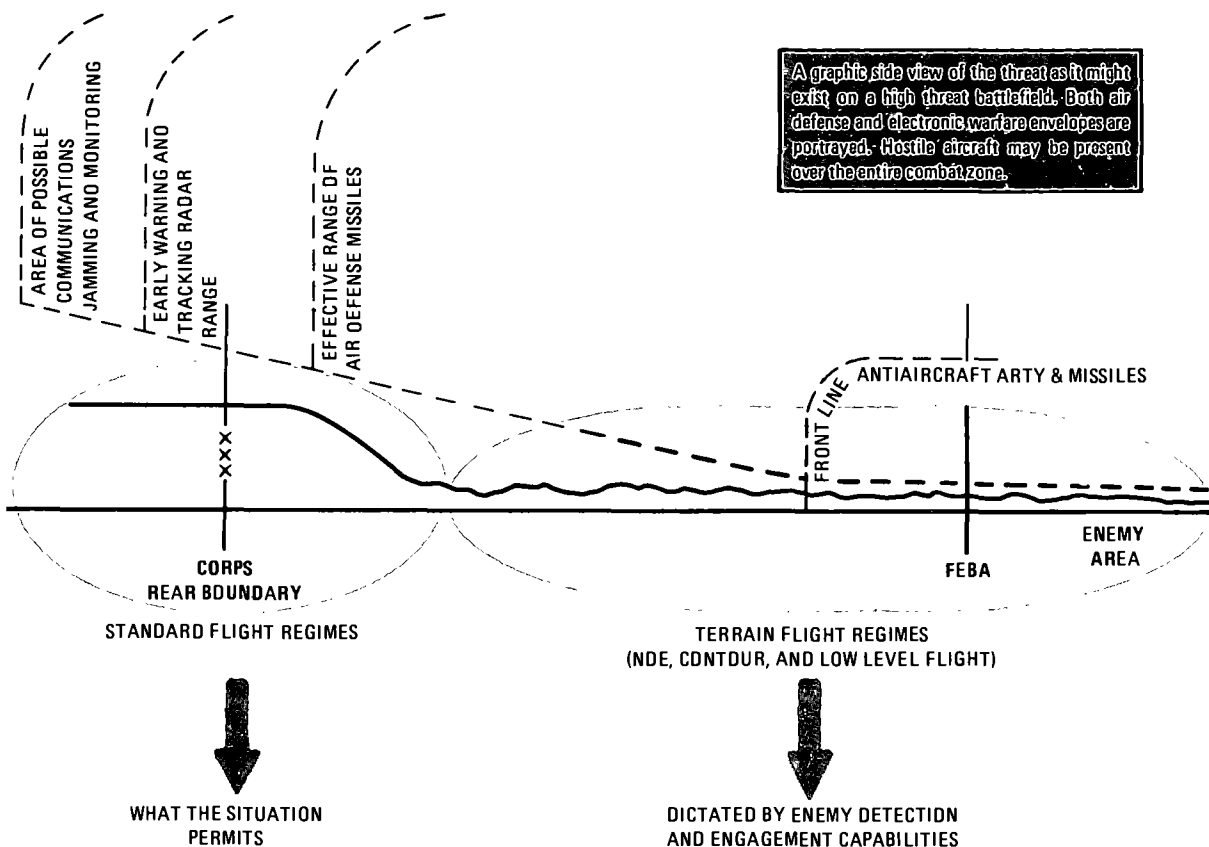


Figure 2-1. Threat Profile.

Air Defense Threat

The threat systems described in the following are typical of those weapons that will confront Army aircraft in the near timeframe. A potential enemy has the ability today to field all these systems in varying numbers. Precise threat assessments must be prepared from classified sources for each contingency plan and tactical situation.

Every Army aviator should know *the enemy is out to get him*. Massive air defense forces are deployed to destroy or nullify the effectiveness of U.S. aircraft, regardless of type. Foreign armies are well aware of the threat posed by even a small group of helicopters, and have trained the entire combined arms team to engage this type of target. In deploying air defense the enemy can be expected to follow the basic principles of **Mass, Mix, Mobility, and Integration**.

Mass is achieved by concentrating air defense weapons on and around a defended critical asset. Whenever possible, weapons within tactical units will be positioned so that the combined fires of that unit can be brought to bear on a single target, e.g., all the guns in an AAA battery, all individual weapons in a rifle platoon, or all machine guns in a tank platoon will be able to concentrate their firepower against a single target. *This means that whenever a pilot discovers one enemy ADA weapon, he can expect another weapon nearby.*

Mix is achieved by employing a complementary family of weapons. The capabilities of one system offset the limitations of another so that aircraft cannot defeat in detail any particular weapon system. Forward area guns are employed in combination with short-range air defense missiles to protect critical assets. The long- and medium-range radar-directed systems complement forward area systems by denying the medium and high altitude attack approaches to high performance aircraft. Equipment diversity and redundancy are emphasized in foreign radar design and deployment. Combined radar-optical modes are used to minimize radar exposure and counter chaff and jamming. Observers are used to fill in any gaps in radar surveillance.

A wide variety of missile guidance schemes, e.g., command, semi-active, IR homing, etc., and a broad spectrum of radar frequencies are used to make ECM more difficult. To defeat such an air defense array, requires efforts to suppress the whole spectrum. It is not enough to defeat one gun or missile system, or to obscure optical systems, or to jam a limited frequency spectrum.

Mobility is achieved by using forward area gun/missile units that are able to keep up with and maintain air defense coverage for the maneuver force. Highly mobile air defense systems capable of firing at low-flying aircraft, either while moving or during brief halts, will follow directly behind the battleline of tanks. These will remain ready to open fire against aircraft. Tactical radars are movable with the more modern ones emphasizing mobility compatible with the movement of ground forces. An aviator should never expect air defense systems to remain in fixed positions. A gun or missile site, once located either by reconnaissance or because of an engagement, will move. *Any attempt to destroy the weapon must be made as soon as its location is detected.*

Integration is achieved by having forward air defense weapons integrated into the commander's scheme of maneuver and integrated rearward, through command and control systems, with all available supporting air defense fires. Air defense weapons will be at the front and in the middle of march columns. Distance between the AD unit and other vehicles is always greater than 50 meters so that AD personnel have freedom of movement when firing at low-flying targets. A pilot, *once spotted by any means*, e.g., by a rifleman in a combat outpost must *assume this information is being relayed to the air defense units.*

Antiaircraft Artillery Systems

At the beginning of World War II, most countries were extremely weak in antiaircraft artillery. During the war, rapid advances were made in gun technology but most countries turned their attention to missiles after World War II. Threat forces have, however, maintained a strong AAA base while simultaneously exploiting the

advantages of missile development. The experiences of Vietnam and the Middle East conflicts have proven the value of a balanced and complementary force of missiles and guns.

SMALL ARMS

Air defense begins with the individual soldier, and the infantry rifleman should be considered the first line of the air defense AAA threat. In motorized rifle companies a portion of the command is always designated to deliver massed fire on attacking aircraft. Each combat soldier is trained in antiaircraft firing techniques and visual identification of hostile aircraft.

AIR DEFENSE MACHINE GUNS

Air defense capable machine guns are mounted on all combat vehicles. These weapons may be of the 7.62mm, 12.7mm, or 14.5mm type, and may be used in either a ground or air defense role.

ZPU-4 AND ZU-23

Towed light antiaircraft weapons are widely deployed with ground forces and are usually organized as a machine gun battery organic to a motorized rifle regiment. These weapons may be either the quad, trailer-mounted, ZPU-4 14.5mm machine gun or the newer twin-barreled ZU-23 which is a trailer mounted 23mm gun. These relatively short-range weapons have optical sights. Normal deployment would be well forward to cover front line elements of motorized infantry forces (Table I).

ZSU-23-4

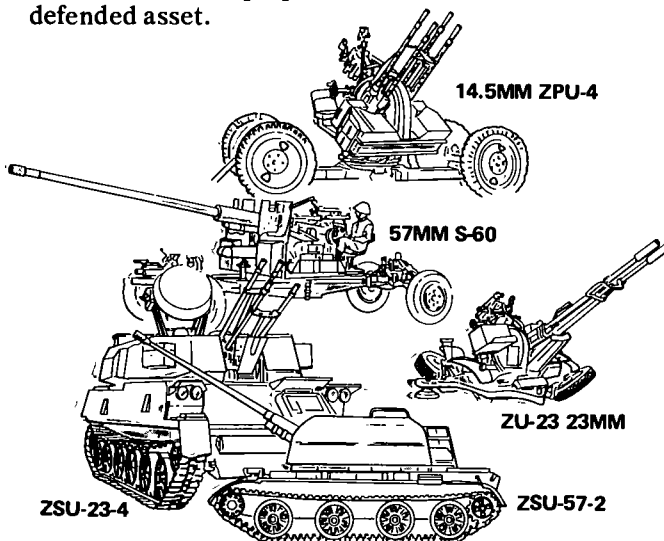
The threat of tactical nuclear weapons with the resulting requirement for more mobile forces created the need for highly mobile armored air defense weapons. The ZSU-23-4 seen in the Middle East War, is one such weapon. Although only lightly armored, the system's tracked carrier permits it to deploy well forward in an overwatch position just behind lead tanks and armored personnel carriers. The system has four 23mm guns and a Gundiash radar mounted on a tracked vehicle. The guns are fired simultaneously and provide low-level cover for armored and motorized elements which it usually accompanies. The dish-type radar has a very narrow beam that provides for excellent aircraft tracking and is also difficult to detect or evade. The system is also used in

mutual support of surface-to-air missiles to provide air defense protection from low-flying aircraft. It has three modes of firing: radar control, electro-optical (radar provides range only), and optical. The system is capable of being fired while on the move in any one of the three modes.

ZSU-57-2







The less sophisticated ZSU-57-2, is a track-mounted, twin-barreled 57mm AA gun. Its armor protection permits well forward deployment with maneuvering forces, and the system can fire at a rate of 240 rounds per minute making it a threat to helicopters and slow-flying aircraft. The ZSU-57-2 has an optical-mechanical sight and has a tactical antiaircraft range of 4,000 meters. (See Table I).

Other guns are found in divisional rear areas. These systems are 57mm or larger and are used to protect critical assets such as refueling points, command posts, and main supply routes. These weapons are deployed in battery formations on, or very near, the defended asset. All radar directed systems can be fired by optical back-up devices and on-carriage gunsights. Because of their deployment in the division rear areas these weapons would be a threat to Army aircraft normally in deep penetration attacks on a defended asset.



The following antiaircraft weapons table represents current systems inservice in threat countries. The weapons are considered to be a cross section of their capability, but by no means all-inclusive.

Table I. Air Defense Artillery Weapons Systems

WEAPON SYSTEM	RANGE AND CAPABILITY	GUIDANCE	ASSIGNED TO
S-60 (57mm) 	Range: 6,000 m Elevation: -2° to +87° Traverse: 360°	Radar and Optical Mechanical Com- puting	Antiaircraft Regi- ment of Tank Division and Motor- ized Rifle Division
ZSU-57-2 (57mm) 	Range 4,000m Elevation: -2° to +87° Traverse: 360°	Optical-Mechanical Computing Sight	Air Defense Units in Tank Regiment of Tank Division and Motorized Rifle Division
ZSU-23-4 (23mm) 	Range: Optical-2,500m Radar-3,000m Elevation: +8° to +87° Traverse: 360°	Radar-Optical	Air Defense Units in Tank Regiment, Motorized Rifle Regiment of Tank Division and Motor- ized Rifle Division
ZU-23 (23mm) 	Range: 2,500m Elevation: -10° to +90° Traverse: 360°	Optical	Air Defense Units in Motorized Rifle Regiment of Tank Division and Motor- ized Rifle Division
ZPU-4 (14.5mm) 	Range: 1,400m Elevation: -8.5° to +90° Traverse: 360°	Optical	Air Defense Units in Motorized Rifle Regiment of Tank Division and Motor- ized Rifle Division
Machine Gun (12.7m) 	Range: 1,000m	Optical	Platoon level Weapon

Surface-to-Air Missiles

Long-range high-altitude bombers designed during and after World War II led to the development of the surface-to-air missile (SAM) system. Early SAM development efforts were concentrated on systems for defense of the homeland. In recent years, emphasis has been placed on tactical systems, some of which are also capable of a strategic role. It is interesting to note that most foreign powers have always realized the low-altitude limitation of the SAM and have continued to develop more effective low-altitude air defense guns.

The effectiveness of the SAM was first realized when a U-2 aircraft was downed in 1960. Since then SAM systems have been effectively used in both Vietnam and the 1973 Middle East War. Surface-to-air missiles will continue to influence future battles and success will favor that combatant who has the ability to suppress these systems, (fig. 2-2).

SAM's are classified according to the major role played in providing air defense coverage. The role distinctions are based on weapon altitude and range capabilities.

Surface-to-air missiles compel the helicopters to terrain flight altitudes as far back from the FEBA as the division rear.

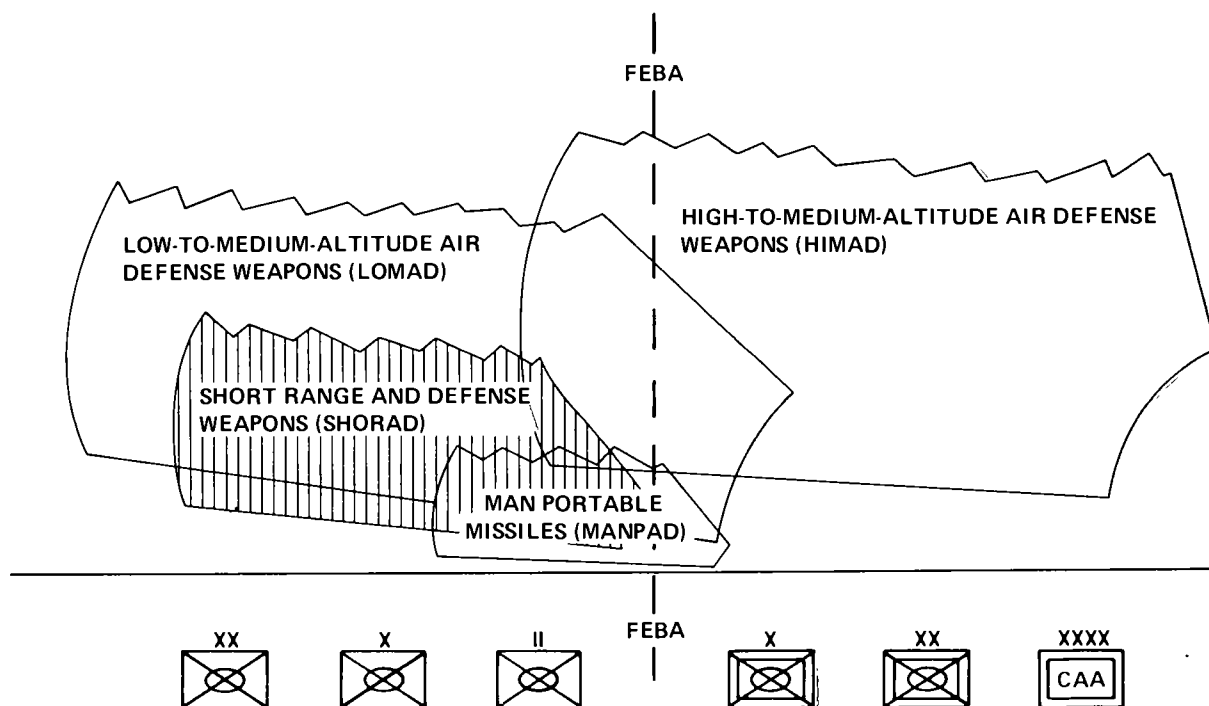


Figure 2-2. Surface-to-Air Threat Profile.

HIMAD

High-to-medium-altitude air defense (HIMAD) is provided by long-range weapons that are deployed in small numbers to cover relatively large areas. Examples of HIMAD SAM's include the SA-2 GUIDELINE and SA-4 GANEF (Table II), which have roles similar to the NIKE-HERCULES. These systems have been developed to provide air defense up to the service ceiling of most combat aircraft but also have a capability as low as 1,000 to 1,500 feet. Mobility of these systems varies with the individual design. Generally, they do not have the mobility required to move in combat with a division. The SA-2 uses wheeled tractors and trailers and is considered transportable while the SA-4 is mounted on tracked vehicles and does have the mobility of moving with divisions. Because of their role, these weapons are not a great threat to Army aircraft operating in forward areas. It is highly unlikely that terrain flying helicopter pilots would be engaged by such systems; however, *Army aircraft flying at 1,000 feet or above could be a target for these systems.*

LOMAD

Low-to-medium-altitude air defense (LOMAD) is provided by medium-range weapons. The capabilities of systems employed in this role fill the gap between HIMAD and SHORAD. Some LOMAD missile systems include the SA-3 GOA and SA-6 GAINFUL which are similar to the U.S. HAWK. These systems, developed to provide a counter against enemy high-performance aircraft flying at low and medium altitudes, also have a capability against targets above terrain flying altitudes. The SA-3 system is used in a variety of roles ranging from battlefield support to barrier and terminal defense of rear area targets, while in most cases the SA-6 will be deployed with the front line divisions. It is possible Army aircraft could be taken under attack by these weapons. *In fact, LOMAD systems seriously restrict the close-to-the-FEBA employment of all aircraft not operating in the terrain flight mode.* (See Table II.)

SHORAD

Short-range air defense (SHORAD) of local areas or point targets is provided by quick-

reacting weapons designed to counter the immediate low-altitude air threat to the field army that penetrates LOMAD coverage. *These weapons represent a very serious threat to Army aircraft.* Normally, they will be organic to division or lower echelons, and will be deployed in large numbers in the vicinity of the FEBA. All such systems are highly mobile and will frequently be used in the protection of armor columns and reserves. Examples of typical SHORAD threat systems would be SA-8 and SA-9 (see Table II).

MANPAD

This classification covers *man-portable missile systems* intended for the protection of forward area point targets as an attrition weapon against low-flying aircraft. A system fulfilling this role is the SA-7 GRAIL. Such man-portable systems can be deployed easily and flexibly throughout the forward area, and move with troops, providing a responsive local air defense during daylight, good-weather conditions. Characteristics common to the systems are that they are man-portable, shoulder-fired, contact-fuzed, small warhead, IR passive homing guidance. *Army aviators operating in the vicinity of the FEBA can expect frequent engagement by enemy MANPAD systems.* (See Table II.)

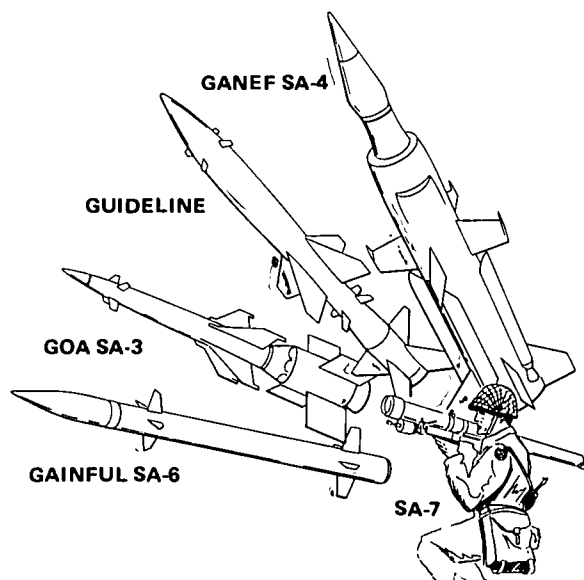







Table II. Surface-to-Air Threat

WEAPON SYSTEM	RANGE	GUIDANCE	ASSIGNED TO
SA-2 GUIDELINE 	Ceiling: 24,400m Slant Range: 40 km	Command/Radar	Army
SA-4 GANEF 	Ceiling: 24-28,000m Slant Range: 70 km	Command/Radar	Army
SA-3 GOA 	Ceiling: 8-12,000m Slant Range: 24 km	Command/Radar	Army
SA-6 GAINFUL 	Ceiling: Classified Slant Range: 30 km	Command/Radar	Army
SA-9 Classified	Ceiling: Classified Slant Range: 7 km	Passive Infrared Homing	Regiment
SA-8 Classified	Ceiling: 6100m Slant Range: 10-15 km	Command/Radar	Classified
SA-7 GRAIL 	Ceiling: 3050m Slant Range: 3.5 km	Passive Infrared Homing	Company

Combat Against Helicopters and Low-Flying Aircraft

Foreign armies are well aware of the potential of U.S. Army helicopters and low-flying aircraft. Firing against helicopters occupies an important place in combat and gunnery training carried out not only by air defense gunners, but also by tank personnel and riflemen. Because they possess an adequate mix of weapons, enemy forward air defense gunners and missilemen are able to dedicate themselves almost exclusively to combating the low-altitude aircraft and helicopters. AD gunners master the art of destroying targets just a few meters above the ground. Every attempt is made to reduce the amount of time required to detect the target. *Army aviators should understand the techniques used to accomplish rapid detection.*

Well-organized *site reconnaissance* is the first criteria for success against low-flying aircraft. A careful study of the terrain is always made. Particular attention is given to positioning ADA fire units and surveillance radars. Using topographic maps, the commander identifies those key terrain features with the greatest coverage. Once the preliminary map analysis is complete, a terrain reconnaissance is made of the area and necessary changes in the positions are made immediately.

ADA fire units move to the predetermined positions in such a way that continual coverage is maintained. How this is done depends on the weapon. Some move in a leap-frog manner, while others provide protection even while on the move. In any event, *aerial surveillance is always emphasized.* In addition to radar, air defense batteries have reconnaissance scouts at battery and platoon command posts. Moreover, all riflemen and tankers can take part in the visual search for helicopters and other low-flying aircraft. Because of the integration of air defense units with the infantry and armor units, *information is quickly passed among the riflemen, AD gunners, and tankers.*

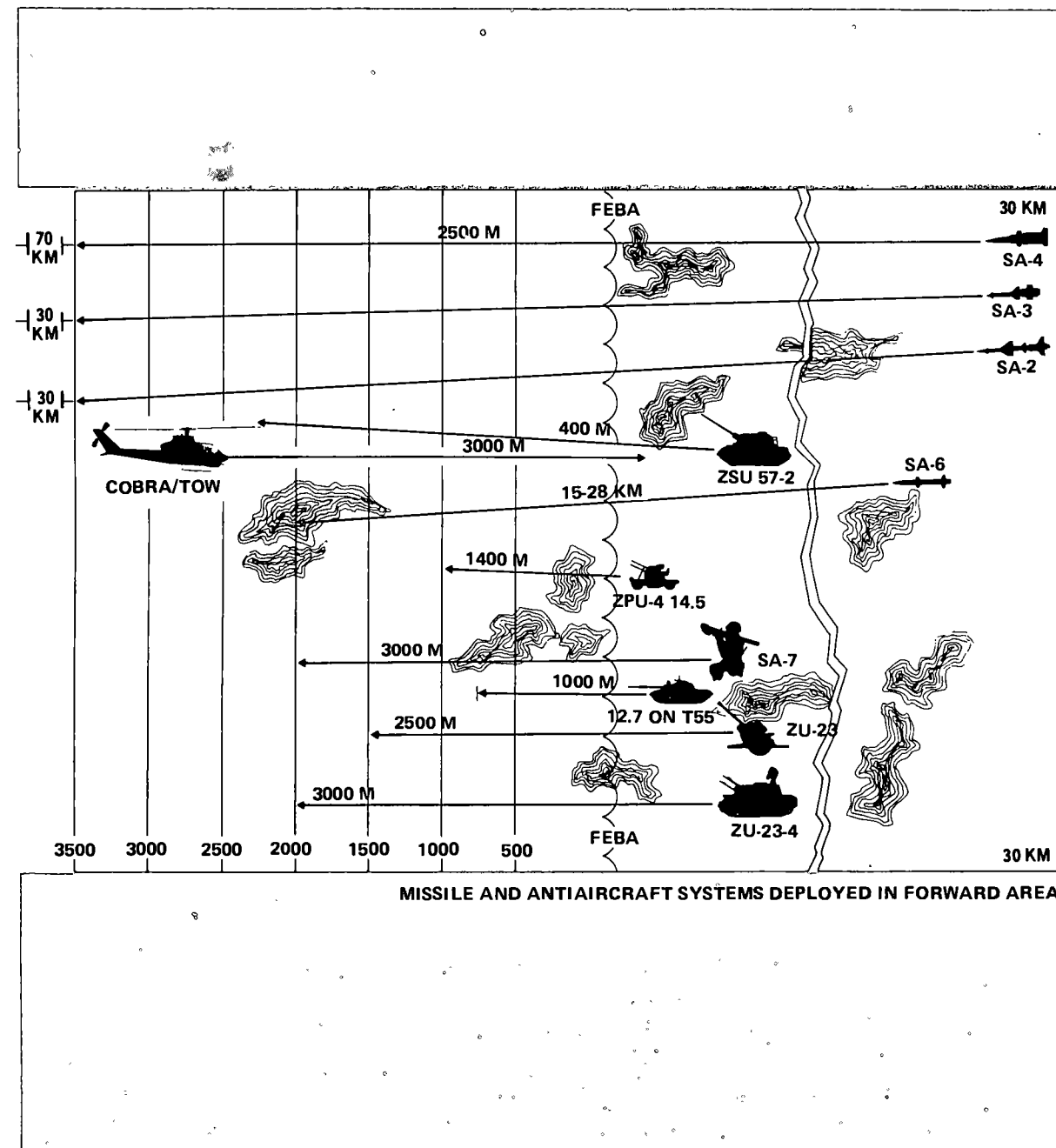
Upon reaching their new position, the gun (or missile) crews determine the sectors of

observation. *Particular attention is given toward the front and flanks and in those areas where natural screens for the concealment of helicopters carrying antitank guided missiles exist.* Radar operators immediately prepare clutter diagrams so they can rapidly identify target returns. Coverage diagrams are also prepared to identify those areas not covered by radar. Once the position is occupied, the scouts at the battery command post and the observers at the guns go to work. The scouts search the battery area for targets and the observers scan the gun sectors. If necessary, *additional observers are drawn from gun crews to fill in gaps in the radar coverage.*

The coordination of the fire direction radars of several batteries is undertaken by the battalion commander. This is done to provide the best low altitude coverage. Each radar is given a specific sector. *Whenever one radar detects a target, it goes into a tracking mode and sends target coordinates to the guns in other batteries.*

Considerable importance is placed on anticipating the avenues of approach that helicopters can use to attack critical assets. Natural screens are kept under constant observation. Each gun or missile launcher is assigned a sector of fire. The principal axis of this sector will pass over the spot where the helicopter is expected to appear. Whenever possible, ADA fire units will occupy *ambush positions* that will allow at least a portion of the guns and missiles to be carefully concealed. These positions will be along anticipated helicopter approaches.

Once a helicopter is detected, maximum fire by guns and missiles will be brought to bear against it. This rate of fire will be maintained until the target is destroyed or lost. While a helicopter is exposed, either searching for a target or firing an ATGM, missilemen will launch one or more missiles. The enemy knows the probability of a kill with one missile is low, and therefore, is prepared to expend several missiles without waiting to see the results of each individual missile. This significantly increases the kill probability.



The fact that Army aircraft may be operating in coordinated attacks with the U.S. Air Force complicates the air defense function but does not necessarily suppress it. In fact, the enemy anticipates this and trains on transferring fire from tactical aircraft to helicopters. This task is always given to the best crews.

Army aviators should be aware that the enemy studies U.S. tactics. The enemy is constantly training and devising methods to engage low-flying aircraft. They realize the threat they represent to the aviator and they will do everything in their power to destroy him. *The enemy knows that by being better prepared and better trained it can defeat the aviator.*

Threat From the Air

Among the more serious battlefield threats is that posed by enemy high performance aircraft and armed helicopters. A factor which makes this threat unique is that enemy aircraft may strike anywhere in the combat zone, even deep in rear areas where the tendency may be to lull ourselves into a false sense of security being beyond acquisition and engagement ranges of most other enemy weapons. **Our actions when encountering hostile aircraft are clearly defensive and encompass the following: detection avoidance, evasive action, and engagements as a matter of self-defense.**

Tactical Air Threat

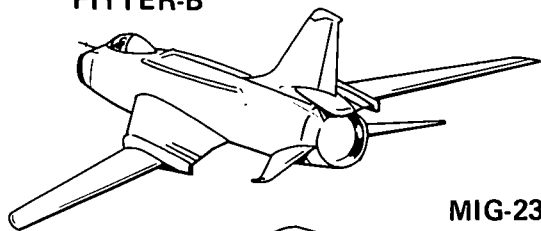
High performance fighters are equipped with a wide variety of weapons systems to include automatic cannons, rockets, missiles, and bombs. Fighter pilots are highly skilled and aggressive

and will attack quickly and without warning *if given the opportunity*. Your job will be to deny him this opportunity. But to do so, you must learn to recognize the enemy and know how he may attack you.

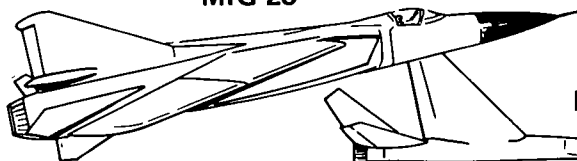
Tactical fighters which currently may be encountered are the SU-7 Fitter and the MIG-21 Fishbed (See Table III). The SU-7 Fitter is a tactical fighter with the primary mission of close air support. Modified versions of the SU-7 include a variable geometry wing aircraft and another with a short takeoff and landing capability. The MIG-21 is an all-weather, delta wing jet fighter capable of speed in excess of Mach 2.

Later model fighter aircraft include the MIG-23 Flogger capable of speeds in the Mach 2.3 range and combat radius of around 700 to 900 kilometers.

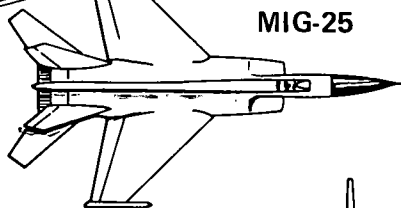
"FITTER-B"



MIG-23



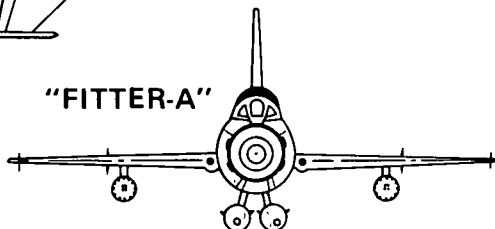
MIG-25



MIG-21



"FITTER-A"



Concept of Employment for Search Tactics

Fighters are designed for air-to-air combat or close air support and do not possess the observation capability of a reconnaissance aircraft. *Forward visibility in a fighter is extremely limited* (approximately 12° angle of

depression) so that the pilot finds *side-viewing the most effective means of searching for targets* (fig. 2-3). At best, the fighter pilot's vision will be very restricted. Fighters will normally operate in pairs, but larger flights may be encountered. After detecting a target, their attacks will usually come in rapid succession with one aircraft attacking immediately after the other.

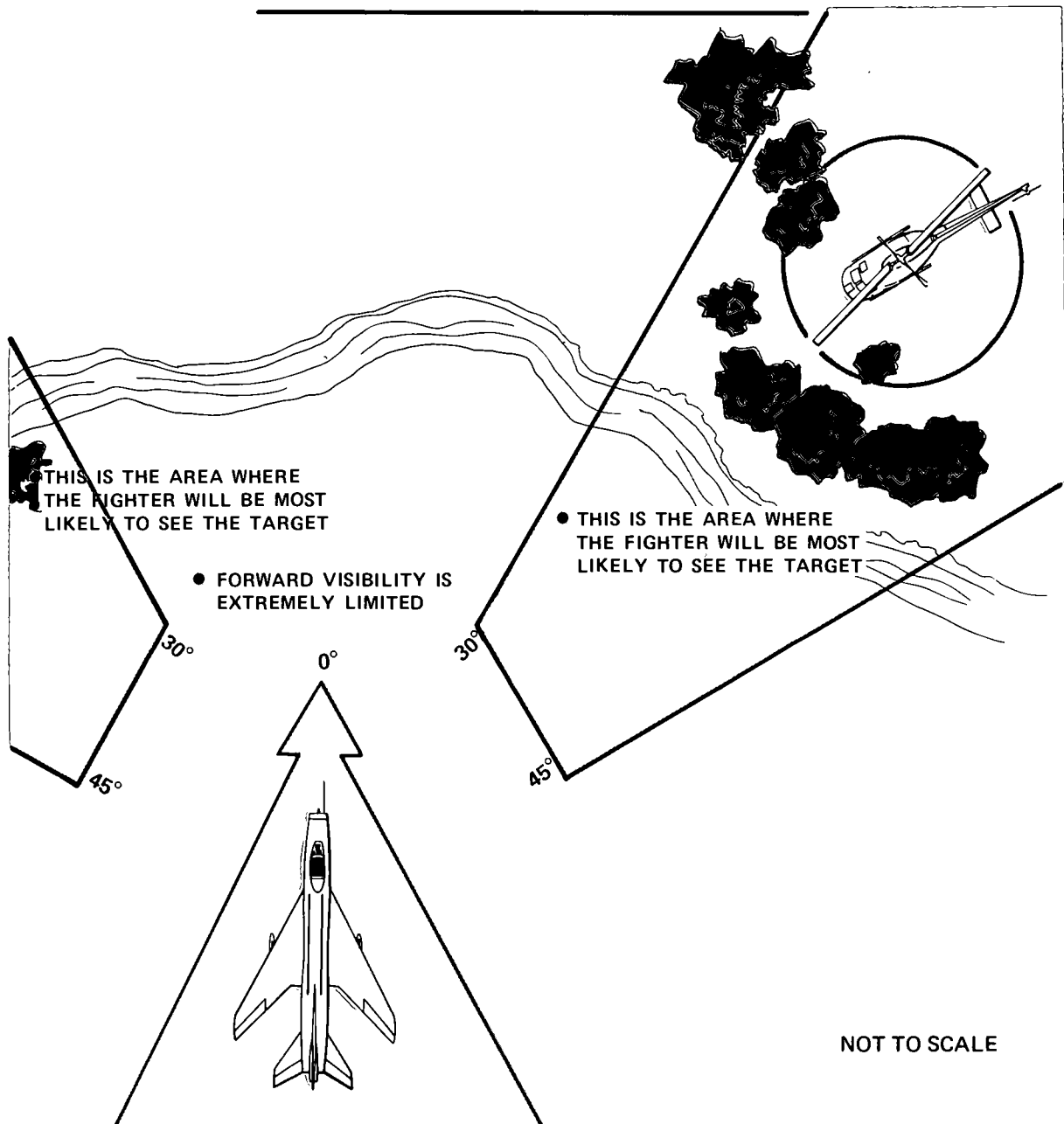


Figure 2-3. Search Tactics.
2-12

TYPES OF ATTACK

A helicopter employing nap-of-the-earth tactics is a potential target for threat high performance aircraft conducting armed reconnaissance missions. Armed reconnaissance is defined as a planned air mission flown with the primary purpose of searching out, attacking, and destroying targets of opportunity along designated ground communications routes or within an assigned general area. Helicopters can be engaged by aircraft on this type of mission. Types of attack are as follows:

- STRAFING
- ROCKET ATTACK
- BOMBING

Strafing. Cannon fire (strafing) is a basic weapon of the fighter aircraft. Its characteristics of versatility, accuracy, and concentration make it highly effective against a wide variety of targets, and it should be noted that it is the most effective method of delivering an attack against a ground target. Strafing is easily performed and may be initiated from almost any condition of flight with a minimum of preplanning. The fact that the normal dive angle is 5° to 45° makes strafing a highly effective method of attack against helicopters (fig. 2-4).

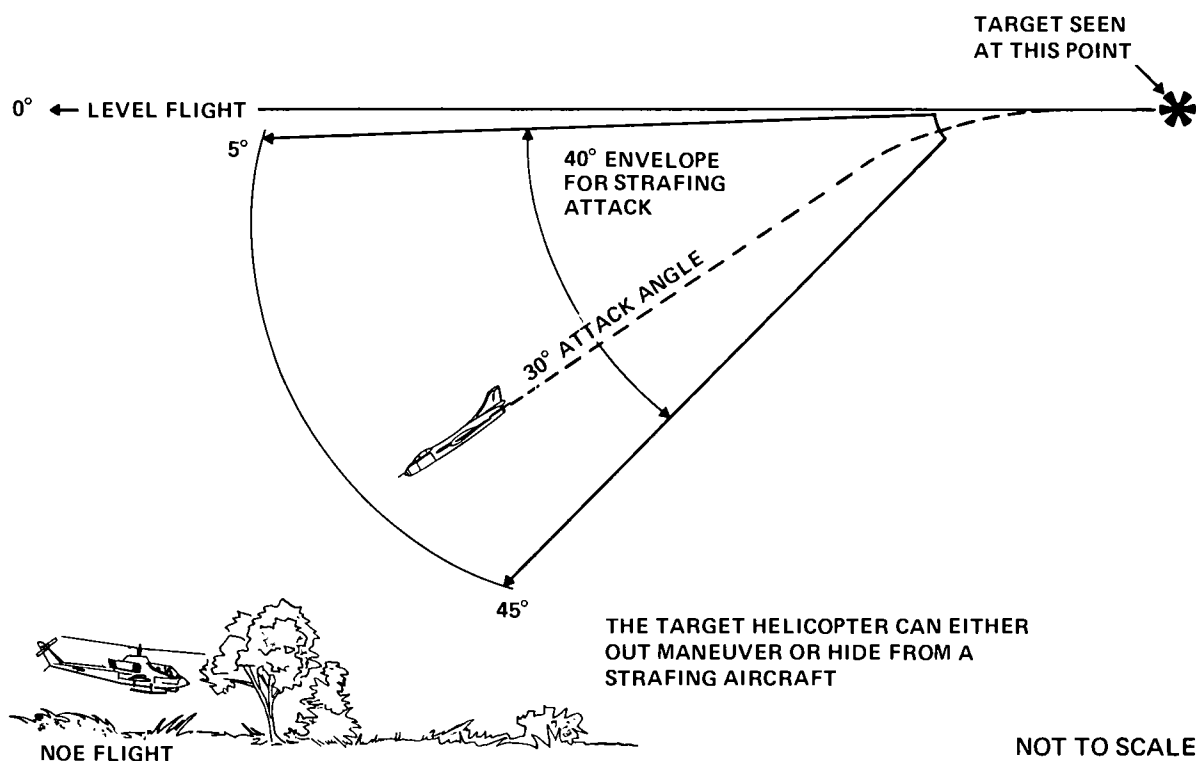
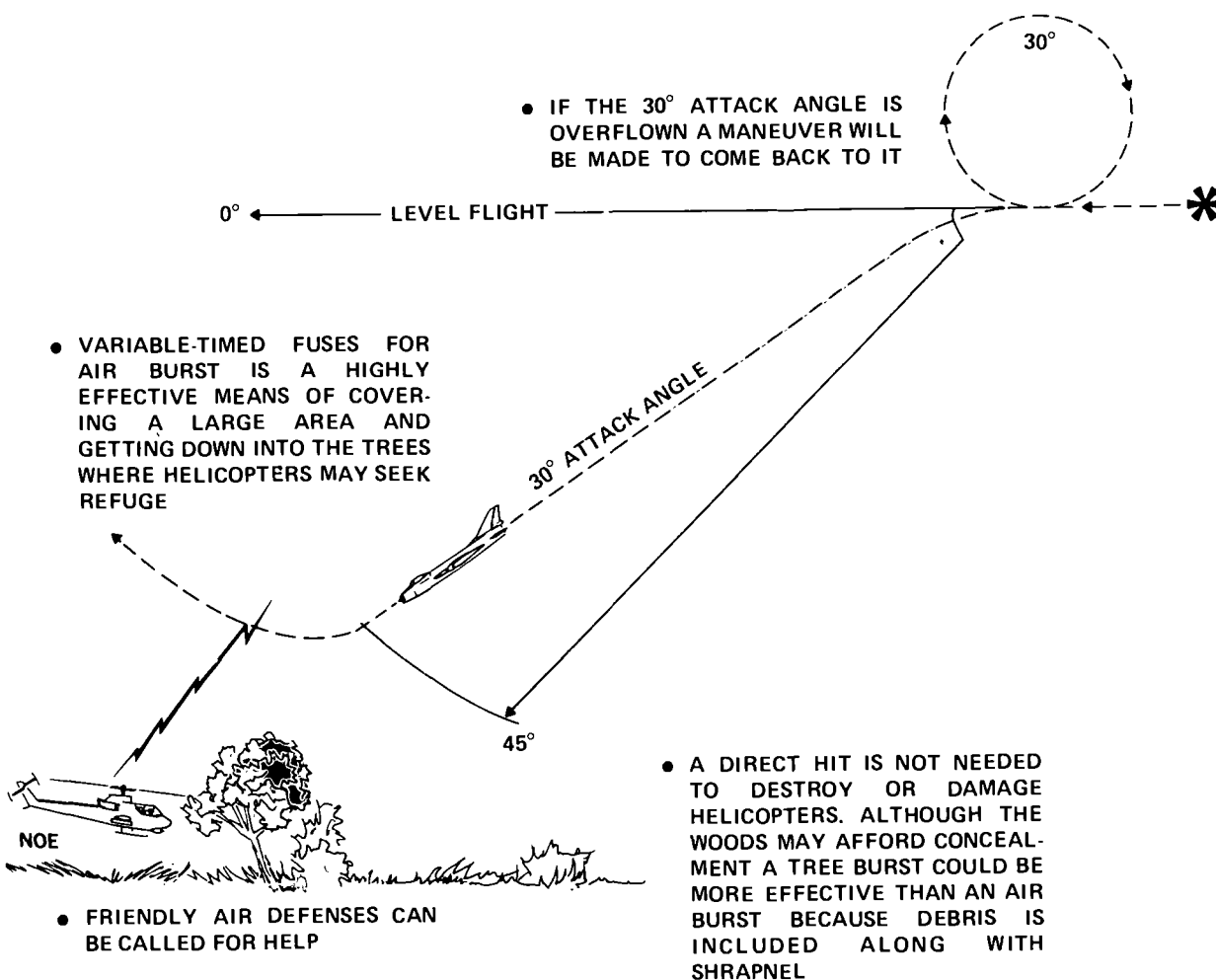


Figure 2-4. Strafing Attack.

Rocket Firing. This type of attack is more difficult to initiate in the threat environment because of the need for a relatively steep dive angle that will necessitate the fighter being at a higher altitude. The steeper the attack angle, the more effective the fire; therefore, it can be

assumed that accuracy will be impaired if the enemy aircraft is forced to attack with a relatively low angle of attack. In a rocket attack, certain considerations must be taken into account as shown in the following illustration (fig. 2-5).



NOT TO SCALE

Figure 2-5. Rocket Attack.

Bombing (Low and High Level). While bombing attacks against helicopters are not likely, they should not be completely ruled out. Accuracy is extremely important to the success of this type of attack and a moving helicopter is not a good target. However, the same considerations for rockets apply with one addition: the increased amount of ordnance being delivered at one time.

Dive Bombing. This type of attack requires a 30° to 45° angle of attack and requires a great deal

of altitude. It has two advantages not previously noted. It is much easier to see hidden or semihidden targets, and to keep them in view throughout the attack which makes it ideal for attacking helicopters hiding in wooded areas.

One method of countering an attack by a high performance aircraft is illustrated below (fig. 2-6).

- WHAT TO DO:**
- 1 FLY HEAD-ON TO THE FIGHTER AND WHEN HE IS COMMITTED.**
 - 2 TURN SHARPLY AND MANEUVER AWAY. ONCE COMMITTED THE FIGHTER IS NOT HIGHLY MANEUVERABLE.**

REMEMBER: ENEMY FIGHTERS ARE EMPLOYED AT LEAST IN PAIRS

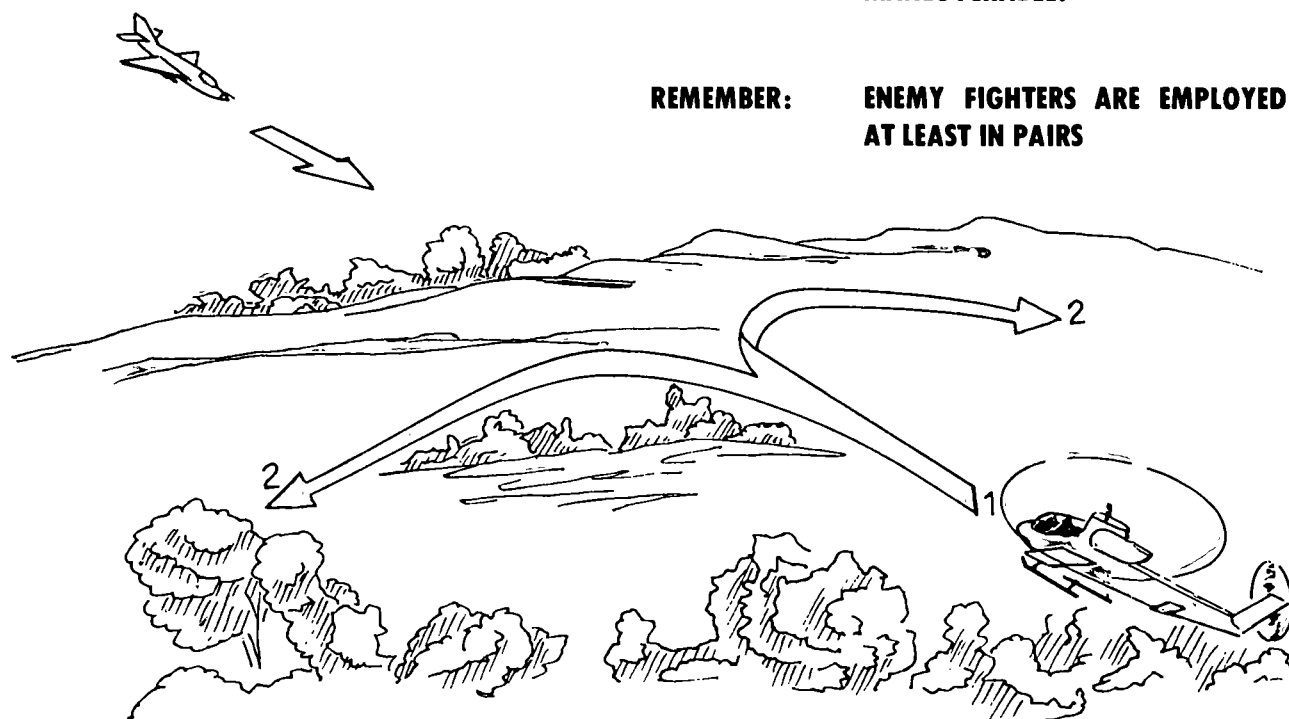


Figure 2-6. Evasive Maneuvering.

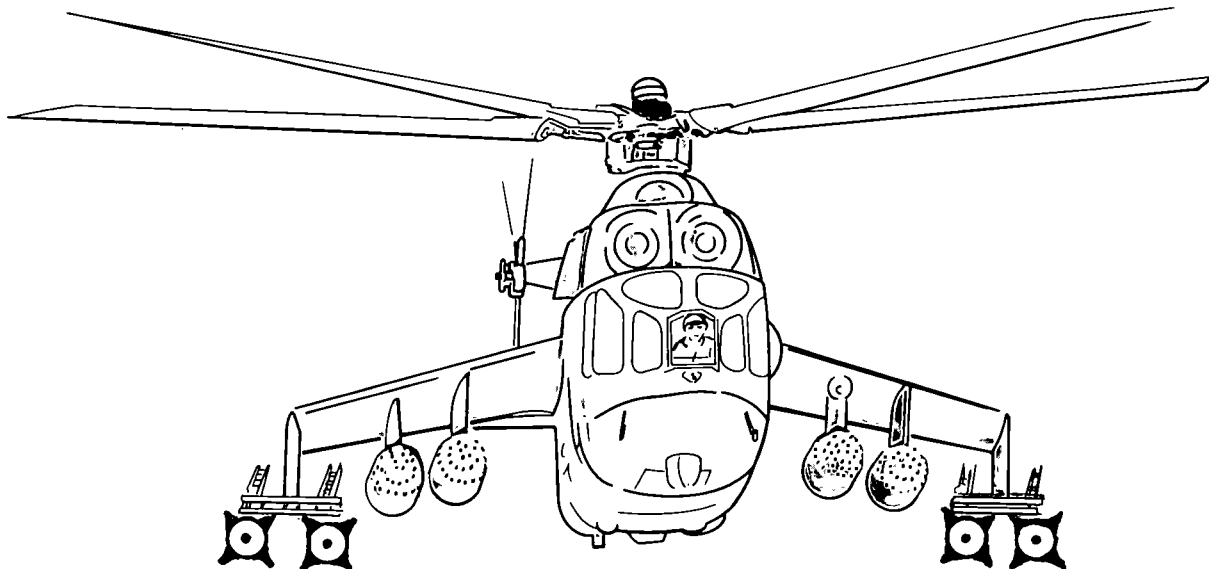
Potential Helicopter Threat

The presence of armed enemy helicopters on the battlefield presents a unique and perhaps a far more serious threat than the fighter. This is because weather often precludes the use of high performance fighters; *but if the weather permits us to employ our helicopters, the enemy can employ his.* Moreover, they operate in our envelope and have range effective weapons similar to our own.

The MI 24 Hind presents the most serious threat to friendly helicopters. Two versions of the MI 24 are currently being deployed. The Hind A is the more heavily armed of the two, being equipped with the 4 SWATTER antitank missiles mounted on the outboard wing stations and 128 rockets in four pods carried on the inboard wing stations. A 23mm cannon is mounted in a chin

turret and a 12.7mm machine gun is mounted in the nose. The Hind B should be considered an armed assault aircraft capable of transporting 8 to 12 troops and armed with rockets and machine gun only. The Hind has a retractable landing gear, and cruise speed is in excess of 140 knots with a maximum speed estimated in excess of 160 knots. The most recognizable difference between the Hind A and B is that the Hind A has negative dihedral wings and chin turret (fig. 2-7). (See Table III).






Two other helicopters, the MI 8 HIP and the MI 4 Hound are usually unarmed, but have been observed with mounted machine guns and rockets. However, these aircraft are normally employed in the assault role. The MI 4 outwardly resembles the Sikorski-produced UH-19, but is significantly larger.



Can you defeat this helicopter?

Figure 2-7. M21 Hind A.

Table III. Threat From the Air

AIRCRAFT	RANGE	SPEED	MISSION
SU-7 Fitter 	Combat Radius: 260 nm Maximum: 780 nm	Max. at S/L: 460 knots Max. at Altitude: 917 knots	Close Air Support Interdiction
MIG-21 Fishbed 	Combat Radius: 290 nm Maximum: 593 nm	Max. at S/L: 701 knots Max. at Altitude: 1,203 knots	Multi-role Fighter Tactical Fighter
MIG-23 Flogger 	Combat Radius: 520 nm Maximum: 950 nm	Max. at S/L: 1,150 knots Max. at Altitude: 1,318 knots	Fighter Interceptor Ground Attack
MIG-25 Foxbat 	Combat Radius: 610 nm Maximum: 1300 nm	Max. at S/L: 1,203 knots Max. at Altitude: 1,833 knots	All-weather Combat Aircraft Multi-role Fighter
MI-24 HIND-A 	Combat Radius: Classified Maximum: 200 nm	Cruise: 140 knots Maximum: 160 knots	Attack Helicopter

Artillery Threat

Employment of massive artillery fire has always characterized threat force doctrine. Enemy artillery presents a significant threat to all phases of helicopter operations. This fact underscores the requirement to *disperse, conceal, and camouflage* our ground operations in larger areas, rearm/refuel sites, and maintenance locations. Since helicopters operate in the terrain flight mode, they are vulnerable to artillery and must rely on speed, maneuverability, and countersuppression to reduce its effects. Threat artillery falls into the following categories: mortars, guns, rockets, and missiles. Because of the wide variety of weapons, only a cross section of the artillery threat is presented here. (See Table IV.)

Mortars

Although mortars do not possess the range and accuracy of gun artillery pieces, they can produce tremendous volumes of fire. Their light weight makes them easy to transport by ground and air means. Mortar high angle fire is extremely useful in mountainous terrain. Mortars are often used, therefore, to augment or substitute gun artillery for airborne, mountain, and air assault forces. Threat force mortars vary from 50mm to 240mm.

Guns, Howitzers and Field Guns

The difference between these artillery weapons is a matter of definition. But simply stated, guns are generally low-trajectory, long-barreled artillery pieces with high velocity. The largest threat force gun is 420mm. Howitzers are short-barreled, low-muzzle velocity weapons generally used in high angle fire but capable of low angle fire at shorter ranges. Threat force howitzers are generally 122mm and 152mm. Field guns are of high velocity flat trajectory and may be deployed well forward and used as antitank guns. However, they also are used as low-trajectory artillery pieces and due to their velocities have extremely long ranges. Field guns vary from 57mm to 130mm. The vast majority of threat force artillery is towed. However, in recent years, self-propelled weapons have been introduced. Future trends indicate that deployment of self-propelled artillery will continue.

122mm Howitzer (D-30)

This weapon represents one of the newer towed artillery pieces in the threat force inventory. Some of the unique and easily recognizable features of the weapon are that it is towed by means of a lunette attached below the end of the muzzle. Additionally, the baffled muzzle brake and large pod-like recoil mechanism housing are also unique. The most significant feature is the outrigger suspension system which allows 360° on carriage traverse. The D-30 has a maximum range of 15,300 meters.

152mm Howitzer (D-1 and D-20)

The D-1 is a rather old howitzer, but remains in wide use by threat forces today. The howitzer is towed in a conventional manner by a pintle on the split trails. Some of its distinguishable features are the large double-baffled muzzle brake and the recuperator cylinder and carriage which extend through the severely sloped gun shield. The maximum range of the D-1 is 12,500 meters. The D-1 is being replaced by the improved D-20, which offers greater range to 18,500 meters.





130mm Field Gun M46

The M46 is the largest of the threat force field guns. Its high muzzle velocity provides for excellent direct fire and extended range capability. The M46 is organic to the field army and is employed to provide general fire support to a range of 27 kilometers.

180mm Gun-Howitzer M1955

The M1955 possesses good mobility for an artillery piece of its size with its large dual tires filled with sponge rubber. The 180mm fires high explosive and concrete-piercing projectiles. The M1955 may also be capable of delivering nuclear rounds.

Table IV. Artillery Threat

WEAPON	RANGE AND CAPABILITY	RATE OF FIRE	ASSIGNMENT
122mm Howitzer (D-30) 	Range: 15,300 m Elevation: -7° to +70° Traverse: 360°	7 to 8 rounds per minute (rpm)	Division
152mm Howitzer (D-20) 	Range: 17,000 m Elevation: -5° to +48° Traverse: 58°	4 rpm	Division
130mm Field Gun (M46) 	Range: 27,490 m Elevation: -2° to +46° Traverse: 360°	5-6 rpm	Army
180mm Gun-Howitzer (S-23) 	Range: 30,000 m Elevation: 0° to +60° Traverse: 44°	Less than 1 rpm	Army

Surface-to-Surface Rockets and Missiles

The threat posed to Army aviation units by surface-to-surface rockets on the battlefield must be planned for when locating logistical and support facilities. (See Table V.) The missiles can strike anywhere from tens to hundreds of kilometers away and many are being equipped with nuclear warheads. When planning for combat operations, the commander must consider these weapons and their destructive capability on his aviation resources.

Free Rocket Over Ground (FROG)

The FROG family of rockets represents a short range, surface-to-surface rocket capability. There are seven FROG missile types, numerically designated one through seven. All FROG missiles are approximately 30 feet long and are transportable. (See Table V.)

