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FM 1–100, 21 November 1966, is changed as follows:

Page 25. Chapter 8 is superseded as follows:

CHAPTER 8

DOCTRINE FOR EMPLOYMENT OF THE ARMED HELICOPTER

Section I. INTRODUCTION

44. General

Armed army helicopters provide a means of supplementing and extending the fire support capabilities available to the ground commander. They are not intended to substitute for ground-based fire or close air support. They can provide direct fire support to ground operations by performing reconnaissance by fire, by attacking enemy forces during airmobile or security operations, and by providing organic, highly mobile direct fire support. Direct fire support can be delivered from armed helicopters for self-protection, for protection of ground convoys or helicopters endangered by hostile ground fires, and for suppression of enemy fire in and around the landing zone during airmobile operations. Armed helicopters are capable of delivering both area fire and point fire. Area fire is utilized in suppression or neutralization of known or suspected hostile positions. Point target fire is directed against specific, identified points with the intent to destroy the target. FM 1–110 contains a detailed discussion of armed helicopter employment.

45. Capabilities of the Armed Helicopter

Armed helicopters can engage in offensive, defensive, reconnaissance, security, direct fire support, and special operations in support of the ground maneuver plan. The armed helicopter provides—

a. Responsive aerial firepower against personnel and materiel on area or point type targets.

b. Extension of the reconnaissance and security capabilities of ground units.

c. An additional means of target acquisition, target marking, target fixing, and the means for initiating requests for close air support by Air Force, Navy, and Marine attack aircraft. Armed helicopters can be used to augment the striking force and to evaluate strike effects subsequent to the attack.

d. Escort of other helicopters.

e. Escort or overhead cover for ground convoys.

46. Fundamentals of Employment

a. General. Armed helicopter units support infantry and armored units by responsive delivery of aerial firepower where it is needed. Command relationships must be established prior to committing the armed helicopter force. The commander of an armed helicopter unit, understanding the tactics and employment of each type ground unit and familiar with the plan of action of the ground force, recommends the best utilization of his unit in support of this plan. Based on the final decision of the ground force commander, the helicopter unit commander then executes his portion of the plan. The nature of his integrated tasks requires boldness and aggressiveness in the execution of his plan.

b. Fire Team. The basic element is the fire team consisting of two armed helicopters. When circumstances require and resources permit, a heavy fire team consisting of three armed helicopters may be employed. Only under the most extenuating circumstances should a single armed helicopter be employed.

c. Surprise. Surprise is achieved by using the speed and maneuverability and firepower of the helicopter to aggressively attack the enemy at an unexpected time and from an unexpected direction. Well executed aerial movements at low level using concealment, speed, and deception are the key factors in providing the element of surprise.

d. Fire and Maneuver. Armed helicopters using a continuous harass-and-exploit technique can have a damaging psychological effect on the enemy and may prove as destructive to his morale as the loss of men and equipment from helicopter fire. Such engagements employ two common features of warfare—a *base of fire* and a *maneuvering force.* The base of fire is the element that will restrict the enemy's ability to maneuver during the engagement. The maneuvering force is the element that will attack and destroy the enemy by fire. Target characteristics and standoff distance necessary to avoid effective counterfire will determine the type armament needed by each of these helicopter elements for a given engagement. 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.

e. Mobility. The rapidity of armed helicopter unit movement over obstacles, the maneuver of helicopter firepower into position to destroy 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 in the objective area concurrent with the maneuver of ground combat elements. The inherent capability of the helicopter to overfly terrain obstacles permits the assignment of multiple tasks to helicopter units and also permits their rapid disengagement once committed. Therefore, the armed helicopter unit commander at every level should expect diversity of task and should be prepared with all plans and details necessary to overcome or avoid terrain obstacles and restrictions to movement in the combat area.

f. Flexibility. Mobile warfare dictates that combatants be capable of adapting their actions to rapidly changing situations on the battlefield. Armed helicopter units, because of their excellent means of communications, high degree of mobility, and variety of weapons, are ideally suited for operations in this environment. They are adaptable to rapid changes in attack formations and other engagement techniques during a single encounter with the enemy. It is imperative that an armed helicopter mission commander keep himself and his superiors well informed and be able to modify his plans to contribute to the success of the overall mission. Mission-type orders best permit flexible response to changing conditions and permit the armed helicopter mission commander to modify his plans as the situation dictates.

g. Coordination. The use of armed helicopters in combat operation is most effectively accomplished by aviation and ground units through closely knit teamwork that comes from constant association with each other at the lowest level. Armed helicopter unit commanders maintain contact with their own higher headquarters. Coordination is accomplished in such a manner as to prevent loss of time in performing the mission.

46.1. Factors Affecting Employment

a. General. Factors affecting employment of armed helicopters are mission, enemy, terrain and weather, and troops and equipment (METT). Commanders first consider each factor separately. They then weigh each factor in the light of the importance of the other factors pertaining to the specific mission. In many situations, the relative importance assigned to each factor of METT will determine which course of action will be selected. The armed helicopter unit and mission commanders consider all factors in relation to the unique equipment and mission capability of their unit.

b. Mission. The mission of an armed helicopter force falls within the mission assigned to higher headquarters. The mission, with its

stated and implied tasks, always will be the overriding consideration of the commander.

c. Enemy.

(1) *Available information.* All available information on the enemy location, strength, disposition, composition, and habitual employment is obtained prior to commitment of armed helicopter units. The collection of information is continued throughout the operation in order to furnish the armed helicopter force commander accurate and timely information for his continuing estimate of enemy capabilities and dispositions. Sources of enemy information include reports from units in contact; air observers and aerial photos; PW, refugees, and civilians; liaison with adjacent units; ground and air reconnaissance patrols; and intelligence provided by higher headquarters. Reconnaissance in force risks loss of surprise in the ensuing operation and must be coordinated with higher headquarters. For further information on combat intelligence, see FM 30–5 and FM 30–7.

(2) *Capabilities.* An armed helicopter unit will be of high priority as a target for enemy tactical air and ground forces. All forms of deception, cover, dispersion, concealment, and types of movement are important to survival of the helicopter. The enemy capability of employing airborne or air-mobile forces and of employing his firepower to counter the employment of armed helicopter units is of vital concern to the armed helicopter mission commander. Factors to be considered are—

(*a*) Number and type of weapons possessed by or available to the enemy, and location and disposition of these weapons and their possible fields of fire.

(*b*) Characteristics of enemy weapons; e.g., range, target acquisition means (visual or electronic), rate of fire, mobility, elevation limits, and relative effectiveness against aircraft.

(*c*) Vulnerability of enemy weapons to armed helicopter firepower.

d. Terrain and Weather. The terrain and weather are important factors in armed helicopter operations. The armed helicopter mission commander must determine his advantages from the terrain, and evaluate the advantages it affords the enemy. Conditions of relatively low visibility and ceiling are ideally suited as concealment for helicopter operations; however, high temperatures at high elevations will greatly inhibit the load carrying capability.

Section II. ARMED HELICOPTER ATTACK

46.2. General

Armed helicopter attacks augment the ground commander's capability to deliver selective, responsive, accurate, and discriminating fires on the ground objective. The primary objective of the armed helicopter attack is to deliver direct fire support to destroy or suppress the enemy through the concentrated delivery of aerial firepower against enemy machinegun emplacements, bunkers, tanks, personnel, and other targets that, when neutralized, will assist the ground commander in seizing his attack objective.

a. Suppressive Fires. Fire suppression does not place emphasis on inflicting high casualty rates or materiel losses on the enemy, but rather on rendering enemy combat power ineffective for a given period of time. Enemy use of weapons and countermeasures must be neutralized by suppressive fires. The movement of enemy forces to reposition combat power and thereby influence the action is minimized. Attacking helicopter elements, when delivering suppressive fire, prevent effective enemy fire and restrict enemy movement. Prior to conducting the fire suppression, a decision by the commander is made as to the type of weapons, amount of ammunition, warhead selection, method of attack, and engagement and disengagement ranges, tailoring each element to the mission.

b. Destructive Fires. Destructive fire re-

quires that a high casualty rate be inflicted upon enemy personnel and equipment. Normally, a destruction mission for armed helicopters will be related to a small area or to point targets. Destructive fires may be delivered in conjunction with suppressive fires; i.e., point targets such as fortified bunkers within an area to be suppressed may be designated for destruction. For example, tanks moving across an open area would make a lucrative target for helicopters armed with antitank missiles. Moving tanks can be acquired by dust or diesel fumes while, because of the noise, tank crews would have a difficult time hearing approaching helicopters. By using nap-of-the-earth techniques, helicopter crews have the elements of surprise and speed and can effectively engage any type armor formation. The implied task of poststrike analysis is best accomplished by the armed helicopter mission commander during the termination phase of an attack. If the target remains active, subsequent attacks will be initiated using all available resources to accomplish the mission. Planning considerations for delivering destruction fires are essentially the same as those for suppression missions; however, the weights applied to various factors will change.

46.3. Fundamentals of Attack

To accomplish direct fire support missions of suppression or destruction, the following fundamentals must be considered:

a. Surprise. Surprise, based on sound tactical planning, must be attained to achieve maximum results.

b. Speed. Attacks are conducted with maximum speed, determined effort, and concentrated violence.

c. Volume of Fire. An adequate volume of fire is maintained throughout the engagement by the attacking elements.

d. Timing. Precise timing of the attack and the disengagement is necessary to exploit mutual support of all attacking elements and to reduce the effect of enemy countermeasures.

e. Flexibility. The armed helicopter mission commander must be allowed the widest latitude of initiative in accordance with the principles of war. He must use all factors to his advantage, move decisively, and defeat the enemy.

f. Avoidance of Enemy Strength. To place the enemy at his greatest disadvantage, enemy areas of strength are avoided while his areas of weakness are exploited.

g. Combat Power. Available combat power is used to the maximum.

46.4. Methods of Attack

Armed helicopters may use running fire, hovering fire, or stationary fire to attack targets.

a. Running Fire. Running fire is delivered on a target while the helicopter is in forward flight. It can be delivered from any altitude, provided the slant range to the target is compatible with the maximum effective range of the weapon. Running fire employed through delivery from the nap-of-the-earth flight mode takes maximum advantage of available concealment. This mode provides fire which is highly effective against troops in the open, but the armed helicopter will be less effective in terrain offering cover or concealment to the enemy. Higher flight altitudes during attack will result in diving fire at short slant ranges, which also increases vulnerability of the attacking armed helicopter. If repeated attacks on a target are required, succeeding passes should be made from different directions to hamper enemy target acquisition and engagement of the attacking helicopters.

b. Hovering Fire. Hovering fire is delivered as the armed helicopter rises momentarily from a covered or concealed position. Available cover and concealment must be used during the approach and execution of the fire mission. Where terrain permits, the helicopter should be moved laterally between bursts of fire so that it does not appear to the enemy twice from the same position. Background for the helicopter should be chosen with care to avoid being silhouetted against the sky or light terrain. Fire teams will alternate their attacks in order to place continuous fire on the enemy position. The helicopter is extremely vulnerable when practically motionless over the ground. Firing from a hover does not significantly increase weapons accuracy. With certain weapons subsystems (e.g., the aerial rocket), a loss of accuracy causes fire from a hover to be impractical. Hovering fire should be used only when it is necessary to clear a

terrain mask, or to attack lightly defended areas for short durations or to avoid enemy antiaircraft fires in the vicinity. Loss of observation, mobility, flexibility, and maneuver must be thoroughly considered by all commanders prior to the employment of armed helicopters in a hovering attack.

c. Stationary Fire. Stationary fire is delivered with the armed helicopter in a static ground position. For some systems, this method provides excellent accuracy due to the elimination of normal dispersion errors caused by helicopter movement. However, stationary fire momentarily loses mobility and thus increases the vulnerability of the armed helicopter. Concealment, and well-planned exit routes are mandatory. The loss of mobility, observation, and flexibility must be carefully weighed by the commander when considering employment of stationary fire. Stationary firing of aircraft weapons is planned when armed helicopters are on the ground in laager areas. The armed helicopters are positioned to permit the use of their weapons for the laager area.

46.5. Attacks Against Lines of Communications

a. General. Armed helicopters may conduct preplanned attack missions against lines of communications in the forward portion of the enemy's combat zone. Typical targets are supply routes leading into the forward battle area, communications centers, and forward supply depots. Attacks also may be conducted against targets of opportunity such as moving vehicles and watercraft.

b. Planning the Mission.

(1) The mission must be planned to avoid known enemy troop concentrations, antiaircraft positions, and artillery.

(2) The mission commander must coordinate with friendly artillery to insure that his flight route does not interfere with preplanned artillery fire. If available, the artillery may fire smoke on critical points along the flight route to conceal the armed helicopter passage of those areas. In addition, high explosive concentrations may be placed on enemy positions along the proposed flight route.

c. Conducting the Attack. The attacking armed helicopters must execute their mission rapidly and violently and then withdraw. This technique engages the enemy by surprise before he can organize his forces and bring his combat power to bear on the attacking helicopters.

46.6. Raids

a. General. Armed helicopters performing a raid normally will have the mission of destroying or neutralizing a target by surprise attack, followed by rapid withdrawal from the target area. Normally, raid operations will be shallow in depth and may be compared to tank sweeps against selected targets. The helicopter raid force should accomplish its mission in a maximum of two runs on the target, preferably one on the way in and one on the way out, using an attack pattern that will result in maximum destruction in the minimum time period. The raid force should use a route of withdrawal which is different from the approach route to the target.

b. Planning the Raid. The armed helicopter mission commander should assign individual targets to fire teams. Normally, armed helicopter raid targets will be small. Time permitting, rehearsals should be run on similar terrain. The degree of mission success is based directly on the amount of surprise achieved. In order to achieve surprise at the moment of attack, the armed helicopter force must plan to—

(1) Avoid en route enemy positions.

(2) Employ frequent changes in direction of flight.

(3) Make maximum use of terrain and weather conditions.

(4) Request other armed helicopters to perform feints elsewhere in the battle area.

(5) Coordinate with the Air Force and artillery to suppress the enemy's observation capability and render on-call support.

c. Support of Airmobile Raid Forces. Armed helicopters may support an airmobile raid. Close coordination must be effected between the ground commander of the airmobile force and the supporting armed helicopter mission commander, to include coordination of voice radio and visual (smoke or cluster) signals

for lifting and shifting of helicopter fire. If the raid force is to be helicopter-lifted out of the area after the raid has been accomplished, the mission commander must insure that sufficient ammunition is held in reserve to protect the extraction of the force. Consideration should be given to coordination for artillery and Air Force suppression of enemy ground-to-air fire during the attack and the withdrawal from the area.

Section III. ARMED HELICOPTERS IN SUPPORT OF GROUND OPERATIONS

46.7. General

The armed helicopter contributes greatly to the success of ground combat operations through its ability to operate in the same environment as the ground force. The concept of using the helicopter in a direct fire support role visualizes its employment to supplement and extend the firepower available to the commander from ground-based weapons and from supporting Air Force or Navy elements.

46.8. Offensive Operations

a. General. Armed helicopters support the ground offensive by providing aerial firepower to increase the overall effectiveness of the ground attack mission.

b. Penetration. Armed helicopters support the ground offensive by attacking the enemy forces that are maneuvering into positions to counterattack the penetrating force. Detailed coordination with ground commanders must be made to insure that the helicopter force does not mistakenly identify friendly troops as enemy forces. This is most critical during conduct of the breakthrough; friendly forces are in close contact with the enemy and the line of contact is not easily distinguished.

c. Exploitation. Armed helicopters are well suited to the support of an exploitation. The mobility and firepower of armed helicopters will increase the speed of the ground forces exploitation. The armed helicopter can be employed to extend reconnaissance and security for the main force during the exploitation. The armed helicopter force may attack enemy troops attempting to escape an envelopment, and disrupt and disorganize enemy attempts to reinforce threatened units. The armed helicopter force may extend flank reconnaissance and security, permitting the ground force commander to pursue the exploitation with greater speed and boldness of action. The armed helicopter mission commander must make arrangements for refueling and rearming during the conduct of the exploitation. Airlift helicopters may be used to deliver ammunition and fuel forward on call, at a time and place selected by the armed helicopter mission commander in coordination with the ground force commander. Servicing areas and delivery times must be coordinated with both the ground commander and the airlift helicopter unit commander performing the resupply mission.

d. Counterattack. Armed helicopters supporting a counterattack provide the ground commander with aerial firepower that may be rapidly deployed against the flanks of the enemy offensive and against forces maneuvering to reinforce the main enemy attack. The armed helicopter mission commander must assist in the coordination of the tactical ground plan and the helicopter fire support plan, and insure that his fire teams know the locations of the friendly ground forces. When this information is known in advance, he will assign targets to fire teams. During conduct of the mission, the armed helicopter mission commander will issue appropriate fragmentary orders as targets of opportunity are sighted. After coordination with the ground commander, the armed helicopter mission commander will select rendezvous locations and known safe areas for emergency landings. These must be disseminated to the fire teams.

46.9. Defensive Operations

a. General. Armed helicopters may support infantry and armored forces engaged in defensive operations. Without augmentation, the armed helicopter force has a limited capability to perform defensive missions. Preparation for defensive operations requires the same detailed planning, coordination, and organization that is characteristic of offensive action.

b. Basic Defensive Considerations. In planning the support of the ground defense, the

armed helicopter mission commander must consider the following actions:

(1) *Coordination with the ground force commander.* Coordination is conducted with the ground force commander for assigned missions, priority of fire, and the most suitable location within the defensive area of the supported unit. Siting of armed helicopters is based on consideration of quick reaction time, communications capability, and the security of support installations. Since armed helicopter supporting fires normally are incorporated into the overall defense plan, the ground force commander must be notified when they cannot be provided or are terminated so that he may adjust for their absence.

(2) *Selection of type armament and ammunition.* The most probable target (armored or infantry) must be determined. Based on this, the most effective armament systems and type ammunition are selected.

46.10. Retrograde Operations

a. General. In delaying actions, such as those in support of retrograde movement, the armed helicopter is used for tasks requiring reconnaissance by fire, general reconnaissance, escort operations, and aerial fire support to cover the withdrawal or disengagement of forces. In support of retrograde operations, armed helicopters will be used to inflict maximum damage on the enemy forces through counterattacks, traps, and canalization of attacking forces.

b. Reconnaissance by Fire. Reconnaissance by fire is conducted to give early warning, and to delay, disorganize, and harass the enemy's advance elements. The armed helicopter reconnaissance force should be sufficient to provide attack strength, operating flexibility, and area coverage. In the fluid situation often encountered in retrograde operations, coordination with the ground force commander of the overall tactical plan and the areas, spaces, and routes to be reconnoitered by fire will be an important consideration.

c. Fire Support of Holding Forces. Special considerations associated with fire support to holding forces are—

(1) The fluid disposition of friendly forces must be known to the armed helicopter mission commander. Direct communications with the holding force is necessary. Fire support coordination channels may be used for this purpose.

(2) Fuel and ammunition for the armed helicopter force should be located in a relatively safe area to the rear of the holding force.

d. Escort of Airmobile Withdrawal of Covering Forces. The availability of armed helicopters provides the commander with a significant advance in techniques of conducting all types of retrograde operations or disengagements with the enemy, either as part of a withdrawal, in the conduct of a mobile defense, or in achieving separation distance for the employment of nuclear weapons. Ground forces in contact with the enemy are essentially holding the enemy by fire and maneuver. In order to withdraw them effectively it is necessary to provide a substitute fire and maneuver means. Armed helicopters are well suited to this task. Initially, the force to be withdrawn is provided with all available artillery and close air support. Transport helicopters, escorted by armed helicopters, move to the rear of the forces to be withdrawn. A portion of the armed helicopters participates in bringing fires on the enemy while others secure the landing zone (LZ). On prearranged signals the ground force withdraws to the LZ as the intensity of aerial fire support increases. Plans should be made for the shifting of artillery and close air support fires to protect the LZ from envelopment by the enemy force. Upon extraction of the ground force, the armed helicopter force breaks contact. Artillery and close air support fires are intensified to minimize enemy interference with the movement of the airlift helicopters.

46.11. Airborne Operations

a. General. Armed helicopters may support the conduct of airborne operations. During the assault and organization phases, the armed helicopters will provide suppressive and antitank fire to secure the airhead from ground

attack. After the airhead has been established, the helicopter may be assigned the mission of extending reconnaissance and security for the ground force. For further details on airborne operations, see FM 7–11, FM 7–20, FM 57–10, and FM 57–35.

b. Planning Considerations. A primary consideration is the deployment of armed helicopters to the airhead area during the air movement phase.

(1) If the airborne operation is to be conducted within the fuel range of the armed helicopters (including the use of a ferry tank), the armed helicopter mission commander should consider flying his helicopters to the airhead to provide fire support to the parachute assault echelon. The task force commander should plan the arrival of his armed helicopter force in the airhead area in sufficient time prior to the parachute assault to suppress the drop zone; however, the armed helicopters must not conflict with the delivery of preparatory fires by artillery or tactical air. The mission commander should also plan the arrival of his armed helicopter force immediately subsequent to the termination of the preparatory fires in order to use these fires to cover his approach. The armed helicopter force initially will provide suppressive fire in the drop zone area and neutralize key targets (enemy antiaircraft installations, communications sites, command post, reserve positions). Initial ammunition loads should be selected to fit these targets. Coordinated preplanning will insure that armed helicopter activity does not constitute a hazard to personnel parachuting into the drop zone or adversely restrict other supporting fires. Armed helicopters will continue to act in economy of force roles to protect airborne forces during assembly and movement to initial airhead objectives. Support will shift to reconnaissance and security operations after seizure of the airhead line. Since antitank missions and neutralization of enemy forces moving toward the airhead may be anticipated to be predominant at this time, armament and ammunition loads should be selected for these type targets.

