ATP 3-04.16

Airfield Operations

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Airfield Operations

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Preface

ATP 3-04.16 details non-prescriptive airfield operational procedures that support aviation throughout the range of military operations. While it contains techniques for aviation unit commanders and aviators, the manual is intended primarily for use by. aviation personnel employed within airfield management elements of Aviation Brigades, Airfield Operations Battalions (AOB), and installation airfield management teams. This manual outlines airfield management organization and is divided into three parts to present techniques that support airfield contingency operations, aviation unit operations, and installation garrison operations. Services of the theater airfield operations groups (TAOGs), AOBs, aviation unit plans and operations staff, and installation airfield management operations. It explains personnel qualifications, duties, and responsibilities critical to establishing and operating an airfield. It also provides information on airfield design, security, and support requirements when planning and operating an airfield within a theater of operations (TO) or during homeland security operations. Installation airfield management structure, responsibilities, services, and safety requirements are presented in part II of this manual.

The principal audience for ATP 3-04.16 is all members of the profession of arms. Commanders and staffs of Army headquarters (HQ) serving as a joint task force or multinational HQ should also refer to applicable joint or multinational doctrine concerning the range of military operations and joint or multinational forces. Trainers and educators throughout the Army will also use this publication.

Commanders, staffs, and subordinates ensure that their decisions and actions comply with applicable United States, international, and in some cases host-nation laws and regulations. Commanders at all levels ensure that their Service members operate in accordance with the law of armed conflict and the rules of engagement. (See FM 6-27 for legal compliance.)

ATP 3-04.16 uses joint terms where applicable. Selected joint and Army terms and definitions appear in both the glossary and the text. Terms for which ATP 3-04.16 is the proponent publication (the authority) are marked with an asterisk (*) in the glossary. When first defined in the text, terms for which ATP 3-04.16 is the proponent publication are boldfaced and italicized, and definitions are boldfaced. When first defining other proponent definitions in the text, the term is italicized and the number of the proponent publication follows the definition. Following uses of the term are not italicized.

ATP 3-04.16 applies to the Active Army, Army National Guard, the United States Army Reserve, and Army civilians unless otherwise stated. In addition, trainers, educators, and contractors will also use this publication as a doctrinal reference. ATP 3-04.16 builds on collective knowledge and experience gained through recent operations, exercises, and the deliberate process of informed reasoning. Its principles and fundamentals address new technologies and evolving responses to diverse threats. It will also assist Army branch schools in teaching air traffic services (ATS) and airfield management operations.

The proponent of ATP 3-04.6 is the United States Army Aviation Center of Excellence (USAACE). The preparing agency is the Directorate of Training and Doctrine (DOTD), USAACE. Send comments and recommendations on Department of the Army (DA) Form 2028 (*Recommended Changes to Publications and Blank Forms*) to Director, DOTD, ATTN: ATZQ-TD (ATP 3-04.6), 2218 6TH Avenue, Fort Novosel (formerly known as Fort Rucker), AL 36362; by e-mail to usarmy.rucker.avncoe.mbx.doctrine-branch@army.mil; or submit an electronic DA Form 2028..

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Introduction

This publication focuses on Army Aviation airfield operations and management throughout the range of military operations. ATP 3-04.16 covers fundamental airfield considerations and discusses the organizations responsible for airfield management. The ATP also addresses critical airfield construction and design considerations when operating in a joint environment.

Army Aviation's responsibility to manage and operate theater airfields has greatly increased over the last decade. The establishment of an expeditionary airfield to receive aviation organizations and their equipment and facilitate forward movement. is critical to opening a TO and subsequent aviation expeditions. Aviation organizations must be able to effectively operate assigned airfields to provide a safe and efficient area to conduct aviation operations.

To understand ATP 3-04.16, the reader must understand the fundamentals contained in AR 95-2 and should also be familiar with the airfield design standards contained in Unified Facilities Criteria (UFC) manuals.

ATP 3-04.16 provides techniques and non-descriptive ways to operate and manage Army airfields and facilities. The use of the terms "shall" and "will" in this ATP requires procedural compliance.

ATP 3-04.16 is a two-part manual:

- Part One discusses airfield considerations and begins with the fundamentals which includes the operational environment and the organizational design of aviation units that are responsible for airfield operations and management. It also provides information on multidomain operations, airfield management training, airfield design and construction, and joint considerations for airfields.
- Part Two provides an overview of aviation unit operations and discusses the organization and staff of aviation units. It details mission scheduling that outlines the requirements associated with assigned aviation missions. This part of the manual includes a section on operations training and evaluation and concludes with a section on the aviation mission planning system (AMPS). It outlines the installation airfield management organizational structure with associated duties and responsibilities. Additionally, this part discusses flight planning and operations, airfield services and safety.

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PART ONE

Airfield Considerations

Chapter 1

Fundamentals

Successful employment of Army Aviation is contingent upon establishing and maintaining secure airfields. Aviation forces will conduct maneuver as dispersed formations with the close combat area and from larger unit assemblies at established airfields within the Corps and Division consolidation areas. Airfield management and aviation safety become essential tasks as aviation platforms become the primary means of resupply and projection of ground forces. These tasks become more complicated when airfields are host to a variety of allied military, nongovernmental organizations (NGOs), and commercial air activities. The organization of airfield management personnel within the Army is designed to efficiently support Army, joint, interagency, interorganizational, and multinational aviation operations in all required environments.

OPERATIONAL ENVIRONMENT

1-1. Army Aviation combines speed, mobility, and lethality to gain advantage as the aerial maneuver force of the combined arms team. Efficient management and thoughtful airfield design contributes to the timely response of Army Aviation in large scale combat operations, contingency, and continental United States (CONUS)-based operations. Locations for Army Aviation airfield operations include, but are not limited to:

- Highway landing strips.
- Improved and unimproved austere airfields.
- Captured enemy airfields.
- Host and adjacent nation airfields.
- Airfields designated for homeland security operations.

1-2. Expansion of the area of operations (AO) at each echelon may be dependent on forward operating airfields. These airfields enable the commander to seize the initiative and influence operations at critical points within the AO. Aviation, including armed and unarmed unmanned aircraft systems (UASs), expands the ground commander's area of operations in both space and time. A forward airfield enhances:

- Aviation maneuvers across all core competencies.
- Commander's advantage gained through increased depth and breadth for information collection and joint/coalition fires (direct and indirect) against either a conventional or an asymmetric threat.
- Economy of force and resources ensuring that Army Aviation can range anywhere within the AO.
- Aviation's ability to conduct attacks, shaping operations, support sustainment, and provide aerial mission command platforms for supported tactical and operational commanders.

- The mobility, of ground forces, positioning of long-range fires, and s and other weapons systems in proximity of advancing enemy formations attack reconnaissance aircraft permitting enemy detection and engagement beyond the range of ground direct fire systems.
- Conventional and asymmetric operations.

1-3. Ground forces benefit from forward airfields through:

- Increased maneuver and sustainment speeds.
- Overwatch of moving forces.
- Insertion of light or dismounted forces to seize chokepoints and secure danger areas prior to heavy force linkup.
- Movement of critical equipment and supplies forward.
- Information systems aircraft providing commanders mobility and communications links.

1-4. Well-established and maintained secure airfields contribute to aviation tactical sustainment operations to include air movement and aerial sustainment in support of special operations, light, airborne, air assault, and heavy forces. It also supports high priority resupply and air movement throughout the TO.

1-5. Airfield service elements must maintain the capability of continuous, around-the-clock operations with a capability to launch and recover aircraft in instrument meteorological conditions (also called IMCs). This requires:

- Battle rhythm management of assigned personnel.
- Operational, sustainable, and certified navigational aids (NAVAIDs).
- Adequate and appropriate airfield lighting.
- Advanced digitized communications systems providing increased situational awareness.

1-6. Airfield planning principles and services are based on the types of aircraft utilizing the airfield and the assigned tasks associated with the airfield's mission. These tasks depend on mission, enemy, terrain and weather, troops and support available, time available, civil considerations, and informational considerations [METT-TC (I)].

ARRAY OF AIRFIELDS THROUGHOUT THE THEATER

1-7. Threats to U.S. interests throughout the world are countered by the ability of U.S. forces to respond to a wide variety of challenges along a conflict continuum that spans from peace to war. U.S. Army aviation forces conduct a range of military operations to respond to these challenges. The range of military operations is a fundamental construct that helps relate military activities and operations in scope and purpose within a backdrop of the conflict continuum. All operations along this range share a common fundamental purpose-to achieve or contribute to national objectives.

1-8. Multiple operational variables make support to large-scale combat operations the greatest challenge for the positioning and protection of theater airfield management forces. Large-scale combat operations are intense, lethal, and high tempo. Their conditions include complexity, chaos, fear, violence, fatigue, and uncertainty which necessitates integration of all warfighting functions across all domains to win on the multidomain battlefield.

1-9. Airfield operational forces enable unified land operations through the establishment of airfields which project and sustain combat forces to achieve the Army and its unified action partner's objectives. Lack of sufficient airfield and air traffic support slows operational tempo, contributes to increased aviation risk, and restricts the effective and timely maneuver of friendly forces on the ground.

STRATEGIC SUPPORT AREA

1-10. Joint and Army forces receive support from the strategic support area. The support provided includes strategic lift, material integration, financial management support, HR support, and Army Health Systems support. The strategic support area describes the area extending from a theater to a CONUS base or another combatant's AOR. The strategic support area includes the air and seaports supporting the flow of aviation forces into the theater.

1-11. Air Mobility Command (AMC) is the U.S. Air Force (AF) airlift component of USTRANSCOM and serves as the single port manager for air mobility. AMC aircraft provide the capability to deploy the Army's forces worldwide and help sustain them across a range of military operations. USTRANSCOM, through AMC, executes its single port manager role for aerial port of embarkation (APOE) and aerial port of debarkation (APOD) performing functions necessary to support the strategic flow of the deploying forces' equipment and supplies from the APOE to the theater. For detailed information regarding AMC see JP 3-36.

1-12. APOEs and APODs are usually designated joint aerial complexes and managed by AMC. Where designated, AMC is also the operator of common-use APOEs and/or APODs. The operation of a joint aerial complex can be divided into two parts: air terminal operations and air terminal support operations. Air terminal operations are run by AMC. The Army Service Component Command (ASCC) has responsibility for air terminal support operations and employs the theater sustainment command (TSC) to facilitate reception, staging, onward movement, integration (RSOI) of deploying forces and materiel to designated tactical maneuver support areas within the Corps and Division and Support Areas

LANDING ZONES

1-13. The Army and Air Force hold joint responsibility for selection of landing areas, with the objective of deploying and sustaining the force. The Army coordinates the landing zone (LZ) selection with the Air Force making the final decision. This decision is based on information gathered from a landing area study that highlights not only large, modern facilities, but also areas suitable only for takeoffs and landings and austere airfields similar to the one used by a C-17. Each identified site is classified based on suitability in terms of type and number of aircraft, and available and/or required support facilities. Any physical improvements necessary are the responsibility of the ranking Army engineer. Desirable characteristics of LZs are ease of identification from the air; a straight, unobstructed, secure approach for aircraft; and close proximity to ground objectives/units. LZs to be developed into theater airfields with more sophisticated facilities should possess the following additional characteristics:

- An area of sufficient size and traffic ability to accommodate the number and type of aircraft to be landed.
- Parking and dispersal areas to accommodate the planned capacity of the facility.
- A road net to handle ground vehicular traffic.
- Minimum construction and maintenance requirements.
- Areas and facilities for air terminal operations.
- Facilities for holding patients awaiting evacuation.
- Sufficient aerial port capacity to handle incoming personnel and supplies.
- Facilities to support crash rescue vehicles and equipment.