Missile Systems

Threat force battlefield missile systems stress mobility, and are moved and fired from tracked or wheeled transporter erectors. An example is the SCUD family of missiles represented by the SCUD B. (See Table V.)

Multiple Rocket Launcher Systems

Threat countries have a number of multiple rocket launcher systems ranging from 122 to 250 millimeters and firing from 4 to 40 missiles per rack. An example is the BM-21, which is considered the most modern multiple rocket launcher in the threat army. Although the 122mm model is small in caliber, its rocket carries a warhead equal to the 140mm rocket; and the range of both the short and long rockets exceeds that of the 140mm and 240mm models. A further advantage is that the launcher fires up to 40 rounds. The launcher has an elevation capability of from 0° to 75°, a traversable capability of 120° left and 60° right of center, and can be reloaded in 10 minutes.

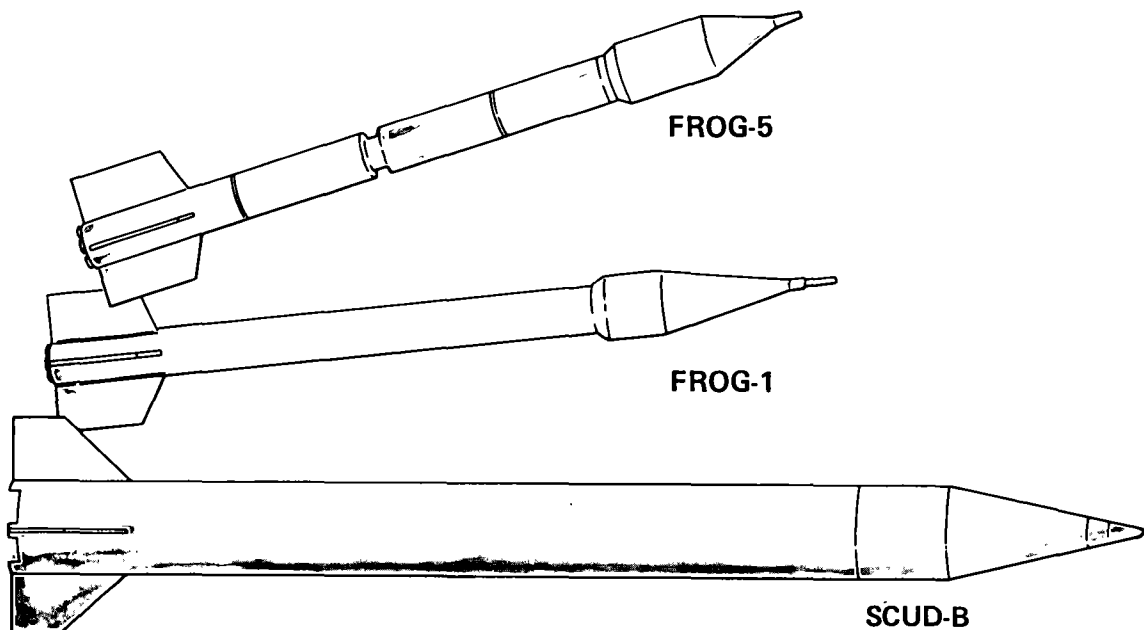





Table V. Surface-to-Surface Rockets and Missiles

WEAPON SYSTEM	RANGE OF THE MISSILE	GUIDANCE	ASSIGNMENT
FROG-7 	70,000 m	Free Flight	Division
SCUD-B (SS-1) 	280,000 m	Radio or Inertial Probable	Army
Multiple Rocket Launcher (BM-21) 	20,500 m	Fin stablized, slow spin	Division

Potential Electronic Warfare Threat

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

Intercept operations are conducted to determine the composition of our forces, 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 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 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 or some atmospheric disturbance, or where there exists an atmosphere of confusion. Potential threat forces 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.

Threat units 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.

Survivability

As far as Army aircraft are concerned, the high threat battlefield will clearly be the most formidable yet faced. However, Army aircraft will survive on it; in fact, survivability is only half the issue. Aviation must survive while accomplishing the mission. This can be done through the use of the proper tactics and techniques. **It must be remembered that no one on the battlefield can be killed by so many different weapons as the infantryman, and yet he survives through the use of proper tactics and techniques.** Additionally, it must be remembered that the helicopter presents survival problems for enemy forces; therefore, survival is a two-edge sword. Developing these tactics and techniques is a matter of training, knowledge and threat awareness and being able to evaluate your actions through the enemies' eyes to differentiate between when secure and when in danger.

Survivability is a function of **HARDWARE, TACTICS, and TRAINING**. The October 1973 war confirmed our need to develop new materiel, doctrine and techniques, and training if our forces are going to survive in this type of hostile environment in the next war. The following ingredients of each area are necessary for survival and for Army aviation elements to achieve their objectives:

Aircraft Survivability Equipment

SIGNATURE REDUCTION (such as infrared suppression, glint reduction canopies, and paint).

THREAT WARNING (such as radar-warning receivers and missile detectors so aircrews can take evasive action or adapt their attack to counter the threat).

COUNTERMEASURES (such as infrared and radar jammers and expendables, i.e., chaff, smoke, flares).

VULNERABILITY REDUCTION (redundant components, component shielding, armor protection, crashworthiness, twin engines, overall performance).

Training

- Since training should satisfy mission requirements, the determination of what is to be taught and the length of *training should stem from an analysis of the combat mission.*
- Successful accomplishment of each mission is dependent upon precise timing and teamwork developed through *integrated training, rehearsals, and use of SOP.*
- *Innovative training* by individual units continues to be a cornerstone for the further development and exploitation of Army aviation unit capabilities.
- *Crew skill, motivation, dedication, confidence, imagination, and will to win* remain primary factors in combat results.
- The computed unit readiness condition (REDCON) reflects only part of the picture. The true test lies in the demonstrated capability of the unit to provide responsive aviation support to the ground commander.

Tactics and Techniques

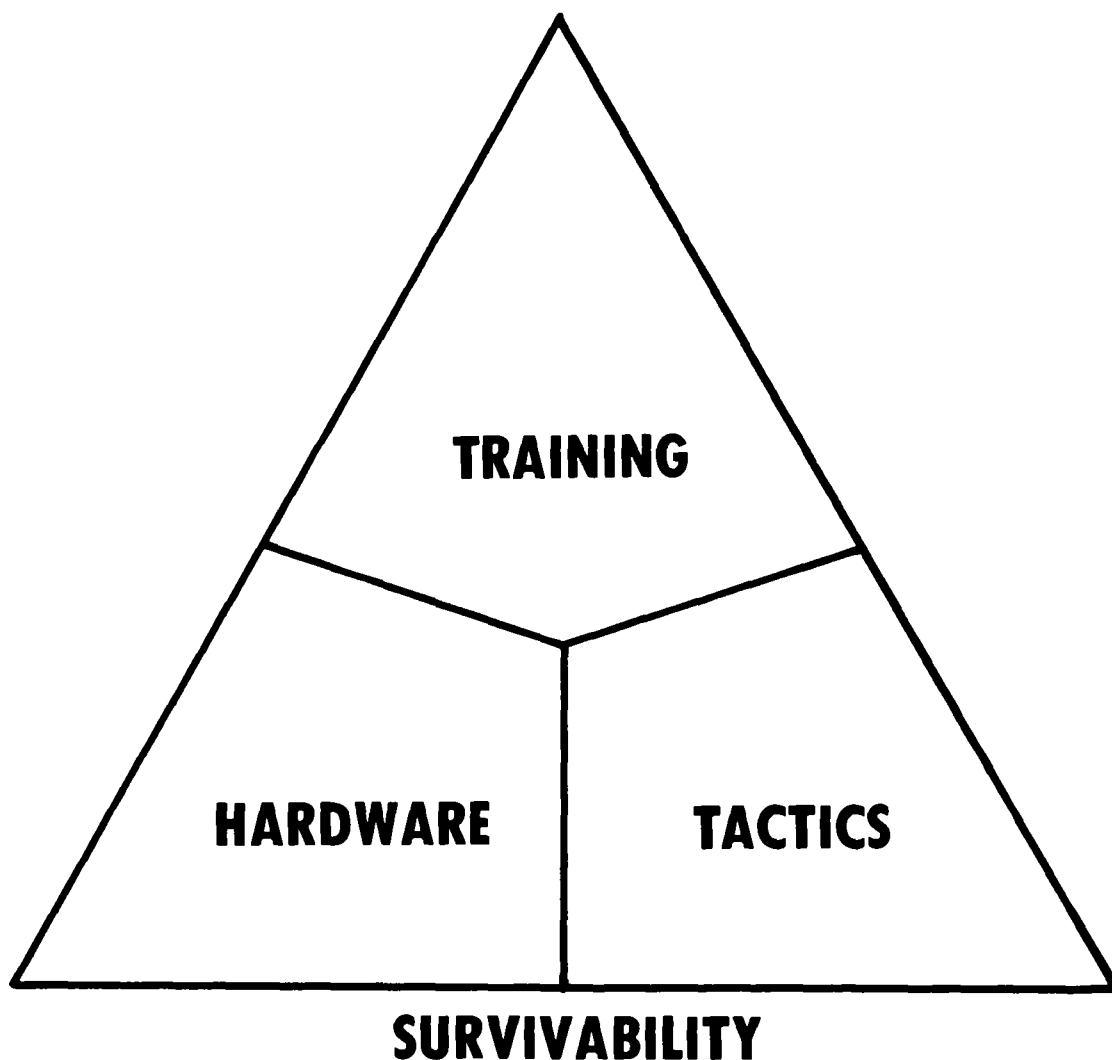
- Teamwork
- Stand-Off Engagement
- Terrain Flying
- Overwatch
- Night Operations
- Use of Chaff and Smoke
- Pop-Up
- Communications Security
- Suppression
- Fire Support Coordination
- Evasive Maneuvering

If we don't use the techniques and tactics, with good hardware, and don't have properly trained people, we can expect to be DESTROYED in the FIRST battle of the next war.

Summary

The mutual destructive power of modern forces means that individuals and weapons systems which are not employed properly will be destroyed. In order to preclude such a fate, the commander must be aware of the current sophisticated air defense and electronic warfare

threat. He must understand that survivability is an admixture of hardware, tactics, and training. He must also be confident of not only surviving but accomplishing the mission through training and proper use of the principles of employment.



Next
Concepts of Operations

Concept of Operations

This chapter provides the combined arms commander with the principles of employing aviation units properly. Moreover, it describes what aviation units can do to increase the overall combat effectiveness of the combined arms team. A multiple approach is used. The principles of employment are defined, the aircraft capabilities described, and mission profiles are provided. As a unifying concept, action-oriented scenarios provide the air and ground interface of major combat units in realistic combat situations on a future battlefield. Finally, an overview of aviation unit operations in a high threat environment are described for desert, tropic, mountain, and arctic warfare.

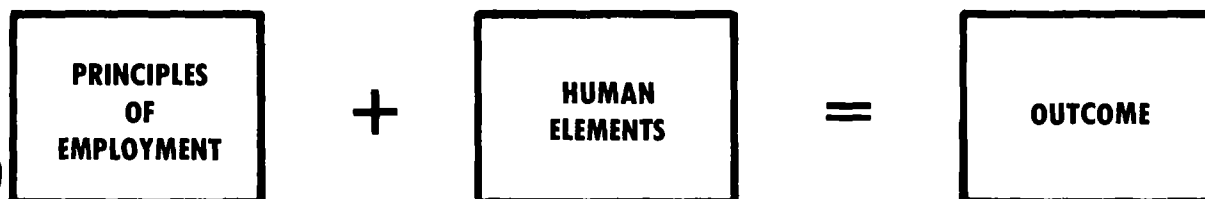
Principles of Employment

The principles of employment are basic guidelines for the tactical employment of Army aviation units to accomplish their objectives (CHAPTER 1) in a high threat environment (CHAPTER 2). The principles of employment are applicable to all aviation elements and units operating in the combat zone. They provide a guide for planning and executing tactical operations for not only air cavalry, attack, and assault units, but for combat support units as well. *The principles of employment constitute a collection of commonsense ideas that must be understood in their entirety but they are not dogma to be rigidly applied.* Their application must be carefully measured for each situation. More emphasis may be placed on one or more of the principles in any particular situation. The considered balance of these principles to meet successfully each specific situation is the aim of the military leader. **By following the principles the commander can attain optimum effectiveness, minimize vulnerability, and maximize survivability.**

In applying these principles, a continued awareness of the threat must be maintained. In fact, the particular threat existing in any given situation forms the base or foundation of knowledge necessary for the optimum application of the principles of aviation unit employment to achieve the commander's objective—tactical effectiveness.

Mere knowledge and understanding of the principles of employment will not provide the solution to every problem of war. The human elements—courage, morale, discipline, and leadership—have a direct bearing on the outcome of any operation and are so vital to success that they deserve constant attention. In the final analysis, sound judgment and commonsense are a vital importance to the successful application of the principles of employment.

EQUATION FOR SUCCESS



The Principles of Employment

- Fight Integrated on the Combined Arms Team
- Exploit capabilities of other services
- Capitalize on intelligence-gathering capabilities
- Suppress enemy weapons and acquisition means
- Exploit firepower
- Exploit mobility
- Integrate fire and maneuver
- Employ surprise
- Mass forces
- Utilize terrain for survivability
- Displace forward elements frequently
- Maintain flexibility
- Exercise staying power

A discussion of important considerations to each principle of employment follows.

Fight Integrated on the Combined Arms Team

Aviation units must be an integral component of the combined arms team, for only through their full and continuous integration into the combined arms force will the helicopter's full combat potential be achieved. For the helicopter, the density and sophistication of enemy air defense weapons systems will also require mutual support as offered by the separate capabilities of the various weapons systems. Furthermore, the firepower of one element reduces threats to the other, thus improving the survivability of all. The effectiveness of helicopters is improved by a *closely knit teamwork* of aviation and ground units that comes from training with each other. For the infantryman and tank, the capabilities of aviation offer great assistance in achieving their portions of the overall mission. **Thus the effectiveness of the total combined arms force is greater than the sum of its elements.** Applying this principle to helicopter operations as a part of the combined arms team—engaging at ranges which minimize their own vulnerability—taking maximum advantage of terrain cover and concealment—coordinating suppression with their movements—operating around the clock and in adverse weather—aviation units can contribute to the favorable outcome of the battle.

Additionally, aviation units must be closely integrated with air defense elements in the area of operation. This will help assure freedom of operation from enemy tactical aircraft, particularly those that may be equipped with new "look down—shoot down" radars and weapons.

Exploit Capabilities of Other Services

The requirement for close air support has not diminished even though armed helicopters have become an integral part of the combined arms team. Attack helicopters perform traditional Army firepower tasks *which in no way conflict or compete with tactical air support provided by other services.* This support must be utilized to the maximum extent possible to aid in suppression, intelligence-gathering, reconnaissance, saturation of air defenses through jamming, electronic warfare and countermeasures, target location and acquisition, and in combined mutually supporting attacks. Just as the combined arms whole is strengthened by integrated combat action, increased survivability of Army aircraft and, thus, **greater mission effectiveness of the combined arms team will be obtained** by exploiting the capabilities of the other services.

Capitalize on Intelligence-Gathering Capabilities

Army aircraft have ability to gather quantities of timely information of the enemy, weather, and terrain, and provide responsiveness equaled by no other intelligence-gathering means available to the ground commander. Observation helicopters can cover larger areas in less time than is possible by the use of ground means. If heavy vegetation negates aerial observation efforts, ground reconnaissance elements may be air-landed to collect the detailed information required. Aviation units use visual, photographic, and infrared means to conduct aerial reconnaissance and provide a battlefield capability through visual observation and radar coverage. Intelligence collection is enhanced by aerial deployment of ground surveillance, target acquisition, and night observation. Additionally, aircraft provide rapid evacuation of prisoners of war and captured documents from forward areas.

Radio direction-finding systems mounted on aircraft organic to Army Security Agency aviation units can provide a capability to detect and locate electronic emissions associated with enemy communications and noncommunications equipment.

Even individual aircraft not performing intelligence missions have the inherent capability of collecting intelligence information. *This inherent capability of aviation can be exploited and the information collected as a byproduct of almost all flights over the battle area.* Such information can be collected in post-flight crew debriefings and submitted to the proper intelligence agency. Therefore, continued emphasis is necessary to:

Exploit the intelligence-gathering ability of organic and supporting aircraft which have high responsiveness, a wide ranging coverage of the battlefield, a unique point of view, equipment ideally suited for collection, and crewmembers who understand the enemy and the ground battle.

Suppress Enemy Weapons and Acquisition Means

The principle of suppression is to degrade the effectiveness of enemy combat power for a given period of time. Because of the forward employment of the ZSU-23-4, the ZSU-57-2, the SA-7's and SA-6's, *aviation units cannot count on surviving on the battlefield if they expose themselves more than momentarily to weapons which are range effective and which have not been destroyed, suppressed, or obscured.*

The principle of suppression requires that:

Attacking elements are prepared to deliver overwatching suppressive fire at all times from carefully selected positions, and they move into and out of these positions with the least possible exposure.

Supporting field artillery, overwatching Cobra TOW and AH-1G, assault helicopters and tanks, antitank-guided missiles and automatic weapons deliver suppressive fires to provide essential protection to those elements moving forward over the best covered routes.

Maximum use is made of attack helicopters, friendly ground fire, artillery, and tactical air suppressive fire. This is mandatory in minimizing the effectiveness of the enemy's air defense.

Unit commanders must be experts on the scope and nature of air defense suppression operations. They must plan and coordinate air defense suppression operations using all available assets or they will not receive effective support from aviation units or air elements of the other services.

Enemy overwatch positions, direct and indirect fire weapons must be suppressed or obscured.

The use of chaff and smoke will degrade the enemy's capability to optically or electronically acquire your aircraft.

Use must be made of electronic countermeasures (ECM) to limit the effectiveness of enemy electronic warfare (EW) equipment.

Exploit Firepower

The commander is able to more fully exploit his firepower capabilities through the employment of Army aircraft to deliver area and point target fire, observe and adjust fires, position artillery and antitank teams, and provide timely ammunition resupply. The attack helicopter provides a standoff antitank, antibunker, antipersonnel weapon system which augments the commander's capability to deliver selective, responsive, accurate, and discriminating fires in the accomplishment of his mission. Through the use of the observation helicopter, the commander is provided with a highly mobile platform to acquire and designate targets and to adjust both his aerial and ground fires. By using the medium lift and utility helicopters to rapidly move towed artillery and to reposition ground antitank teams about the battlefield, the commander can maximize the efficiency of the employment of his ground firepower assets. Finally, Army aircraft provide the commander with the means to rapidly resupply ammunition throughout his area of responsibility to insure the continuous utilization of his firepower assets.

For the maximum firepower advantage the attack helicopter should:

Fire fast and first in an attack helicopter-antitank battle. In such a duel, firing first with accuracy while minimizing exposure time is critical to avoiding destruction.

Be integrated into the fire support and battle plans of the combined arms team.

Be employed early as far forward in battle area as possible.

Fire weapons at maximum effective standoff range compatible with terrain.

Engage the most eminent threat first.

Exploit Mobility

That quality or capability of military forces which permits them to move from place to place

while retaining the ability to fulfill their primary mission is inherent in Army aviation units. Mobility is essential to apply maneuver to establish the concentration of forces or using the principle of mass. Because helicopters have a marked mobility differential over other members of the combined arms team, they provide the means for the commander to rapidly apply heavy, decisive combat power. The rapidity of helicopter movement over obstacles, the maneuver of helicopter firepower into position to engage the enemy, the rapid concentration and prompt dispersal of fire elements, and the ease of convergence on a single objective from several directions permit the employment of concentrated firepower on the objective as the maneuver element closes with the enemy. The inherent capability of the helicopter to overfly obstacles permits the assignment of multiple tasks to helicopter units and also permits their rapid redeployment to a more critical sector once committed.

Mobility through the use of aviation assets:

Allows a gain of 5-to-1 equivalent force ratio over the enemy for an attack.

Allows a gain of 20-to-1 equivalent force ratio over the enemy during exploitation.

Integrate Fire and Maneuver

This principle employs two common features of warfare—a base of fire element and a maneuvering element. A base of fire is the element that restricts the enemy's ability to maneuver during the engagement. The maneuvering force is the element that attacks and destroys the enemy by fire. Their roles may be interchanged when the maneuvering force completes its task and becomes the new base of fire, while the old fire element becomes the new maneuvering force. Helicopters have both the firepower and the maneuverability to accomplish the mission. By maneuvering, the commander can dispose his force in such a manner as to place the enemy at a disadvantage and thus achieve results that would otherwise be more costly in men and materiel. By maneuvering, combat power is moved to provide the necessary mass at the proper time and place for mission accomplishment. Helicopters can also aid in

positioning of military forces to accomplish the principle of fire and maneuver.

Mass Forces

Combined arms forces must concentrate superior combat power at the critical time and place. This requires immediate accurate intelligence, mobility, firepower, training, and effective decision making. Aviation units help achieve the principle of mass by being able to rapidly move combat power by concentrating maneuver forces and firepower, and by rapid combat service support to gain an advantage over the enemy.

In order to accomplish the principle of mass, the following fundamentals must be observed:

One of the primary missions of the utility, medium and heavy lift helicopters is to give the ground force commander the ability to rapidly move both firepower and forces about the battlefield without regard to the tyranny of terrain. The firepower of the attack helicopter also offers the ground commander a capability of a system that exceeds any other at his disposal in maneuvering firepower quickly about the battlefield.

Assault helicopter forces provide an excellent means for the commander to rapidly exploit assailable flanks before the enemy is able to reposition elements to fill the gap in his defenses.

The unique fire and maneuver capability of attack helicopter units allows them to deny and dominate key terrain and major avenues of approach on the battlefield. The helicopter cannot hold ground but, with the heavy hitting power of its attack elements, can make the enemy pay too heavy a price to seize a given piece of ground. When driven from a terrain position by heavy enemy artillery fire, for example, the attack helicopter force still has the capability to rapidly shift to adjacent terrain and continue to cover by fire the ground it had previously occupied.

Early use of aeroscouts at the FEBA or area of contact to assist in rapid tactical commitment of attack helicopters upon decision by the commander.

Attack helicopters should be employed in large numbers at critical points. This means they will normally be committed to platoons, companies, and battalions in a series and recycled back into action as rapidly as they can be reformed and refueled.

Concentration of attack helicopters with antitank capability to destroy massed enemy tank forces.

Utilize Terrain for Survivability

Employ Surprise

With their high mobility and ability to operate from front line locations, helicopters can strike the enemy when, where, and in a manner for which he is unprepared, thus using the principle of surprise. By using the speed, maneuverability, and firepower of the helicopter to aggressively attack the enemy at an unexpected time and from an unexpected direction, surprise is achieved. *Terrain flying using concealment and cover, the maintenance of radio silence or deception, and around-the-clock capabilities are key factors in providing the element of surprise.* Surprise is also accomplished through taking advantage of adverse weather.

Army combat aircraft in forward battle areas must use terrain flying in order to survive. Scout, attack, utility, and cargo helicopters must live and operate in an environment characterized by the enemy's use of sophisticated air defense weaponry. So effective are these systems that *any target that can be seen or detected by the enemy can be engaged and destroyed.* Aircraft must use protection afforded by the terrain to conceal their movement to minimize exposure to direct fire weapons and air defense radar systems, and to deny the enemy intelligence concerning locations of friendly troops and installations. However, terrain flying is more than flying close to the ground. It involves utilizing the ground and vegetation for protection. Terrain flying down

forward slopes will not necessarily afford protection against radars sensitive to moving targets or whirling rotors as in the case of the ZSU-23-4 radar. Normally, Army fixed-wing aircraft operate with a combination standoff range and minimum altitudes to insure survival and effectiveness; however, the situation may require over-the-hill reconnaissance capabilities peculiar to the OV-1. Such an effort would require a concerted operation involving electronic suppression, fire support, and air defense suppression.

Because of the threat:

The first cardinal rule in minimizing vulnerability to enemy fire is proper use of concealment or cover.

Exposed forces will be destroyed unless they effectively employ their weapons at maximum effective ranges and use terrain to reduce vulnerability.

Any part of the defense which can be seen by the enemy will be destroyed or suppressed. Every commander from squad to battalion must inspect his defenses from out front—from the terrain from which the enemy's direct and indirect fire weapons will be brought to bear on his defenses. The same thought applies to the air. The commander must insure that his force is covered by air defenses so that every enemy tactical aircraft, especially those with "look down—fire down" capabilities are denied effective operations.

**Displace Forward
Elements Frequently**

Because of the increased ability of potential enemies to acquire targets and the telltale signature of Army aircraft, such as their communication and navigation aids, commanders must expect that their *aircraft will have only limited survivability if they remain static* for extended periods of time. In fact, the closer to the FEBA a unit is located, the more vulnerable it is to early acquisition and destruction. The same probably will be true for forward area command posts frequented by aircraft—even those few used for command and control. Therefore, bivouac and

refueling sites must be moved periodically and landing areas must be offset from unit locations and facilities to the maximum extent feasible. Hours rather than days will be the norm for how long such elements may remain in place.

In positioning aviation units on the high threat battlefield, commanders must not only displace elements frequently and properly utilize terrain but must also consider the maximum use of dispersion consistent with security and mutual support limitations. Because of the lucrative target presented by large aviation complexes, all aviation unit operations and training facilities should be dispersed and positioned outside the range of enemy light and medium artillery when possible. Therefore, in most cases they will be located in the brigade rear area when functioning as part of the combined arms forces. Aircraft in static positions should be camouflaged to protect against detection by enemy aircraft.

In selecting positions for his aviation elements, the commander must consider factors such as command relationships, mutual support and security requirements, and mission, enemy, terrain, time and troops available.

Aviation units must generally be close enough to ground forces to permit rapid reaction and deployment with these units while receiving assistance in providing for local security. However, the principle of frequent displacement and wide dispersion in positioning aviation assets requires that:

When requirements do not dictate that aviation units be positioned in the forward battle area, they should be located far enough to the rear to reduce the possibility of destruction by enemy artillery fire. Generally this should be beyond the reach of medium artillery fire.

The size of aviation elements will also be a factor in determining the degree of dispersion needed to reduce the size of the target offered to enemy weapons. In addition, the farther forward elements are placed, the greater the degree of dispersion required consistent with the other factors of security and mutual support.

Owing to the extended range of enemy weapons, forward area operations such as landing zones and forward refueling and rearming points (FARRP) must be dispersed and shifted frequently. Forward operational refueling and rearming between missions should be conducted in areas separate from bivouac areas and command posts. Frequency of use of any facility greatly increases the chance of detection and destruction.

Consideration must be given to the use of dispersed, existing manmade structures such as tunnels, buildings, and bridges and natural terrain features to protect and camouflage aviation maintenance and other operations from enemy visual and electronic devices including satellites.

Maintain Flexibility

Mobile warfare requires flexibility in responding to rapidly changing situations on the battlefield. Helicopter units possess excellent means of communications, a high degree of mobility, and a variety of weapons that are ideally suited for operations in a mobile warfare environment. They can rapidly respond to changes in enemy attack formations and tactics. To fully exploit these capabilities, a commander must keep his troops, himself, and his superiors well-informed and must be able to rapidly adapt his plans to fit the overall combined arms mission. Use of mission-type orders provides the most flexible means of responding to rapidly developing situations and changing conditions that are characteristic of mobile warfare.

Exercise Staying Power

Staying power involves the capability to remain effective on the battlefield around the clock and in adverse weather conditions. While in the past aviators have been taught night flight and instrument flight, these capabilities generally have not been adapted to standard battlefield doctrine. True, night operations have been the exception, not the standard. Yet, hardware already exists for effective night flight and tactical instrument operations. Thus the intention and the requisite training are keys for the establishment

of true staying power. Once the intention is established, new hardware improvements will come along to enhance basic capabilities.

For example, while crewmembers, flying without the aid of night vision equipment, can perform many normal daytime duties with efficiency, they can gain marked increase in capabilities with night vision goggles and forward looking infrared (FLIR) equipment.

To exercise staying power there is a need for emphasis on:

Individual crewmember and unit proficiency so as to be able to exploit the protection provided by flight during hours of darkness or limited-visibility conditions.

Proper planning and maintenance procedures to sustain the vitality of tactical aviation operations providing quick-fix sites well forward of major maintenance facilities in rear areas. Modular part replacement expedites repair and return of aircraft to combat.

Operations of aviation units on an around-the-clock basis to provide immediate response to requests for aerial fires and the movement of urgently needed troops and supplies.

Operating in darkness or other conditions of reduced visibility in order to take advantage of the reduced range and accuracy of enemy observation and fire.

The ability to fly during intermittent or sustained instrument flight conditions as required to remain combat effective longer.

Control and distribution of antitank fires in order to kill targets rapidly, conserving ammunition to engage the next attacking echelon.

Establishing mobile FARRP's within the forward battle area to reduce turn-around time and fuel consumption, thus increasing responsiveness, enhancing stamina, and reducing time spent away from the mission area.

Insuring that all commanders and planners understand the requirements for maintenance, rearming, and refueling which have an impact on the helicopter's

staying power. For example, if a given number of helicopters are required to defend a sector, it may take two to three times that number to insure continuous coverage while elements rotate through required maintenance, rearming, and refueling. Approximately one-third of the force will be committed at a given time with possibly a reduction in the size of the committed element when there is a lull in the action.

Summary

The principles of employment are designed to gain maximum tactical effectiveness and survivability as well as to get full measure from the capabilities of aircraft and personnel.

The combined arms commander utilizes aviation resources to accomplish specific missions, thereby increasing the effectiveness of his force. Army aircraft are employed in a wide range of roles and operations. Table VI is a summary of those operations and the degree to which Army aircraft, as a part of the combined arms team, can contribute to the overall success of the mission. Also depicted are the major capabilities provided by Army aircraft and the significant limitations which impact on each individual type operation.

From the following table, it can be seen that the significant capabilities of Army aviation units

outweigh the limitations. Even in those operations identified as not being ideal for employment of Army aviation units, Army aircraft can provide to the combined arms team commander an important segment of the firepower, mobility, and staying power available to him. Thorough planning, innovation, imaginative execution and comprehensive training in conjunction with proper utilization of the principles of employment outlined earlier will reduce the effects of these limitations. Equipment presently in the developmental process and future technological breakthroughs promise to reduce these limitations even further. However, threat changes and advancements in enemy capabilities will continue to make both the capabilities and limitations variables in the combat success equation.

Roles and missions of each Army aircraft will next be presented followed by realistic combat scenarios that portray the principles of employment.

Table VI. Aircraft Effectiveness

OPERATIONS	EFFECTIVENESS				AIRCRAFT CAPABILITIES													AIRCRAFT LIMITING FACTORS									
TYPES OF OPERATIONS FOR ARMY AIRCRAFT PERFORMING MISSIONS IN COMBINED ARMS OPERATIONS	DEGREE OF AIRCRAFT EFFECTIVENESS				RAPID MOBILITY	HIGH VOLUMES OF FIRE POWER	TANK KILLING AT STANDOFF RANGES	RECONNAISSANCE AND INTELLIGENCE	SECURITY	RESPONSIVE LOGISTICAL SUPPORT	ECONOMY OF FORCE	AIR DEFENSE SUPPRESSION	COMMAND AND CONTROL	DOMINATE, DENY, AND COVER KEY TERRAIN	BYPASS RESTRICTIVE TERRAIN & OBSTACLES	FIRE ADJUSTMENT	MEDICAL EVACUATION	REQUIRES TAC AIR AND AIR DEFENSE SUPPRESSION	RESTRICTED COMMO BECAUSE OF TERRAIN FLIGHT AND ENEMY EW	ADVERSE WEATHER	LACK OF NIGHT VISION DEVICES	LACK OF SIGHT OF ENDURANCE	AIRCRAFT LOAD RESTRICTIONS	VULNERABILITY OF FORWARD ELEMENTS TO ARTILLERY	HIGH VOLUMES OF LOGISTICS SUPPORT	LACKS AIRCRAFT SURVIVABILITY EQUIPMENT	LACKS TARGET ACQUISITION AND DESIGNATION EQUIP
	OPTIMUM	EFFECTIVE	MARGINALLY EFFECTIVE	NOT EFFECTIVE																							
OFFENSE:																											
MOVEMENT TO CONTACT	X				3	3	3	3	3	3	3	2	3	3	3	3	3	1	0	0	0	0	1	1	0	0	0
HASTY ATTACK	X				3	3	3	3	3	3	3	2	3	3	3	3	3	1	0	0	0	0	1	1	0	0	0
DELIBERATE ATTACK		X			3	3	3	2	2	3	2	2	2	2	3	3	3	0	0	0	0	1	0	0	0	0	0
EXPLOITATION	X				3	3	3	3	3	3	3	2	3	3	3	3	2	1	0	0	0	0	0	1	0	0	0
PURSUIT	X				2	3	3	3	3	3	3	2	3	3	3	3	3	1	0	0	0	0	0	1	0	0	0
NIGHT ATTACK			X		3	2	1	1	1	1	1	1	1	1	3	1	3	0	0	0	0	1	1	0	0	0	0
INFILTRATION		X			3	3	3	2	2	2	3	2	2	3	3	3	3	0	0	1	0	0	0	1	0	0	0
COVERING FORCE		X			3	3	3	3	3	3	3	2	3	3	3	3	3	0	0	0	0	0	0	1	0	0	0
DEFENSE:																											
ACTIVE DEFENSE		X			3	3	3	3	3	3	3	2	3	3	3	3	3	0	1	0	0	1	0	0	0	0	0
RETROGRADE:																											
WITHDRAWAL		X			3	3	3	3	2	3	3	2	3	3	3	3	3	1	1	0	1	2	1	1	1	0	0
DELAY		X			3	3	3	3	2	3	3	2	3	3	3	3	3	0	0	0	0	1	0	1	0	0	0
RETIREMENT	X				3	3	3	3	3	3	3	/	3	3	3	3	3	2	2	1	2	2	1	2	1	2	2
RELIEF OPERATIONS:																											
PASSAGE OF LINES		X			2	2	1	1	2	3	/	2	3	2	3	1	2	0	1	1	1	2	1	0	1	1	0
SPECIAL OPERATIONS:																											
AMPHIBIOUS OPERATIONS		X			3	3	3	2	2	3	3	2	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0
LINK-UP OPERATIONS			X		3	3	3	2	2	3	3	2	3	3	3	3	3	0	0	0	0	0	0	1	0	0	0
RAIDS – SPOILING ATTACKS		X			3	3	3	3	2	2	3	2	2	3	3	3	3	1	1	1	1	2	2	1	1	1	1
DECEPTION, FEINTS, DEMONSTRATIONS AND RUSES		X			3	3	3	3	3	3	3	2	3	3	3	/	3	0	0	0	0	0	0	0	0	0	0
AIR ASSAULT OPERATIONS	X				3	3	3	3	3	3	3	2	3	3	3	3	3	0	0	0	0	1	0	0	0	0	0
COMBAT AT RIVERLINES		X			3	3	3	3	3	3	3	2	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0
COMBAT AGAINST FORTIFIED AREAS				X	3	3	3	1	1	1	1	1	1	1	3	1	1	2	2	1	1	1	1	2	1	2	2
CIVIL DISTURBANCES/POPULACE CONTROL		X			3	/	/	3	3	3	3	/	3	/	3	/	3	1	1	1	0	1	1	1	1	1	1
STABILITY OPERATIONS		X			3	3	3	3	3	3	3	2	3	3	3	3	3	0	1	0	0	1	1	1	0	0	0
RIVERLINE OPERATIONS		X			3	3	/	3	3	3	3	2	3	3	3	3	3	1	1	0	0	1	1	1	1	1	1
UNCONVENTIONAL WARFARE	X				3	3	3	3	3	2	3	2	3	3	3	3	3	1	1	1	0	1	0	2	1	0	1
ANTI-AIRBORNE OPERATIONS		X			3	3	3	3	3	3	3	2	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0
HELICOPTER VERSUS ARMOR	X				3	3	3	3	3	3	3	2	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0
HELICOPTER VERSUS INFANTRY	X				3	3	/	3	3	3	3	2	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0
HELICOPTER VERSUS MODEST AIR DEFENSE		X			3	3	/	3	3	2	3	2	3	3	3	3	2	0	0	0	0	0	0	0	0	0	0
ATTACK OF BUILTUP AREAS			X		3	3	3	3	3	3	2	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0
OPERATIONS IN NBC ENVIRONMENT		X			3	3	3	3	3	3	3	2	3	3	3	3	2	1	1	0	1	0	1	0	0	0	0
SEARCH AND RESCUE OPERATIONS	X				3	3	3	3	3	3	3	2	3	3	3	3	2	0	0	0	0	0	0	1	2	0	1
PSYCHOLOGICAL OPERATIONS		X			3	3	/	3	3	/	3	2	/	3	3	3	2	1	1		1	1	1	2	1	1	1

(1) AIRCRAFT CAPABILITIES

(2) AIRCRAFT LIMITING FACTORS

3 - OPTIMUM

0 - MAJOR

2 - EFFECTIVE

1 - MINOR

1 - MARGINALLY EFFECTIVE

2 - NONE

0 - NOT EFFECTIVE

Roles and Missions

Each member of the family of Army aviation units performs at least one of the five functions of land combat: firepower, mobility, intelligence, command and control, and combat service support. From his aviation unit assets, the ground commander inherits a considerable increase in his capability to carry out the missions demanded of him. However, many in the Army often have a tendency to view "Army Aviation" as a separate entity which causes considerable misunderstanding. Further confusion exists because Army aviation units of all types and sizes are integrated throughout the entire force structure of the Army. *Many of these units are equipped with identical aircraft with similar mission configurations. Yet, the unit roles and missions are widely diverse.*

To clarify these points, it must be understood at the outset that Army aviation is not a branch of the Army, but provides the combat and supporting arms as well as the Army at large with an aerial capability to augment well-defined roles and missions based on requirements. In short, Army aviation units must be thought of and employed as a member of the combined arms team. Generally speaking then, aviation unit proponentcy rests with the arm the unit serves. A brief guide for the organizational and doctrinal proponentcy of Army aviation units follows:

Armor:

- Air cavalry units
- Attack helicopter units
- Air cavalry combat brigade

Artillery:

- Artillery aviation elements

Infantry:

- Assault helicopter units

Transportation:

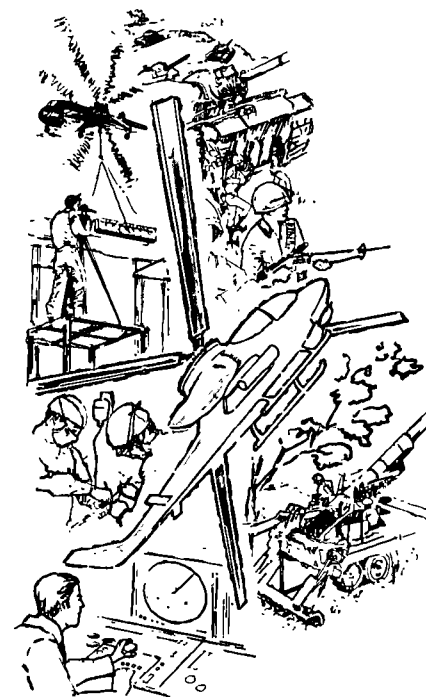
- Medium and heavy helicopter units
- Aircraft maintenance units and related systems

Intelligence and Army Security Agency:

- Military Intelligence aviation units and related systems

The United States Army Aviation Center:

- Air traffic control units and related systems
- (Additionally, the Aviation Center coordinates the overall effort with all other proponent agencies for aviation doctrine, training, programs, policies, units, aircraft systems, and related equipment, to insure responsiveness to the overall Army requirement.)



The discussion of unit roles and missions which follows does not encompass all Army aviation units and activities, but includes those which the combined arms commander could normally expect to employ.

Air Cavalry Troop/Squadron

MISSION

The air cavalry mission is to perform reconnaissance, security, and surveillance to provide real-time intelligence concerning the enemy terrain and weather throughout the battle area and to alert or provide protection against enemy observation or attack.

ORGANIZATION

As with most aviation organizations, air cavalry troops and squadrons vary in composition based on unit of assignment and mission requirement. The units presented here represent type air cavalry units currently in the force structure.

A peculiarity of air cavalry troop organization is that each platoon is pure: scouts, attack helicopters, and infantry with its organic utility helicopters. This is unlike its ground counterpart, the armored cavalry, where each platoon in reality is a small combined arms force. This does not mean, however, that the air troop remains in this configuration for combat. When an armored cavalry troop scrambles, it essentially means that platoons reorganize into a pure configuration, scouts, tanks, infantry and mortars. Conversely, in an air cavalry scramble, the air cavalry troop commander task-organizes his unit to best accomplish a particular mission. Additionally, aircraft availability rates have significant impact on his ability to do this effectively. Since the air troop has four different types of aircraft, a balanced scramble is not always possible or even desirable. Therefore, task organization for the air cavalry troop usually takes on the appearance of a partial scramble. However, the built-in flexibility of the unit allows this to be accomplished without adverse effect, partially because of the decentralized characteristics of air cavalry operations. The very nature of these decentralized operations places added responsibilities on junior leaders, demanding an ability to evaluate situations accurately and to make rapid decisions which could ultimately affect the entire force. (See fig. 3-1, 3-2.)

ASSIGNMENT

Air cavalry troops are assigned to the Armored Cavalry Squadron of the Armor and Mechanized Infantry Division and the Cavalry Squadron of the Airborne Division.

Air cavalry squadrons are assigned to the Air Assault Division, Infantry Division, and the Air Cavalry Combat Brigade. Separate squadrons may also be assigned to Corps or an Aviation Group.

GENERAL

Essentially air cavalry units conduct the same missions as their ground cavalry counterparts. Using the flexibility, mobility, and firepower provided by helicopters, air cavalry can greatly expand and accelerate conventional cavalry functions. *All air cavalry missions must be considered in the economy of force category, using minimum resources to find and fix the enemy and to develop a situation so that major combat forces can be effectively employed at the proper place and time.* Thus, air cavalry may operate independently, but it is most effective when employed in conjunction with ground forces, particularly a cavalry ground force whose organization and training is totally consistent and compatible with air cavalry concepts and primary mission requirements. Air cavalry pays the biggest dividends when tactical operations are fast moving or changing, and the terrain is difficult for the movement of ground forces. Air cavalry can move at speeds commensurate with or greater than ground force main bodies on high speed approaches and still provide early warning or protection.

Reconnaissance, of course, is a primary function of air cavalry. Zone, area and route reconnaissance is performed primarily by the aeroscout elements of the unit. Aerorifle elements augment this capability and are employed when information cannot be obtained from the air, in missions such as providing bridge classification or operating in heavily vegetated areas. The attack helicopters of the cavalry unit primarily provide security for the air and ground reconnaissance elements, but are in no way limited to merely a security role and will kill any target commensurate with the overall unit mission.

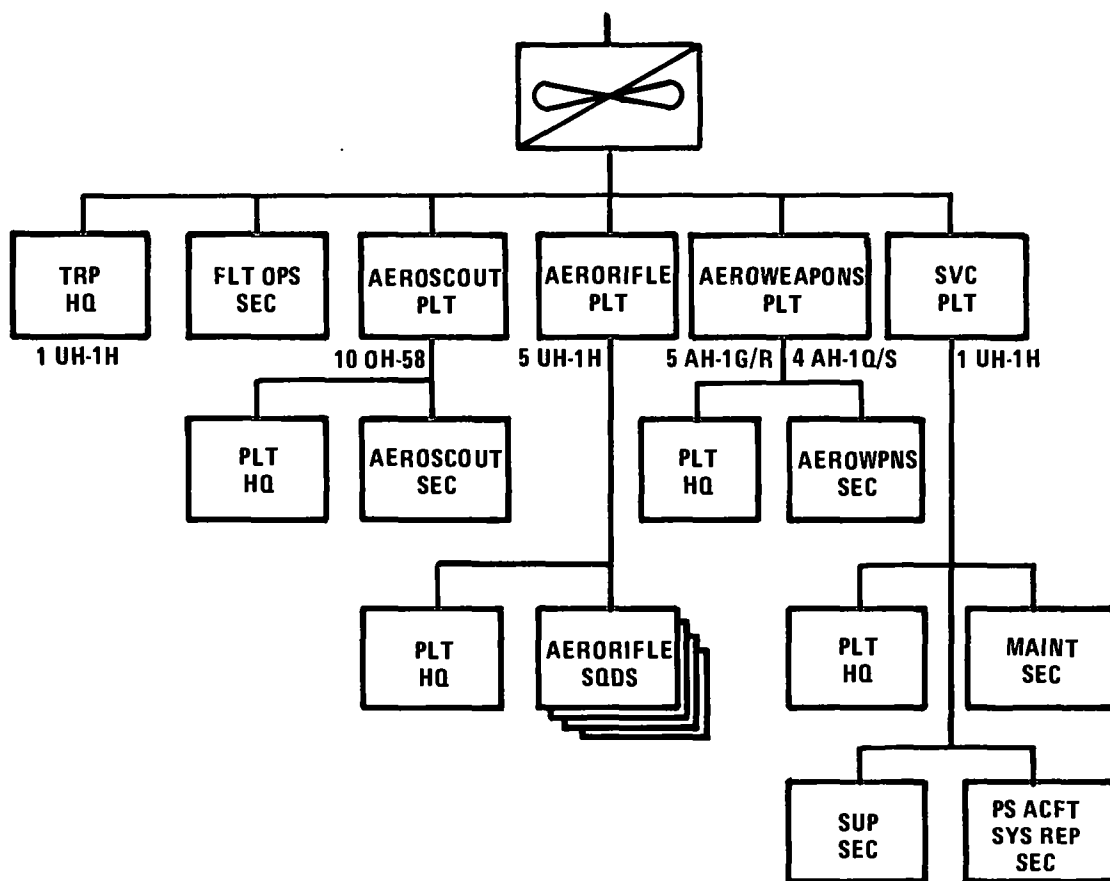


Figure 3-1. Type Air Cavalry Troop.

Security is also a major air cavalry task. This is accomplished by providing a screen to give early warning to a particular force. Air cavalry units may also be employed as a part of an advanced, rear, or flank guard to protect a force, or as part of a covering force. Air cavalry is also capable of conducting raids, limited objective attacks, and can seize lightly defended areas and hold them for limited periods of time. Additionally the attack

helicopters can dominate terrain by fire. Because of the high mobility and diverse mission capability, air cavalry is excellent for rear area security operations. Rear area security in the high threat environment may assume overwhelming significance if threat forces employ airborne, air assault or major irregular forces in friendly rear areas.

We must remember, however, that every air cavalry mission keys on the aeroscout. *Air cavalry is designed for reconnaissance, intelligence-gathering, and security and not to perform the heavy combat tasks associated with annihilating enemy forces.* The troop has four Cobra TOW aircraft, and any tanks they may kill will be done while in the process of gathering information or developing a situation for the employment of major combat forces. *The proper use of air cavalry then can take much of the guesswork out of the combined arms commander's tactical decisions, thus allowing his force to act rather than react.*

Without doubt, air cavalry missions are more diverse than those of any other type aviation unit missions. All the combined arms commander has to do is to give the air cavalry commander a mission order and allow him the freedom to accomplish it. Air cavalry troop assets are delicately balanced and the unit should not be piecemealed or fragmented. The air cavalry commander is an expert on the employment of his unit, and his advice should be sought.

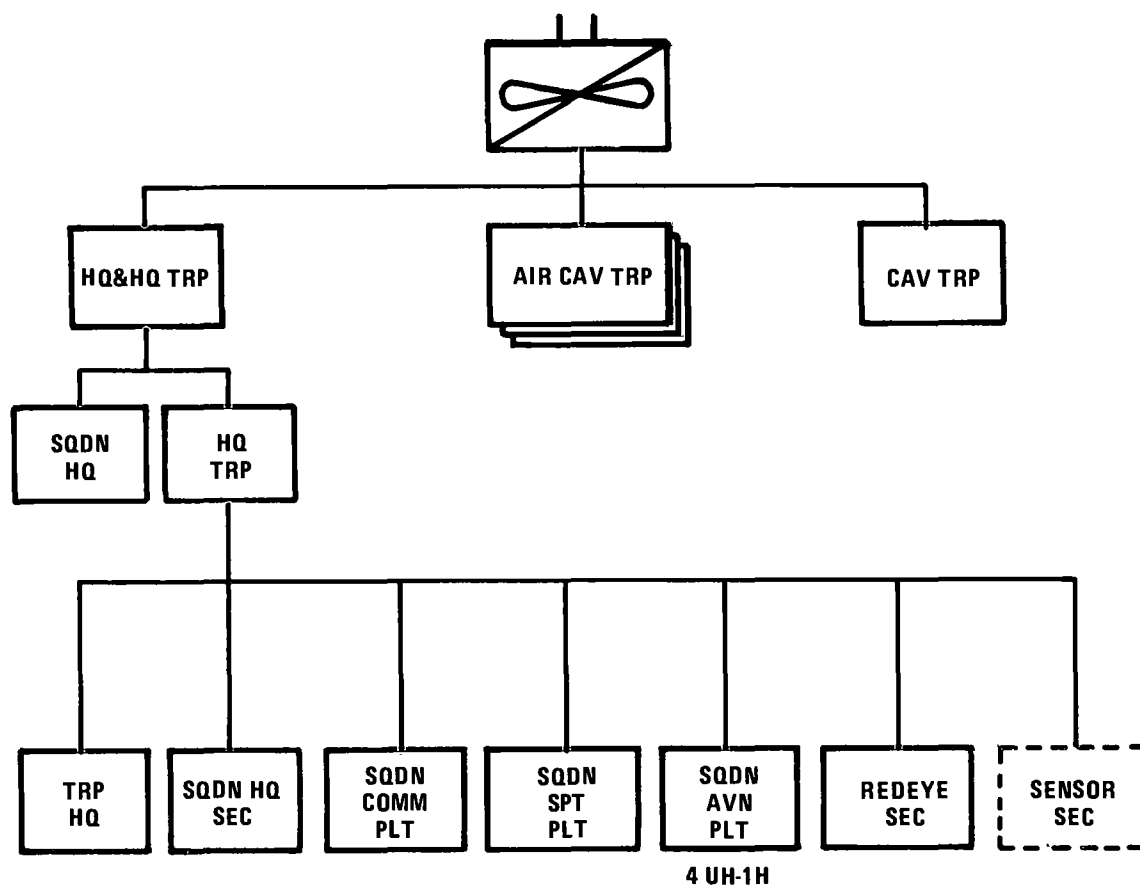


Figure 3-2. Type Air Cavalry Squadron.

Air Cavalry Troop

MISSION

Action: Reconnaissance

Problem: To provide detailed and timely reconnaissance information for an armored division in a movement to contact.

Situation: A U.S. armored division is preparing to execute a movement to contact. Proposed primary and alternate routes for the divisional elements have been selected by map reconnaissance. However, the available maps of the area are not accurate enough for complete planning, inclement weather conditions preclude Air Force reconnaissance and aerial photos, and recent damage caused by the enemy has not been clearly determined or evaluated. The division commander assigned the mission of zone and route reconnaissance to the armored cavalry squadron. The squadron commander, in turn, assigns the missions of route reconnaissance to the three armored cavalry troops and a mission of zone reconnaissance to the air cavalry troop.

SOLUTION

Air Cavalry Troop Contribution: Using teams formed from its organic platoons, the air cavalry troop conducts a detailed reconnaissance of the zone and orients its activities on gathering intelligence and reporting information of enemy activity, meteorological conditions, geographical profiles and trafficability conditions—in short, all factors that may affect, either favorably or unfavorably, the division plan.

How: The air cavalry troop commander assigns primary responsibility for accomplishing the zone reconnaissance mission to the aeroscout platoon. Scout sections and teams are assigned specific zones of responsibility. The other troop elements respond to and support the scouts and employ terrain flight techniques to reduce their vulnerability to enemy air defense systems. The aerorifle platoon is employed for reconnaissance of areas which cannot adequately be covered from the air; for example, bridge classification, fording site survey, and barrier neutralization appraisals. Attack helicopters protect air and ground elements and direct aerial fires from overwatch positions. The aerial scouts keep continuous reports on their progress flowing to the division.

Result: By using the aerial scouts and the air cavalry troop to perform the reconnaissance, a thorough reconnaissance of the area can be accomplished in a matter of hours when ground means may have taken days. With this rapid intelligence-gathering source, the division is able to alter or confirm plans concurrent with the reconnaissance reports. The intelligence gathered by the troop results in eliminating costly delays and its near real-time value serves to take most of the guesswork out of the operation.

Air Cavalry Squadron

MISSION

Action: Covering force

Problem: To provide timely battlefield information and increase the overall combat capability of the covering force.

Situation: An air cavalry squadron (separate) has been placed under optional control of a reinforced armored cavalry regiment deployed in the covering force area. The mission of the covering force is to cause the enemy to commit his main attack early and then attrite the enemy force forward of the main battle area. Intelligence indicates that the attack by threats forces is imminent.

SOLUTION

Air Cavalry Squadron Contribution: The air cavalry troops of the squadron are assigned sectors of responsibility consistent with mission requirements. Because of the width of their sectors and the enemy situation, mixed teams of scout and attack helicopters are employed to provide long-range observation to determine enemy intentions and main thrust lines. The scouts adjust artillery fires on the enemy to cause him to deploy. Attack helicopters provide overwatching fires from standoff ranges for the scouts and destroy or suppress enemy weapons attempting to engage the scout helicopters. Aerorifle elements establish observation posts to supplement the aerial security effort and are airlifted as an immediate reaction force as the situation dictates. These coordinated actions by the squadron's subordinate elements are orchestrated by the squadron commander in such a manner as to cause the enemy to lose the element of surprise, to slow his advance by suffering maximum casualties, to expend large amounts of ammunition and equipment, and to commit his main attack early. When the enemy's main attack forces are committed, the covering force units are maneuvered into position to inflict maximum destruction.

How: Air cavalry troops are assigned sectors of responsibility. As part of the overall plan for the regiment, the air cavalry elements provide early warning information about the enemy on specific avenues of approach, and identify areas where the enemy has penetrated into the covering force area. The attack helicopters protect the scouts by destroying enemy weapons, suppressing enemy positions, and destroying enemy armor as it advances. Aerorifle elements can be held as a quick reaction force or employed in ambushes, observation posts and mobile antitank teams. The high mobility, flexibility, and speed of air cavalry elements enable the squadron to extend over wide frontages and react rapidly to a fluid battle situation.

Result: The approaching enemy force is denied the element of surprise and his main routes are determined. The covering force inflicts maximum destruction on the enemy's attack forces forward of the main battle area and the valuable intelligence is gathered concerning strengths and weaknesses of the enemy's order of battle.

Attack Helicopter Company / Battalion

MISSION

To destroy or disrupt enemy armor and mechanized forces by aerial firepower.

ORGANIZATION

The organization of the type attack helicopter company and battalion currently in the force structure is represented in Figures 3-3 and 3-4.

ASSIGNMENT

Attack helicopter company/battalion(s) are assigned to the Corps, Air Cavalry Combat Brigades and Aviation Groups, and the Air Assault Division.