(2) If the airhead is beyond the fuel range of the armed helicopters and the helicopters are to be flown to the airhead, provisions must be made for refueling en route. If the refueling must be accomplished in a hostile area, the fuel can be—

(*a*) Dropped by parachute or air landed immediately prior to the arrival of the armed helicopters, or

(*b*) Seized from the enemy by partisans, or

(*c*) Transported in other aircraft which will accompany the armed helicopter formation.

(3) When armed helicopters are to be airlifted in support of airborne operations, the helicopters should be air landed as soon as practicable after the initial assault. Air Force cargo aircraft that afford minimum disassembly of the armed helicopters are desirable for this purpose. Maintenance personnel and aircrews will accompany the helicopters in the cargo aircraft to expedite placing the helicopters in an operational status after the air landing. The initial ammunition load should accompany each helicopter in the cargo aircraft.

(4) Resupply of fuel and ammunition should be air landed with the followup echelon. Designated POL and armament personnel should accompany these supplies to expedite distribution. If resupply is to be parachuted into the drop zone, fuel and ammunition for the armed helicopters should be heavy dropped with the airborne force heavy drop loads. Designated POL and armament personnel should parachute with the supplies and assemble them at a central point. These personnel must also position their ammunition and POL

loads and lay out landing panels for helicopter servicing operations.

(5) The timing of servicing operations must be phased in order to maintain continuous direct fire support, reconnaissance, and security. Initial servicing should be accomplished alternately by fire teams, thereby providing steady fire support during the critical landing phase. Additional servicing should be accomplished subsequent to the seizure of initial assault objectives.

46.12. Airmobile Operations

Armed helicopters provide security to airlift helicopters engaged in airmobile operations when air-to-ground suppressive fires are required, or when a combination of air and ground protection is essential to the security of the airmobile operation. See FM 57–35 for detailed discussion of airmobile operations.

a. Planning Considerations. Detailed planning and coordination are necessary. When urgency of operations precludes normal planning, unit SOP and training must be relied upon for efficient execution of the mission. The ground force commander must issue the operations order in time to allow the supporting aviation unit commander time to formulate his supporting plan, to issue orders, and to conduct aircrew briefings. Proper aviation planning and briefings help assure the success of the ground operation. Warning orders are issued well in advance to allow for adequate planning time. Flight routes are selected which offer minimum interference from enemy forces and maximum cover and concealment. Nap-of-the-earth flight is used as necessary. En route formations will be determined by the factors of METT. When the airmobile force is of such size that flank security at extended distance is required, a portion of the armed helicopter force may be given a flank security mission and the balance of the force will escort the formation. The armament used on armed helicopters will depend upon the nature of known and suspected enemy targets. Armed helicopters selected for escort ideally have a greater speed capability than the helicopters being escorted. This will allow the escorts to depart the formation en route, engage targets, and rejoin the formation. Lead escort helicopters can accompany the formation up to the latest practical time prior to departing the formation ahead to conduct landing zone reconnaissance, prestrike, and suppressive fire missions. Centralized control of the entire airmobile force (troops, airlift helicopters, and armed escort helicopters) is essential during the operation. This control normally is vested in the airmobile force commander.

b. Conduct of Escort Operations for Airlifted Forces.

(1) Armed helicopters provide security for the airlifted forces during the loading phase. Once the airlifted force is airborne and en route to the objective area, armed helicopters are responsible for the destruction or suppression of enemy forces which threaten the formations. Escort helicopters are deployed in advance, along the flanks, and to the rear of the formation. Escort formations should remain flexible, and the armed helicopter mission commander should continually adjust his elements to maintain 360° protection. If the force is threatened or attacked, suppressive fires will be placed upon the enemy until the airlifted force has passed out of range or until the enemy is neutralized. If the enemy target is not neutralized, the supported unit leader is notified so that subsequent lifts will avoid the known enemy position.

(2) Mechanical failure or enemy action may force transport helicopters to abort prior to reaching the objective area. If possible, escort helicopters will provide security and fire support for crews and troops of downed helicopters until they can be rescued. Rescue may be facilitated by employing empty airlift helicopters returning from the landing zone or by supporting medical evacuation helicopters.

(3) As the airmobile force nears the landing zone, designated armed helicopter escorts will conduct the landing zone reconnaissance. The compo-

sition of the reconnaissance force is dependent upon the escort strength available, the size of the landing zone, and the time available for conducting the reconnaissance. When approaching the landing zone, the helicopters should avoid the open areas which provide the enemy the best fields of fire and will probably be the areas where fires are concentrated. Initiating the reconnaissance from the flanks forces the enemy to fire from a less desirable position. The armed helicopter mission commander will designate specific portions of the landing zone for each armed helicopter to cover, based on prior intelligence, aerial photographs, and maps of the area. The armed helicopter mission commander will instruct his fire teams to search for and mark with smoke exact locations and dispositions of enemy troop positions, antiaircraft weapons, and automatic weapons. Reconnaissance by fire will be employed as necessary. In addition to locating enemy positions, the condition of the landing surface will be checked for obstacles such as poles stuck in the ground, cables strung across the area, and indications of mines or demolition charges. Upon completion of the reconnaissance, the armed helicopter mission commander must report to the airmobile force commander with a recommendation that the mission be continued or aborted. This report must be given in sufficient time for the airmobile force commander to react.

(4) Armed escort helicopters may be assigned the mission of prestriking the landing zone. Well-timed suppressive fires, violently executed, will significantly reduce the enemy's capability to repel the airmobile assault force. The armed helicopter mission commander should consider giving priority to the expenditure of sufficient ammunition to make the prestrike effective and yet not sacrifice the capability of performing subsequent missions. An ineffective prestrike negates the element of surprise and leaves the enemy alerted to the impending airmobile assault. Prestrike fire support should be maintained until the airlanded force has engaged the enemy. There should be no time gap between the prestrike and the assault of the airlanded force. Any time interval between these fires gives the enemy time to reposition weapons and troops and to replace gun crews without interference. When they arrive in the landing zone, the striking helicopters will be augmented by the suppressive fire of escort helicopters that remained with the airmobile formation. When firing in the landing zone, the escort helicopters should maintain a minimum altitude of approximately 100 feet above the terrain to permit observation and the engagement of targets of opportunity on the periphery of the landing zone. The first element of the airlift helicopters will augment the fires of the escort helicopters with controlled suppressive fires on the landing zone during the approach and on takeoff after clearing the assaulting troop positions. Rules of engagement for the landing zone area must be clearly established prior to the operation to preclude armed helicopters escorting subsequent lifts from firing into friendly troops already in the area.

(5) Armed helicopters may be required to deliver smoke on enemy positions or to lay a screen between the enemy and the landing zone to conceal the arrival of the airmobile force. Wind and weather must be accurately evaluated immediately prior to the use of smoke. Smoke could severely hamper the airmobile force if improperly employed.

(6) Subsequent to the debarkation of the airlanded force, a portion of the armed helicopter escort may be designated to remain in the landing

zone area to support the ground elements by fire support and reconnaissance.

(7) As the empty airlift helicopters depart the landing zone, they are escorted to a specified flight altitude or release point by elements of the armed helicopter force. This escort force will cover the departure route with suppressive fire. The escort mission commander must insure that, as the airlift helicopters begin their liftoff, his fire teams are in a position to conduct effective fire suppression of the departure corridor. Normally, this will require the fire teams to be located to the flanks behind and below the airlift aircraft as they climb out.

46.13. Amphibious Operations

a. General. Armed helicopter support of amphibious operations normally involves the escort and fire support of the airmobile forces landing in conjunction with the beach assault. Actions in the objective area and over land areas are essentially as discussed in airmobile operations (para 56). For further details concerning amphibious operations, see FM 31–12 and FM 31–13.

b. Special Considerations. Special considerations encountered in the support of amphibious operations which result from employing aircraft carriers in lieu of land-based staging areas are—

(1) Aircrews must be trained to operate off aircraft carriers, to include proficiency in overwater navigation, use of aircraft carrier navigational aids, and water survival to include ditching procedures. The essential techniques and procedures used during aircraft carrier launch and recovery operations must be practiced by all crews.

(2) During the planning phase, the mission commander must consider naval gunfire plans as they relate to flight routes and he must know the radio frequencies of the air and naval gunfire liaison company (ANGLICO), Naval Air, and the amphibious force.

(3) During the execution phase, emphasis must be placed on fire support and seizure of the initial beachhead line. Normally, conventional supporting fires are shifted to deeped targets. Armed helicopters may be used in this period to satisfy the ground commander's immediate fire support requirements.

46.14. Escort of Ground Convoys

The threat of ambush to ground convoys usually is present in defensive or retrograde situations in restrictive terrain such as jungle, and in operations against an enemy adept at infiltration. Stability operations frequently will require aerial escort of ground convoys; general warfare operations will require convoy escort in the combat or communications zone when security is necessary. The ambush threat can be greatly reduced by using an armed helicopter escort for the convoy. Coordination and communications with the convoy command and control elements are necessary for immediate, accurate, protective response by the armed helicopters.

46.15. Night Operations

Armed helicopter night operations offer an excellent opportunity for achieving deception and surprise, thus enhancing the success of the mission. Armed helicopters may perform fire support, reconnaissance, fire adjustment missions in support of ground operations, and other conventional armed helicopter missions. The fundamentals involved in night operations are the same as those in daylight operations, although techniques may vary. For example, more control measures will be placed upon armed helicopter units during night operations than during daylight operations. Consideration must be given to the method by which ground units will mark their positions during armed helicopter fire support missions, to assure prompt accurate fire support without endangering friendly troops. Mission success is dependent upon prior reconnaissance, simple plans, accurate navigation, the night training proficiency of flight crews, and thorough coordination between all elements involved. An example of the techniques which can be developed specifically for night helicopter operations

is the use of a helicopter equipped with a searchlight or similar device which illuminates an enemy night operation while accompanying helicopters, armed with machineguns and rockets, attack and destroy the target. This technique has proved particularly effective against barges operating along waterways at night.

Section IV. DELIVERY OF DROPPABLE MUNITIONS BY ARMED HELICOPTERS

46.16. General

Mortars supply the primary means of indirect fire support provided by the rifle company to its elements. The responsiveness of this support is reduced when the mortar and its ammunition must be transported over difficult terrain by footmobile units. Also, the limited resupply capability of footmobile units reduces the ability of supporting fires to exert continual pressure on enemy positions. Under these conditions, it may be necessary to obtain fire support by variations from standard fire support systems. The use of armed helicopters for delivery of droppable munitions, to include modified mortar projectiles, and cluster bomb units (CBU) is one such variation which can be integrated into the ground unit's plan of action.

46.17. Basic Principles

a. Attack. The task of helicopters equipped to deliver modified mortar projectiles or cluster bomblets is to assist the maneuver of supported ground forces by—

(1) Neutralizing or destroying enemy personnel and materiel.

(2) Providing security to vulnerable flanks of airmobile or other ground force elements by use of interdicting fires.

(3) Causing the enemy to expose himself to lethal fires by use of air delivered nonlethal chemical munitions such as riot control agents.

(4) Disrupting counterattacks by use of spoiling attacks on enemy forces preparing to participate in such counterattacks.

b. Defense. In the defensive role, armed helicopters may assist friendly ground force units by delivery of modified mortar projectiles or cluster bomblets on attacking enemy troops when ground visual restrictions, unfavorable weather conditions, or terrain masking preclude their delivery by conventional methods.

46.18. Methods of Attack for Mortar and Cluster Bomb Unit Armed Helicopters

a. Preplanned Targets. When helicopter delivered mortar projectiles or cluster bomb units (CBU) are to be placed on targets which also will be taken under fire by other means, the helicopter fires should be delivered last. This method lessens the probability of losses due to enemy antiaircraft fires and allows delivery up to the time that friendly troops approach the enemy positions.

(1) For preplanned targets, combinations of projectile types may be used. Nonlethal agents may be delivered prior to the arrival of the helicopters. Delivery of such agents may cause the enemy to evacuate his defensive positions and expose himself to lethal fires delivered by helicopters.

(2) Mortar/CBU delivery helicopters should be accompanied on firing passes by conventionally armed helicopters delivering simultaneous destructive fires. This will result in increased shock effect and provide a degree of protection against enemy antiaircraft fires.

b. Targets of Opportunity. Helicopters armed with mortar projectiles or cluster bomb units (CBU) can rapidly engage targets which are too fleeting to be engaged by conventional means. Such targets might present themselves while troop ships are en route to landing zones. Mortar/CBU delivery helicopters can overfly the area from which hostile fire originates and immediately drop sufficient projectiles or bomblets to silence the enemy fire. The helicopters can then rejoin the airmobile column and be ready to deliver other fires as required.

46.19. Control of Fires

The mortar/CBU delivery system may be controlled by the airmobile task force commander during airmobile operations or by the

armed helicopter mission commander during preplanned strikes not connected with airmobile assaults.

46.20. Factors Affecting Employment

The factors affecting employment of armed helicopters are mission, enemy, terrain and weather, and troops and equipment (METT) as described in FM 1–110. These same factors affect employment of overhead delivery system helicopters.

46.21. Methods of Acquiring and Marking Targets

a. Targets normally are identified by the ground unit commander and given to the armed helicopter mission commander on a fire mission basis. Also, the mortar/CBU delivery helicopter can be assigned in direct support of a ground unit and directed to the target by personnel on the ground.

b. Target designation can be accomplished in a manner similar to designating targets for conventional weapons. Targets may be identified by use of coordinates, verbal description, direction and distance from a known reference point, or they may be marked by direct fire support helicopters using tracers or smoke.

c. Damage will be assessed after each mortar/CBU delivery run to determine whether successive runs are necessary. Procedures for successive runs will consist of corrections to move the point of impact to the target and/or to request more or less rounds to be dropped during the next overhead attack.

Section V. AERIAL ROCKET ARTILLERY

46.22. Mission

The mission of aerial rocket artillery is to provide aerial fire support throughout areas of operations. It may be assigned tactical missions of direct support, reinforcing, general support, and general support-reinforcing.

46.23. Assignment

Separate aerial rocket artillery battalions may be attached to corps artillery. One battalion is organic to the airmobile division. The battalions are designed to provide aerial fire support and antitank defense fires throughout areas of operations.

46.24. Airmobile Operations

Airmobile operations are executed with precision and speed over extended distances. Aerial rocket artillery provides responsive and flexible fire support to the maneuver force; its direct support fires are particularly useful during movement en route, landing, and assault of the objective. Direct support cannon artillery units may be prepositioned to support the assault or landed subsequently to supplement or replace aerial fires. Thus, the direct aerial fires and indirect ground fires are complementary.

46.25. The Tactical Plan

Planning required for support of the air assault is more complex than that required for support of ground assault operations. Aerial rocket artillery units must know exact target locations en route to and on the objective, the direction from which fires are to be delivered, and the actions to be taken after delivery of fires. Detailed coordination is required with supported or reinforced units. In planning for aerial delivery of fires, the unit's limited flight endurance and resupply capability must be taken into consideration. The airmobile force commander considers and includes aerial rocket artillery fires in the preparation of his fire support plan.

46.26. Forward Base Areas

Forward base areas provide defensible terrain from which aerial rocket artillery operations may be conducted. Forward base areas may contain all firing elements of the battalion, but normally are of battery or platoon size. Perimeter defense of forward base areas is organized utilizing the limited fire capabilities of aerial rocket artillery helicopters, organic ground weapons, and resources of collocated or adjacent forces. Forward base areas are located geographically near the supported forces, commensurate with the assigned mission and enemy situation (areas should be outside of enemy cannon artillery range). Forward base areas are selected by the aerial rocket artillery battalion commander responsi-

ble for positioning elements of the aerial rocket artillery battalion.

46.27. Target Categories

Enemy targets engaged by aerial rocket artillery may be either preselected or targets of opportunity. The present weapons systems, are effective against personnel, light fortifications, light materiel, and tanks.

46.28. Response to Requests for Fire Support

Aerial rocket artillery must respond to requests for fire on targets of opportunity as expeditiously as possible, consistent with coordination requirements. Coordination of these fires may not require the timing normally associated with prearranged fires. Acquisition and designation of targets of opportunity may come from various sources, to include aerial rocket artillery pilots. It is preferable for the forward observers of direct support artillery units to provide mission control to aerial artillery units delivering fires on targets of opportunity. The airmobile force commander's fire support coordinator considers, plans, and coordinates the use of aerial rocket artillery. Techniques of target designation and necessary control may include the following:

a. Observers (aerial or ground) orally designating and describing targets.

b. Marking of targets by firing tracers, smoke grenades, or rockets; at night, references to fluorescent panels or balloons and luminescent paints or sprays may be used.

c. Vectoring of aerial rocket artillery helicopters by radio communications from aerial or ground observers.

d. Using checkpoints, coordinates, or referring to prominent terrain or manmade features.

46.29. Air Movement

The airmobile force commander considers the use of aerial rocket artillery during air movements, however, this role normally is performed by armed escort helicopters. If both means are employed en route, close prior planning and en route coordination are required between the airmobile force commander, his fire support coordinator, the armed escort mission commander, and the aerial rocket artillery element commander.

46.30. Initial Points

When the aerial rocket artillery unit is participating in an airmobile operation, the initial point (IP) for the air column is designated by the assault force commander. The artillery commander also establishes a unit IP, short of the air column IP, and designates a time for subordinate units to reach the point and clear it. The unit IP is the point at which elements of the unit in formation join the air column. It must be far enough from the takeoff areas to permit unit aircraft to become airborne and gain the proper airspeed, altitude, interval, and formation by the time they reach the unit IP. All IP should be easily identified from the air.

Page 46. Paragraph 105*b* is rescinded.

By Order of the Secretary of the Army:

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FIELD MANUAL
No. 1–100

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *21 November 1966*

ARMY AVIATION UTILIZATION

* This manual supersedes FM 1–100, 5 June 1963, including C 1, 30 June 1964.

CHAPTER 1
GENERAL

1. Purpose and Scope

a. Purpose. This manual provides doctrine and guidance for the utilization of Army aviation in support of military operations on land. Its purpose is to assist aviation commanders in supervision of their units, and to familiarize other than aviation commanders and their staffs with the employment of supporting aviation units.

b. Scope. This manual discusses the capabilities and limitations of Army aviation and the command relationship between ground commanders and supporting aviation units. Additionally, it discusses tasks that are appropriate for assignment to Army aviation units.

c. Application. This manual applies to Army aviation employment in—

(1) Nuclear and nonnuclear environments.

(2) Chemical, biological, and radiological environments.

(3) Internal defense and development operations.

2. Recommended Changes

Users of this manual are encouraged to submit recommendations to improve its contents. Comments should be keyed to the specific page, paragraph, and line of the text in which the change is recommended. Reasons should be provided for each comment to insure understanding and complete evaluation. Address comments to the Commanding Officer, United States Army Combat Developments Command Aviation Agency, Fort Rucker, Ala. 36360. Originators of proposed changes which would constitute a significant modification of approved Army doctrine may send an information copy through command channels to Commanding General, United States Army Combat Developments Command, to facilitate review and followup.

CHAPTER 2

MISSION, CONCEPTS, CAPABILITIES, AND LIMITATIONS

Section I. MISSION AND CONCEPTS OF OPERATION

3. Mission

a. The mission of Army aviation is to augment the capability of the Army to conduct prompt and sustained combat incident to operations on land. It accomplishes its mission by augmenting other organic means of mobility and firepower through use of aircraft capable of avoiding concentrations of enemy firepower and ground obstacles.

b. Aviation resources are organized, trained, and equipped primarily for responsive support of sustained combat incident to operations on land.

4. Concepts of Operation

a. Fluid situations and dispersion of Army units are characteristic of present and future combat operations. Units organized into combined arms teams will operate over large areas, laterally and in depth, as required by the tactical situation. The combat zone cannot be finitely measured in all cases and may vary appreciably as a conflict develops.

b. Within a combat zone, mobility is a decisive factor. Leaders of units which support mobility must be oriented fully in the tactics and techniques of the ground forces that they support, and must be conversant with the combat situation as it progresses.

c. Army unit commanders have the services of Army aircraft available to perform the following functions:

(1) *Command and control.* This includes courier and liaison missions, control of vehicular columns and tactical units, message drop and pickup, and wire laying.

(2) *Observation and surveillance.* Army aviation provides aerial "eyes" over the operational area. Through this capability it supports intelligence-gathering activities and target organization. Additionally, it conducts flights in support of aerial survey operations and aerial radiological surveys.

(3) *Mobility.* By airlifting troops and combat equipment, Army aviation provides an additional means of maneuver to the ground commander. Weapons may be emplaced rapidly and troops may be carried quickly over obstacles using Army aviation's air mobility capability.

(4) *Firepower.* Army aviation observes, adjusts, and registers indirect artillery fire. It also uses rotary wing aircraft as weapons platforms to deliver suppressive fire or to launch and control antimechanized aerial weapons systems. This helps fill the gap between the support provided by conventional ground fire means and close air support provided by tactical aircraft of other Service components.

(5) *Logistics.* Army aviation supports logistical operations by providing aerial movement of troops and equipment, aeromedical evacuation of casualties, and evacuation of damaged equipment within the combat zone.

d. The employment of Army aviation complements rather than duplicates the functions performed by the Air Force. Its capability of operating from pioneer-type fields and its assignment to Army unit commanders who have a recurring need for its capabilities provide

the essential degree of responsiveness needed to support prompt and sustained combat.