ORGANIZATIONAL DESIGN

1-14. The TAOGs provide the joint force commander (JFC) with the expertise to execute the theater airfield mission and coordinate all support requirements not organic to the Airfield Operation Battalion (AOB). These requirements include weather support, firefighting capabilities, airfield lighting, cargo handling, engineer, and NAVAID support. The TAOG may be deployed in total or task organized by teams to provide the JFC with the coordination and command and control (C2) capability to operate a single airfield or conduct operations in multiple locations within the TO. Airfield management forces train to support large-scale combat operations and a wide range of operations that include regular and irregular warfare, humanitarian assistance operations, security force assistance, and support to civil authorities.

1-15. Meeting the challenges of an uncertain, complex, and interconnected strategic environment requires airfield formations that are adaptive, innovative, flexible, and agile in training and operations. Support of large-scale combat operations requires deployment of airfield management forces from all components on short notice; therefore, the increased training readiness of these units is key to the success of our Army. Since the Army is largely a CONUS-based force, leaders and units must practice the ability to deploy into an austere theater through contested ports, conduct RSOI, and immediately support large-scale combat operations.

THEATER AIRFIELD OPERATIONS GROUP

1-16. The TAOG provides command and control of assigned airfields and air traffic organizations while synchronizing air traffic operations in a joint environment. It establishes theater airfields in support of reception, staging, onward movement, and integration requirements, SPOD, and APOD operations. The TAOG coordinates and integrates terminal airspace use requirements with the mission command element of a controlling HQ. The TAOG coordinates and schedules flight checks, reviews and processes terminal instrument procedures (TERPs), and provides quality assurance of the controller, air traffic control (ATC) maintenance, and airfield operations training and certification programs. It also supports the Army Service Component Command regarding United States Code, Title 10, ATS issues, liaison responsibilities with host nation airspace authority, and other United States and combined services and agencies. The TAOG consists of a HQ and HQ company and three AOBs. (Figure 1-1).

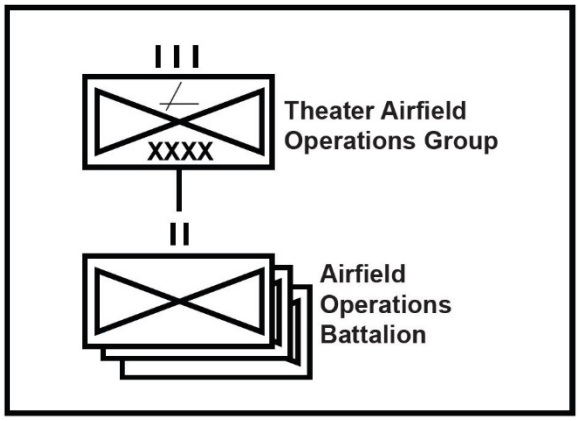


Figure 1-1. Theater airfield operations group organization

AIRFIELD OPERATIONS BATTALION

1-17. The AOB (Figure 1-2, page 1-5) is composed of staff and operational sections/platoons required for the management and execution of airfield activities at designated airfields within the TO. The AOB provides airfield management, airfield operations, flight dispatch services, and ATC. AOBs execute airfield management and air traffic control services, but the organizational design of the AOB does not include the associated equipment and personnel needed to provide a full range of airfield activities in support of aviation operations. An ATC operations HQ airfield services element, safety/standardization section, and communication/navigation (COMNAV) maintenance section are organic to the AOB. Aircraft crash rescue; hazardous material handling; engineer support for runway surveys and runway battle damage assessment; cargo handling; weather services; petroleum, oils, and lubricants (POL) services; and the base defense operations center (BDOC) are external support elements.

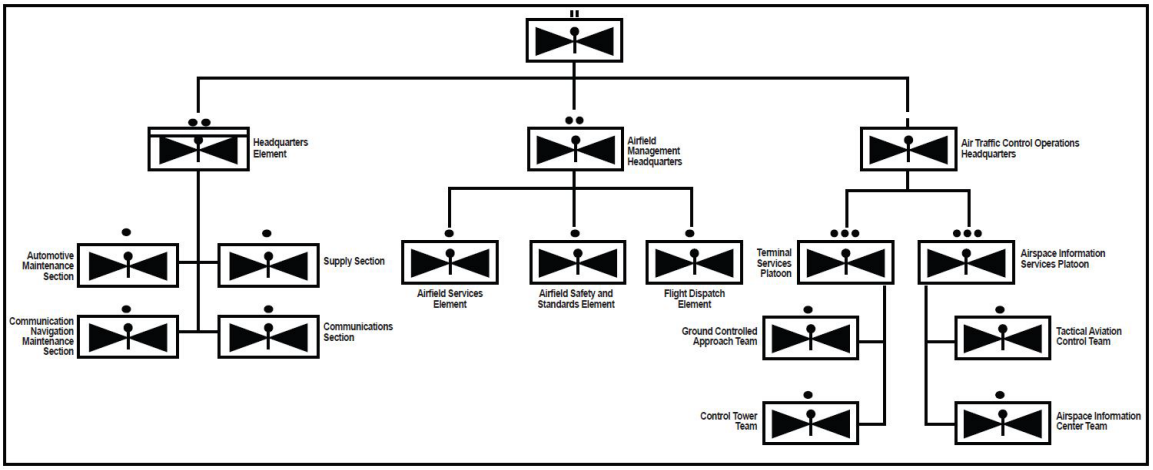


Figure 1-2. Airfield operations battalion organization

Airfield Management Headquarters

1-18. The airfield management HQ is made up of a military occupational specialty (MOS) 15B Aviation officer and a 15Z operations sergeant. This headquarters is responsible for:

- Developing local airfield standard operating procedures (SOPs) that govern areas such as:
  - Flight plan filing.
  - Use of airfield services.
  - Joint use of airspace.
  - Airfield facility use.
  - Night operation agreements.
  - Noise abatement.
  - Nap-of-the-Earth (also called NOE) training area rules and other special interest areas.
  - Implementation of an airfield advisory council.
  - Expansion and acquisition efforts for the airfield.
  - Synchronization of aviation actions for the senior aviation commander.
- Training and performance of the flight dispatch element and the airfield services element.
- Developing and updating of the local hazard map.
- Developing of the pre-accident plan.
- Developing of letters of agreement (LOAs) and memorandums of agreement for UAS operations.
- Flight information publications (FLIPs) availability and currency.
- Coordinating for and acquiring additional airfield services such as refuel, weather, engineer support, and firefighting.
- Interfacing with the mission command system and the combined air operations center's control and reporting center.

Airfield Services Element

1-19. The airfield services element consists of a 15P20 aviation operations sergeant and a 15P10 aviation operations specialist. The airfield services element facilitates aircraft manifests and provides limited cargo transportation control. It also reports airfield status and coordinates notice to air mission (NOTAM) advisories. The element maintains appropriate flight operation publications and disseminates appropriate airspace coordinating measures to aircrews. The airfield services element coordinates various flight activities in and around the airfield and coordinate directly with the airfield management HQ, ATC, other airfield services organizations, and force protection elements.

1-20. The airfield services element—

- Provides airspace and local airfield procedures briefings including air tasking order, airspace control order, and special instructions (also called SPINS) concerning local airspace to transient aviators and aviation units operating at the airfield.
- Develops SOPs for notification and dissemination of aircraft emergencies, all Air Force provided weather watches, warnings, and advisories.
- Develops airfield security plan and coordinates with other agencies to integrate security measures and reaction plan.
- Conducts foreign object damage (FOD) checks of the airfield at least once per shift.
- Conducts airfield lighting checks at least once per day.

Airfield Safety and Standards Element

1-21. The airfield safety and standards element consists of a 153AB aviation safety officer (ASO), 150AB air traffic and airspace management technician and a 15Q40 ATC senior sergeant. It develops and implements a comprehensive accident prevention program to minimize the risk to aviation operations. This element develops a pre-accident plan and works collaboratively with airfield services elements and the aviation community. Airfield safety and standardization personnel coordinate aircraft accident investigations, review operational hazard reports, and publish flight procedures in theater-specific aviation procedure guides (APGs). Additional responsibilities include—

- Serving as a member of the airfield advisory council.
- Coordinating airspace usage agreements for training and airfield operations.
- Conducting initial and follow-up airfield safety inspections.
- Developing local airfield flight procedures and rules.
- Developing and ensuring currency of a local hazards map.
- Establishing the airfield crash system.
- Coordinating and securing any additional assets needed.
- Reviewing and processing the TERPs data package for completeness and accuracy; requests flight inspections for NAVAIDs.

Flight Dispatch Element

1-22. The flight dispatch element consists of two aviation operation sergeants. The flight dispatch element processes flight plans through the combat airspace system or host nation system. It develops and maintains local checklists, logs, and other required documentation to support functional area responsibilities. The element also provides flight planning services to include current publications, maps and charts, NOTAM display, and weight and balance forms for Class 2 aircraft. Flight dispatch also—

- Develops local instructions for—
  - Inbound and outbound aircraft.
  - Distinguished visitors.
  - Aircraft requiring special handling (such as air evacuation and hazardous cargo).
  - Airfield restrictions (prior permission required [Also called PPR]).
  - Crash alarm system.
  - FLIPs.
  - In-flight advisories.
- Provides advisory service in the event of ATC facility closure.
- Develops a training program for newly assigned personnel.
- Ensures airfield advisory procedures are established when required.
- Ensures ground personnel operating near or on taxiways (TWYs) or runways (RWYs) are thoroughly briefed on two-way radio communication procedures and are familiar with the ATC light gun signals contained in the Aeronautical Information Manual and the FAA Order JO 7110.65Z.

- Establishes and maintains current flight information developed within the theater.
- Establishing and maintaining a FLIP account for the airfield according to AR 95-2. (AR 95-2 contains information on the establishment and maintenance of a Department of Defense [DOD] FLIP account.)

Air Traffic Control Operations Headquarters

1-23. The coordination of ATC procedures and establishment of ATS is the responsibility of the terminal services and airspace information services platoons. These elements provide detailed planning for terminal and airspace information services in and out of the area of responsibility (AOR) by developing aviation flight procedures and incorporating them into the theater airspace plan. ATC elements coordinate directly with the airfield management HQ, other airfield services organizations, and force protection elements. The ATC operations element—

- Assists in the development of local airfield procedures.
- Develops the crash grid map used by airfield responding agencies.
- Develops the airfield diagram and identifies/annotates crash response points.
- Assists in development and publication of the APG.
- Develops aircraft emergency procedures for both on and off the airfield.
- Coordinates, assists, and directs emergency crash rescue services.
- Develops ATC facility training manuals and programs for the airfield assigned. This ensures a comprehensive program of instruction for assigned air traffic controllers, enabling them to become Federal Aviation Administration (FAA) certified as CTOs or ATC specialists.
- Provides the CTO and/or ATC specialist examiners for those ATC facilities.
- Initiates the TERPs process if necessary or completes any portion of it to include an emergency recovery procedure in conjunction with tenet aviation unit's standardization officer.
- Secures and disseminates the air tasking order/airspace control order and associated special instruction (also called SPINS).
- Interfaces and coordinates with local AMD.

Airfield Operations Battalion Required Communications

1-24. The AOB requires a robust communication capability throughout its elements to execute the airfield management mission and send and receive critical information regarding current and future operations. These capabilities include—

- Dedicated, secure, jam resistant very high frequency (VHF)-frequency modulation (FM), VHF-amplitude modulation (AM), and ultra-high frequency (UHF)-AM radios.
- Continuous monitoring VHF-AM and UHF-AM emergency frequencies (guard frequencies with guard transmit presets).
- Secure jam resistant voice and data communications in the high frequency/single-side band with automatic link establishment.
- UHF-FM satellite communications demand assigned multiple access for beyond line of sight communication.
- Direct-voice landline communications to the control tower, airspace information center, Army and joint airspace control authorities, airfield weather services, refueling point, and tenet aviation units.
- Mobile communication console integrating all radio and telephones landline communications providing centralized use.
- Voice primary crash alarm system with circuit activation capability for five key agencies.
- Handheld, short-range radio communications in the VHF-AM/FM frequency spectrum.
- Telecommunications equipment to process flight data, flight movement messages.
- Internet capability (NIPR/SIPR/coalition network).