GENERAL

The attack helicopter unit is uniquely designed to be integrated into combined arms operations. Attack helicopter units are in reality *combat maneuver units*. Attack units should be employed as *units* and not fragmented. Their employment then must be integrated into the overall scheme of maneuver and fire planning of the ground force. It must be kept foremost in mind that *attack helicopter units are markedly more effective on a battlefield characterized by enemy movement*. This is because of the helicopter's significant mobility advantage over armored vehicles, and the requirement to use maximum standoff engagement techniques which maximize kills and enhance survivability. If attack helicopters are used to attack well dug-in and concealed enemy forces who possess substantial size and capability, effectiveness is decreased and attack helicopter loss rates will be higher. Early target acquisition favors the enemy in this situation because helicopters would be forced to engage at

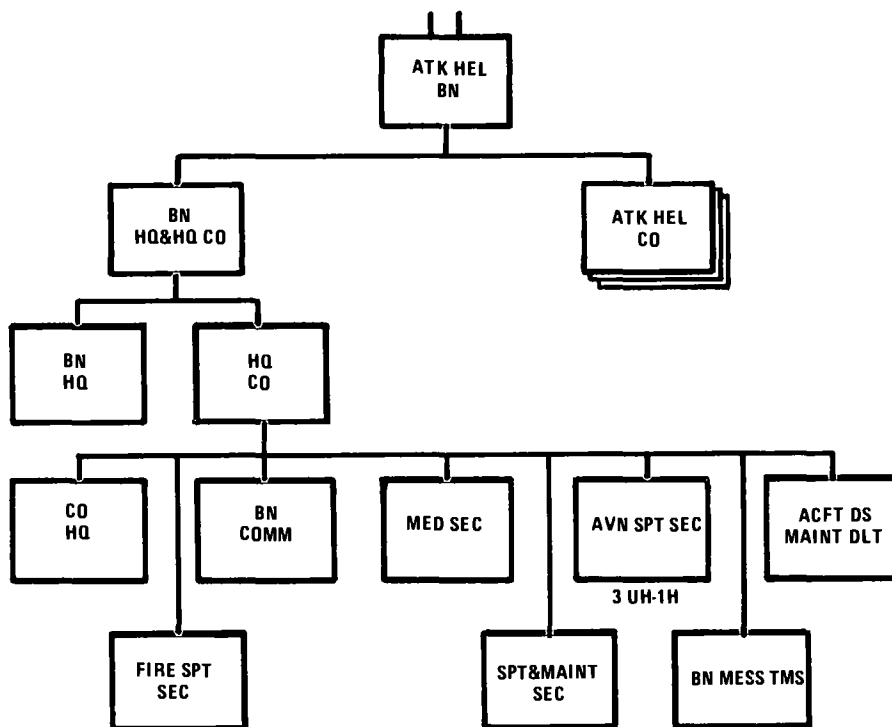


Figure 3-3. Type Attack Helicopter Battalion.

extremely short ranges, and opposing air defense will be stationary and have terrain advantages.

The flexibility and speed at which attack helicopter units can move allow them to rapidly respond to developing enemy threats such as an enemy breakthrough. But as with any force, the attack helicopter units' effectiveness is greater when they are committed early to allow time for planning. Attack helicopter units can then fight on their terms gaining an early advantage. If for example, the attack helicopter unit had been placed on this particular avenue of approach and integrated into the overall defense, chances are a breakthrough would not have occurred in the first place, precluding considerable casualties and equipment losses always associated with bruising breakthrough confrontations.

Attack helicopter units are singularly designed to kill the enemy. They do this by orienting on the enemy force and destroying it. Their mobility and firepower allow them to strike the enemy at the critical point and time. They can be used to exploit enemy weakness or attrite enemy strength. The dynamics of the modern battlefield will present ample opportunity to do both. Even though enemy forces will be large, exposed or assailable flanks will exist, allowing attack helicopter units access

to enemy flanks and rear areas where they can cause destructions, disruptions, and confusion, diverting resources and attention from enemy forward forces. Although attack helicopter units cannot seize terrain, they can dominate it for limited periods of time, thus denying its use to the enemy. Additionally, attack helicopters must be committed in strength enabling them to mass their fires and to promote continuous operations. This is accomplished through a series of ambushes in width and depth. Attrition is the method, destruction of the opposing force is the goal.

A close working relationship between the ground and attack helicopter unit commander is essential. Each must thoroughly understand the capabilities and limitations of the other. Further information on attack helicopter employment concepts is contained in TC 17-50-1 and TC 17-45-1. Also many innovative concepts are included in unit tactical SOP's which are designed for a particular area and the threat with which you may be confronted. Moreover, imagination and innovation are still the bywords of attack helicopter operations which preclude actions from becoming totally predictable. The following are examples of how attack helicopter units may be employed.

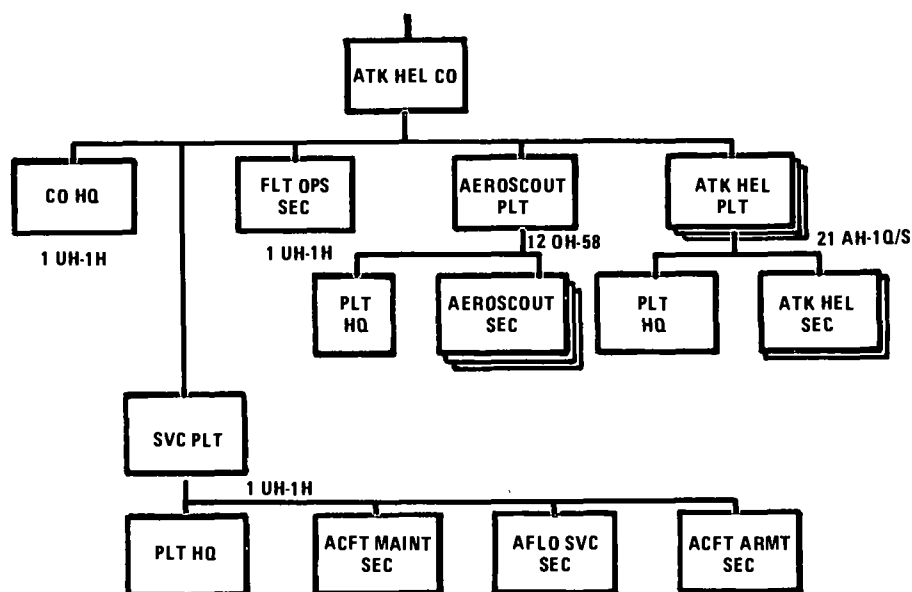


Figure 3-4. Type Attack Helicopter Company.

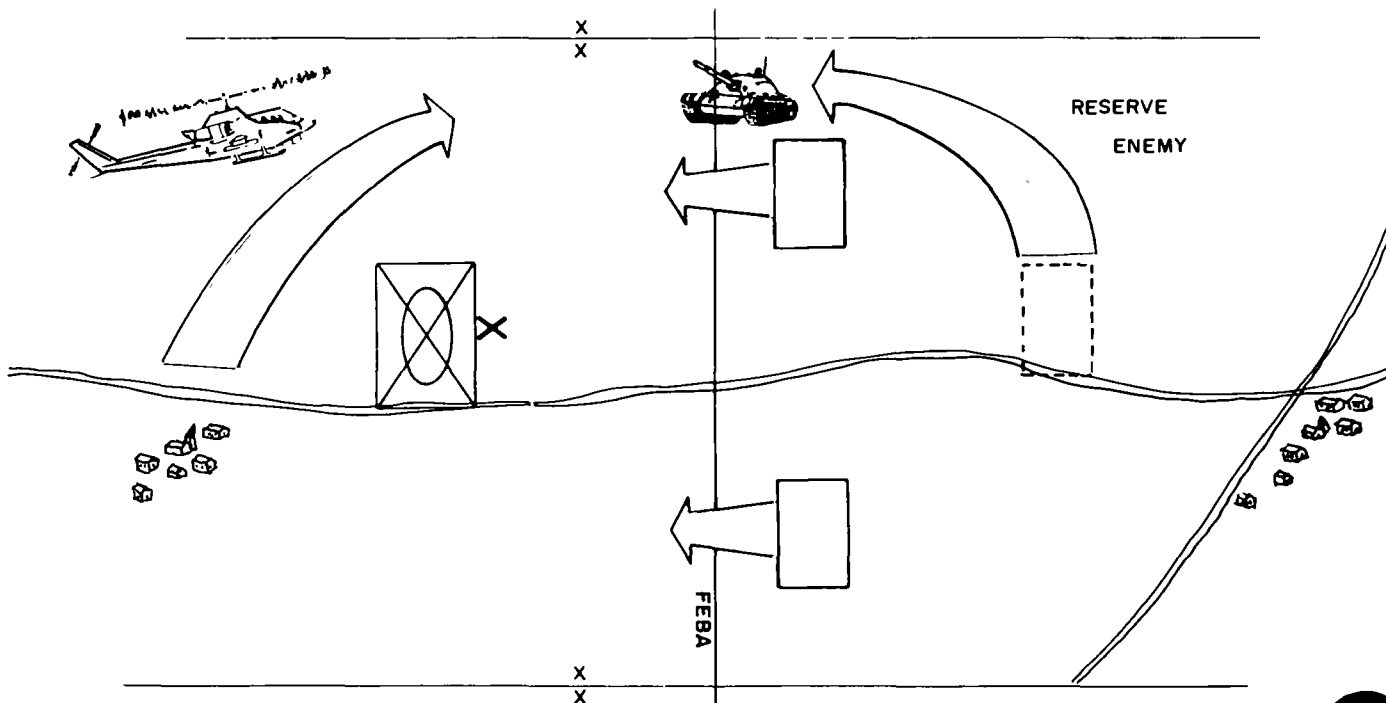
Attack Helicopter Company

MISSION

Action: Reinforcement

Problem: To reinforce a battalion threatened with a penetration by enemy armor.

Situation: A U.S. armored division is defending in the main battle area on the northern flank of the corps with three brigades forward and a reinforced task force in reserve. Battle has been heavy and the enemy has shifted his emphasis from the planned main attack in the south where it met stiff apposition when the division reserve was committed. The enemy committed his reinforcements to the extreme northern brigade area and the brigade is strained to hold. A penetration is expected in the battalion area astride the enemy main thrust line. The attack helicopter battalion from corps which was committed in the south is detached from the southern division and attached to the northern division. As advance elements of the attack helicopter battalion arrive in the division area, the main battle area of the threatened battalion is penetrated. The division commander directs that the attack helicopter battalion be OPCON to the northern brigade. The brigade commander placed the first attack helicopter company to arrive under the operational control of the penetrated battalion.

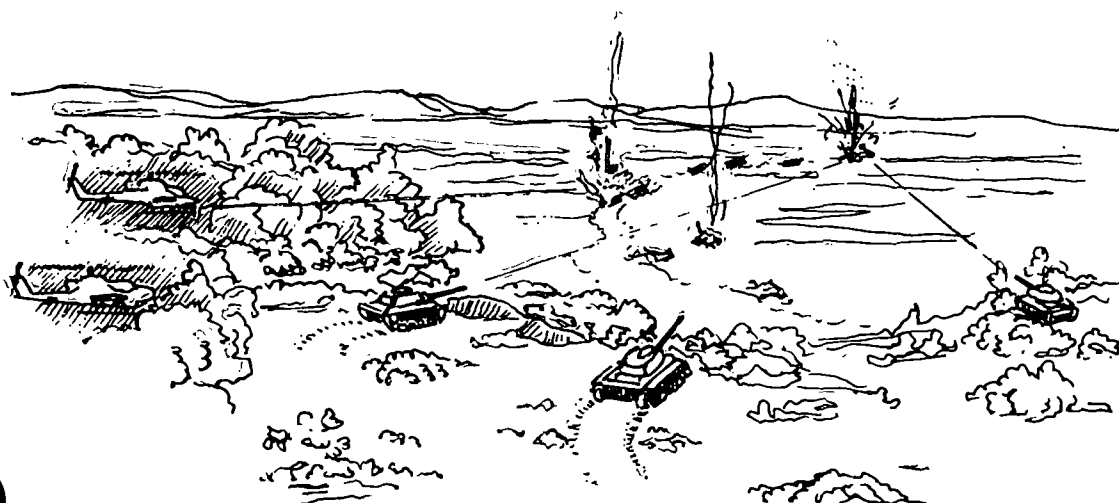


SOLUTION

Attack Helicopter Company Contribution: Attack helicopters of the company block to stop the enemy advance and then assist ground forces in reducing the enemy penetration and reconsolidating the main battle area.

How: The commander of the attack helicopter company is quickly briefed on the situation since time is critical. A detailed reconnaissance and thorough coordination with ground forces in contact is not possible. Since only the attack helicopter battalion command group and the one attack company arrived, refueling must be accomplished using division resources. Corps CH-47's are en route with additional FARRP equipment to reduce turnaround time for the company, and later, the battalion. The attack company is immediately committed against the penetration. So numerous were the enemy targets that the attack company had expended all missiles in 20 minutes of combat. The company was quickly relieved by another which had just arrived and returned to the FARRP to rearm and refuel and await recommitment. Attack helicopter elements coordinated their fires with ground forces and the enemy advance was halted. Attack helicopter units were now being cycled through firing, rearming, refueling, and ready process at a rapid, steady pace — allowing ground forces in the area to regain balance and initiate efforts to reconsolidate their defense in depth.

Result: Timeliness of action was a major contribution to success. When time-distance factors preclude commitment of ground forces to counter the penetration, attack helicopter units can cover extended distances and be prepared to fight in a minimum of time, thus allowing ground elements time to reconsolidate the main battle area.

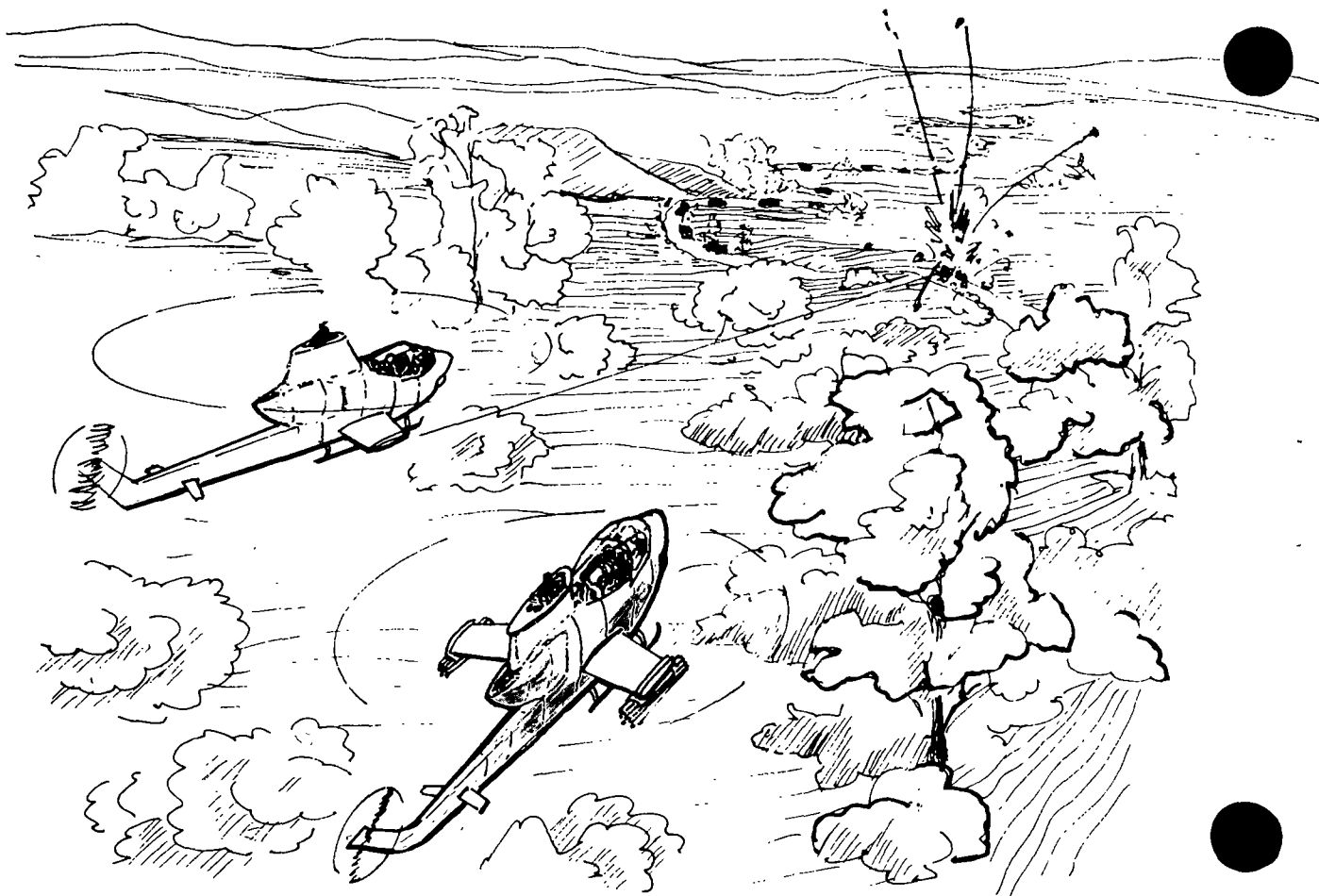


Attack Helicopter Battalion**MISSION**

Action: Exploitation

Problem: To exploit the successful breakthrough of elements of an armored division attacking enemy forward force.

Situation: As a result of a surprise, coordinated attack by elements of a U.S. armored division, major breakthroughs exist at several points along the forward area. U.S. forces are preparing to exploit this success. In order to rapidly capitalize on battlefield successes, an attack helicopter battalion was already poised for this mission. Planning ahead, the battalion FARRP's and maintenance teams were positioned well forward to shorten turnaround time. Companies of the attack helicopter battalion are alerted by FRAG orders and assigned individual missions in order to quicken the reaction tempo.



SOLUTION

Attack Helicopter Battalion Contribution: The attack helicopter battalion rapidly deploys its attack helicopter companies to critical blocking positions to intercept and prevent enemy reinforcement, spoil counterattack efforts, disrupt rear area movement of replacements, equipment, ammunition, and supplies.

How: The attack helicopter battalion immediately applied combat power at the locations of the breakthroughs. Attack helicopters attack enemy forces organizing for a counterattack and relentlessly apply continuous pressure on the enemy armor by firing deadly accurate TOW antiarmor missiles from concealed positions at standoff ranges. Attack efforts are coordinated with and supported by all available field artillery and tactical airstrikes. FARRP's are moved and established well forward consistent with the tactical situation. One company is committed to prevent reinforcement by blocking a high speed avenue of approach which could be used by enemy second echelon forces. Another company occupies a blocking position to prevent withdrawal of enemy forces withdrawing from the killing zones. Attack helicopter blocking positions are organized much differently than those of ground forces. Because attack helicopter units cannot hold terrain, they block by dominating terrain by deadly accurate fire from concealed positions to the rear and flanks of the area where enemy movement is to be blocked. Essentially then the effects are the same, only the method is different. The third attack company is employed to search out and attack enemy artillery, command posts, and other targets of opportunity — firing at maximum effective ranges from concealed firing positions. The attack helicopter battalion's overall plan is characterized by flexibility allowing reinforcement of any of its elements. Because of its inherent mobility, flexibility, and sting, it can attack at multiple locations simultaneously or mass to deal the decisive blow at the critical time and place.

Result: The attack helicopter battalion's ability to react immediately and rapidly, to gain access to vulnerable enemy areas before he can be reinforced significantly, enhances the success of the exploitation. The coordinated attack helicopter, artillery, and close air support action causes the enemy to fight in many directions, disrupts reorganization and counterattack efforts, dismantles command control and communication nets, and neutralizes resupply efforts. The general destruction of the enemy throughout the battle area caused by the attack helicopter battalion diverts enemy attention from points of ground contact, creating confusion and disorganization, and enables friendly ground forces to destroy the remaining enemy strong points.

Air Cavalry Combat Brigade

MISSION

To destroy or disrupt enemy armor or mechanized forces by aerial firepower.

ORGANIZATION

The Air Cavalry Combat Brigade (ACCB) is organized as shown in Figure 3-5.

ASSIGNMENT

The ACCB will most often be retained as a corps asset but may be employed as part of a division.

GENERAL

The ACCB is designed for employment as an integral part of U.S. or Allied combined arms forces. Its capabilities are optimized when employed as part of the larger force—corps or division. Within the brigade, the air cavalry units

find the enemy and attack helicopter units kill them. The ACCB's full potential is realized when it attacks enemy armor/motorized formations which are on the move.

The brigade will most often be retained as a corps asset with its subordinate units deployed as part of the forward defense forces consistent with the concept of multiple employment. For detailed employment concepts refer to TC 17-45-1.

The ACCB is well suited for selected offensive and defensive operations that capitalize on its quick reaction. The brigade employs its air cavalry squadron and two attack battalions in such a manner that maximum advantage is gained from its aviation assets. When planning for employment of the ACCB the force commander should give primary consideration to the following characteristics: *flexibility*—its ability to task-organize and tailor forces rapidly, *mobility*—its advantage is relative mobility over conventional ground forces, *firepower*—its ability to employ antiarmor point target weapons rapidly on a wide front against multiple targets or in strength in a small area, *multiple employment*—its ability to reinforce ground units with subordinate units (companies or battalions) in one or more locations, then as a result of the great mobility of its units, reorganize at a moment's notice for employment in the primary mission assigned the brigade.

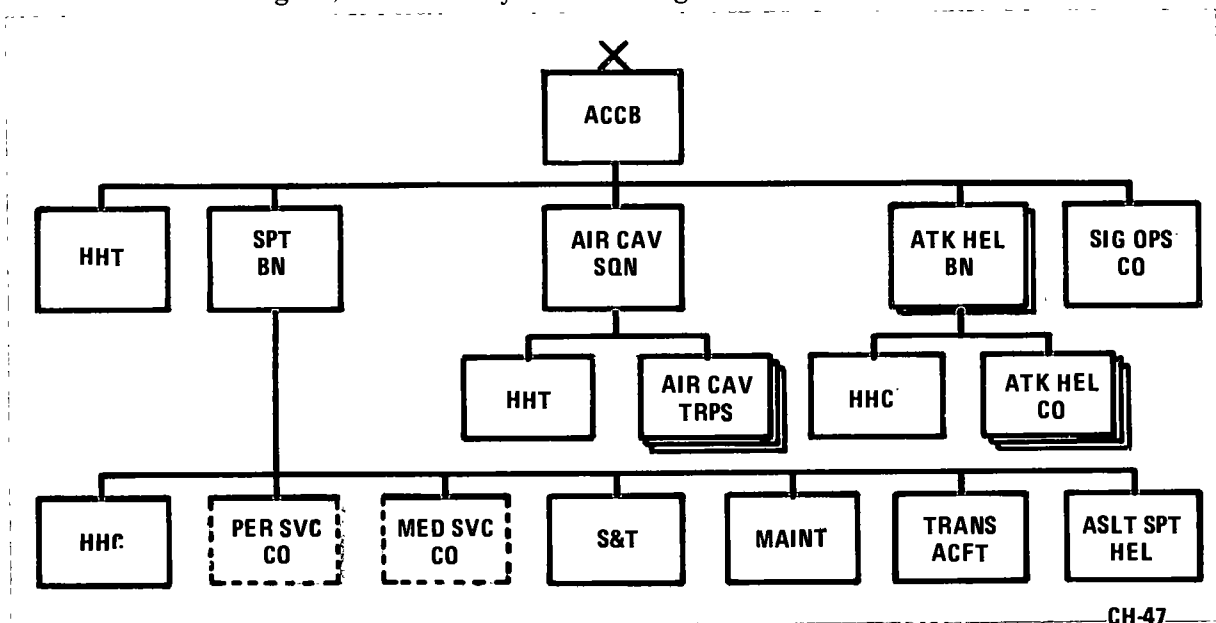


Figure 3-5. Air Cavalry Combat Brigade.

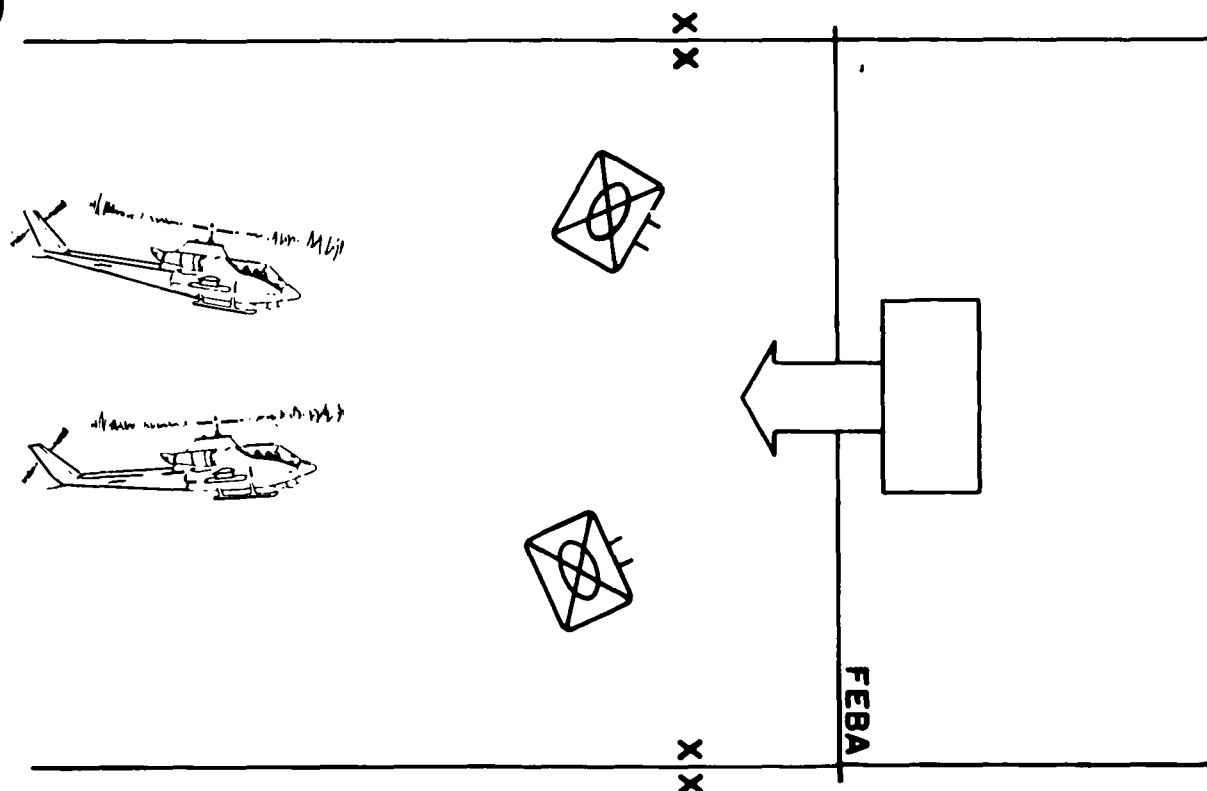
Air Cavalry Combat Brigade (ACCB)

MISSION

Action: Counterattack

Problem: To stop on enemy tank penetration in the division battle area in order to slow its momentum.

Situation: A U.S. mechanized division is receiving heavy enemy armor pressure in the center. Penetrations of forward forces occurring in several locations along the FEBA and a major enemy breakthrough is threatened. Some U.S. ground forces have been forced to fall back and are hastily trying to regroup and stiffen the defense. Contact with some forward units is lost and they are feared to be isolated or destroyed. The small division reserve is already committed to heavy enemy pressure in the right flank brigade area. Corps ground forces reserves are unable to arrive in time to stop the penetration. Unless a sizeable antitank force can get in front of and stop the penetration, a major breakthrough is imminent. The ACCB is being held in corps reserve after serving as part of the covering force. It is assigned the mission of attacking the penetration.



SOLUTION

ACCB Contribution: The ACCB is the only unit with the mobility and speed to get in front of the enemy force to halt the penetration to allow the ground commander time to reconstitute the defense and integrate reinforcements.

How: The ACCB is placed under the operational control of the division commander in the threatened area. However, the ACCB is given a sector of responsibility and, since a ground controlled defense presently is not feasible, the ACCB assumes operational control of the ground forces within the sector. Elements of the air cavalry squadron screen to the front and flanks to locate the limits of the penetration. Scout aircraft conduct reconnaissance while attack helicopters of the squadron provide overwatch to protect them. The scouts also select routes to be used by elements of the attack helicopter battalions and establish contact with scattered or isolated U.S. units. CH-47 helicopters of the assault support helicopter company move FARRP's and maintenance facilities to the forward areas to reduce refuel and rearm turnaround time and increase the maintenance support capability. Attack helicopters and scout aircraft from the attack helicopter battalions locate the enemy armor strong points and attack using deadly accurate TOW missiles fired from concealed positions at standoff ranges. Scout helicopters locate targets for the attack aircraft and coordinate tactical airstrikes and adjust artillery fires on the enemy.

When stopped, enemy attempts to bypass the ACCB resistance. Air cavalry is easily able to maintain contact in order to allow attack helicopters to shift their fires to destroy bypass attempts. As two ground force battalion-size forces arrive to reinforce and move into blocking positions, the ACCB assumes OPCON. When the reinforcing brigade headquarters and ground forces are in position to assume the defense, the control of the battlefield passes to the local brigade commander. The ACCB reverts to corps reserve. However, if needed to stiffen the defense, elements of the ACCB may remain in the battle area and under the operational control of the division commander.

Result: The threat of a major enemy breakthrough was muzzled by the rapid reaction and devastating fires of the ACCB. Due to the combined effort of the air casualty squadron and the attack helicopter battalions, enemy momentum was halted, thus enabling ground force elements to reorganize the defense of the battle area.

Air Cavalry Combat Brigade

MISSION

Action: Reinforcement

Problem: Enemy tank divisions threaten to penetrate the division area.

Situation: A U.S. division defending with three brigades forward and astride a critical enemy avenue of approach, has been forced to commit its reserves to counter heavy enemy armor pressure. Heaviest enemy pressure is in the 2d brigade sector in the South. This sector appears to be the most critical sector in the corps defense. Another enemy main thrust line is on the boundary between the 3d brigade in the center and the 1st brigade in the North. The enemy pressure is increasing and intelligence estimates indicate the enemy is preparing to strengthen the attack with the addition of forces in the 2d brigade sector. The ACCB is in corps reserve. The corps commander commits the ACCB to the division sector to be integrated into the total defensive effort.

SOLUTION

ACCB Contribution: The ACCB is committed to the defense to create a more favorable force ratio.

How: The ACCB is placed under operational control of the division commander. Since a ground defense is viable, the ACCB elements are placed OPCON to the ground force commander. The division commander shifts the boundary between the 1st and 3d brigade northward for more effective control in fighting the enemy thrust in that area. One attack helicopter battalion is placed OPCON to the 3d brigade. The ACCB minus, consisting of one attack helicopter battalion and one air cavalry squadron, is placed OPCON to the 2d brigade in the South where the most critical sector exists. The attack helicopter battalion in the 3d brigade area cycles platoons or companies into battle positions to maintain continuous pressure on the enemy. The air cavalry squadron locates routes and fighting positions for attack helicopters and screens gaps along the southern flank. The attack helicopter battalion coordinates and integrates its fires with the ground element fires to reap the maximum overall combined arms effect.

Result: The overall defense effort is strengthened by integration of the ACCB elements into the ground force defense. Since a ground controlled defense is possible ACCB elements are OPCON to ground commanders.

Assault Helicopter Company / Battalion

MISSION

Assault helicopter units provide tactical mobility for combat troops, weapons, equipment, and supplies and conduct air assault or airmobile operations throughout the battle area.

ORGANIZATION

Figure 3-6 represents an assault helicopter battalion assigned to an air assault division.

Assault helicopter battalions may also be formed by assembling assault companies under an aviation battalion headquarters. (See fig. 3-6, 3-7.)

ASSIGNMENT

Assault helicopter companies of various types are assigned to the infantry division, aviation battalion or group in the corps. Assault helicopter battalions are assigned to the air assault division, aviation group or corps.

GENERAL

Air assault operations in the high threat environment present interesting challenges as well as opportunities for assault helicopter units. As with all aviation units, methods of employment have been altered drastically because of threat considerations. Moreover, the high threat battlefield is not only an assault helicopter problem, but has implications affecting the changing roles of air assault forces in general. The stakes are much higher now. Methods that were perfected and worked so well in the past are not totally transferable to the battlefield of the future. Even though we no longer enjoy free and unlimited access throughout the battle area, certainly there will be many opportunities to use air assault forces on a continuing basis. For the battlefields of the future will be characterized by movement, and the ability to be able to move forces rapidly to either act or react assumes tremendous significance.

One of the most critical tasks for which air assault forces are suited is blocking enemy movement. Emplacement of air assault blocking forces of various sizes will become a matter of standard practice. Assault helicopter units provide the ability to accomplish this rapidly, over great distances and to areas inaccessible to ground forces because of terrain restrictions.



The reinforcement of forward forces is another mission of importance. This can be accomplished by the movement of major units or by rapidly thickening existing defenses with antiarmor teams equipped with DRAGON or TOW missiles. Additionally, new capabilities are rapidly developing such as emplacement of aerial mines and unattended ground sensors. Raids have always been an important capability of air assault forces. Movement of engineers to prepare demolitions of bridges, road craters, and abatis as well as other barrier tasks to include transportation of atomic demolition munitions also can be accomplished by assault helicopter units.

Assault helicopter units will make their most significant contribution by placing major ground

combat power deep into enemy rear areas. These operations however cannot be considered routine. Conditions must be right and planning must be meticulous. Exposed or assailable flanks must exist, and concealed routes must be available. Fire planning must include all firepower sources and be well coordinated to provide adequate suppression. Particular attention must be paid to the tactical air requirement. Not only must airstrikes be conducted against ground targets, but superiority must be established over opposing air forces as well. Operations of this nature would be best conducted at night or during periods of adverse weather. As aviation units develop their battlefield staying power, opportunities to conduct these operations will increase.

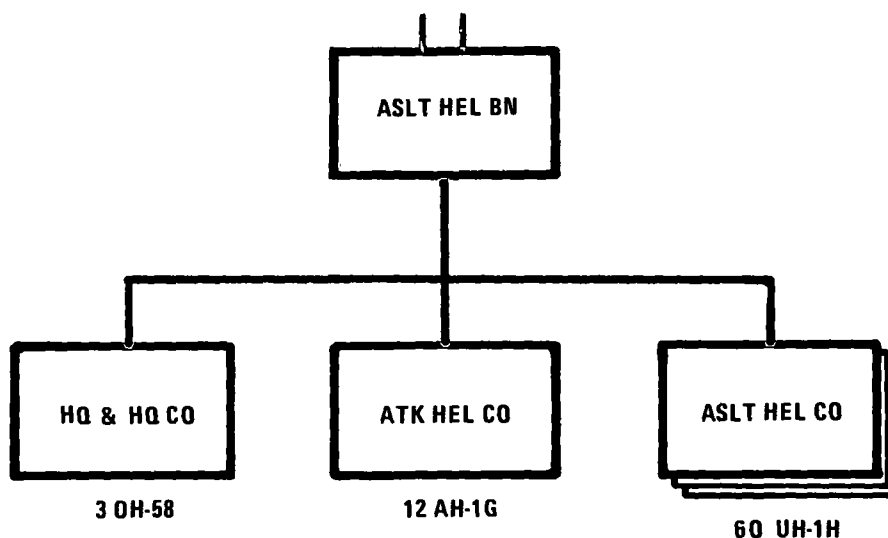


Figure 3-6. Type Assault Helicopter Battalion.

Resupply of tactical units may appear unglamorous, but is clearly essential. Assault helicopter units can accomplish the vital task faster and more efficiently than by any other means.

It must also be remembered that the whole world is not tank country. Future battlefields may well be in mountains, arctic or tropic regions. Moreover, even in temperate climates vast marshes, swamps, and forest exist. In these conditions dismounted infantry will conduct the fighting and assault helicopters will carry the infantry.

In many situations assault helicopter units in the air assault role will afford the commander with the vital option of bypassing the main enemy force and deploying friendly troops on an objective to engage the enemy at his most vulnerable point. Actual formations should be employed that provide tactical integrity of units; i.e., one squad carried by one helicopter. While not currently available, a true squad-carrying capability will be afforded the ground commander with the introduction of the future utility tactical transport system (UTTAS) into Army units.

The following situations depict some missions assault helicopter units may conduct on the high threat battlefield.

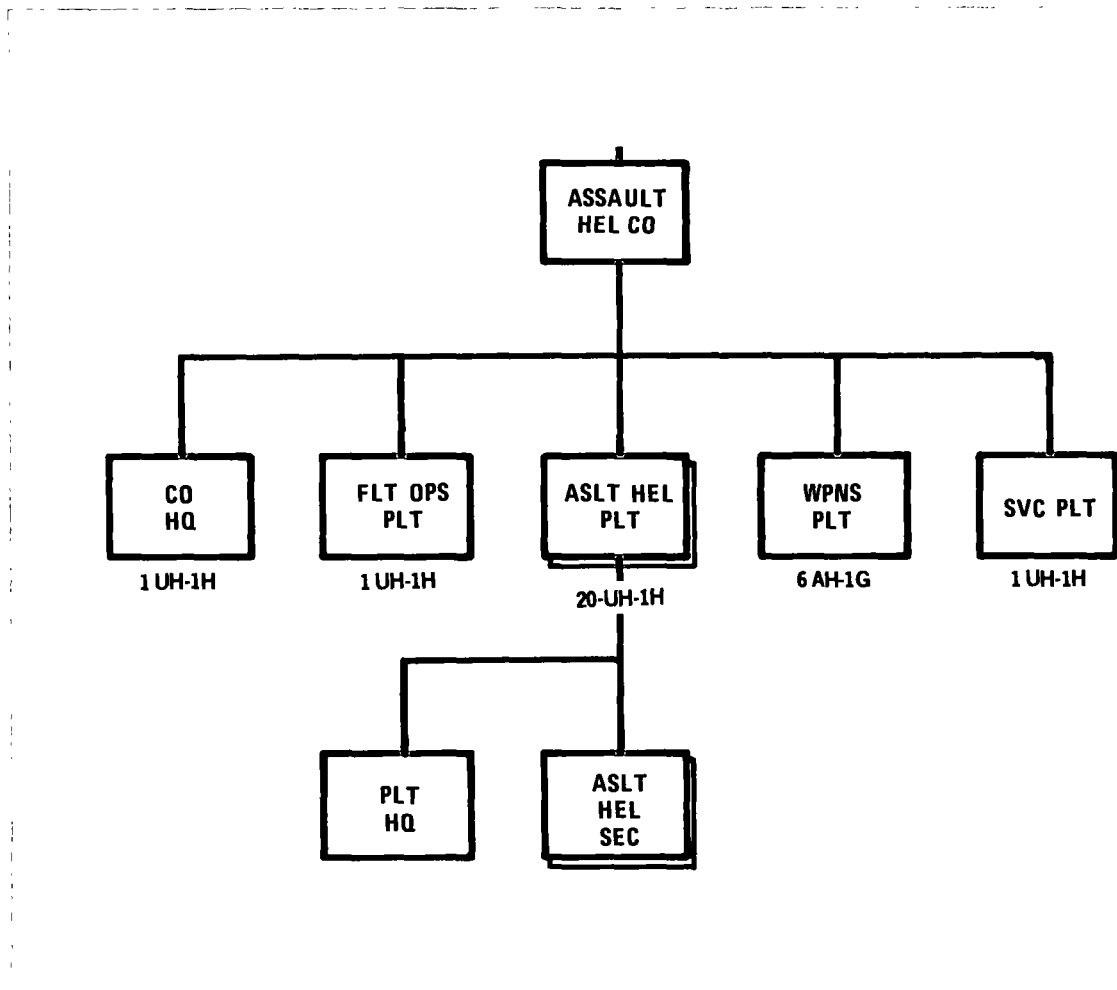


Figure 3-7. Type Assault Helicopter Company.

Assault Helicopter Company**MISSION**

Action: Movement of antitank teams

Problem: To provide an additional antitank capability to airborne infantry units heavily engaged with an enemy armor force.

Situation: A major enemy breakthrough in the adjacent corps sector has exposed the right flank of a U.S. corps. High speed armor avenues of approach through mountain passes constitute the major enemy routes into the corps flank. An airborne battalion task force was quickly deployed and is defending until mechanized reserves can be committed. The airborne task force is heavily engaged with a reinforced motorized rifle regiment and is urgently in need of the additional antitank capability. Unless the task force receives additional antitank reinforcements with TOW and DRAGON weapons, it will not be able to hold its present position. Because of time and distance factors, ground transportation of antitank teams is considered untimely. The teams must be moved by air.

SOLUTION

Assault Helicopter Company Contribution: TOW and DRAGON teams are transported by the assault helicopter company elements to the airborne task force location in time to be effective.

How: A corps assault helicopter is assigned the mission of airlifting the antitank teams. The teams are from the mechanized infantry battalion which is moving up from corps reserves to assist the heavily engaged airborne battalion. The pickup of the teams is coordinated with the mechanized battalion by the assault helicopter air mission commander. Further coordination is effected with the airborne battalion to determine landing zones, routes and the enemy situation. Pickup of the AT teams is carried out smoothly and attack helicopters from the assault company provide overwatch as the assault helicopters using terrain flying techniques move to the preselected landing zones. Landing zones are selected as far forward as possible without risking unnecessary exposure to enemy air defense weapons and compromise the nature of the reinforcement. Personnel from the airborne battalion secure and mark the landing zones for the inbound aircraft. Attack helicopters provide suppressive fires, as necessary, during the landing zone operations.

Result: The assault helicopter company provided the means to rapidly move the antitank firepower to the point of critical need in time for it to be effective. Consequently, the airborne battalion task force was able to repeatedly repulse attacking armor forces and hold the critical passes until additional combat power arrived. The unit's armored personnel carriers and remaining elements close subsequently.

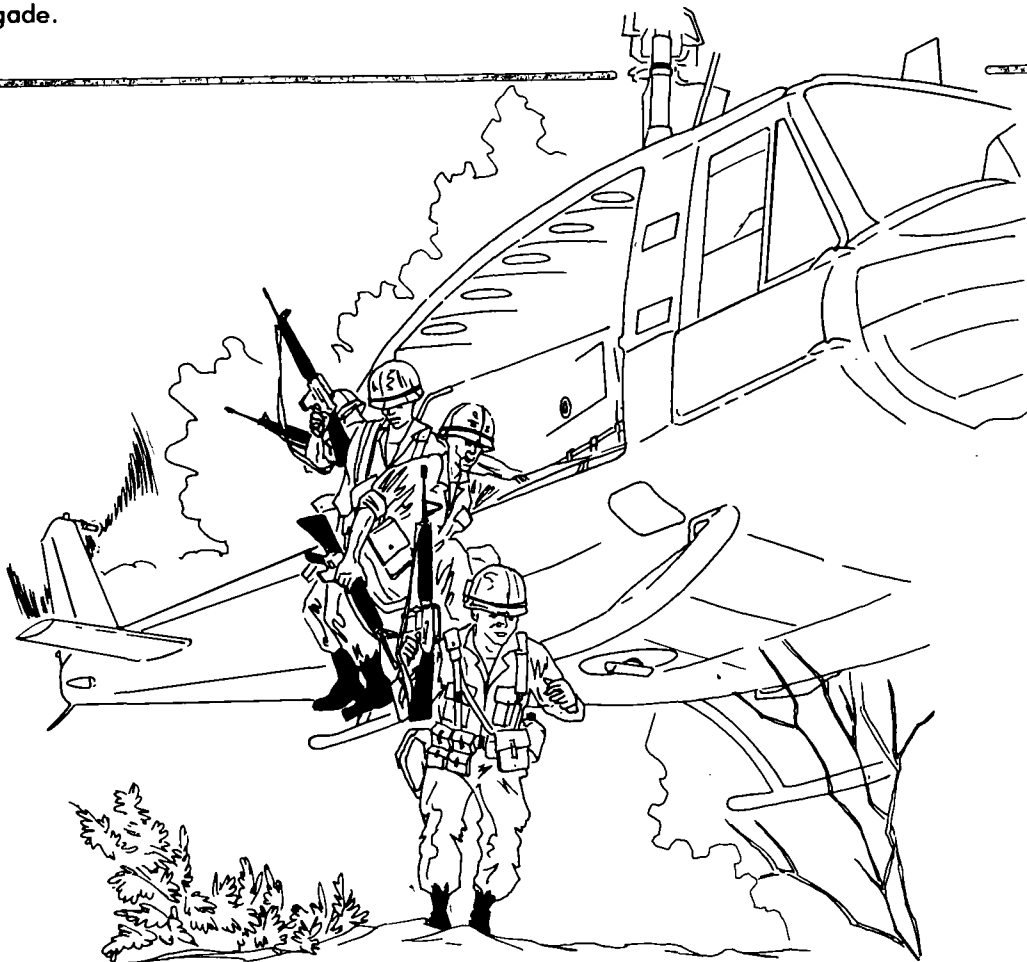
Assault Helicopter Company

MISSION

Action: Raid behind enemy lines

Problem: To secure key facilities and conduct ambushes behind enemy lines.

Situation: A U.S. airborne division has been successfully defending key mountain passes on the southern flank of the corps. Enemy forces attacking in that area have been beaten back repeatedly by elements of the division and intelligence reports indicate mounting morale problems among the enemy troops caused by a shortage of food and warm clothing and generally undependable resupply lines. The situation is ideal for an attack. The corps commander directed that the division prepare to attack by conducting raids behind enemy lines to secure key locations, destroy selected bridges, locate lucrative long-range artillery targets, adjust artillery fires and airstrikes on targets of opportunity and conduct ambushes of resupply efforts. The division commander directs that one assault helicopter company from the combat aviation battalion be placed under the operational control of the 2d brigade.



SOLUTION

Assault Helicopter Company Contribution: The assault helicopter company airlifts selected assault teams into rear areas behind enemy lines to secure key bridges, attack supply lines and command posts, and conduct disruptive operations in general. The success of this operation will contribute to the overall success of the division attack.

How: The 2d brigade commander designated that a company-size force be used for the raids. The commanders of the airborne company and the assault helicopter company are briefed on the enemy situation and objectives by the brigade commander. Plans and preparations are made for the operation. Since the small key objectives are behind enemy lines, heavy reliance on map reconnaissance is necessary. The air defense threat is evaluated carefully and the operation is planned to take advantage of the low ceilings and patches of ground fog in the early morning hours to lessen the threat from enemy high performance aircraft. The aircraft pick up the teams just prior to dawn and proceed by multiple routes to the preselected objectives. An attack helicopter and a scout aircraft from the aviation general support company of the combat aviation battalion accompany three of the lifts and provide overwatch through areas of greatest risk. The other three lifts proceed unaccompanied depending only on their door gunners for protection from sporadic small arms fire. The lifts are placed on reverse slopes of enemy positions in order to minimize detection and hostile fire. The lift aircraft employ the techniques of terrain flying, using the terrain to mask their routes of flight and protect from enemy air defense threats. Since the assault helicopter company was able to lift all elements of the company conducting the raids in a single lift, risk of enemy detection was minimized. Operation plans included rendezvous pickup points for extraction of the teams upon completion of their mission.

Result: The assault helicopter company provided the means for many small airborne teams to be simultaneously airlifted along a multitude of routes into enemy rear areas. This in effect saturated the enemy rear area with a number of small but disruptive hit-and-run battles and highly accurate observed field artillery fires. The enemy thus miscalculated the size and scope of the action. Being forced to fight from many unexpected directions caused a further weakening of forward forces and negative impact on morale, making the attack by the U.S. airborne division all the more devastating.

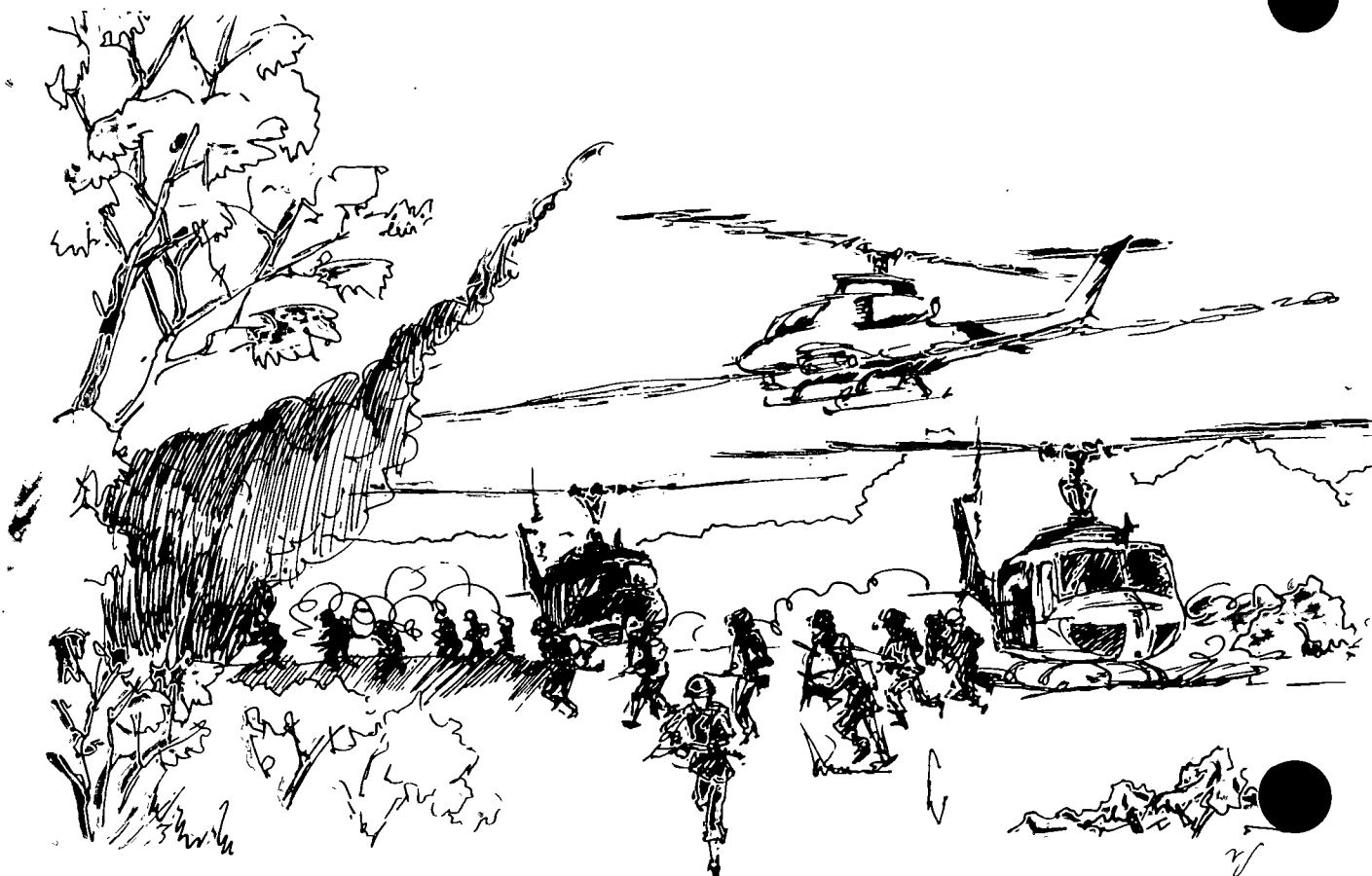
Assault Helicopter Battalion

MISSION

Action: Air assault

Problem: To conduct an air assault deep into enemy rear areas to block avenues of withdrawal.

Situation: Successful coordinated attacks by units of the corps resulted in an overall weakening of the enemy's defenses across the front. U.S. forces immediately began exploitation operations. Air Force fighters and Army attack helicopter units were able to penetrate into enemy rear areas destroying withdrawing enemy combat forces, logistics complexes, and support elements. Enemy command and control is breaking down as their forces attempt to break contact and withdraw. Remnants of an enemy motorized division are attempting to withdraw through two mountainous passes and execute a river crossing. The U.S. corps commander is prepared to block this avenue of escape and withdrawal by air assaulting an infantry brigade to secure dominating terrain to control the passes and to prevent the enemy river crossing.

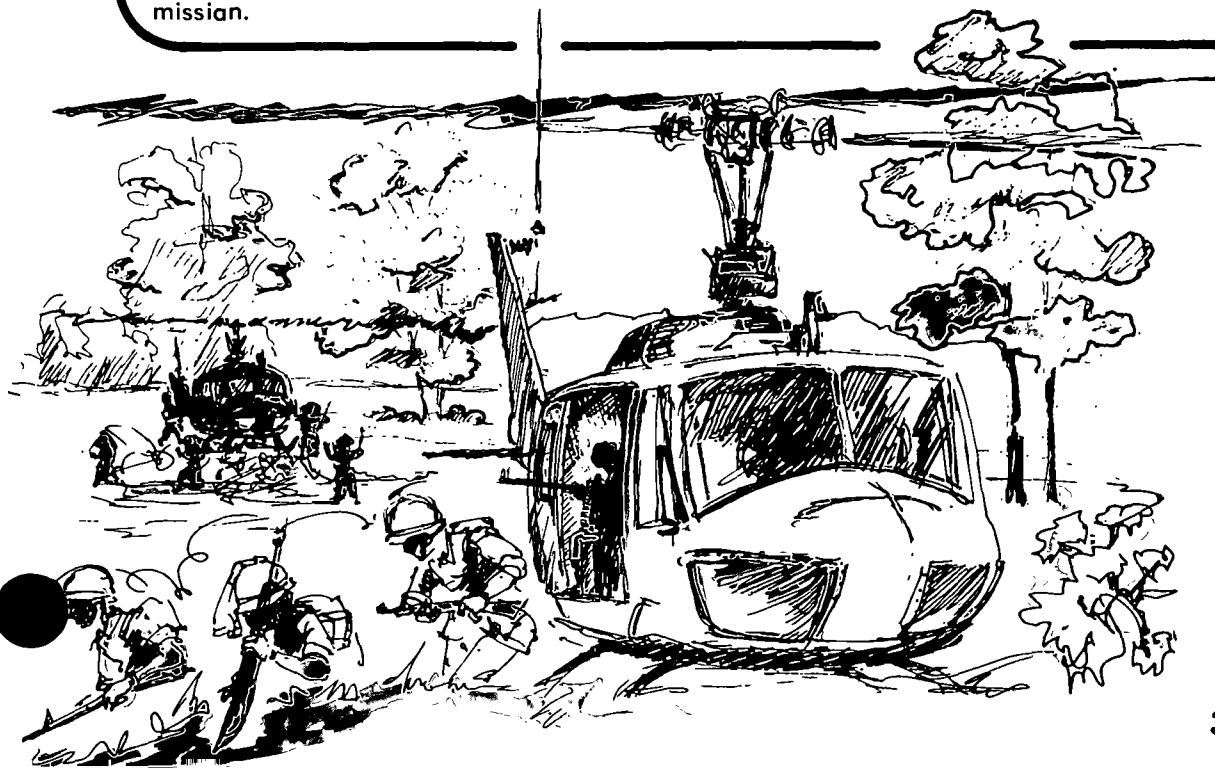


SOLUTION

Assault Helicopter Battalion Contribution: An assault helicopter battalion from the corps aviation group is placed under operational control of a separate infantry brigade which is located in the corps reserve.

How: Joint planning and coordination between the infantry brigade and the assault helicopter battalion began immediately upon receiving the mission. Intelligence reports, particularly information provided by attack helicopter units operating in the enemy rear, are studied in detail to determine and plan for minimum risk routes to the objective areas. Additionally, close coordination is effected with tactical airstrikes, artillery fires, and the overall attack helicopter effort to support and complement the air assault. Because of the thorough planning and coordination, only light opposition in the form of small arms fire is encountered en route to the landing zones. Attack helicopters employ overwatch, and door gunners from the assault helicopters quickly suppress scattered small arms fire. The fact that surprise is achieved along with heavy suppressive fires in and around the landing zones allows the assault helicopters to land and depart unopposed. After landing, brief but sharp fire fights are encountered by the infantry; however, the passes and river crossings are secured as planned.

Result: Enemy forces within the entrapment were quickly forced to capitulate. The rapid mobility provided by the assault helicopter battalion provided the corps commander with the means to execute a bold tactical maneuver. The thorough planning based on sound intelligence allowed the ground and assault helicopter units to effectively execute the mission.