5. Organization

a. Divisional Aviation. The tables of organization and equipment of each type Army division authorize organic aviation units required to provide aerial support for tactical and logistical operations of the division. The organic aviation units are referred to as *divisional aviation.* The quantity of organic aviation assigned to a particular division varies according to the mission and other means of mobility organic to that division. If specific missions require aviation assets not assigned, the additional aircraft may be requested from nondivisional aviation units at corps or field army.

b. Nondivisional Aviation. All Army units do not require the support of Army aviation on a continuing basis. To support these units when required and to augment the organic aviation assets of other Army units, separate aviation companies, battalions, and groups are included in the Army force structure. These separate Army aviation organizations are referred to as *nondivisional aviation.* Often such units are composed of a mix of aircraft or contain special-purpose aircraft for which there is an essential, but not continuing, requirement. These aviation organizations normally are assigned to a field army with further attachment to subordinate corps. Such an arrangement allows the army commander to allocate critical aviation resources according to the priorities he establishes.

Section II. CAPABILITIES AND LIMITATIONS

6. Capabilities

Increased and immediately responsive mobility is a basic capability which organic Army aviation provides the commander. This mobility results from the inherent speed of aircraft as compared to ground means of mobility, and from the relative freedom of aircraft from terrain obstacles. Organic and attached aviation elements can assist the ground commander in the accomplishment of his mission by—

a. Providing, during the planning phase, personnel to advise the commander on the capabilities, limitations, and resources of available aviation elements.

b. Providing the commander with an aerial command post, to include communications facilities, from which he can observe the developing situation and control elements of his command.

c. Conducting aerial surveillance of routes, landing zones, and objective areas, and by reconnaissance of routes to locate points favorable for ambush or terrain obstacles to ground movement.

d. Providing airlift of personnel, equipment, and supplies for a variety of tasks within the combat zone.

e. Providing armed escort and supplemental fire support aircraft.

f. Performing other miscellaneous tasks such as aerial spot photography, night illumination support, and aerial surveys within aircraft capabilities.

7. Limitations

Limitations to aviation operations include—

a. Vulnerability to enemy air defense measures and enemy aircraft.

b. High consumption rates for POL and ammunition.

c. Relatively high maintenance requirements when compared to other means of transport.

d. Effects of adverse weather conditions.

e. Limited ability to defend aircraft while participating in operations.

f. Limitations common to night operations.

g. Limited capability to lift heavy equipment.

Section III. AUTHORITY AND PHILOSOPHY OF ARMY AVIATION

8. Authority

a. The basic statutory authority for Army aviation is contained in the National Security Act of 1947. Section 205(e) of the National Security Act of 1947, as amended, is quoted in part as follows:

> "In general the United States Army, within the Department of the Army, shall include land combat and service forces and such aviation and water transport as may be organic therein. It shall be organized, trained and equipped primarily for prompt and sustained combat incident to operations on land."

b. The Secretary of Defense published Department of Defense Directive Number 5160.22, dated 18 March 1957, (Army Regulations 95–100, 3 May 1957), subject: "Clarification of Roles and Missions of the Departments of the Army and the Air Force Regarding Use of Aircraft" for the purpose of—

> "(1) Defining the scope of the United States Army Aviation Program and establishment.
>
> "(2) Insuring that the United States Army may employ aircraft necessary for its internal requirements in the conduct of operations on land, without duplicating the functions assigned to the United States Air Force.
>
> "(3) Stressing and clarifying the responsibilities of the United States Air Force with regard to providing aviation support for the United States Army."

The Department of Defense Directive 5160.22 (AR 95–100) prescribed the functions to be performed by organic Army aircraft within the combat zone as follows:

> *"a. Command, liaison, courier, and communications.*
>
> *"b. Observation, visual and photographic reconnaissance, fire adjustment, and topographical survey.*
>
> *"c. Airlift of Army personnel and materiel.*
>
> *"d. Aeromedical evacuation."*

9. Philosophy

Army aviation personnel and aircraft will be integrated into the combat, combat support, and combat service support units of the Army when their employment will benefit Army operations. These aviation resources will be immediately responsive to the Army commander for use as he considers necessary for the discharge of his military mission. Army aviation units must live with the Army so that they may be available for operations on short notice and responsive to the immediate command and requirements of troop commanders.

CHAPTER 3
FUNDAMENTALS OF EMPLOYMENT

10. General

The ground commander utilizes supporting Army aviation elements to increase the tactical capabilities of his force. He assigns tasks to the aviation commander, and the aviation commander employs his unit to support the ground force mission. Aviation techniques and procedures contained in FM 1–105 are employed by the aviation unit commanders to perform their assigned tasks. Methods of employing Army aviation are flexible, and users should take advantage of the services of the Army aviation officer in order to utilize the great potentialities of Army aviation in combat support. Army aviators are well grounded in the philosophy that Army aviation is an asset only so long as it remains immediately responsive to the supported unit commander. Therefore, the employment of Army aviation in support of combat operations should be well integrated with the ground tactical plan at the earliest stage.

11. Employment Considerations

The efficient employment of Army aviation is based on the following considerations—

a. Immediate Availability. The opportunity to employ aviation to the best advantage may come suddenly and require that supporting aviation units be immediately available and responsive to the commander's requirements. Availability is facilitated by flexible organization, mobility, proper scheduling of personnel and aircraft, adequate maintenance support, and by locating aviation facilities near the area of intended use.

b. Freedom of Utilization. Freedom of utilization permits the commander to employ organic, attached, or supporting Army aviation units in the way which contributes most to the successful accomplishment of his mission. Organic assignment provides the commander with greater freedom of utilization than attachment, and attachment provides greater freedom of utilization than operational control.

c. Economy of Utilization. There is seldom enough aviation support to satisfy all justifiable demands. Aircraft should not be used when surface means are equally effective. Therefore, economy must be practiced and missions assigned on a priority basis. Proper coordination and control tend to promote the most effective use of Army aviation.

d. Tactical Integrity. Tactical integrity is essential to both the aviation unit and the ground unit during airmobile operations for close coordination, effective teamwork, and positive control. For example, tactical integrity is achieved by lifting a rifle platoon with an airlift platoon or an infantry battalion with a combat aviation battalion.

12. Planning Employment

a. Basis for Planning. Plans for Army aviation support are based on the tactical plans of the unit to be supported. For planning, employment, and characteristics of divisional tactical operations, see FM 61–100.

b. Factors Affecting Employment. The following factors should be considered when planning for the employment of Army aviation:

(1) *Mission.* The mission of the aviation unit is dictated by the mission of the supported unit. Army aviation support must be integrated into, and based on, the fire support plan and scheme of maneuver of the supported unit. To insure availability of sufficient aircraft for all operations, future missions must be considered and priorities for use of aircraft established.

(2) *Enemy.* The location, disposition, and capabilities of the enemy—especially his air defenses and air offensive capabilities—must be considered. The suppression of enemy fire en route to and in the objective area will preclude the excessive loss of aircraft and ground troops.

(3) *Weather.* Weather is important in planning the employment of Army aviation support. Low ceilings and limited visibility reduce enemy air and ground action and can be used to advantage during some combat operations. Helicopter operations are possible in marginal weather conditions which limit fixed wing flight. Determination of minimum ceilings and visibilities needed for continuous helicopter support depends on such variables as aviator training and experience, obstructions to flight in the operational area, and certain associated operational risks that the ground commander is willing to accept.

(4) *Terrain.* Terrain must be considered when planning locations for airfields, heliports, and alternate landing areas. High hill masses, lack of flat or gently rolling terrain, and high elevations limit facility locations. Locations for navigational aids must preclude terrain mask of signals. Routes for ground supply, communications support, and local security require heavy engineer support if located in rough, undeveloped areas. Flight characteristics of helicopters make them less dependent upon improved areas than fixed wing aircraft.

(5) *Training readiness.* Army aviators and combat crewmembers must be allowed to train under conditions similar to operational environments in order to maintain proficiency in the specific tasks to be performed. Also, mechanics, radio repairmen, electronic equipment operators, and observers must be trained for replacement of personnel. Particular attention should be directed to the training of ground combat personnel in such specific procedures as loading and unloading from Army aircraft during airmobile operations.

(6) *Aviator and aircraft availability.* Availability of aircraft and aviators, auxiliary equipment such as cargo slings and nets, and adequate maintenance and supply must be considered when planning the employment of aviation units. Operational procedures should be flexible enough to allow periods of maximum maintenance and minimum use of aircraft to assure maximum availability of aircraft to support an operation (FM 1–10 and FM 55–45).

(7) *Vulnerability.* Aircraft vulnerability can be reduced by use of suppressive fires delivered from armed helicopters, from defensive weapons mounted on troop-carrying helicopters, by supporting artillery and mortar fires, and by USAF tactical air support. Aircraft and crewmembers are particularly vulnerable to the effects of nuclear weapons. Aircraft are most seriously affected by the blast effect which creates extreme turbulence and atmospheric overpressures. Selection of appropriate flight routes and altitudes is a passive measure which will reduce vulnerability to blast, but flash blindness caused by the fireball of a nuclear explosion will remain a hazard.

(8) *Airspace utilization.* The airspace over the combat zone must be used by surface-to-surface fires, surface-to-air fires, and aircraft of all participating Services. The joint force commander must establish measures for preventing or minimizing mutual interference among the operations of all Services in this space without denying any Service component full exploitation of its use. Army air traffic regulation facilities can coordinate with other users of airspace to prevent conflicts in its use and assist Army aviation operations.

(9) *Support requirements.* Primary sup-

port requirements influencing the employment of Army aviation are POL, ammunition, and aircraft/avionics maintenance.

(a) *POL.* Aircraft fuels are consumed in relatively large quantities. POL items require special handling, and refueling facilities should be readily available.

(b) *Ammunition.* The ammunition carried by Army aircraft may be expended rapidly. This makes it necessary to locate resupply facilities near the area of operations or a time penalty will exist while aircraft go to a more distant area for replenishment.

(c) *Aircraft/avionics maintenance.* To assure continuing availability of aircraft, close coordination is required between the commanders concerned; i.e., the land force commander and the supporting maintenance unit commander. Sound maintenance planning based on operational requirements will contribute to success. Time must be made available for routine required inspections and repair. Proper scheduling of aircraft is mandatory to prevent maintenance overload and reduce aircraft availability. For any large operation, personnel and aircraft from maintenance support units must be allocated for aircraft recovery and repair.

(10) *Security restrictions.* Aircraft employment may be influenced by security restrictions imposed by the commander (e.g., radio silence for a given period of time prior to an operation, or a limited number of flights in a given area).

(11) *Control.* Aircraft control is accomplished through use of an efficient communications system which permits commanders to issue instructions to elements scheduled for or participating in aircraft operations. Army aircraft are given warning prior to employment of a friendly nuclear weapon within their area of operations. This is accomplished through the appropriate air traffic control facility or through the unit command net in accordance with established SOP.

(12) *Coordination of effort.* Aviation units and aircraft must be employed in a manner to prevent overlapping responsibilities of similar agencies. Duplication of effort by the U.S. Army and U.S. Air Force may occur during missions involving observation or surveillance, fire adjustment, and reconnaissance; however, such duplication should be complementary.

(13) *Dispersion.* Under nuclear warfare conditions, Army aviation units should be located in dispersed areas for protection. Company or platoon integrity should be maintained when possible. This dispersion may result in increased maintenance time, additional ground security requirements, additional communications facilities for dispersed aviation elements, and a slower reaction time. However, proper planning can minimize the disadvantages caused by dispersion.

13. Employment of Fixed and Rotary Wing Aircraft

a. Army aircraft may be classed as observation, utility, or cargo types. Appendix B shows the basic characteristics of all types of Army aircraft. These characteristics should be considered by the land force commander in planning operations which involve Army aviation support.

(1) *Observation.* Observation aircraft are used to conduct visual, photographic, or electronic observation, and for the adjustment of fires or aerial wire laying. Observation aircraft also can be used for command and control, liaison, reconnaissance, surveillance, and a limited amount of resupply, evacuation, and aerial fire support.

(2) *Utility.* Utility aircraft are used for missions such as cargo and passenger transport, patient movement, unit tactical transport, command and con-

trol, and dissemination of material during psycholgical operations. Armed utility aircraft can be used to escort troop carrying helicopters and to provide supplemental aerial fire support.

(3) *Cargo.* Cargo aircraft are used for airmobile operations and transport of troops, equipment, and supplies within the battle area. They may also be used for such specialized missions as refueling tankers and evacuation of patients, prisoners, or damaged equipment. Cargo aircraft possessing a vertical takeoff and landing capability can transport surface vehicles and other heavy equipment for short distances over natural or manmade obstacles.

b. The armed helicopter contributes greatly to mission accomplishment through its ability to operate in the same environment as the ground force. The concept of using the helicopter in a supplemental fire support role visualizes its employment to supplement and extend the firepower available to the commander from ground-based weapons and close air support. Also, armed helicopters possess the capability to deliver effective, suppressive fire in objective areas at a critical time during airmobile operations. Employment concepts (FM 1–110) envision armed helicopters performing a variety of roles to include—

(1) Escort.
(2) Reconnaissance.
(3) Security.
(4) Screening missions.
(5) Deception.
(6) Suppressive fire.
(7) Delaying actions.
(8) Raids.
(9) Patrol actions.
(10) Antitank operations.

CHAPTER 4

ARMY AVIATION COMMAND, CONTROL, AND COORDINATION

14. General

The senior Army aviator at each echelon in the field army normally is designated as the Army aviation officer. He may be the commander of an aviation unit and as such is a special staff officer for Army aviation matters on the staff of the force commander.

15. Command Relationships

a. When Army aviation is assigned or attached to a force, the aviation unit commander normally will be both a subordinate commander and a staff officer of the force commander. When Army aviation is neither assigned nor attached to a force, but supports the force, the Army aviation unit commander's relationship to the force commander is that of an advisor, as well as that of an independent commander obliged by his mission to render effective aviation support. In either case, close coordination and liaison between commanders is essential for accomplishment of both their missions.

b. It is essential that there be complete understanding of the nature of control that the supported unit commander exercises over the Army aviation units supporting an operation. Aviation units or elements may be employed as an organic part of a force, as an attachment to a force, as a unit under operational control of a force commander, or as a unit performing one of the missions of direct support, general support, or reinforcing. These methods of employing aviation provide a wide range of selection in the degree of control and responsibilities of the supported as well as supporting commander.

c. In most instances, aviation support can be adequately and effectively provided through the assignment of one of the three standard missions, direct support, general support, or reinforcing. These methods relieve the supported commander of burdensome responsibilities for command and service support and allows the supporting aviation commander flexibility in the accomplishment of mission-related tasks. The governing consideration, however, should be the mission and the proper degree of control necessary to accomplish the overall mission. Regardless of the status, mission, or relationship assigned to an aviation unit, the aviation commander has the authority inherent in his command position to issue orders to subordinate elements of his command as necessary for the accomplishment of his assigned tasks.

d. Methods of employment which prescribe a particular status, mission, or relationship should not be combined. Since each has a separate purpose and meaning, it is improper to state "attached for operational control" or "attached in direct support" of a unit or command. When an aviation unit is attached to another unit or command, the commander receiving the unit can delegate a lesser degree of control of the attached unit to subordinate units or elements of his command. A commander being supported by an aviation unit or element can assume no greater degree of control than that provided under the status, mission, or relationship designated in the orders. The support requirements can be terminated only by the headquarters which assigned the support function.

16. Responsibilities of the Supported Commander

When an aviation unit is attached to another unit, combat service support for the aviation unit is furnished through the headquarters to which it is attached. However, the ability of the gaining unit to furnish the required support may impose a need to qualify this method

of employment by delineating specific areas of responsibility to be retained by each commander concerned; i.e., operations, training, and service support. Although the commander of the unit occupying the airfield is responsible for the local security for the airfield and unit position, the supported ground force commander normally provides a perimeter defense or a security force for the position. The security force may include one or more Redeye teams or other antiaircraft weapons to increase the air defense capability of the aviation unit if such teams or weapons are not organic. See appendixes E and F for employment of nonair defense weapons and Redeye teams against hostile aircraft.

17. Command Relationships and Missions

Support requirements to be implemented by an aviation unit are indicated by the assignment of a status, relationship, or mission. The normal requirements and responsibilities inherent to each are reflected in table I.

a. Attachment. Attachment is a temporary command, not a tactical mission. An aviation unit may be separated from its parent command and attached to another unit or command. The commander of the organization receiving the attachment will exercise the same degree of command and control over the attached unit as he does over units and persons organic to his command. An exception is the responsibility relating to the transfer and promotion of personnel which is retained by the command to which the unit is assigned. Attachment imposes full responsibility for the adequacy of the unit's plans, operations, training, and service support. Because of the increased burden imposed by these functions, attachment of aviation units normally will be made only when the situation dictates. Operations of long duration and operations from areas a great distance from base facilities might require attachment. In cases where attachment is necessary for short durations, but relief of all or a part of the gaining commander's planning and service support requirement is desired, attachment may be made at a time and date following the planning phase to last for the duration of the operation only, limiting service support requirements to commonly used classes of supply; i.e., classes I, III, and V.

b. Operational Control. Operational control is a relationship which transfers certain functions of command to a specific commander or headquarters. It provides the supported unit commander authority to assign tasks and objectives and to exercise as much direct authority as is necessary to accomplish the mission. The commander exercising operational control may tailor, group, and position forces under his authority as required. Operational control does not include responsibility for service support, military justice, and unit training except when a subordinate command requires such assistance in order to accomplish its mission.

c. Direct Support. An aviation unit assigned the mission of direct support answers directly to the supported unit's requests for assistance. The method of employment provides for a direct mission request channel between units. The supported unit commander specifies requirements, and the supporting aviation unit commander determines how requirements are to be fulfilled. The direct support aviation unit commander positions his unit and coordinates its activities with those of the supported commander as necessary to accomplish his mission. However, he remains under the command of his parent headquarters and retains certain prerogatives in the conduct of support requested by the supported unit. The aviation commander has final authority on the technical aviation aspects of the support operation; i.e., aircraft capabilities, weather contingencies, and suitability of flight routes and landing areas as they pertain to technical characteristics of the aircraft. These prerogatives do not extend to a denial of support when the supported commander's utilization of this resource is in question. Preparation of aviation plans and orders associated with the support mission and establishment of liaison with the supported unit are responsibilities of the supporting aviation unit commander. Service support remains the responsibility of the parent unit.

d. General Support. An aviation unit assigned the mission of general support furnishes aviation support to a force as a whole. Control and priorities for support are retained by the parent unit or a higher headquarters. The sup-

Table I. Missions and Command Relationships for Aviation Units

An aviation unit assigned the tactical mission or command relationship of—	Receives tasks and responds directly to—	Establishes communications and liaison with—	Move base by order of—	Combat service support furnished through—	Highest degree of control that can be passed to subordinates—
Attachment	Headquarters to which attached.	Headquarters to which attached.	Headquarters to which attached.	Headquarters to which attached unless otherwise specified.	All missions and relationships listed herein.
Operational control	Headquarters exercising operational control.	As directed by the headquarters exercising operational control.	Headquarters exercising operational control.	Habitual service support channels or as otherwise specified.	Operational control, direct support, general support, reinforcing.
Direct support	Headquarters being supported.	Headquarters being supported.	Parent unit, or at the discretion of the supporting unit commander.	Habitual service support channels or as otherwise specified.	Direct support.
General support	Headquarters being supported.	As directed by the headquarters being supported.	Parent unit, or a higher headquarters.	Habitual service support channels or as otherwise specified.	General support.
Reinforcing	Headquarters being reinforced.	Reinforced headquarters.	Parent unit, or at the discretion of the reinforcing unit commander.	Habitual service support channels or as otherwise specified.	Reinforcing.

porting unit commander prepares his own plans and orders and establishes liaison with supported units. The authority and responsibility of commanders are the same as that prescribed for direct support.

e. Reinforcing. An aviation unit assigned the mission of reinforcing augments the aviation support capabilities of another aviation unit. The reinforcing unit remains under the command of its parent organization, but its flight missions are planned and controlled by the reinforced unit. A direct communications channel is established between the reinforcing and the reinforced units, and the reinforced unit calls directly upon the reinforcing unit for assistance. The authority and responsibility of commanders are the same as that prescribed for direct support.

CHAPTER 5
COMMUNICATIONS

Section I. GENERAL

18. Areas of Responsibility

a. The aviation unit commander is responsible for communications within the unit and for the unit communications to higher headquarters and supported units. All subordinate commanders of the unit are responsible for the communications systems within their subunits.

b. A properly established communications system provides the commander with parallel means of communications that will assure him the capability to control the actions of his unit; to receive and transmit orders and information; to maintain contact with higher, lower attached, supporting, and adjacent units; and to coordinate combat service support matters.

c. Establishing and maintaining communications between units is governed by the following rules:

(1) The superior unit is responsible for establishing and maintaining communications with subordinate (including attached) units and units under operational control.

(2) A unit supporting another is responsible for establishing and maintaining communications with supported units.

(3) Although one unit is specifically charged with establishing communications with another unit, if the communications capability is lost, all units affected try to reestablish it immediately.

19. Means of Signal Communications

a. Radios (FM, UHF, and VHF) are available in all aircraft, and ground radios have been provided all commanders and key personnel down to and including lift company section leaders. Additional radios are provided for command posts, air traffic control, crash rescue, and other uses.

b. Radio equipment issued to the aviation unit includes portable and vehicular radio sets (not including those organic to the aircraft). Portable sets can be carried and operated by one man; they can also be carried in aircraft to maintain radio contact while aircraft are shut down. Since vehicular sets normally are operated from vehicular power sources, their use is limited to situations and terrain where vehicles can be utilized.

c. By using the remote control equipment, a radio operator may be located at a distance from the set he operates. Other remote control units may connect a radio set to a switchboard, thus making the radio available to commanders and staff officers through their telephones. Remote control facilities are used extensively, and normally are established to provide communications for the battalion command post.