Communications Section

1-25. The communications section is made up of a 25B20 information technology sergeant and a 25U10 signal support systems specialist. The communications section installs, employs, maintains, troubleshoots, and assists users with signal support systems and terminal devices to include radio, wire, and automated systems. This section—

- Integrates signal systems and networks.
- Disseminates information service policies.
- Prepares maintenance and supply requests for signal support.

Communication/Navigation Maintenance Section

1-26. The communication/navigational maintenance section consists of a 94D30 ATC systems maintenance supervisor, a 94D20 ATC equipment repairer, and three 94D10 ATC equipment repairers. This section is organic to the AOB and maintains equipment maintenance records, authorized spare parts, supply stock, tool lists, and technical manuals and instructional material for repair of ATC communication and navigation systems and equipment. The communication and navigational maintenance section also provides:

- Field-level maintenance to ATC systems.
- Component replacement and limited component repair.
- Installation and troubleshooting of ATC equipment, landing systems, and identification friend or foe/selective identification feature systems.
- Comparison checks on repaired equipment per test standards.
- Intermediate direct support maintenance and installation of ATC communications, NAVAIDs, and landing systems.
- Ground certification of NAVAIDs prior to flight checks.

Chapter 2
Contingency Airfield Operations

The U.S. Army in multidomain operations identifies the requirement to "win tomorrow, we must evolve how we organize and integrate the Army as part of the joint force." In doing this the Army must develop or improve capabilities to contribute to cross-domain options with the Joint Force. The Army must execute airfield and air traffic operational capabilities to fully support Joint and Coalition Forces at airfields essential for the sustainment and aerial resupply of ground maneuver.

CORPS AND DIVISION AND SUPPORT AREAS

2-1. FM 3-0 has detailed information regarding Corps areas.

CORPS AREA

2-2. Corps and division commanders designate close, deep, and rear areas to describe the physical arrangement of forces in time, space, and focus. Maintaining freedom of action of maneuvering forces often requires the establishment of airfields to provide nodes for intra-theater airlift of the movement of personnel and resources. Typically, aircraft capable of accomplishing a wide range of operational and tactical level missions conduct these operations. Unit movements within the theater are in response to JFC's operation or campaign plan. Once combat units are deployed to a theater, the JFC may use intra-theater airlift to maneuver forces to exploit weaknesses in the adversary's position. In this capacity, airlift allows the JFC to reposition forces expeditiously, achieve surprise, and control the timing and tempo of operations.

2-3. Army managed airfields in within the corps and division areas permit the continuing resupply of forward units. These requirements normally are predictable, regular, and quantifiable when the forces are not engaged in combat operations. During competition, these requirements can usually be fulfilled through a fixed resupply schedule. However, once forces are conflict, resupply requirements increase dramatically and become more unpredictable and variable. The ability of airlift to rapidly and flexibly accommodate the critical resupply requirements of units engaged and operating in such a dynamic environment provides commanders with an essential warfighting capability. A key element to this sustainment distribution network is the establishment of airfields in the corps and division areas to support aerial resupply and airlift of combat forces.

DIVISION DEEP, CLOSE, REAR AND SUPPORT AREAS

2-4. FM 3-0 has detailed information regarding division deep, close, rear, and support areas.

Deep

2-5. Deep operations are tactical actions against enemy forces, typically out of direct contact with friendly forces, intended to shape future close operations and protect rear operations. At the operational level, deep operations influence the timing, location, an enemy force involved in future battles. At the tactical level, deep operations set conditions for success during close operations and subsequent engagements.

2-6. At both the operational and tactical levels, the principal effects of deep operations focus on an enemy force's freedom of action and the coherence and tempo of their operations. Deep operations strike enemy forces throughout their depth and prevent the effective employment of reserves, C2 nodes, logistics, and long-range fires. Deep operations are inherently joint since many of the capabilities employed by or in support of Army formations are provided by a joint headquarters or Service component.

2-7. Several activities are typically conducted as part of deep operations. They include:

- Deception.
- ISR and target acquisition.
- Interdiction (by ground or air fires, ground or aerial maneuver, cyberspace forces, special operations forces, or any combination of these).
- Long-range fires against enemy integrated air defense systems, sustainment nodes, fires
- capabilities, and echeloned follow-on maneuver formations.
- Electromagnetic warfare.
- Offensive cyberspace operations and space operations.
- Military information support operations.

2-8. Not all activities focused forward of the line of contact are deep operations. Counterfire, for example, primarily supports close operations, even though the targets attacked may be located at great distances from the forward line of troops.

2-9. Deep operations require detailed planning. Because of the relative scarcity of resources with which to perform these activities, deep operations focus on the enemy vulnerabilities and capabilities most dangerous to the next close operation. Attacks must employ enough combat power to achieve the desired result. This is critical when—as is frequently the case—maintaining momentum in close operations depends on successful prosecution of deep operations.

Close

2-10. Close operations are tactical actions of subordinate maneuver forces and the forces providing immediate support to them, whose purpose is to employ maneuver and fires to close with and destroy enemy forces. Until enemy forces are defeated or destroyed in close operations, they retain the ability to fight and hold ground. At the operational level, close operations comprise the efforts of large tactical units—corps and divisions—to win current battles by closing with and defeating enemy forces after setting favorable terms to do so. At the tactical level, close operations comprise the efforts of smaller tactical units to win current engagements through movement combined with direct and indirect fires while physically in contact with the enemy forces they intend to destroy and defeat. Close operations concentrate overwhelming combat power at the right time and place to create and then exploit windows of opportunity to achieve assigned objectives.

2-11. Close operations include the deep, close, and rear operations of their subordinate maneuver formations. For example, divisions and separate brigades conduct corps close operations. Brigade combat teams are the primary forces conducting division close operations. Successful deep operations disintegrate the structures and systems that enable enemy operational approaches, isolate enemy close operations from sources of support, and make enemy forces vulnerable to defeat in detail. Seizing and defending contested land areas require close operations.

2-12. The positioning of assets and capabilities does not determine whether they are part of the close operation. For example, some reconnaissance and target acquisition units, while located forward near the line of contact, may have a purpose that supports deep operations. Close operations are inherently lethal because they involve direct fire engagements at relatively short ranges with enemy forces seeking to mass direct, indirect, and aerial fires against friendly forces. Deep and rear operations set conditions for the success of close operations. The measure of success of deep and rear operations is their positive impact on increasing the effectiveness and reducing the cost of close operations.

2-13. Activities are part of close operations if their purpose contributes to defeating committed enemy forces that are or will be in direct physical contact with friendly forces. The activities that comprise close operations include:

- Maneuver of subordinate formations (including counterattacks).
- Close combat (including offensive and defensive operations).
- Indirect fire support (including counterfire, close air support, electromagnetic attack, and offensive space and cyber operations against enemy forces in direct physical contact with friendly forces).

- Information collection.
- Sustainment support of committed units.

Rear

2-14. Rear operations are tactical actions behind major subordinate maneuver forces that facilitate movement, extend operational reach, and maintain desired tempo. This includes continuity of sustainment and C2. Rear operations support close and deep operations. At the operational level, rear operations sustain current operations and prepare for the next phase of the campaign or major operation. These operations are distributed, complex, and continuous. At the tactical level, rear operations enable the desired tempo of combat, assuring that friendly forces have the agility to exploit any opportunity.

2-15. Rear operations typically include five broad activities: positioning and moving reserves; positioning and repositioning aviation, fire support, and AMD units; conducting support area operations; securing sustainment and C2 nodes; and controlling tactical unit movement between the division or corps rear boundary and units conducting close operations. Rear operations typically include efforts that consolidate gains to make conditions created by deep and close operations more permanent. All of these activities compete for limited terrain and lines of communications. Division and corps rear command posts are generally responsible for rear operations. There are several considerations for conducting rear operations. They include:

- C2.
- Information collection activities to detect enemy forces.
- Establishment and maintenance of routes.
- Terrain management.
- Movement control.
- Protection of critical friendly capabilities.
- Information activities.
- Infrastructure repair and improvement.
- Defeating bypassed forces and continuing to consolidate gains.
- Minimum-essential stability tasks which are—
  - Establish civil security.
  - Provide immediate needs (access to food, water, shelter, and medical treatment).
- Coordination with host-nation and multinational governmental organizations.
- Adjusting to shifts in the unit and subordinate rear boundaries.
- Integration of new units into the division or corps.

2-16. Commanders establish rear operations before they can conduct deep and close operations. Enemy deep operations often target friendly rear operations because they are often both vulnerable and essential to friendly mission success. Commanders commit combat power to protect rear operations, but they balance those requirements against those necessary for successful close and deep operations. Units involved in rear operations must protect themselves using both passive and active measures. Commanders and staffs must continuously reevaluate the possibility of more serious threats to rear operations and develop plans to meet them with minimum disruptions to ongoing close operations.

Support Area Operations

2-17. Support area operations are a critical part of rear operations. Support area operations are the tactical actions securing lines of communications, bases, and base clusters that enable an echelon's sustainment and command and control.

2-18. A support area is where units position, employ, and protect base sustainment assets and lines of communications required to sustain, enable, and control operations. Support area operations include sustainment for the echelon and relevant security operations. Support area operations enable the tempo of deep and close operations. Support area operations require detailed planning to coordinate among the various units providing sustainment, protection, and security.

2-19. A maneuver enhancement brigade or brigade combat team typically provides C2 for support area operations for a division or corps due to the level of security, planning, and integration required.

AIRFIELD PROTECTION

2-20. Airfield security is integral to the protection of forces and equipment. Physical security measures deter, detect, and defend against threats from terrorists, criminals, and unconventional forces. These measures include:

- Armed security forces.
- Fencing and perimeter standoff space.
- Lighting and sensors.
- Vehicle barriers.
- Blast protection.
- Intrusion-detection systems and electronic surveillance.

FORCE PROTECTION

2-21. Procedural measures are designed to protect United States personnel and equipment regardless of mission or geographical location. Procedural measures include:

- Security checks.
- Training and awareness.
- Property accountability/inventory requirements.
- Physical security inspections of mission-essential or vulnerable areas.
- Physical security surveys of installations.

AIRFIELD DEFENSE

2-22. FM 3-90 has detailed information regarding base defense operations.

Base Defense Plan

2-23. Base defense is the cornerstone of area security. Security forces (military police or other designated force protection units) are the base commander's link for detection, early warning, and employment against enemy attacks. Information gathered is dispersed throughout the area to apprise commanders of enemy activities occurring near bases. When the threat exceeds the capability of the base/airfield's quick reaction force (QRF) and assigned personnel, the base commander requests military police assistance through the base cluster operations cell or the maneuver enhancement brigade (MEB) assigned to their respective AO. Airfield defense requires detailed coordination with the BDOC. Security forces treat airfields like any other base or base cluster. The airfield may house the base-cluster commander, or it may be a cluster by itself. The security force is responsible for the airfield's external defense. Its internal defense is primarily the responsibility of the BDOC QRF and units assigned to the airfield. The quick reaction force provides in-depth defense for weapons, weapons systems, command centers, personnel, and other priority resources established by the BDOC commander.

Chemical Biological Radiological and Nuclear Defense

2-24. A chemical, biological, radiological, and nuclear (CBRN) defense and decontamination plan are prepared as a part of the base defense plan. The CBRN defense plan addresses the following considerations:

- Likelihood of CBRN attack.
- CBRN threat and alarm conditions
- MOPP levels
- Base decontamination capabilities (including tenant units).
- Contamination mitigation, including contamination control fixed site and aircraft decontamination.

Note. Refer to ATP 3-11.32/MCWP 10-10E.8/NTTP 3-11.37/AFTTP 3-2.46 for additional information.

Explosive Ordnance Disposal Operations

2-25. In the competition continuum, explosive ordnance disposal (EOD) forces support all phases of multidomain operations to include render safe and disposal of explosive ordnance, and countering WMD. EOD forces could support airfields in offensive, defensive and stability operations.