Assault Support Helicopter Company / Battalion

MISSION

To provide air transport of personnel and supply for combat support and combat service support operations. Provide rapid battlefield displacement of fire support elements.

ORGANIZATION

The organization of type assault support helicopter companies and battalions in the force structure are shown in Figures 3-8 and 3-9.

ASSIGNMENT

The assault support helicopter company or battalion may be assigned to Theater Army, Theater Army Support Command, Combat Aviation Battalions or Groups and other commands as required. One battalion is currently assigned to the Air Assault Division, and one company to the support battalion of the ACCB.

GENERAL

Assault support helicopter units have assumed increased significance on the modern battlefield because of the tremendous logistical requirements of Army ground and aviation forces. The bulk supply these units can rapidly move allows fast and deep offensive operations to be conducted over broad areas which would be difficult without aerial logistic augmentation.

Flexible rapid response characterizes assault support helicopter unit operations. For this reason they are often used to transport field artillery both guns and missiles, air defense units, and antitank elements about the battlefield. Additionally, they have the capability of carrying vehicles which provide the deployed unit increased ground mobility.

Often these units are used to transport bulk barrier materials and rapidly placing them on site. But in addition to taking materiel forward they also evacuate critical weapons and systems to repair facilities or evacuation channels.

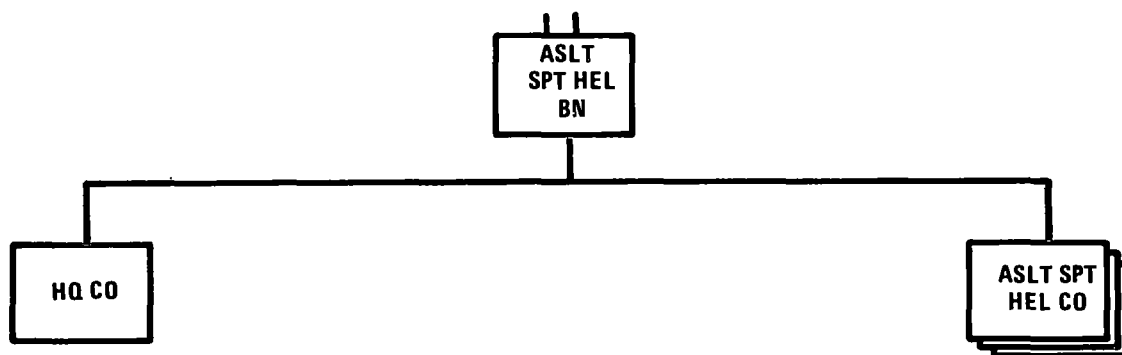


Figure 3-8. Type Assault Support Helicopter Battalion.

Assault support helicopter units are often the lifelines for tactical aviation such as attack and cavalry units which are often rapidly committed at extended distances far from their normal ground logistical support base. Moreover these tactical aviation units are often committed across terrain obstacles where ground support could not follow. In these situations the tactical unit relies solely on aerial resupply for fuel, ordnance, and repair parts.

The versatile CH-47C has an external load capability allowing rapid hook-up and delivery of loads. This system is also used for outsized cargo

which could not be carried internally. New external suspension and load stabilization equipment being developed for this aircraft will provide a better terrain flight capability. The assault support helicopter unit has the ability to accomplish its mission day or night and in adverse weather. The following are typical missions the unit can perform to enhance combined arms operations.

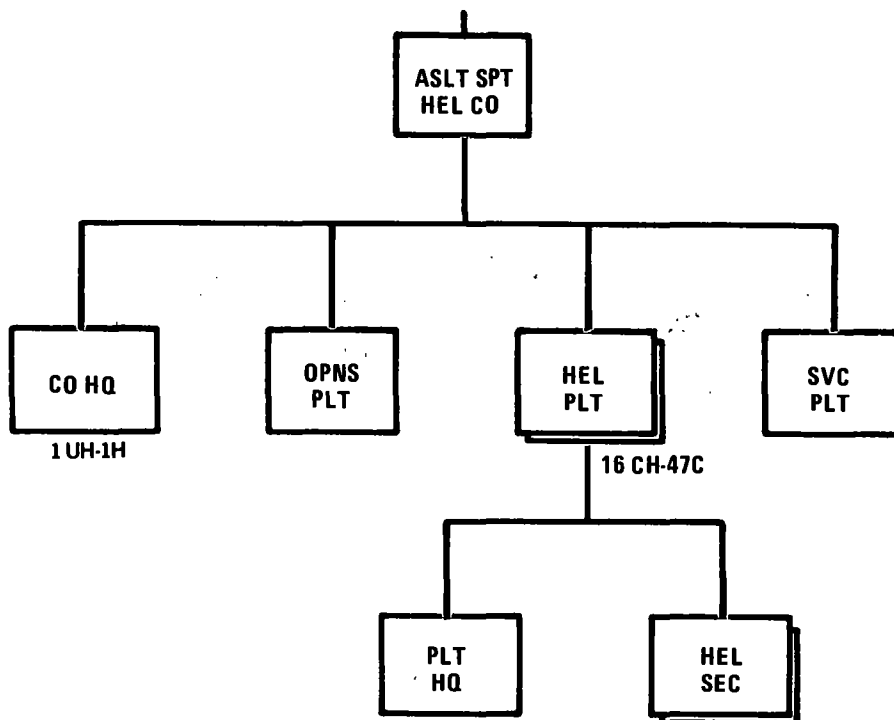
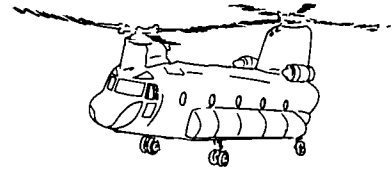


Figure 3-9. Type Assault Support Helicopter Company.

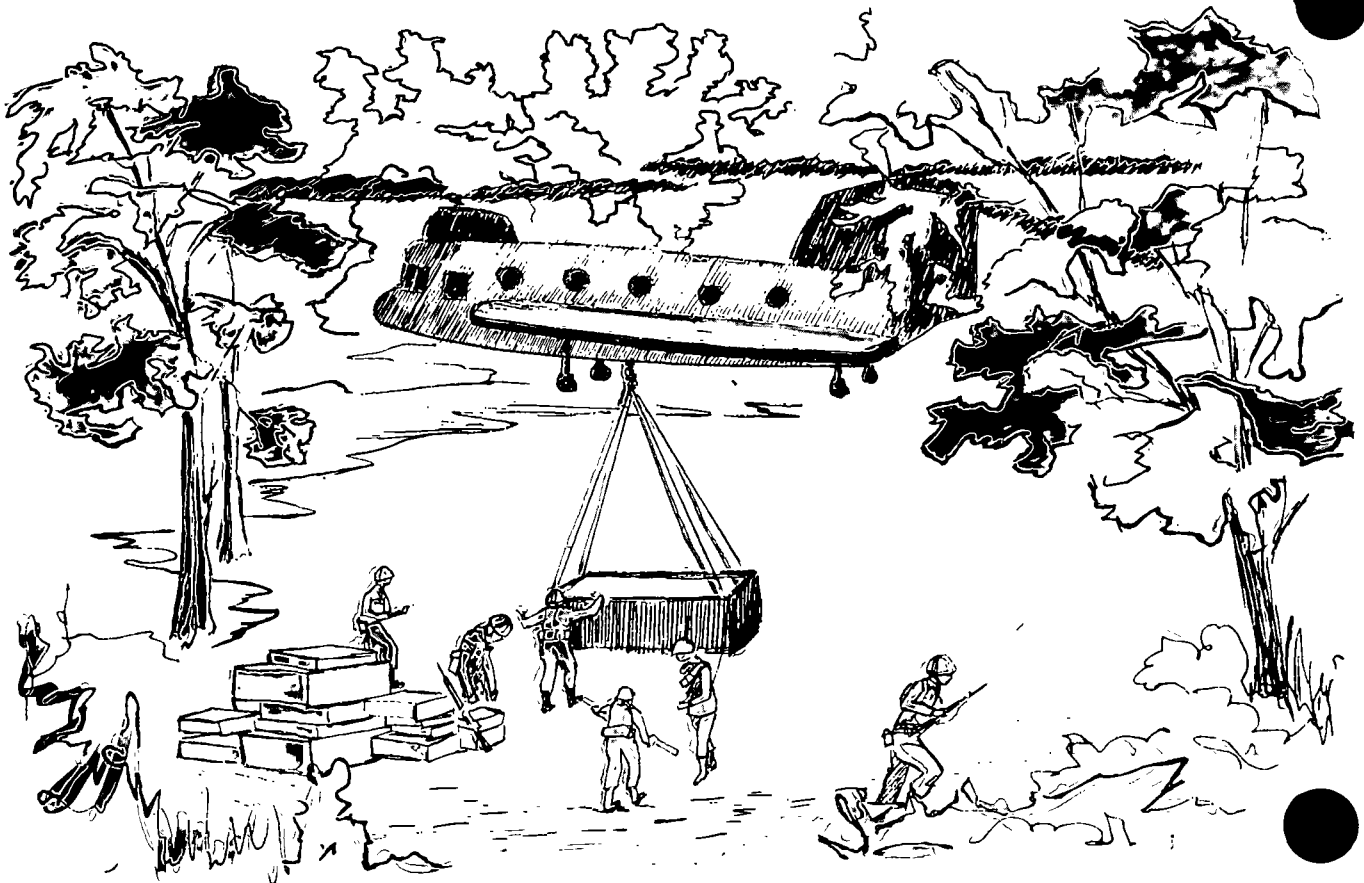
Assault Support Helicopter Company

MISSION

Action: Displacement of logistics

Problem: To reposition essential ammunition and fuel forward to resupply attacking forces.

Situation: Following a successful coordinated attack by U.S. armor and mechanized infantry forces against elements of an enemy motorized rifle division, the forces began an exploitation and pursuit action. Rapid advances by lead elements created a large gap between the combat forces and the support elements. Attempts to push the support units forward by ground to close the gap have been hampered by poor roads and destroyed bridges. Resupply of critical ammunition and fuel must be accomplished or the pursuit will have to be slowed and, perhaps, lose its momentum. Resupply points must also be relocated in order to sustain the operation and hold the initiative. The division requests aviation element support from corps to accomplish the airlift of supplies and relocate supply points.



SOLUTION

Assault Support Helicopter Company Contribution: An assault support helicopter company airlifts critically needed class III and V logistics to the front lines to resupply armor and mechanized forces. Air elements can easily traverse the terrain obstacles in order to close the supply gap.

How: The division is provided one assault support helicopter company consisting of 16 CH-47 aircraft to accomplish the resupply operation. The DISCOM commander is given operational control over the company in order to best coordinate and direct their actions. Close coordination with the assault support company commander allows maximum economy of use of the medium-lift helicopters. Some aircraft are quickly loaded internally with pre-packaged, containerized loads of critical ammunition, while others sling load large fuel bladders externally. The helicopters carried the loads to the forward areas remaining below the enemy air defense threat by employing the techniques of terrain flying. The loads were quickly unloaded on reverse slopes and resupply effected easily. As soon as immediate resupply needs were satisfied, the assault support helicopter company concentrated its efforts on relocating supply points well forward so that dependence on ground resupply operations could resume. Coordination between DISCOM and the division engineer element allowed movement of needed bridge and culvert repair materiel to be moved direct to the construction site prior to releasing the assault support helicopter company back to the corps.

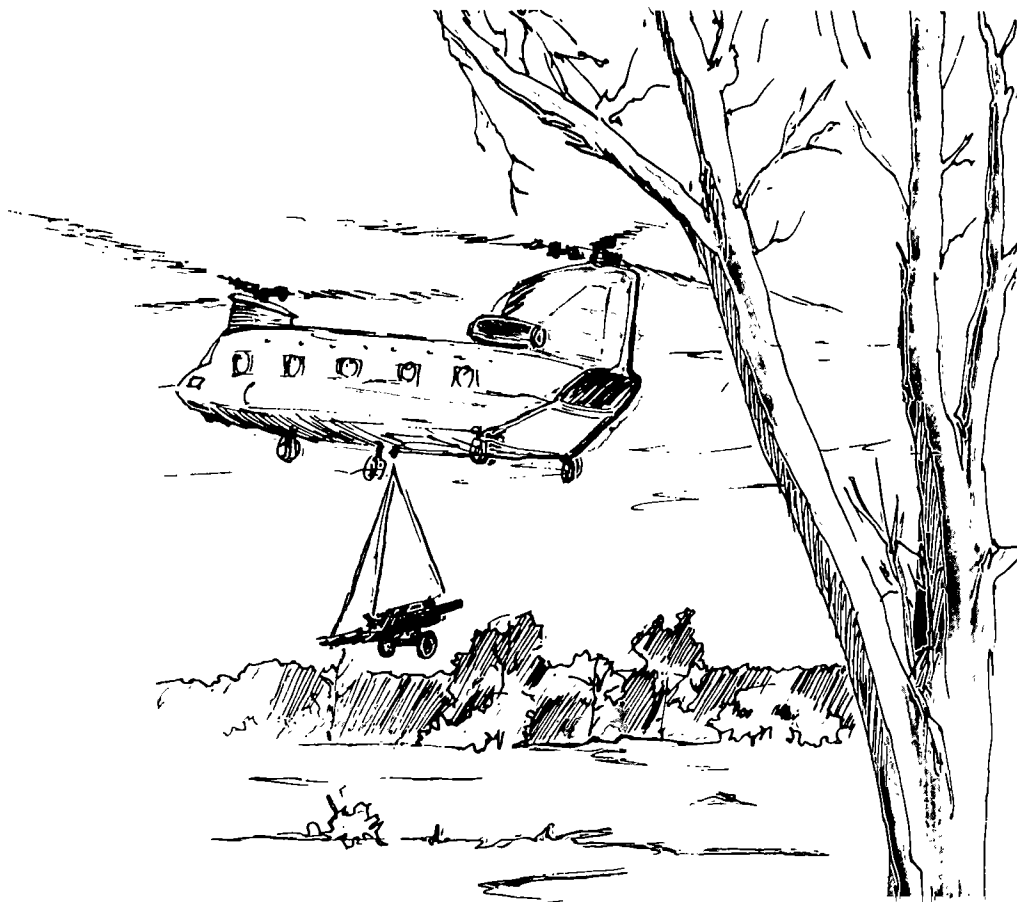
Result: The pursuing armor and mechanized forces were able to retain the momentum of the attack by being resupplied at the front lines. The operation could sustain itself since the assault support helicopters also relocated supply points well forward thus increasing the staying power of all combat elements.

Assault Support Helicopter Battalion**MISSION**

Action: Airlift of combined arms task force

Problem: To rapidly reinforce a mechanized infantry brigade.

Situation: For the past 2 days a mechanized infantry division has been defending on an extended front. All three brigades are forward. Because of heavy enemy armor pressure, the division reserve is committed in the center brigade sector. Enemy pressure along the entire front is increasing and the strongest pressure is being felt in the southern brigade area. An enemy penetration and breakthrough is expected unless reinforcements are immediately available and the defense is strengthened. Corps reserves consist of elements of an infantry division. The corps commander directs that an airmobile, combined arms task force be formed and airlifted to reinforce the threatened division position. The task force consists of an infantry battalion, a 105mm howitzer battery, and an attack helicopter company. The division commander places the task force under the operational control of the southern brigade commander. The corps provides an assault support helicopter battalion to airlift the task force in order to reduce movement time and enhance the success of deceiving the enemy of the nature of the activity.



SOLUTION

Assault Support Helicopter Battalion Contribution: The assault support helicopter battalion airlifts the combat elements of the task force into blocking positions to reinforce the threatened brigade area.

How: The brigade commander briefs the task force commander and the assault support helicopter battalion commander on the scope of the operation and emphasizes his desire to conduct the reinforcement with a degree of secrecy. Due to the urgency of the situation, the reinforcement must be partially conducted at night. Close coordination and planning are required since much of the reinforcement takes place during darkness and some readjustment of forces in place is necessary. The remaining daylight hours provided the task force and assault support helicopter battalion commander time for a thorough reconnaissance of the area. Assault support helicopter company commanders and flight leaders select routes to various landing zones near the preselected blocking positions where pathfinders are positioned to mark landing zones and provide terminal control using low light signals. Radio silence is in effect for the movement. Assault support helicopter companies A and B are assigned the mission of airlifting the infantry battalion. Company C is directed to airlift and emplace the 105mm howitzer battery and then assist the attack helicopter company by transporting a FARRP to a forward predesignated location. The assault support helicopters begin lifting at 1800 hours as scheduled. Attack helicopters of the attack helicopter company provide overwatch for the air movement. Terrain flying techniques are used along the preselected routes and minimum lighting directs them into the landing zones. The airlift is completed by 2200 hours allowing the ground elements the cover of darkness to organize their fighting positions.

Result: The assault support helicopter battalion provides the means to rapidly move the entire task force into combat positions to respond to the enemy threat. When the enemy intensifies the attack the following morning, he is met with deadly accurate antitank fires and dug-in infantry to repulse the attack.

Heavy Helicopter Company

MISSION

To provide aerial movement of troops, fire support, supply and outsized cargo within the area of operations.

ORGANIZATION

The Heavy Helicopter Company is organized as shown in Figure 3-10.

ASSIGNMENT

The heavy helicopter company is normally assigned to the corps combat aviation battalion or combat aviation group and other commands as required.

GENERAL

The CH-54 is currently considered the Army's heavy helicopter; however, this term may be misleading when future lift requirements are considered. The fact is that the lift capability of

the CH-54 is virtually the same as that of the CH-47C helicopter in the medium-lift category, and thus the CH-54 will not be adequate to handle the heavy-lift requirements projected for the future. However, for the purposes of illustration we will consider those missions which fall within the capabilities and limitations of the heavy helicopter company.

The missions of the unit are virtually the same as the assault support helicopter, but the unusual configuration of the CH-54 does lend to accomplishment of additional missions. The heavy helicopter company basically delivers retail bulk supply. It may often be used for loading and unloading of container ships to rapidly clear port facilities or for over-the-shore operations. The unit delivers and evacuates vehicles, aircraft containerized loads and outsized equipment. Additionally the unit increases the ground mobility of combat forces in other ways. For example, bridge construction can be rapidly increased by using the CH-54 to emplace assembled sections or transporting floats.

The heavy helicopter company can perform a wide variety of missions which have significant impact on the overall logistics system. The following is an example of missions which can be accomplished by the heavy helicopter company.

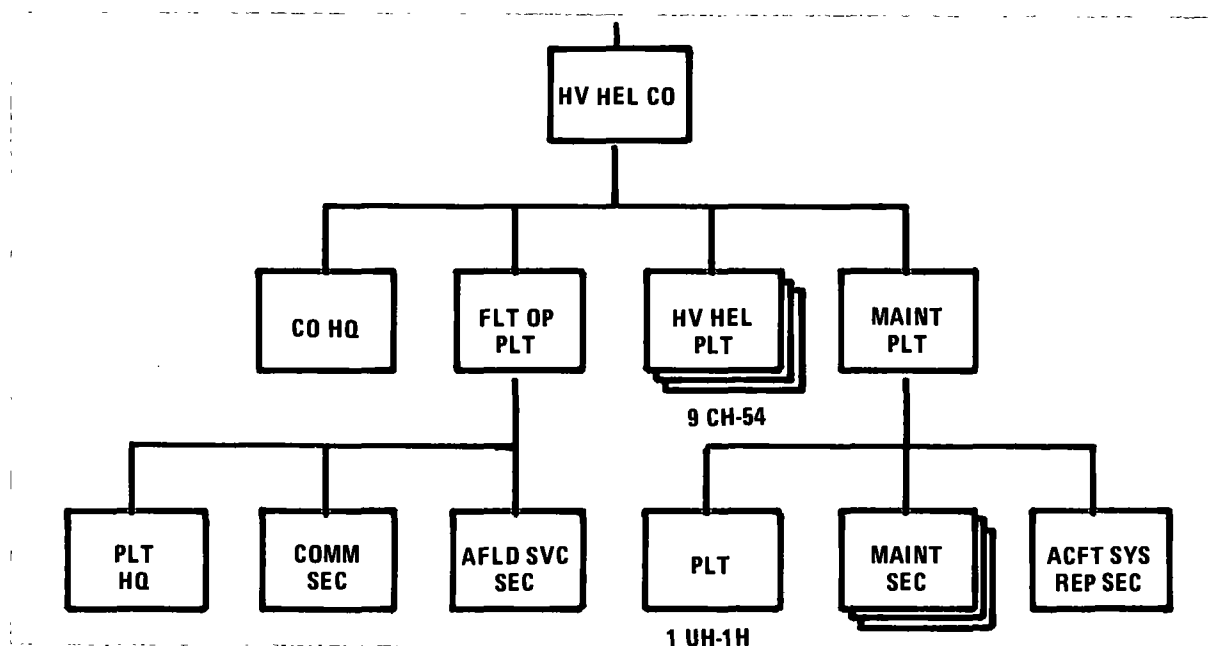


Figure 3-10. Type Heavy Helicopter Company.

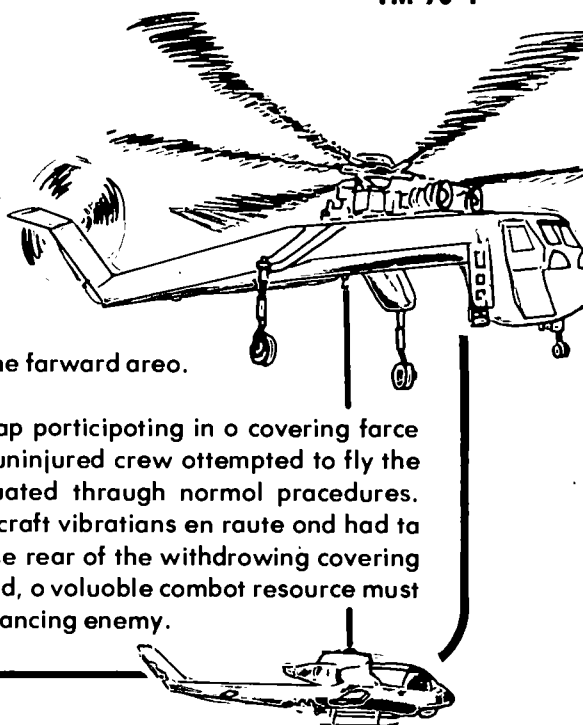
Heavy Helicopter Company

MISSION

Action: Recovery of a downed aircraft

Problem: Recovery of a downed attack helicopter in the forward area.

Situation: An attack helicopter of an air cavalry troop participating in a covering force withdrawal sustained substantial battle damage. The uninjured crew attempted to fly the aircraft to a forward area where it could be evacuated through normal procedures. However, the pilot experienced severe control and aircraft vibrations en route and had to execute an immediate forced landing 6 kilometers to the rear of the withdrawing covering force. If rapid recovery of the aircraft is not accomplished, a valuable combat resource must be destroyed to prevent its imminent capture by the advancing enemy.



SOLUTION

Heavy Helicopter Company Contribution: One of the CH-54 helicopters from the corps aviation group supporting a forward division is diverted to extract the downed helicopter and transport it to the collection point.

How: As the attack helicopter crew executed the forced landing, they simultaneously notified the troop operations of their situation and position. The operations officer immediately dispatched a request for a recovery aircraft while the maintenance officer proceeded to the site of the downed aircraft with a security and rigging team to remove ordnance and weapons and prepare the helicopter for aerial extraction. A scout aircraft from the troop rendezvoused with the CH-54 in the rear area to lead it forward by the safest and most expeditious route to the damaged attack helicopter. Two attack helicopters of the troop provided overwatch as the scout and heavy-lift helicopter moved forward using terrain flying techniques. The attack helicopter is rigged for air evacuation when the CH-54 arrives and is immediately hooked up and airlifted to the collection point or maintenance area in the division rear.

Result: The rapid extraction of a valuable combat aircraft was possible through the flexibility, speed, and capacity of the CH-54. This mission is consistent with the standing policy of combat resource conservation. Although the attack helicopter cannot be mission-ready again, it was saved to be repaired to fight again.

Heavy Helicopter Company**MISSION**

Action: Theater logistics movement

Problem: To offload supplies which are critically short within the theater of operations from U.S. Navy vessels.

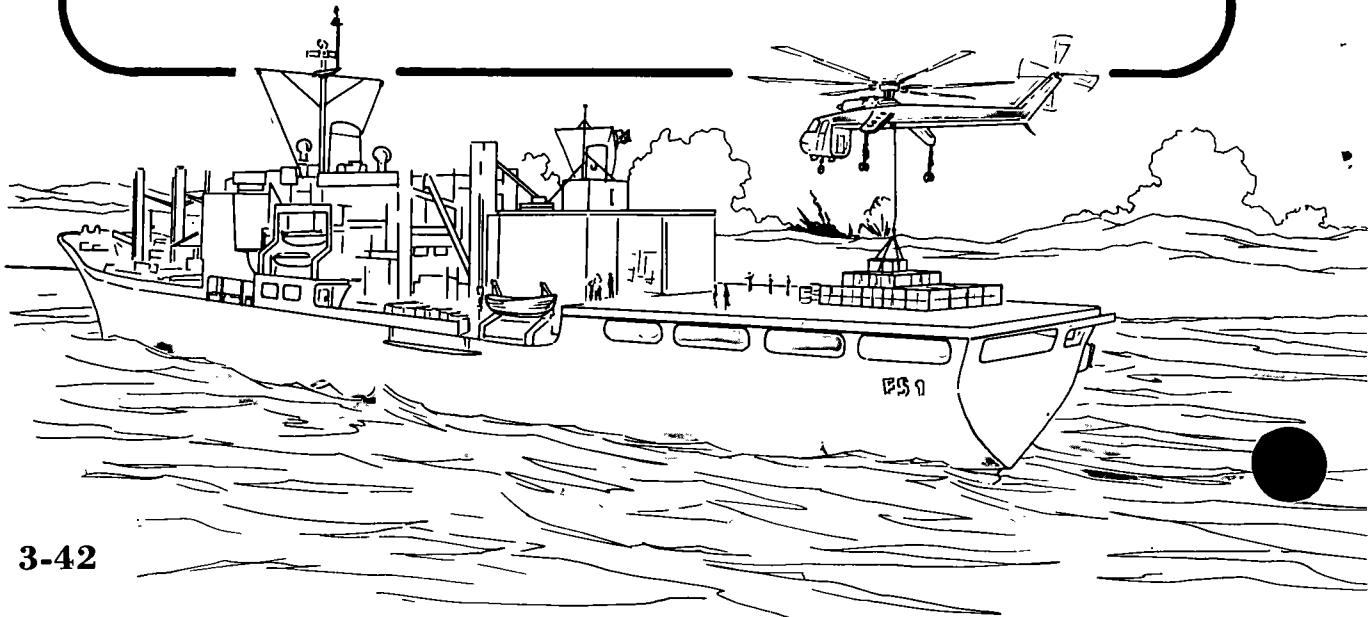
Situation: Navy vessels with large containerized loads of critically needed supplies are unable to use the port facilities because three heavily damaged ships are blocking the channel. Army aviation assets are requested to assist in the unloading mission.

SOLUTION

Heavy Helicopter Company Contribution: A heavy helicopter company from a corps combat aviation group is given the mission to unload the cargo vessels.

How: The heavy helicopter company commander coordinates with the port facility commander to locate the shore offloading points. Six CH-54 aircraft simultaneously begin transporting the containerized loads quickly and efficiently from the vessels to shore. Once secure on shore, the loads can be broken down and distributed either by ground or other air means to the numerous supply distribution points.

Result: Unloading and distribution of badly needed supplies and equipment is made without delay because of harbor congestion. The flow of supplies to theater combat forces is uninterrupted and expedited.



Division Aviation Company

MISSION

To provide aviation support for the Armored and Mechanized Infantry Division headquarters.

ORGANIZATION

The division aviation company is organized with a company headquarters, an air traffic control platoon, a general support platoon, and a service platoon. The general support platoon consists of a utility support section equipped with 4 utility helicopters, and a command and control section equipped with 6 observation helicopters. The service platoon contains an aircraft and communications maintenance capability and an airfield service section. (See fig. 3-11.)

ASSIGNMENT

The division aviation company is organic to the armored division or the mechanized infantry division.

GENERAL

The division aviation company provides aircraft for command and control, and liaison as required by the division commander and his staff. Additionally, at the direction of the commander, provides command and control capability to subordinate commanders as necessary. The company operates an instrumented airfield for the division, to include continuous ground controlled approach (GCA) guidance. The service platoon provides emergencies maintenance and refueling for transient aircraft as well as emergency air and weather warnings to aircrews.

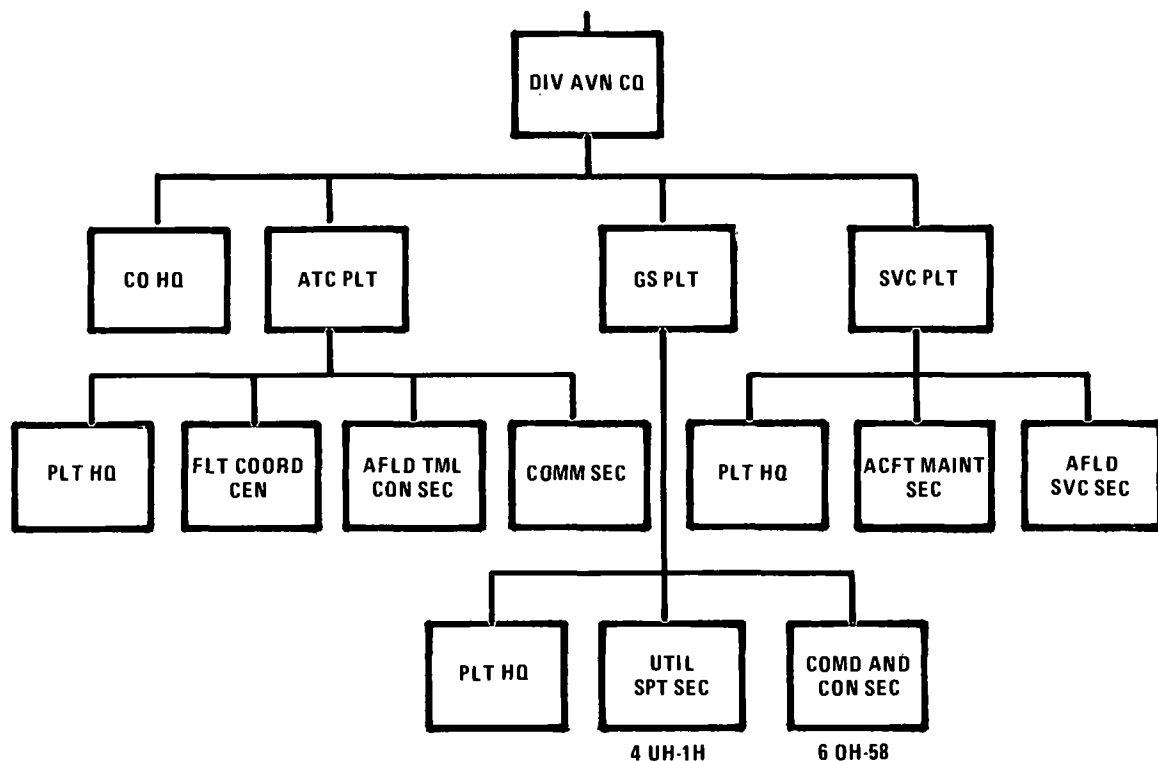


Figure 3-11. Type Division Aviation Company.

Division Aviation Company
(Armor and Mechanized Infantry Division)

MISSION

Action: Command and control

Problem: To provide command and control for a reinforced brigade-size task force.

Situation: The task force has been conducting a highly effective delay for the past 24 hours. Due to the extended frontages of the brigade, communications are strained to the maximum. To further complicate matters, the enemy force has employed communications jamming at task force tactical frequencies. Because of the terrain and distances, radios must remain on high power. Operator procedures and use of alternate frequencies have only partially relieved the problem. Additionally, because of the extended distances, the task force commander has requested an aerial command post for the next critical phase of the delay.

SOLUTION

Division Aviation Company Contribution: A command and control utility aircraft is provided for the task force commander on a continuous basis for the next critical phase of the delay.

How: The command and control helicopter, equipped with a sophisticated, multi-radio console, provides the task force commander an alternative to operating command nets on high power. The commander is able to move about the battle area effecting personal coordination and control, reducing the use of radio communications significantly. When radio communications are necessary, the range is shortened so that low power transmissions are adequate and the mobile platform reduces enemy jamming and direction-finding success. An additional benefit of the mobile command post is that it provides the commander the means to position himself where he can best control and monitor critical situations or rendezvous personally with battalion commanders for candid discussions which are too lengthy or inappropriate for radio transmission.

Result: The airborne command post provided an effective means of communications and control and allowed the task force commander to overcome the difficulties presented by extended distances and enemy communications jamming.

Military Intelligence Company Aerial Surveillance (MICAS)

MISSION

To provide combat surveillance, reconnaissance, and target acquisition capabilities to theater Army, corps, division, and separate task force.

ORGANIZATION

The MICAS is organized with a company headquarters platoon, communications electronic maintenance platoon, three aerial platoons, an aviation maintenance platoon, and an imagery interpretation platoon. The aerial sections are equipped with a total of 18 OV-1D aircraft with three aircraft per section. (See fig. 3-12.)

ASSIGNMENT

Assigned to theater Army, corps, or separate task force as required.

GENERAL

The Military Intelligence Company, Aerial Surveillance (MICAS) is a semi-independent unit, capable of performing sustained aerial reconnaissance and surveillance in an assigned area. The theater Army, corps, or task force commander has command and control over the company and exercises the control through the G2. The company is capable of performing aerial surveillance and reconnaissance of routes, areas, and zones. Other capabilities include collecting data in support of post-strike analysis, radiological surveys and target acquisition procedures. To establish a complete system of battlefield surveillance, assets of the company are employed in conjunction with and to complement those battlefield surveillance assets found in division and corps military intelligence support units.

The principal intelligence-gathering, fixed-wing asset of the ground commander is the OV-1D. The OV-1D may be equipped with side-looking airborne radar (SLAR), infrared, and photographic systems to provide the pilot with the capability of continuous surveillance of the battle area under near all-weather conditions and furnish information to the commander on a near

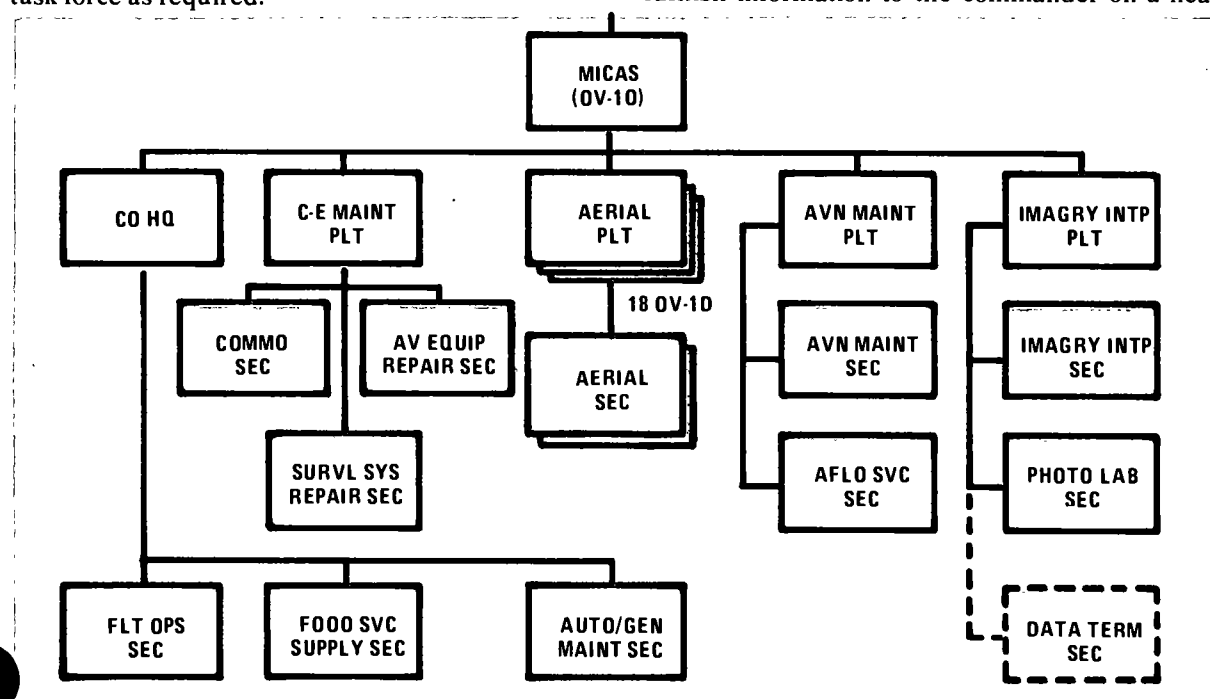
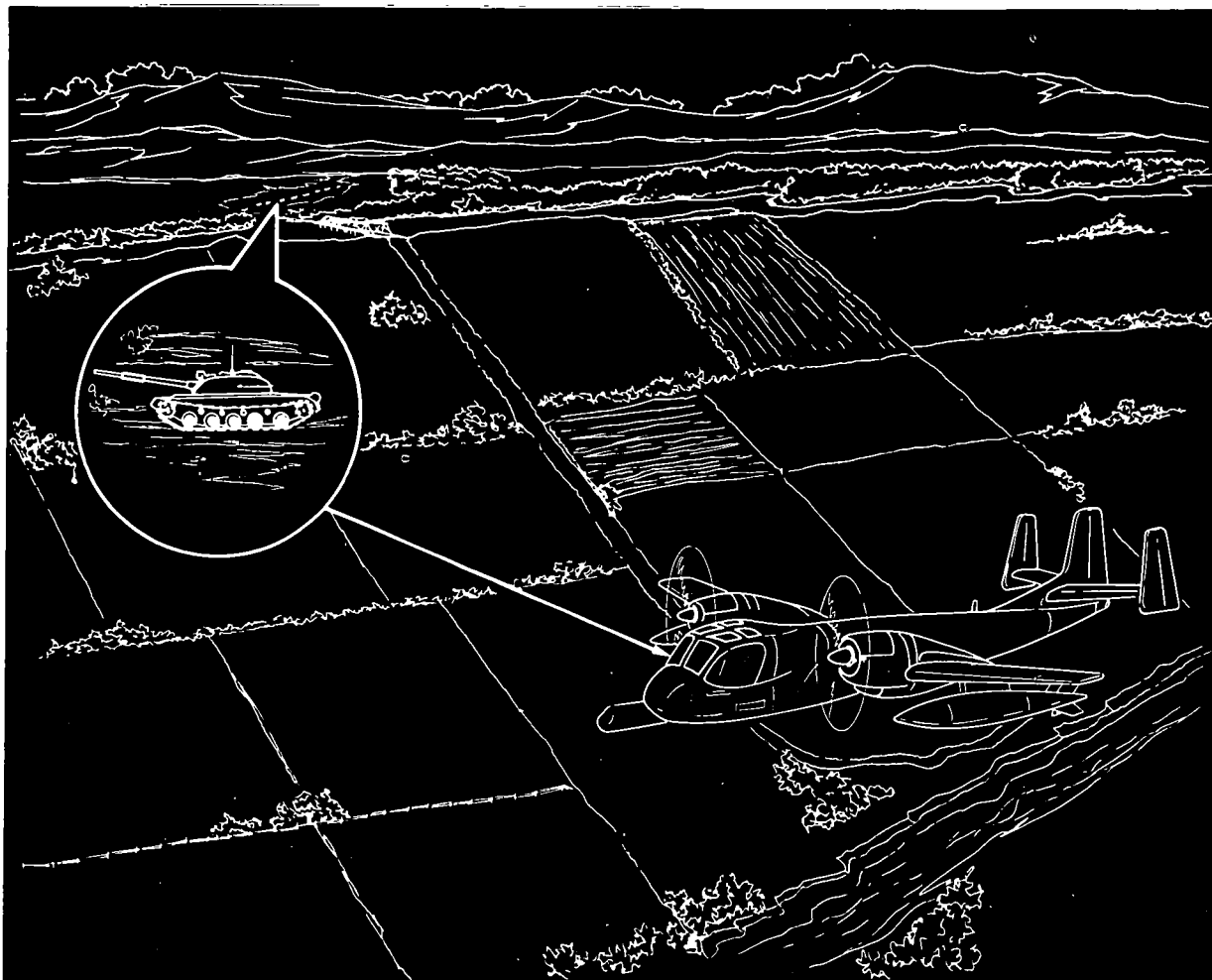


Figure 3-12. Military Intelligence Company, Aerial Surveillance [MICAS].

real-time basis. To perform missions adequately, the OV-1D pilot must fly at altitudes which provide optimum systems coverage balanced with survivability factors. Even using standoff techniques this altitude requirement causes the OV-1D to be more exposed to air defense weapons than aircraft operating at terrain flying altitudes. **Accordingly, detailed mission planning, careful evaluation of the existing enemy threat, and maximum use of assets available for suppression of enemy air defense weapons are imperative for successful employment of the OV-1D.**

In a high threat environment most of the OV-1D missions will be flown using the SLAR sensor

systems to detect movement within large areas of enemy territory. When targets are detected that are important to the ground commander, the OV-1D infrared or photographic systems may be used for small-area search, route reconnaissance, or detecting spot targets in order to confirm activity or identify targets. When the OV-1D is required to operate in the infrared or photographic role, commanders must consider such factors as terrain masking, visibility restrictions and route selection to avoid enemy air defense. Additionally, air defense suppression provided by all available weapons and electronic countermeasure systems increases survivability.



Military Intelligence Company Aerial Surveillance (MICAS)

MISSION

Action: Intelligence collection

Problem: To collect information on enemy armor concentrations and combat activities.

Situation: An armored cavalry regiment is deployed as the corps' covering force. To effectively counter the enemy advance, intelligence information concerning the enemy armor concentrations and main thrust lines is needed. The regimental commander determines essential elements of information (EEI) necessary for planning and coordination of the defense and request intelligence collection support from the corps.

SOLUTION

MICAS Contribution: As part of the overall intelligence collection effort, OV-1 aircraft from the military intelligence company of corps or higher echelons provide around-the-clock surveillance of the battlefield.

How: The MICAS located at corps is assigned the mission in support of the covering force commander. An OV-1D aircraft using side-looking airborne radar (SLAR) is assigned a systematic plan for surveillance of the battle area and forward for which the supported unit is concerned. The surveillance plan incorporates use of an appropriate mix of photographic, infrared and visual means, as necessary, to determine intelligence information determined essential by the supported unit. The near all-weather, day or night surveillance capability of the military intelligence company further enhances intelligence-gathering efforts by providing hard copy imagery interpretation reports to the supported unit on an around-the-clock basis. Threat and mission considerations will determine the optimum altitudes and distance from the enemy at which the aircraft will be flown.

Result: Throughout all phases of the covering force operations, the commander is provided with valuable intelligence data otherwise not available except through the functions of the military intelligence company. An electronic and photographic picture of enemy force dispositions and operations is possible in order to develop the defense to counter enemy aggression. For example, enemy order of battle, deployment and EW vulnerability, and a comprehensive analysis of radar directed air defenses are but a sampling of the information provided by the MICAS efforts. With this information the commander was able to organize the defense to successfully defend in the battle area.

Aviation Company General Support

MISSION

To provide aviation support for the Infantry, Airmobile, Airborne Division headquarters, division support command, and other units without organic aircraft. In addition, it provides limited general support and reinforcement to units with organic aircraft, and limited aerial fire support to combat elements of the division.

ORGANIZATION

The general support aviation company is organized with a company headquarters, a service platoon, and a general support platoon. The general support platoon contains a utility support section, equipped with 4 observation helicopters and 2 utility helicopters, and a tactical support section equipped with 6 attack helicopters. The service platoon contains an aircraft and communications maintenance capability and an airfield service section (fig. 3-13).

ASSIGNMENT

Organic to the combat aviation battalion, infantry, airmobile, and airborne division.

GENERAL

The aviation general support company is employed as directed by the battalion commander and operates from the division airfield. The company augments the division headquarters in establishing and operating the division instrumented airfield. The company contains personnel and equipment necessary to provide continuous and responsive aviation support to the division. It performs its own organic maintenance and provides its own supply and communications. Organization of sections within the company is accomplished to permit flexible employment to meet operational requirements. The company establishes and maintains a heliport adjacent to the division command post to support the division commander and his staff.

To insure proper coordination and employment of the company, the company commander must maintain close liaison with the aviation battalion S3. The success of a mission depends on the degree of planning and coordination between the supported and supporting unit. The general support company establishes and maintains close liaison with the supported unit commanders.

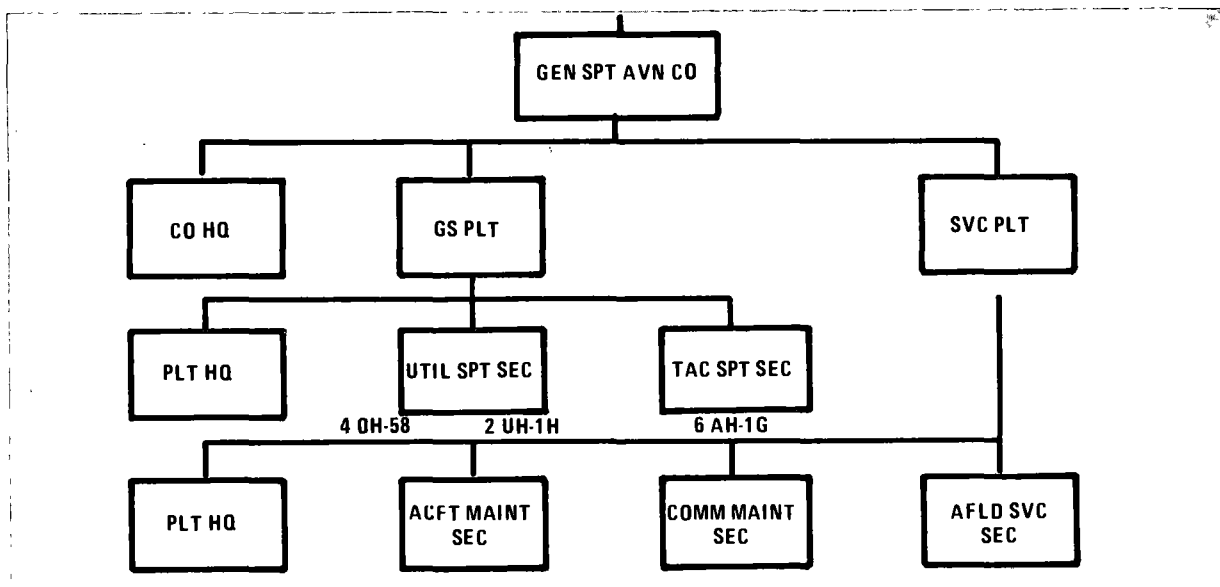


Figure 3-13. Type General Support Aviation Company.

General Support Company
(Infantry, Airmobile, Airborne Division)

MISSION

Action: Resupply

Problem: To conduct a resupply mission of a unit in contact.

Situation: An infantry company is conducting a follow-up mission behind attacking armor forces to clear out small pockets of enemy resistance that were bypassed by the pursuing armor in exploitation. Due to the heavy foliage and rugged relief of the terrain, an enemy platoon is able to occupy a prominent defensive position. As a result, the lead infantry platoon becomes decisively engaged. The heavy volume of enemy fire made it necessary for one platoon to provide overwatching fires while a second platoon maneuvered for a flank attack, driving the enemy from its position. As a result of the heavy contact, 70 percent of the company's basic load of ammunition is expended. Resupply of ammunition is essential prior to the company continuing the mission.

SOLUTION

General Support Aviation Company Contribution: One utility helicopter with one scout and two attack helicopters providing overwatch effects of resupply of the infantry company in contact, thus allowing continuation of the mission without waiting for ground resupply over the rugged terrain.

How: The general support aviation company assigns a utility helicopter crew the mission of resupplying the infantry company. A scout aircraft and two attack helicopters are directed to provide overwatch to suppress any enemy resistance encountered during the mission. Using terrain flying techniques, the utility helicopter flew to the ammunition supply point and was immediately loaded with the waiting ammunition and supplies. The scout and attack helicopters provide overwatch as the utility aircraft flies contour and NOE to the forward infantry location. Even though the infantry company has tried to make a clearing (for the helicopter to land) in the dense vegetation, the clearing is not large enough. The utility crew planned ahead and brought a chainsaw and pioneer tools for such a contingency. The saw is lowered to the ground unit and the clearing is made large enough for the utility helicopter to be hovered and offloaded. The scout aircraft adjusts an artillery smoke screen as the utility helicopter departs to prevent enemy gunners from engaging the aircraft.

Result: The timely utility helicopter resupply of prepositioned ammunition and other ordnance in convenient packages to the infantry company in contact enabled it to continue its follow-up mission without delay.

Aviation Section, Division Artillery

MISSION

To provide limited aviation support to division artillery headquarters and the organic artillery battalions.

ORGANIZATION

The aviation section is equipped with 14 observation helicopters and contains 6 commissioned and 9 warrant officer aviators, and 21 enlisted personnel.

ASSIGNMENT

The aviation section is organic to the headquarters and headquarters battery of division artillery in the armored, infantry or mechanized infantry division.

GENERAL

The aviation section is capable of providing adjustment of artillery fires, helicopters for command and control, and aerial observation and reconnaissance. Additional capabilities include aerial wire laying, aerial radio relay, radiological survey, and limited aerial resupply and battlefield illumination. It provides aeromedical evacuation when necessary.

Aviation Section Division Artillery

MISSION

Action: Adjusting field artillery fires.

Problem: To provide an air observation post from which air observers can adjust field artillery fire.

Situation: For 2 days elements of a mechanized division have been in heavy contact with an enemy motorized rifle division in rugged mountainous terrain. Both forces are deadlocked and casualties are heavy on both sides. Enemy forces are backed by strong artillery support, the source of which is not detectable to friendly troops on the ground. Further, the extremely heavy vegetation and rugged terrain make observation and adjustment of friendly counter battery fires difficult at best.



SOLUTION

Division Artillery Aviation Section Contribution: Two division artillery observation helicopters with air observers provide the air observation post.

How: After a brief map study, one particularly high area in the contact zone is recognized that will provide excellent observation except for the heavy vegetation. A team of two observation helicopters is given the mission; and using terrain flying techniques along minimum risk routes, they move quickly to the designated area. Once in position they begin observation then locate and adjust field artillery fires on enemy positions using a "pop-up" observation technique by unmasking just long enough to observe and adjust fires. Detection and lock-on by enemy anti-aircraft weapons is disrupted both by incoming artillery and by constant maneuvering of the observation helicopters. Accurate field artillery fires neutralize the hostile position.

Result: Accurate field artillery fire made the difference. Though one observation helicopter was slightly damaged by ZSU-23-4 fire, the other remained in position, and within 30 minutes the forces were able to mount a successful offensive against the battered motorized rifle division.



Brigade Aviation Section

ASSIGNMENT

Organic to the headquarters and headquarters company of each brigade.

MISSION

To provide limited aviation support to the brigade headquarters and units attached to the brigade.

GENERAL

ORGANIZATION

The brigade aviation section is equipped with 4 observation helicopters and contains 1 commissioned and 3 warrant officer aviators. Normally the section is under the staff supervision of the brigade S3.

The brigade aviation section provides observation helicopters for command and control, aerial observation and reconnaissance, aerial wire laying, aerial radio relay, radiological survey, limited aerial resupply and battle area illumination.

Brigade Aviation Section

MISSION

Action: Support of an Air Force forward air controller (FAC) directing airstrikes for a covering force.

Problem: To provide responsive mobility for a FAC directing airstrikes for an armored brigade.

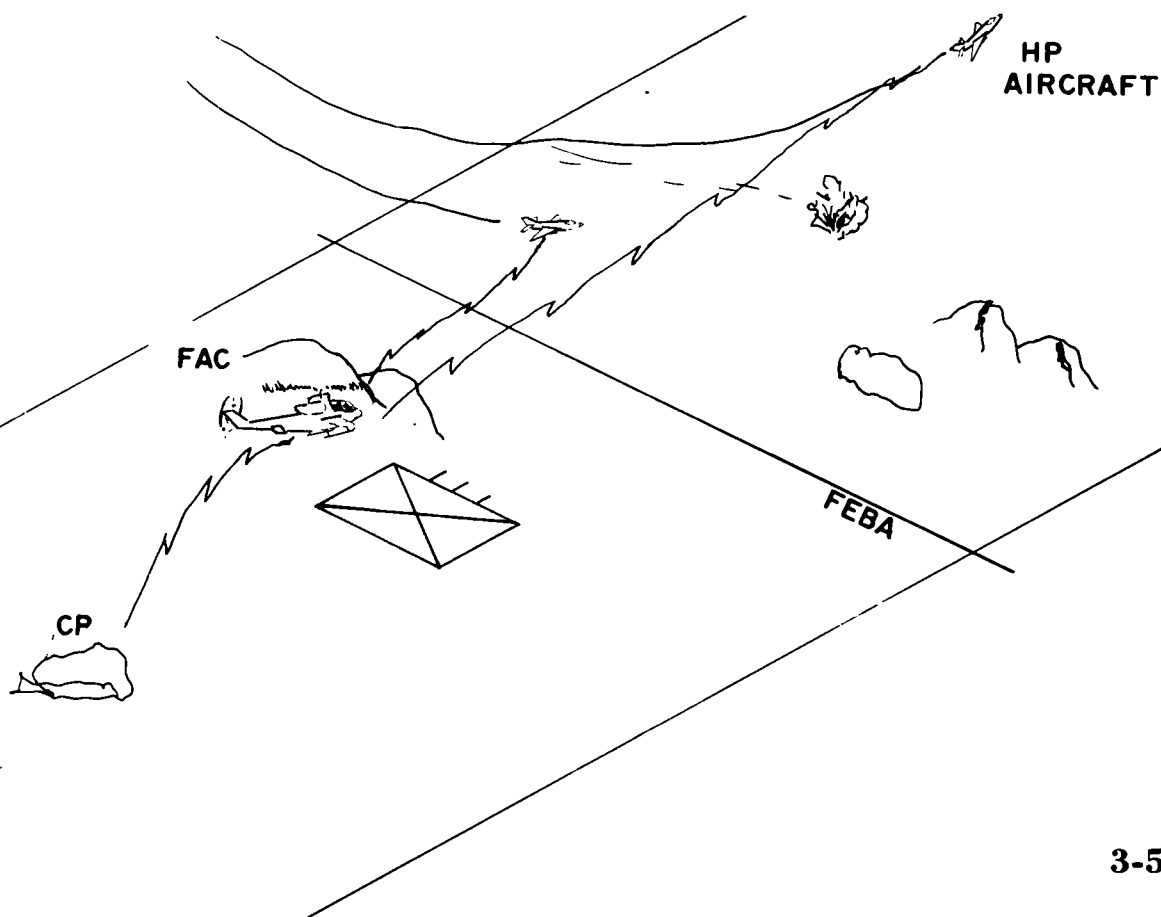
Situation: An armored brigade is defending on the FEBA. The forward air controller supporting the brigade has preplanned airstrikes on the main avenues of approach into the brigade area. Due to extended frontage of the brigade and the abundance of lucrative targets, ground transportation normally provided the FAC is not rapid enough to move him about the battle area and place him in position to direct the airstrikes as they occur.

SOLUTION

Brigade Aviation Section Contribution: Using an observation helicopter from the brigade aviation section, the FAC is able to observe and control the airstrikes from a forward vantage point.

How: The FAC maintained continuous contact on maneuver battalion command nets to keep abreast of the tactical situation. Using the helicopter on-board radios, the FAC is able to stay in contact with the Air Force tactical air control party element located at the brigade command post to process additional tactical air requests. Fighter bombers were briefed and controlled from the helicopter on UHF and VHF radio. The observation helicopter's mobility, agility, and survivability tactics allow the FAC to quickly move to positions from which he can most effectively control the attacking fighters.