20. Radio Communications

a. The primary means of communications for Army aviation units is radio. Amplitude modulated (AM) and frequency modulated (FM) radios are used extensively for daily operations.

b. Amplitude Modulated Radios. Equipment operating in the ultra high frequency (UHF) band is used primarily for air-ground communications with flight operations centers, airfield control towers, and other air traffic regulation communications facilities. Also, it may be used as a primary air-to-air communications link with other service component aircraft and as a secondary air-to-air communications link between Army aircraft. UHF hand-held sets such as the AN/URC–10 emergency radio are

used for air-ground communications between search and rescue aircraft and downed aviators.

c. Frequency Modulated Radios. FM radios provide the primary means of air-ground communications between the supporting aviation unit and the supported ground unit. Radios such as the AN/ARC–54 radio are organic to the aviation unit. This radio will net with 800 of the 920 channels of the AN/VRC–12 family of radios.

(1) FM radio equipment is subject to line-of-sight limitations, causing reception distances to decrease as the equipment is operated closer to the ground. By increasing altitude, radio operational range can be increased. Increasing the range beyond that necessary will result in the possibility of enemy electronic countermeasures and interference with other friendly radio traffic on the same frequency.

(2) Any tactical FM radio can be used by Army aircraft as a signal source on which to orient an FM homing device. Use of this device enables the pilot to fly to the location of the transmitting station. Stations can be located at any desired point.

d. High Frequency-Single Side Band (HF–SSB). Selected Army aircraft may be equipped with HF–SSB radios. These radios provide nonline-of-sight short and long range communications. Limitations of this equipment are its weight, size, complex antenna, and the hazard of high voltages on the antennas.

21. Wire Communications

Wire is the second most important means of communication used by Army aviation units. Generally, it is installed within the aviation unit area, and between the aviation unit and the supported unit if distance permits. The decision to establish wire communications depends on the unit mission and the time available for wire installation and use. The supply of wire on hand, the expected resupply, and future needs also are considered. Helicopter companies have necessary TOE equipment to install and maintain internal wire communications systems. Priority for establishing wire lines of communications will be determined by the unit communications officer.

22. Messenger Communications

a. Ground messenger service is used extensively in or near an Army aviation battalion base; however, organic aircraft are employed for rapid delivery of maps and documents, and to rapidly gather subordinate commanders and key personnel for the dissemination of important, bulky, or classified information.

b. When locations are fixed and the amount of traffic warrants, a scheduled ground or air messenger service is established.

23. Visual Communications

a. Improvised signalling using flashlights to send prearranged messages can be of primary importance to aircraft in formation at night. By prescribing their use in the signal operation instructions (SOI), certain flashlight signals can be used to transmit messages during radio silence or after radio failure.

b. Pyrotechnics, including smoke, are issued in various colors and types. The meanings of certain signals are given in the SOI. Signals are included for identifying units as friendly, marking landing zones, lifting or calling for fires by the aerial weapons company, marking targets, and identifying the location of downed aircraft to include specifying the need for medical attention. Pyrotechnic devices also may be used to light landing zones for night operations.

c. Two general types of panels are issued for communications with the aircraft—marking and identification panels which are made in bright fluorescent colors, and black and white panels which are used on light and dark backgrounds respectively. The marking and identification panels may be used to mark positions and to identify friendly units, as well as to mark landing zones. The black and white panels are used in accordance with a combined panel system and panel recognition code in the SOI to transmit brief messages or to identify particular units.

d. Aircraft maneuvers, such as "porpoising,"

or rocking about the longitudinal axis of the aircraft, may be used for limited air-to-air and air-to-ground visual communications. Prearranged signals among aircraft or from the aircraft to the ground (used primarily in emergencies or for aircraft identification to radar operators) should be specified in the SOI or battalion SOP.

24. Sound Communications

Sound signals and their meanings are prescribed in the SOI or are assigned by commanders. Rapid and continuous percussion sounds made with the standard gas alarm or improvised devices (iron rails and empty shell cases) normally are used to warn of CBR attacks.

Section II. PLANNING AND SECURITY

25. Communications Planning

Communications planning encompasses all staff actions taken by the division signal officer in preparation for projected operations. For details on communications planning, see FM 24–16 and FM 101–5.

26. Communications Security

Special attention is given to the safeguarding of standing signal instructions (SSI), SOI items, cryptographic material, and classified signal equipment. Extracts, not complete SOI's, normally are carried forward of brigade or between bases of operation. The commander establishes communications security measures by stating general principles in the unit SOP and by announcing, before an operation, any variation to normal security practices. Detailed information concerning communications security is contained in FM 32–5.

CHAPTER 6
AERIAL OBSERVATION AND SURVEILLANCE OPERATIONS

Section I. AERIAL OBSERVATION

27. Aerial Observation

Aerial observation may be defined as missions undertaken to support operations by use of aerial platforms or vehicles using visual, optical, photographic, and electronic means to obtain information of military value, normally pertaining to the strength, disposition, activity, and terrain occupied by an enemy or potential enemy.

28. Tactical Application

A major tactical application of Army aviation observation is that of bridging the gap between slow, detailed, close-in ground observation and rapid long-range Air Force observation. Army aviation observation augments these and supplements data obtained by electronic observation devices. The commander is given a broader view of his operational area, but a view which is superior in detail to that afforded by faster aircraft.

29. Aerial Observation Capabilities

Observation from Army aircraft includes surveillance, conduct of fire, reconnaissance, column control, camouflage inspection, survey operations, and the collection of intelligence information. It generally is satisfactory for normal observation requirements of a division, and for adjustment of divisional organic and attached artillery fires. However, adjustment of fire, target evaluation, and damage assessment of long range weapons may require supplementation by high performance aircraft.

30. Aerial Adjustment of Fire

Observation capabilities of Army aviation provide both mobile and relatively fixed observation posts for effective adjustment of fire support weapons. Detailed discussion of procedures employed in adjustment of artillery, mortar, and naval fire can be found in FM 6–40 and FM 6–135. These procedures fundamentally include establishment of gun-target line, target offset, location of bursts, communicating fire adjustments, and proper flight techniques.

31. Preflight Planning

a. Unit Aviation Officer. As a special staff member, the unit aviation officer's thorough knowledge of the tactical situation and of the commander's decisions aids in advanced planning for observation missions. His planning is further coordinated with S2 (G2), S3 (G3), and the supporting artillery. With the assistance of his operations officer, he then fits his plan for aerial observation into the overall observation plan of the unit. He assures the adequacy of pilot and observer briefings on each mission to cover:

(1) Tactical situation.
(2) General plan of observation and the aerial observation plan.
(3) The specific mission to be performed, including areas, activities, and relative priorities.
(4) Method and time of reporting.
(5) Signal communication instructions, including radio frequencies, call signs, codes, and restrictions (if any).
(6) Special security regulations, including limitations on flight paths, altitudes, crossing of front lines, and the use of maps, documents, or codes.
(7) Flying safety precautions, including known enemy air activity, enemy and friendly ground antiaircraft installa-

tions, anticipated friendly fire of proximity fuzed or atomic projectiles, and, if appropriate, special survival procedures in case of forced landing.

b. Pilot and Observer. Following the briefing, pilot and observer jointly plan mission details including:

(1) Evaluation of terrain to be covered.
(2) Map or chart preparation for convenient use during flight.
(3) Detailed flight plan, covering time, flight path, routes, altitudes, and other data.
(4) Checklist of all items included in the mission briefing.
(5) Check of aircraft, equipment, and supplies for the mission (maps, codes, field glasses, radio, camera, film, etc).

32. Essentials of Aerial Observation

The pilot-observer team is trained to recognize potentially reliable evidence of enemy activity, to adjust flight path and altitude to mission requirements, to make wise use of any and all natural means to conceal mission purpose and aircraft, to record observed data for proper use, and to report information accurately.

a. Flight Path and Altitude. Flight path and altitude are either prescribed by the unit aviation officer, when these are essential elements of mission success, or selected by the observer team on the basis of best observing position, safety, and concealment of mission objectives.

b. Recording Data. Recording observation data consists essentially of marking locations on the appropriate map, with brief marginal notes indicating time of observation, activity seen, and its potential nature.

c. Reporting Information. As decided during the mission briefing, observational data may be reported immediately, at intervals, or at the conclusion of the mission. Following the mission, the observer reports to the S2, the unit aviation officer, or the debriefing officer for oral interrogation. He reports observed facts, strength estimates, and negative results.

Section II. AERIAL SURVEILLANCE

33. Aerial Surveillance

Aerial surveillance is the systematic observation of specific air, surface, or subsurface areas by visual, electronic, photographic, and other means employing an aerial platform to provide timely intelligence information for supported tactical ground commanders.

34. Types of Reconnaissance/ Surveillance Missions

a. Area Search. Area search normally is conducted for the purpose of covering an area that has not been under observation before, monitoring any movement within an area, or detecting any military activities that have previously remained undetected. The limits of the area to be searched are designated in the mission request, but the aircraft crew must plan the pattern to be flown to insure complete coverage. Search areas may vary in size from one or two square miles to the entire division area of interest.

b. Specific Search. Specific search normally is conducted to detect military activities in areas that are suspected or known to be active. Specific search usually is employed for point targets and for specific information.

c. Route. Observation of roads, railroads, and waterways may be conducted to determine the condition of the route or the amount of traffic it handles. It is performed on a point-to-point or town-to-town basis over selected routes which may pass through several search areas.

35. Visual Missions

Aerial visual operations are accomplished by employing direct aerial observation techniques to obtain and report information of military value. These techniques are divided into four areas: visual search, target recognition, geographical orientation, and general target, location.

a. The purpose of visual search is to detect targets. It is influenced by the altitude of observation, speed of the observation aircraft,

terrain conditions, and limitations of the human eye.

b. Target recognition or identification of sighted targets assists commanders, and especially their intelligence officers, in associating items of equipment with specific types of enemy units. For example, if an aerial observer reports an indirect fire weapon as a mortar, but does not indicate the size, then the usefulness of the information is restricted. If the observer had identified the weapon as a heavy mortar, it would have provided more validity in estimating the size or type unit.

c. Geographical orientation and target location complement each other. Geographical orientation is the ability of an aircraft team to know its position relative to any geographic reference including tactical maps, charts, airphotos, or preselected terrain feature(s). Target location is the transdisposition of a sighted target on the ground to a geographical representation of the terrain, such as a map or chart.

d. Once the target or enemy activity has been detected, identified, and located, it must then be reported to the person or agency requesting the mission. The crew makes immediate reports to the supported requesting agency and/or to the G2 section, if deemed appropriate. If an immediate report is not required while the aircraft is in the air, the debriefing officer forwards a mission report through intelligence channels to the unit(s) concerned.

e. The trained aerial observer is perhaps the most important target acquisition means of the aerial surveillance unit. For detailed information on aerial observation techniques, see FM 1–80.

36. Photographic Missions

The aircraft of the surveillance unit may be equipped with several different types of camera systems. Selection of the appropriate camera system and camera angle for the type target information required and the direction of approach available must be accomplished during the flight planning. Night photography is limited to vertical pictures. In addition to specific photographic missions, photographs of targets sighted while performing SLAR or infrared missions frequently are taken.

37. Aerial Radar Missions (SLAR)

a. The aerial radar section is employed to extend the range and flexibility of the commander's reconnaissance and surveillance effort. Equipped with both radar and photographic sensors, the section normally is employed to provide surveillance of routes, zones, or areas where enemy movement is suspected, and to acquire targets therein.

b. The side-looking airborne radar (SLAR) is particularly valuable during inclement weather when black and white photography and infrared imagery quality are greatly reduced. The side-looking feature of the SLAR permits the use of the aircraft to look deep into enemy territory while still flying over friendly terrain. The medium range observation aircraft may be employed over enemy terrain when the enemy air defense capability is such that employment is possible.

c. The aircraft of the aerial radar section contain navigation systems that permit mission accomplishment during periods of marginal weather. Ceiling and visibility criteria must be established. Operations during instrument weather conditions (day and night) require an instrumented airfield with terminal flight facilities to include ground controlled approach radar.

38. Aerial Infrared Mission

a. The aerial infrared section is employed to provide air-to-ground infrared coverage of routes, zones, or areas within enemy territory, and to acquire targets within.

b. The aerial infrared section may be employed on day or night aerial target acquisition missions; the procedures and techniques utilized are determined by the type of mission.

c. When flying within enemy territory, maximum use should be made of all known techniques to reduce the enemy's capability to detect or engage the aircraft. Some of the infrared sensors are particularly effective at night (in fair weather) when the aircraft is partially concealed from visual observation.

d. The aerial infrared system is not an all-weather system. For best results with the infrared detectors, aircraft are required to fly below cloud levels in the target area.

39. Operational Concepts

a. Operational concepts delineate the responsibilities of personnel and units involved in the planning and execution of aerial surveillance missions. The commanders and staffs of supported and supporting units, including the G2, G2 Air, photo processing and reproduction units, image interpreters, and aerial surveillance units commanders, are involved. The following are some of the items which must be considered:

(1) Determination of requirements for aerial surveillance to support assigned and contemplated missions of the unit.
(2) Determination of priorities and planning for employment of organic and supporting aerial surveillance effort.
(3) Preparation and processing of requests for aerial surveillance support.
(4) Supervision and operation of image processing, reproduction, interpretation, and distribution facilities.
(5) Dissemination of intelligence resulting from aerial surveillance missions.
(6) Characteristics of the area of coverage.
(7) Enemy defenses which will affect accomplishment of the missions.
(8) Weather.
(9) Capabilities, limitations, and availability of sensors and aerial platforms.
(10) Coordination with Tactical Air Force Flight Operations Centers and friendly air defense units.
(11) Location of airstrips and unmanned aerial vehicle launch and recovery areas.

b. The commander of the aerial surveillance unit will be responsible for detailed mission planning and execution. Operational considerations are—

(1) Size and location of the area of coverage.
(2) Enemy defenses affecting the successful accomplishment of the mission.
(3) Weather.
(4) Sensor capability and the range of aerial platforms.
(5) Number of aerial platforms available.

c. Based on these considerations, the commander conducts detailed planning to include determination of the number of sorties required to complete the mission, direction of flight, altitude, and the amount of film required. He will coordinate flights with the appropriate air traffic control agency prior to the conduct of the flight.

d. If the mission is visual surveillance, the observer can report during the flight. If the mission requires permanent record imagery, the imagery is delivered to the supporting reproduction unit.

e. The reproduction unit will process the record and turn it over to the interpreters. Some preliminary interpretation frequently will be accomplished at the reproduction facility for immediate exploitation. However, both immediate and detailed interpretation normally will be accomplished at the image interpretation facility. Imagery interpretation reports will be provided directly to the requestor.

CHAPTER 7
AIRLIFT OF PERSONNEL AND MATERIEL

40. Introduction

a. General. The airlift of personnel and materiel (equipment and supplies) within the combat zone is a major function of Army aviation. It includes the movement of units to execute airmobile operations, the movement of reserves, the shifting and relocation of units and individuals within the combat zone, and air movement of equipment and supplies.

b. Requirements. Requirements for the airlift of personnel and materiel by Army aircraft are generated by—

(1) The need for attaining tactical advantage.
(2) The need for speed and flexibility.
(3) The need for dispersion of units on the nuclear battlefield.
(4) The presence of inadequate surface routes of communications due to enemy action, terrain obstacles, rapid advance of friendly forces, or the isolation of friendly forces.
(5) The need for reinforcement of threatened areas.

c. Basic Factors. Basic factors for use of air transportation are—

(1) Availability of aircraft of suitable speed, range, and payload (app B).
(2) Facilities and terrain characteristics at rear airfields, intermediate landing points, and terminal landing areas.
(3) Weather and visibility conditions.
(4) Ability to maintain control of air routes of communication.
(5) Availability of trained personnel to load, unload, and operate aircraft.
(6) Time available.
(7) Enemy air defense capability.
(8) Availability, adequacy, and relative savings of time, men, and materiel as compared to use of other means of transportation.

41. Airlift of Personnel

a. Staff Procedures. The unit requesting airlift of personnel is responsible for planning the movement and the necessary coordination with higher, lower, and adjacent units. The unit aviation officer or the supporting aviation unit liaison officer assist in planning the movement. A liaison officer from the aviation unit should coordinate pickup zone activities when a multiple lift is made from a single pickup zone. Aircraft for airlift of personnel normally are assigned on a mission basis with aviation unit integrity maintained as much as practicable. Aviation unit planning to support the mission should be based on the plans of the supported unit. SOP for air movement of troops should be developed at all levels by aviation units as well as supported units. Of particular importance in advance planning is the establishment of potential requirements for cargo nets, slings, and tiedown devices to secure external or internal loads. The requirement for these items *must* be forecast on a long range basis, and adequate stockage must be maintained by support organizations for immediate availability to using units.

b. Methods. Methods by which airlifted personnel can be delivered into objective areas include—

(1) *Air landed.* Personnel moved by air can disembark after the aircraft has landed.
(2) *Airdrop.* Personnel can parachute from aircraft in flight (see *d* below).
(3) *Rapelling.* Trained troops can use ropes or ladders to descend from hovering helicopters unable to land because of terrain obstacles.

c. Airmobile Operations. An airmobile operation is one in which combat forces and their equipment are moved about the battlefield in aircraft under the control of a ground force commander to engage in ground combat. FM 57–35 contains a detailed discussion of airmobile operations.

d. Airborne Operations. Airborne operations involve the movement and delivery by air of combat and combat support elements into an objective area for execution of a tactical or strategic mission. Troops participating in airborne operations are air landed or air dropped into the airhead by U. S. Air Force elements. Army aircraft organic to airborne elements are air transported into the airhead by Air Force aircraft or are flown in by Army aircraft when the distance permits (FM 1–110 and TM 57–210).

42. Airlift of Materiel

a. Staff Procedures. Requests for aerial delivery of materiel will be sent through normal channels. The decision to use Army aircraft for this type of mission will be made by the echelon possessing the airlift capability (normally division or higher). Normal staff procedures are followed. Coordination and planning are accomplished at the level possessing supplies and aircraft to accomplish the mission. Logistical aviation units normally are assigned the mission, or aircraft of the division may be allocated on a daily basis to S4/G4 for logistical support. A limited number of aviation units are authorized cargo slings and nets. Additional slings or nets will be required for sustained or large scale, cargo sling operations. When this requirement exists, additional slings or nets should be obtained through supply channels and issued to the organization responsible for preparing the cargo for movement. The aircraft commander will supervise the loading of supplies and equipment. For details covering these procedures, see FM 1–105 and FM 10–8, and TM 10–500–6, TM 55–450–8, and TM 55–450–9. Planning for this type of movement will include—

(1) Delivery priorities to allow for differing load capabilities of specific aircraft (see app B) and for weather conditions.
(2) Flight routes.
(3) Pickup and delivery points.
(4) Refueling when long distances are involved, or when limited fuel is carried to increase payloads.
(5) Communications with and identification of units which are to receive supplies.
(6) Methods of delivery (*b* below).
(7) Establishment of landing or drop zones.
(8) Plans for use of unit pathfinders at landing or drop zones.

b. Methods of Delivery. Methods by which airlifted materiel can be delivered to using units by Army aircraft include—

(1) *Air landed.* Materiel moved by air is unloaded after the aircraft has landed. During the airlift, this materiel may be carried internally or externally by fixed wing or rotary wing aircraft.
(2) *Airdrop.* Materiel can be delivered from Army aircraft in flight by—
  (*a*) Free dropping, without the use of parachutes.
  (*b*) Use of cargo parachutes.

c. Airmobile Operations. In airmobile operations, the operations plan will include the requirement for delivery of equipment and supplies. The supported unit will prepare and load its own equipment and supplies. Loading of the aircraft will be accomplished under the supervision of the aircraft commander.

d. Airborne Operations. Delivery of materiel to the airhead will be accomplished by U. S. Air Force elements until those elements are withdrawn from the operation. Supplies and equipment airlifted within the airhead may be transported by organic Army aviation.

43. Aviation Support of Rear Area Security and Area Damage Control

a. Staff Procedures. Rear area security forces and area damage control parties normally are controlled by the operations center of the support command or the director of security of the logistical command. Army aviation for the support of this force normally will be allocated by the G3 or director of plans and operations as a secondary mission to be per-

formed on an on call basis. It may be necessary to give the supported force operational control of certain aviation elements over extended periods. The air cavalry troop is well suited to participate in rear area security missions as a part of the armored cavalry squadron or other larger units. An aviation liaison officer from the supporting unit should assist in planning for these missions. Detailed planning and decentralized execution are required. A specific aviation unit should be given the mission of supporting rear area security operations (see FM 31–16).

b. Coordination. Necessary coordination must be accomplished with—

(1) The supported units.
(2) Higher, lower, and adjacent units.
(3) Army air traffic regulations system (AATRS) elements.
(4) Air defense elements.

c. Planning Factors. Planning should include consideration of—

(1) Pickup points for security or control parties.
(2) Evacuation procedures.
(3) Communications.
(4) Support of forces to include ammunition, POL, and maintenance.
(5) Acceptable nuclear radiation dosages.

d. Requirements and Capabilities.

(1) Effective rear area security forces must—
   (*a*) Have a high degree of mobility. Army aviation can provide the required mobility to rear area security forces.
   (*b*) Have flexibility in organization to permit tactical tailoring to support a wide variety of security missions. Army aviation is capable of supporting a wide variety of missions.
   (*c*) Have adequate firepower to achieve superiority over expected hostile forces. Helicopters can be used to provide suppressive fires and to transport additional firepower means.
   (*d*) Have adequate and efficient communications. Army aviation's capability to provide radio relay stations, transport communications facilities to inaccessible areas, lay wire, drop and pick up messages, and carry messengers and couriers increases the communications capacity of the supported force.

(2) Effective area damage control parties must—
   (*a*) Be capable of assuming control at the site of a major incident under a variety of conditions and making a rapid assessment of the situation. The capability of Army aviation to provide aerial observation posts enables observers to survey damaged areas and perform aerial survey and monitoring of contaminated areas. Its capability to patrol the area by air, transport control personnel into the area, and augment communications will greatly enhance the capability of the damage control party.
   (*b*) Be capable of rapid expansion by augmentation from varied sources. The rapid transport capability of Army aviation may be employed to bring in additional elements.
   (*c*) Be mobile. Army aviation can provide mobility to the damage control parties as required.