2-26. EOD units are integral to clear airfields and runways of explosive hazards and rendering safe systems such as surface-to-air-missiles that may be present on or near airfields. Depending on the size of the airfield, clearance operations could require several EOD platoons or companies. To accomplish this mission EOD forces may require heavy equipment to move large munitions away from the airfield. Unexploded ordinances (UXOs) will usually be disposed in an off-site location to not impact airfield repair or operations.

Note. Refer to ATP 4-32 for additional information.

BASE AND BASE CLUSTERS

2-27. Bases and base clusters form the basic building block for planning, coordinating, and executing base defense operations. A base may be a single-service or a joint-service base. A single service base is occupied by one service only. A joint-service base may consist of one service with a primary interest or two or more services having equal interests. MEBs and other subordinate support HQ (such as an AOB) are responsible for coordinating base and base cluster defense in the corps and division AOs. This defense protects elements from Level I and II threats in their assigned areas. Airfield commanders ensure their airfields train and prepare for their roles in base and base cluster defense. Cooperation and coordination between the support HQ and tenants are critical.

2-28. Units use observation posts, listening posts, or unattended sensors on likely avenues of approach to collect information on threat activity. In areas where the populace is friendly, local law enforcement or government agencies can provide information on threats in the area.

2-29. Within the base cluster, the three types of commanders are:

- The base cluster commander.
- The base commander.
- The individual unit commander.

2-30. The division commander is the overall terrain manager and assigns security responsibilities to the MEB commanders in their respective AO. MEB commanders designate the commanders of tenant units as base cluster commanders from units located in the cluster. The base cluster commander, usually the senior commander in the base cluster, forms a base cluster operations cell from their staff and available base assets. The BDOC assists with planning, directing, coordinating, integrating, and controlling base defense efforts. The base cluster commander also appoints base commanders, who then form their own BDOCs.

2-31. The base cluster commander is responsible for securing their base, coordinating the defense of bases within their base cluster, and integrating base defense plans into a base cluster defense plan. Their specific responsibilities include:

- Establishing a base cluster operations cell from their staff and available base or base cluster assets controlling base cluster defense activities. base cluster operations cells implement an integrated warning plan within their cluster and with adjacent bases or base clusters.
- Providing appropriate facilities, housing, and services for necessary liaison personnel from within the cluster.

2-32. The base commander is responsible for base security and defense. All forces assigned for base defense purposes are operational control (also called OPCON) to the base commander. Base defense responsibilities include—

- Establishing a BDOC from available base assets to serve as the base's focal point for security and defense.
- Establishing an alternate BDOC from base resources or, if base assets are not available, designating a HQ element from units dedicated to the base for its local defense.
- Planning for transient units by ensuring that base defense plans include provisions for augmenting regularly assigned base defense forces with units present during periods of threat.

MILITARY POLICE OPERATIONS

2-33. The Military Police Corps supports airfield opening, security, and management operations.

2-34. Their assets are limited and specific functions are determined by:

- The needs of the supported commander,
- The intensity of the conflict, and
- The availability of police resources.

2-35. The AOB commander, through the area support command's provost marshal (also called PM), sets priorities for military police operations in support of airfields. The provost marshal (also called PM) continuously evaluates the tradeoff between the support requested by the AOB commander and the support that can be provided. The AOB commander, in conjunction with the airfield management HQ, develops a tactical plan that sets priorities for the provost marshal (also called PM). This assists the provost marshal (also called PM) in the allocation and employment of these assets for:

- Police operations.
- Security and mobility support.
- Detention operations.

2-36. They also support the AOB commander's security of forces and means programs by:

- Controlling or monitoring installation, airfield, or base-cluster access or entrance points.
- Monitoring intrusion-detection systems and providing a response force.
- Conducting physical-security inspections.
- Conducting perimeter security or site surveillance.
- Recommending placement of walls, berms, gates, or barriers around designated mission-essential or vulnerable areas, high-value areas, or perimeters.
- Supporting the commander's risk-analysis effort.
- Conducting roving patrols, checkpoints, and roadblocks.
- Performing other physical-security measures as required by the commander.

2-37. Military police can be the airfield and base-cluster commander's response force against enemy attacks. They gather enemy information and provide it to commanders while performing missions throughout the AO. They also provide a mobile response force by consolidating into platoons and responding as quickly as possible to conduct combat operations. Military police defeat or delay threats until a tactical combat force can arrive.

DEFENSIVE OPERATIONS

2-38. In the defense, commanders protect forces and critical assets by conducting area security operations. Forces conducting area security in the defense can deter, detect, or defeat enemy reconnaissance while creating standoff distances from enemy direct- and indirect-fire systems. Area security operations can be used to protect the rapid movement of combat trains or to protect cached commodities until needed. Air missile defense assets optimize the protection of Soldiers by providing coverage over defended forces and other designated critical assets. Other air missile defense tasks in the defense include providing and disseminating early, situational awareness of airspace, contributing to targeting information

determining/predicting and reporting enemy missile and launch points and impact points, and proactively engaging threat aerial platforms before they attack or surveil.

RESPONSE FORCE OPERATIONS

2-39. The airfield QRF will be trained and equipped to detect, delay, and deny Level I threats. If a Level II or III threat is present, the QRF along with assigned airfield units are tasked with delaying actions; however, other support must be employed to defeat these threats.

2-40. Attack helicopters and slower fixed-wing (FW) close air support should be used in airfield defense due to their ability to observe the target thus avoiding nearby friendly elements. Attack helicopters may be the most responsive and efficient means of providing fires to an airfield.

AIR AND MISSILE DEFENSE IN FORCE PROTECTION

2-41. Air and missile defense operations are important active force protection measures. These measures are addressed in the AOB's base defense plan and coordinated with the MEB. This ensures that offensive counter air and theater missile defense operations are sufficient to defeat or suppress threat capabilities. Defensive counter air and theater missile defense operations destroy enemy aircraft and missiles threatening airfields.

2-42. The air defense artillery commander considers METT-TC (I), intelligence preparation of the battlefield, and the supported commander's intent and concept of operations to develop air and missile defense priorities. Priorities are based on the factors of criticality, vulnerability, recoverability, and the threat. The air defense artillery commander recommends these priorities to the division for corps approval.

COUNTER-FIRE OPERATIONS

2-43. The principles of fires planning and coordination for airfields do not differ significantly from those in the forward areas and apply to both the offense and defense. There is, however, a difference in the facilities available. Counter-fire radar systems such as the counter-rocket, artillery, and mortar may be employed to support critical assets such as airfields. These systems have an automated counter-fire delivery capability. The use of these systems in support of an AOB will require an LOA outlining procedures for use in defense of the airfield and friendly aircraft.

2-44. With few exceptions, indirect fire assets should not be employed against a Level I threat or against those Level II threat forces that can be defeated by airfield, base cluster units, and military police response forces. Level III threats have the size and combat power that could require the use of indirect fire assets.

2-45. The applicable fire support coordination measures (FSCMs) for airfields will be restrictive measures (for example, no fire areas, restrictive fire areas, and restrictive fire lines). The airfield base defense operations center should establish them as part of the overall airfield defense plan. The procedures for establishing FSCMs in the support area must become part of the overall planning process. Forces employed to deal with a Level III force are given an AO. The establishment of a boundary within the support area and the possible addition of a task force fire support officer (FSO) require close coordination with the airfield BDOC. These measures should be—

- Reviewed routinely by higher HQ; posted on operations maps.
- Entered into the Advanced Field Artillery Tactical Data System.
- Given to any supporting component forces, reaction forces, and BDOCs.
- Coordinated for inclusion in the supporting fires unit's fire control plan.

AIRFIELD SUPPORT

2-46. This section discusses engineer and signal support to airfields.

ENGINEER SUPPORT

2-47. Engineers plan, design, construct, and repair airfields and heliports in the TO. To ensure these facilities meet proposed requirements, the responsible MEB or theater support command engineer officer will

coordinate closely with the AOB and aviation commanders. The airfield commander will set work priorities for the engineer support. Engineers depend on the appropriate commanders for information on the weight and traffic frequency of using aircraft, facility life support, protection requirements, and the geographic boundaries of the airfield. The time available for repair and construction is dictated by the operation plan. Planning, reconnaissance, and site investigations are often limited by lack of time or the tactical situation. If ground reconnaissance and on-site investigations are not possible, the engineer should obtain photographs of the area.

2-48. Extensive field surveys coordinated through the TSC provide aeronautical and other information in support of contingency airfields, providing the basic required information for the formulation of terminal instrument procedures and the safe operation of aircraft using the airfield. These surveys provide source information on:

- Position.
- Azimuth.
- Elevation.
- RWYs and stopways.
- NAVAIDs.
- Title 14, Part 77 obstructions in the Code of Federal Regulations (CFR).
- Aircraft movement and apron areas.
- Prominent airport buildings.
- Selected roads and other traverse ways.
- Cultural and natural features of landmark value.
- Miscellaneous and special request items.

2-49. Positioning and orientation information for NAVAIDs is required to certify airfield instrument-landing approaches. Airfield obstruction charts establish geodetic control in the airport vicinity, consisting of permanent survey marks accurately connected to the National Spatial Reference System (also called NSRS). The National Spatial Reference System connection ensures accuracy between surveyed points on the airfield and other surveyed points in the theater airspace, including navigation satellites.

2-50. The support provided to airfields by engineers takes many forms, including—

- Commercial power requirements.
- Repair of existing facilities.
- Construction of new facilities.
- Life support requirements.
- Post-attack airfield recovery guidance from AF civil engineers.

2-51. Construction of defensive measures includes—

- Berms for—
  - Aircraft.
  - Power generation units.
  - Fuel supplies.
- Bunkers for—
  - Ammunition.
  - Fighting positions.
  - Protection of the force.

2-52. Engineers provide the following troop construction support to the ground and air commanders:

- Development of engineering designs, standard plans, and materiel to meet requirements.
- Reconnaissance, survey, design, construction, repair and improvement of airfields, roads, utilities, and structures.
- Rehabilitation of air bases and facilities beyond the immediate emergency recovery requirements of the air commander.

- Supply of materials and equipment to perform engineering missions.
- Construction of temporary standard air base facilities.
- Repair management of war damage and base development, including supervision of engineer personnel.

2-53. The amount of work in the theater and the limited engineer resources available make it imperative that existing host nation or captured enemy facilities be used whenever possible. The use of captured enemy airfields requires extensive planning and review of possible sites to ensure needed requirements are met.

2-54. Engineer brigades and groups usually conduct site reconnaissance, make location recommendations, and complete detailed design work. Engineer battalions usually construct the airfield and adapt the design to local conditions.

2-55. Engineer construction units, under the appropriate Army command, are responsible for construction on a general and direct support basis. The execution of large construction projects is usually based on the general support of missions as defined by project directives. Units assigned in general support of a specific Army element may be assigned in direct support of that element for restoration of an airfield.

2-56. JP 3-34, Joint Engineer Operations details engineering functions provide by each service. Each Service has core engineering units and capabilities shaped by their traditional roles. An understanding of the Services' combat, general, and geospatial engineering capabilities is essential for the effective and efficient use of engineer forces in the airfield mission area. Additionally, airfield management forces should understand multinational, interagency, NGO, and intergovernmental organization engineer capabilities to better coordinate adjacent activity, develop viable courses of action (COAs) and, as conditions dictate, integrate them into the joint operation.

SIGNAL SUPPORT

2-57. The communication section of the AOB will request signal support through their MEB to the TSC. This section should establish a liaison capability with theater signal units to ensure their requirements are understood and met. See ATP 3-04.6 for more information on AOB communications means and methods.

2-58. Theater signal units support airfields as they have greater technical capabilities than the small communication section organic to the AOBs. Theater signal support has the capability to deploy, interface, and interoperate with equipment from other services, allies, commercial, and host nation infrastructures. Theater signal support provides a communications architecture for all AOB requirements.