Result: The overall effectiveness of the FAC was vastly increased by the mobility provided by brigade aviation aircraft. This capability resulted in a corresponding increase in the responsiveness and effectiveness of the supporting fighters.



Army Aviation in Action Against the Threat

The days of the battlefield purist in which one arm is dominant are over. The combined arms concept has been, and continues to be, the doctrine of the United States Army. Recent conflicts have overwhelmingly substantiated the accuracy of this doctrine.

Army aviation is an integral part of the combined arms team, and offers dynamic new dimensions to land combat in terms of reconnaissance, intelligence, command and control, firepower, and battlefield mobility. Aviation's exciting new capabilities provide interesting alternatives to traditional solutions. The multiple impact of today's aviation on ground operations is not limited to those capabilities listed above. *Indeed, aviation increases the effectiveness of ground forces overall, allowing maximum use of limited resources through rapid mobility.* For example, combat power critically needed elsewhere will not be wasted defending areas where there is no enemy. Additionally, aviation can provide security forces that can move at speeds commensurate with advancing main bodies during movement to contact, and offer substantial capabilities in more fluid situations such as exploitation or delay operations. In fact, *aviation complements and expands any tactical scheme and envelope, and also provides an unparalleled logistical flexibility to make the tactician's dreams a reality.*

These capabilities have other implications, particularly as we measure the size of U.S. forces against the size of some of our potential opponents. It becomes abundantly clear in some instances that we may be placed at a marked quantitative disadvantage.

Military history teaches that given a reasonable force ratio, quality forces properly applied will be decisive.

Facing an enemy of tremendous size and capabilities on the broad fronts of future conflicts, we must orient our doctrine toward applying combat power at the decisive place and time. The Army aviation contribution to combat power suggests it may well be the key to offsetting quantitative disparities.

In this portion of the chapter we will observe Army aviation, with its unique characteristics, integrated into the combined arms team in various high threat environment scenarios, accomplishing tasks for ground units. Before we describe the tank killing helicopter in action a discussion of its capabilities, limitations, and possibilities for employment is in order.

The Attack Helicopter

Helicopters have appeared in many conflicts of varying intensities throughout the world during the last three decades. The attack helicopters, however, were used extensively in combat only by U.S. forces in Vietnam. Since the Vietnam conflict, military planners have devoted considerable thought to the problems facing these aerial firing platforms in future conflicts where tanks, armored vehicles, and complex air defense systems would abound. However, development of *a truly effective antitank missile-firing helicopter that provides standoff capabilities and extends engagement range to at least 3,000 meters has provided a major innovation in military tactics and is cause for review of relative combat power.*

The United States Army presently holds and must maintain a commanding lead in the development of attack helicopters. For the past 10 years, it has pioneered not only in materiel requirements, but in tactical techniques of employment of these vehicles. We have relied on our combat experience, field tests and evaluations, war games, and computer simulations to determine the effectiveness of attack helicopters on future highly lethal battlefields.

We have found that— Attack helicopter elements, properly employed, cannot only survive but can destroy opposing armored vehicles and even air defense weapons with a highly favorable loss ratio. Conversely, when helicopters are used carelessly and proper tactics and techniques are not engrained through training, the results are likely to be disastrous.

Before we enter into the scenario where examples will show both proper and improper employment principles and techniques, let's explore the peculiarities of attack helicopters.

The attack helicopter is clearly a study in contrasts, capable of efficiently destroying a wide variety of targets, yet subject to being destroyed by an equally wide variety of weapons systems. Simply stated, our Cobra TOW possesses firepower superior in some respects to a tank and yet, because of its lack of armor protection, it can be killed by a variety of weapons. The helicopter, however, is no more obsolete than the infantryman who can also be killed by a variety of weapons. *The helicopter pilot, just as the infantryman, employs measures in battle to protect himself.*

The tank is an awesome threat to ground forces; however, the tank is not nearly so intimidating to the missile-firing helicopter that can engage it at a standoff range. On the other hand the air defense weapons that accompany armored forces are not of particular concern to friendly tank elements, but can pose a serious threat to attack helicopters. This statement illustrates the combined arms concept.

If ground elements can help suppress the air defenses, the attack helicopters can gang up on enemy armor.

Basically, *modern warfare is a system of measures and countermeasures*, requiring a mixture of offensive and defensive weapons systems. The Cobra TOW specializes in tank killing but it is not merely a tank countermeasure. Often, such false labels as "flying tank," "aerial howitzer," or "airborne APC" have been placed on the attack helicopter. It is clearly none of these things, although it possess many of the capabilities of these ground systems. To employ a Cobra TOW in this context would *severely limit its potential and expose these valuable machines to needless risk.*

Why, then, is the tank-killing attack helicopter so vitally needed when similar but cheaper ground-based weapons systems are available? The obvious answer is the helicopter's speed, mobility, and volume of fire. Not quite as evident but equally noteworthy is the fact that the armed helicopter has truly extended the capability out to 3,000 meters. The improved Cobra TOW can "pop up" to the altitude that affords the gunner the visibility to convert what would be an 800-meter shot on the ground, because of intervisibility considerations, to a 3,500-meter kill (fig. 3-14).

Most engagement ranges are a function of terrain, and the helicopter is not restricted by

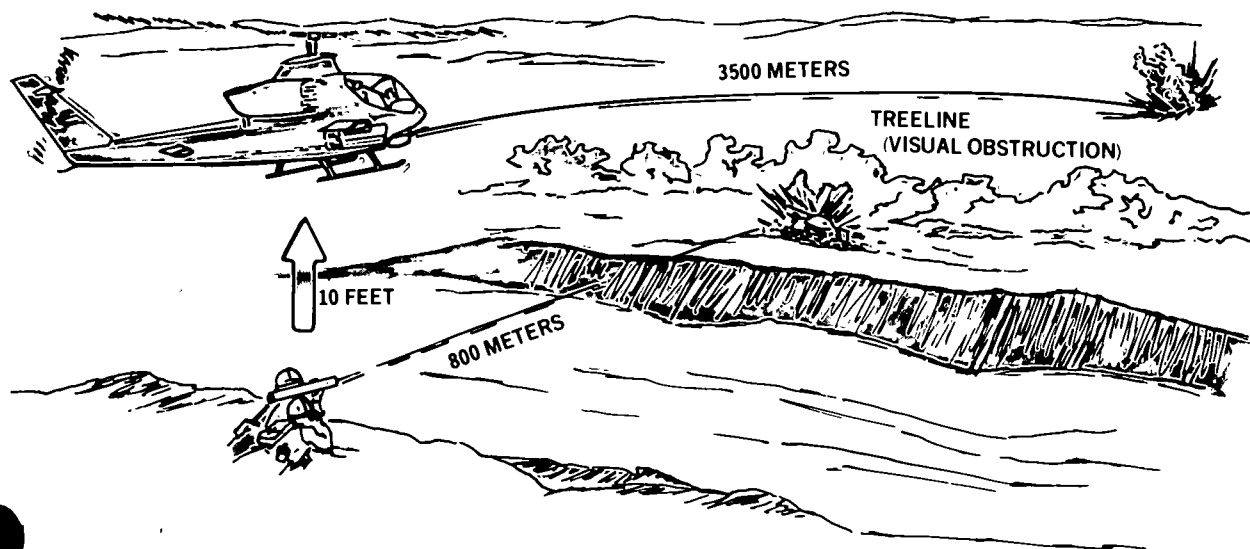


Figure 3-14. Intervisibility Considerations.

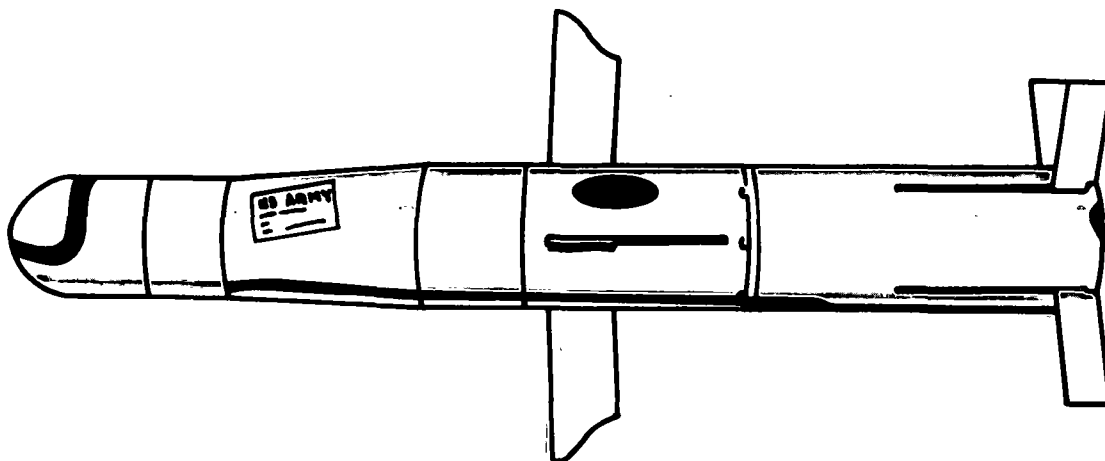
many factors that limit ground elements. Therefore, the helicopter as a tank destroyer provides a devastating impact no other system can match.

The commander fortunate enough to employ the flexible Cobra TOW can respond quickly to changes in the tactical situation; but, as with

ground arms, helicopters achieve the greatest gains when operations are characterized by detailed and methodical planning allied with deliberate and violent execution.

The Cobra TOW, like the serpent for which it was named, employs stealth and elusiveness and, although thin-skinned, strikes with deadly speed.

THE TOW MISSILE



Characteristics:

Military Designation: BGM-71A

Type: Heavy antitank guided weapon system

Guidance Principle: Automatic missile tracking and command guidance from optical target tracker

Guidance Method: Wire guidance control of aerodynamic surfaces

Propulsion: Two-stage solid-propellant motor

Warhead: High-explosive shaped charge armour piercing

Missile Length: 117 cm

Missile Diameter: 15.2 cm

Launch Weight: 18 kg

System Weight: 102 kg including one missile

Speed: 1,000 km/h

Range: Minimum: 65 meters

Maximum: 3,000 meters

Figure 3-15. The TOW Missile.

Army Aviation on a Future Battlefield

To illustrate the broad spectrum of combat capabilities of Army aviation—both present and future—in a high threat environment, let us look at a battlefield scenario set against the background of fictitious countries that depicts the combined arms concept in action in a corps operation.

The action is intended to show how aviation functions as part of the combined arms team and how it benefits the ground-gaining arms. Each member of the Army aviation family accomplishes tasks you will recognize immediately as increasing the ground commander's capability to perform the five functions of land combat and increase:

- **Firepower**
- **Mobility**
- **Reconnaissance**
- **Security**
- **Command and Control**
- **Logistics**

In order for aviation to perform successfully in battle, each commander, aircrew member, mechanic, air traffic controller — in fact, everyone associated with aviation — must be aware of the threat and the measures required to avoid, suppress or destroy forces and accomplish the mission. In these scenarios, you will note that countermeasures and techniques discussed in this chapter are put into practice. Aircraft will take maximum advantage of terrain flight and firepower available from all sources.

THE PAKLAND-EURLANDIA CONFLICT

On 14 August the Allied Forces were deployed along the border of the Eurlandian Republic. Intelligence sources indicated that Pakland forces would invade Eurlandia with the initial objective of destroying Allied Forces before they could be reinforced. When Eurlandia had fallen, Pakland would then opt for a political settlement which they believed would be accepted to end hostilities.

To achieve Pakland objectives, speed and maximum destruction of Allied Forces was the primary consideration. Pakland therefore planned to attack in summer to take advantage of the excellent trafficability afforded by the dry ground. In addition, the clear weather would allow maximum use of observed artillery fire, capitalizing on a five-to-one superiority in artillery tubes. Moreover, good weather would also allow extensive use of high-performance aircraft with which Pakland expected to maintain air superiority over the battlefield, and facilitate the use of aviation, airmobile and airborne forces which could be employed in friendly rear areas. Pakland 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.

The U.S. corps, alerted to the possible invasion, closed into its defensive position, 1800 hours, 14 August, with two divisions abreast, an armored division on the North, and a mechanized infantry division on the South. An armored cavalry regiment with attachments was deployed as the corps covering force with a separate mechanized infantry brigade in corps reserve (fig. 3-16).

Prior to forward deployment, the U.S. corps received attachment of an air cavalry combat brigade (ACCB). A highly flexible force, the ACCB could be task organized to accomplish a variety of missions as a part of the mobile reserve.

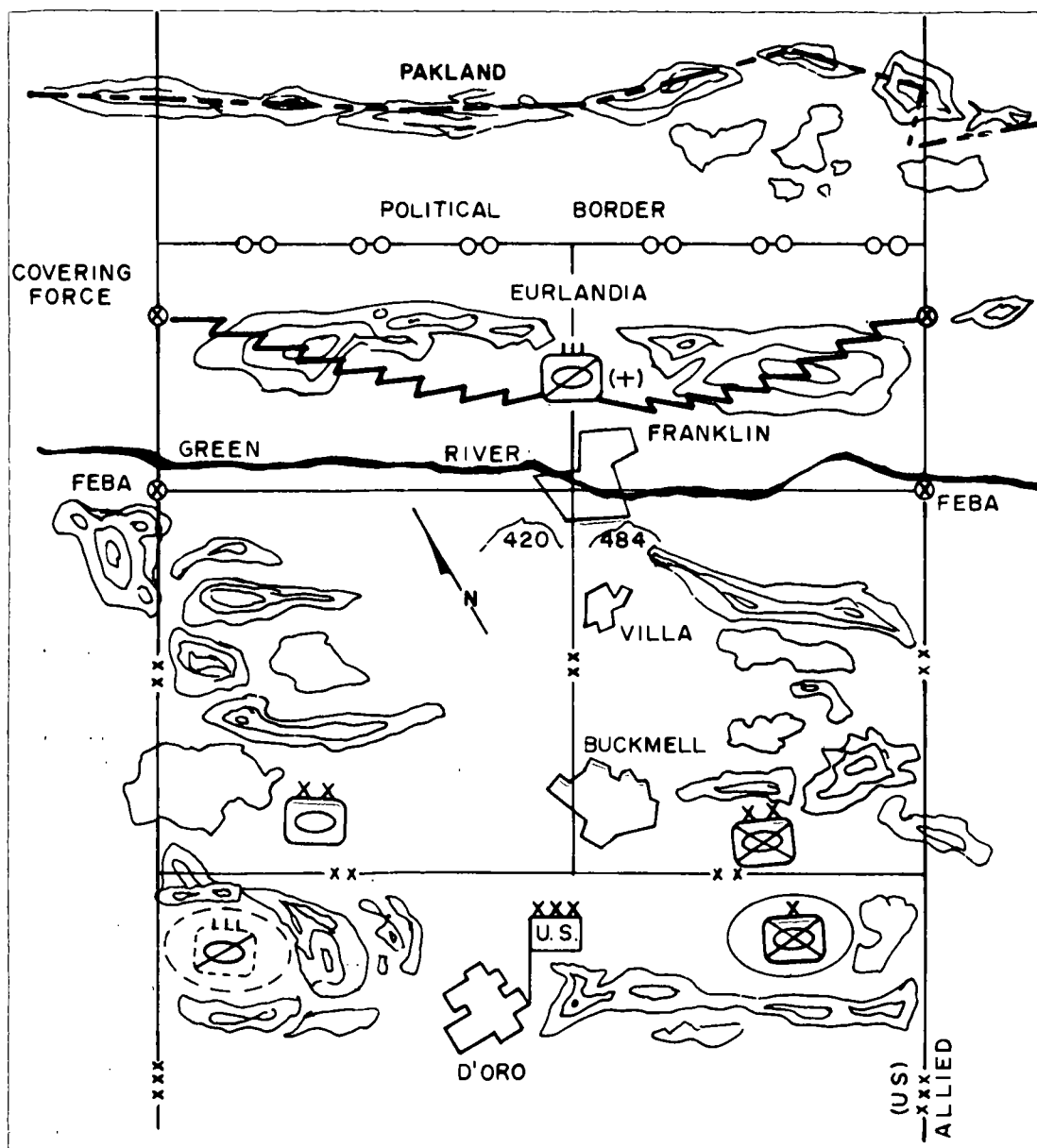


Figure 3-16. Corps Initial Distribution.

Critical Situation I

The Corps Covering Force

Combined Arms Aviation Tasks

- Reconnaissance
- Gathering and relaying information
- Emplacement of aerial mines and unattended ground sensors
- Airlift of tank killer teams
- Emplacement/displacement of FARRP's
- Airlift of Redeye teams
- Screening/economy of force
- Security
- Aerial forward observers
- Air defense suppression
- Destruction of armor
- Use of counterbattery fire
- Overwatch
- Traveling overwatch
- Resupply of ground units
- Medical evacuation
- Downed aircraft recovery
- Command and control
- Radio relay

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

Before and after the forward deployment of the corps, OV-1D Mohawk aircraft from the corps military intelligence company (aerial surveillance) and RU-21 aircraft from the Army security agency aviation company had been committed on an around-the-clock basis to provide the corps with surveillance and signal intelligence. The Mohawk, using side-looking airborne radar (SLAR) and associated data link, where available, provided the G2 with information on movement of enemy forces. By means of sophisticated electronic equipment the RU-21's obtained data from enemy radios, radars, and other electronic emitters that intelligence specialists used to identify specific enemy elements. *Throughout all phases of tactical operations, these aircraft provided the commander an electronic picture of*

Survival Measures

- Threat awareness
- Familiarity with terrain
- Premission planning
- Rehearsals
- Detailed coordination and planning of flight routes, altitudes, and IFF
- Artillery suppression
- Tactical air support
- Application of overwatch tactics
- Use of multiple preselected firing positions
- Terrain flight
- Detection avoidance
- Electronic warfare suppression
- Use of chaff, smoke, and illumination
- Night flight
- Use of night sights
- Secure voice communications
- Evasive maneuvers
- Communications and light discipline
- Diversionary tactics
- Use of wire ground communications in preattack stages
- Camouflage and dispersion

the opposing forces. They also aided him in targeting and identification and provided aviation elements with a comprehensive picture of the air defense threat array. Additionally, OV-1 pilots, by means of secure voice, made radio reports to the appropriate commander affected by enemy movement.

As specified in the war plan, the armored cavalry regiment received operational control of an air cavalry squadron (separate), an assault helicopter company, and two platoons from the corps helicopter ambulance company for the covering force mission. Additionally, Air Force forward air controllers were provided to squadron level and were prepared to control preplanned airstrikes.

Fuel and ammunition for these aviation elements were presently being positioned at predesignated locations in accordance with logistical plans. *All ground aviation units were thoroughly familiar with the mission and terrain because they had rehearsed this mission many times during previous training exercises.* Helicopter ambulances were under the control of the regimental surgeon and were located to support all forward maneuver elements across the wide front. The priority of mission support for assault helicopter elements was to emplace aerial mines and unattended ground sensors, to be prepared to lift tank killer teams from D troop of the air cavalry squadron, and aerial resupply

The air cavalry squadron accepted operational control of the air cavalry troop of the armored cavalry regiment until passage of lines. The air cavalry squadron coordinated its activity, based on the scheme of maneuver and fire plans of the armored cavalry regiment, deploying all air cavalry troops forward with the regimental air cavalry troop on the left, A and B troops (air cavalry) in the center because of the high-speed approach in that sector, and C troop (air cavalry) on the right. The ground element of the air cavalry squadron, D troop, was organized into tank killer teams which could be moved rapidly throughout the battle area as the situation required. Additionally, the air cavalry squadron coordinated aerial passage points with the general outpost of the divisions occupying the FEBA.

Further, detailed coordination with forward area air defense was required concerning the use of chaff and other countermeasures and for passage points, flight routes, altitudes, and identification friend-or-foe (IFF) procedures.

The regimental air cavalry troop arrived to support the 1st Armored Cavalry Squadron located on the left flank of the covering force. The following will provide a view into the activities taking place at troop level.

The armored cavalry squadron commander briefed the air cavalry troop commander on the situation and provided copies of the barrier plan, fire support plan, operations overlays, and sensor diagrams for dissemination to cavalry aircrews. The armored cavalry squadron would delay on a front in excess of 30 kilometers which gave forward armored cavalry troops frontages in excess of 10 kilometers and platoon in excess of 3 kilometers. The air cavalry troop would cover gaps and dead space forward and between the extended ground forces and was given the mission to establish visual contact with the enemy as soon as possible to facilitate an early warning and accurate engagement at maximum range. The right flank of the 1st Squadron was clearly the most critical, since the enemy's main attack was expected on the major avenue of approach into the 2d Squadron's area. Spillover from the attack could quickly roll up or encircle C troop on that flank before delay could be accomplished. The artillery was in position, ready to fire, and CEOI extracts of their firing channels were issued to the air cavalymen. Forward minefields were in place and assault helicopters were presently emplacing minefields to the rear of the squadron. Lanes in the minefields would be quickly closed by air, and abatis and bridge demolitions would be blown on order. Unattended ground sensors were in place to provide intelligence and target acquisition.

To assist the squadron, the air cavalry troop commander employed his aeroscouts well forward, and established additional observation posts with his aerorifle platoon. Cobra TOW's were employed in the C troop (ground) area on the right which was nearest the major armor avenue of approach. AH-1G's were located to the rear of the ground troops to enable them to react across the entire front. The AH-1G's were equipped with advanced fire control, wingstore management, and remote fuzing systems which

allow accurate area target engagement from the terrain flying mode to ranges in excess of 5,000 meters. Their 2.75-inch rockets were highly stabilized by the new fin assemblies, and warheads included antitank and personnel submunitions, chaff, smoke, and illumination. *The AH-1G's clearly complemented the Cobra TOW's, not solely because of their unique capabilities, but largely because they presented a totally different threat to the enemy and further complicated the antihelicopter problem.*

Air cavalry troop elements began their premission planning and battlefield preparation. Since they had conducted a detailed area reconnaissance, they had accurate wire and hazard diagrams of the area. They removed some of the wires which would interfere with aircraft or missile flight. Through reconnaissance, they reconfirmed primary, alternate, and supplemental firing positions, and rehearsed entry to and exit from these positions, so as not to skyline their aircraft. Ranges from these firing positions were determined and flight routes selected. AH-1G fires were also preplanned based on avenues of approach. Aeroscouts selected mounted and dismounted observation posts. Precombat checks were completed in accordance with troop field SOP's. The air cavalry elements left nothing to chance. **Their efforts were totally systematic, each interfaced with and depended upon the other, functioning like a fine rifle with all parts working smoothly.**

PAKLAND ATTACKS

At 2330 hours, 15 August, OV-1D Mohawks detected massive forward movement of Pakland forces on the enemy side of the political border. By 0330 hours the next day, the enemy was attempting to jam communications across the entire front. *This effort was, by and large, ineffective, because of the extensive use of wire and a well-executed communications discipline and deception plan.* At 0400 hours, massive enemy artillery fire began. However, friendly forces sustained negligible damage due to *effective deception, camouflage and concealment measures.*

Pakland forces used smoke to conceal their movement through their own border minefields.

As the first enemy elements emerged from the smoke screen and crossed the political border, they were *immediately engaged by U.S. field artillery* causing them to button up inside their vehicles. Aided by night sights, *Cobra TOW elements then began methodical destruction of these armored reconnaissance units.* Radar warning receivers aboard the aircraft indicated that only a few ZSU-23-4's were operating in the radar mode, thus reducing their effectiveness. Because of smoke and darkness, SA-7 operators could not see the opposing helicopter elements.

The enemy's sheer mass prevailed, and helicopter elements were forced to reposition farther to the rear. Thus far, the battle losses had been one-sided in favor of the defender. Across the entire corps front, five U.S. helicopters had been lost to air defense weapons. In all but one case the crews were recovered. To a great extent, *darkness and field artillery suppression had limited the enemy's ability to create an effective antihelicopter response.* With the coming of daylight the enemy attack began to gain momentum. Artillery fires increased in quantity and accuracy and began causing forest fires to rage out of control throughout the battle area. Forest fires were clearly benefiting the defender at this point, allowing more force to be concentrated in contested areas, and in effect, channeling enemy movement. Impassable burning areas, minefields, and abatis had reduced enemy forward movement significantly. Barriers were covered by fire from both ground and air elements. Clearing operations were slow and costly, and enemy combat forces which were beginning to jam up to the rear of the barriers presented lucrative targets for U.S. fire support systems to include Cobra TOW aircraft. Pakland pioneer engineer elements eventually succeeded in breaching these defenses at high cost. Coordinated attacks against the covering force caused it to withdraw to successive positions.

As the covering force began moving to its successive position, enemy fighter aircraft which had previously been concentrating on deep targets began to appear in considerable quantity in forward areas. They were met by U.S. Air Force fighters and air defense; however, many succeeded in penetrating these defenses and

harassed the repositioning ground forces. Helicopters possessed little in the way of effective countermeasures and were forced to play cat and mouse with enemy fighters; and relied, for the most part, on tactical air and ground forces for active protection. However, by 1245 hours U.S. forces were established in relatively good order on the subsequent position. Medical evacuation by helicopter had been effectively accomplished. The armored cavalry regiment requested that additional air defense elements from the Chaparral/Vulcan battalions of the forward divisions be sent forward.

During this time, CH-47 aircraft resupplied fuel, TOW missiles, and artillery ammunition. Assault helicopter elements brought additional Redeye teams forward and assisted in closing minefield lanes.

POSITION SELECTION

As enemy pressure mounted across the front, a Cobra TOW crew from the air cavalry troop maneuvered its aircraft into what appeared to be an excellent firing position on a wooded knoll which offered vast fields of fire. The crew was elated with its success of the morning and was

looking forward to a destructive afternoon. Because of their intense concentration on a scout pilot's information on the advancing enemy force approaching its killing zone, crewmembers did not notice the fallen leaves being stirred high in the air as a result of a rotor wash. This cyclonic funnel of leaves was not overlooked by the crew of a ZSU-23-4, accompanying the attacking armor force, who were becoming increasingly aware of the telltale sign of careless opposing helicopters. Without hesitation the crew trained its four-barreled gun on the helicopter's location. The Cobra crew was also aware of the ZSU because it had been reported by the scout. The Cobra crew had planned to quickly locate and destroy this weapon first, assisted by the scout and its radar warning receiver, and then systematically knock out the tanks. As the Cobra unmasked, it immediately began taking fire from the air defense weapon. Realizing its precarious situation, the Cobra crew immediately took evasive action and tactically repositioned to another firing position while the ZSU-23-4 was engaged by another aircraft. **Firing positions must be selected with care, paying particular attention to dust, debris, and even loose snow which would disclose an otherwise excellent location (fig. 3-17).**

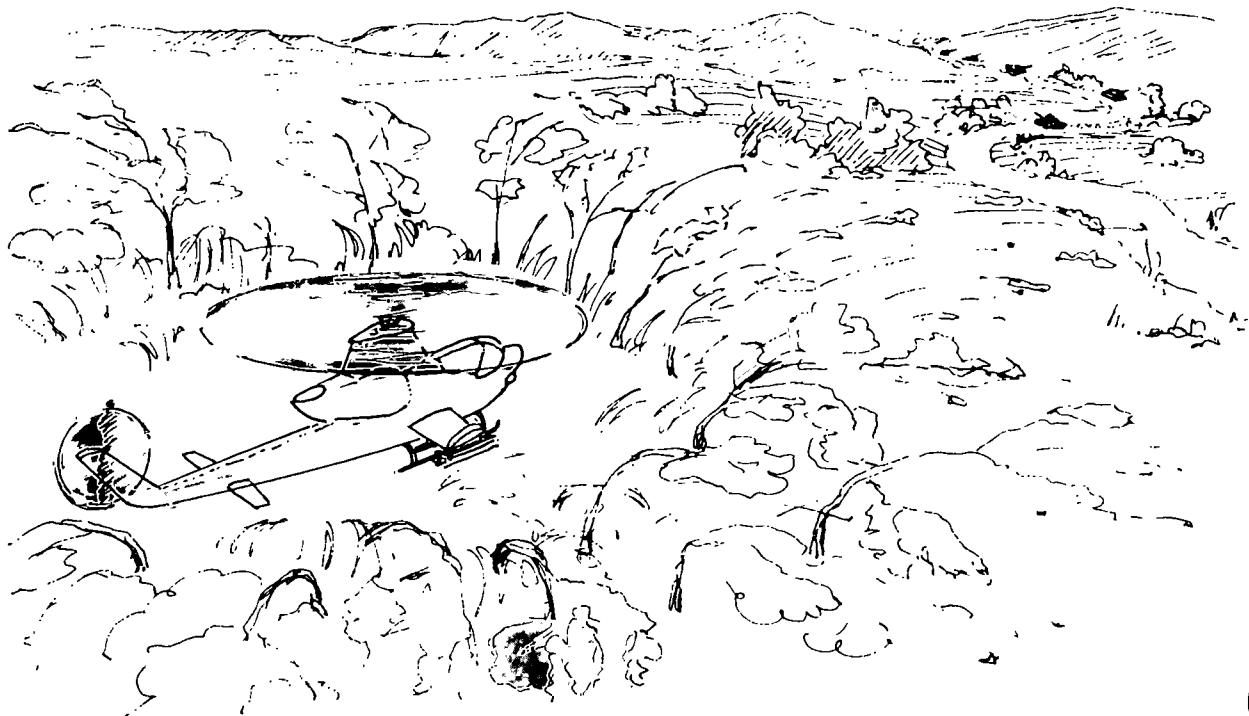


Figure 3-17. Rotor Wash Signature.

Pakland forward air defense elements were rapidly becoming adept at anticipating Cobra TOW firing positions. Artillery was also being used to keep helicopter elements off balance. The enemy was aware that even near-misses would flush helicopters from their concealed firing positions, making them prey for the air defense as they repositioned. However, U.S. counterbattery fire was becoming more effective. Towed enemy artillery afforded little crew protection and was slow to displace. Pakland artillery units were suffering excessive losses, and enemy artillery elements were becoming more conservative, to the gratitude of friendly helicopter forces who had to that point been considerably affected by artillery fire. Additionally, air cavalry elements had devised countermeasures that restricted the effectiveness of the ZSU-23-4. *These guns were easier to locate when operating in the radar mode because of the readily detectable energy they emit.* On the other hand the enemy realized that prolonged radar operation resulted in destruction. ZSU crews resorted to visual acquisition which diminished their effectiveness. This degradation in ZSU capability provided a sharp increase in Cobra TOW effectiveness that often allowed killing of two or more tanks from primary and alternate firing positions located fairly close together.

Also effective was the diversion of the enemy's attention by exposing a helicopter for brief periods of time at ranges greater than those of the ZSU. Enemy air defense gunners would become intent on targets they could see and would overlook lurking, well-concealed Cobras within range which could destroy the armored vehicles.

PASSAGE OF LINES

The covering force effected passage of lines at 0030 hours screened by overwatching air cavalry. As aviation elements passed through the forward division's general outpost, they were released from the control of the armored cavalry regiment and returned to preselected assembly areas to complete post combat checks, replace materiel and personnel, and prepare for subsequent tactical operations.

The covering force battle had lasted 18 hours. During this period the enemy had faced extremely tough resistance forcing him to commit his main attack early and reveal the locations of these

attacks to FEBA forces allowing them to adjust accordingly. Moreover the covering force had bought time for these adjustments to be made and had wrought significant destruction on the evading enemy forces. Equally important, however, was the fact that each participating element—both air and ground—was still a viable combat force ready for future commitment.

In summary it can be stated that the covering force role is one of the most difficult military missions to accomplish. *This is primarily because of the decentralized nature of the operation, which strains command and control communications to the maximum.* Timing is of overwhelming importance. If forces are moved too early the enemy will not commit his main attack, nor will maximum delay be effected; if too late, decisive engagement may have precluded the ability of the force to maneuver, and defeat in detail could be the end result. Many factors contributed to the overall success of the covering force just depicted.

Among the most significant of these are the following:

- All participating elements thoroughly understood the capabilities and limitations of the other.
- Integrated previous training and rehearsal for this particular mission was accomplished.
- Junior commanders and leaders were thoroughly trained, a must for decentralized operations.
- Meticulous tactical and logistical planning had been accomplished.
- Air and ground elements were knowledgeable of the enemy's doctrine and capabilities which allowed relatively accurate predictions of his intentions.
- Individuals, crews, units, and commanders knew the capabilities of their weapons, systems, and equipment. This technical proficiency allowed each element to be employed with maximum efficiency.
- The covering force capitalized on the mistakes and enemy weaknesses; but just as importantly, learned from their own mistakes and made rapid corrective adjustments.
- Mobility and quick response of the aviation elements were utilized to help tie together the decentralized operation.

Critical Situation II

The Defense of a River Line

Combined Arms Aviation Tasks

- Delivery of massed firepower on enemy columns
- Security for river crossing
- Assistance in passage of lines
- Emplace minefields
- Overwatching fire for ground units
- Airlift of rifle squads and TOW teams
- Resupply of rearming points
- Resupply of artillery battalions
- Counter air assault operations
- Rear area security
- Flank security
- Cover dead space
- Command and control
- Use of illumination
- Medical evacuation
- Displacement of FARRP's
- Spilling attack
- Gathering and decentralization of information/intelligence

The general outpost of the forward divisions assisted the covering force in its passage through the FEBA. The Pakland attack had lost considerable momentum. The covering force elements had destroyed large quantities of tanks, armored vehicles, and other materiel. In some instances, enemy losses were so great that unit replacement of attacking elements was required prior to continuing the attack on FEBA forces which were defending along the Green River.

The U.S. corps commander's philosophy was paying off. Plans were designed to subject the enemy to ever-increasing, uninterrupted attrition as he advanced, while keeping friendly losses to a minimum. U.S. commanders were very much aware of the fact that they had a lower threshold of pain than the enemy, and could not afford to suffer comparable losses, because replacements for equipment and personnel were not readily available. They realized for the time being that the battle could not become clearly decisive; for the present, at least, the active defense and delay must

Survival Measures

- Threat awareness
- Familiarity with terrain
- Premission planning
- Rehearsals of counterattack plans
- Detailed coordination and planning of flight routes, altitudes, and IFF
- Application of overwatch tactics
- Use of multiple preselected firing positions
- Artillery suppression
- Terrain flight
- Detection avoidance and evasive action
- Electronic warfare and IR suppression
- Night flight
- Use of night sights
- Use of chaff, smoke, and illumination
- Evasive maneuvers
- Communications and light discipline
- Diversianary tactics
- Use of wire communications
- Air-to-air defensive tactics
- Antiaircraft fire
- Camouflage and dispersion

characterize the nature of the corps operations. Fortunately, at this point the terrain favored this course of action.

As for aggressor force commanders, this would be their first opportunity to destroy major U.S. elements. They were confident they could force decisive combat, believing the actions of the opposing forces to be accurately predictable. Their plan basically required concentration on U.S. forces expected to occupy key terrain positions, attacking these in force, bypassing, isolating, and then defeating them one at a time. On the previous day, aggressor aerial reconnaissance had photographed the defenses being prepared which indicated the U.S. corps elements were establishing a relatively weak defense in place.

THE DEFENSE

In reality, however, these fortifications were part of a well-coordinated deception plan. Actual corps defense plans called for maximum destruction of enemy forces on their approach to and crossing the Green River. At this time of year, the river presented little in the way of an obstacle as the marshy approaches were dry and trafficability was good. The river itself was low and bridging would be relatively simple. However, the enemy crossing would be costly in terms of casualties and time. Both near and far banks had been extensively mined and were covered by fire. *The corps defense was planned in depth as an active defense, using combined arms teams and task forces. The concept was to wear down the attacker by confronting him aggressively from mutually supporting battle positions throughout the battle area.* The terrain in this region would allow success if actions were well timed and aggressively executed. Surprise, even in the defense, can be a major factor contributing to success. Generally, high ground in the area was heavily wooded, largely limiting movement to dismounted infantry. Areas in which combat vehicles could be maneuvered were scarce and tanks would be primarily restricted to roads or, at best, limited frontages in open areas of deep valleys and cross compartments. Additionally, many streams could not be forded and would require bridging.

The corps commander had placed an attack helicopter battalion (separate) under the operational control of the mechanized infantry division. This battalion was deployed forward

with the division to defend along the Green River and to participate in subsequent delay operations. The division was defending with three brigades abreast—the 1st in the North, the 2d in the center, and the 3d in the South (fig. 3-18). One attack helicopter company reinforced each brigade. The divisional armored cavalry squadron was initially deployed with the covering force. One platoon from each attack company was under the operational control of the squadron until the covering force was withdrawn. These attack elements and the air cavalry troop had covered the withdrawal of the general outpost's ground elements across the Green River and had protected engineers destroying the river bridges. Plans called for the armored cavalry squadron to screen the division right flank. The air cavalry troop with an assault helicopter company and one rifle company was given a rear area security mission under division control. The division commander was concerned about the enemy's capability to employ airmobile or airborne forces and to complicate matters, some irregular forces were known to be operating in the divisional and corps rear areas.

At 1720 hours, enemy artillery began firing extensive preparations on what they suspected to be U.S. forces' defensive positions, delivering smoke as well as high explosive rounds on the near side of the river. Friendly artillery provided counterbattery fire on targets provided by radar and unattended ground sensors. The prevailing westerly winds aided in concealing enemy activity on their side of the river, and artillery-delivered smoke was being augmented by smoked dispensers and the burning city of Franklin. For the most part, the battle thus far had been conducted by artillery and mortar exchanges. Occasionally, where smoke was less dense, a Cobra or tank would get a quick shot at an armored vehicle attempting to clear mines or at bridging equipment working on the far side. Cobra elements across the front were getting a considerable number of kills because *they could easily move to high ground positions where enemy artillery was not impacting and could fire down through the smoke*, while ground elements were forced to fire horizontally through it.

Cobras were employed on the basis of the principle of mass across the entire divisional front. However, mass has a somewhat different connotation when applied to armed helicopters,

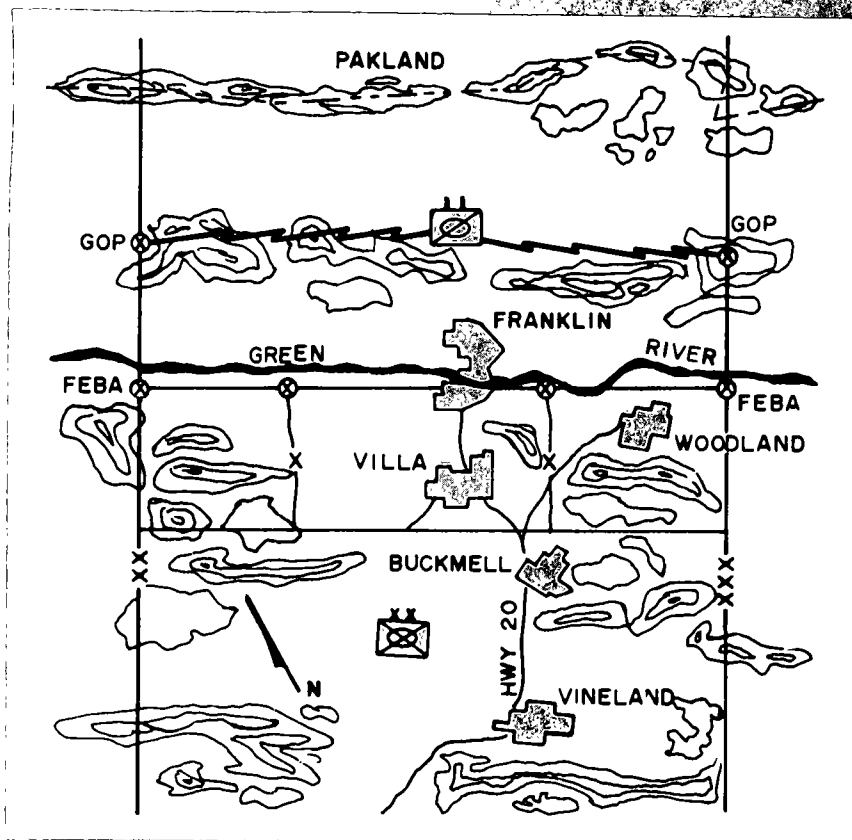


Figure 3-18. Division Disposition.

having implications with regard to *helicopter staying power*. For example, continuous attack helicopter support is desirable, but helicopters have a limited time in which they can remain on station because of their fuel state and the rate at which they expend ordnance. In many instances, a degree of overlap as elements relieve each other may be desirable because overlaps allow time for situation briefings and lend continuity to operations. But, if a given number of scouts and attack helicopters can provide adequate coverage of a given front, it may require two or three times that number to provide continuous coverage. These and other factors such as ordnance expenditure rates and the time and distance required to refuel and rearm must be considered.

For a closer look at an attack helicopter company in the defense, we will examine the actions of B company of the attack helicopter

battalion which reinforced the 2d brigade in the center of the mechanized infantry division sector. The 2d brigade was defending in sector with a two-battalion task force forward and a tank heavy task force in reserve.

The liaison operations officer of the attack helicopter company had been with the brigade headquarters since reinforced alert to coordinate his units' activities. Forward area refueling and rearming points had been emplaced at predesignated locations in the brigade rear areas. Two additional forward area refueling and rearming points had been placed well forward just to the rear of the forward battalions to support the 3d platoon which would initially fight as part of the covering force and, upon withdrawal, would assume FEBA defense responsibilities and be

prepared to revert to the operational control of the 2d brigade's reserve task force. The 1st and 2d platoons also reinforced the forward battalions and were prepared to support various preplanned counterattack contingencies.

Counterattack plans called for helicopters to provide overwatching fire for ground units as well as aerial maneuver elements. Additionally, contingency planning required regrouping of the company proper in the event of a breakthrough, and if required, commitment of an additional company or the entire attack helicopter battalion.

Indications were that Pakland forces would opt for a night river crossing, initially employing dismounted infantry and pioneers to secure bridgeheads and to clear minefields. Once bridges were emplaced, enemy armor and mechanized infantry would probably launch their main attacks to break through the U.S. division. The main attack would likely be oriented on Highway 20 driving toward Villa and Buckmell, with the final objective being the high ground south of Vineland.

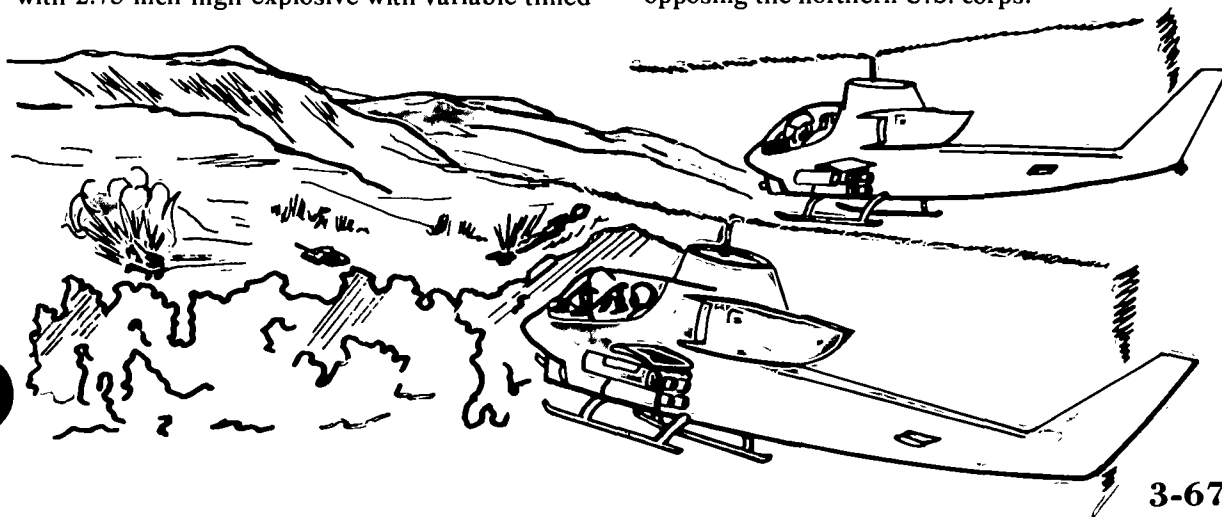
The Pakland attack was launched at 2200 hours across the division front. By 2245 hours, aggressor forces had established two bridgeheads. A diversionary attack, which was being contained, had also been launched toward Woodland. Friendly attack helicopter elements were firing enormous quantities of antipersonnel and materiel ordnance. The assault helicopter company was utilized to resupply rearming points with 2.75-inch high explosive with variable timed

(VT) fuse, sub-munition, flechette, flare warheads and automatic cannon ordnance. CH-47 aircraft were presently resupplying divisional and reinforcing artillery battalions with fuse VT and illuminating projectiles which were being expended at a very high rate.

Before launching the main attack, aggressor infantry was tasked to secure the high ground, hills 420 and 484, which dominated the axis of the main attack (fig. 3-19). However, forest fires raged in both areas, denying these high ground positions to both friendly and enemy forces. The aggressor commander elected to attack between these fires, using them for flank security. Enemy forces moved forward until arriving at the town of Villa, which was burning and, because of rubble in the streets, impassable. Pakland armored forces were forced to find routes north and south of the town in order to bypass. Cobra TOW's from A and B companies were waiting. The tanks were relatively easy targets silhouetted against the background of the burning forests and built-up areas. Movement along the enemy axis of advance was reduced to a crawl, and large quantities of enemy armored vehicles were being knocked out of action all along Highway 20.

STALEMATE

By 0400 hours the main aggressor attack remained stalemated at Villa; in fact, activity across the northern corps front appeared to have stabilized. Information being received was that the enemy had launched a major attack in the *adjacent corps area* and holding operations characterized the activity of enemy forces opposing the northern U.S. corps.



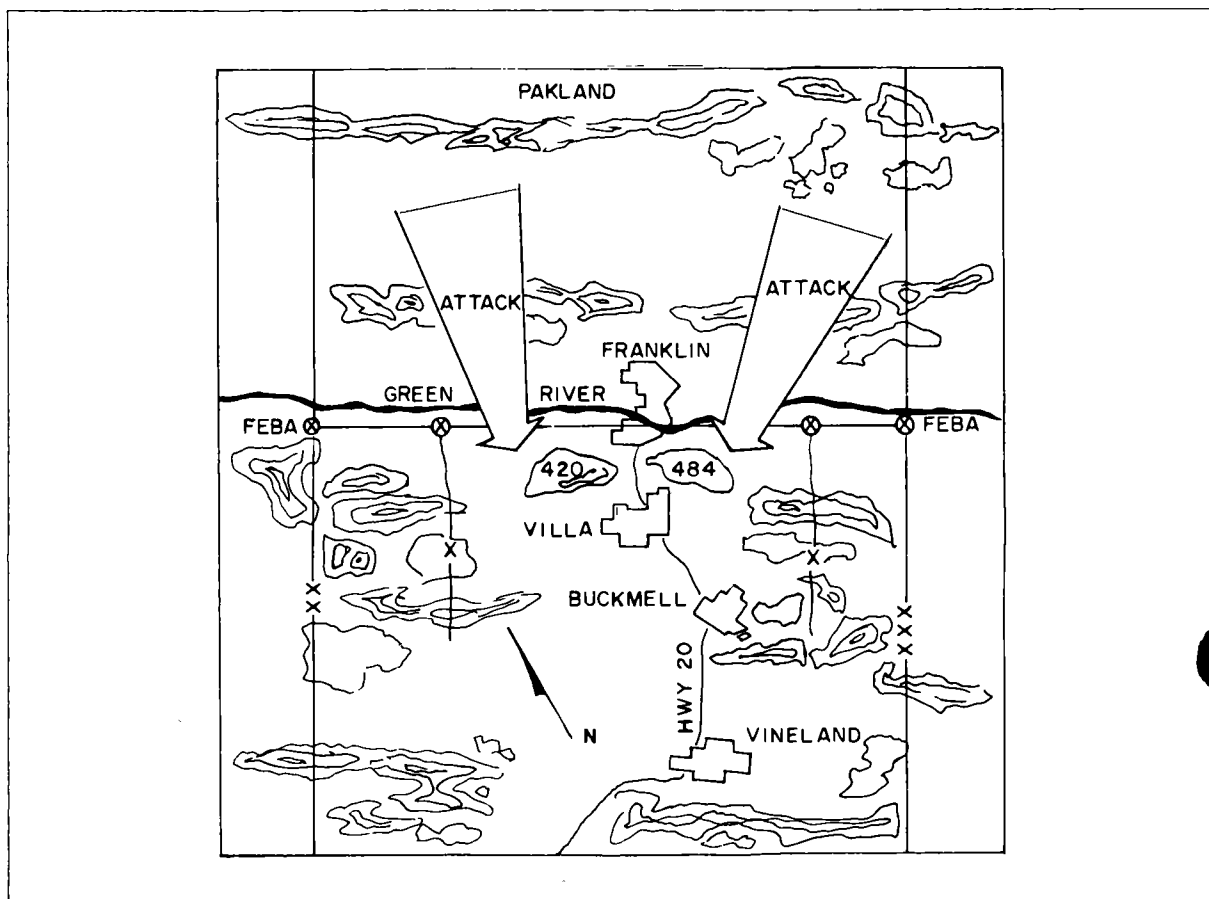


Figure 3-19. Aggressor Attack.

In summarizing the defense to this point, it was clear that the defense of the Green River had cost aggressor forces dearly. A lion's share of the enemy losses at Green River was directly attributable to helicopters fires across the division front. *The helicopter success was a result of combined arms operations and previous training.* Combined arms operations had allowed continuous attrition of aggressor elements without parallel friendly losses. Brigade and battalion commanders, through familiarity with helicopter employment strengths and weaknesses, had used them to complement their fire plans and schemes of maneuver. The commanders knew, for example, not to restrict

helicopter mobility and that, because of the range of TOW missiles, Cobras could provide excellent firepower from positions as much as 3,000 meters to the rear or flank of the supported ground elements, if aggressor artillery barrages forced the helicopters from the FEBA firing positions. Attack helicopter commanders realized full well the support that ground elements could provide by countersuppressing threats to their existence, particularly the aggressor air defense, conventional artillery, and aircraft. This combination of combat capability, properly applied, resulted in tremendous battlefield staying power against heavy odds.

Critical Situation III

Forward Deployment of Division Logistics

Combined Arms Aviation Tasks

- Detailed plans and preparations
- Supervision of ground support personnel to prepare loads
- Timely movement of POL and ammunition to division combat positions in adverse weather and at night
- Use of intelligence

On 15 August, prior to the outbreak of hostilities, a CONUS-based mechanized Infantry division had been completely deployed to Eurlandia. Immediately upon arrival in the theater, elements of the division began drawing their major items of equipment from prestocked positions. However, the division had not been deployed forward when the general outbreak of hostilities occurred. At 0600 hours, 18 August, this mechanized division was ready for combat and ordered to occupy and defend the center sector of the corps FEBA not later than 0600 hours, 19 August.

As the division began to move, it became obvious that sufficient POL and ammunition for this operation could not be rapidly displaced forward with organic or attached wheeled vehicles in time to allow proper positioning and distribution before the division engaged in combat. The division commander requested assistance from the corps commander who, in turn, directed the corps aviation battalion to provide the required support.

Two assault support helicopter companies of the battalion started moving supplies from the depots to the division's forward brigade trains areas and the support command. As the aircrews

Survival Measures

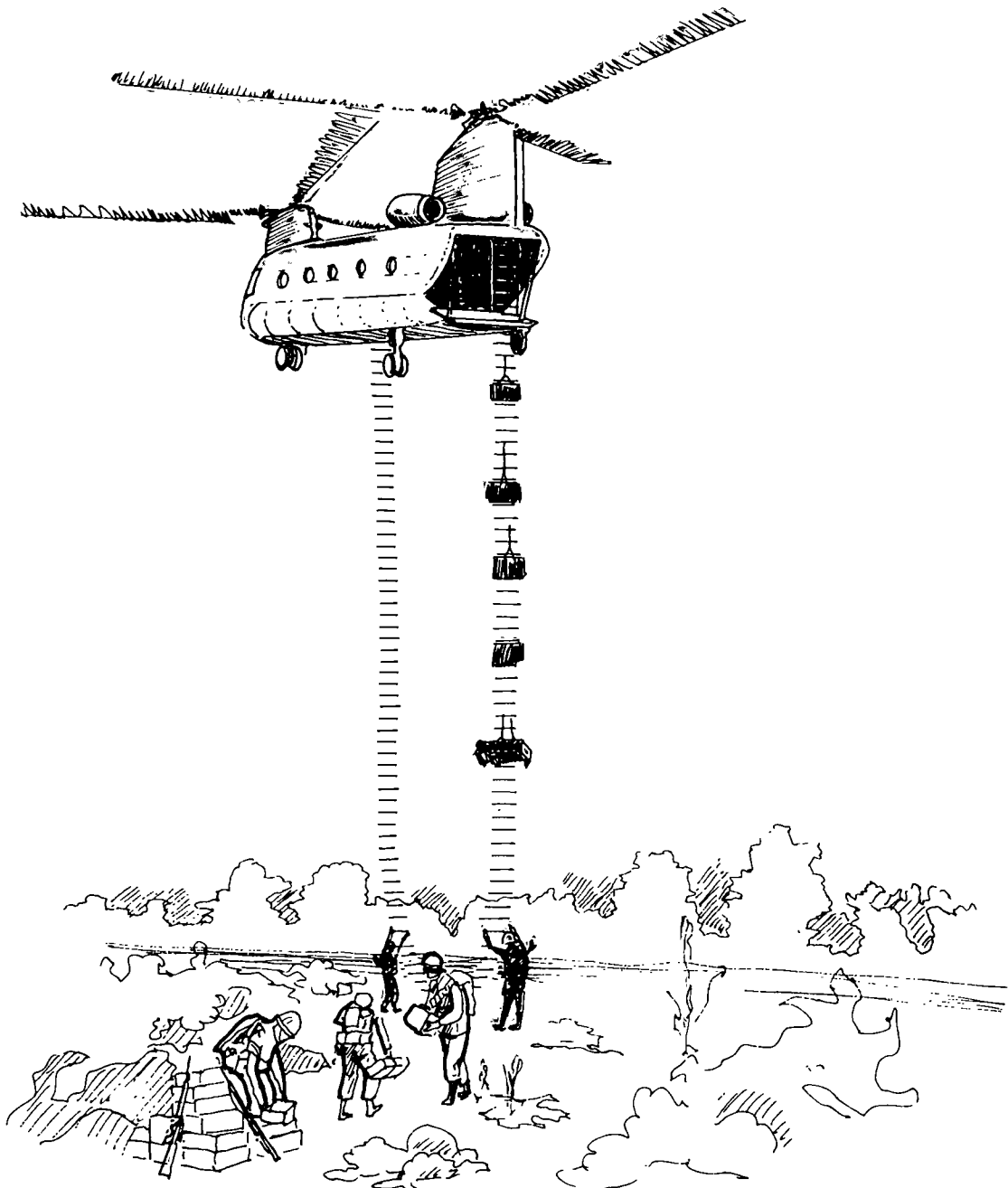
- Threat awareness
- Familiarity with terrain
- Permission planning
- Detailed coordination and planning of flight routes, altitudes, and IFF
- Terrain flight
- Detection avoidance
- Night flight
- Communications and light discipline
- Camouflage and dispersion

flew their CH-47 aircraft forward, the deteriorating weather conditions were quickly becoming a factor concerning mission accomplishment. Being able to reach the forward areas, the aircraft were landed on the reverse slopes of the landing zones to off load their cargos. As weather conditions worsened, many aircraft were forced to proceed from the forward areas under instrument meteorological conditions employing tactical instrument flight procedures. By contacting the division area flight control center and utilizing the electronic navigational aids available in the forward areas, the aircraft were able to return for additional cargo. Although slowed by the intermittent

instrument meteorological conditions, the companies moved the majority of these supplies at night to further reduce the possibility of enemy detection. These procedures denied the enemy information as to the location of the forward logistical sites. By 0300 hours, 19 August, more than 300 tons of all classes of supply had been repositioned.