CHAPTER 8
AERIAL FIRE SUPPORT

44. General

Armed Army helicopters provide a means of supplementing and extending the fire support capabilities available to the ground commander. They are not intended to substitute for ground-based fire or close air support. They can be used to support ground operations by performing reconnaissance by fire missions, by attacking enemy forces during airmobile or security operations, and by attacking stationary or moving targets during actual fire support missions. Defensive fires can be delivered from armed helicopters for self-protection, for protection of ground convoys or troop-carrying helicopters endangered by hostile ground fires, and for suppression of enemy forces opposing landings by troop-carrying helicopters participating in airmobile operations. Armed helicopters are capable of delivering both area fire and point fire. Area fire is utilized in suppression or neutralization of known or suspected hostile positions. Point target fire is directed against specific, identified points with the intent to destroy the target. FM 1–110 contains a detailed discussion of armed helicopter employment.

45. Fundamentals of Employment

Armed helicopter units support infantry, armored, mechanized, and airborne infantry units by responsive delivery of aerial firepower where it is needed. Command relationships must be established prior to committing the armed helicopter force. The commander of an armed helicopter unit, understanding the tactics and employment of each type ground unit and familiar with the plan of action of the ground force, recommends the best utilization of his unit in support of this plan. Based on the final decision of the ground force commander, he then executes his portion of the plan. The nature of his integrated tasks requires boldness and aggressiveness in the execution of his plan.

a. Surprise. Surprise is achieved by using the speed and maneuverability of the helicopter in crossing terrain obstacles to strike the enemy at an unexpected time and from an unexpected direction. It is augmented by well-executed aerial movements at low level, when necessary, using available cover and concealment and with all speed, aggressiveness, and deception possible.

b. Fire and Maneuver. Combining fire and maneuver as a single entity, armed helicopters engage the enemy with a persistence that both distracts his aims and undermines his confidence. Armed helicopters using a continuous harass-and-exploit technique can have a damaging psychological effect on the enemy and may prove as destructive to his morale as the loss of men and equipment from helicopter fire. Such engagements employ two common features of warfare—a *base of fire* and a *maneuvering force*. The base of fire is the element that will restrict the enemy's ability to maneuver during the engagement while attempting to destroy him. The maneuvering force is the element that will, in fact, attack and destroy him by fire. Target characteristics and standoff distance necessary to avoid effective counterfire will determine the type armament needed by each of these helicopter elements for a given engagement. 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.

c. Mobility. The rapidity of armed helicopter unit movement over obstacles, the maneuver of their firepower into position to destroy 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 in the objective area concurrent with the maneuver of ground combat elements. The inherent capability of the helicopter to overfly terrain obstacles permits the assignment of multiple tasks to helicopter units and also permits their rapid disengagement once committed. Therefore, the armed helicopter unit commander at every level should expect diversity of task and should be prepared with all plans and details necessary to overcome or avoid terrain obstacles and restrictions to movement in the combat area; that is, his planning must be continuous and encompass as a minimum such factors as friendly or enemy fires, good and poor weather conditions, the state of materiel readiness, and personnel strength.

d. Flexibility. Mobile warfare dictates that combatants be capable of adapting their actions to fluid and rapidly changing situations on the battlefield. Armed helicopter units, because of their excellent means of communications, high degree of mobility, and variety of weapons, are ideally suited for operations in this environment They are adaptable to rapid changes in attack formations and other engagement techniques during a single encounter with the enemy. It is imperative that an armed helicopter mission commander keep himself and his superiors well informed and be able to modify his plans to contribute to the success of the overall mission. Mission-type orders best permit flexible response to changing conditions and permit the mission commander to modify his plans as the situation dictates.

e. Coordination. The potential of the armed helicopter is best realized when employed in conjunction with the ground and air combat elements. Armed helicopters alone are not capable of holding terrain. When employed with conventional forces, they provide mobile firepower at critical times and places to augment and extend the fire support capability of the ground commander. All operations should be coordinated to the fullest extent possible among all participating units.

46. Factors Affecting Employment

Factors affecting employment of armed helicopters are mission, enemy, terrain and weather, and troops and equipment. Commanders first consider each factor separately. They then mentally weigh each factor in the light of the importance of the other factors pertaining to the specific mission. In many situations, the relative importance assigned to each factor affecting employment will determine which course of action will be selected. The armed helicopter unit and mission commanders consider all factors in relation to the unique equipment and mission capability of the unit.

CHAPTER 9
MEDICAL SERVICE EMPLOYMENT OF ARMY AVIATION

Section I. GENERAL

47. Mission

The mission of the Army Medical Service (AMEDS) is to maintain the health of the Army and conserve its fighting strength.

48. Responsibility

Aeromedical evacuation in the combat zone is a mission of the AMEDS. This mission includes battlefield pickup of selected patients (except those from an airhead where airborne operations include air landed logistical support by the Air Force), their transportation to an initial treatment facility, and subsequent movement between treatment facilities within the combat zone. The AMEDS responsibility for aeromedical evacuation extends to the U.S. Army and joint airheads or beachheads that are supported by U.S. Army forces.

Section II. ARMY AEROMEDICAL EVACUATION

49. General

Aeromedical evacuation by organic means, for routine or emergency patient movement, is required during all intensities of conflict. Area weapons, generating more casualties over wider areas, and meager surface lines of communication encountered during stability operations, necessitate employment of the increased medical evacuation capabilities inherent in aircraft. Within the combat zone, AMEDS aircraft provide the means of a rapid and dependable aerial method for moving patients to medical treatment facilities. Some of the more prominent advantages of aircraft over surface means of evacuation are speed, range, flexibility, patient comfort, and morale. To the commander, these advantages mean a reduction of noneffectiveness and an economy of medical means. Combat zone aeromedical evacuation operations are conducted exclusively under operational control of the responsible surgeon. The surgeon plans the employment of AMEDS aeromedical evacuation units which must remain continuously under his operational control. When Army aviation elements are committed to patient movement missions, they respond exclusively to direction of the responsible surgeon with regard to how and where patients are to be moved. These provisions are in accordance with the details of agreement of STANAG 2087.

50. Types of Forward Aeromedical Evacuation

Medical evacuation performed by Army aircraft is divided into two general types depending upon the in-flight patient care provided.

a. Aeromedical Evacuation. Aeromedical evacuation is that part of the combat zone medical evacuation function which employs AMEDS air ambulance and provides in-flight medical treatment and/or surveillance.

b. Air Movement of Patients. Air movement of patients is that part of the combat zone medical evacuation functions which employs AMEDS air ambulances or other aircraft under the operational control of the surgeon and in which prior medical treatment minimizes the need for in-flight medical treatment and/or surveillance.

51. Army Medical Service Air Ambulance Units

a. AMEDS air ambulance units are assigned

to the field army or a theater army logistical command as required to accomplish the aeromedical evacuation of selected patients. Details pertaining to their organization are contained in FM 8–5.

b. The primary mission of the air ambulance service is to provide on-call Army aeromedical evacuation of seriously ill or injured patients. Secondary missions include the following:

(1) Army air movement of patients when ground ambulances are inappropriate or inadequate.

(2) Lateral shifting of patients to other medical facilities for treatment.

(3) Transportation of medical personnel, units, supplies, and equipment as required.

c. All aircraft assigned as AMEDS air ambulances are marked with the Geneva cross and national colors as prescribed in the Geneva convention and appropriate DA publications.

d. AMEDS air ambulances have an internal litter capability with provisions for in-flight treatment and care of patients. Medical personnel and equipment are carried aboard these aircraft on all missions.

e. AMEDS ambulances, ground or aerial, are *not* used for transporting nonmedical personnel, supplies, or equipment. This restriction is in compliance with the rules of land warfare.

f. Details of aeromedical evacuation operations are contained in FM 8–10, FM 8–15, and FM 8–16.

52. Supporting Aeromedical Evacuation Means

a. Division, corps, and field army aviation units have the capability of augmenting the AMEDS air ambulance system to meet peak casualty requirements and to move stabilized patients on a scheduled basis. To the extent feasible, all Army utility and cargo aircraft (see app B) are designed to accept litter configurations. Augmentation aeromedical evacuation and air movement of patients is a secondary mission for nonmedical aviation units.

b. Nonmedical aviation units normally are used to transport routine patients. Upon request of the responsible surgeon, these operations are conducted as follows:

(1) *Scheduled movements.* Scheduled patient movements involve the use of return space generated by other scheduled airlift requirements. This back-haul capability normally is used to move patients who do not require in-flight medical attention.

(2) *Movements of opportunity.* Evacuation movements of opportunity are instituted by the medical officer in the forward facility when a requirement arises coincident with the availability of a nonscheduled aircraft which can be sent to the general destination predesignated for these patients.

c. Non-AMEDS aircraft can be used to meet the requirements of peak periods of activity when normal aeromedical evacuation capabilities become temporarily inadequate. Improvisation consists of providing appropriate AMEDS personnel and materiel to furnish in-flight medical treatment on those aircraft whose size and interior configuration permit medical personnel to work effectively. In instances of extreme pressure on the patient evacuation system, every available space on general-purpose aircraft may be used to transport all classes of patients without mandatory provision for in-flight medical treatment. Regardless of the method used, the responsible surgeon designates the point of origin, the patients to be carried, and the destination point.

53. Staff Relations, Procedures, and Planning

Under the overall supervision of the appropriate general staff officer, the command surgeon is technically responsible for all medical evacuation, whether by surface or aerial means. He maintains control over all patients regardless of the means of evacuation used. He determines the pick-up site and destination for all patients moved by air. The command surgeon directs the employment of AMEDS air ambulance units with necessary coordination with the staff aviation officer and air traffic control agencies. He determines requirements for air evacuation, and transmits requests for support by nonmedical aviation units to the staff aviation officer. The command sur-

geon is responsible for medical training of aviation personnel and the provision of staff medical advice to the commander and the staff aviation officer, and for providing technical assistance to aircraft accident investigators. AR 40–21, STANAG 3318, and SEASTAG 3318 provide guidelines on the medical aspects of aircraft accident investigation.

Section III. AIR CRASH RESCUE

54. Helicopter Ambulance Air Crash Rescue Units

a. Helicopter ambulance air crash rescue detachments provide air crash rescue support to Army airfields or heliports and all phases of airmobile operations. Details pertaining to their organization are contained in FM 8–5 and FM 8–16.

b. The mission of the air crash rescue service is to provide continuous immediate response for extraction of personnel, fire suppression and forcible entry as necessary, emergency medical treatment, and evacuation and in-flight treatment of patients from aircraft crash sites.

c. Air crash rescue units may be assigned to provide fulltime rescue support at high density airfields and heliports, establish an area support posture to provide an on-call service to one or more airfields or heliports, to provide a zonal-type rescue coverage for air operations based on the number and type of supported aircraft and the aerial mission plan.

d. Details of air crash rescue operations are contained in FM 8–16.

55. Staff Relations, Procedures, and Planning

a. Air crash rescue units are assigned to the major medical command, with supervision provided by medical command and control units such as medical groups or medical battalions. When based at major Army airfields or with concentrations of Army aircraft, this type unit is attached to, and under the operational control of, the airfield commander or major Army aviation unit commander. Technical supervision will be provided by the command surgeon or, in the absence of a surgeon, the medical commander responsible for area medical service. The dispatch of air crash rescue aircraft is directed by the local air operations control element, exploiting the fastest and most direct means of communications in accordance with procedures established by the airfield commander. Destination medical treatment facilities will be designated by the responsible surgeon.

b. When air crash rescue units are required to provide air crash rescue support to two or more nearby Army airfields or heliports, operational jurisdiction will be retained by the medical commander responsible for area medical support.

c. During those operational periods when air crash rescue units may be required to provide air crash rescue coverage to administrative or tactical mass aerial movements, operational jurisdiction is temporarily transferred to the aerial mission commander. Technical medical supervision will be provided by the surgeon responsible for medically supporting the aerial mission.

CHAPTER 10
AIRMOBILE ORGANIZATIONS

Section I. GENERAL

56. Introduction

An airmobile operation is an operation in which combat forces and their equipment move about the battlefield in aircraft under the control of a land force commander to engage in land combat. Airmobile forces are trained and equipped to take advantage of the superior mobility which distinguishes them from conventional ground forces. Their equipment is designed for maximum air transportability, and more aircraft are assigned to airmobile units than to nonairmobile units. Tactical integrity is essential to both the supporting lift unit and the supported combat unit. Combat units must be landed in close proximity to their objective with tactical cohesion in order to reduce or eliminate the fatiguing and time-consuming task of reorganization. Lift units must maintain tactical integrity during airmobile assaults for reasons of closer coordination, effective teamwork, and a more positive measure of control. FM 57–35 contains details on the conduct of airmobile operations. This chapter is confined to a discussion of units of the airmobile division (TOE 67T) which possess organic aircraft.

57. Capabilities

The airmobile division is capable of—

a. Rapidly maneuvering to gain surprise and tactical advantage.

b. Operating in difficult terrain and without the usual restrictions caused by surface obstacles.

c. Providing firepower by direct air-to-ground fire supporting weapons.

d. Fighting simultaneously in more than one direction or area.

e. Raiding, harassing, and interdicting the enemy rear, thus forcing the enemy to divert combat power to the protection of his supporting installations and units.

58. Limitations

As compared to other U.S. Army divisions, this division has the following limitations:

a. Increased sensitivity to weather and visibility conditions.

b. Increased requirements for aviation POL and aircraft maintenance.

c. Limited capability for sustained ground combat.

d. Primary dependence upon the maintenance of air lines of communication.

e. Requirements for local air superiority gained by other Services.

59. Basic Organizational Concepts

Basic organizational concepts of the airmobile division include—

a. Substitution of helicopters for traditional equipment such as trucks, armored combat vehicles, and ground fire support systems.

b. Elimination of heavy equipment from the combat and combat support elements of the airmobile division to insure the operational air mobility of these elements in aircraft organic to the airmobile division.

60. Concepts of Employment

Employment of the airmobile division is based upon the following concepts:

a. Organic aircraft enable the airmobile division to respond immediately and to maneuver rapidly over large areas. These aircraft provide an increased ability to (1) find, fix, and

fight the enemy and (2) bypass obstacles and strongpoints. Combat and combat support elements are moved into, and are extracted from, the battlefield area by aviation units using assigned aircraft. The division thus maneuvers its combat battalions through use of assigned aircraft rather than slower traditional surface vehicles. Supporting artillery and other combat support elements of the division are emplaced and subsequently displaced by air as required.

b. Armed aerial escort, air-to-ground fire support, and resupply of combat forces of the division are provided by aerial weapons systems and cargo aircraft.

c. Surface movement and employment of the combat elements within the battlefield area (exclusive of airmobile operations) are essentially the same as that of infantry division units (FM 61–100).

Section II. AVIATION GROUP, AIRMOBILE DIVISION

61. Mission

The mission of the aviation group is to provide aviation support to the division, and aviation special staff personnel to the division headquarters.

62. Capabilities

The aviation group has the following capabilities:

a. Provides command, control, and staff planning, and supervision of subordinate and attached units.

b. Provides aviation special staff personnel for division headquarters.

c. Provides limited aerial battlefield surveillance and performs target acquisition.

d. Airlifts simultaneously the assault elements of two airmobile infantry battalions *and* one of the airmobile division's 105mm field artillery battalions (three batteries).

e. Provides continuous (day and night) operations during visual flight conditions and limited operations under instrument flight conditions.

f. Airlifts supplies, equipment, and troops of units of the division.

g. Provides aircraft for general support of units without organic aircraft.

h. Provides aircraft for general support and reinforcement of units with organic aircraft.

i. Augments aeromedical evacuation capability of the medical battalion at the request of the appropriate command surgeon.

Section III. HEADQUARTERS AND HEADQUARTERS COMPANY AIRMOBILE DIVISION BRIGADE

63. Mission

The mission of the headquarters and headquarters company is to provide personnel to command and control attached combat and combat support elements in both training and combat operations. The unit is assigned on the basis of three per airmobile division.

64. Capabilities

The commander and staff officers of the headquarters and headquarters company have the following capabilities:

a. Commanding attached elements of the airmobile division's combat and combat support elements in offensive and defensive operations.

b. Accepting or releasing attached elements on short notice.

c. Supervising the movement and security of attached or supporting elements.

d. Supervising tactical training of attached airmobile division elements.

e. Establishing emergency operational headquarters in the event of the destruction of division headquarters.

f. Providing Army aviation for command control of brigade headquarters and attached infantry battalions.

Section IV. CAVALRY SQUADRON, AIRMOBILE DIVISION

65. Description

The cavalry squadron, airmobile division, is a combat force with combat elements mounted completely in organic aircraft and conventional surface vehicles. The unit combines the characteristics of tactical three-dimensional mobility and highly destructive firepower from both surface and aerial systems in the performance of reconnaissance and security for the division (FM 17–36).

66. Capabilities

The cavalry squadron has the following capabilities:

a. Performs air and ground reconnaissance and provides security for the unit to which assigned or attached.

b. Conducts offensive, defensive, or delaying operations as required.

c. Provides limited air and ground antitank defense for the unit to which assigned or attached.

67. Concept of Employment

The cavalry squadron normally is employed as a unit with air elements and ground elements in close conjunction so that their respective capabilities are fully exploited and complementary. The squadron conducts ground and air reconnaissance and security operations over large areas for the division, and may conduct offensive, defensive, or delaying operations as required.

Section V. DIVISION ARTILLERY, AIRMOBILE DIVISION

68. Mission

The mission of the division artillery, airmobile division, is to provide direct support and general support artillery for the airmobile division.

69. Capabilities

The capabilities of the division artillery include—

a. Providing conventional artillery support to include communications, target acquisition, and survey.

b. Establishing the fire support element of the division tactical operations center.

c. Providing command and control of additional attached artillery units.

d. Providing one field artillery battalion, 105mm, to participate in airborne operations when organized as an airborne field artillery battalion.

e. Providing aerial mounted artillery support.

f. Providing night fire support to include use of aerial flares.

70. Employment and Fire Support Coordination

a. Employment. The bulk of firepower within the airmobile division is provided by the division artillery. The three 105mm howitzer battalions normally are assigned direct support missions in support of the three infantry brigades. The aerial artillery battalion is employed in general support of the division, and also to reinforce the fires of the direct support missions in support of the three in- are completely air transportable by Army helicopter and/or fixed wing aircraft.

b. Fire Support Coordination. Fire support coordination is accomplished by the fire support element in the tactical operations center at division level, and in the fire support coordination centers at lower levels. At division level, the division artillery commander normally is the fire support coordinator and principal advisor to the division commander on fire support matters. Below division level, the commander of, or the liaison officer from, the supporting artillery unit normally performs this function. See FM 6–20–2, and FM 101–5.

Section VI. SUPPORT COMMAND, AIRMOBILE DIVISION

71. Mission

The mission of the support command is to provide division-level combat service support to all assigned or attached elements of the division, except military police, communications, and construction services, and those administrative services provided by special staff sections in the administration company.

72. Capabilities

The support command, airmobile division, is capable of providing—

a. Requisition, receipt, storage, and distribution of all classes of supply, and maintenance of a 1-day reserve of supplies for the division.

b. Direct support maintenance, except for medical and cryptographic items.

c. Medical service support to include evacuation of patients, medical (and emergency dental) treatment, medical supply, and organizational maintenance of medical equipment.

d. Graves registration service when appropriate teams from TOE 10–500 are attached.

e. Air delivery equipment supply and maintenance support to the division.

f. Music for division functions.

CHAPTER 11
AVIATION SUPPORT OF INTERNAL DEFENSE AND GUERRILLA WARFARE OPERATIONS

Section I. INTERNAL DEFENSE

73. Introduction

a. An internal defense operation is conducted by a host country or its allies directly against armed insurgents and their underground organization, support system, and external sanctuary or outside supporting power. Army aviation support is provided to host country and U.S. forces engaged in internal defense operations in accordance with agreements between the governments of the host country and the United States. This support covers the spectrum of internal defense operations, to include military civic action, tactical operations, advisory assistance, psychological operations, intelligence operations, and internal security. The nature of internal defense operations, coupled with poor road networks and rugged terrain often encountered in these operations, creates a mobility disadvantage for forces designed and trained to conduct conventional military operations. Air mobility, aerial reconnaissance, and aerial fire support assist in reducing this disadvantage.

b. U.S. forces conducting internal defense operations are supported by organic Army aviation units. Separate aviation companies and battalions normally provide support to host country forces, with operational control of these aviation units being retained by the senior U.S. officer involved in the operation. Appropriate request channels must be established to insure that aircraft are used on appropriate missions and procedures should be established to allow for rapid reaction to immediate requirements. Field manuals of the 31- and 41-series, and FM 100–20 (see app A) contain guidance and doctrine for commanders of U.S. forces participating in internal defense operations.

74. Military Civic Action

Military civic action is action performed or supported by military or paramilitary forces using their military skills, equipment, and resources in cooperation with civil authorities, agencies, or groups. Army aviation elements can provide air transport not otherwise available to the host country for carrying out these actions. Command and control of aviation resources remain essentially the same as for tactical or internal development operations, with the added requirement for direct coordination between aviation units and user organizations such as host country departments of agriculture and health, and members of the U.S. Country Team such as the U.S. Agency for International Development and the U.S. Information Agency.

75. Tactical Employment

Following are tasks, listed under the five land combat functions, which aviation units can perform in support of tactical internal defense operations:

a. Intelligence. Reconnaissance, surveillance, and target acquisition tasks are performed by use of the following techniques:

(1) *Visual.* Reconnaissance and surveillance tasks are performed by pilots and trained observers in aircraft operating throughout the area of interest. Aviators and passengers, regardless of their mission, should conduct visual surveillance along their routes, especially when flying over hostile areas.