AIRFIELD DAMAGE REPAIR OPERATIONS

2-59. Airfield damage repair (ADR) operations encompasses all actions required to rapidly prepare airfield operating surfaces and infrastructure to establish or sustain operations at forward landing zone or to recover operations at a main operating airfield that has sustained damage from an attack. ADR is an essential element in the rapid projection and application of joint U.S. Military power to ensure the United States can establish operations anywhere on the globe in minimum time. Army ADR operations include tasks such as damage assessment, explosive ordnance reconnaissance, minimum operating strip (also called MOS) selection, repair quality criteria (RQC) determination, airfield surface repair, minimum airfield operating surface (MAOS) marking and striping, and airfield lighting system repair and installation. To ensure an airfield can quickly return to its operational role following an attack, a well-organized ADR effort is essential. The value of the planning and training becomes evident as the procedures are implemented during an actual attack.

2-60. Damage assessment is normally the first function performed by airfield management personnel after an attack. It is extremely important to rapidly obtain a damage picture of the entire area of interest (runway, taxiways, shelter access, etc.) by using all tools available. Integration of force protection cameras, elevated observation posts, and other reports will expedite and focus airfield damage assessment. Damage Assessment Team (DAT) members should be identified long before the need for damage assessment occurs. It is important all team members fully understand each other's role during damage assessment operations.

2-61. A fully functional DAT is comprised of the following personnel:

- Airfield Management Personnel – Determine airfield surfaces to be evaluated and develop route/sequence plan.
- EOD Personnel – Identifies and classifies UXO, performs immediate action procedures as required, directs movement of team when UXOs are discovered.
- Engineer Personnel – Assist with the marking and recording of airfield damage. Assists EOD personnel with explosive safety procedures.

2-62. Predetermined routes are developed based on prioritization of mission essential areas; ensuring all critical locations are assessed. Additionally preplanned routes eliminate the duplication of efforts. Being thoroughly familiar with the assigned travel routes and check points, will prevent delays in the assessment process. Good communication is essential in damage reporting and ultimately expedites airfield repair operations. Without proper communication, vital information might be lost causing delays in airfield damage recovery operations. Communication procedures must be established between the team, tower personnel, and the base defense operations center.

2-63. A detailed damage assessment is performed to accurately locate all airfield damage. This information is vital to the control tower's decision-making process on the ability to launch and recover aircraft. A balance between speed and accuracy is essential. During airfield damage recovery operations, the actual repair process cannot begin until the DAT has completed its assessment and EOD personnel have assessed all UXOs. The DAT must be able to locate damage on the runway within plus or minus one meter as required by the North American Treaty Organization (NATO) Standardized Agreement 2929. Practicing and following standard procedures can easily achieve accuracy and speed. There are three basic rules that must be followed when locating damage:

- Zero Point Rule. Once established, it is fixed! Only reference from one direction.
- Centerline Rule. All distances are measured along the existing runway centerline, from zero point, to center of damage/UXOs.
- Right/Left Rule. All damage/UXOs are located left or right of existing runway centerline to the center of damage/UXOs. All items are identified being to the left or right of the centerline with the team member's back to the zero point.

2-64. Two methods are commonly accepted for recording and reporting airfield damage. They are the single point method used for single points of damage and the double-point plotting method used for spall and bomblet fields.

2-65. The process for using the single point coordinate system is detailed below. Figure 2-1, page 2-11, is an example of a single point coordinating system.

- Determine and record type of damage.
  - C- Crater
  - S- Spall
  - B- Bomblet
  - X- UXO
- Estimate and record distance down pavement, from zero point.
- Determine direction and distance from center line.
- Record L or R.
- Record distance.
- Estimate apparent diameter of crater/field/HOE.

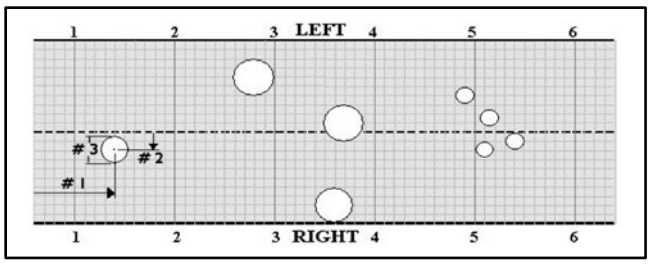


Figure 2-1. Single point coordinating system: C140 R20 D30

2-66. The process for using the double point coordinate system is detailed below. Figure 2-2 is an example of a double point coordinating system.

- Locate distance of center point of the leading edge of the field
- Determine the distance left or right from runway centerline of center of leading edge of the field.
- Determine the approximate width of the leading edge of field.
- Locate distance of center point of the trailing edge of the field from zero point.
- Determine the distance left or right from existing runway centerline of center of trailing edge of the field.
- Determine the approximate width of the trailing edge the field.
- Determine the approximate number of spalls in the field.
- Enter data into your log, and report damage to the control center.

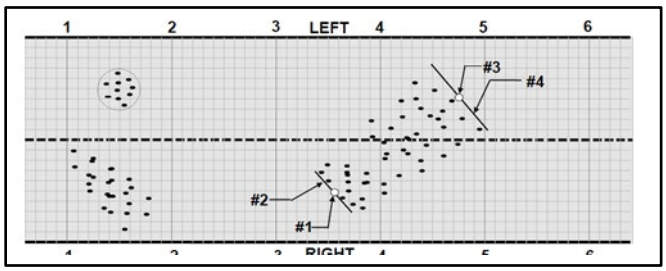


Figure 2-2. Double point coordinating system: S355 R50 W50 F475 L40 W75 N45

MOVEMENT CONTROL

2-67. Movement control is the planning, routing, scheduling, controlling, coordination, and in-transit visibility of personnel, units, equipment, and supplies moving over lines of communications (LOCs) and the commitment of allocated transportation assets according to command planning directives. It is a continuum that involves synchronizing and integrating logistics efforts with other programs that span the spectrum of military operations. Movement control is a tool used to help allocate resources based on the combatant commander's priorities, and to balance requirements against capabilities.

2-68. Aerial delivery includes airdrop, airland, and sling-load operations. Airdrop and airland distribution are joint (Army and AF) operations requiring large FW aircraft; sling-load operations are usually unilateral using rotary-wing (RW) aircraft. Historically, United States military forces have been called on to execute aerial delivery operations in support of unilateral and allied force combat operations or humanitarian relief efforts throughout the world. Future operations will require a smaller, CONUS-based, force projection Army capable of conducting combat operations. Therefore, forward deployed airfields will continue to play an increasingly vital role in the supporting distribution system necessary to meet the requirements of the force.

2-69. Areas of operation range in size from small, urban centers to areas encompassing multiple countries within a region. Combat organizations may operate within a box as large as 1,000 kilometers by 1,000 kilometers or in a noncontiguous AO with large unsecured areas. Units will have increasingly smaller logistics footprints. Aerial delivery and airfields will be required to have more responsive and efficient delivery. LOCs will be longer with a large proportion of the support provided by intermediate staging bases

(ISBs) that could be hundreds of miles away. In this environment, aerial delivery plays an ever-increasing role in the total distribution system; to be effective, friendly forces must control airspace and operate airfields throughout the AO.

2-70. Aerial delivery is no longer the last resort, but rather, through necessity, is becoming a viable mode of distribution in support of the fight against a very flexible, fluid, and ever-changing threat environment. Army transformation has given the Army an airfield management capability, and with augmentation, the ability to manage large airfields capable of aerial delivery and distribution throughout the TO. The goal is to give combat units a previously unknown freedom of movement by drastically reducing their dependence on logistical support. A primary objective of this transformation is to reduce the logistics footprint by substituting large, redundant supply bases with a distribution-based logistics system. In this system, the "pipeline" becomes the supply base. To achieve this objective, the speed of supplies moving through the pipeline must be increased. Aerial delivery provides necessary acceleration and sustainment capabilities. This delivery method provides support without hampering maneuvers. Army distribution is discussed in detail in Army Doctrine Publication 4-0 and FM 4-40.

2-71. There are major Army and Air Force organizations common to both airland and airdrop operations. AOB commanders coordinate these assets through the MEB to the TSC ensuring required assets are available for cargo handling and management. The following organizations are designated by the TSC to assist the AOBs with their cargo handling needs.

ARRIVAL/DEPARTURE AIRFIELD CONTROL GROUP

2-72. The arrival/departure airfield control group is a provisional organization established by the supported land component commander. Its mission is to control and support the arrival and departure of personnel, equipment, and sustainment cargo at airfields.

MOVEMENT CONTROL TEAM

2-73. Movement control teams (MCTs) are subordinate elements of the movement control battalions (MCBs) that provide decentralized execution of MCB movement responsibilities throughout a specified AO. MCTs can be employed at a variety of locations in a variety of configurations to meet mission demands but are normally under the control of the TSC's MCBs. This team plans, documents, directs, and or coordinates the movement of Army and joint force equipment. When given authority by the MCB, MCTs can coordinate for the use of allocated FW or RW assets in an aviation brigade.

TRANSPORTATION TERMINAL BATTALION

2-74. Transportation terminal battalions (TTBs) are assigned to the TSC and are normally attached to sustainment brigades. The mission of the TTB is to command, control, and supervise units conducting terminal operations. Terminal operations include truck, rail, air, and marine terminals. The TTB staff translates mission orders from the sustainment brigade into specific requirements, enabling the effective and efficient flow of materiel and personnel into and out of the TO utilizing airfields and other ports of embarkation and debarkation.

Chapter 3
Airfield Management Training

Contingency airfield management training in the Army is primarily executed through unit training events and with computer based instructional media available through the Army Learning Management System (ALMS). This chapter provides a foundation for the development of a unit training and Soldier qualification program to support airfield operations during contingencies.

AIRFIELD MANAGEMENT ACTIVITIES

3-1. The execution of airfield management activities is performed through the organization of cross functional teams. Standard organizational unit designs align commissioned aviators, aviation safety warrant officers (flight and air traffic and airspace management technicians), and enlisted aviation operations personnel. Additionally, air traffic controllers are often used to augment the airfield management team.

AIRFIELD MISSION COMMAND AND PLANNING

3-2. The first group of airfield management activities contained in collective tasks reflect the mission command functions and planning actions required to operate contingency airfields. These activities are directed by the senior airfield authority and executed by the airfield management team. The following activities fall within this group:

- Conducts senior airfield authority duties.
- Develops airfield master plan.
- Establishes airfield planning board or cells.
- Coordinates airfield support services.
- Conducts liaison activities with transient units.
- Develops airfield procedures, LOAs, MOUs, and SOPs.
- Synchronizes airfield construction and repairs activities.
- Implements airfield contract services and activities.
- Conducts Army Aviation reception staging and onward integration (RSOI) activities.
- Directs the emplacement of air traffic control facilities.
- Coordinates airfield defense measures.
- Coordinates flight inspections of navigational aids.
- Coordinates airspace usage agreements.
- Develops the airfield security plan.

EXECUTION OF AIRFIELD MANAGEMENT ACTIVITIES

3-3. The second group of activities contained in collective tasks reflect those airfield management and support services executed to ensure the airfield is operating in accordance with appropriate standards. The following activities fall within this group:

- Conducts flight planning and aviation dispatch operations.
- Conducts airfield sweeping and FOD checks.
- Manages FLIPs.
- Implements wildlife and bash programs.
- Coordinates passenger manifesting and movement control operations.

- Processes NOTAMs and provides airfield status.
- Relays weather watches, warnings, and advisories.
- Coordinates aviation refuel and armament operations.
- Manages airfield-entry control points.
- Inspects airfield signage and markings.
- Inspects airfield lighting.
- Conducts airfield flight line driving/access programs.
- Manages classified material and implements communications security procedures.
- Maintains airfield logs and journals.
- Operates radio communications equipment.
- Conducts daily airfield inspections and checks.
- Conducts airfield damage and repairs assessments.