In summary, medium cargo helicopters can provide forward forces with a responsive means

for rapid movement of vast quantities of bulk supply. *However, optimum mission response can only be realized by proper organization of loading sites, establishment of priorities, efficient rigging, loading and off-loading procedures.* Early recognition of requirements allows preplanning and preparation of loads. Additionally, extensive training of ground support personnel is essential if the full measure of effectiveness is to be achieved.



Critical Situation IV

Movement of Theater Logistics

Combined Arms Aviation Tasks

- Planning for security of air movements
- Movement of supplies from ship to ground transportation beyond bombed out area
- Movement of supplies from ship to port facilities
- Movement of bridging material to bridge sites at night
- Use of intelligence

After the outbreak of hostilities, theater transportation command experienced difficulty maintaining a smooth and uninterrupted flow of logistics within the theater.

On 15 and 16 August, aggressors bombed the port and city of Breton destroying 60 percent of the port facilities and mining the harbor. The proximity of this facility to enemy lines and forward bases together with bomb damage made the port of little value. The Navy estimated it would take several weeks to remove mines, two sunken ships, and other hazards to navigation. The streets in the city were blocked by extensive rubble that prevented rapid surface movement of supplies out of the harbor area. Any salvable supplies had been moved by CH-54 cargo helicopters from the harbor area and loaded on ground transportation situated beyond the bomb-damaged city. Rail and road transport through the northern areas of Eurlandia then became more unreliable because of airstrikes along these routes. Damaged and destroyed bridges and increasing refugee control problems were effectively slowing movement of critically needed materiel.

The unhardened pipeline through the northern section of the country also received extensive

Survival Measures

- Threat awareness
- Familiarity with terrain
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- Detailed coordination and planning of flight routes, altitudes, and IFF
- Terrain flight
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- Camouflage and dispersion

damage and was unusable. Barge traffic on the rivers was at 50 percent capacity because enemy air activity had forced them to move mostly by night. Bridge spans had been dropped into the navigational channels in several places, and because the rivers were extremely low at this time of year, barge loads had to be portaged around these obstacles.

U.S. Forces Eurlandia therefore shifted their logistical activity farther west to the port of Navar. Navar had been bombed, but only 10 percent of the port facilities had been extensively damaged,

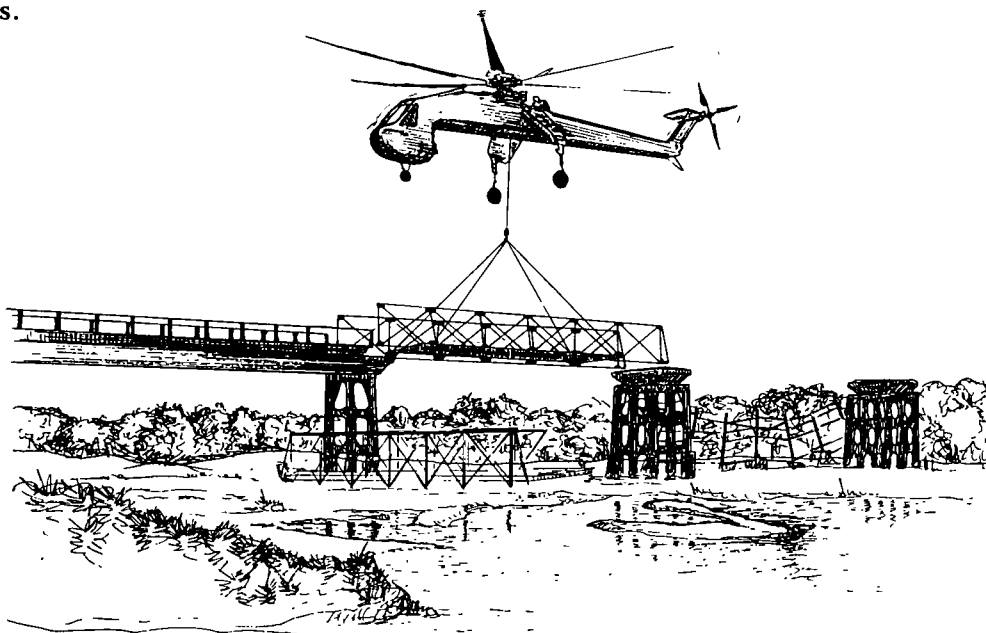
and this at extreme cost to Pakland air forces because of heavy air defenses. Submarines had little effect on harbor approaches because of the shallow water and extensive antisubmarine warfare activity of allied navies.

The theater transportation command made extensive use of Air Force assault transport aircraft to move supplies from airfields and from improvised landing areas on major highways near the port facility to improvised airfields in the Army group rear areas. The most significant bottleneck in the logistics flow was movement of supplies from ships to aerial port facilities. Ships were beginning to back up because of time required to unload them.

On 16 August two additional CH-54 companies arrived Eurlandia as prescribed by the time-phased force deployment plan. Initially, both companies were employed to clear out the clogged port facilities at Navar. CH-54 helicopters transported massive quantities of containerized loads from waiting ships. This method of offloading did not require container ships to enter the harbor which precluded time-consuming waiting periods and increased ship turn-around time. Ships waited offshore, protected by a coordinated air defense and antisubmarine screen. In a matter of a few days, the situation at the port facility had greatly improved to the point that one CH-54 company could be relocated to aid the logistics flow from the communications zone to the corps.

Massive enemy airstrikes had succeeded in eliminating all but a few of the bridges across the major rivers behind the corps, requiring Allied Forces to use engineer constructed bridges in order to move supplies via ground transportation. Using CH-54's to shuttle the heavy bridging equipment forward, the engineers were able to respond rapidly to the tactical opportunity. Helicopters were able to move equipment from stocks more than 100 miles in the rear as fast as the troops at bridging sites could assemble it. What normally would take 6 hours to transport, actually took an average of 1.5 hours per bridge because of the CH-54's.

In summary, it is clear that a sophisticated enemy will certainly take action to interdict the movement of men and materiel from the source to the forward areas. It can be expected that attempts to halt, reduce, or disrupt the forward flow of logistics will take the form of sabotage, actions at sea, hostile air activity, and land raids conducted by paramilitary or military forces. Geographical considerations also impact on responsive logistic flow, particularly as distances become greater. *Stoppages of bottlenecks, if identified early, can often be prevented or eliminated through the use of large cargo helicopters.* Their combination of vertical lift, speed, and capacity make them the most responsive means of logistical movement. In quantity they can greatly influence theater logistics programs.



Critical Situation V

Combined Arms Attack of Built-up Area

Combined Arms Aviation Tasks

- Reconnaissance
- Air defense suppression
- ECM suppression
- Attack of point targets
- Air assault
- Artificial illumination
- Command and control
- Use of intelligence
- Aerial resupply
- Medical evacuation

By 10 September the tactical situation in Eurlandia had changed dramatically. Allied combat power had increased to the point that a rather stabilized front had been established through the center of the country. Moreover, Allied Forces were now preparing for offensive operations.

The allied advance began on 15 September across a broad front and was initially met by strong Pakland resistance. Allied intelligence and reconnaissance indicated that Pakland forces were attempting to gain time to complete extensive fortifications 60 kilometers to the rear of the present line of contact. The new Pakland defense line roughly paralleled Turnpike 90 and included various sized built-up complexes as strong points along this route. Cities were still filled with civilians who were unable to escape the Pakland invasion. Pakland planners did not expect that Allied Powers would totally destroy these cities and risk the lives of countless civilian personnel. These implications were also clear to allied planners.

By 18 September the initial Pakland defense began to break down, and the allied advance began to make steady progress toward what became known as the Pakland Line (fig. 3-20).

Survival Measures

- Threat awareness
- Permission planning
- Rehearsal
- Detailed coordination and planning of flight routes, altitudes, and IFF
- Tactical air support
- Application of overwatch tactics
- Terrain flight
- Detection avoidance
- Electronic warfare suppression
- Use of chaff, smoke, and illumination
- Night flight
- Use of night sights
- Communications and light discipline
- Camouflage and dispersion

At 1400 hours on 20 September, a U.S. corps reached the Pakland Line with two armored divisions forward. An armored cavalry regiment screened the flanks. Corps reserve consisted of a mechanized infantry division and an air assault division.

In the center of the zone of the U.S. corps was the major city of Eurodelphia. This city had a

population in excess of one million people due to the refugee problems. Eurodelphia was to be the cornerstone of the Pakland defense in this area.

To complement the city defenses, Pakland forces had moved many tanks into the city, many of which were automotively disabled. These vehicles were placed in buildings and defilade positions from which their firepower would be most effective. Pakland forces established strong point defenses throughout the city. However, the major defenses were established in three defensive rings which would be used to fall back on as outer defenses became untenable. Pakland forces in the city expected that U.S. Forces might elect to bypass the city initially and then attack from all sides. Because of this, mining of all approaches to the city was extensive. City bridges and tunnels had also been prepared for destruction. Air defenses in the city were not so sophisticated and were provided by missile and radar gun complexes outside the built-up area. The tall buildings inside the city precluded establishment of sophisticated air defense sites. However, in some open areas such as the airport, large stadiums, parks, and parking areas some

of the larger air defense weapons were located. In the city proper, what was lacking in quality was made up for in quantity. Multi-barreled 12.7mm and 23mm gun positions, including some acquisition radars, were established to provide mutual support from tops of buildings. SA-7's were issued in ample quantity throughout the city.

The U.S. corps commander planned a coordinated night attack to begin 2100 hours, 20 September, with his two forward armored divisions against the Pakland Line. As part of the corps attack to the Plant River Line, the mechanized infantry division was given the mission of seizing Objective White, the city of Eurodelphia. One brigade from the air assault division and helicopter assets were attached to the mechanized infantry division for special small operations to assist in securing Eurodelphia. Air assault elements were tasked to secure selected key objective areas within the city (fig. 3-21).

This would be the first time air assault elements were to be used to attack a major built-up area. The rationale for using air assault forces was as follows:

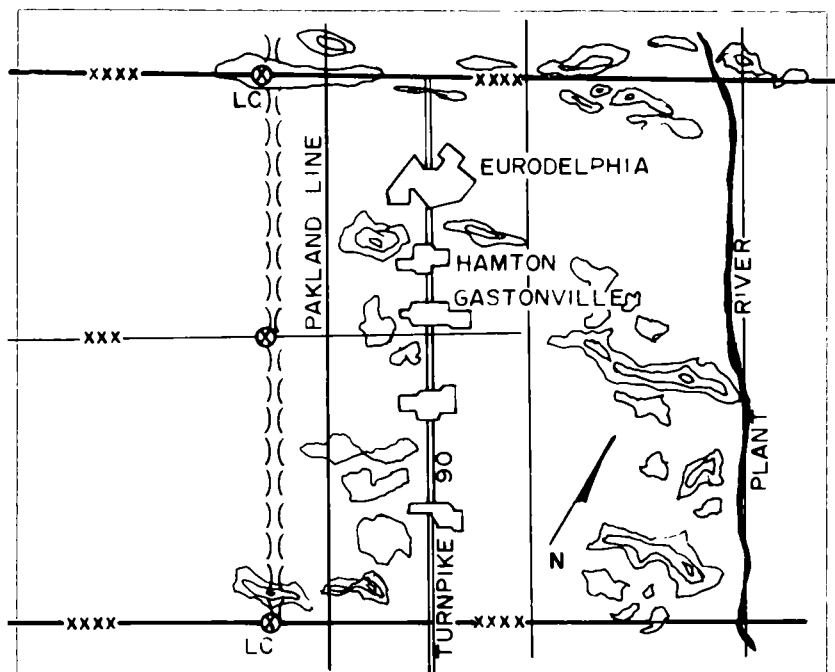


Figure 3-20. Pakland Defensive Line.

- Once air defenses were suppressed, precision attacks could take place to secure key objectives throughout the city simultaneously.
- These attacks could effectively defeat the defensive ring concept of city defense forcing the enemy to fight in many unexpected directions, thus weakening the defense as a whole.
- Helicopters could land the infantry, on whose shoulders the brunt of the city fighting would fall, on tops of buildings enabling them to fight from the tops of the buildings down.
- Occupying the tops of buildings would provide the best observation and fields of fire in the city.
- The accuracy of helicopter weapons would allow selective destruction of targets since neither extensive airstrikes nor artillery could be used in order to keep civilian casualties and unwarranted damage to a minimum.

- Resupply to building tops or a clear area would be relatively easy, using helicopters.
- Command and control is extremely difficult when fighting in built-up areas due to the limitations imposed on communications, determining all elements exact location, and coordinating fires. Combat in cities is characterized by a multitude of small, relatively isolated, though hard-to-rout encounters.
- Even in built-up areas, where casualty rates can be high, helicopters provide the most efficient method of medical evacuation.

For over a week the air assault elements had been preparing for the attack on the city. Generally the plan required a simultaneous air assault and ground attack by the mechanized infantry division.

The assault forces had stockpiled large quantities of Dragons, TOW's, LAW's, cratering charges, hand grenades, and explosives which would be used by the infantry and combat engineers who would accompany the assault echelon.

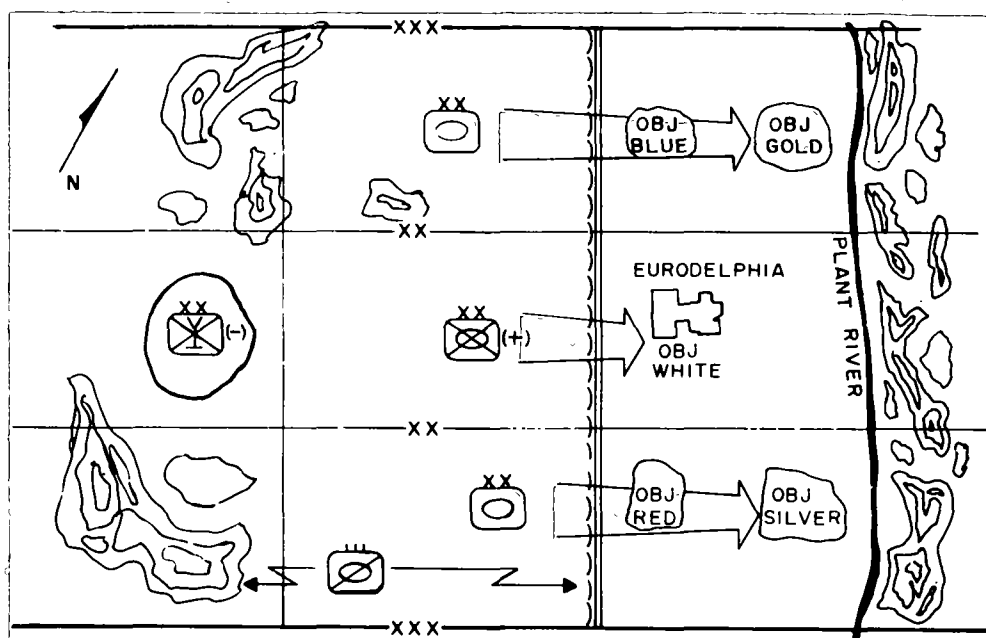


Figure 3-21. Corps Attack.

Assault helicopter elements had been practicing pinnacle approaches developing skills that will enable them to rapidly land assault forces on tops of selected buildings and in small confined areas.

Attack helicopter elements had stockpiled 2.75-inch rockets with bunker and delay fuzes for use against buildings and fortified positions. TOW missiles would also be used. Flechette warheads and turret cannons would aid in suppressing rooftop and window defense positions, reducing damage to structures and minimizing civilian casualties.

The city was divided into sectors, and objectives were provided down to small unit level. Phase lines were also established as additional control measures. Some of the major objective areas in the city were major buildings, the Eurodelphia International Airport, the city water and power facilities, the railway yards, the University of Eurlandia, and major industrial complexes.

THE ATTACK

Following a 20-minute fire preparation, the corps attack began against the Pakland Line outside the city. By 2245 hours; the Pakland Line was breached in several places, Objectives Red and Blue were secured by 0400 hours, and the forward divisions were continuing the attack on Objectives Silver and Gold. Large numbers of Pakland prisoners and materiel were captured. At 1720 hours, 21 September, Objectives Gold and Silver were secure. Retreating Pakland forces passed through the Combined Arms Army forces which had established defenses on the far side of Plant River.

The attack on Eurodelphia began at 0600 hours, 22 September. The U.S. Air Force was tasked to provide local air superiority over and around the city for the duration of the operation and to assist in the elimination of Pakland air defenses prior to the air assault.

Fighters, armed helicopters, and electronic warfare were used to engage most of the air defense systems. Air Force and Army aircrewmembers, however, had no way of knowing if all air defense had been eliminated. After the first 30-minute suppression effort, remaining Pakland air defense units realized that to fire resulted in immediate attack. A considerable amount of small arms fire continued to be received across the entire city. The assault helicopters initially entered the city at extremely low level, which

allowed their door gunners to aid in suppressing the expected small arms fire. Additionally, this flight mode and traveling at a high rate of speed over the buildings presented fleeting targets to Pakland gunners and made flight routes and objective areas more difficult to predict. In the immediate vicinity of the objective areas the assault aircraft rapidly climbed to sufficient altitude to make rooftop approaches. Attack helicopters preceded the assault aircraft to suppress the flight route while others provided traveling overwatch. As the assault helicopters executed their climb, approach, and departure, attack helicopters flew below them to provide suppression during this critical phase.

A few attack helicopters were lost to ground fire. Many other aircraft received battle damage from automatic weapons fire. Some aircraft received blade damage from debris on the building rooftops. Assaults were time-consuming because most buildings could only accept one to three helicopters simultaneously. As the assault progressed, however, fire directed at the aircraft decreased markedly. For the assault troops the going was also slow, tough, and dangerous. Assault aircraft were also used to evacuate casualties. By 1215 hours all air assault forces had been lifted into the city. Even as the initial elements were being brought in, there came an immediate need for resupply. Hand grenades, explosives, munitions, and flame throwers were being expended rapidly. The University of Eurlandia, a major building complex located on high ground in the center of the city, was one of the key objective areas assigned to the air assault force. Occupation of these key structures and the commanding view of the city afforded from their upper stories was of primary importance in securing the city. Therefore, the university was designated a battalion objective. As the assault helicopters approached their assigned landing zones on the rooftops, attack helicopters fired flechette rockets to suppress the suspected enemy positions located in the many windows and on the rooftops. This suppression had the desired effect, but also precluded unnecessary damage to structures, particularly the rooftops on which the helicopters must land, and kept civilian casualties in surrounding areas to a minimum.

Commencing simultaneously with the air assault, the mechanized infantry division reinforced with engineers began the ground attack of the city from all sides.

Initial progress through residential areas was rather rapid, however, sharp fighting took place in the industrial areas and around the Eurodelphia Airport. By 1600 hours, the utilities plant and the airport were in friendly hands. Military and civilian engineers and members of the area coordination center were immediately brought to the scene to estimate the extent of damage and the time required to make the facilities operational. They would be critically needed once government control of the city was reestablished.

As elements of the infantry division reached the metropolitan outskirts, enemy resistance became increasingly intense. Well-concealed gun emplacements in buildings were difficult to destroy. Armed helicopters firing rockets with bunker fuzes and TOW missiles aided in the destruction of some of these positions.

Additionally, other weapons systems which were well suited for this type of fighting were the combat engineer vehicle (CEV), the M60A2 Tank, and the M551. The large caliber capability of these vehicles was extremely effective. The short barrels allowed turret traverse in extremely small streets, and the dual missile capability of the M60A2 and M551 was useful at extended range when required. The M551's small size allowed it access to almost all streets, alleys, and in some instances, even in buildings.

As darkness fell the pace of activity slowed somewhat because fighting in darkened buildings was extremely difficult. The streets of the city in contested areas remained no-man's-land. Night vision devices and artificial illumination provided by helicopters and artillery were used extensively.

At this point air assault troops had captured at least the upper portions of the dominating buildings assigned as objectives in the city. This significantly reduced the enemy's ability to move in the streets. Although the enemy virtually controlled the subway and sewer networks and could to a degree move underground, vehicular traffic was halted. The air assault had effectively defeated the contracting defensive ring concept of city defense.

Street fighting continued for 3 days more before the city was relatively secure. City defense was totally fragmented and its ability to resupply isolated forces was impossible. Air and ground assault forces had linked up and numerous civilians and soldiers surrendered due to lack of food and ammunition.

For the assault forces, population care and control were becoming increasingly more burdensome than the enemy. The Eurlandian government continued the process of establishing hospitals and a civil/military government and relieved U.S. forces of clearing the remaining pockets of enemy resistance.

On 26 September U.S. forces were withdrawn from the city and established assembly areas in the rear of the forward corps to prepare for subsequent combat operations.

In summary it is logical to assume that *combat in built-up areas will assume increasing significance in future conflicts*. A rapid review of major land areas since World War II reveals the vast extent of construction that has taken place in metropolitan, industrial, and suburban areas.

Combat in major cities, particularly capitals, will often have political, psychological and humanitarian implications which will normally impose constraints on field commanders. Other complications are that most cities are completely different in composition and the order of battle of enemy forces in them is difficult to determine or predict. Additionally, no recent precedents, in view of the technological advances over the past 30 years, are available and *many old concepts may now be invalid as far as combat in built-up areas is concerned*.

It is known that combat in cities is slow, expensive, and dangerous and presents unique problems for the combat commander in terms of command, control, maneuver, fire coordination, task organization, logistics, and population control.

In this scenario the helicopter provided the attacking force solutions to the above problems. Not quite so evident, but of equal importance, the air assault placed the enemy in an off-balanced position. *Once a defensive plan and posture for city defense is established, it can be difficult, if not impossible, to change*.

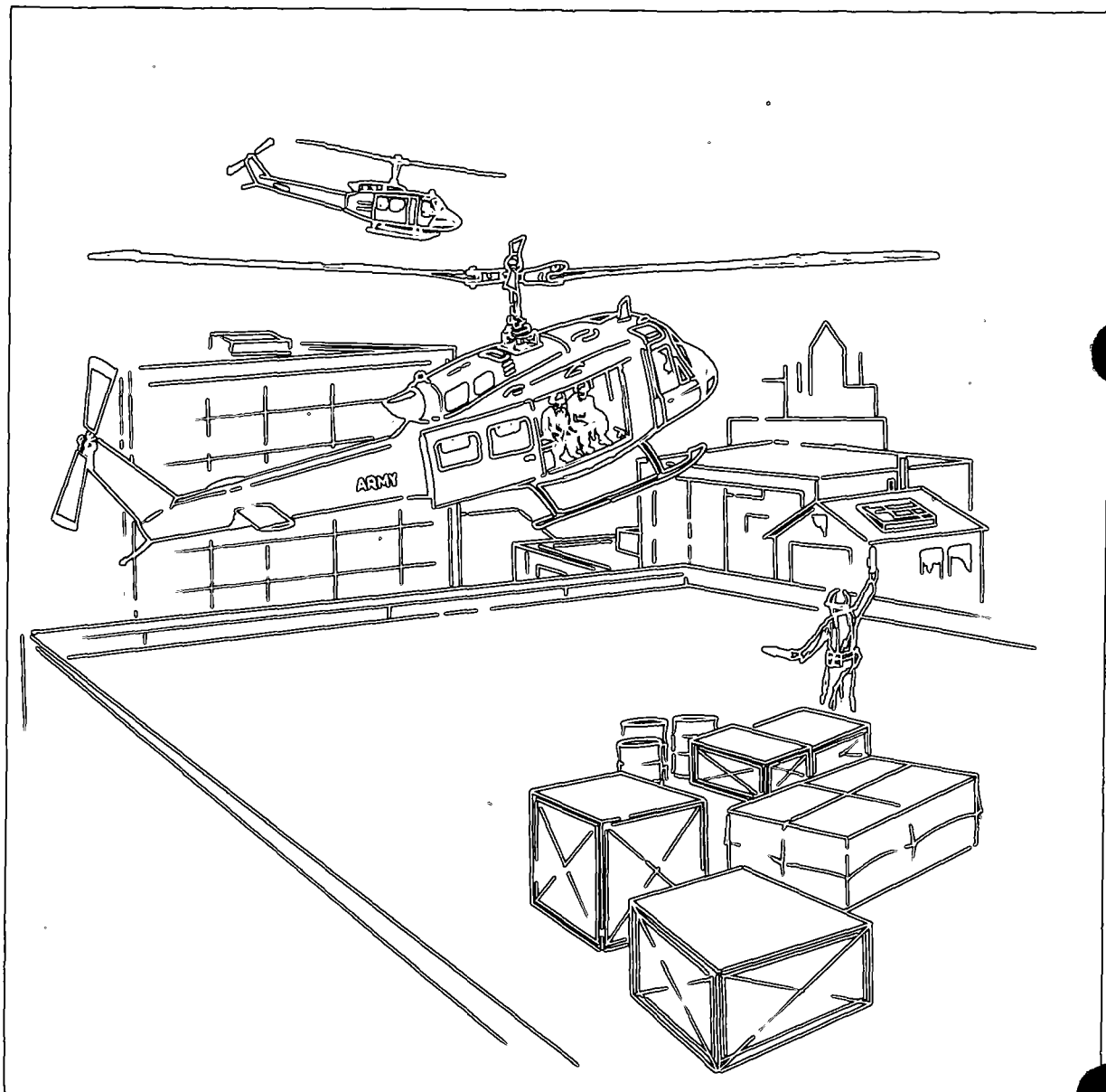
Army aviation provided assault forces the means of taking the most important objective areas first which offered the best fields of fire, observation, and communication. The simultaneous attack throughout the city fragmented city defenses.

The point fire and limited destruction capability of helicopter weapons systems are entirely appropriate for attacks in built-up areas. They allow elimination of an enemy fortified position without destroying an entire building or block. Helicopter fires are easily directed and controlled, are readily available, and provide selected effects with a wide variety of weapons and warheads.

Conventional ground attack should also be employed in conjunction with air assaults in built-

up areas. This requires the enemy to man outer defenses and prevents him from concentrating his combat power against the air assault forces. In effect it should spread the enemy thin in both areas.

The helicopter capability makes logistics and medical evacuation responsive. Even at night portable lights and visual glide slopes can be established on rooftops allowing around-the-clock operations.



Critical Situation VI

Air Assault Into Enemy Rear Areas

Combined Arms Aviation Tasks

- | | |
|---|---|
| <ul style="list-style-type: none"> • Reconnaissance and security • Use of intelligence • Air defense suppression • Establishing secure corridor • ECM suppression • Traveling overwatch • Bounding overwatch • Establishment and movement of FARRP's • Screening operation • Movement of artillery to forward | <ul style="list-style-type: none"> • Locations • Coordinated attack • Massing fire • Destruction of armor • Adjust artillery • Command and control • Medical evacuation • Downed aircraft recovery • Exploitation • Pursuit |
|---|---|

By 27 September Allied Forces had consolidated their positions, and further offensive operations were to begin early on the following day. The terrain in the area of operations generally favored the defender. Low ceilings, reduced visibility, and intermittent rain were forecast for the next 5 days and would restrict the use of tactical air power on both sides. Heavy rains had already substantially decreased trafficability, and the swollen streams and rivers throughout the operational area could be crossed only with extreme difficulty.

Intelligence indicated that the Rainy Mountain approach was defended by the 1st Mountain Division from the satellite country of Ramar. The 1st Mountain Division was reported to be poorly trained and equipped and had not previously seen combat. Movement through the mountains was expected to be slow due to the lack of a dependable road network. Pakland air defense weapons were not deployed in depth throughout the mountain areas since they had previously been concentrated with forward, committed forces and around the canal bridges.

In Allied Army Group South a heavy U.S. corps (fig. 3-22) consisting of two armored, two mechanized infantry, and one air assault division was prepared to make the main attack in three phases.

Survival Measures

- Threat awareness
- Detailed coordination and planning of flight routes, altitudes, and IFF
- Artillery suppression
- Application of overwatch tactics
- Use of multiple preselected firing positions
- Terrain flight
- Detection avoidance/evasive action
- Electronic warfare suppression
- Use of chaff, smoke, and illumination
- Night flight/adverse weather flight
- Use of night sights
- Communication and light discipline
- Camouflage and dispersion

In Phase I (fig. 3-23) the corps attacks 280400 September with three divisions abreast to secure Objectives ACE, KING, and JACK with the reserve armored division following in the center. After securing Objective KING, in Phase II (fig. 3-23), the reserve passes through in the center and both armored divisions continue the attack to secure Objectives CLUB and SPADE with the

mechanized division in the south securing Objective HEART. In phase III (fig. 3-24), the air assault division would attack to secure Objectives DIAMOND, TRUMP, FLUSH and STRAIGHT, link up with attacking ground forces and assist in the canal crossing.

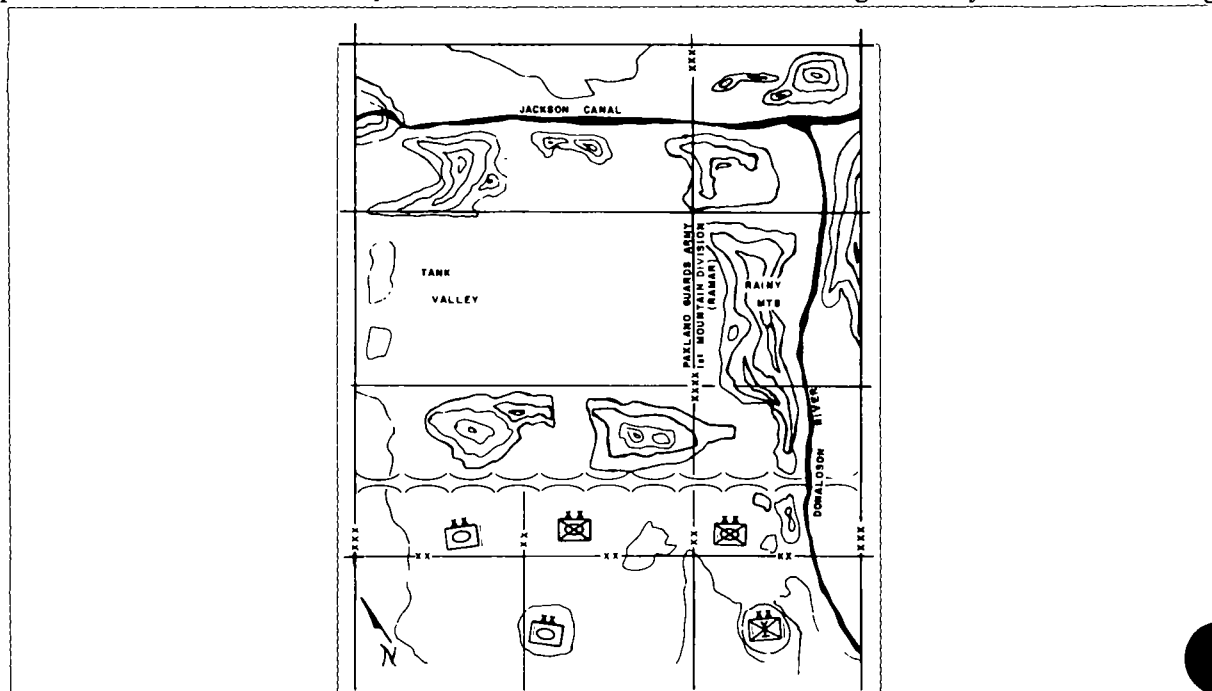
The air assault division was alerted for its mission because of its ability (1) to move rapidly over the mountainous, heavily wooded obstacles in the southern sector, (2) to conduct a rapid, deep penetration securing the bridges before destruction, and (3) to overfly the canal obstacle.

PHASE I

At 0400 hours, 28 September, the corps attacked using extensive artillery preparation. In conjunction with the coordinated attack some attack helicopter elements of the forward divisions managed to infiltrate through enemy forward defenses with the mission of disrupting activities in Pakland rear areas. The infiltration did not go unopposed, and several aircraft were lost. The attack helicopters moved with caution, using bounding overwatch as they infiltrated deeper to the enemy rear to occupy firing positions covering enemy supply routes. In the rear areas Pakland forces primarily used the road network to increase speed because of poor terrain off-road trafficability. The enemy air guard precautions were lax since the weather precluded high performance aircraft activity. The attack

helicopter elements were able to mass their fires on a large convoy and then quickly dispersed. Pursuit of the helicopter elements by the enemy ground elements was impossible. However, some aircraft were hit and destroyed by well hidden enemy SA-7 missiles attempting to counter the attack helicopter threat.

Meanwhile, in the mechanized infantry division zone on the corps southern flank, the attack was conducted largely by dismounted infantry because of the extremely mountainous and heavily wooded terrain. The Pakland satellite mountain division defenses were organized in a multitude of strong point defenses with the largest being of battalion size. Air assaults along the FEBA appeared impossible because the mountaintops were obscured, and there was a lack of suitable landing areas in the valley. However, the corps assault helicopter battalion was attached to the division to be employed if the opportunity arose. The divisional air cavalry elements determined that *along the FEBA, SA-7's and automatic weapons presented the most serious threat*. These weapons were extremely difficult to acquire and suppress. *The best countermeasure to the SA-7 and automatic weapons threat in these mountainous heavily wooded areas is tactical terrain flying techniques which present only a fleeting target, thus reducing exposure time and reliance on aircraft survivability equipment*. Additionally, because of the high density altitudes, hovering



out-of-ground-effect with a combat load during NOE flight required a great deal of skill and caution.

PHASE II

By 0830 hours the Pakland position on the FEBA across the corps front was becoming untenable. Several major intermediate objective areas had already been taken, and enemy counterattacks had failed. At 0930 hours in the corps center the reserve armored division passed through the mechanized infantry division, and by 1045 hours the two armored divisions began exploitation operations in Tank Valley. At 0930 hours in the southern zone three company-sized air assaults were in progress in the enemy rear areas. At 1100 hours the air cavalry squadron from the air assault division crossed the FEBA to reconnoiter the route to the deep objective areas assigned to the division. Weather prevailing in the mission areas was predominantly 500 feet in the mountain valleys, hilltops obscured in overcast, one-mile visibility, and intermittent light rain ruling out any supporting or opposing tactical fighters. However, Air Force EW aircraft had provided information that relatively heavy air defenses dominated the Donaldson River Valley approach, and Pakland helicopters had been operating in that area. Therefore, an approach route was selected through the Rainy Mountains.

PHASE III

As the air cavalry proceeded along the proposed route, scattered contacts were made with dismounted Pakland forces which were easily defeated by the helicopter force. It appeared that the satellite soldiers were attempting to avoid combat and move to the rear as they were aware of the danger of being outflanked by the U.S. armored divisions to their north. As the air cavalry elements crossed the satellite division's rear boundary, their radar warning receivers indicated the presence of enemy air defense. Confirmation was dramatically underscored by the loss of an attack helicopter to an SA-6. Scout aircraft were successful in locating this missile firing battery, and the troop commander quickly formulated a plan to eliminate the air defense. The battery was located in a clearing that ran down the valley floor and was provided protection by two 23mm air defense weapons, and suspected SA-7's. Scout helicopters had carefully plotted the position of the missile launchers and air defense gun positions. AH-1G's would be used to provide area suppression while Cobra TOW's destroyed individual launchers and guns. An additional AH-1G maneuvered through another valley route to the rear of the battery. It would attack first to create a diversion and then provide overwatch of the battle area to suppress any SA-7's which might be located.

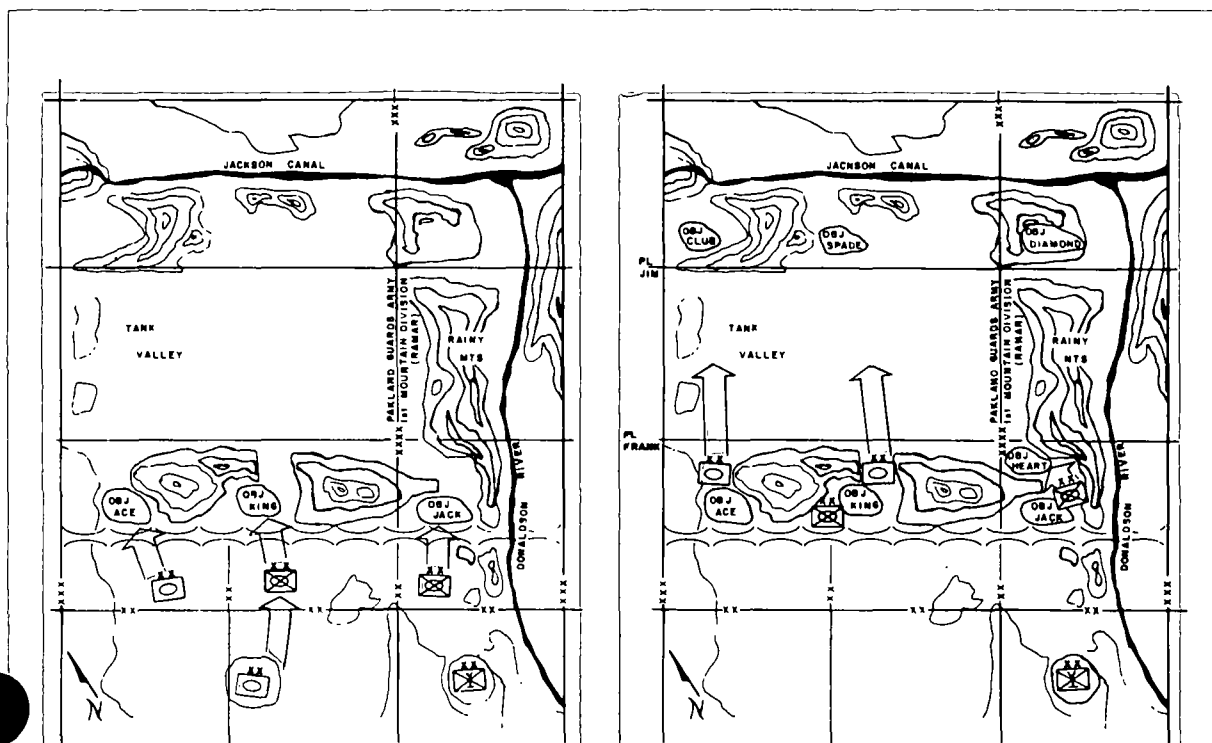


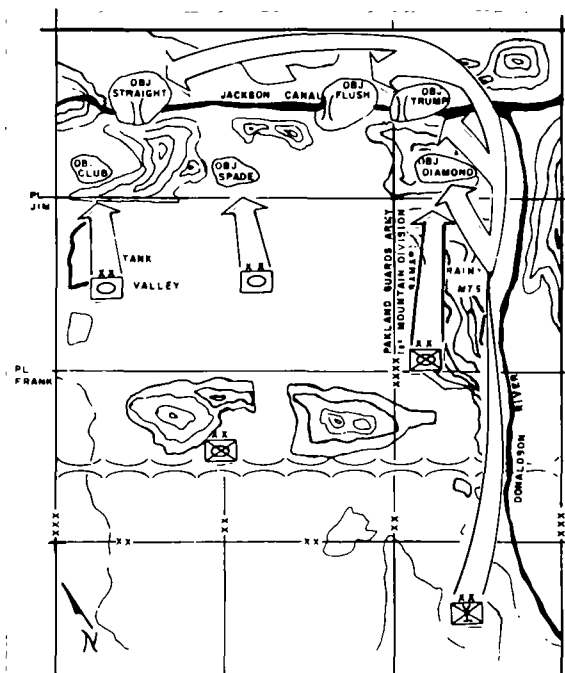
Figure 3-23. Phase I and II.

The AH-1G to the rear of the enemy position fired a mixed load of submunition, smoke, and chaff rockets at the radar complex in the missile battery. On his break through a mountain pass the Cobra received multiple hits from a 12.7mm gun located there to protect that approach and was able to execute a safe landing 2 miles down the valley. He was successful, however, in diverting attention and reducing much of the radar capability on the target area. Immediately after the initial attack, the other two AH-1G's began delivery of their mixed ordnance loads and the Cobra TOW's began systematic destruction of the weapons systems. The Cobra TOW's due to weather restrictions, were unable to engage at maximum range; but the shortened range also shortened missile times of flight, allowing rapid transition from one target to the other. Additionally, to create diversion, a scout helicopter 3,000 meters down the valley was intentionally exposing himself to radar acquisition and would break-lock by moving behind a cliff. This engagement lasted 3-2 minutes before the air defense unit was destroyed. The downed AH-1G crew was extracted by a scout helicopter, and C troop relieved A troop to continue the mission of opening the corridor. The C troop commander air assaulted with elements of the ground cavalry troop and his aerorifle platoon through the contested area and 28 prisoners and 10 vehicles were captured.

By 1200 hours the air cavalry squadron had established a relatively secure corridor to within 7 kilometers of the Jackson Canal. Air and ground observation posts were established along the entire corridor. Because of the lack of a road network and poor trafficability, the Pakland forces in the Donaldson River Valley were effectively cut off. No assistance was available from the north because the two attacking U.S. armored divisions were keeping pressure on retreating Pakland forces in Tank Valley. U.S. forces then crossed Phase Line Frank.

DIVISION DISPLACEMENT

The air assault division commander elected at this time to move his logistics and fire support forward to the vicinity of Objective DIAMOND. Pursuant to this he air assaulted the 1st brigade forward to secure the selected area. At 1205 the 1st battalion was lifted and headed for the corridor preceded by armed helicopters. The attack helicopters in this instance swept the route ahead of the lift elements to eliminate any enemy resistance. Others provided overwatching fire as the assault helicopters proceeded down the corridor to prevent interference. In the objective area the armed aircraft provided local security and suppressed the landing zones as required. The assault aircraft employed terrain flying techniques and moved rapidly down the corridor.



A few rounds of sniper fire were all that was reported. These points were given area suppressive fire by the Cobras. The attack helicopters in the objective areas reported no enemy activity, and the assault was completed with the need for suppression. At 1215 hours the second battalion proceeded down the corridor without incident, and at 1300 hours the last battalion of the brigade was on the ground. Also at 1300 hours the first medium helicopter sorties, transporting the DS artillery battalion, began down the corridor. Eight kilometers from the objective area an alert crewman aboard a CH-47 detected the signature of an SA-7 missile fired from a ridgeline approximately 3 kilometers across the valley. The CH-47 immediately began to launch flares which diverted the missile, and an armed helicopter suppressed the area. Once the brigade and its DS elements closed, CH-47 aircraft began transporting fuel and ammunition to stock the FARRP's and the artillery. The assault helicopter battalions began the forward displacement of the remaining brigades and support elements.

The air assault division Objectives FLUSH, STRAIGHT, and TRUMP were defended principally by support troops. However, the air defense in these objective areas was formidable and suppression would be difficult. Armed helicopters alone were incapable of performing the mission and due to weather, tactical air was not available. Therefore, the lion's share of this mission would fall to the artillery and mortars of the division. Aerial forward observers adjusted artillery on the Pakland air defense positions in and around the objective area. Electronic warfare aircraft had been of assistance in detecting missile and gun batteries operating in the radar mode. However, some ZSU-23-4's not operating in this mode remained undetected, as well as SA-7's, ZSU-57-2's and 12.7mm guns. Because of these considerations, smoke was used extensively. The use of smoke precluded use of landing zones in the objective area. Air cavalry and attack units were given the mission of dominating the terrain around the objective areas to prevent reinforcement which, due to the nature of the terrain, would likely occur only in the Jackson Canal Valley.

At 1500 hours the artillery and mortar suppression effort began and by 1510 hours the cavalry attack helicopter guard was established to seal off the objective area. Attack helicopters

which provided overwatching fire for the assault were in position. Landing zones 3 and 4 kilometers north and south of the objective area were selected. Two infantry battalions were assaulted into the southern landing zones to constitute the attack force. Another infantry battalion was landed to the north to establish blocking positions. AH-1G's preceding the assault aircraft prepared the high ground locations around the LZ's to suppress fire in the immediate area.

The enemy SA-6 missile batteries did not pose a serious threat to the helicopter assault force primarily because they were located on high ground positions on opposite ridgelines and could not fire down into the river valley, and because of minimum range considerations. However, extreme caution was exercised by helicopter aircrews to remain masked in the mountains on their approach to the landing zones. This required that smaller formations be utilized in order to fly safely through the narrow mountain valleys. The SA-7's, ZSU-57-2's, and ZSU-23-4's, however, were in the valley and presented a serious threat. Even though the suppressive fire was intense and well planned, not all weapons could be neutralized. Each time an air defense weapon fired, it was immediately engaged by a Cobra, but three aircraft were lost and others received damage. However, the air assaults were completed by 1700 hours. Ground contact was light, and Objective TRUMP was secured with canal bridges intact by 1800.

At 1200 hours the two armored divisions attacking to the north had crossed Phase Line Jim. The Pakland forces were clearly disorganized and attempted to withdraw rapidly across the Jackson Canal, blow the bridges, and establish defenses on the eastern side. Due to the rapid movement to the rear of Pakland combat forces, enemy logistics support and other rear echelon elements were in complete disarray. Command and control systems were on the verge of total collapse. Senior Pakland commanders were hopelessly attempting to salvage what they could, and therefore, would defer destruction of the bridges over the canal until the last possible minute.

Against this background, the U.S. corps commander ordered the air assault division to secure the bridge sites at Objectives STRAIGHT and FLUSH. At 1645 hours air cavalry elements

proceeded toward the objective areas to recon proposed landing zones to determine the extent of enemy activity, and to establish a screen to the east of the objective areas. Upon arrival in the vicinity of Objective FLUSH, aeroscouts quickly discovered the extent of confusion which existed. The traffic jams at the bridge crossings were extensive, and Pakland soldiers were attempting to cross the bridges on foot fleeing the rapidly approaching U.S. elements. Pakland resistance became weak and disorganized.

The cavalry squadron commander immediately informed the division of the circumstances in the objective area and the 2d brigade was quickly committed. At 1725 hours the first two battalions were landed three kilometers out of the objective area. Attack helicopters made repeated attacks on the enemy forces in the objective area. Pakland resistance became almost nonexistent as rear echelon elements attempted to escape. At 1750 hours the canal bridges at Objectives FLUSH and STRAIGHT were blown up to keep them from being used by U.S. forces. This action, however,

cut off Pakland forces west of the canal and ended the possibility of any organized east bank defense.

The air assault division secured Objectives FLUSH and STRAIGHT by 1950 hours, and armed helicopters continued the exploitation until weather precluded further operations. Link-up between air assault and armored forces was not made until 1145 hours the following day due to difficulties in surrender arrangements of Pakland forces between these elements. Weather also precluded aerial pursuit of retreating Pakland forces. However, OV-1 aircraft reported that they are presently moving across the political border. The corps armored cavalry regiment, crossed the Jackson Canal at 1205 with the mission of reestablishing contact and securing the political border. The border areas were secure by 2030 hours, and the two armored divisions moved to the rear of the covering force to prepare for possible future combat operations. The mechanized and air assault divisions then swept the rear areas to capture the remaining bypassed Pakland soldiers.

Summary

In summary, the employment of major air assault forces can be extremely useful when conducting exploitation operations. The ability to rapidly place large combat forces in the relatively weak enemy rear areas forces the enemy to fight in many directions and prevents him from establishing highly organized forward defenses. As shown in this scenario, these operations should normally be conducted on weak or exposed enemy flanks. *Operations in enemy rear areas must be considered in the high risk category, and are laced with "what ifs."* As far as this situation was concerned, *what if* the weather cleared and overwhelming enemy fighter activity prevented us from maintaining air superiority. Or *what if* the weather became so bad that helicopters of the division could not fly. **All military operations have their unknowns, but opportunities not seized may be forever lost.**

In this instance the air assault division attempted to eliminate many of the unknowns by the proper use of its air cavalry. In fact, the

division operations keyed on current cavalry reports of enemy activity, terrain, and weather. One immutable principle is that any penetration of the FEBA must be a well-planned combined arms action. Another factor of great importance was the division's organic capability to displace its own artillery, particularly since it was operating beyond the range of other divisional and corps artillery and in the absence of tactical air support.

Some intangible advantages resulted from the fact that the combined arms elements of the division had trained together which precluded the necessity for extensive coordination and liaison effort. From the enemy's point of view, he was accustomed to fighting armored forces. To engage in combat with an air assault force of this size and capability required a complete tactical reorientation and a psychological adjustment which was not instantaneous. Interim tactical mistakes and slow response proved decisive.

Scenario Synthesis

The Reasons for Success

Review of the preceding scenarios makes it apparent that all have rather subtle commonalities, even though type units, missions, and battlefield composition may have varied substantially. The major similarity was the fact commanders exploited the quick response and flexibility of aviation in addition to its inherent mobility and firepower. All were successful in accomplishing their missions and achieving the stated objectives, even when vastly outnumbered in some instances. Reasons for success are sometimes difficult to perceive, particularly when woven through a brief, fast-moving combat situation. Effects are easy to determine while causal factors require a more detailed analysis. Therefore let's briefly evaluate the reasons for success.

Essentials of Employment

In every scenario situation many of the principles of employment, defined earlier in the chapter, were used. These principles are combat tools that, when properly applied, will greatly assist in achieving the desired combat result. Not all are necessary to success in any operation, and the use made of each will vary with the specific situation. In themselves they do not insure success, but neglecting even one of them may spell disaster. These are the significant essentials for successful employment of Army aircraft.

Command Relationships

To organize an effective combined arms force, various command relationships must be established to promote functional aviation and ground force integration. Command relationships vary, depending on the type, size, and mission of the aviation unit and the level at which the command relationship is established.

GENERAL RULES to follow when establishing command relationship between aviation and ground units:

If a unit is in very good condition, healthy, in command, it is conceivable that OPCON would go down to battalion level.

If the battalions or companies are hard pressed then direct support provides the best command relationship.

CORPS LEVEL. Because of its extensive command, control, planning, and logistic capability, the corps can establish any command relationship it deems appropriate including attachment, general and direct support, or operational control with any type of aviation unit irrespective of size or aircraft.

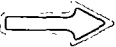
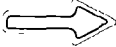
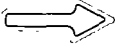
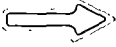
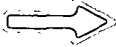
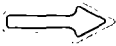
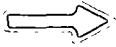
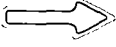
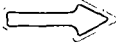

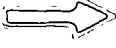

DIVISION LEVEL. Non-organic tactical aviation units such as attack, air cavalry and assault helicopter units will normally be placed under the operational control of a division, for these units are destined for employment with the division maneuver elements. The division has the command, control, planning, and limited logistics capability to support these types units.

BRIGADE/REGIMENTAL LEVEL. The normal command relationship for brigade/regimental level units and attack, air cavalry and assault helicopter units is operational control. Brigade/regiment units have the command and staff planning capability with which to assume such a relationship with tactical aviation units.

BATTALION/SQUADRON LEVEL. The maneuver battalion or squadron can accept operational control of a tactical aviation unit if the commander is in complete control and able to operate on the battlefield. But, if hard pressed by the enemy, direct support with full coordination would be more appropriate.

COMPANY/TROOP LEVEL. Essentially the same criteria which is applied at battalion level is used for the company/troop; recognizing, however, that companies will invariably be more hard pressed by the enemy than the battalion. Operational control would usually be inappropriate and direct support with coordination may predominate. The situation may dictate that coordination can only be effected by radio.

The Essentials For Success

- | | | |
|--------------------------|---|--|
| Combined Arms |  | Use of several tactical branches of the Army and the support available from other services employed together in operations. |
| Suppression |  | A combination of fire, electronic, or other measures which prevent opposing forces from placing effective fire on friendly elements. |
| Firepower |  | The volume, accuracy, and intensity of fire delivered by a position, unit, or weapon. |
| Mobility |  | A quality or capability which permits a force to move from place to place to fulfill its primary mission. |
| Fire and Maneuver |  | A method of attack in which one element of a command moves while being supported by the fire of another element or elements. |
| Sustaining Power |  | The capability to conduct sustained combat operations around-the-clock and in adverse weather. |
| Terrain |  | Use of natural or manmade features of the earth to afford a stationary element or moving elements the maximum degree of protection from fire or observation or allow a tactical advantage in observation or fire over the enemy. |
| Mass |  | The concentration of combat power directed at a single point or area. |
| Flexibility |  | The capability to act or react, to seize opportunity, or respond to an unexpected threat. |
| Surprise |  | Achieved by acting suddenly without warning, by doing the unexpected. Surprise can be enhanced by deception. |
| Intelligence |  | Use of available information on an enemy, or the area of operations to enhance the prospects for success of a military operation. |
| Reconnaissance |  | The seeking of intelligence information by military elements to facilitate the planning for and the conduct of operations. |

Command and Control

Commanding and controlling highly mobile forces deployed over vast distances has always presented significant problems for field commanders. On today's battlefield, for example, the mobility and firepower of one brigade allows it to effectively defend an area that during World War II may have been occupied by one or more divisions. Increased time, distance, and mobility factors have had a corresponding decrease in time required for commanders to make estimates and evaluations of tactical situations and translate these into orders. Moreover, good field commanders prefer an on-site look at the terrain over which the battle is to take place. Simultaneously, the requirement still exists for commanders to remain in continuous contact with senior and subordinate commanders and their staffs as well.

The use of the command and control helicopter has thus gained increased significance even on the high threat battlefield by allowing the commander to remain constantly in contact through the use of his onboard radio console with voice security provisions and yet have a vehicle with the speed and mobility which allows the commander to be where he is most needed at the time. The use of the helicopter allows commanders to rendezvous for face-to-face discussion on subjects that are too lengthy, complex, or inappropriate for radio transmission,

The sophisticated radar environment, which characterizes the high threat battlefield, has implications affecting the employment of command and control aircraft. Even when operating beyond the range of forward air defense weapons, carelessness with regard to enemy radar could result in disclosure of command posts and unit locations. Command and control aircraft must be operated using the same planning and terrain flight considerations as tactical aviation units to avoid radar or visual acquisition.

In forward areas, terrain flying is a matter of survival. This flight mode will often limit radio communications and may require communications augmentation by employing radio relay or retransmission. The volume of radio traffic inherent with command and control make any command post especially susceptible to electronic detection and jamming. The mobility of the helicopter will contribute to overcoming this limitation to a degree.

In the past, command and control aircraft operated at an altitude over the ground forces

giving the commander a panoramic view of the battle. This would clearly be a nonhabit-forming practice on the high threat battlefield. Even though the view from terrain flight modes is limited, it is as good or better than that offered from ground observation posts. Moreover, the ability to rapidly change positions and gain a new perspective presents many advantages.

In the future, command and control aircraft could be equipped with stabilized optics which would aid field commanders immeasurably. But even now, proper employment of the airborne command post provides the tactical ground and aviation commander with the capability to streamline his command and control function.

Resource Management

Management of aviation combat resources—our personnel, materiel, and the logistics required to support them—has always been complex. Commanders will always be faced with the resource constraints which force very tough tactical decisions on their part. How effectively a commander manages limited commodities then, often determines the outcome of battle. Resource management will have increased significance on the battlefield of the next war. We know the overwhelming importance of winning the first battle of that war because we realize the consequences if we lose. We know also that in all probability we will fight outnumbered against an enemy which will be at least equal in technology to our forces.