(2) *Photographic.* Aircraft may be equipped with aerial cameras to provide rapid and timely photographic

coverage of suspected areas. This coverage can include daylight and night photography, and both area and specific target photography.

(3) *Infrared and radar.* Infrared surveillance equipment can provide information on insurgent activities, such as locating cooking fires hidden by the jungle canopy. Radar surveillance equipment, with or without data link equipment, may be employed for night surveillance of coastal, river, and canal traffic.

(4) *Route and rail reconnaissance.* Constant patrolling of road and rail lines often will deter insurgent ambush. Photographs and visual inspection of rail lines may reveal insurgent sabotage, destruction, and possible ambush sites.

(5) *Landing zone and area reconnaissance.* Deliberate preplanned reconnaissance of landing zones must be conducted unless requirements for security or surprise restrict such activities. Current records on all landing zones must be developed and maintained.

(6) *Target acquisition.* Information for timely and adequate target acquisition may be developed from aerial reconnaissance and surveillance missions and from administrative and tactical missions.

b. Mobility. Air movement of troops and equipment, to include planned operations and employment of reserves, improves the relative force ratio in favor of internal defense forces. To obtain maximum advantage of this mobility, designated combat units with adequate supporting weapons and equipment must be moved close to departure sites. Additionally, aviation units must be capable of immediate movement to staging areas and rendezvous points. Airmobile operations are conducted with emphasis on mobility of forces, surprise, and speed. Location of staging areas should be based on accessibility to the area of tactical operations, logistical compatibility to support the operation, and security. Applications of air mobility include:

(1) *Airmobile combat patrols.* Airmobile combat patrols, composed of infantry troops transported in helicopters, can attack targets of opportunity and participate in preplanned operations.

(2) *Raids.* Airmobile forces can conduct raids against base areas, command post locations, training areas, and areas considered by the enemy to be secure. In addition to keeping the insurgent force off balance, these raids can provide an excellent method of maintaining the initiative and gathering information on enemy activities. Armed helicopters, operating as an independent force, can conduct harassing missions when use of other combat power is precluded (FM 1–110).

(3) *Patrol support.* Aviation elements can support ground patrolling activities by positioning and evacuating personnel participating in patrols, and by providing them with aerial fire support, resupply, radio relay, reinforcement, and medical evacuation.

(4) *Encirclement.* Aircraft can be used in encirclement operations to block gaps by delivery of aerial fires, positioning of reserves, and coordinating movement of converging forces escaping from the encirclement.

(5) *Night operations.* Airmobile operations such as airmobile patrols, raids, and support of ground patrols can be conducted at night. Operations at night deny insurgent forces the freedom of action afforded by periods of darkness.

(6) *Landing zone security and counter-ambush techniques.* Measures which may be used to provide security for, and to counter ambushes of, landing zones include (1) use of decoy and multiple landing zones, (2) delivery of aerial fires on adjacent landing zones and likely avenues of approach, and (3) use of smoke and riot control agents to mask aircraft landings.

c. Firepower. Fire support for airmobile operations must be thoroughly planned and coordinated, and may include close air support,

aerial fire support, artillery fires, and naval gunfire. Fire support should be selective in application in order to protect the civil population from the massive, more indiscriminate application of firepower associated with limited and general positional war situations. Army aviation units can provide firepower in support of internal defense operations. The firepower delivered by Army aviation units can be combined with firepower delivered by other means, to include the following:

(1) *Close air support.* Close air support, to include prestrike and on-call fire support, should be considered in planning all airmobile operations. This support, provided by the U.S. Air Force, is controlled by the forward air controller.

(2) *Naval gunfire.* Naval gunfire can be integrated with artillery fires and close air support missions during preparatory fires for airmobile operations and supporting fires for ground operations. Representatives of the air and naval gunfire liaison company provide observation and adjustment of naval gunfire.

(3) *Artillery.* Aerial observers can enhance the effectiveness of artillery fires supporting internal defense operations by assisting in target acquisition and fire adjustment.

d. Command, Control, and Communications. Command is exercised by the task force commander. The aviation commander advises him on aviation capabilities and limitations. When host country forces are employed, command is established by prior arrangement and normally is vested in the host country's tactical unit commander with U.S. advisor and liaison personnel functioning as intermediaries to insure definition of command structure. Specialized airborne communications equipment provides the commander using an aerial command post with a means of directing the activities of airmobile and ground troops engaged in internal defense operations.

e. Combat Service Support. Air line of communication missions performed by Army aviation units participating in internal defense operations include the air movement of personnel, supplies, and equipment. These missions may be performed in support of U.S. Army forces, host country forces, or any combination of U.S. and other forces. In areas lacking railroads, navigable waterways, and suitable roads, air transport may be the most efficient means of transport or may be the only practicable means when priority conditions exist. FM 31–73 discusses service support missions which may be performed by aviation units engaged in internal defense operations.

76. Psychological Operations in Support of Internal Defense Operations

Psychological operations (PSYOP) are conducted to cause hostile, neutral, or friendly groups to support the achievement of national objectives. Since these operations are most effective when direct contact can be made with the people whose opinions are to be influenced, and since many of these people live in remote villages or rural areas, a rapid means of transporting psychological operations personnel and equipment to these remote areas is an important requirement. Control of aviation resources allocated to PSYOP organizations is vested in the senior commander through his G3 staff and aviation commanders. Trained personnel and special equipment to be used in these operations are supplied by the PSYOP element. Loudspeakers can be mounted on aircraft and used to disseminate propaganda to villagers. Leaflets can be disseminated from aircraft flying over target areas. Officials can be air landed at remote villages to make personal area assessments, determine the needs of the people, implement military civic action programs and psychological operations, and gather PSYOP intelligence for supplementary operations. Medical, agricultural, and other teams whose mission is to improve the social, political, and economic conditions can also be air landed to perform their missions.

77. Advisory Assistance

U.S. Advisory assistance includes furnishing specialized military assistance advisory group (MAAG) mobile training teams for training host country armed, paramilitary, and irregular forces, or civilian agencies in military branch or branch immaterial subjects. These operations with military civic action are undertaken

to improve host country military, economic, social, political, and civic activities. Army aviation can provide personnel and units for mobile training teams to instruct, advise, and train host country forces in a number of aviation and related subjects. Advice may be provided regarding Army aviation aspects of the host country force's mission. Army aviation units may provide personnel and equipment for mobile training teams and for support of other such teams and MAAG missions. Mobile training teams may be comprised of individual specialists, 500-series TOE cellular teams, or teams drawn from separate aviation companies, division aviation battalions, or airmobile divisions. Army aviation flight detachments may provide only aircraft support to these teams and organizations or they may participate actively in the advisory program. Command and control of aviation mobile training units and units conducting advisory assistance is exercised through the commanders of MAAG's, Missions, Military Assistance Commands, or other designated subordinate commands. It follows essentially the same pattern as command and control procedures for tactical operations. Aviation training teams and units include training, assistance, and advice in the following specific areas of Army aviation utilization:

a. Providing host country aviation students primary and basic flight training.

b. Conducting transition training of rated host country Army aviators in new aircraft.

c. Conducting training for host country Army aircraft and avionics mechanics.

d. Providing operational training and advice on the employment and operation of host country Army aviation units.

e. Conducting training for and advising host country commanders and staffs on all aspects of airmobile operations and Army aviation utilization.

f. Conducting training for and advising host country troop units in the conduct of airmobile operations and air mobility.

78. Internal Security

Army aviation supports internal security operations by providing aircraft to assist military and paramilitary forces in maintaining law and order and controlling population and resources. Command and control of Army aviation resources for internal security operations usually is vested in the senior U.S. commander and delegated to subordinate U.S. advisors and aviation commanders. Directives, plans, coordination, and requests for aviation support usually originate with the central agency charged with national, regional, or local internal security operations.

Section II. SUPPORT OF GUERRILLA WARFARE

79. General

Guerrilla warfare encompasses military and paramilitary operations conducted in enemy-held or hostile territory by irregular, predominantly indigenous forces. The term "guerrilla warfare" normally is used to denote the primary overt military activities of resistance movements in limited and general war operational environments. It is characterized by offensive action with emphasis on mobility, elusiveness, and surprise.

80. Organizations

a. General-purpose aviation units may provide support to friendly guerrilla operations on a mission basis for specified periods of time. These units may provide command and control, liaison, and administrative aircraft for headquarters personnel of the Joint Unconventional Warfare Task Force (JUWTF), and augment U.S. Army special forces aviation for operations contingent to the special forces operational base (SFOB).

b. The aviation platoon, special forces group (airborne) is capable of supporting administrative missions for the SFOB.

c. Division and corps aviation units support combat forces in conjunction with linkup operations and during guerrilla force demobilization phases.

81. Operations

Coordination and planning for operations in guerrilla warfare stem from the JUWTF.

Army aviation missions are assigned by JUWTF in coordination with the U.S. Army special forces staff at the SFOB, operational detachments in the guerrilla warfare operational area, and divisional units conducting operations in conjunction with guerrilla forces. Aviation commanders are in command of and control aircraft during air movement portions of the mission. In the guerrilla warfare operational area, aircraft are under the operational control of the guerrilla warfare operational area commander. When the guerrilla warfare operational area falls within the zone of responsibility of advancing major tactical commands, operational control of affected guerrilla forces and supporting aviation usually is transferred from the JUWTF to the tactical commanders of division or higher level units. Aviation operations in support of guerrilla warfare operations encompass the five functions of Army aviation.

a. Mobility. Infiltration and exfiltration of U.S. Army special forces and indigenous guerrilla personnel may in emergencies be accomplished by use of air landed and airdrop techniques, and the air-ground pickup system.

b. Fire Support. Armed Army aircraft may provide discriminating, accurate aerial fire support for operations within the guerrilla warfare operational area and during linkup operations.

c. Command, Control, and Communications. Aircraft can be employed in a large, well-secured guerrilla warfare operational area by guerrilla force commanders for command, control, and liaison. Aircraft can provide radio retransmission between the SFOB, JUWTF, and deployed guerrilla forces.

d. Logistics. Aircraft can be employed in emergencies to deliver sensitive and critically needed materiel such as medical supplies, ammunition, and radio repair equipment. POL and aircraft maintenance for aviation operations in the guerrilla warfare operational area pose major logistical problems.

e. Reconnaissance, Surveillance, and Target Acquisition. Within the capabilities of the aircraft, Army aviation can provide intelligence by observation and surveillance missions during operations in the guerrilla warfare operational area and during linkup.

CHAPTER 12
SPECIALIZED AVIATION SUPPORT

Section I. CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL (CBR) OPERATIONS

82. General

The aerial mobility provided by Army aviation affords the supported commander with the increased flexibility needed to conduct operations under CBR conditions. CBR materiel (e.g., weapons and protective equipment) in short supply may be held in central locations and moved to critical areas rapidly and efficiently through use of Army aircraft. FM 3–10-series manuals discuss the employment of chemical and biological weapons. FM 3–12 contains a detailed discussion of operations under radiological conditions.

83. Aviation Tasks

Tasks which can be performed by use of Army aircraft in support of CBR operations include—

a. Transport of all types of CBR weapons systems and defensive equipment.

b. Radiological survey.

c. Aerial support of chemical operations to include dispersion of flame and smoke, riot control agents, and defoliants.

84. Planning and Coordination

a. Aerial radiological surveys are planned by the chemical officer under the general staff supervision of the G2 and in coordination with the Army aviation representative.

b. Other Army aviation CBR missions are planned by the CBR element in coordination with the Army aviation element. The supporting chemical unit will provide technical advice and assistance in matters pertaining to the handling of CBR munitions and the decontamination of aircraft (TM 3–220). In the absence of a chemical unit, assistance may be obtained from the chemical officer of the appropriate command headquarters. The Army aviation element will plan the flight path to the area of release. The CBR element will recommend the best flight path to achieve the desired results over the dispersal area.

85. Radiological Survey

a. Radiological survey is a directed effort to determine the presence, location, extent, and intensity of radiological contamination in a given area (FM 3–12). Radiological survey can be conducted from fixed or rotary wing Army aircraft. In electing to employ aerial rather than ground methods of radiological survey, the following capabilities and limitations of aerial survey must be considered:

(1) *Capabilities.*

(*a*) Speed and flexibility enable coverage of a large area in minimum time.

(*b*) Altitude provides means of surveying areas with protection from dose rates that are unacceptable to ground parties.

(*c*) Minimum personnel, equipment, and communications are required.

(*d*) Aircraft permit surveying of areas inaccessible to ground parties.

(2) *Limitations.*

(*a*) Aerial surveys are less accurate than ground surveys because of the difficulty of maintaining constant distances above the ground, constant ground speed, and because of instrument delay time experienced in aircraft.

(*b*) Aircraft may be subjected to enemy ground fire.

(*c*) Weather conditions may limit low-level flights.

b. Aerial survey can be conducted by two methods: The preselected point survey and the preselected course leg. The preselected course leg method is the standard Army method of conducting radiological surveys. Details on radiological surveys are contained in FM 3–12. Although both fixed and rotary wing aircraft can be used to conduct aerial radiological surveys, rotary wing aircraft are better suited, becausing of their hovering and reduced-speed operational capability. Ground speeds of 50 to 60 knots will provide the most valid results.

86. Crew Hazards

The crew is in danger of contamination when transporting chemical or biological agents and munitions should a leak occur. A potential hazard for the crew exists whenever aircraft are used to disseminate chemical agents and munitions. The degree of hazard, as well as protection and decontamination requirements for the crew, will depend on the type of agent involved, the requirement for agent dissemination (may require wearing of the protective mask), and the possibility of munition leakage.

87. Decontamination and Protective Measures

a. Changing wind conditions will require designation of several decontamination areas at all Army airfields and heliports. Aircraft returning from CBR missions should proceed directly to the decontamination area for inspection and decontamination as required.

b. FM 21–40 and FM 21–41 contain information on CBR protective measures.

Section II. PSYCHOLOGICAL OPERATIONS (PSYOP)

88. General

Psychological operations conducted at division level are the responsibility of the division G3. The division's PSYOP unit is responsible for the planning and execution of these operations. Since psychological operations are conducted by communication with the individuals and groups towards whom the operations are directed, Army aircraft can be used to assist in the performance of many of the tasks necessary for the success of these operations. FM 33–1 discusses psychological operations in detail.

89. Communications Media

The use of Army aircraft can greatly increase the effectiveness of the communications media listed below:

a. Printed Matter. Pamphlets, magazines, and other printed matter can quickly be distributed over a large area by use of airplanes or helicopters. The material can be scattered from aircraft flying over the target area, or packages containing material to be distributed by persons on the ground can be air dropped or air landed. Good dispersion has been obtained by hand scattering leaflets from helicopters flying 300 feet above the ground at forward speeds of 40 to 60 miles per hour.

b. Voice Amplification. Loudspeaker equipment, assigned to some PSYOP units, can be mounted on helicopters and used to amplify messages prerecorded on tapes or delivered by human voice. These messages normally are delivered from low altitudes from helicopters operating at reduced power settings.

90. Personal Contact

Aircraft can be used to move PSYOP personnel, medical teams, government representatives, or other personnel to isolated or distant settlements. The inherent speed of aircraft can enable such key personnel to devote more of their time to their necessary tasks and less time to travel.

Section III. SEARCH AND RESCUE OPERATIONS

91. General

Army aviation can effectively participate in military and civilian search and rescue missions. These missions can range from situations involving missing persons or aircraft to situations of national disaster. An important military application is in the search and rescue of personnel of aircraft downed in enemy territory.

92. Responsibilities and Coordination

a. Civilian Operations. AR 95–10 is the authority for Army aviation participation in civilian search and rescue operations. Liaison must be maintained with the agency responsible for conducting the operation. Coordination for supply and maintenance is accomplished with the nearest military installation. Areas and methods of coverage will be assigned by the responsible agency, which, in cases of downed civil aircraft or lost civilian personnel, will be the civil air patrol.

b. Military Operations.

(1) *Nontactical.* In a nontactical situation, a search and rescue mission for downed military aircraft normally will be the responsibility of the local USAF air rescue service or comparable Navy or Coast Guard organization. When requested, Army facilities will be made available. Liaison and coordination should be accomplished by Army aviation units assigned the task of giving assistance. When Army aircraft are involved in the local flying area, the helicopter ambulance air crash rescue unit or the Army aviation unit concerned may perform the search and rescue operation.

(2) *Tactical.* To minimize the loss of aviators and crews in tactical operations, each Army aviation unit must have an effective search and rescue plan. This plan will be prepared by the operations officer in close coordination with the unit intelligence officer. Prior to departing on any mission over enemy lines, aviators must be briefed on escape and evasion techniques including pickup points for rescue if downed behind enemy lines. This briefing normally will be conducted by the unit briefing officer in coordination with the intelligence and operations officers.

Section IV. CIVIL DISASTER RELIEF OPERATIONS

93. Authority

Policy guidance and responsibilities of Department of the Army agencies with respect to operations involving participation in natural disaster relief activities are prescribed in AR 500–60. Upon occurrence of a civil disaster, the appropriate Army commander will investigate the situation to determine if Army aviation will be used in the relief operations. If use of Army aviation is appropriate, the commander will organize a provisional Army aviation disaster search and rescue unit under his jurisdiction consisting of such aircraft and personnel as necessary. The officer designated to command this unit normally should be the senior aviation staff officer within the command. This unit will be based, whenever possible, on existing Army, Navy, Air Force, Coast Guard, or National Guard installations within the area nearest the disaster and will follow prescribed procedures for drawing necessary supplies.

94. Missions

Missions that may be performed by Army aircraft in disaster and emergency operations include—

a. Airlift of medicine, food, and emergency supplies.

b. Air evacuation of victims.

c. Airlift of rescue parties and guidance of surface rescue parties.

d. Message drop and pickup.

e. Radio retransmission operations.

f. Courier service.

g. Insect control.

h. Wire laying for emergency communications.

i. Illumination for night operations.

j. Photographic and reconnaissance missions.

k. Warning missions.

l. Dropping informational bulletins pertaining to—

(1) Areas to be evacuated.

(2) Advice urging the populations to move voluntarily to specified refugee accommodations as directed.

(3) Transportation facilities.

(4) Available escape routes.

(5) Measures to be taken to protect personal property and livestock.

95. Planning

The civil disaster and emergency relief plan of commanders of Army areas and major overseas Army commands should clearly outline the missions, responsibilities, and duties of the Army aviation disaster emergency relief units with respect to administration, operations, maintenance, food service, supply, transportation, medical facilities, and security.

CHAPTER 13
OPERATIONS IN VARIED ENVIRONMENTS

Section I. NIGHT OPERATIONS

96. General

Night operations conducted by Army aviation elements include surveillance, adjustment of fire, aerial fire support, battlefield illumination, night photography, and logistic and service missions. All Army aviation units are organized and equipped to conduct night operations.

97. Advantages

Advantages of conducting aviation night combat operations including the following:

a. Night operations deny the enemy the freedom of action he otherwise would have under cover of darkness.

b. Some activities, such as those indicated by enemy campfires or fire fights in which tracers are being used, can best be observed at night.

c. Greater freedom of action is possible during the hours when enemy air defense measures are least effective.

98. Disadvantages

Disadvantages of conducting aviation night combat operations include the following:

a. Difficulty of conducting night formation flights without use of aircraft lights.

b. Obstacles cannot be readily seen, and objects or obstructions on the ground create hazards to landing or taxiing aircraft.

c. Necessity for additional coordination, control, planning, and training.

d. In the absence of electronic aids, difficulty of navigation.

e. Necessity for airfield lighting.

f. Difficulty of target acquisition and fire control during aerial fire support operations.

99. Coordination

Night missions must be scheduled far enough in advance for coordination with other activities. The flight operations center (FOC) is the agency responsible for furnishing the air defense commander flight plan data on Army aircraft flights originating in the air defense zones. It is also responsible for insuring coordination with the control and reporting center. Coordination must be extended to the lowest echelon concerned because of the difficulty ground troops have in distinguishing friendly from enemy aircraft at night.

Section II. GEOGRAPHICAL ENVIRONMENTS

100. General

Army aviation units can conduct operations in any geographical environment. Although environmental conditions can limit the capabilities of an aviation unit, the environment may have a lesser influence upon aviation capabilities than on the capabilities of ground units. For example, although the location of landing zones at higher elevations in mountainous terrain necessitates reduced aircraft payloads, the same mountainous terrain may completely prohibit the use of ground vehicles. Thus, an environment which reduces the efficiency of an aviation unit can increase the supported unit's capabilities as compared to other means of transporting personnel and equipment. FM 1–15 discusses aviation operations in desert, mountain, jungle, and cold environments. FM

1–105 discusses aviation techniques and procedures used in those environments, and FM 31–50 discusses combat in fortified and built-up areas.

101. Mobility

Reduced ground mobility is a characteristic of military operations in the unsophisticated environments of deserts, mountains, jungles, and cold areas. Use of aircraft to augment ground transportation means can offset or minimize this disadvantage. This can be accomplished by locating bases as far forward as practicable, by use of ground vehicles, and by use of aircraft to transport personnel and equipment from these bases to objective areas.

102. Maintenance

Aircraft maintenance requirements are greater in areas approaching the extremes of environment than in temperate zones. Desert-sand damage and the higher power settings used in rarefied mountain air increase engine maintenance requirements. Rust and rot caused by jungle heat and humidity and the damage to grease seals and batteries caused by extreme cold make it necessary to replace components more often. The same factors that increase aircraft maintenance requirements also decrease the efficiency of the individuals who perform this maintenance.