AIRFIELD SAFETY AND STANDARDIZATION

3-4. The last group of activities contained in collective task reflect those airfield safety and standardization functions to mitigate aviation risks. The following activities fall within this group:

- Manages the aviation safety program.
- Coordinates airfield surveys and/or conduct airfield assessments.
- Evaluates airfield safety criteria.
- Develops airfield-parking plan.
- Develops airfield waivers.
- Coordinates and reports airfield pavement conditions evaluations.
- Implements an airfield crash rescue and mishap prevention plan.
- Determines airfield marking and lighting requirements.
- Processes airfield operational hazard reports.
- Establishes hazardous material handling procedures.
- Assesses the safety of aviation refueling and armament operations.
- Collects and assesses data for terminal instrument procedures of instrument approaches.

AIRFIELD TRAINING ENVIRONMENTS

3-5. The employment of Army Aviation assets, unmanned aircraft systems, and the support to joint and contract aviation aircraft during contingency operations requires different airfield operating environments. These airfield environments range from paved FW RWYs, semi-prepared LZs, and helicopter RWYs. Integrating all of these airfield environments into the unit's collective training strategy will provide the best opportunity to gain the appropriate knowledge and skills within the airfield management/operations mission area.

ARMY INSTALLATION AIRFIELDS

3-6. Army installation airfields provide the best environment to build a foundational understanding of airfield management/operations. These airfields provide ready access to training opportunities with experienced professionals and can satisfy knowledge and skill requirement progression within relatively short periods for most of the airfield management and support activities listed above. AR 95-2 details airfield operations training programs for installation airfield personnel and mirrors many of the airfield activities required in contingency operations. Leaders should balance training opportunities at installation airfields with other unit collective events that require more expeditionary employment demands required with semi-prepared landing zones. Soldiers participating in training at installation airfields should receive training in the following areas:

- AAF/AHP organization, roles, and responsibilities.
- Physical security.

- Airfield criteria (pavement, signs, lighting, markings, obstructions, imaginary surfaces).
- Procedures for conducting airfield inspections and checks.
- AAF/AHP construction management.
- FOD prevention.
- AAF/AHP hazard analysis and risk management.
- AAF/AHP condition reporting.
- Aircraft rescue and firefighting operational requirements.
- Handling hazardous materials (HAZMAT).
- Snow and ice control (where applicable).
- Wildlife hazard management.

LANDING ZONES (C-130/C-17 OPERATIONS)

3-7. LZs, both paved and semi-prepared, represent the most utilized method for airlift delivery during contingency operations. Joint Publication 3-36 describes the successful integration of cargo aircraft into forward operating bases and other airfields as the key to fully achieving air mobility.

3-8. Airfield management team members must become familiar with the design and operational requirements of LZs. Design criteria of LZs is different than FW RWY criteria often applied at installation airfields. Airfield management personnel should integrate LZ environments into collective training to develop the following knowledge and skills:

- LZ design (RWY composition, length, width, overruns).
- LZ RWY safety areas (primary surfaces, maintained areas, graded areas, exclusion areas).
- Accident potential areas, clear zones, approach departure clearance surfaces.
- LZ markings and lighting.
- LZ RWY inspections (semi-prepared surfaces).
- LZ aprons and TWYs.
- Soil composition and weight bearing capacity measurements (semi-prepared RWYs).
- Landing zone safety officer (LZSO) duties.

COMMANDER'S TASK LIST

3-9. DA Form 7871 (*Commander's Task List, Airfield Management*) is the base document from which a Soldier progression program is developed. It is incumbent on leaders to define the sub tasks associated with those tasks on the commander's task list (CTL) and other collective tasks required for Soldier proficiency. The requirements established by the CTL are tailored to the proficiency training needs of the individual team member. It specifies the tasks the team member must accomplish during the training year.

3-10. An individual task is defined as a task primarily performed by the individual team member, though assistance may be sought from any team members, in completion of the task by the team member.

3-11. Team tasks are selected by the commander to support the performance of the unit mission essential task list (METL). A team task is primarily performed by multiple team members during the performance of a mission. It requires a combination of specific actions by various team members to perform the task to standard. Individual team members are responsible for performing specific roles during performance of the task. These tasks cover skills, knowledge, and procedures to operate the system during the performance of tactical or special missions.

3-12. Commanders may develop additional tasks for inclusion on the CTL, as needed, to accomplish the unit's mission. The commander lists them separately on the CTL when an additional task is developed by the unit. The commander must perform a risk analysis for performance of the task and determine training required for personnel to attain proficiency in the task. The additional tasks must include—

- Task number (if applicable).
- Title of the task.
- Conditions under which the task is performed.

- Standards for performance of the task.
- Description of how the task is performed.
- Considerations for performance of the task such as environmental and safety.
- Training/evaluation requirements.

Note. The airfield management commander's task list is comprised of tasks that reflect the full range of airfield management activities required of personnel at differing skill levels and military occupational specialties. Leaders should select tasks appropriate to Soldier performance requirements and document completion only when successful demonstration of that task has been met.

Chapter 4

Airfield Design and Construction

Ideally, theater airfields are developed through detailed advanced planning that gathers needed information, translated into specific requirements, and establishes an airfield development plan. The airfield development plan determines and ensures that required manpower and resources are available at the appropriate place and time. It takes the combined knowledge and expertise of aviation professionals, engineers, and logistics professionals to ensure the optimal plan of action to meet mission requirements. Theater airfields facilitate the reception, staging, and onward movement of personnel and equipment into a theater, while installation airfields may be critical to expeditionary deployment operations.

AIRFIELD CONSTRUCTION SURVEYS

4-1. Airfield obstruction chart surveys are critical to site selection, design, and construction of airfields. These surveys are used to determine obstructions to air navigation that may affect the safe and efficient use of navigable airspace and the operation of planned or existing air navigation and communications facilities. Whether planning for an airstrip for tactical use or an installation heliport or airfield, they are used to determine any combination of the following:

- Location of obstacles within 10 nautical miles of an airfield center.
- Dimensions of RWYs and TWYs, height of control towers, and NAVAIDs.
- Safe approach angles to RWYs and minimum, safe glide angle.
- Elevation of the barometer on an airfield.
- Positions and azimuths of points designated for inertial navigation system checkpoints.
- Information used to assist military aircraft crash or disaster incident investigation.
- Development of instrument approach and departure procedures.
- Maximum takeoff weights.
- Airport certification for certain types of operations.
- Updating of official aeronautical publications.
- Geodetic control for engineering projects related to RWY/TWY construction, NAVAID positioning, obstruction clearing, and other airport improvements.
- Assistance in airport planning and land-use studies.

ROTARY-WING OPERATIONS

4-2. Airfields that conduct RW operations may not be required to conduct all aspects of the airfield survey listed above. The five levels of heliport development in the TO each meet certain requirements based on the following:

- Mission.
- Length of operations.
- Type and number of aircraft.
- Location.

AIRFIELD/HELIPORT CLASSES

4-3. Army deployment objectives require strategic responsiveness wherever needed. This operational concept depends on flexible combinations of Army and joint capabilities across the entire spectrum of operations. The Army establishes airfields and forward operating bases (FOBs) to increase responsiveness and reduce battlefield distances. The following factors are considered when planning airfields and FOBs:

- Occupy host nation airfields if available and tactically acceptable.
- Using abandoned or captured airfields to reduce construction and support requirements.
- Use roads, highways, or parking lots if airfields are not available in sufficient quantity or unsuitably located.
- Construct an airfield or FOB.

4-4. These planning factors broadly establish the environment for which aviation operations are expected to operate. Campaign planning at joint level establishes airfield requirements early on with consideration of service-specific objectives. Army, Air Force, Navy, and Marine engineers all have the capability to design, plan, construct, upgrade, and maintain airfields and heliports. Airfields and heliports are classified by their degree of permanence and the type of aircraft they are designed to support. Army airfields and heliports are divided into six classes (Table 4-1).

Table 4-1. Army airfield and heliport classes

Class	*Definition (controlling aircraft weights reflect operational weight)*
I	Heliports/pads with aircraft 25,000 lbs. (11,340 kgs) or less. Controlling aircraft (UH-60)-16,300 lbs. (7,395 kgs).
II	Heliports/pads with aircraft over 25,000 lbs. (11,340 kgs). Controlling aircraft (CH-47)-50,000 lbs. (22,680 kgs).
III	Airfield with class A runways. Controlling aircraft (combination of C-23 aircraft-24,600 lbs. (11,200 kgs) and a CH-47 aircraft at 50,000 lbs. (22,680 kgs). Class A runways are primarily used for small aircraft (C-12 and C-23).
IV	Airfields w/class B runways. The controlling aircraft is a C-130 aircraft at 155,000 lbs. (70,310 kgs) operational weight or a C-17 aircraft at 580,000 lbs. (263,100 kgs) operational weight. Class B runways are primarily used for high performance and large heavy aircraft (C-130, C-17, and C-141).
V	Heliports/pads supporting Army assault training missions. Controlling aircraft (CH-47)-50,000 lbs. (22,680 kgs).
VI	Assault landing zones for operations supporting Army training missions that have semi-prepared or paved landing surfaces. Controlling aircraft (C-130-155,000 lbs. [70,310 kgs] or C-17-580,000 lbs. [263,100 kgs]).
Legend: kgs = kilograms, lbs = pounds	

4-5. An airfield is also described based on its location within the AO. FOB/close area heliports are intended to provide focused logistics support or to support combat missions of short-range aircraft such as attack helicopters and UAS. These airfields are designed for initial or temporary operational standards, depending on mission requirements, and may be paved or semi-prepared. Support area airfields provide general logistics support and support of combat missions of longer-range aircraft. These airfields are designed to temporary or semi-permanent standards, depending on mission and operational requirements. Normally, these airfields are paved and provide a link between FOBs/close area heliports and sustainment area heliports/airfields. rear area heliports/airfields provide logistics support from fixed, secure bases, and support combat operations of long-range aircraft and are designed to be semi-permanent or permanent facilities. (See Figure 4-1, page 4-3, for notional heliport/airfield layout.)

4-6. After seizing a FOB or available airfield from which sustained main base or base camp operations can be conducted, the combat aviation brigade (also called CAB) may be able to request joint FW refuel/resupply support.

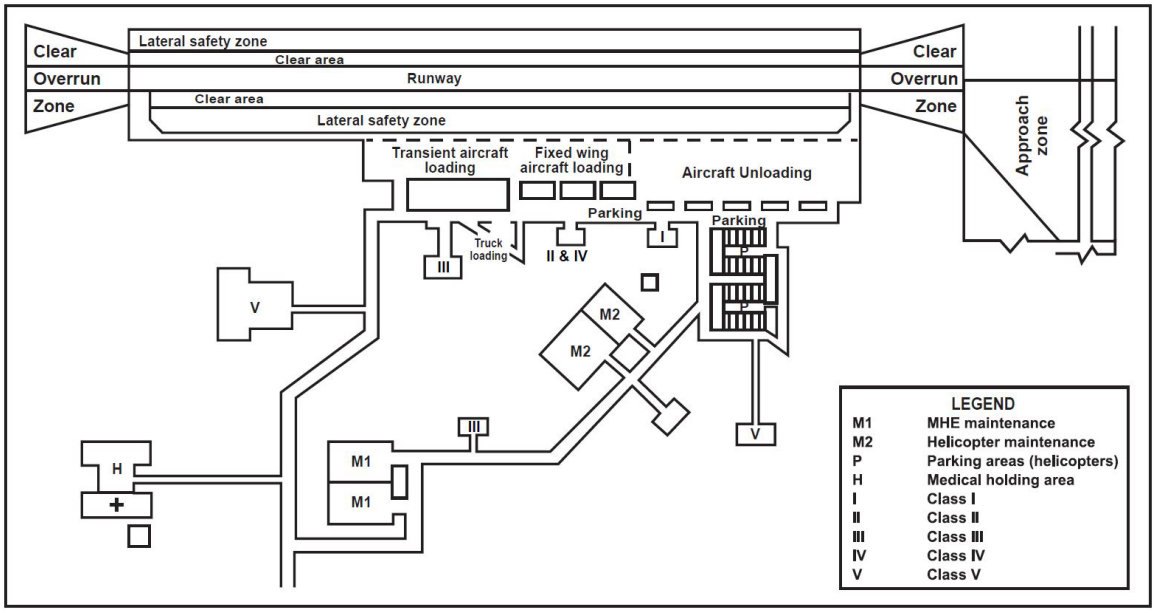


Figure 4-1. Notional area heliport/airfield

4-7. Army H-60 and CH-47 aircraft can establish refuel points from the aircraft (Fat Hawk operations for H-60s and Fat Cow for CH-47s), while the Marine Corps CH-53s have a unique refueling capability that can support supply points, operations in noncontiguous areas, and other specialized mission applications.