Aviation units must conduct around-the-clock tactical operations because the enemy will also conduct similar operations. Continuous combat operations have implications affecting every function of an aviation unit and is cause for reappraisal of our management functions. The time-worn outmoded concepts and management tools used for combat in Vietnam are no longer viable. We cannot hope to win the first battle by imposing academic "blade time" restrictions on our combat operations, nor by committing standard packages of scouts, guns, and lift aircraft with mandatory release times. Every commander must establish *realistic* procedures, methods, policies, and practices for his type *unit, mission, and the particular tactical situation*. A balance must be struck between his long- and short-range goals. To do this effectively requires considerable knowledge, experience, and technical expertise. For example, too much emphasis on reaching a short-range goal may very well expend resources needed to reach the long-range objective. Conversely, failure to expend the

resources required to achieve the short-range goal, will invariably place the long-range goal beyond reach.

Proper management of resources has implications affecting the amount of combat power to apply, staying power required, and readiness objectives to be met. Tactical necessity may dictate that an aviation unit be committed for a maximum effort requiring all available aircraft for a sustained period. If so, the price will be paid by failure to meet readiness objectives in the near term. If, however, aviation units are cycled in and out to combat regularly, maximum efforts can be sustained indefinitely without degradation of aircraft availability rates. When an aviation unit is committed for continuous operation, resources must be managed very closely to insure that aircraft are available when a maximum effort is required. The requirements for resource management in the high threat environment are:

- Psychologically prepare to fight around the clock.
- Organize the unit and backup maintenance units to support continuous operations.
- Make available maximum aircraft consistent with future requirements. Established aircraft availability targets should be met but should not become the maximum to be released for operations.
- Keep next higher commander and supported unit commander continuously apprised of status. Do not become caught in the middle between them.
- Measure utilization as well as availability to determine true ability of the unit to perform.
- Flexibility must characterize management and maintenance policies and systems. Even current peacetime procedures and practices are not binding requirements and must be foregone when victory or defeat hangs in the balance.

Training

In every scenario situation air and ground units were highly trained. Proper training is the key to success. *The profit motive for tactical forces is combat readiness.* Combat readiness is a perishable commodity. Therefore, to retain the degree of tactical and technical proficiency demanded, continuous training is essential. Well-conceived training will place emphasis on junior leaders, requiring them to think about their jobs, instill confidence in a unit's ability to perform and elicit the commitment of all. The following chapter will provide an in-depth study of training and its requirements.

The Will to Win

Success in battle requires a combination of science, skill, and art. Therefore, not ingredients can be quantified or placed on charts and graphs.

The capability of a particular force rests largely on intangible qualities inherent in its leaders and soldiers.

They are entirely too numerous to list here. Some of the most significant of these are leadership, courage, confidence, experience, perceptiveness, motivation, and decisiveness. These qualities have long been recognized as essential to success in any endeavor—sports, business, or government service. However, they have far greater impact when applied to combat where much more is at stake than championships, money, or prestige. These qualities can and must be developed to the highest degree. For they are clearly the foundations of victory and the driving force behind the will to win.

Army Aviation in Other Than Temperate Zones

The United States Army, designed as a world-wide force, is trained to fight in other than the temperate climates that were depicted in the scenario situations. Moreover, the high threat environment may very well exist in polar, desert, tropic, and mountainous regions. While the basic principles of employment remain relatively constant, the extremes of weather and terrain will alter techniques and modify the manner in which units and equipment are employed. A certainty, however, is that the extremes in terrain and weather increase the requirement for Army aviation because its mobility greatly assists

ground elements to complete their missions with less exposure to terrain and weather difficulties. Briefly, this discussion will provide some of the considerations for executing tactical operations in these regions and how Army aviation increases the combined arms commander's ability to accomplish the five functions of land combat.

Tactical Considerations for Mountain Combat

The tempo of mountain combat is much slower than combat in other regions and every combat problem is magnified. The effects of high altitude, extremely rough terrain, unpredictable weather, and lack of roads may often limit the composition of ground combat forces to dismounted infantry and light artillery and their size to small unit actions.

Due to mobility limitations, mountain combat generally favors the defender and the employment of small forces. Even though field fortifications may be difficult to prepare, avenues of approach are easy to predict and small forces can normally defend against overwhelming odds. Additionally, if the attacker must execute a dismounted approach march, his troops will be fatigued while the defending forces are not.

Logistics problems in the mountains are tremendous. The larger the force the more difficult they become. Greater planning and anticipation of supply requirements are essential as a result of the increased time required to complete a logistical transaction.

Weather may interrupt aerial delivery means and reduce the

COMBAT SERVICE AND SUPPORT



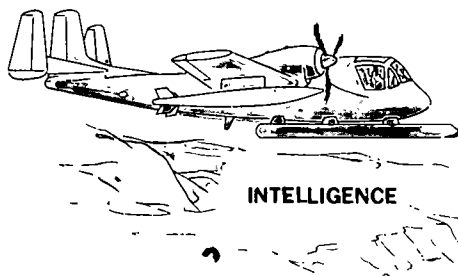
MOBILITY



COMMAND AND CONTROL



INTELLIGENCE



FIREPOWER



speed of ground transportation. Due to the limited supply routes interdiction is an ever-present possibility. When applying the five functions of land combat to mountainous regions, the ability to accomplish these functions is markedly more difficult than the norm. Army aviation provides the ground command the means to increase the tempo of mountain combat and can have a profound effect on each one of the five functions of combat. The following will identify some of aviation's capabilities and limitations as they apply to these functions.

Capabilities

Firepower. Army attack helicopters carrying multiple ordnance loads increase the overall firepower of the force in volume, responsiveness, and mobility. Destruction, suppression, and interdiction fires can significantly affect the outcome of battle. Additionally, the use of aerial forward observers will permit more flexible and immediate response of supporting artillery and mortars. The aircraft also have a different view of targets than is available to ground elements.

Mobility. The inability to maneuver forces rapidly due to rugged terrain and lack of space is by far the most significant limiting factor and has implications which impact on all other functions. However, the mobility of the assault helicopter will allow the commander to quickly land fresh troops on or near objective areas, without the time-consuming and fatiguing approach marches, and to reinforce or withdraw his forces at will.

Intelligence. The reconnaissance and intelligence provided by air cavalry and aerial surveillance units may be the most responsive because of the time and distance limitations placed on foot patrolling, ground vehicles, and line-of-sight restrictions of ground radars.

Command and control. The effects of atmospheric and dead space degrade the range of radio communications. Wire is difficult to lay and maintain. Movement between ground elements is difficult. The helicopter, therefore, offers the best means of command and control with its onboard radios, ability to lay wire, and ability to rapidly move between ground elements.

Combat service support. The rough terrain, lack of roads, and snow- or ice-covered surface conditions make movement of logistics and supporting weapons difficult. Often the best positions for supporting artillery will be inaccessible by ground means. The capability of cargo helicopters will allow supporting weapons to be placed where they will be the most effective. The movement and distribution of logistics can also be rapidly accomplished by these aircraft. Cargo helicopters provide the force commander the ability to use the terrain to his advantage and not be ruled by it.

Other Considerations

The rapid and often unpredictable changes in weather in mountainous areas may interrupt or hinder aviation operations. The unusual wind conditions, effects of turbulence, high density altitudes, and difficult landing sites associated with mountain flying present unusual problems for aircrews. These can be largely overcome through (1) comprehensive mountain training which allows aircrews to become thoroughly familiar with these conditions and develop the skills required to cope with them and (2) improved performance—power and agility—of helicopters.

Tactical Considerations for Desert Combat

Desert combat will normally be characterized by the employment of large armored forces, high mobility, and extended range engagements. All else being equal, desert warfare generally favors the attacking force. Because of the wide expanses of terrain associated with desert fighting, gaps in defenses and exposed or assailable flanks in all likelihood will exist. The presence of almost continuous good flying weather is also significant. Therefore, combat in the desert presents Army aviation with some rather interesting opportunities and problem areas. These will be identified as we look toward applying aviation to the five functions of land combat.

Capabilities

Firepower. Due to the size and capability of the forces that will be employed in the desert, firepower assumes tremendous significance. To be able to rapidly mass firepower may be the key to success in many engagements. Units like the ACCB are ideal for the desert because of the overwhelming fire they can deliver selectively over wide frontages on a sustained basis.

Mobility. Air assault operations are ideal in a war of movement. Because of wide battlefield disposition and composition of forces, enemy rear areas may be readily accessible to the attack helicopter and air assault forces. Air assault elements can be used in raids, preemptive or spoiling attacks, flank attacks, exploitation, and numerous other ways.

Intelligence. Because this type of mobile warfare presents gaps, exposed or assailable flanks, the air cavalry will gain increased significance. For not only will it be required to find gaps and weaknesses of enemy forces, but it will be required to screen and protect those of our own. Intelligence-gathering and surveillance aircraft will also have increased utility because of the real time intelligence they can pictorially and electronically provide.

Command and control. Command and control of widely deployed major elements will certainly be difficult. Aviation can assist in the solution to the problem by the use of command and control helicopters which extend radio range and allow rapid on-site control. Radio retransmission capability is also available by supporting signal elements.

Combat service support. Because of the extended and rapidly changing time-distance factors, logistics problems can be significant. Class III, V, and IX supplies will be used at an accelerated rate. Army cargo helicopters provide one of the most efficient and responsive means of logistical support.

Other Considerations

The good flying weather generally associated with desert warfare allows extensive use of helicopters during both day and night. The weather is also ideal for opposing fighters and air defense. Therefore, air defense suppression and the coordinated use of tactical fighters and friendly air defense will be required to counter this threat.

The good visibility allows the Cobra/TOW to fire at extended ranges. Conversely, good firing positions may be more difficult to find and dust from rotor wash may reveal firing positions. However, not all desert terrain is dusty. Unless the surface has been churned up recently by vehicular movement, desert areas tend to acquire a crust over time which cuts downwash signatures. Canopy and rotor system glint will also be more prevalent.

High density altitudes may also limit ordnance, fuel, personnel, or cargo payloads.

Sand and dust will shorten mean time between failure or change of aircraft components and assemblies. Due to heat, operating temperatures will also be higher and sand and dust will affect aircraft performance. The overall aircraft maintenance requirements can be expected to increase.

Tactical Considerations for Arctic Combat

Due to the extreme severity of the weather in arctic regions, special troops, equipment, and extensive training are required. The arctic is not unlike the desert in some respects. Combat can take place over the wide expanse of frozen wasteland. Though similar to mountain combat, the pace may be reduced by the constraints imposed by weather and terrain. Briefly let's examine the aviation contribution to the five functions of land combat in the arctic.

Capabilities

Firepower. The nature of targets in the arctic can vary from dismounted or ski troops to tracked vehicles and fixed complexes. The varied ordnance loads of armed helicopters allow engagement of the entire spectrum of targets. Additionally, artillery and naval gunfire can be adjusted by aerial observers.

Mobility. Battlefield mobility may present the greatest problem in arctic areas. The terrain can vary from flat or open rolling to extremely mountainous, creviced, and rugged. Vast expanses of tundra are common; islands are not uncommon. When terrain and weather factors are combined, the helicopter is without doubt the most efficient means of combat mobility.

Intelligence. Like the desert, reconnaissance and intelligence requirements over these vast reaches will be extensive and can best be satisfied by commitment of air cavalry and intelligence-gathering aircraft.

Command and control. The requirement for aerial radio retransmission aircraft and command and control aircraft is evident. Land navigation for ground elements can often be enhanced by Army aircraft.

Combat service support. The extremes of terrain and weather increase the combat service support requirements which can be most easily satisfied by the use of cargo helicopters. Low density altitudes will allow maximum loads to be transported in all types of helicopters and aircraft.

Other Considerations

As with ground forces the severity and unique weather conditions in arctic regions dictate the major changes in operating procedure for aviation

units. For example, the unusual phenomenon of long arctic nights will require aviation units to become more adept at night operations. Aircraft operations are often limited because of low clouds, reduced visibilities, whiteouts, and severe icing. Navigation can be especially difficult if long vistas to identifiable terrain features are not available.

Blowing snow from helicopters rotor downwash may require high hover or running fire techniques be employed so as not to divulge firing positions. Also, blowing snow affects routine landing and hovering operations and can cause whiteout resulting in spatial disorientation. The maintenance requirements for aircraft may significantly increase due to the cold because as seals fail, lubrication is uneven. Batteries fail and extended ground operation is required before flight. Also maintenance will take longer and is hampered by heavy clothing and gloves. As with ground forces, if aviation units are to be effective in arctic regions, training and special equipment as well as established SOP's are required.

Tactical Considerations for Tropic Combat

Generally, weather conditions which prevail in the tropic regions of the world do not seriously limit combat operations for extended periods of time. The terrain constitutes the most serious limiting factors and can vary from densely vegetated jungles, swamps, and forested mountains to marshes and open plains. Often a wide variety of these conditions is found in relatively small geographical areas. But the inaccessibility of these areas caused by the lack of road networks, poor trafficability, and space required to maneuver armored vehicles and other heavy combat equipment often limit battle actions to dismounted infantry. Combat can also be expected to occur at shorter ranges. Mobility and proximity then have implications affecting the application of firepower and, in fact, all functions of land combat.

Because of the Vietnam conflict, the U.S. Army is one of the most experienced in the world for combat operations in tropic regions, particularly as far as helicopter employment is concerned. However, combat experience is a perishable commodity, and a brief review of the capabilities and considerations of Army aviation in tropic combat is appropriate.

Capabilities

Firepower. The attack helicopter provides the diversity, responsiveness, accuracy, and mobility of no other fire support means. No battlefield target is out of its range nor beyond its capability to destroy. For air assaults the attack helicopter can precede, accompany, and remain in the objective area to provide the firepower necessary. In conjunction with its scouts, the attack helicopter can acquire and destroy targets before they present an immediate threat to ground forces. Additionally, forward visibility on the ground is normally restricted while aerial adjustment of fire from other sources is easily accomplished by air.

Mobility. Assault helicopters provide a means of placing forces in inaccessible areas in a matter of minutes while maintaining the irreplaceable factor of surprise. The same operation conducted by ground means would have taken an inordinate amount of time with a resulting loss of surprise.

Intelligence. In densely forested inaccessible areas finding and fixing the enemy can be a most demanding task. Use of air cavalry and intelligence aircraft can accelerate this requirement with a minimum expenditure of resources. This allows major forces to be immediately available to respond to a substantial contact with the enemy.

Command and control. Communications are extremely difficult in the jungle. Command and control and radio retransmission aircraft are vital.

Combat service support. Cargo helicopters allow fire support to be placed in the best tactical

locations rather than tied to positions which could be reached and resupplied by ground means. Fire support can also be rapidly displaced as the situation requires. Additionally, the capability to rapidly resupply lightens the combat load of all ground units enhancing their mobility.

Other Considerations

The combination of dense vegetation, poor trafficability, and the effects of moisture and weather on electronic components, may limit to some extent the quantity and measure of effectiveness of the more sophisticated air defense systems which would be found in abundance on other battlefields. However, these same considerations may promote the effectiveness of the air defense provided by automatic guns of various calibers and the hand held antiaircraft missiles. These smaller weapons are more easily transported and concealed. Normally they will only be acquired after they have opened fire. Because of the nature of the terrain, helicopter elements can be expected, as with ground forces, to operate in closer proximity to the enemy. The principles of overwatch and suppression are still applicable. However, the composition and density of the air defense array is somewhat different in nature and more difficult to define.

Operating in terrain flight modes will normally present the aircraft as a fleeting target to the enemy gunner. Automatic weapons will be forced to hipshoot and missile gunners may not have time to perform prefiring procedures and get a positive IR lock. If air defenses require armed helicopters to operate in terrain flying modes over jungled areas, the absence of dive angle during target attacks will diminish gun and rocket penetration effects through jungle canopies at the greater ranges.

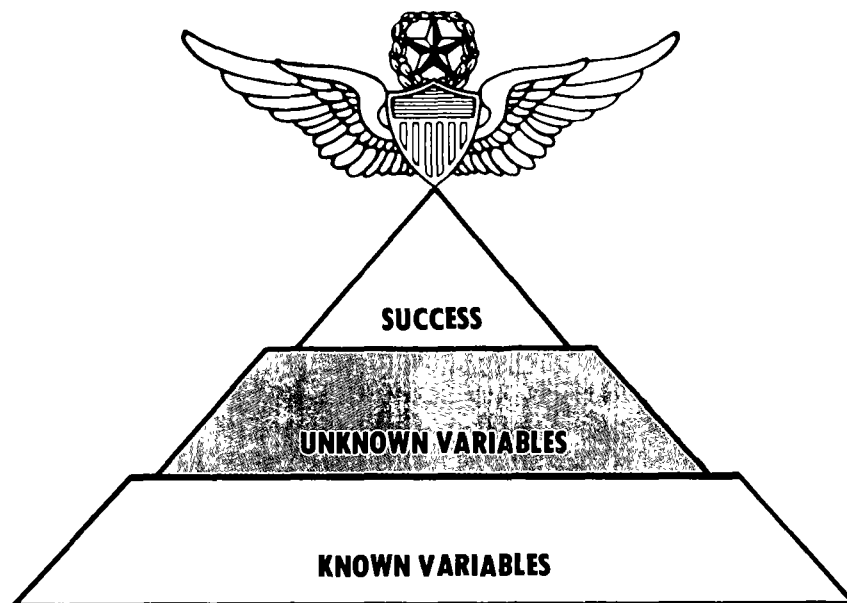
High density altitudes may limit fuel, ordnance, personnel, or cargo loads. With the combination of high power requirements and the effects of moisture on avionics and electronics, increased aircraft maintenance requirements can be anticipated.

Summary

In summary, we find that Army aviation can play a significant part in any future conflict irrespective of geographical location, scope, or intensity. Aviation presents clear advantages to the combined arms commander, the operations and logistics planner, and complements every combat and supporting arm of the United States Army.

The success of Army aviation, like other members of the combined arms team on the battlefields of the next war, ultimately depends on how well we appreciate the variables which contribute to victory. Basically, these variables fall into two major categories, the variables we can control, and the ones we can't control but must be aware of. An example of a controllable variable is training. An example of an uncontrollable variable is an enemy technological breakthrough which

increases his capability. It is clear that the more variables we bring under our span of control and become aware of, the greater the probability of our success in battle. However, we must begin the process of control and awareness now prior to combat. For example, the variable of training is one we have the power to control now if we choose to do so. To wait and attempt to gain control of this variable in battle clearly courts disaster. Chances are that in the next war, the United States Army will, at least initially, fight outnumbered and our opponent will be highly sophisticated. The lifespan of the high potential, low achiever will be short indeed. Even being good is no longer good enough, we must be the best. The equation for success is difficult to formulate. But it can be accomplished by establishing control and awareness of the known variables.



**TO ACHIEVE SUCCESS IN THE NEXT WAR, WE MUST FIRST BUILD
A FIRM FOUNDATION BASED ON KNOWN VARIABLES.**

VARIABLES OF SUCCESS

Training for Combat

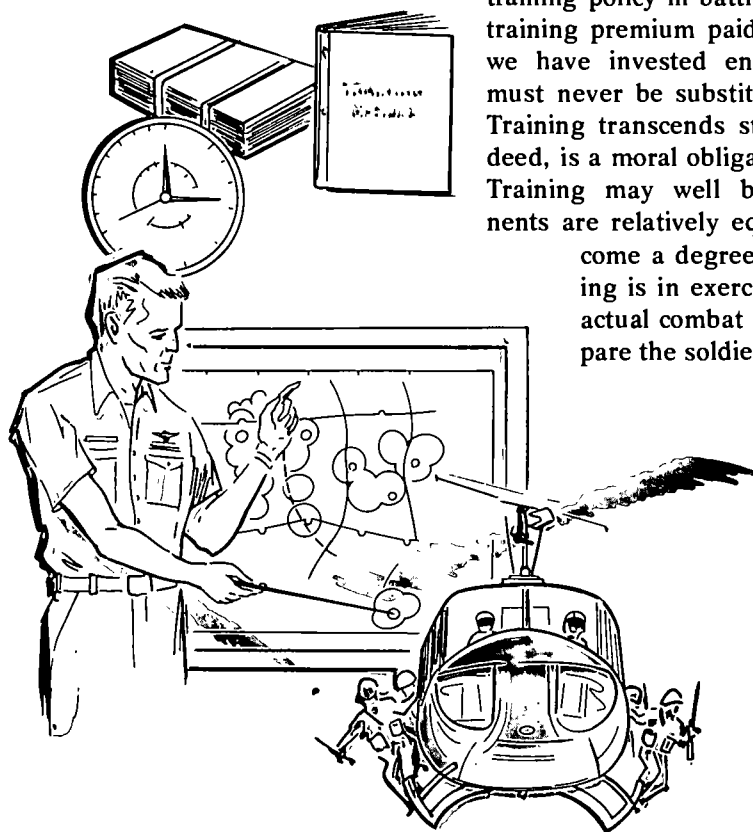
The present day commander preparing for combat of the future faces significant problems, none more so than the commander with aviation assets whose plight is best described . . .

"If you don't train a tank or an infantry battalion, you get relieved! . . . But, to train an aviation unit properly, you must get a waiver!"

*MG Robert M. Shoemaker
Commander
1st Cavalry Division*

Commanders must insist on realistic and closely supervised training. Training is much like insurance, an intangible which is convertible to a tangible only in combat. Time spent for training is similar to money spent for insurance. It may at times appear burdensome, particularly in view of the many demands and conflicting priorities we face daily; however, the burdensome demands dwindle significantly when it is time to cash in our training policy in battle. It is then that we discover that the training premium paid was truly a bargain, and hopefully, we have invested enough. The bravery of our soldiers must never be substituted for the lack of proper training. Training transcends stated military requirements and, indeed, is a moral obligation on the part of every commander. Training may well be the deciding factor when opponents are relatively equal in technology. It can even overcome a degree of numerical inferiority. Good training is in exercise in perception, and must simulate actual combat as nearly as possible if we are to prepare the soldier to overcome the initial psychological

shock of battle. Remember, the way a unit trains is the way it fights in combat. Certainly doctrine, systems, and weapons are important but the finest military hardware in the hands of the untrained soldier is valueless.



Command Responsibilities

The key to providing a solution to a training problem rests ultimately with the commander. The problems that he faces are multiplied when aviation assets are placed in the training picture. Qualification, currency, and proficiency—along with the maintenance of materiel and taking care of the troops—are just as much a part of an air assault company as a rifle company. The commander must continually evaluate the strengths and weaknesses of his entire organization in developing a training plan for attaining a high level of combat proficiency. First, the unit's actual needs must be realistically evaluated against the tactical missions, both specified and implied. Using the key operations and training personnel available to him, the commander then develops a training plan designed to progressively correct deficiencies and systematically develop and maintain technical and tactical proficiency. Continuous updating of the training program to reflect change in equipment and doctrine is required to insure an effective program.

Annual training requirements for aviators are prescribed by regulation, but do units really capitalize on this training as they should? In many instances, flying hours are wasted by aviators flying only to "get their time." It is clear that in a high threat environment, routine peacetime administrative flying is not a suitable substitute

for hard, threat-oriented training. The flying hours do not qualify the aviator for his combat tasks. With a small amount of planning and scheduling effort, significant tactical training value could be realized. A suggested plan for tactical rotary wing aviation units has been provided at the end of this chapter. This should only serve as a guide from which to select, add, or expand those items that tend to be forgotten as time and unforeseen events overtake intended actions. After the individual plan has been developed and reviewed, the commander must then, with all of his force and tact, sell the plan to the higher headquarters responsible for the unit. Assuming that the plan was successfully sold, the plan must now be implemented and constantly supervised. Last, but perhaps most important, the commander must be prepared to effectively defend his program. However, he should be ready to offer acceptable alternatives when faced with conflicting demands for resources. The commander at the outset of training must provide the impetus necessary to insure that the momentum of the program will overcome unforeseen obstacles encountered in the peacetime military posture. Positive motivation is essential. The individual soldier must be lead to recognize the essentiality of vigorous training and be made to realize that his individual effort is a vital part of the unit's function.

Threat Awareness

Each member of the unit must be aware of the threat and understand that training participation is designed to provide the skills to overcome the threat. On a monthly or quarterly basis, briefings dealing with potential threat forces and their

latest capabilities should be presented. These briefings should be for all unit personnel and serve as a stimulant for involvement and motivation.

Sharpening Individual Skills

Mission accomplishment on the high threat battlefield requires the combat soldier to be proficient in the basic skills of surviving and coping with the threat he faces. The commander must set his initial training priorities toward unit members sharpening their individual skills. The

commander must develop various tactical scenarios with defined missions exposing the individual to a myriad of events designed to teach and test him on applicable techniques anticipated in combat.

Training Base

Skill proficiency is developed through repetition and measured by evaluation against an established standard. For example, the newly graduated aviator may possess the basic qualification but he has not developed his skill level to the point that it is totally ingrained and almost second nature to him. Although the unit must conduct crew, platoon, and company training, individual training is a continuous process that commanders must develop and closely monitor throughout the training program. Because the high threat environment poses many restrictions to flying, the aircrews must achieve a high level of flight proficiency. The skills required can only be acquired by considerable exposure to the environment both in normal training and tactical exercises. The contour of the terrain, availability of natural masking features, and the location of known or suspected enemy air defense

weapons are factors which dictate route selections. Navigation along unstructured routes will require the aviator to orient himself on features at a low angle profile; thus reducing the distance which he can see. The requirement to maintain continuous orientation within 100 meters of a desired course during all conditions of flight dictates the requirement for aircrews to conduct detailed map reconnaissance of the route of flight prior to the conduct of the mission. Teamwork between the crew while in flight is essential to insure the success of the mission. During conditions of restricted visibility, even greater demands are placed upon the crew to navigate accurately and still remain masked from threat weapons. The capability of continued support can be attained through vigorous and realistic training.

Education

Tactical operating procedures and associated aviation knowledge should be firmly established through classroom instruction to insure the maximum training benefit of practical exercises conducted in the field. A suggested list of those academic subjects requiring particular emphasis is provided at the end of this chapter. A scheduled program of academic instruction is essential to the overall training program. In addition, the commander should select personnel for advanced training at formal schools or capitalize upon nonresident courses of instruction. Another valuable tool available to every unit is a

meaningful program of unit seminars utilizing guest speakers from other organizations or expertise within the unit. Flight surgeons, weather officers, and similar personnel can provide such assistance. Seminars discussing current air defense trends, cavalry, mechanized tactics or artillery employment will provide aviators with a deeper insight into how the combined arms team can best be supported. A free flow of information between aviation and ground units will also increase their effectiveness in combat, based on a better understanding of the problems each type of unit faces.

Equipment Knowledge

Each member of the unit should be well trained in the use and care of each piece of equipment within the parameters of his assigned and related areas of responsibility. The recurring need for the results of this training will prevail throughout all phases of unit preparedness and may save lives in

combat. The vitality of extensive coverage in this area necessitates that the individual be trained in accordance with outlined procedures in applicable publications. Current publications must be made available at the user level where ready reference is necessary.

Instructor Pilots and Standardization

One of the most effective methods the commander can use to obtain a realistic assessment of individual capabilities is the proper utilization of his instructor pilots. A properly directed and well-supervised instructor pilot force can assist in determining a training program for aviators in the unit. From this point on, all flying in the unit should be conducted in such a fashion so as to accomplish the assigned mission and to provide a definite training benefit toward the development of tactical operating procedures during day and night and adverse weather conditions. A training program conducted simultaneously with mission accomplishment is necessary to derive maximum training benefits from the available resources. A plan for the individual is provided at the end of this chapter.

While the commander has the ultimate responsibility for preparing his unit to accomplish its assigned combat mission, invaluable assistance is available through the Aviation Standardization Program. This program is wide-ranging, encompassing aviator cockpit performance, aircrew teamwork, tactics, maintenance, air traffic control, and safety. Standardization is defined as the uniform application of established, tested procedures and techniques to achieve and maintain a high level of excellence and professionalism in the operations and employment of Army aircraft. This high level is reached through standard aviation publications, training literature, a disciplined instructor pilot force, frequent tests, flight checks, and command supervision. Of course, technical information and guidance pertinent to aircraft operation are also provided the commander, as well as the aviator, through the local installation aviation standardization board.

The commander will find that dedicated, highly professional instructor pilots are among his foremost assets. Instructor pilots are qualified to evaluate pilot proficiency, instruct in instrument flight procedures, tactics with emphasis on terrain flying as part of the tactical training, and safety. They are authorized to perform instructor pilot duties in a particular type and series of aircraft, and to work under the technical supervision of the

local aviation standardization board. In some cases, due to a shortage of school-trained instructor pilots, the commander may find it necessary to appoint them from among the unit's aviators. If this should become necessary, he should select the most knowledgeable and experienced aviators who display both the ability and desire to instruct.

Standardization instructor pilots provide technical surveillance, guidance, and training for the unit's instructor pilots. Standardization instructor pilots should be selected on the basis of training, knowledge, experience, judgement, maturity, and proven instructor pilot ability. Unit standardization instructor pilots and instructor pilots must possess a complete understanding of:

- **Prescribed procedures and techniques for the operation and employment of assigned aircraft.**
- **Tactical requirements and missions for the unit and parent organization.**
- **Tactical procedures to effectively conduct operations from terrain flight modes.**
- **Maintenance, safety, and operational considerations for the geographic area, type unit, and assigned aircraft.**

The commander should employ his instructor pilots in a quality assurance role such as periodically evaluating proficiency of individual aviators and determining specific training requirements supportive of the tactical mission. The instructor pilots should also conduct the training required to achieve the highest possible level of individual effectiveness. This will include individual training for newly assigned aviators, essential periodic training in normal and emergency procedures, administration of post-accident flight evaluations, and the conduct of remedial training on an as required basis.

Standardization instructor pilots and instructor pilots can also advise the commander as technical experts on optimum aircraft procedures and techniques. They can provide invaluable assistance in developing and accomplishing effective and realistic unit training programs, with due consideration to aircraft capabilities, aviator proficiency, and local conditions.

Though the standardization instructor pilots operate primarily at unit level, they may also be tasked with specific standardization functions for the local standardization board or higher headquarters. The aviation standardization board establishes local procedures, monitors overall implementation of the aviation standardization and safety program, and provides technical

guidance for appointed standardization instructor pilots, instrument examiners, and safety officers.

While mission accomplishment is always primary, appropriate consideration must be given to aviation safety. In this regard, the unit safety officer should work closely with the commander, standardization instructor pilots, instructor pilots, and other key members of the unit in the formulation of peculiar or special tactical operating procedures and techniques and in the accomplishment of individual and unit training. The challenge of aviation safety is to conserve the commander's resources so that aircraft assets are available for combat.

Night Training

Night training must be expanded to include all daylight maneuvers and emergency procedures. Night flight training, coordinated with ambient light intensity levels of moon phases and other hemispherical illumination, provides an opportunity to develop low-level night operating capabilities. It is imperative that we approach night training in three distinct and progressive phases predicated upon a high degree of daylight skills. In the first phase, aircrews must be brought to a level of confidence and proficiency in conventional night operations. The second phase

involves exposure to the night terrain flight environment. In both phases the aircrewmembers must be able to accomplish their missions without the assistance of night visual aids. The third phase should serve to introduce effective night operations using night visual aids that can greatly enhance aviation capabilities. Proficiency in night flight is realized only through intensive and repetitious practice. It is the commander's responsibility to bring his unit to this peak and thus increase both the unit's staying power and combat capability.

Instrument Flying

Every aviator needs to know how to fly under instrument meteorological conditions, regardless of whether he is en route from Fort Campbell to Fort Hood or over the combat zone. Canceling essential tactical missions in adverse weather must not be rationalized by an overemphasis on safety consciousness. The capabilities of our machines are clearly defined. To enable us to exploit the effectiveness of our hardware to its fullest, we must strive to maximize individual capabilities even under adverse weather

conditions. Previously acquired fair weather skills provide the necessary fundamental background for our aviators to participate in a program that will progressively acclimatize the individual. The archaic attitude that "it could not be done before, so it can't be done now" must not prevail.

The low operating altitudes of the high threat environment necessitate that tactical instrument skills be developed. This can only be accomplished by "biting the bullet" and getting out and doing it.

Aerial Scout Training

The profile of the aerial scout mission takes on an entirely new complexion when viewed from the high threat environment concept. The characteristics of the future threat environment increase both the need for aerial scout operations and, at the same time, the degree of difficulty in accomplishing the mission. The diversity of combat operations, facilitated by aeroscout employment, requires that development and refinement of mission capabilities in this area of aviation be given special consideration and emphasis. The air defense characteristics of the future battlefield deny the high

flying command/control and navigation assistance previously provided the aeroscout by the "Big Brother" attack helicopter. Current and future concepts of employment require precise teamwork, navigation, and communications. The successful employment of attack helicopters is predicated on the abilities of the aeroscout to designate targets and firing positions. A comprehensive training program should be established to ingrain the skills of reconnaissance techniques, artillery adjustment, target designation, navigation, effective communications, and precise teamwork.

Gunnery Training

We have noted how important it is for aircraft crews to be able to adopt terrain flying techniques in order to survive the air defense threat. This becomes vitally important in the gunnery training of armed helicopter crews. Nap-of-the-earth gunnery techniques must be refined to allow the crew to place effective fire on the target. Scout aircraft should be used whenever possible on the gunnery course to develop the inter-aircraft coordination required for immediate target engagement. Communications must be standardized so that clear, concise, and unhesitating radio transmissions are made and understood by all.

Engagement is more difficult because lucrative targets will be moving at relatively rapid rates—in some cases more than 25 miles per hour. Because of this, gunnery training and range facilities must be revamped to allow for engagement of multiple moving targets at maximum range. Realism must be injected into every aspect of training to insure a fluid and challenging atmosphere. Emphasis must be on placing the crews in unexpected circumstances to prevent them from falling into "school solution" patterns and a stagnated training program. Because tactical situations do not always allow for the most efficient nose-into-the-wind flight conditions, training must

include crosswind and downwind firing and hovering maneuvers. Demolition pits, aggressor forces, radio jamming, smoke, camouflage, and "enemy" aircraft are but a few of the ways to inject realism which should contribute to the eventual "Baptism of Fire." Night firing must also be practiced, and until effective night target acquisition devices become available, artificial illumination should be used.

To validate the effectiveness of the program some means of objective scoring should be considered; however, as with all good tactical gunnery courses, "steel on the target" must be the dominant measure of crew proficiency. Emphasis must be placed upon attack helicopter crews maintaining annual gunnery qualification. To restrict this training due to the high cost is to deprive the commander of his best antiarmor weapon. Development of simulators which enable the crew to duplicate actual firing will provide an economical alternative for a portion of the annual gunnery requirements. A direct fire simulator using lasers is presently in the developmental stage. These simulators will be a part of an overall tactical gunnery training program for attack helicopters as well as other combat equipment with conditions, and will provide realism and experience that heretofore has been impossible in a training environment.

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navigation assistance previously provided the aeroscout by the "Big Brother" attack helicopter. Current and future concepts of employment require precise teamwork, navigation, and communications. The successful employment of attack helicopters is predicated on the abilities of the aeroscout to designate targets and firing positions. A comprehensive training program should be established to ingrain the skills of reconnaissance techniques, artillery adjustment, target designation, navigation, effective communications, and precise teamwork.

Gunnery Training

We have noted how important it is for aircraft crews to be able to adopt terrain flying techniques in order to survive the air defense threat. This becomes vitally important in the gunnery training of armed helicopter crews. Nap-of-the-earth gunnery techniques must be refined to allow the crew to place effective fire on the target. Scout aircraft should be used whenever possible on the gunnery course to develop the inter-aircraft coordination required for immediate target engagement. Communications must be standardized so that clear, concise, and unhesitating radio transmissions are made and understood by all.

Engagement is more difficult because lucrative targets will be moving at relatively rapid rates—in some cases more than 25 miles per hour. Because of this, gunnery training and range facilities must be revamped to allow for engagement of multiple moving targets at maximum range. Realism must be injected into every aspect of training to insure a fluid and challenging atmosphere. Emphasis must be on placing the crews in unexpected circumstances to prevent them from falling into "school solution" patterns and a stagnated training program. Because tactical situations do not always allow for the most efficient nose-into-the-wind flight conditions, training must include crosswind and downwind firing and hovering maneuvers. Demolition pits, aggressor forces,

radio jamming, smoke, camouflage, and "enemy" aircraft are but a few of the ways to inject realism which should contribute to the eventual "Baptism of Fire." Night firing must also be practiced, and until effective night target acquisition devices become available, artificial illumination should be used.

To validate the effectiveness of the program some means of objective scoring should be considered; however, as with all good tactical gunnery courses, "steel on the target" must be the dominant measure of crew proficiency. Emphasis must be placed upon attack helicopter crews maintaining annual gunnery qualification. To restrict this training due to the high cost is to deprive the commander of his best antiarmor weapon. Development of simulators which enable the crew to duplicate actual firing will provide an economical alternative for a portion of the annual gunnery requirements. A direct fire simulator using lasers is presently in the developmental stage. These simulators will be a part of an overall tactical gunnery training program for attack helicopters as well as other combat equipment with conditions, and will provide realism and experience that heretofore has been impossible in a training environment. Simulators also allow for an actual personnel reduction for tactical evaluators during training tests. The "Bang-

Simulators also allow for an actual personnel reduction for tactical evaluators during training tests. The "Bang-bang, you're dead" philosophy is overcome and the chips will fall where they may. When the helicopter is unceremoniously eliminated from the battle-play, an instant and important teaching point is brought home to the aircrew. Training is the

place to make these mistakes, for in combat the learning process would have been brought to an abrupt, lamentable end. These laser systems will also be mounted on cargo, utility and scout aircraft to provide to these crews the same capability to determine the success or failure of their tactics.

Cargo Operations

Medium and heavy lift companies have to be able to conduct their support roles under the same conditions as other aviation elements do. Ingenuity and close coordination with the ground elements will result in responsive support and a minimum amount of wasted blade time. Internal loads carried must be loaded and off-loaded rapidly. Responsive logistical support can only be provided by

well-trained riggers and ground support personnel. FARRP displacement must be instantaneous and conceivably to a multitude of locations during the day. Aircraft and equipment recoveries, more than in the past, must have extensive gunship and artillery coordination that only can be accomplished by teamwork training.

Communications and Electronic Warfare

Communications discipline and an awareness of electronic warfare capabilities are other factors which must be integrated into the tactical training plan. Unit personnel must be able to degrade the enemy's effectiveness to jam, monitor, or neutralize friendly electronic communications and noncommunicative sig-

nals. This threat makes minimum communications, both secure and non-secure, and preferably radio silence a requisite for aviation operations. Abuse of the communications-electronics operating instructions (CEOI) by aviation units cannot be tolerated.

Maintenance Training

Just as the high threat environment places a high demand on aircrew training, it places unique demands on our logistics policies and systems. At unit level, a high rate of aircraft availability particularly in tactical units which will operate around-the-clock in forward areas, is demanded. Because of this, unit aircraft maintenance contact teams will be located well forward to identify problems and perform rapid field fixes such as modular replacement, while longer term maintenance repairs are performed with the field trains elements deep in the rear

operations area. In addition, requirements for mobile contact teams will clearly increase. Smooth coordination between all maintenance activities can only develop through regularly scheduled field practice.

Key unit personnel must be cross-trained in related skills to maintain a high state of operational readiness. Cross-training can be readily supported by closely supervised on-the-job training, nonresident instruction, and Training Extension Courses (TEC).

Unit Training

Unit training accomplishes various important functions. It continues refinement of individual skills, trains unit leaders, induces the element of team coordination and contributes to tactical realism; however, before he launches a training program, the commander must determine the present capability of his unit.

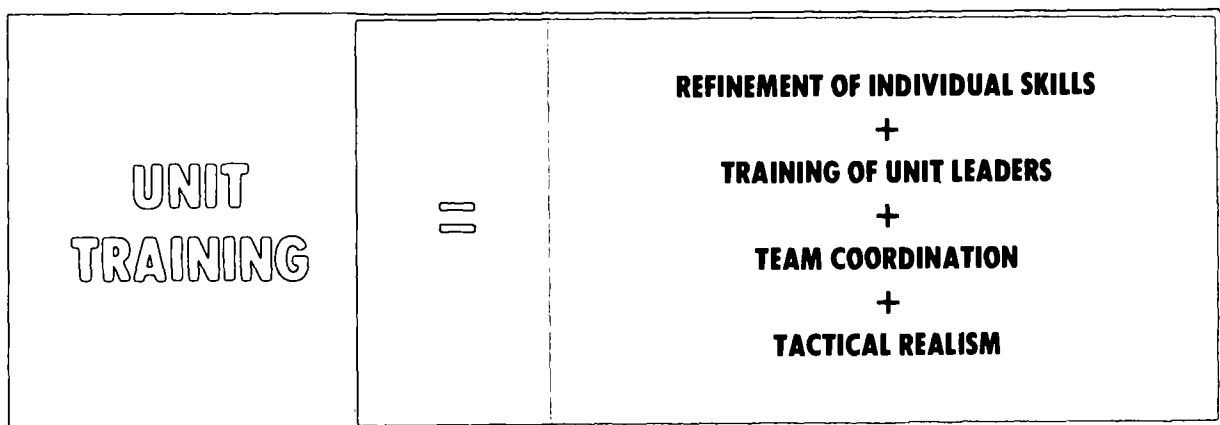
Basically, units must constantly practice the missions they would actually fly in combat. They must make every effort to coordinate these missions with the training programs of supported ground units, allowing each to become thoroughly familiar with the other's requirements, thus establishing a smooth working relationship.

Irrespective of the type of unit or its mission, the one thing all units have in common is that they are designed to operate in a combat environment. All too often aviation units have a tendency to remain on their airfields, and training constraints resulting from procedures and administrative requirements prevail. The entire unit should participate regularly in tactical field training. It allows the commander to evaluate the capabilities of the unit and its contribution to the combined arms effort. For example, loading plans, camouflage, concealment, light and communications discipline, and the hundreds of other important items can be tested and deficiencies which would not be apparent in garrison identified. A unit must become cohesive with each element doing its part to make the entire system function properly. Field training

allows for validation of the unit tactical Standing Operating Procedures, which require periodic revision and the widest dissemination to effectively accomplish the task for which they were designed.

Aviation units must spend a considerable amount of time conducting night and adverse weather training. The benefits of this training are twofold. First, it increases aviation staying power and, secondly, night and adverse weather operations reduce somewhat the threat posed by previously discussed air defense systems. Units with formation flying requirements such as assault and air cavalry elements will have unique training tasks. These skills must be developed for day and night operations in the terrain flying mode. Attack helicopter teamwork must be developed, and platoons and companies must learn to effectively and rapidly mass their fires.

A function which tends to be forgotten because of the dynamic new roles of our aviation units is the capability to conduct aeromedical evacuation. It must be remembered that emergency medical evacuation is a secondary role even in combat aviation units. Casualties will occur in forward areas where tactical aviation units operate on a continuous basis. Additionally, we can expect to have casualties among our own aircrews. For these reasons all personnel must be proficient in first aid, another often forgotten item in a unit's training plan that will become vital when the mission cannot stop for casualties.



Testing as a Function of Training

Planning, preparation, inspection, and evaluation are all functions of training. Testing is an integral part of the training process. In the final analysis, only testing allows us to determine how effective our training really is and where improvements are necessary. Furthermore, testing provides an immediate goal and contributes to a sense of urgency. With all tactical units, weapon and tactical proficiency measured against a known standard should be of the utmost importance to the commander.

To provide the tactical aviation commander with a recognizable standard, the new Army Training and Evaluation Program (ARTEP) is being developed. ARTEP's are individualized by TOE to provide aviation units with sound training objectives and comprehensive training and testing

guidance. With a program designed for his particular type of unit, the commander can more readily incorporate operational training with mission operations; however, because aviation units worldwide have varying and unique responsibilities, ARTEP's alone may not be enough. Therefore, training has variables which must be considered by the commander when establishing aviation training requirements.

Awards and incentives for demonstrated tactical and technical proficiency are other tools that have proven useful to commanders at all levels. For example, a top-gun award for a high-scoring aircrew or a meaningful soldier-of-the-month program not only recognizes individual accomplishments, but also enhances teamwork with the unit.



Composite Training Program

The following chart represents a suggested training plan applicable to tactical rotary wing aviation units. The maneuvers/operations represent those times during the designated

period that a unit should consider training, if applicable. For example, an assault helicopter company should consider conducting tactical airlift operations two times a month.

D — Daily; M — Monthly; Q — Quarterly S — Semi-annually; A — Annually				
	UTILITY	AERO- SCOUT	ATTACK	CARGO
Conduct Tactical Airlift	M/2	M/2	M/2	M/2
Conduct Tactical Resupply	Q/2			M/2
Perform Aircraft Recovery	S/1			Q/1
Special Support Operations	A/1	A/1	A/1	A/1
Medical Evacuation Procedures	S/1	S/1		A/1
Battle Drill		Q/2	Q/2	
Reduced Visibility Operations	Q/4	Q/4	Q/4	Q/4
Reconnaissance Techniques	A/1	M/2	M/1	A/1
Unit Movement	Q/1	Q/1	Q/1	Q/1
Organizational Maintenance Training	M/2	M/2	M/2	M/2
Physical Training	D/1	D/1	D/1	D/1
Adventure Training	A/1	A/1	A/1	A/1
CBR Operations	Q/1	Q/1	Q/1	Q/1
Communications Security Training	Q/1	Q/1	Q/1	Q/1
Electronic Warfare	Q/1	Q/1	Q/1	Q/1
Escort Operations		Q/1	Q/1	
Route Security		Q/1	Q/1	
Mine Laying Operations	S/1			
Wire Laying	A/1			
Psyops	A/1			
Rear Area Security	A/1	S/1	S/1	
Retrograde Operations	S/1	S/1	S/1	
Camouflage	Q/2	Q/2	Q/2	Q/2
Command and Control	Q/1	S/1		
Nuclear Surety	A/1			A/1
Sensor Deployment	A/1	A/1		
Intelligence-Gathering	A/1	M/2	Q/1	S/1
Aerial Photography	A/1	A/1		
Amphibious Operations	A/1	A/1	A/1	A/1
Land Clearing Operations		A/1		

Composite Training Program (continued)

	UTILITY	AERO- SCOUT	ATTACK	CARGO
Damage Control	A/1	A/1		
Gunnery Operations			Q/1	
Door Gunner Operations	Q/1	Q/1	Q/1	Q/1
Formation Flying	Q/1	Q/1	Q/1	Q/1
Battlefield Illumination	Q/2	Q/2	Q/2	
Firefly Operations	Q/1		Q/1	
Tactical Refuel Operations	Q/1	Q/1	Q/1	Q/1
Map Reading	M/1	M/1	M/1	M/1
Threat	M/2	M/2	M/2	M/2
Mission Planning	Q/1	Q/1	Q/1	Q/1
Aeromedical Training	Q/1	Q/1	Q/1	Q/1
Combined Arms Team Training	D/1	D/1	D/1	D/1
Adjustment of Indirect Fires	Q/1	Q/1	Q/1	Q/1
Fire Support Operations	Q/1	Q/1	Q/1	Q/1
Forward Air Guide Operations (CAS)	Q/1	Q/1	Q/1	Q/1
Individual Weapons Qualifications Training	A/1	A/1	A/1	A/1
Inter-Unit Training				
Air Defense	Q	Q	Q	Q
Field Artillery	Q	Q	Q	Q
Infantry	Q	Q	Q	Q
Armor/Cavalry	S	S	S	S
Engineer	A			A
Long-Range Reconnaissance Patrols	S	S	S	
Air Force		S	S	
Navy	A			
Marines	A	A	A	
Allies				
Aggressor	Q	Q	Q	Q

Individual Flight Training

The following chart represents a suggested training plan of maneuvers applicable to the individual aviators assigned to a rotary wing tactical unit. For example, an individual assigned

to an assault helicopter company should consider performing takeoff from hover three times during day and night.

<div> M — Monthly; Q — Quarterly S — Semi-annually; A — Annually </div>				
Standard Flight Maneuvers	UTILITY	AERO-SCOUT	ATTACK	CARGO
Takeoff to Hover	M/3	M/3	M/3	M/3
Landing from Hover	M/3	M/3	M/3	M/3
Sideways Hover	M/2	M/2	M/2	M/2
Rearward Hover	M/1	M/1	M/1	M/1
Hovering Turns	M/2	M/2	M/2	M/2
Decelerations	M/1	M/1	M/1	M/1
T/O from Ground	M/2	M/2	M/2	M/2
T/O from Hover	M/3	M/3	M/3	M/3
S Turns	M/1	M/1	M/1	M/1
Straight Descents	M/2	M/2	M/2	M/2
Descending Turns	M/2	M/2	M/2	M/2
Shallow Approach	Q/1	Q/1	Q/1	Q/1
Normal Approach	M/3	M/3	M/3	M/3
Steep Approach	Q/1	Q/1	Q/1	Q/1
Landing to Hover	M/3	M/3	M/3	M/3
Landing to Ground	M/3	M/3	M/3	M/3
Running Landing	Q/1	Q/1	Q/1	Q/1
Crosswind Landing	Q/1	Q/1	Q/1	Q/1
Hoist Operations	S/1			S/1
Confined Area Operations	Q/1	Q/1	Q/1	Q/1
Pinnacle Operations	Q/1	Q/1	Q/1	Q/1
Emergency Procedures				
Hovering Autorotation	Q	Q	Q	
Standard Autorotation	Q	Q	Q	Q
Low Level Autorotation	Q	Q	Q	
Autorotation with turn	Q	Q	Q	
Forced Landing	Q	Q	Q	
Servos Off Landing/SAS Off	Q	Q	Q	Q
Simulated Anti-torque Failure	Q	Q	Q	
Emergency Governor/Trim Ops	Q	Q	Q	Q
Ski Operations	(As Required)			

Individual Flight Training (continued)

Tactical Flight Techniques	UTILITY	AERO-SCOUT	ATTACK	CARGO
Hover Check	M/3	M/3	M/3	M/3
NOE Takeoff	M/2	M/2	M/2	M/2
Down Wind Takeoff	M/1	M/1	M/1	M/1
Quick Stop	M/2	M/4	M/3	S/1
Masking and Unmasking	M/5	M/10	M/10	S/1
NOE Approach	M/2	M/2	M/2	M/2
Down Wind Approach	M/2	M/5	M/5	S/1
NOE Turns	M/5	M/10	M/5	S/1
Sling Loads	S/3			M/5
Internal Loads	Q/4			Q/4
Formation Flight	Q/1	S/1	S/1	A/1
Revetments Operations	A/1	A/1	A/1	A/1
CBR	Q/1	Q/1	Q/1	Q/1
Evasive Maneuvers	Q/2	Q/5	Q/5	S/1
Reduced Visibility Operations	Q/1	Q/1	Q/1	Q/1
Gunnery		Q/1	Q/1	
Night Flight	Q/5	Q/5	Q/5	Q/5
Reconnaissance Techniques	Q/5	Q/5	Q/3	A/1
Adjustment of Indirect Fire	S/1	Q/1	S/1	A/1
TAC Instrument Procedure	Q/1	Q/1	Q/1	Q/1
Rappelling	S/1			S/1
Terrain Flight	M/5	M/5	M/5	M/5

Academic Training

Aircraft Maintenance	M/2	Aircraft Emergency Procedures	S/2
Preflight, Post Flight	Q/.5	Communication Procedures/Security	S/1
Weight and Balance	A/1	Cockpit Procedures (Crew)	Q/.5
Tactical Refueling and Rearming (FARRP's)	S/.5	Missions and Roles of Army Aviation Units	A/1
Instrument Flight Techniques (UH-1, SFTS)	M/1	Missions and Employment of Army Ground Units	S/1
Flight Regulations	Q/.5	VFR Tactical Navigation	M/1
Safety and Accident Prevention	M/1	Meteorology	S/2
Aviation Medicine and Life Support System	S/2	Unit Movement/Loading Plans	Q/.5
First Aid	S/2	Night Vision Training	S/1
Survival, Evasion, Resistance and Escape	A/12	Nuclear Surety Training	A/1
		Target Acquisition	Q/.5
		Aircraft Recognition	Q/2
		Equipment Recognition	Q/2

Summary

It is evident that adequate unit preparation lies in the commander's abilities to develop imaginative, innovative, and inspiring training programs. Continuous supervision and command emphasis must be incorporated with comprehensive self-evaluations to insure that unit training does not become an exercise in merely fulfilling a requirement. The commander must avail himself of the innumerable channels open to him for current training and tactical doctrine to insure that his programs are credible. Outmoded programs are a waste of valuable assets and can be nothing but a detriment to required personnel motivations. Care must be taken to insure that

soldiers are aware of why they are doing what they are doing. Awareness of the threat and tactics required to combat the threat will provide a purpose to training and instill the need for conscientious efforts. While repetition is the basis for specific skill development, the commander must vary the curriculum frequently enough to avoid complacency.

The methods of success are many and restricted only by the limitations of the imagination. The premium of training must be paid to reap dividends, and the burden of payment is solely on the commander.



Conclusions

The preceding chapters have shown that thoroughly trained aviators and properly employed Army aircraft can not only survive but be highly successful on the high threat battlefield. The principles, techniques, concepts, and procedures — countermeasures, in short — have been discussed that can be used for successful around-the-clock employment. These are briefly summarized as follows:

1st

Initially, along with a broad training base, a current accurate picture of the enemy air defense and electronic warfare threat is required. Each commander as well as all aircrewmen must understand this threat in order to exploit any weaknesses in the enemy's systems. Obviously, the enemy air defense weapons including his aircraft must be suppressed. Inherent in air defense suppression is the proper employment, as part of the combined arms effort, of our own air defense weapons against enemy aircraft.

2nd

The capabilities of the other services must be fully utilized both to suppress the enemy's air defense, electronic warfare, and artillery and to obtain local air superiority as priority for air assault operations.

3rd

Maximum use of countermeasures such as chaff, smoke, and ECM must be made to jam enemy radars, defeat his optical target acquisition devices, disrupt his communications, and deny him access to friendly communications.

4th

Use of terrain flying techniques and tactical instrument flight will be normal procedures for Army aircraft operating in the forward battle area even extending back into the corps area. Moreover, these techniques must be employed in adverse weather conditions to provide aviation the staying power needed in combined arms operations.

5th

The commander will want to take maximum advantage of the intelligence information available on enemy dispositions in order to select the best possible primary and alternate routes to and from the target or objective areas beyond the FEBA. These routes should be as free of enemy air defense weapons and other flight hazards, both manmade and natural, as possible; and should allow aircrewmen to take advantage of all available masking provided by terrain features.

6th

In the employment of Army aircraft, night operations must be given maximum consideration since the cover of darkness severely restricts the enemy's ability to visually observe aircraft movement.

Throughout this manual much emphasis has been placed on the employment of new equipment which at this time is not in the Army inventory. The illustration (fig. 5-1) below emphasizes the need to develop doctrine and begin unit training for use of new equipment well in advance of actual deployment to preclude needless loss of valuable time.

If the helicopter is to survive, it must be flown at terrain flight altitudes; to fly higher would invite destruction by sophisticated air defenses. We know now that this is the technique we must use. However, to fire present weapons systems from terrain flying altitudes results in relatively inaccurate fire on targets. This inadequacy will be resolved with the introduction into the system of the helicopter armed with the new antitank wire-guided missile. Knowing that this, and other new systems, will soon be in the inventory, demands

that our training and doctrine be geared for its arrival. However, this does not reduce or restrict training with the equipment presently in the hands of field units.

While training for or operating against the threat, we may discover other countermeasures or ways of improving equipment utilization that should be used by both the planners and commanders and their aircrewmembers. If the user is to employ Army aircraft successfully in battle, these survival techniques must, through standardization, become second nature to us and form an integral part of all training and planning. The old adage of "know your men, know your equipment, and know the enemy," has never been more applicable than it is to today's commander as he seeks to properly employ and utilize the valuable assets provided by Army aviation in the high threat environment.