CHAPTER 14
AVIATION MAINTENANCE AND SUPPLY

103. General

The aviation maintenance and supply structure is designed to provide adequate and timely maintenance and technical supply support for Army aircraft. The structure is based upon the precept that if an aircraft can fly, but needs either routine or nonroutine maintenance beyond the organizational level, it should be flown to a direct support unit for such maintenance. If the aircraft is not flyable, maintenance support will be furnished by contact teams from the direct support unit. Since aircraft are the most mobile items of equipment in the Army, it is logical that this inherent mobility should be used to facilitate maintenance and supply activities and to relieve operating aviation units of the bulk of time-consuming field maintenance tasks. Maintenance float aircraft, to replace aircraft undergoing maintenance, should be utilized to assist the aviation units in maintaining maximum availability of operational aircraft. Policies pertaining to the use of serviceable parts from unserviceable aircraft are established in AR 750–1500–8. Cannibalization of aircraft is allowed only as prescribed in AR 750–50.

104. Utilization

The ground commander may temporarily have to use aviation support at an abnormally high rate. He must understand that this level of activity will be followed by a period of reduced aviation capability pending reestablishment of the balance between flight operations and aircraft maintenance. Even though the commander may be willing to accept future reduction in aviation support as a tradeoff to meet immediate requirements, consideration should be given to the ability of the aviation unit to provide future support to other ground units. These units may be deprived of such future support if the aviation unit is unable to operate at expected efficiency levels due to a heavy backlog of maintenance requirements. Therefore, the ground commander's decision to use aircraft in a specific operation is dependent upon the ability of the maintenance and supply support organization to provide the required flyable aircraft (FM 1–10 and FM 55–45).

105. Categories of Maintenance

a. Maintenance operations are classified into categories according to the frequency, magnitude, and degree of technical skill required. Except in the airmobile division, the categories of maintenance are—

(1) *Organizational.* Organizational maintenance is that maintenance normally authorized for, performed by, and the responsibility of a using organization on equipment in its possession. This maintenance includes inspecting, cleaning, servicing, and lubricating assigned equipment. When properly conducted, it results in fewer equipment failures and, thus, increased aircraft availability.

(2) *Direct support.* Direct support maintenance is that maintenance normally authorized and performed by the designated maintenance activities in direct support of using organizations. It consists of the repair of end items or unserviceable assemblies in support of using organizations on a return-to-user basis.

(3) *General support.* General support maintenance is that maintenance authorized and performed by designated TOE and TD organizations in support of the Army supply system.

(4) *Depot.* Depot maintenance activities, through overhaul of economically re-

pairable materiel, augment the procurement program in satisfying overall Army requirements and, when required, provide for repair of materiel beyond the capability of general support maintenance organizations.

b. The airmobile division's maintenance system is based on three levels of maintenance as follows:

(1) *A-level, user.* A-level maintenance provides the using unit with the capability of performing on-site maintenance that is essential to mission performance. This maintenance is performed in the using unit's base area, which frequently is far forward. Equipment which cannot be repaired in the forward area within 4 hours normally is evacuated to the division base area.

(2) *B-level, direct support.* B-level maintenance provides backup maintenance and supply support for the user. It includes major inspections, modular or component replacement, repair of unserviceable parts, recovery of aircraft, and signal and ordnance support. Equipment which cannot be repaired in the division base within 72 hours is evacuated to the C-level activity.

(3) *C-level, general support and depot.* C-level maintenance provides backup for A- and B-levels, above, including overhaul and rebuild of components and assemblies, fabrication of parts, and the modification and assembly of aircraft. This level of maintenance also includes the depot support system which performs limited rebuild or major components and maintenance beyond the capability and/or capacity of the C-level general support element.

106. Aircraft, Aerial Weapons, and Avionics Supply

a. Aircraft supply support is a staged system wherein supplies are initially received by a depot in the logistical command and shipped to general support supply activities for issue to operating elements of the aircraft maintenance support system. The throughput of aircraft repair parts is limited to the movement of emergency supplies and heavy or bulky items such as aircraft engines or transmissions which can be readily identified and controlled.

b. The direct support unit is customer-oriented, providing the supported aviation unit with retail supply support for expendable supplies and for repair parts that are normally fast-moving and have a predictable consumption rate. The general support supply activity is commodity-oriented, providing wholesale supply of all items that are stocked by the direct support elements. In addition, the general support supply unit stocks bulky or heavy items, repair parts that normally have a low usage factor, and items that are controlled or are in critically short supply.

107. Interrelationship of Supply and Maintenance

Effective repair support for aircraft in the field army is directly and particularly dependent upon adequate and responsive aircraft supply support. The parts required for a repair operation must be immediately available, especially at the direct support level where equipment must be repaired for return to user with the least possible delay. Components, assemblies, and parts repaired by the general support activity for return to stock constitute a major source of supply in support of the maintenance mission. At the same time, repair of items for return to stock is contingent upon the rapid return of unserviceable items to the general support activity. Thus, the interdependence of maintenance and supply is readily apparent; the requirement for positive control, coordination, and management of the two activities is essential.

CHAPTER 15
AIRFIELDS AND HELIPORTS

108. General

Army airfields and heliports vary from small, unimproved areas which meet minimum requirements for the operation of fixed wing aircraft or helicopters to completely organized and equipped airfields and heliports. The type of facility which is used in a tactical operation will depend on the terrain and the time available for preparing ground installations. Minimum preparation is normal for airmobile operations, the most important consideration being the selection of a location favoring the mission. TM 5–330 contains details on airfield site selection and construction.

109. Responsibilities for Selection and Construction

a. Ground Commander. The ground commander employing organic aviation designates the general location in which the airfield is to be established by the aviation unit. Commanders of units without organic aviation are responsible for the selection and development of airfields or heliports to be used by supporting aviation elements to include requesting necessary engineer support. Factors to be considered in selecting locations for landing zones include—

(1) Suitability for mission accomplishment. This is the primary consideration.

(2) Terrain capability to support the number and type aircraft used.

(3) Security of the area.

(4) Suitability for communications facilities and ground resupply operations.

b. Aviation Commander. The aviation commander selects the site, within the general area designated by the ground force commander, for location of the aviation unit. FM 1–15 discusses the reconnaissance, selection, and occupation of aviation battalion and company position areas. Although engineer construction units provide airfield construction support in a theater of operations, commanders of units employing Army aviation, or of units supported by organic aviation, will develop their own landing zones when engineer support is not available. Minor maintenance of airfield will be performed by the units using the installation. Major maintenance beyond organic capability of the unit operating the airfield will be performed by engineer elements.

110. Classification of Airfields and Heliports

a. Standards of Construction.

(1) *Pioneer.* A pioneer Army airfield or heliport represents the lowest standard of construction which can be used under favorable operating conditions. Construction normally is limited to the removal of rocks and brush and the filling of holes on or near the landing surface. Refueling capabilities are limited or nonexistent.

(2) *Hasty.* A hasty Army airfield or heliport is one which is built to provide a substandard but operable margin of safety. This type of field permits reasonably safe and efficient operations except in prolonged adverse weather. If suitable sod is not present, portable matting may be installed on the landing surface. The facility normally includes a limited refueling capability.

(3) *Deliberate.* A deliberate Army airfield or heliport is one which is constructed according to established standards of safety and efficiency. The landing surface is well compacted and covered with a flexible pavement. The installa-

tion includes facilities for refueling and for the performance of some aircraft maintenance.

b. Airfield Types. TM 5–330 classifies airfields according to location and mission for fixed wing aircraft. Airfield types are derived by combining the controlling aircraft classification with the appropriate military area. Construction criteria for each type of airfield are listed.

APPENDIX A
REFERENCES

DOD Directive 5160.22	Clarification of Roles and Missions of the Departments of the Army and Air Force Regarding Use of Aircraft dated 18 March 1957 (AR 95–100, 3 May 1957)
JCS Pub 1	Dictionary of United States Military Terms for Joint Usage.
JCS Pub 2	Unified Action Armed Forces.
AR 40–20	Evacuation of Patients
AR 55–10	Military Standard Transportation and Movement Procedure (MIL STAMP).
AR 95–Series	Aviation.
AR 220–58	Organization and Training for Chemical, Biological, and Radiological Operations.
AR 310–1	Military Publications—General Policies.
AR 310–3	Publications—Preparation, Coordination, and Approval.
AR 320–5	Dictionary of United States Army Terms.
AR 320–50	Authorized Abbreviations and Brevity Codes.
AR 350–1	Army Training.
AR 350–5	Military Education and Service Schools.
AR 380–5	Safeguarding Defense Information.
AR 500–60	Disaster Relief.
AR 600–105	Army Aviation Officer Career Program.
AR 711–17	Utilization and Processing of DA Forms 2765 and 2765–1, Request for Issue or Turn In (Punched Card Series).
AR 735–35	Supply Procedures for TOE and TDA Units or Activities.
AR 750–5	Organization, Policies, and Responsibilities for Maintenance Operation.
AR 750–8	Command Maintenance Management Inspections.
DA PAM 108–1	Index of Army Films, Transparencies, GTA Charts, and Recordings.
DA PAM 310–Series	Military Publications Indexes.
DA PAM 750–1	Preventive Maintenance Guide for Commanders.
FM 1–5	Aviation Company.
FM 1–10	Army Aviation Organizational Aircraft Maintenance.
FM 1–15	Aviation Battalion.
FM 1–60	Army Aviation Air Traffic Operations—Tactical.
FM 1–80	Aerial Observer Training.
FM 1–105	Army Aviation Techniques and Procedures.
FM 1–110	Armed Helicopter Employment.
FM 3–10	Employment of Chemical and Biological Agents.
(S) FM 3–10A	Employment of Biological Agents (U).
FM 3–12	Operational Aspects of Radiological Defense.
FM 5–20	Camouflage, Basic Principles and Field Camouflage.
FM 6–20–1	Field Artillery Tactics.
FM 6–20–2	Field Artillery Techniques.
FM 6–40	Field Artillery Cannon Gunnery.
FM 8–5	Medical Service Units, Theater of Operations.

FM 8–10	Medical Service, Theater of Operations.
FM 8–15	Division Medical Service, Infantry, Airborne, Mechanized, and Armored Divisions.
FM 8–16	Medical Service, Field Army.
FM 8–35	Transportation of the Sick and Wounded.
FM 9–6	Ammunition Service in the Theater of Operations.
FM 9–30	Maintenance Battalion: Division Support Command.
FM 10–8	Air Delivery of Supplies and Equipment in the Field Army.
FM 17–36	Divisional Armored and Air Cavalry Units.
FM 19–15	Civil Disturbances and Disasters.
FM 20–33	Combat Flame Operations.
FM 20–60	Battlefield Illumination.
FM 21–5	Military Training Management.
FM 21–11	First Aid for Soldiers.
FM 21–26	Map Reading.
FM 21–40	Small Unit Procedures in Chemical, Biological and Radiological (CBR) Operations.
FM 21–41	Soldier's Handbook for Chemical and Biological Operations, and Nuclear Warfare.
FM 21–48	Chemical, Biological, and Radiological (CBR), and Nuclear Defense Training Exercises.
FM 21–60	Visual Signals.
FM 21–76	Survival.
FM 21–77	Evasion and Escape.
FM 24–1	Tactical Communications Doctrine.
FM 24–18	Field Radio Techniques.
FM 30–5	Combat Intelligence.
FM 30–20	Aerial Surveillance—Reconnaissance, Field Army.
FM 31–16	Counterguerrilla Operations.
FM 31–20	Special Forces Operational Techniques.
FM 31–21	Special Forces Operations.
FM 31–22	U.S. Army Counterinsurgency Forces.
(S)FM 31–22A	U.S. Army Counterinsurgency Forces (U).
FM 31–50	Combat in Fortified and Built-Up Areas.
FM 31–72	Mountain Operations.
FM 31–73	Advisor Handbook for Counterinsurgency.
FM 33–1	Psychological Operations—U.S. Army Doctrine.
FM 33–5	Psychological Operations—Techniques and Procedures.
FM 41–5	Joint Manual of Civil Affairs/Military Government.
FM 41–10	Civil Affairs Operations.
FM 55–45	Aircraft Maintenance Services and Units in the Field Army.
FM 57–35	Airmobile Operations.
FM 61–100	The Division.
FM 100–5	Field Service Regulations—Operations.
(C)FM 100–20	Field Service Regulations, Counterinsurgency (U).
FM 101–5	Staff Officers' Field Manual: Staff Organization and Procedure.
TC 1–16	Employment of Aircraft Flares from Army Aircraft.
TC 1–20	SS–11/UH–1, Weapons Systems.
TC 1–22	Rotary Wing Aircraft Gunnery.
TC 1–27	Low-Level Navigation.
TM 1–250	Fixed Wing Flight.

TM 3–210	Fallout Prediction.
TM 3–220	Chemical, Biological, and Radiological (CBR) Decontamination.
TM 5–330	Planning, Site Selection, and Design of Roads, Airfields, and Heliports in the Theater of Operations.
TM 5–366	Planning and Design for Rapid Airfield Construction in the Theater of Operations.
TM 10–500–6	Airdrop of Supplies and Equipment from Army Aircraft.
TM 10–1101	Petroleum Handling Equipment and Operations.
TM 11–5820–401–10	Operators Manual: Radio Sets AN/VRC–12, 43, 44, 45, 46, 47, 48, and 49.
TM 38–750	Army Equipment Record Procedures.
TM 55–450–8	Air Transport of Supplies and Equipment: Internal-Transport Procedures.
TM 55–450–9	Air Transport of Supplies and Equipment: External-Transport Procedures.
TM 55–601	Troop Movement Guide.
TM 57–210	Air Movement of Troops and Equipment.

APPENDIX B
ARMY AIRCRAFT CHARACTERISTICS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A. AIRCRAFT	UNIT	O-1A, E OBSERVATION	OV-1A, B, C OBSERVATION	U-1A UTILITY	U-6A UTILITY	U-8D UTILITY	U-8F UTILITY	OH-6A OBSERVATION	OH-13H OBSERVATION	OH-23D OBSERVATION	UH-1B[4] UTILITY	UH-1D[4] UTILITY	CH-34C CARGO	CH-47A[3] CARGO	CH-54[3] CARGO
B. NAME		BIRD DOG	MOHAWK	OTTER	BEAVER	SEMINOLE	SEMINOLE		SIOUX	RAVEN	IROQUOIS	IROQUOIS	CHOCTAW	CHINOOK	SKY CRANE
C. CREW (200 Lbs Ea)	Ea	1	2	1	1	1	1	1	1	1	1	1	2	3	2
D. CARGO DOOR															
(1) Dimensions - Width/Height	In	45" x 33"	NA	46" x 45" Left	40" x 40"	35" x 36½"	50½"x26½"	2'2½"x3'4½" 2'10½"x3'4½"	NA	NA	48"x48"	92"x49"	53"x48"	90"x78"	NA
(2) Location - Side of Fuselage	In	Right	NA	30" x 42" Right	Left & Right	Right	Left	Left & Right	NA	NA	Left & Right	Left & Right	Right	Rear	NA
E. CARGO COMPARTMENT															
(1) Height of Floor Above Ground	In	NA	NA	46"	46"	NA	48"	25.25"	NA	NA	27"	32"	34"	30"	NA
(2) Length Usable	In	NA	NA	156"	92"	50.5"	110.6"	46"	NA	NA	60"	92"	163.5"	366"	NA
(3) Width Floor	In	NA	NA	60"	48"	53.6"	55.0"	50.5"	NA	NA	80.5"	96"	60"	90"	NA
(4) Height (Clear of Obstructions)	In	NA	NA	52"	51"	46.7"	55.0"	48.5"	NA	NA	56"	52"	70"	78"	112"
(5) Cargo Space Optimum	Cu Ft	NA	NA	293'	125'	136'	168.8'	38'	NA	NA	140'	220'	363'	1,487'	NA
F. EXTERNAL CARGO[2]															
(1) Maximum recommended external load	Lbs	500	4,000	NA	1,000	NA	NA	NA	NA	NA	4,000	4,000	5,000	16,000	20,760
(2) Rescue Hoist Capacity	Lbs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	600	600	NA
(3) Cargo Loading Winch Capacity	Lbs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3,000	NA
G. PASSENGER CAPACITY															
(1) Troop Seats (240 Lbs Per Man)	Ea	1	0	10	5	4	4	3	1	2	7	11	12 or 18	33	NA
(2) Litters and Ambulatory	Ea	0 + 1	NA	6 + 3	2 + 2	0 + 5	0 + 5	0 + 3	2 + 0	2 + 1	3 + 1	6 + 1	8 + 0	24 + 3	NA
H. OPERATIONAL CHARACTERISTICS[1,2]															
(1) Maximum Allowable Gross Wt	Lbs	2,100 2,165	12,500; 13,318; 12,676	8,000	5,100	7,300	7,700	2,700	2,450	2,700	8,500	9,600	13,600	33,000	42,000
(2) Basic - Weight	Lbs	1,502 1,614	9,673; 10,650; 10,004	4,900	3,100	5,000	5,490	1,080	1,715	1,821	4,600[4]	4,900[4]	7,800	17,200	19,300
(3) Useful Load	Lbs	598 551	2,827; 2,668; 2,672	3,100	2,000	2,300	2,210	1,620	735	879	3,900	4,700	5,800	15,800	22,700
(4) Internal Fuel Capacity	Lbs/ Gal	252/42	1930/297	1,281/213,5	828/138	1,380/ 230	1,380/ 230	382/59	258/43	276/46	1,072/165	1,430/220	1,572/262	4,095/630	8,700/1,350
(5) Normal Cruising Speed[5]	Kts	87	185	104	105	155	160	100	70	70	90	100	85	110	100
(6) Endurance at Cruising Speed[5]	Hrs + Min	4 + 00	1 + 25	6 + 30	6 + 00	6 + 00	6 + 00	2 + 25	1 + 45	1 + 50	1 + 45	2 + 15	2 + 50	2 + 40	2 + 00
(7) Grade of Fuel	Oct	80/87[7]	JP-4	80/87[7]	80/87[7]	115/145	115/145	JP-4	80/87[7]	80/87[7]	JP-4	JP-4	115/145	JP-4	JP-4
(8) Fuel Consumption Per Hour[6]	Lbs/ Gal	54/9	1,105/170	180/30	132/22	204/34	204/34	130/20	120/20	120/20	487/75	487/75	456/76	1,300/200	3,460/532

DEFINITIONS:

MAXIMUM ALLOWABLE GROSS WEIGHT: The maximum allowed total weight of the aircraft prior to takeoff; the "BASIC WEIGHT" of the aircraft plus the crew, personnel equipment special devices, passengers/cargo, and usable fuel and oil. This is limited by structure, power available, or landing load.

BASIC WEIGHT: The empty weight of an aircraft in its basic configuration, to include all appointments, integral equipment, instrumentation, and trapped fuel and oil, but excludes passengers, cargo, crew, and fuel and oil.

NORMAL CRUISING SPEED: The true airspeed which an aircraft can normally be expected to maintain at some standard power setting below rated military power. This speed will vary with altitude.

ENDURANCE AT CRUISING SPEED: The time that an aircraft can remain airborne at normal cruising speed with fuel aboard without using the required fuel reserve. The data listed under "OPERATIONAL CHARACTERISTICS" is computed utilizing full fuel minus a 30-minute reserve, except turboprop which requires 20 minutes reserve.

PAYLOAD: The useful load less the crew, full oil, and the required fuel for the mission.

USEFUL LOAD: The load-carrying capability of an aircraft. It includes the payload, crew, and usable fuel and oil required for the mission. Here it is the difference between "MAXIMUM ALLOWABLE GROSS WEIGHT" and the "BASIC WEIGHT" as defined above. Thus, it is evident that a reduction of the fuel load will reduct the ENDURANCE and increase the PAYLOAD. Full oil is required for all missions.

FOOTNOTES:

[1] All data computed at standard conditions at sea level.
[2] Detail weight computations and characteristics taken from current technical manuals on each aircraft.
[3] Data subject to change, resulting from developmental testing.
[4] Basic weight for standard aircraft. (Weapons systems and components not included.)
[5] Airspeeds and fuel consumptions will vary with gross weight, altitude, power settings, and aircraft. See appropriate operator's manual for correct airspeed and fuel consumption.
[6] Computed at maximum gross weight and at sea level.
[7] During mobilization, fuels will be 115/145 and JP-4.

APPENDIX C

STANAG NO. 2104, FRIENDLY NUCLEAR STRIKE WARNING TO ARMED FORCES OPERATING ON LAND

NATO—UNCLASSIFIED

DETAILS OF AGREEMENT

FRIENDLY NUCLEAR STRIKE WARNING TO ARMED FORCES OPERATING ON LAND

AGREEMENT

1. It is agreed that the NATO Armed Forces will adopt the following system of friendly nuclear strike warnings for use at corps level and below. This applies to surface-to-surface and air-to-surface strikes in support of ground forces, and to emplaced atomic demolition munitions (ADMs).

GENERAL

2. The requirement for a standard warning message and delineation of notification channels is essential to ensure that timely warning of friendly nuclear strikes is provided so that Armed Forces personnel may take individual measures to protect themselves.

3. For the purpose of STRIKWARN message, azimuth is the horizontal angle from grid north to a certain point expressed in degrees or mils.

WARNING RESPONSIBILITIES

4. a. Responsibility for issuing the warning rests with the Commander requesting the nuclear strike.

b. Commanders authorized to release nuclear strikes will ensure that strikes affecting the safety of adjacent or other commands are coordinated with those commands in sufficient time to permit dissemination of warnings to Armed Forces personnel and the taking of protective measures. Conflicts must be submitted to the next higher Commander for decision.

DETERMINATION OF HEADQUARTERS, FORMATIONS/UNITS TO BE WARNED

5. a. The Commander responsible for issuing the warning should inform:

(1) Subordinate Headquarters whose units are likely to be affected by the strike.