4-8. The KC-130 or C-17 can operate from small airfields with limited supporting infrastructure. The airfield RWY must be 3,500 to 6,000 feet (1067 to 1829 meters) long and 90 feet (27.4 meters) wide with graded and compacted gravel or clay. If KC-130 or C-17 is used as a primary means of resupply, RWY repair requirements will increase dictating engineer augmentation. CH-53 tactical bladder fuel distribution system and CH-47 Fat Cow refueling does not require a RWY but does require a large relatively flat area similar in size.

4-9. Helipads are constructed for aircraft that do not require a RWY to become airborne. They are most advantageous where a limited number of helicopters are to be located, or at heliports that handle a large volume of traffic where separate landing and takeoff operations are desired. Helipad layouts have been developed for the various helicopters. Refer to TM 3-34.48-1 and TM 3-34.48-2 for detailed information on various helipad construction standards.

Note. Criteria for airfields and RWYs are derived from UFC publications; consult the latest UFC for criteria standards.

AIRFIELD OPERATIONS BATTALION RESPONSIBILITIES

4-10. The AOB utilizes information obtained from an airfield survey to develop the airfield plan. This information provides insight into construction and repair requirements of the airfield based on the expected type and amount of air traffic utilizing the landing surface. The airfield survey determines the length of time the landing surface can be used without extensive construction or repair.

4-11. AOBs have certain responsibilities during the conduct of an airfield survey. AOBs inspect airfields for obstacles that violate airfield imaginary surface criteria, such as—

- Construction activities (for example, cranes).
- Tree growth.
- Dirt/snow piles.
- Sandbag bunkers.

4-12. This information is then compiled along with engineer survey data and forwarded to the theater to assist in the development of the airfield plan.

Existing Facilities

4-13. Criteria in UFC 3–260–01 is not intended to apply to existing facilities located or constructed under previous standards. This includes cases where RWYs may lack paved shoulders or other physical features as they were not previously required or authorized. These facilities can remain in use without impairing operational efficiency and safety. If used by the Air Force, AOBs must identify such facilities on airfield obstruction maps using a building restriction line to encompass exempt areas or an annotation on or near the feature noting its exempt status. Refer to attachment 19 of UFC 3–260–01 for guidelines used to establish the building restriction line.

4-14. Existing airfield facilities need not be modified or upgraded to conform to UFC 3–260–01 criteria. If a change in mission results in a facility category code reclassification, an upgrade to current standards is required. Upgraded facilities must be maintained at a level that will sustain compliance with current standards. When existing airfield facilities are modified, construction must conform to UFC 3–260–01 criteria, unless waived per paragraph 1.8 of UFC 3–260–01. Modified portions of facilities must be maintained at a level that will sustain compliance with current standards. Standards for TO facilities are contained in Army TM 3-34.48-1 and TM 3-34.48-2.

Note. The JFC will determine the minimum acceptable airfield criteria to be used in the theater.

Airfield Inspection Areas

4-15. Lateral clearance areas (RWYs, TWYs, and aprons) are inspected for violations (fixed or mobile) per AR 95-2. Table 4-2 describes inspected areas.

Table 4-2. Airfield inspection areas

1. Obstacle clearance criteria (tree growth vegetation, dirt/snow piles, ponding, construction, depressions, mobile/fixed obstacles)
a. Runway clear zones 1,000 x 3,000 feet (first 1,000 feet must be cleared).
b. Runway lateral clearance 500 feet centerline.
c. Taxiway lateral clearance 150 feet centerline.
d. Apron lateral clearance 100 feet Class A, 125 feet Class B.
e. Construction areas.
f. Perimeter/access roads.
g. Transition slope (7:1).
2. Foreign object damage control
a. Runways/overruns, taxiways/shoulders.
b. Parking aprons.
c. Infield areas between runways/taxiways.
d. Perimeter/access roads (controls).
3. Signs/markings (faded/broken)
a. Visual flight rules holding positions.
b. Instrument holding positions.
c. Elevation signs.
d. Navigational aid ground receiver checkpoints.
e. Closed areas.

Table 4-2. Airfield inspection areas (continued)

4. Runways/taxiways/aprons/shoulders widths
a. Runway 15.24 meter/50 feet Class A, 60.96 meters/200 feet Class B.
b. Taxiway 7.62 meters/25 feet Class A, 15.24 meters/50 feet Class B.
c. Apron 7.62 meters/25 feet Class A, 15.24 meters/50 feet Class B.
5. Construction
a. Parking.
b. Work site (lighting/marking).
c. Storage.
d. Vehicles (lighted/marked).
e. Foreign object damage.
6. Pavement conditions (rubber deposits, cracks, spalling, marking, paint buildup/chipping)
a. Runways/overruns.
b. Taxiways.
c. Parking aprons.
d. Access roads.

Lighting Check

4-16. The following lighting areas are inspected per AR 95-2, UFC 3–535–01, and FAA Advisory Circular 150/5340-26:

- RWY edge lights.
- Visual glide slope indicator.
- Threshold.
- Approach light system.
- RWY end identifier lights.
- TWY.
- Obstruction lights.
- Rotating beacon.
- Wind cones.
- NAVAID checkpoints.
- Apron lights.

Daily Airfield Inspections

4-17. Daily airfield inspections are conducted using established airfield criteria by the AOB's airfield services element. Each operational day the airfield services element inspects—

- Airfield for obstacles that violate airfield imaginary surface criteria.
- RWYs, TWYs, aprons, and lateral clearance areas for violations (fixed or mobile).
- Construction areas, ensuring a high level of safety is maintained. Check barricades, construction lights, equipment parking, stockpiled materials, and debris and foreign objects.
- Airfield markings for peeling, chipping, fading, and obscurity due to rubber buildup. Markings must be correct, properly sited, and reflective during hours of darkness.
- Airfield signs to ensure correct background and legend colors, legibility, clearance of vegetation, dirt, and snow, frangible mounting, and proper illumination, if required for night operations.
- Airfield lighting systems to ensure they are frangible mounted and foundations do not extend three inches above the finished surface of surrounding area and not obscured.

- Pavement areas for conditions that could cause ponding, obscure markings, attract wildlife or otherwise impair safe aircraft operations. For example, scaling, spalling, cracks, holes, or surface variations such as—
  - Bumps/low spots.
  - Rubber deposits.
  - Vegetation growth.
- Pavement areas for loose aggregate or other foreign objects and contaminants. Foreign objects and contaminants must be promptly removed.

4-18. An airfield /heliport self-inspection checklist can be found in AR 95-2.

AIRFIELD MARKING AND LIGHTING

4-19. The airfield marking system is a visual aid in landing aircraft. It requires illumination from either an aircraft lighting system or daylight. Standards for airfield marking have been adopted by the Army and Air Force. Determination of an airfield marking system is a theater-level responsibility. The methods and configurations described here are those most commonly applicable to theater-level airfields. For a more detailed discussion of airfield marking, refer to UFC 3–260–04, TM 5-823-4, and AF manual (AFMAN) 32-1040.

RUNWAY MARKINGS

4-20. The marking elements that apply to RWYs in general are described in the following paragraphs.

Centerline Marking

4-21. Centerline marking is a broken line with 30.48 meters (100 foot) dashes and 18.288 meters (60 foot) blank spaces. The minimum width for a basic RWY centerline marking is 18 inches. For precision and non-precision instrument RWYs, the minimum width is 0.9144 meters (3 feet).

Runway Designation Numbers

4-22. RWY designation numbers are required on all RWYs (basic, precision, and non-precision instrument). They are not required on a minimum operating strip or short-field assault strip. The numbers designate the RWY direction and accent the end limits of the RWY environment. RWY designation numbers are normally 9.144 meters (30 feet) high and 3.048 meters (10 feet) wide, excluding the number one that is 9.144 meters (30 feet) high and 0.762 meters (2.5 feet) wide. For specific information on RWY designation numbers refer to TM 3-34.48-1 and TM 3-34.48-2 or UFC 3–260–01. The number assigned to the RWY is the whole number closest to one-tenth the magnetic azimuth of the centerline of the RWY, measured clockwise from magnetic north. Single digits are preceded by a zero.

Threshold Marking

4-23. Threshold marking is required on all precision and non-precision instrument RWYs. Threshold markings for RWYs must be at least 45.72 meters (150 feet) wide. On RWYs less than 45.72 meters (150 feet) wide, start threshold markings 3.048 meters (10 feet) from each edge of the RWY. Table 4-3 depicts the number of runway stripes required.

Table 4-3. Number of Runway Threshold Stripes

Runway Width	*Number of Stripes*
60 feet / 18 meters	4
75 feet / 23 meters	6
100 feet / 30 meters	8
150 feet / 45 meters	12
200 feet / 60 meters	16

Note. Criteria for airfield threshold markings are derived from UFC publications; consult the latest UFC for criteria standards.

Touchdown-Zone Markings And Edge Stripes

4-24. Touchdown-zone markings and edge stripes are required on RWYs served by a precision instrument approach. Their use in the Should be kept to a minimum due to the time and effort required to obliterate them if the tactical situation requires it. For marking dimensions, refer to TM 3-34.48-1 and TM 3-34.48-2 and UFC 3–260–01.

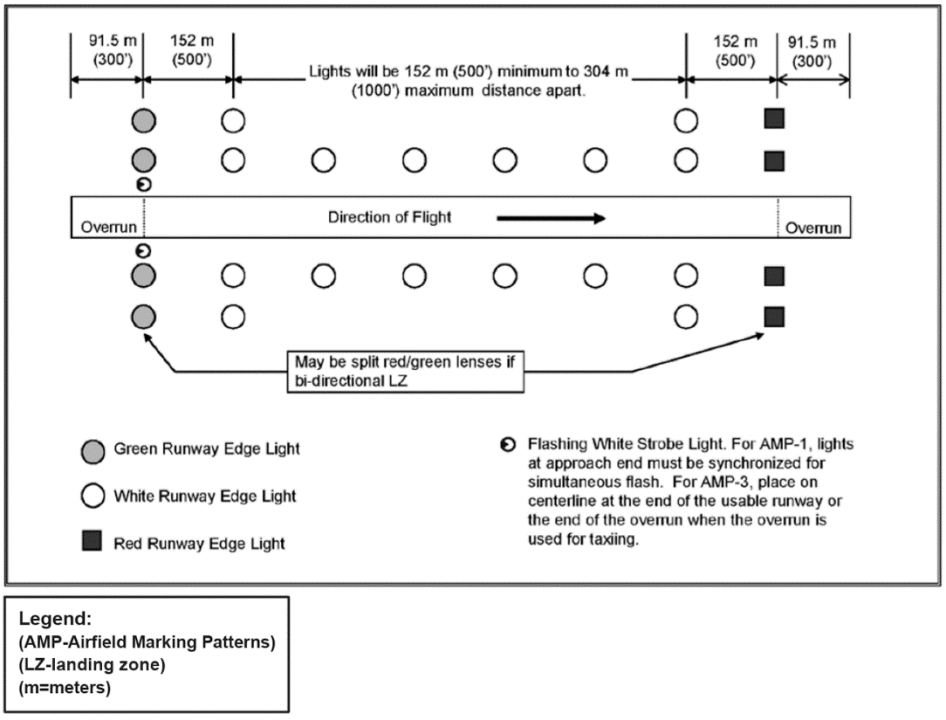
Fixed-Distance Markings

4-25. Fixed-distance markings are rectangular painted blocks 9.144 meters (30 feet) wide by 45.72 meters (150 feet) long, beginning 304.8 meters (1,000 feet) from the threshold. They are placed equidistant from the centerline and 21.9456 meters (72 feet) apart at the inner edges. They are required on all RWYs 45.72 meters (150 feet) wide or wider and 1,219.2 meters (4,000 feet) long or longer and used by jet aircraft.