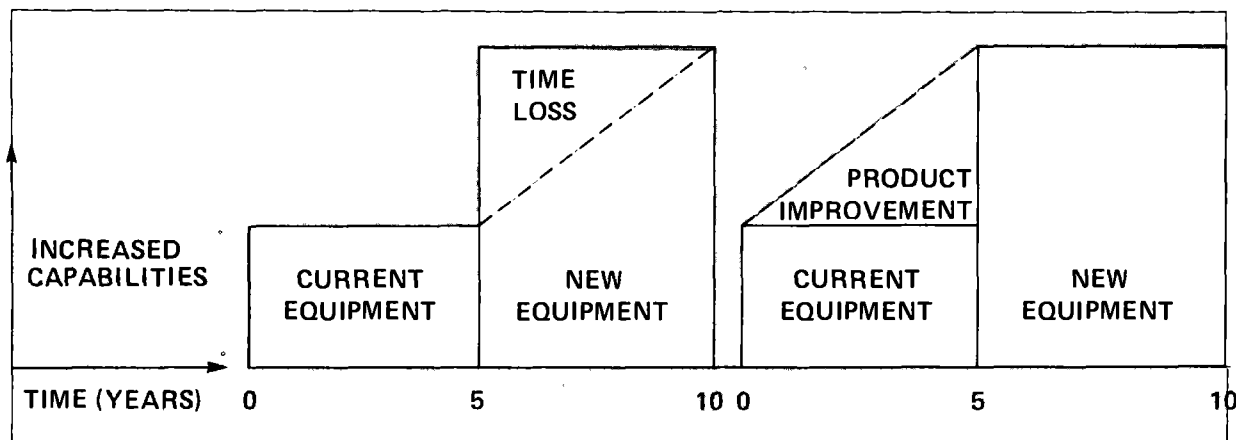


Figure 5-1. Develop Doctrine and Train in Advance to Preclude Needless Loss of Time.

Glossary

Active Defense. The method or system of flexible and elastic defense on the modern mechanized battlefield designed to fight successfully against numerically superior attacking armored formations. The concept of active defense is to wear down the attacker by confronting him aggressively and continually from successive positions with strong combined arms teams and task forces fighting from mutually supporting battle positions in depth throughout the battle area.

Air Assault. Ground combat forces utilizing the firepower, mobility, and flexibility of aerial vehicles to close with and destroy enemy forces.

Airmobile Operations. Operations in which combat forces and their equipment move about the battlefield in air vehicles under the control of a ground force commander to engage in ground combat.

Air Movement. Air transport of units, personnel, supplies and equipment, including airdrops and air landings and covering both tactical and administrative movements.

Air Observer. An individual whose primary mission is to observe or take photographs from an aircraft in order to adjust artillery fire or obtain military information.

Aircraft Survivability. The survivability of an aircraft is its capability to withstand enemy actions, material deterioration or the effects of natural phenomena which singly or collectively result in the loss of its capability to perform the mission(s) for which it was designated.

Air Defense Artillery. Weapons and equipment for actively combating air targets from the ground. Weapons are classified as—

Light 20-57mm

Medium 58-99mm

Heavy 100mm or greater

Air Reconnaissance. The acquisition of intelligence information employing aerial vehi-

cles in visual observation or the use of sensory devices.

All Available. A command or request to obtain the fire of all artillery able to deliver effective fire on a given target.

Alternate Position. The position given to a weapon, unit, or individual to be occupied when the primary position becomes untenable or unsuitable for carrying out its task. The alternate position is so located that the weapon can carry out its original task.

Armed Reconnaissance. An offensive mission conducted to search for and attack targets of opportunity in a designated area or along designated routes.

Army Aviation Units. Personnel, aircraft and allied aircraft equipment organically assigned to Army organizations by appropriate authorization tables.

Assault Aircraft. Powered aircraft including helicopters which move assault troops and cargo into an objective area and which provide for their resupply.

Attrite. A mission frequently assigned to a unit conducting an active defense. It requires the unit to destroy as much of the attacking enemy force as possible. This mission does *not* necessarily require the unit to hold or retain specific terrain.

Avionics. The application of electronics to aviation and astronautics. Can be applied to voice communications, navigational systems and their associated instrumentation and electronics.

Barrier. A coordinated series of obstacles designed or employed to analyze, direct, restrict, delay, or stop the movement of an opposing force, and to impose additional losses in personnel, time, and equipment on the opposing force.

Barrier Plan. That part of an operation plan or order which is concerned with the employment of obstacles.

Battlefield Recovery. Removal of disabled or abandoned materiel, either enemy or friendly, from the battlefield and its movement to a recovery collecting point or to a maintenance or supply establishment.

Close Air Support. Air attacks against hostile targets which are in close proximity to friendly forces and require detailed integration of each air mission with fire and movement of those forces.

Contingency Plan. A plan for major contingencies which can reasonably be anticipated in the principal geographic subareas of the command.

Counterattack. Attack by a part or all of a defending force against an attacking enemy force, for such specific purposes as regaining ground lost or cutting off or destroying enemy advance units, and with the general objective of denying to the enemy the attainment of his purpose in attacking. In sustained defensive operations, it is undertaken to restore the battle position and is directed toward limited objectives.

Counterbattery Fire. Fire delivered for the purpose of destroying or neutralizing indirect fire weapons systems.

Covering Force. (1) A covering force provides the main body early warning, reaction time, maneuver space, and information about the enemy. A covering force is a tactically self-contained security force which operates at a considerable distance to the front, flank, or rear of a moving or stationary force. Its mission is to develop the situation early and defeat the enemy, if possible. If the latter is not possible, then the covering force deceives, delays, and disorganizes the enemy until the covered force can effectively react. (2) In defensive operations, a covering force operating apart from the main body has four basic tasks:

Force the enemy into revealing the strength, location, and general direction of his main attack.

Deceive the enemy, or prevent the enemy from determining the strength, dispositions, and locations of friendly forces, especially those in the main battle area.

Divest the enemy of his air defense umbrella, or require him to displace his air defenses before attacking the main battle area.

Gain time for the main body, enabling it to deploy, move, or prepare defenses within the main battle area.

Covering Force Area (CFA). In defensive operations the covering force area starts at the line of contact and ends at the forward edge of the MBA. Forces in this area are deployed to find the enemy and fight him with sufficient force to cause him to reveal the location of his main thrust. There is no specially delineated covering force area for offensive operations.

Defend. A mission assigned to a unit which requires it to destroy or stop an attacking enemy force from penetrating through the assigned sector or battle area. Sub-units of the defending unit may have missions including block, attrite, retain key terrain, delay or counterattack.

Delay Operation. An operation in which a force under pressure trades space for time by slowing down the enemy's momentum and inflicting maximum damage on him. The delay force may conduct any or all types of combat operations to gain time.

Deliberate Attack. A type of attack characterized by detailed preplanning and coordination of firepower and maneuver.

Feint. A deceptive maneuver intended to draw the enemy's attention away from the area of the main attack, inducing the enemy to move his reserves or shift his fire support in reaction to the feint.

Fire Support Coordination. The planning and executing of fire so that targets are adequately covered by a suitable weapon or groups of weapons.

Forward Air Controller. An officer (aviator/pilot) member of the tactical air control party who, from a forward ground or airborne position, controls aircraft engaged in close air support of ground troops.

Forward Area Refueling and Rearming Point (FARRP). A forward area site established for the purpose of refueling and rearming aircraft. Mobile equipment is used allowing transport by air or ground means.

Hasty Attack. Is one conducted from the line of march without hesitation or major preparation.

High Threat Environment. The high threat environment is an enemy combat posture wherein modern, sophisticated weapons and techniques create a highly lethal situation with the intention of establishing control over territory and airspace contiguous to that territory. Such a posture could include armor, field and antiaircraft artillery, surface-to-air missiles and tactical fighters which would be directed by radar, infrared, optical, electro-optical and visual means and might be supplemented by electronic warfare methods to include jamming and deception.

Main Battle Area (MBA). That area extending rearwards from the FEBA to the rear boundaries of the subordinate elements of the unit. It is in this area that the decisive defensive battle for that unit will be fought.

Movement to Contact. An offensive operation designed to gain or reestablish contact with the enemy.

Nap-of-the-Earth. Flight as close to the earth's surface as vegetation or obstacles will permit, while generally following the contours of the earth. Airspeed and altitude are varied as

influenced by the terrain, weather, and enemy situation. The pilot preplans a broad corridor of operation based on known terrain features which has a longitudinal axis pointing toward his objective. In flight, the pilot uses a weaving and devious route within his preplanned corridor while remaining oriented along his general axis of movement in order to take maximum advantage of the cover and concealment afforded by terrain, vegetation, and manmade features. By gaining maximum cover and concealment from enemy detection, observation, and firepower, nap-of-the-earth flight exploits surprise and allows for evasive action.

Objective. An end in view to be attained by the employment of a military force.

Observed Fire. Fire for which points of impact or burst can be seen by an observer. The fire can be controlled and adjusted on the basis of observation.

Overwatch. A tactical posture utilized by armor, mechanized, and aviation units when moving to contact the enemy. The rear element of the moving unit overwatches the lead element and is prepared to support by fire. Two variations of the overwatch tactical posture are traveling overwatch and bounding overwatch. Traveling overwatch is utilized when enemy contact is possible. Both the rear overwatching element and the forward element are moving. Bounding overwatch is used when enemy contact is imminent. This is the slowest method of movement because the rear element overwatches, then alternates movement by bounds with the forward element. The purpose of the overwatching element is to deliver suppressive fire in support of the forward (advancing) element to minimize vulnerability while simultaneously maximizing the effectiveness of the traveling unit.

Reinforce. To strengthen by the addition of personnel and military equipment.

Reinforcing. A tactical mission in which one artillery unit augments the fires of another artillery unit.

Supplementary Position. That location which provides the best means of accomplishing a task that cannot be accomplished from the primary or alternate position.

Terrain Flying. The tactic of employing aircraft in such a manner as to utilize the terrain, vegetation, and manmade objects to enhance survivability by degrading the enemy's ability to visually, optically, or electronically detect or locate the aircraft. This tactic involves a constant awareness of the capabilities and position of the enemy weapons and

detection means in relation to available masking terrain features and flight routes. Terrain flying of necessity involves flight close to the earth's surface and includes the tactical application of low level, contour, and nap-of-the-earth flight techniques as appropriate to the enemy's capability to acquire, track, and engage the aircraft.

Visionics. The application of optic, electro-optic devices and associated designators and ranging equipment.

FM 90-1

30 SEPTEMBER 1976

By Order of the Secretary of the Army:

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The Adjutant General

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Table VI. Aircraft Effectiveness

OPERATIONS	EFFECTIVENESS				AIRCRAFT CAPABILITIES												AIRCRAFT LIMITING FACTORS											
TYPES OF OPERATIONS FOR ARMY AIRCRAFT PERFORMING MISSIONS IN COMBINED ARMS OPERATIONS	DEGREE OF AIRCRAFT EFFECTIVENESS				RAPID MOBILITY	HIGH VOLUMES OF FIRE POWER	TANK KILLING AT STANDOFF RANGES	RECONNAISSANCE AND INTELLIGENCE	SECURITY	RESPONSIVE LOGISTICAL SUPPORT	ECONOMY OF FORCE	AIR DEFENSE SUPPRESSION	COMMAND AND CONTROL	DOMINATE, DENY, AND COVER KEY TERRAIN	BYPASS RESTRICTIVE TERRAIN & OBSTACLES	FIRE ADJUSTMENT	MEDICAL EVACUATION	REQUIRES TAC AIR AND AIR DEFENSE SUPPRESSION	RESTRICTED COMMO BECAUSE OF TERRAIN FLIGHT AND ENEMY EW	ADVERSE WEATHER	LACK OF NIGHT VISION DEVICES	LACK OF ENDURANCE	AIRCRAFT LOAD RESTRICTIONS	VULNERABILITY OF FORWARD ELEMENTS TO ARTILLERY	HIGH VOLUMES OF LOGISTICS SUPPORT	LACKS AIRCRAFT SURVIVABILITY EQUIPMENT	LACKS TARGET ACQUISITION AND	
	OPTIMUM EFFECTIVE	MARGINALLY EFFECTIVE	NOT EFFECTIVE																									
OFFENSE:																												
MOMENT TO CONTACT	X				3	3	3	3	3	3	3	2	3	3	3	3	3	1	0	0	0	0	1	1	0	0	0	
RECONNAISSANCE IN FORCE	X				3	3	3	3	3	3	3	2	3	3	3	3	3	1	0	0	0	0	1	1	0	0	0	
COORDINATED ATTACK		X			3	3	3	2	2	3	2	2	2	2	3	3	3	0	0	0	0	1	0	0	0	0	0	
EXPLOITATION	X				3	3	3	3	3	3	3	2	3	3	3	3	2	1	0	0	0	0	0	1	0	0	0	
PURSUIT	X				2	3	3	3	3	3	3	2	3	3	3	3	3	1	0	0	0	0	0	1	0	0	0	
NIGHT ATTACK			X		3	2	1	1	1	1	1	1	1	1	3	1	3	0	0	0	0	1	1	0	0	0	0	
INFILTRATION		X			3	3	3	2	2	2	3	2	2	3	3	3	3	0	0	1	0	0	0	1	0	0	0	
COVERING FORCE		X			3	3	3	3	3	3	3	2	3	3	3	3	3	0	0	0	0	0	0	1	0	0	0	
DEFENSE:																												
AREA DEFENSE		X			3	3	3	2	2	3	3	2	3	3	3	3	3	0	1	0	0	1	0	0	0	0	0	
MOBILE DEFENSE		X			3	3	3	3	3	3	3	2	3	3	3	3	3	0	1	0	0	1	0	1	0	0	0	
RETROGRADE:																												
WITHDRAWAL		X			3	3	3	3	2	3	3	2	3	3	3	3	3	1	1	0	1	2	1	1	1	0	0	
DELAY		X			3	3	3	3	2	3	3	2	3	3	3	3	3	0	0	0	0	1	0	1	0	0	0	
RETIREMENT		X			3	3	3	3	3	3	3		3	3	3	3	3	2	2	1	2	2	1	2	1	2	2	
RELIEF OPERATIONS:																												
PASSAGE OF LINES		X			2	2	1	1	2	3		2	3	2	3	1	2	0	1	1	1	2	1	0	1	1	0	
SPECIAL OPERATIONS:																												
AMPHIBIOUS OPERATIONS		X			3	3	3	2	2	3	3	2	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	
LINK-UP OPERATIONS			X		3	3	3	2	2	3	3	2	3	3	3	3	3	0	0	0	0	0	0	1	0	0	0	
RAIDS – SPOILING ATTACKS		X			3	3	3	3	2	2	3	2	2	3	3	3	3	1	1	1	1	2	2	1	1	1	1	
DECEPTION, FEINTS, DEMONSTRATIONS AND RUSES		X			3	3	3	3	3	3	3	2	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	
AIR ASSAULT OPERATIONS		X			3	3	3	3	3	3	3	2	3	3	3	3	3	0	0	0	0	1	0	0	0	0	0	
COMBAT AT RIVERLINES		X			3	3	3	3	3	3	3	2	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	
COMBAT AGAINST FORTIFIED AREAS				X	3	3	3	1	1	1	1	1	1	1	3	1	1	2	2	1	1	1	1	2	1	2	2	
CIVIL DISTURBANCES/POPULACE CONTROL		X			3			3	3	3	3		3		3		3	1	1	1	0	1	1	1	1	1	1	
STABILITY OPERATIONS		X			3	3	3	3	3	3	3	2	3	3	3	3	3	0	1	0	0	1	1	1	0	0	0	
RIVERLINE OPERATIONS		X			3	3		3	3	3	3	2	3	3	3	3	3	1	1	0	0	1	1	1	1	1	1	
UNCONVENTIONAL WARFARE		X			3	3	3	3	3	2	3	2	3	3	3	3	3	1	1	1	0	1	0	2	1	0	1	
ANTI-AIRBORNE OPERATIONS		X			3	3	3	3	3	3	3	2	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	
HELICOPTER VERSUS ARMOR		X			3	3	3	3	3	3	3	2	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	
HELICOPTER VERSUS INFANTRY		X			3	3		3	3	3	3	2	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	
HELICOPTER VERSUS MODEST AIR DEFENSE		X			3	3		3	3	2	3	2	3	3	3	3	2	0	0	0	0	0	0	0	0	0	0	
ATTACK OF BUILTUP AREAS			X		3	3	3	3	3	3	2	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	
OPERATIONS IN NBC ENVIRONMENT		X			3	3	3	3	3	3	3	2	3	3	3	3	2	1	1	0	1	0	1	0	0	0	0	
SEARCH AND RESCUE OPERATIONS		X			3	3	3	3	3		3	2	3	3	3	3	2	0	0	0	0	0	0	1	2	0	1	
PSYCHOLOGICAL OPERATIONS		X			3	3		3	3		3	2		3	3	3	2	1	1		1	1	1	2	1	1	1	

(1) AIRCRAFT CAPABILITIES

3 - OPTIMUM
2 - EFFECTIVE
1 - marginally effective
0 - NOT EFFECTIVE

(2) AIRCRAFT LIMITING FACTORS

0 - MAJOR
1 - MINOR
2 - NONE

Roles and Missions

Each member of the family of Army aviation units performs at least one of the five functions of land combat: firepower, mobility, intelligence, command and control, and combat service support. From his aviation unit assets, the ground commander inherits a considerable increase in his capability to carry out the missions demanded of him. However, many in the Army often have a tendency to view "Army Aviation" as a separate entity which causes considerable misunderstanding. Further confusion exists because Army aviation units of all types and sizes are integrated throughout the entire force structure of the Army. *Many of these units are equipped with identical aircraft with similar mission configurations. Yet, the unit roles and missions are widely diverse.*

To clarify these points it must be understood at the outset that Army aviation is not a branch of the Army but provides the combat and supporting arms as well as the Army at large with an aerial capability to augment well defined roles and missions based on requirements. In short, Army aviation units must be thought of and employed as a member of the combined arms team. Generally speaking then, aviation unit proponentcy rests with the arm and the unit serves. A brief guide for the organizational and doctrinal proponentcy of Army aviation units follows:

Armor:

- Air cavalry units
- Attack helicopter units
- Air cavalry combat brigade

Artillery:

- Artillery aviation elements

Infantry:

- Assault helicopter units

Transportation:

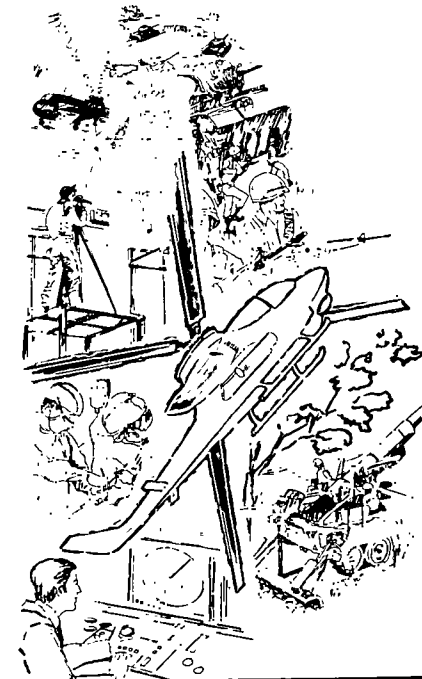
- Medium and heavy helicopter units
- Aircraft maintenance units and related systems

Intelligence and Army Security Agency:

- Military Intelligence aviation units and related systems

The United States Army Aviation Center:

- Air traffic control units and related systems (Additionally the Aviation Center coordinates the overall effort with all other proponent agencies for aviation doctrine, training, programs, policies, units, aircraft systems, and related equipment, to ensure responsiveness to the overall Army requirement.)



The discussion of unit roles and missions which follows does not encompass all Army aviation units and activities, but includes those which the combined arms commander could normally expect to employ.

Army Aviation on a Future Battlefield

To illustrate the broad spectrum of combat capabilities of Army aviation—both present and future—in a high threat environment, let us look at a battlefield scenario set against the background of fictitious countries that depicts the combined arms concept in action in a corps operation.

The action is intended to show how aviation functions as part of the combined arms team and how it benefits the ground-gaining arms. Each member of the Army aviation family accomplishes tasks you will recognize immediately as increasing the ground commander's capability to perform the five functions of land combat and increase:

- Firepower
- Mobility
 - Reconnaissance
 - Security
 - Command and Control
 - Logistics

In order for aviation to perform successfully in battle, each commander, aircrewmember, mechanic, air traffic controller — in fact, everyone associated with aviation — must be aware of the threat and the measures required to avoid, suppress or destroy forces and accomplish the mission. In these scenarios, you will note that countermeasures and techniques discussed in this chapter are put into practice. Aircraft will take maximum advantage of terrain flight and firepower available from all sources.

THE PAKLAND-EURLANDIA CONFLICT

On 14 August the Allied Forces were deployed along the border of the Eurlandian Republic. Intelligence sources indicated that Pakland forces would invade Eurlandia with the initial objective of destroying Allied Forces before they could be reinforced. When Eurlandia had fallen, Pakland would then opt for a political settlement which they believed would be accepted to end hostilities.

To achieve Pakland objectives, speed and maximum destruction of Allied Forces was the primary consideration. Pakland therefore planned to attack in summer to take advantage of the excellent trafficability afforded by the dry ground. In addition, the clear weather would allow maximum use of observed artillery fire, capitalizing on a five-to-one superiority in artillery tubes. Moreover, good weather would also allow extensive use of high-performance aircraft with which Pakland expected to maintain air superiority over the battlefield, and facilitate the use of aviation, airmobile and airborne forces which could be employed in friendly rear areas. Pakland 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.

The U.S. corps, alerted to the possible invasion, closed into its defensive position, 1800 hours, 14 August, with two divisions abreast, an armored division on the North, and a mechanized infantry division on the South. An armored cavalry regiment with attachments was deployed as the corps covering force with a separate mechanized infantry brigade in corps reserve (fig. 3-16).

Prior to forward deployment, the U.S. corps received attachment of an air cavalry combat brigade (ACCB). A highly flexible force, the ACCB could be task organized to accomplish a variety of missions as a part of the mobile reserve.

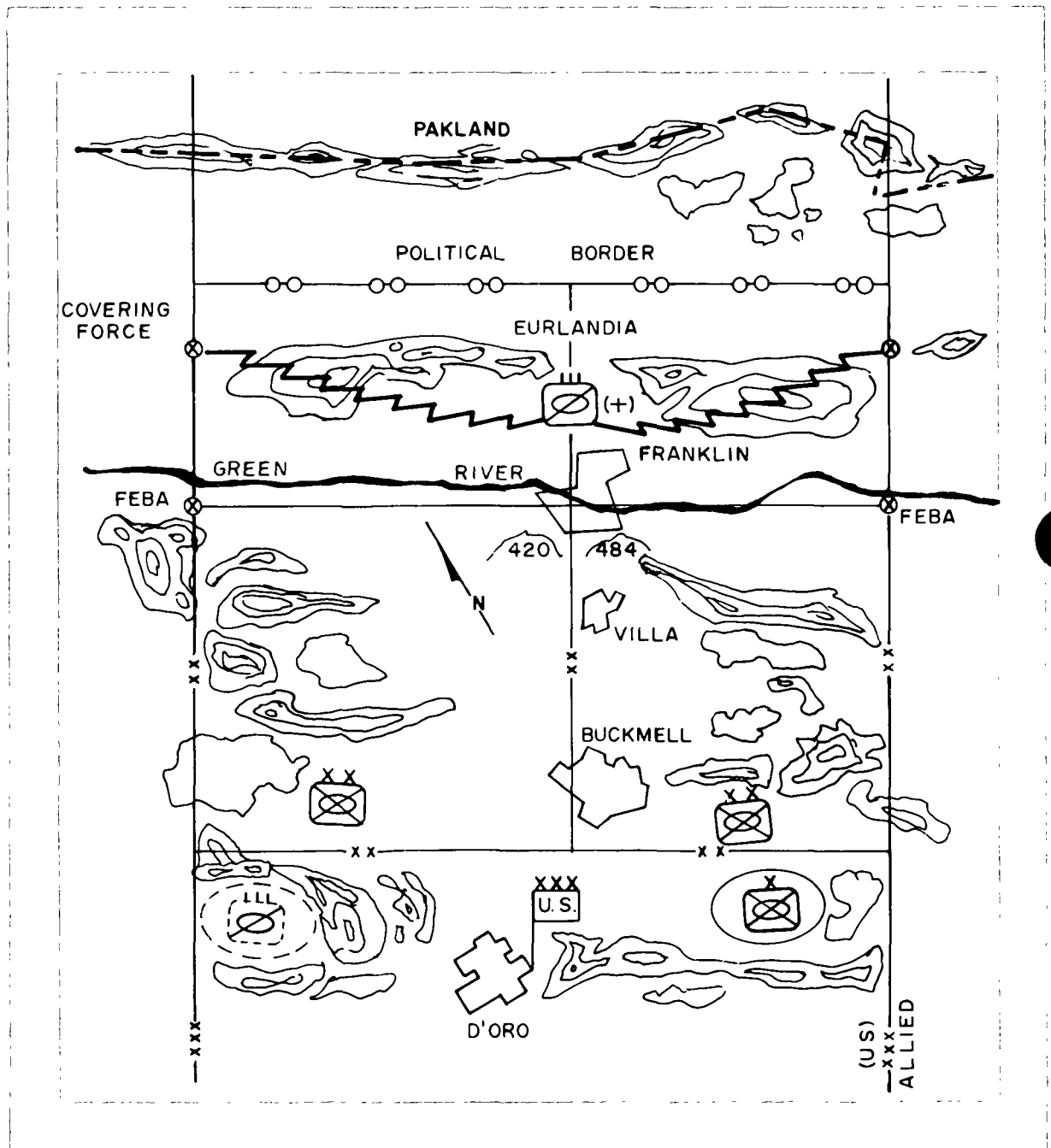


Figure 3-16. Corps Initial Distribution.

Pakland forward air defense elements were rapidly becoming adept at anticipating Cobra TOW firing positions. Artillery was also being used to keep helicopter elements off balance. The enemy was aware that even near-misses would flush helicopters from their concealed firing positions, making them prey for the air defense as they repositioned. However, U.S. counterbattery fire was becoming more effective. Towed enemy artillery afforded little crew protection and was slow to displace. Pakland artillery units were suffering excessive losses, and enemy artillery elements were becoming more conservative, to the gratitude of friendly helicopter forces who had to that point been considerably affected by artillery fire. Additionally, air cavalry elements had devised countermeasures that restricted the effectiveness of the ZSU-23-4. *These guns were easier to locate when operating in the radar mode because of the readily detectable energy they emit.* On the other hand the enemy realized that prolonged radar operation resulted in destruction. ZSU crews resorted to visual acquisition which diminished their effectiveness. This degradation in ZSU capability provided a sharp increase in Cobra TOW effectiveness that often allowed killing of two or more tanks from primary and alternate firing positions located fairly close together.

Also effective was the diversion of the enemy's attention by exposing a helicopter for brief periods of time at ranges greater than those of the ZSU. Enemy air defense gunners would become intent on targets they could see and would overlook lurking, well-concealed Cobras within range which could destroy the armored vehicles.

PASSAGE OF LINES

The covering force effected passage of lines at 0030 hours screened by overwatching air cavalry. As aviation elements passed through the forward division's general outpost, they were released from the control of the armored cavalry regiment and returned to preselected assembly areas to complete post combat checks, replace materiel and personnel, and prepare for subsequent tactical operations.

The covering force battle had lasted 18 hours. During this period the enemy had faced extremely tough resistance forcing him to commit his main attack early and reveal the locations of these

attacks to FEBA forces allowing them to adjust accordingly. Moreover the covering force had bought time for these adjustments to be made and had wrought significant destruction on the evading enemy forces. Equally important, however, was the fact that each participating element—both air and ground—was still a viable combat force ready for future commitment.

In summary it can be stated that the covering force role is one of the most difficult military missions to accomplish. *This is primarily because of the decentralized nature of the operation, which strains command and control communications to the maximum.* Timing is of overwhelming importance. If forces are moved too early the enemy will not commit his main attack, nor will maximum delay be effected; if too late, decisive engagement may have precluded the ability of the force to maneuver, and defeat in detail could be the end result. Many factors contributed to the overall success of the covering force just depicted.

Among the most significant of these are the following:

- **All participating elements thoroughly understood the capabilities and limitations of the other.**
- **Integrated previous training and rehearsal for this particular mission was accomplished.**
- **Junior commanders and leaders were thoroughly trained, a must for decentralized operations.**
- **Meticulous tactical and logistical planning had been accomplished.**
- **Air and ground elements were knowledgeable of the enemy's doctrine and capabilities which allowed relatively accurate predictions of his intentions.**
- **Individuals, crews, units, and commanders knew the capabilities of their weapons, systems, and equipment. This technical proficiency allowed each element to be employed with maximum efficiency.**
- **The covering force capitalized on the mistakes and enemy weaknesses; but just as importantly, learned from their own mistakes and made rapid corrective adjustments.**
- **Mobility and quick response of the aviation elements were utilized to help tie together the decentralized operation.**

Critical Situation II

The Defense of a River Line

Combined Arms Aviation Tasks

- Delivery of massed firepower on enemy columns
- Security for river crossing
- Assistance in passage of lines
- Employ minefields
- Overwatching fire for ground units
- Airlift of rifle squads and TOW teams
- Resupply of rearming points
- Resupply of artillery positions
- Counter air assault operations
- Rear area security
- Flank security
- Cover dead space
- Command and control
- Use of illumination
- Medical evacuation
- Displacement of FARP's
- Spoiling attack
- Gathering and decentralization of information/intelligence

The general outpost of the forward divisions assisted the covering force in its passage through the FEBA. The Pakland attack had lost considerable momentum. The covering force elements had destroyed large quantities of tanks, armored vehicles, and other materiel. In some instances, enemy losses were so great that unit replacement of attacking elements was required prior to continuing the attack on FEBA forces which were defending along the Green River.

The U.S. corps commander's philosophy was paying off. Plans were designed to subject the enemy to ever-increasing, uninterrupted attrition as he advanced, while keeping friendly losses to a minimum. U.S. commanders were very much aware of the fact that they had a lower threshold of pain than the enemy, and could not afford to suffer comparable losses, because replacements for equipment and personnel were not readily available. They realized for the time being that the battle could not become clearly decisive; for the present, at least, the mobile defense and delay must characterize the nature of the corps

Survival Measures

- Threat awareness
- Familiarity with terrain
- Premission planning
- Rehearsals of counterattack plans
- Detailed coordination and planning of flight routes, altitudes, and IFF
- Application of overwatch tactics
- Use of multiple preselected firing positions
- Artillery suppression
- Terrain flight
- Detection avoidance and evasive action
- Electronic warfare and IR suppression
- Night flight
- Use of night sights
- Use of chaff, smoke, and illumination
- Evasive maneuvers
- Communications and light discipline
- Diversionary tactics
- Use of wire communications
- Air-to-air defensive tactics
- Anti-aircraft fire
- Camouflage and dispersion

operations. Fortunately, at this point the terrain favored this course of action.

As for aggressor force commanders, this would be their first opportunity to destroy major U.S. elements. They were confident they could force decisive combat, believing the actions of the opposing forces to be accurately predictable. Their plan basically required concentration on U.S. forces expected to occupy key terrain positions, attacking these in force, bypassing, isolating, and then defeating them one at a time. On the previous day, aggressor aerial reconnaissance had photographed the defenses being prepared which indicated the U.S. corps elements were establishing a relatively weak defense in place.

THE DEFENSE

In reality, however, these fortifications were part of a well-coordinated deception plan. Actual corps defense plans called for maximum destruction of enemy forces on their approach to and crossing the Green River. At this time of year, the river presented little in the way of an obstacle as the marshy approaches were dry and trafficability was good. The river itself was low and bridging would be relatively simple. However, the enemy crossing would be costly in terms of casualties and time. Both near and far banks had been extensively mined and were covered by fire. *The corps defense was planned in depth, using mobile forces, strong points, and reverse slope defense designed to canalize, turn, block, and eject the enemy as he exhausted his strength against lightly occupied objective areas.* The terrain in this region would allow success if actions were well timed and aggressively executed. Surprise, even in the defense, can be a major factor contributing to success. Generally, high ground in the area was heavily wooded, largely limiting movement to dismounted infantry. Areas in which combat vehicles could be maneuvered were scarce and tanks would be primarily restricted to roads or, at best, limited frontages in open areas of deep valleys and cross compartments. Additionally, many streams could not be forded and would require bridging.

The corps commander had placed an attack helicopter battalion (separate) under the operational control of the mechanized infantry division. This battalion was deployed forward

with the division to defend along the Green River and participate in subsequent delay operations. The division was defending with three brigades abreast—the 1st in the North, the 2d in the center, and the 3d in the South (fig. 3-18). One attack helicopter company reinforced each brigade. The divisional armored cavalry squadron was initially deployed with the covering force. One platoon from each attack company was under the operational control of the squadron until the covering force was withdrawn. These attack elements and the air cavalry troop had covered the withdrawal of the general outpost's ground elements across the Green River and had protected engineers destroying the river bridges. Plans called for the armored cavalry squadron to screen the division right flank. The air cavalry troop with an assault helicopter company and one rifle company was given a rear area security mission under division control. The division commander was concerned about the enemy's capability to employ airmobile or airborne forces and to complicate matters, some irregular forces were known to be operating in the divisional and corps rear areas.

At 1720 hours, enemy artillery began firing extensive preparations on what they suspected to be U.S. forces' defensive positions, delivering smoke as well as high explosive rounds on the near side of the river. Friendly artillery provided counterbattery fire on targets provided by radar and unattended ground sensors. The prevailing westerly winds aided in concealing enemy activity on their side of the river, and artillery-delivered smoke was being augmented by smoke dispensers and the burning city of Franklin. For the most part, the battle thus far had been conducted by artillery and mortar exchanges. Occasionally, where smoke was less dense, a Cobra or tank would get a quick shot at an armored vehicle attempting to clear mines or at bridging equipment working on the far side. Cobra elements across the front were getting a considerable number of kills because *they could easily move to high ground positions where enemy artillery was not impacting and could fire down through the smoke*, while ground elements were forced to fire horizontally through it.

Cobras were employed on the basis of the principle of mass across the entire divisional front. However, mass has a somewhat different connotation when applied to armed helicopters,

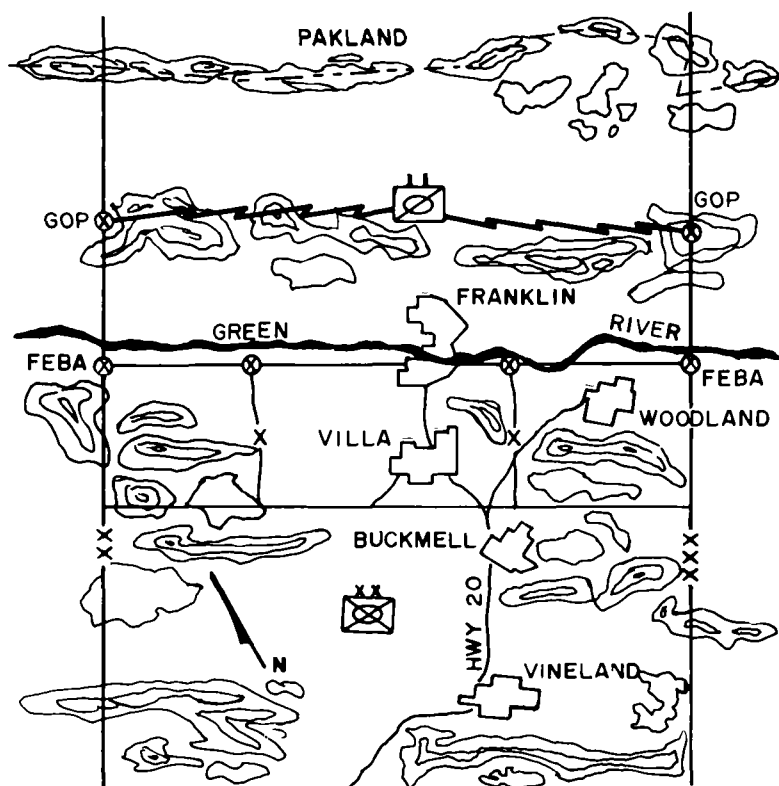


Figure 3-18. Division Disposition.

having implications with regard to *helicopter staying power*. For example, continuous attack helicopter support is desirable, but helicopters have a limited time in which they can remain on station because of their fuel state and the rate at which they expend ordnance. In many instances, a degree of overlap as elements relieve each other may be desirable because overlaps allow time for situation briefings and lend continuity to operations. But, if a given number of scouts and attack helicopters can provide adequate coverage of a given front, it may require two or three times that number to provide continuous coverage. These and other factors such as ordnance expenditure rates and the time and distance required to refuel and rearm must be considered.

For a closer look at an attack helicopter company in the defense, we will examine the actions of B company of the attack helicopter

battalion which reinforced the 2d brigade in the center of the mechanized infantry division sector. The 2d brigade was defending in sector with a two-battalion task force forward and a tank heavy task force in reserve.

The liaison operations officer of the attack helicopter company had been with the brigade headquarters since reinforced alert to coordinate his units' activities. Forward area refueling and rearming points had been emplaced at predesignated locations in the brigade rear areas. Two additional forward area refueling and rearming points had been placed well forward just to the rear of the forward battalions to support the 3d platoon which would initially fight as part of the covering force and, upon withdrawal, would assume FEBA defense responsibilities and be

the chips will fall where they may. When the helicopter is unceremoniously eliminated from the battleplay, an instant and important teaching point is brought home to the aircrew. Training is the place to make these mistakes, for in combat the learning process would have been brought to

an abrupt, lamentable end. These laser systems will also be mounted on cargo, utility and scout aircraft to provide to these crews the same capability to determine the success or failure of their tactics.

Cargo Operations

Medium and heavy lift companies have to be able to conduct their support roles under the same conditions as other aviation elements do. Ingenuity and close coordination with the ground elements will result in responsive support and a minimum amount of wasted blade time. Internal loads carried must be loaded and off-loaded rapidly. Responsive logistical support can only be

provided by well-trained riggers and ground support personnel. FARRP displacement must be instantaneous and conceivably to a multitude of locations during the day. Aircraft and equipment recoveries, more than in the past, must have extensive gunship and artillery coordination that only can be accomplished by teamwork training.

Communications and Electronic Warfare

Communications discipline and an awareness of electronic warfare capabilities are other factors which must be integrated into the tactical training plan. Unit personnel must be able to degrade the enemy's effectiveness to jam, monitor, or neutralize friendly electronic communications and

noncommunicative signals. This threat makes minimum communications, both secure and non-secure, and preferably radio silence a requisite for aviation operations. Abuse of the communications-electronics operating instructions (CE01) by aviation units cannot be tolerated.

Maintenance Training

Just as the high threat environment places a high demand on aircrew training, it places unique demands on our logistics policies and systems. At unit level, a high rate of aircraft availability particularly in tactical units which will operate around-the-clock in forward areas, is demanded. Because of this, unit aircraft maintenance contact teams will be located well forward to identify problems and perform rapid field fixes such as modular replacement, while longer term maintenance repairs are performed with the field trains elements deep in the rear operations area.

In addition, requirements for mobile contact teams will clearly increase. Smooth coordination between all maintenance activities can only develop through regularly scheduled field practice.

Key unit personnel must be cross-trained in related skills to maintain a high state of operational readiness. Cross-training can be readily supported by closely supervised on-the-job training, nonresident instruction, and Training Extension Courses (TEC).

Unit Training

Unit training accomplishes various important functions. It continues refinement of individual skills, trains unit leaders, induces the element of team coordination and contributes to tactical realism; however, before he launches a training program, the commander must determine the present capability of his unit.

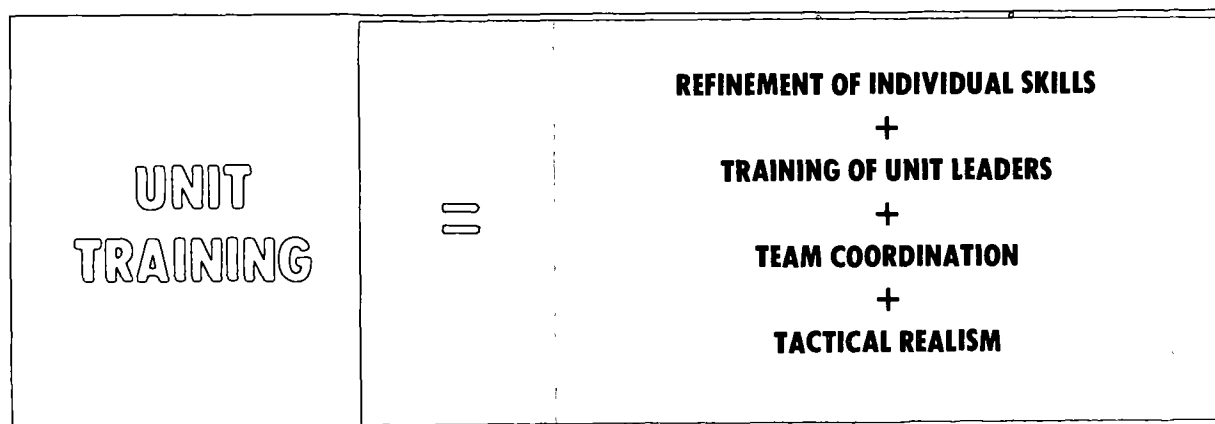
Basically, units must constantly practice the missions they would actually fly in combat. They must make every effort to coordinate these missions with the training programs of supported ground units, allowing each to become thoroughly familiar with the other's requirements, thus establishing a smooth working relationship.

Irrespective of the type of unit or its mission, the one thing all units have in common is that they are designed to operate in a combat environment. All too often aviation units have a tendency to remain on their airfields, and training constraints resulting from procedures and administrative requirements prevail. The entire unit should participate regularly in tactical field training. It allows the commander to evaluate the capabilities of the unit and its contribution to the combined arms effort. For example, loading plans, camouflage, concealment, light and communications discipline, and the hundreds of other important items can be tested and deficiencies which would not be apparent in garrison identified. A unit must become cohesive with each element doing its part to make the entire system function properly. Field training

allows for validation of the unit tactical Standing Operating Procedures, which require periodic revision and the widest dissemination to effectively accomplish the task for which they were designed.

Aviation units must spend a considerable amount of time conducting night and adverse weather training. The benefits of this training are twofold. First, it increases aviation staying power and, secondly, night and adverse weather operations reduce somewhat the threat posed by previously discussed air defense systems. Units with formation flying requirements such as assault and air cavalry elements will have unique training tasks. These skills must be developed for day and night operations in the terrain flying mode. Attack helicopter teamwork must be developed, and platoons and companies must learn to effectively and rapidly mass their fires.

A function which tends to be forgotten because of the dynamic new roles of our aviation units is the capability to conduct aeromedical evacuation. It must be remembered that emergency medical evacuation is a secondary role even in combat aviation units. Casualties will occur in forward areas where tactical aviation units operate on a continuous basis. Additionally, we can expect to have casualties among our own aircrews. For these reasons all personnel must be proficient in first aid, another often forgotten item in a unit's training plan that will become vital when the mission cannot stop for casualties.



Conclusions

The preceding chapters have shown that thoroughly trained aviators and properly employed Army aircraft can not only survive but be highly successful on the high threat battlefield. The principles, techniques, concepts, and procedures — countermeasures, in short — have been discussed that can be used for successful around-the-clock employment. These are briefly summarized as follows:

1st

Initially, along with a broad training base, a current accurate picture of the enemy air defense and electronic warfare threat is required. Each commander as well as all aircrewmen must understand this threat in order to exploit any weaknesses in the enemy's systems. Obviously, the enemy air defense weapons including his aircraft must be suppressed. Inherent in air defense suppression is the proper employment, as part of the combined arms effort, of our own air defense weapons against enemy aircraft.

2nd

The capabilities of the other services must be fully utilized both to suppress the enemy's air defense, electronic warfare, and artillery and to obtain local air superiority or parity for air assault operations.

3rd

Maximum use of countermeasures such as chaff, smoke, and ECM must be made to jam enemy radars, defeat his optical target acquisition devices, disrupt his communications, and deny him access to friendly communications.

4th

Use of terrain flying techniques and tactical instrument flight will be normal procedures for Army aircraft operating in the forward battle area even extending back into the corps area. Moreover, these techniques must be employed in adverse weather conditions to provide aviation the staying power needed in combined arms operations.

5th

The commander will want to take maximum advantage of the intelligence information available on enemy dispositions in order to select the best possible primary and alternate routes to and from the target or objective areas beyond the FEBA. These routes should be as free of enemy air defense weapons and other flight hazards, both manmade and natural, as possible; and should allow aircrewmen to take advantage of all available masking provided by terrain features.

6th

In the employment of Army aircraft, night operations must be given maximum consideration since the cover of darkness severely restricts the enemy's ability to visually observe aircraft movement.

Throughout this manual much emphasis has been placed on the employment of new equipment which at this time is not in the Army inventory. The illustration (fig. 5-1) below emphasizes the need to develop doctrine and begin unit training for use of new equipment well in advance of actual deployment to preclude needless loss of valuable time.

If the helicopter is to survive, it must be flown at terrain flight altitudes; to fly higher would invite destruction by sophisticated air defenses. We know now that this is the technique we must use. However, to fire present weapons systems from terrain flying altitudes results in relatively inaccurate fire on targets. This inadequacy will be resolved with the introduction into the system of the helicopter armed with the new antitank wire-guided missile. Knowing that this, and other new systems, will soon be in the inventory, demands

that our training and doctrine be geared for its arrival. However, this does not reduce or restrict training with the equipment presently in the hands of field units.

While training for or operating against the threat, we may discover other countermeasures or ways of improving equipment utilization that should be used by both the planners and commanders and their aircrewmembers. If the user is to employ Army aircraft successfully in battle, these survival techniques must, through standardization, become second nature to us and form an integral part of all training and planning. The old adage of "know your men, know your equipment, and know the enemy," has never been more applicable than it is to today's commander as he seeks to properly employ and utilize the valuable assets provided by Army aviation in the high threat environment.

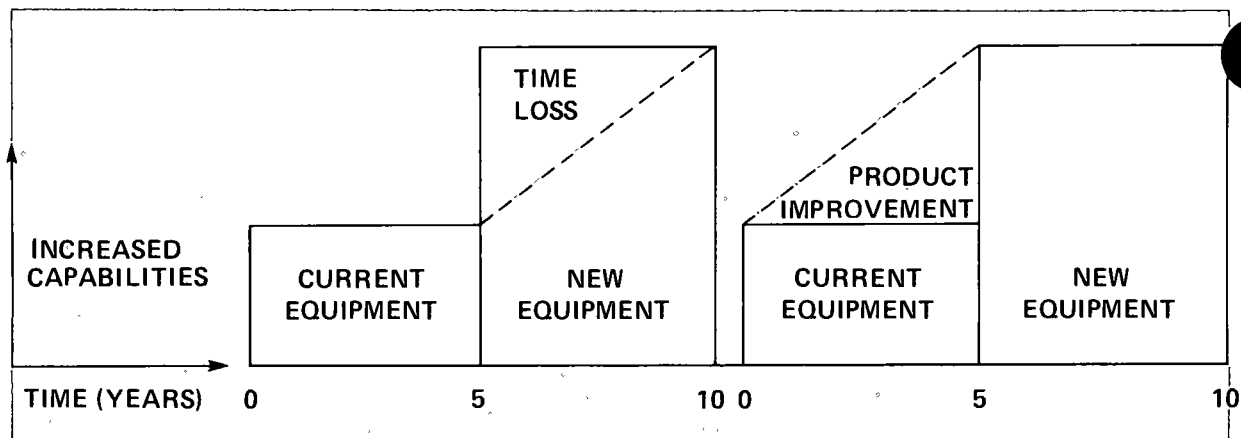


Figure 5-1. Develop Doctrine and Train in Advance to Preclude Needless Loss of Time.

Glossary

Air Assault. Ground combat forces utilizing the firepower, mobility, and flexibility of aerial vehicles to close with and destroy enemy forces.

Airmobile Operations. Operations in which combat forces and their equipment move about the battlefield in air vehicles under the control of a ground force commander to engage in ground combat.

Air movement. Air transport of units, personnel, supplies and equipment, including airdrops and air landings and covering both tactical and administrative movements.

Air Observer. An individual whose primary mission is to observe or take photographs from an aircraft in order to adjust artillery fire or obtain military information.

Aircraft Survivability. The survivability of an aircraft is its capability to withstand enemy actions, material deterioration or the effects of natural phenomena which singly or collectively result in the loss of its capability to perform the mission(s) for which it was designed.

Air Defense Artillery. Weapons and equipment for actively combating air targets from the ground. Weapons are classified as —

Light 20-57mm
Medium 58-99mm
Heavy 100mm or greater

Air Reconnaissance. The acquisition of intelligence information employing aerial vehicles in visual observation or the use of sensory devices.

All Available. A command or request to obtain the fire of all artillery able to deliver effective fire on a given target.

Alternate Position. The position given to a weapon, unit, or individual to be occupied when the primary position becomes untenable or unsuitable for carrying out its task. The alternate position is so located that the weapon can carry out its original task.

Approach March. Advance of a combat unit when direct contact with the enemy is imminent. Troops are fully or partially deployed. The approach march ends when ground contact with the enemy is made or when the attack position is occupied.

Armed Reconnaissance. An offensive mission conducted to search for and attack targets of opportunity in a designated area or along designated routes.

Army Aviation Units. Personnel, aircraft and allied aircraft equipment organically assigned to Army organizations by appropriate authorization tables.

Assault Aircraft. Powered aircraft including helicopters, which move assault troops and cargo into an objective area, and which provide for their resupply.

Avionics. The application of electronics to aviation and astronautics. Can be applied to voice communications, navigational systems and their associated instrumentation and electronics.

Barrier. A coordinated series of obstacles designed or employed to analyze, direct, restrict, delay, or stop the movement of an opposing force, and to impose additional losses in personnel, time, and equipment on the opposing force.

Barrier Plan. That part of an operation plan or order which is concerned with the employment of obstacles.

Battlefield Recovery. Removal of disabled or abandoned materiel, either enemy or friendly from the battlefield and its movement to a recovery collecting point or to a maintenance or supply establishment.

Close Air Support. Air attacks against hostile targets which are in close proximity to friendly forces and require detailed integration of each air mission with fire and movement of those forces.

Contingency Plan. A plan for major contingencies which can reasonably be anticipated in the principal geographic subareas of the command.

Coordinated Attack. A carefully planned and executed offensive action in which various elements of the command are employed in such a manner as to utilize their powers to the greatest advantage to the command as a whole.

Counter Attack. Attack by a part or all of a defending force against an attacking enemy force, for such specific purposes as regaining ground lost or cutting off or destroying enemy advance units, and with the general objective of denying to the enemy the attainment of his purpose in attacking. In sustained defensive operations, it is undertaken to restore the battle position and is directed toward limited objectives.

Counterbattery Fire. Fire delivered for the purpose of destroying or neutralizing indirect fire weapons systems.

Covering Force. A force operating apart from the main force for the purpose of intercepting, engaging, delaying, disorganizing, or deceiving the enemy before he can attack the force covered. Any body or detachment of troops which provides security for the larger force by observation, reconnaissance, attack, or defense, or by any combination of these methods.

Defense in Place. System of defense based upon firm resistance without retreat, as opposed to delaying action or in successive positions.

Delaying Action. Type of retrograde operation in which space is traded for time, and maximum punishment is inflicted on the enemy, without becoming decisively engaged.

Diversionsary Attack. An attack wherein a force attacks, or threatens to attack, a target other than the main target for the purpose of drawing enemy defenses away from the main effort.

Fire Support Coordination. The planning and executing of fire so that targets are adequately covered by a suitable weapon or groups of weapons.

Forward Air Controller. An officer (aviator/pilot) member of the tactical air control party who, from a forward ground or airborne position, controls aircraft engaged in close air support of ground troops.

Forward Area Refueling and Rearming Point (FARRP). A forward area site established for the purpose of refueling and rearming aircraft. Mobile equipment is used allowing transport by air or ground means.

High Threat Environment. The high threat environment is an enemy combat posture wherein modern, sophisticated weapons and techniques create a highly lethal situation with the intention of establishing control over territory and airspace contiguous to that territory. Such a posture could include armor, field and antiaircraft artillery, surface-to-air missiles and tactical fighters which would be directed by radar, infrared, optical, electro-optical and visual means and might be supplemented by electronic warfare methods to include jamming and deception.

Mobile Defense. Defense of an area or position in which maneuver is used with organization of fire and utilization of terrain to seize the initiative from the enemy.

Movement to Contact. A ground movement which is conducted in a theater of operations preliminary to combat to place troops in position to close with the enemy. Movement to contact is usually conducted in the following three phases: (a) contact remote; (b) contact improbable; (c) contact imminent.

Nap-of-the-Earth. Flight as close to the earth's surface as vegetation or obstacles will permit, while generally following the contours of the earth. Airspeed and altitude are varied as influenced by the terrain, weather, and enemy situation. The pilot preplans a broad corridor of operation based on known terrain features which has a longitudinal axis pointing toward his objective. In flight, the pilot uses a weaving and

devious route within his preplanned corridor while remaining oriented along his general axis of movement in order to take maximum advantage of the cover and concealment afforded by terrain, vegetation and manmade features. By gaining maximum cover and concealment from enemy detection, observation, and firepower, nap-of-the-earth flight exploits surprise and allows for evasive action.

Objective. An end in view to be attained by the employment of military force.

Observed Fire. Fire for which points of impact or burst can be seen by an observer. The fire can be controlled and adjusted on the basis of observation.

Overwatch. A tactical posture utilized by armor, mechanized, and aviation units when moving to contact the enemy. The rear element of the moving unit overwatches the lead element and is prepared to support by fire. Two variations of the overwatch tactical posture are traveling overwatch and bounding overwatch. Traveling overwatch is utilized when enemy contact is possible. Both the rear overwatching element and the forward element are moving. Bounding overwatch is used when enemy contact is imminent. This is the slowest method of movement because the rear element overwatches, then alternates movement by bounds with the forward element. The purpose of the overwatching element is to deliver suppressive fire in support of the forward (advancing) element to minimize vulnerability while

simultaneously maximizing the effectiveness of the traveling unit.

Reinforce. To strengthen by the addition of personnel and military equipment.

Reinforcing. A tactical mission in which one artillery unit augments the fires of another artillery unit.

Supplementary Position. That location which provides the best means of accomplishing a task that cannot be accomplished from the primary or alternate position.

Terrain Flying. The tactic of employing aircraft in such a manner as to utilize the terrain vegetation, and manmade objects to enhance survivability by degrading the enemy's ability to visually, optically, or electronically detect or locate the aircraft. This tactic involves a constant awareness of the capabilities and position of the enemy weapons and detection means in relation to available masking terrain features and flight routes. Terrain flying of necessity involves flight close to the earth's surface and includes the tactical application of low level, contour, and nap-of-the-earth flight techniques as appropriate to the enemy's capability to acquire, track, and engage the aircraft.

Visionics. The application of optic, electro-optic devices and associated designators and ranging equipment.

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Reference

RESCINDED Per DA Circular

FM 90-1
C1

CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 20 May 1977

310-81-73
July 1981

Employment of Army Aviation Units in a High Threat Environment

FM 90-1, 30 September 1976, is changed as follows:

1. Remove old pages and insert new pages as indicated below.

Remove pages

3-9 & 3-10

3-57 & 3-58

3-63 & 3-64

3-65 & 3-66

4-5 & 4-6

4-7 & 4-8

5-1 & 5-2

Glossary 1 & 2

Glossary 3

Insert pages

3-9 & 3-10

3-57 & 3-58

3-63 & 3-64

3-65 & 3-66

4-5 & 4-6

4-7 & 4-8

5-1 & 5-2

Glossary 1 & 2

Glossary 3 & 4

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

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