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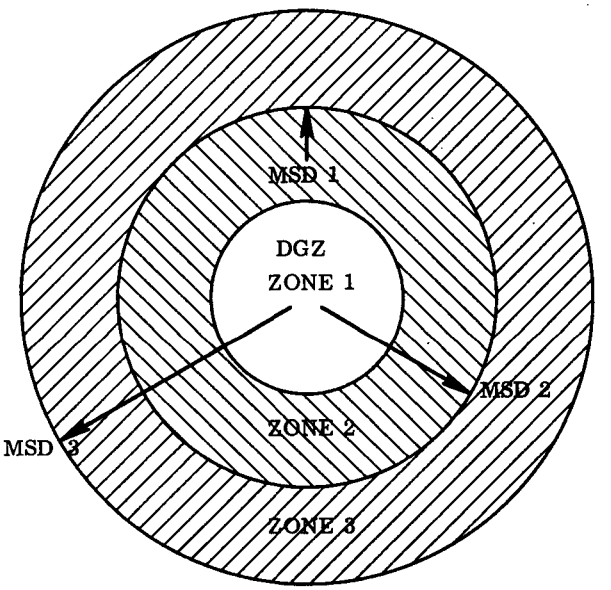
(2) Adjacent Headquarters whose units are likely to be affected by the strike.

(3) Own next higher Headquarters, when units not under the command of the releasing Commander are likely to be affected by the strike.

b. Each Headquarters receiving a warning of nuclear attack will warn subordinate elements of the safety measures they should take, in the light of their proximity to the Desired Ground Zero (DGZ).

c. Each unit concerned, down to the lowest level, will be warned by its next higher level of the safety measures it should take.

6. Zones of Warning and Protection Requirements for Friendly Nuclear Strikes



Notes. 1. MSD means Minimum Safe Distance.

2. The MSD is equal to a radius of safety (Rs) for the yield, plus a buffer distance (d_b) related to the dispersion normal to the weapon system used and the orientation of friendly forces in relation to the line of fire. When surface bursts are used, the fallout hazard will be considered and appropriate buffer distances included.

Radius	Corresponding to	Zone	Requirements
DGZ			
		1	Evacuation of all Armed Forces personnel (See note 2)
MSD 1	Limit of negligible risk to warned and protected Armed Forces personnel (See note 3)		
		2	Maximum protection. (See note 4)
MSD 2	Limit of negligible risk* to warned and exposed Armed Forces personnel		

Radius	Corresponding to	Zone	Requirements
		3	Minimum protection. (See note 5)
MSD 3	Limit of negligible risk* to unwarned and exposed Armed Forces personnel		
More than MSD 3			No protective measure except against dazzle.

* As defined in STANAG 2083.

Notes. 1. Commanders will be guided by safety criteria as stated in FM 101-31-1, Staff Officers Field Manual, Nuclear Weapons Employment (or appropriate national manuals with the same criteria).

2. If evacuation is not possible or if a Commander elects a higher degree of risk, maximum protective measures will be required.

3. Negligible risks should normally not be exceeded unless significant advantages will be gained.

4. Maximum protection denotes that Armed Forces personnel are in "buttoned-up" tanks or crouched in foxholes with improvised over-head shielding.

5. Minimum protection denotes that Armed Forces personnel are prone on open ground with all skin areas covered and with an overall thermal protection at least equal to that provided by a two-layer uniform.

WARNING MESSAGES

7. Warning messages will include the following information (see STANAG 2103):

STRIKWARN

ALPHA : Code word indicating nuclear strike (target number).

DELTA : Date-time group for time of burst in ZULU time. The time after which the strike will be cancelled (ZULU time).

FOXTROT : DGZ (UTM grid co-ordinates).

HOTEL : Indicate air or surface bursts.

INDIA : For all bursts:
MSD 1 in hundreds of meters, four (4) digits
MSD 2 in hundreds of meters, four (4) digits
MSD 3 in hundreds of meters, four (4) digits
Distance to which Armed Forces personnel must shield their eyes from dazzle—in hundreds of meters, four (4) digits.

YANKEE : For all bursts when there is less than a 99% assurance of no militarily significant fallout.
Azimuth of left then right radial lines (degrees or mils—state which) four (4) digits each.

ZULU : For all bursts when there is less than a 99% assurance of no militarily significant fallout.
Effective wind speed in kilometers per hour, three (3) digits.

Downwind distance of Zone I (km), three (3) digits.
Cloud radius (km), two (2) digits.

EXAMPLE MESSAGES

1. FOR AIR BURSTS WITH 99% ASSURANCE OF NO MILITARILY SIGNIFICANT FALLOUT

STRIKWARN. ALPHA TUBE SIX. DELTA PQ WM OT AR/AS DG WY OF. FOXTROT YM AB IM SK. HOTEL AIR. INDIA 0022 0031 0045 0140.

2. FOR ALL BURSTS WITH LESS THAN 99% ASSURANCE OF NO MILITARILY SIGNIFICANT FALLOUT

STRIKWARN. ALPHA TUBE SIX. DELTA PQ WM OT AR/AS DG WY OF. FOXTROT YM AB IM SK. HOTEL SURFACE. INDIA 0022 0031 0045 0140. YANKEE 0215 0255 DEGREES. ZULU 025 080 18.

IMPENDING STRIKE WARNING

8. Warning of impending strikes will be initiated no earlier than is necessary to complete warning of Armed Forces personnel. Any available means of communications—land lines if possible—will be utilized to ensure that all Armed Forces personnel requiring warning are notified.

ACTION ON CANCELLED STRIKES

9. When nuclear strikes are cancelled, units previously warned will be notified in the clear by the most expeditious means in the following format:

a. Code Word (Target Number)

b. CANCELLED

USE OF CODES

10. Items DELTA and FOXTROT above will not be sent in clear unless the time of initiating the warning message is such that no loss of security is involved.

11. Only coding systems which meet NATO security criteria will be used.

OTHER WARNINGS

12. It is recognized that it is impractical to obtain warnings of surface-to-air (for instance, air defense) nuclear burst which may occur at low altitudes, and to disseminate such warnings to Armed Forces personnel.

13. Similarly, it may be impractical to provide warning to the Naval and Air Forces concerned of intended surface-to-surface strikes delivered by weapons within the corps, especially for fleeting targets or when reaction times are short. Nevertheless, it is the responsibility of Army agencies to provide warning to Naval and Air Forces concerned whenever possible.

IMPLEMENTATION OF THE AGREEMENT

14. This STANAG will be considered to have been implemented when the necessary orders/instructions putting the procedures detailed in this agreement into effect have been issued to the forces concerned.

APPENDIX D

INCLOSURE I OF STANAG NO. 3277, AIR RECONNAISSANCE REQUEST FORM

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Original English/French Translation.

[1] STANAG NO. 3277
(Edition No. 3)

DETAILS OF AGREEMENT

AIR RECONNAISSANCE REQUEST FORM

Enclosure: I. Annex 'A'—Air Reconnaissance Request Form.

1. Participants agree to use the standard form at Annex 'A' to request air reconnaissance.

ANNEX 'A' TO STANAG 3277
(Edition No. 3)

1. Front of Air Reconnaissance Request Form

PRECEDENCE (Security Classification)

FROM:

TO :

AIR RECONNAISSANCE REQUEST FORM

L. ORIGINATOR'S SERIAL NUMBER
M. TYPE OF RECONNAISSANCE
N. NATIONAL MAP SERIES AND SHEET NUMBER
O. DESCRIPTION OF TARGET AND MAP REFERENCES
P. OBJECT OF THE REQUEST AND RESULTS DESIRED
Q. PHOTO SCALE OR LIMITS ACCEPTABLE
R. NUMBER OF PRINTS, PLOTS OR REPORTS REQUIRED
S. DELIVERY ADDRESS, DATE, TIME
T. LATEST ACCEPTABLE TIME AND DATE
U. SPECIAL INSTRUCTIONS

Signature of Requesting Officer	Signature of Approving Officer
Rank, Position	Rank, Position

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[1] The Details of Agreement of SEASTAG No. 3277 are identical with the Details of Agreement of STANAG No. 3277.

2. Back of Air Reconnaissance Request Form (English)

Note. The letters A to K have a special significance for certain organizations, and are purposely omitted from the form.

L. ORIGINATOR'S SERIAL NUMBER	Each request will be given a serial number consisting of a prefix followed by a number commencing with number 1 at the beginning of the year. Further requests will be numbered consecutively throughout the year. Prefixes will be the Headquarters demanding e.g., LANDCENT, AFCENT, AFNORTH, 4ATAF.
M. TYPE OF RECONNAISSANCE	For example: visual, electronic, weather fire control or photographic reconnaissance (vertical, oblique or reprint photography). This paragaph should be left blank unless it is understood fully what the selected type of reconnaissance can accomplish.
N. NATIONAL MAP SERIES AND SHEET NUMBER	Owing to the large variety of maps used both in training and operations by nations, these details must be given in full.
O. DESCRIPTION OF TARGET AND MAP REFERENCE	So as to leave the recipient of the request in no doubt as to the requirements, it is necessary to give an exact location, e.g., railway bridge 775386. In the case of oblique, the NEAR boundary of the area to be photographed will be given. If GRID reference is used, state GRID type, i.e., UTM, GEOREF, etc., otherwise state latitude and longitude to the nearest minute.
P. PURPOSE OF REQUEST AND RESULTS DESIRED	It is important that the exact purpose of the request is stated, in order that the most satisfactory results may be produced.
Q. PHOTO SCALE OR SCALE LIMITS ACCEPTABLE	Whenever possible, this heading should be filled in on the advice of a photographic interpreter. The scale should be quoted in figures, e.g., 1/10,000.
R. NUMBER OF PRINTS, PLOTS OR REPORTS REQUIRED	This should never exceed the number actually required. If a photo interpretation report will suffice, prints should not be ordered.
S. DELIVERY ADDRESS, DATE, TIME	State clearly where the prints, plots or reports are to be delivered, and the time and date on which they are required. If there is no haste, as much time as possible should

	be given for final delivery, so as to allow requests of a more urgent nature to be dealt with.
T. LATEST ACCEPTABLE TIME/DATE	The date and/or time after which the prints, plots or reports are no longer required. If delivery cannot be made by the date stated, the request will be cancelled.
U. SPECIAL INSTRUCTIONS	T.O.T., if required, the degree of urgency, or when making more than one request, the degree of priority and the security classification of the material requested. Note whether first, second or third phase photo interpretation is desired from the photographs. Give any instructions or information not already provided, that will aid the planning, or successful accomplishment of the mission.

APPENDIX E
EMPLOYMENT OF NON-AIR DEFENSE WEAPONS AGAINST AIRCRAFT

1. Purpose

The purpose of this appendix is to—

a. Discuss means of countering the threat of enemy airmobile operations, enemy tactical air, and enemy air reconnaissance against any friendly unit in a combat theater.

b. Discuss the potential effect of a large volume of small arms fire that can be furnished by organic weapons against low flying hostile aircraft.

c. Discuss the requirement for establishing detailed SOP for the identification and engagement of hostile aircraft to include the method of identification, personnel who will fire, techniques of fire to be used, rules of engagement, and controls to be exercised.

d. Discuss the necessity for training individual soldiers in aircraft identification, techniques of firing at aerial targets, and response to control methods.

e. Emphasize the aggressive engagement of hostile aircraft with organic weapons as specified in carefully prepared SOP and rules of engagement.

f. Direct attention to the threat to friendly aircraft when there is a failure to discriminate between hostile and friendly aircraft.

g. Place in proper perspective the tactic of of withholding fire to preclude disclosure of positions.

2. Concept

a. The substantial low altitude air threat faced by units in the combat theater may be partially countered by aggressive use of the large volume of fire which non-air defense weapons can place against this threat.

b. Exercise of the individual and collective right of self-defense against hostile aircraft must be emphasized. Hostile aircraft include all attacking aircraft and those positively identified enemy aircraft which pose a threat to the unit. The requirement for exercise of this right has not been adequately emphasized in the past. Large volumes of fire from non-air defense weapons have proven capable of destroying both high and low speed aircraft or disrupting their attack. Exercise of this right does not demand specialized use of communications and is independent of theater air defense rules for engagement and air defense control procedures.

c. Indiscriminate use of non-air defense weapons must be prevented due to the resulting danger to friendly aircraft and troops and the requirement to place in proper perspective the technique of withholding fire to preclude disclosure of positions. Effective and safe employment of these weapons necessitates Army-wide training expenditures. Engagement of hostile aircraft for local self-defense may be frequent and training emphasis should reflect this.

d. Situations may arise wherein the exercise of the right of self-defense should be temporarily suppressed, or when freer use of non-air defense weapons against aircraft should be encouraged. The former case involves a local decision that prevention of position disclosure is paramount. Notice of such restriction is disseminated through command channels. The latter case should be based on a theater-level decision.

e. Use of a single rule for engagement: "Engage hostile aircraft," is based on the knowledge that common sense interpretations of the rule will be correct. For example, all aircraft attacking the unit and enemy aircraft performing operations such as forward air control, reconnaissance, surveillance, or dropping

or landing troops are clearly "hostile aircraft."

3. Engagement

In the absence of orders to the contrary, individual weapon operators will engage attacking aircraft; engagement of all other hostile aircraft will be on orders issued through the unit chain of command and will be supervised by unit leaders. Nothing in this rule is to be taken as requiring actions prejudicial to accomplishment of the primary mission of the unit.

4. Techniques

The following techniques should maximize the destructive and/or deterrent effect against aircraft. Aircraft may be divided into two categories: low speed and high speed. Low speed aircraft include helicopters; liaison, reconnaissance, and observation fixed wing propeller aircraft; while all jet fixed wing aircraft are high speed. This distinction will result in simplified engagement procedures.

a. Engagement of Low Speed Aircraft. In accordance with the rule for engagement, engage low speed enemy aircraft with aimed fire, employing the maximum weapon rate of fire. Aerial gunnery techniques generally applicable to all small arms and automatic weapons are presented in FM 23–65.

b. Engagement of High Speed Aircraft. In accordance with the rule of engagement, engage high speed enemy aircraft with maximum fire aimed well in front of the aircraft, and above its flight path, in order to force it to fly through a pattern of fire. This technique is not unaimed "barrage" fire, but requires a degree of aimed fire. It does, however, call for careful estimation of aircraft speed and required lead.

c. Use of Tracer Ammunition. Automatic weapons should utilize the highest practical proportion of tracer ammunition to enhance the deterrent or disruptive effect of the round and to assist in correcting trajectory.

d. Massed Fire. Units should employ a massed fire technique when using small arms and automatic weapons in an air defense role.

5. SOP Items

Company-level SOP should cover, but not be limited to, the following items relevant to engagement of aircraft with non-air defense weapons:

a. Applicability. Designate weapons operators.

b. Relation to Primary Mission. The primary mission should never be prejudiced.

c. Relation to Passive Air Defense. The necessity for aggressively engaging hostile aircraft is balanced with the requirement to place in proper perspective the tactic of withholding fire to prevent disclosure of position.

d. Authority to Engage. Authority to engage attacking aircraft delegated to individual weapons operators and to engage all other hostile aircraft on orders through unit chain of command, subject to the rule for engagement and rules for withholding fire.

e. Rule for Engagement. Normally self-defense only against all attacking aircraft and those positively identified enemy aircraft which pose a threat to the unit.

f. Rules for Withholding Fire. When ordered. When not positive that aircraft are actually attacking or otherwise hostile. When friendly aircraft or troops are endangered.

g. Position Selection. Applicable only to weapons specifically assigned on air defense role; e.g., designated single barrel caliber .50 machineguns. See FM 44–1.

h. Firing Techniques. Lead and superelevation, massed fire, and maximum use of tracer ammunition.

i. Unit Training Requirements. Motivation and discipline, gunnery, and aircraft recognition.

APPENDIX F
REDEYE DEFENSE CONSIDERATIONS

1. General

a. The Redeye is a 29 pound, infrared homing, optically aimed air defense weapon that can be carried and operated by one man.

b. The Redeye weapon system can provide units with a self-defense capability against hostile aircraft within range and engagement capability. The Redeye weapon system is not a component of an integrated and coordinated air defense deployment. Normally the following engagement rules apply:

(1) Attack aircraft identified as hostile.

(2) Attack aircraft committing a hostile act.

c. The definition of a hostile act and the criteria for identification of aircraft will be published by the area air defense commander and will be incorporated in the unit standing operating procedure. For detailed coverage of aircraft identification, see FM 30–30. For other items that should be covered in the SOP, see paragraph 2*g* below.

d. Unless otherwise directed, hostile aircraft within the capability of the weapon should be engaged. To avoid the disclosure of positions, commanders may direct that aircraft not be engaged in some special situations.

e. When permitted by theater rules, commanders in certain situations may direct that the Redeye team engage all aircraft not identified as friendly.

2. Employment

a. Redeye Mission. The Redeye mission is to provide local air defense of small combat and combat support units.

b. Organization. Redeye is employed by two-man teams allocated on the basis of one per combat and selected combat support company/battery/troop. Redeye may be employed on a "dual duty" basis in certain cases. Redeye is assigned to an air defense section in designated battalions and to designated separate companies/batteries/troops.

c. Defense of the Unit in Position. Redeye teams depend upon visual means for the detection and identification of targets. The positions selected must provide for maximum observation and unobstructed fields of fire commensurate with associated consideration of likely avenues of approach, the desire to engage the enemy before he can strike the defended unit, and local ground security. At least one gunner continuously performs surveillance of the surrounding airspace, alternating with the other gunner as required. The gunners may be separated by short distances where observation is otherwise limited. During periods of intense activity, both may act as gunners thereby doubling the rate of fire or covering additional avenues of approach. Surveillance is maintained in all directions with emphasis on the expected or most likely direction of attack. Units should prepare detailed SOP for air defense based on Army and theater guidance. These SOP should incorporate provisions for early warning compatible with the unit mission and communications capability. Provision should be made for augmenting Redeye fires with those organic non-air defense weapons, primarily automatic weapons, capable of delivering large volumes of direct fire.

d. Defense of the Unit During Movement.

(1) In a company column, the company commander should place one team member near the front of the column and one near the rear, each with a portion of the available missiles. Appropriate primary and secondary zones of responsibility should be as-

signed. All-around observation should be assured, some missiles should be unpacked and ready, and gunners should be ready to dismount quickly.

(2) During movements in which more than one team is involved; e.g., a battalion or brigade move, teams should be placed throughout the column with emphasis on the front and rear. Disposition of the teams within the column is made by the column commander. Route coverage may be improved by directing certain teams to occupy critical points along the route; however, road conditions or column speed may preclude leapfrogging.

(3) The team's ¼-ton truck with trailer will provide the required mobility in most situations. In certain cases, the requirement for mobility may be such that temporarily dropping the trailer and carrying a reduced load of missiles in the truck itself is justified. When tracked vehicle transportation is mandatory in certain situations, the transportation must be obtained on a priority or share-the-ride basis.

(4) When company elements are greatly dispersed, Redeye positions are chosen in relation to the designated priority company element. During a fluid or dispersed situation, Redeye usually must remain with the priority company element.

e. Control. The Redeye gunner (primary duty) normally is permitted to engage all targets positively identified as hostile or committing hostile acts within the criteria set forth in guidance by higher headquarters. The gunner normally attacks the targets on his own initiative since time and space-limitations do not permit the gunner to request permission to fire on any particular target. Unit commanders may impose further restrictions on Redeye fires to prevent compromising the unit location, but under no circumstances will the unit commander allow freedom to fire beyond that established by higher authority. The gunner has no authority to deviate from the established weapon control status, identification criteria, and rules for target selection. *Dual duty gunners are only permitted to fire at aircraft actually firing upon the unit.*

f. Firing Doctrine. The engagement of a low performance aircraft is accomplished by one gunner firing a single weapon, assessing the results, and firing additional weapons as required. Several high performance aircraft may be simultaneously engaged by both gunners, each firing until the aircraft are destroyed or beyond engagement range.

g. Unit SOP. The unit SOP for Redeye operators should cover the following, as a minimum:

(1) Mission.
(2) Command.
(3) States of alert-manning requirements.
(4) Weapon control statuses and hostile criteria, to include:
  (*a*) Precise definition of terms.
  (*b*) Identification criteria and authority to declare an aircraft hostile.
  (*c*) Personnel with authority to authorize deviation.
  (*d*) Statement that self-defense is never denied.
(5) Rules for target selection.
(6) Firing doctrine.
(7) Fire coordination between team members.
(8) Communications.
  (*a*) Nets and frequency allocations.
  (*b*) Discipline and security.
  (*c*) Alternate communications.
(9) Reporting requirements.
  (*a*) Warning: air, ground, and CBR.
  (*b*) Operational status.
  (*c*) Position and displacement.
  (*d*) After action.
(10) Ground security.
(11) Passive air defense procedures.
(12) Standard vehicle loading and movement plan, to include measures to increase mobility.
(13) Logistics.
  (*a*) Resupply procedures.
  (*b*) Reports.
  (*c*) Maintenance.

(14) Emergency destruction plan.
(15) Site selection and alternate site selection.
(16) Safety procedures.
(17) Training.

3. Materiel

The Redeye team (pertains to team manned on a primary duty basis) is equipped with the following items:

a. Transportation. The team is transported in a wheeled vehicle.

b. Armament. The team is armed with the prescribed basic load of Redeye missiles. The basic load may be split between the gunners in certain situations. Each gunner has an M14 or M16 rifle.

c. Communications. Required communication equipment is provided to support team operations, and to permit receipt of orders from the unit commander and transmission of the alert to the commander and other elements upon the detection of hostile aircraft.

d. Orientation and Surveillance. Maps, a compass, and binoculars are provided to assist the team in self-location, orientation, and surveillance of the airspace.

e. Decontamination. A decontamination apparatus is carried in the vehicle to permit decontamination following a CBR attack.

INDEX

By Order of the Secretary of the Army:

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