Expedient Runway Marking

4-26. For expedient construction, surfacing is normally soil-stabilized pavement, membrane, or airfield landing mat. An inverted T is placed at the end of the RWY combined with a centerline stripe, edge markings and a transverse stripe mark at the threshold (152.4 meters [500 feet] and at the RWY midpoint). RWY direction numbers are not provided on landing mat surfaces.

4-27. Figure 4-2 and Figure 4-3 (page 4-8) depict typical airfield marking and lighting layout for both day and instrument/nighttime operations.



Legend:
(AMP-Airfield Marking Patterns)
(LZ-landing zone)
(m=meters)

Figure 4-2. Expedient airfield marking pattern (night/instrument)

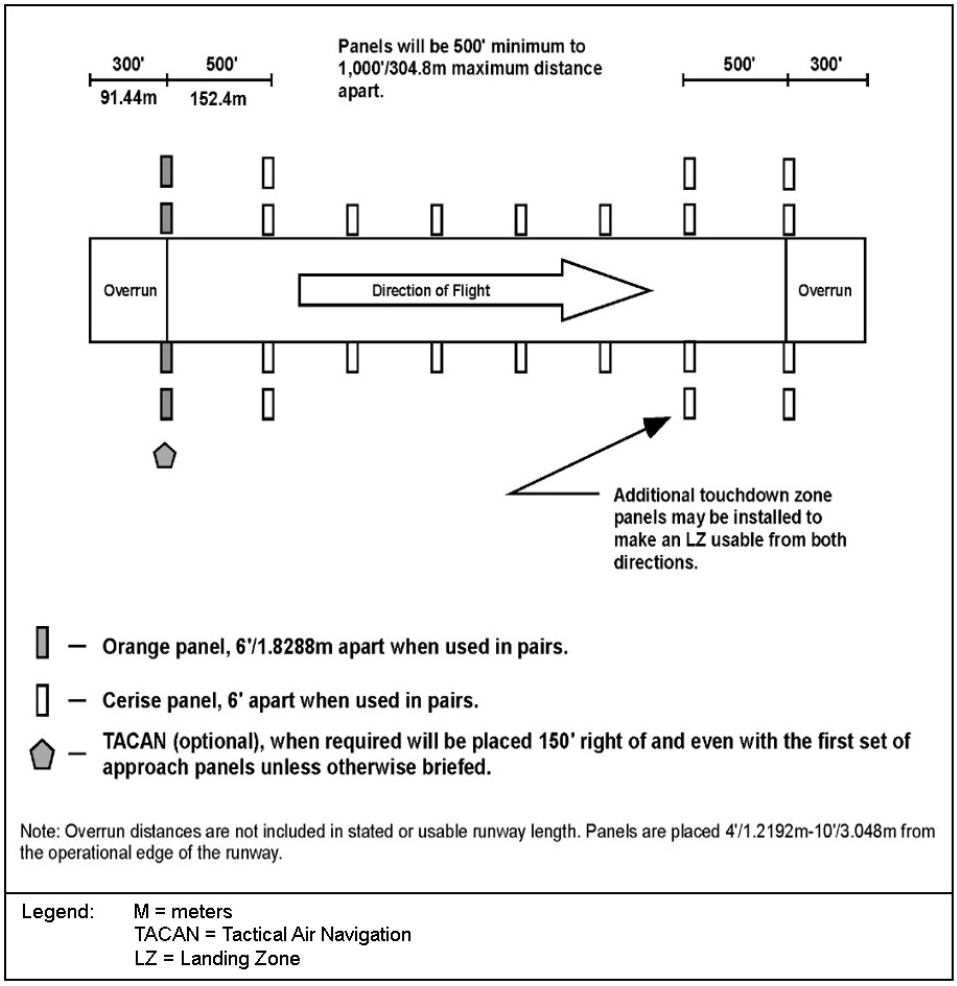


Figure 4-3. Expedient airfield marking pattern (day)

TAXIWAY MARKING

4-28. TWYs should be marked to conform to the following requirements.

Centerline Stripes

4-29. Mark each TWY with a single, continuous stripe along the centerline. These stripes should have a minimum width of 15.24 centimeters (6 inches). At TWY intersections with RWY ends, TWY stripes should end in line with the nearest RWY edge. At TWY intersections, the TWY centerline markings should intersect.

Holding Line Marking

4-30. Place a TWY holding line marking not less than 30.48 meters (100 feet) and not more than 60.96 meters (200 feet) from the nearest edge of the RWY or TWY the TWY intersects. This distance is measured on a line perpendicular to the RWY or TWY centerline intersected. Increase the distance from the minimum 30.48 meters (100 feet) to one that provides adequate clearance between large aircraft operating on the RWY or TWY and holding aircraft.

Note. Criteria for airfields holding line marking are derived from UFC publications 3-260 series; consult the latest UFC for criteria standards.

MARKING MATERIALS AND METHODS

4-31. Materials and methods used in airfield marking must provide visual contrast with the airfield surface. They vary primarily with the surface type and less directly with the construction type or stage. Fewer permanent materials require constant maintenance. Use the following guides to select marking materials:

- Paint is used only on permanent surfaces.
- Lime is used primarily for marking unsurfaced areas such as earth, membranes, or similar surfaces.
- Oil or similar liquids are used for marking unsurfaced areas.
- Panels made of materials such as cloth or canvas, properly fastened to the pavement, may be used for many marking requirements.
- Use yellow flags to show temporary obstructions caused by flying accidents or enemy action. As temporary expedients, sandwich-board markers or stake mounted signs may be used to define the RWY width. These markers are 0.6096 meters (2 feet) by 0.6096 meters (2 feet) in size, have black and white triangles on each side, and are spaced 200 feet apart longitudinally on the outer RWY shoulder edge.
- For TWYs, sandwich-board markers or flat pieces of wood or metal painted with black and white triangles may serve as expedient markers. Fasten these 30.48-centimeter (12 inch) by 30.48-centimeter (12 inch) markers to stakes and place them 30.48 meters (100 feet) apart along the outer TWY shoulder edge.

Note. All expedient markers should be lightweight and constructed to break readily if struck by an aircraft; they should never be hazardous to the aircraft.

4-32. Markers for snow covered RWYs should be conspicuous. Upright spruce trees, about 1.524 meters (5 feet) high, or light, wooden tripods may be used. Place the markers along the sides of the snow-covered RWY. Space them not more than 100.548 meters (330 feet) apart and locate them symmetrically about the axis of the RWY. Place enough markings across the end of the RWY to show the threshold. Aluminum powder and dyes can effectively mark snow in the RWY area.

OBSTRUCTION MARKING

4-33. Obstructions are marked either by color, markers, flags, or red lights. Mark objects by color according to the requirements described below.

Solid

4-34. A solid is an object whose projection on any vertical plane in a clear zone is less than 1.524 meters (5 feet) in both dimensions and colored aviation-surface orange.

Bands

4-35. A band is an object with unbroken surfaces whose projection on any vertical plane is 1.524 meters (5 feet) or more in one dimension and less than 4.572 meters (15 feet) in the other dimension. It is colored to show alternate bands of aviation-surface orange and white. It is also any skeleton (broken surface) structure or smokestack-type structure having both dimensions greater than 1.524 meters (5 feet) and colored in alternate bands of aviation-surface orange and white. Widths of the aviation-surface orange and white bands should be equal and approximately one-seventh of the object's major axis length if the band has a width of not more than 12.192 meters (40 feet) or less than 0.4572 meters (1.5 feet). The bands are placed perpendicular to the major axis of construction. Bands at the extremities of the object should be aviation-surface orange.

Checkerboard Pattern

4-36. Checkerboard patterns are objects with unbroken surfaces whose projection on any vertical plane is 4.572 meters (15 feet) or more in both dimensions. They are colored to show a checkerboard pattern of alternate rectangles of aviation-surface orange and white. The rectangles are not less than 1.524 meters (5 feet) and not more than 6.096 meters (20 feet) on a side and the corner rectangles are aviation-surface orange. If part or all of the objects with spherical shapes do not permit exact application of the checkerboard pattern, modify the shape of the alternate aviation-surface orange and white rectangles, covering the spherical shape to fit the structural surface. Ensure the dimensions of the modified rectangles remain within the specified limits.

Markers

4-37. Use markers when it is impractical to mark the surface of objects with color. Markers are used in addition to color providing protection for air navigation. Obstruction markers should be distinctive so they are not mistaken for markers employed to convey other information; color them as specified earlier. Markers should be recognizable in clear air from a distance of at least 304.8 meters (1,000 feet) in all the directions an aircraft is likely to approach. Position markers so the hazard presented by the object they mark is not increased. Locate markers displayed on or adjacent to obstructions in conspicuous positions to retain the general definition of the obstructions. Markers displayed on overhead wires are usually placed not more than 45.72 meters (150 feet) apart, with the top of each marker not below the level of the highest wire at the point marked. However, when overhead wires are more than 4,572 meters (15,000 feet) from the center of the landing area, the distance between markers may be increased to not more than 182.88 meters (600 feet).

Marking By Flags

4-38. Use flags to mark temporary obstructions or obstructions impractical to mark by coloring or markers. The flags should be rectangular and have stiffeners to keep them from drooping in calm or light wind. Use one of the following patterns on flags marking obstructions:

- Solid color, aviation-surface orange, not less than 0.6096 meters (2 feet) on a side.
- Two triangular sections–one aviation-surface orange and one aviation-surface white–combined to form a rectangle not less than 0.6096 meters (2 feet) on a side.
- A checkerboard of aviation-surface orange and white squares, each 0.3048 meters (1 foot) plus or minus 10 percent on a side, combined to form a rectangle not less than 0.9144 meters (3 feet) on a side.
- Position flags so the hazard they mark is not increased. Display flags on top of or around the perimeter of the object's highest edge. Flags used to mark extensive objects or groups of closely spaced objects should be displayed at approximately 15.24 meters (50-foot) intervals.

AIRFIELD LIGHTING

4-39. Airfield lighting systems are illuminated visual signals that help pilots operate aircraft safely and efficiently at night and during periods of restricted weather conditions. In general, airfield lighting is comprised of RWY, approach, TWY, obstruction, and hazard lighting.

4-40. The colors and configuration used in airfield lighting are generally standardized on an international scale, and there is no difference between permanent and TO installations. The basic color codes are—

- **Blue.** TWY lighting.
- **Clear (white).** Sides of a usable landing area.
- **Green.** Ends of a usable landing area (threshold lights). When used with a beacon, green indicates a lighted and attended airfield.
- **Red.** Hazard, obstruction, or area unsuitable for landing.
- **Yellow.** Caution. When used with a beacon, yellow indicates a water airport.

4-41. The Army has equipped a limited number of AN/MSQ135A, mobile tower systems (MOTS), with a portable airfield lighting system (also called ALS) that is capable of illuminating up to a 5,000-foot RWY. Two airfield lighting systems may be combined to illuminate longer RWYs. Each airfield lighting system is

comprised of 48 white medium intensity RWY lights (also called MIRLs) edge and 16 red/green medium intensity RWY end/threshold lights. Each light uses solar panels and a solar- powered battery for emplaced charging/recharging but can also be charged/recharged with an airfield lighting system equipped 3KW generator and power cables for periods of extended low-light conditions. Refer to MOTS TM 11-5895-1880-10 for more information on use of the airfield lighting system and UFC 3–535–01, Table 2-3, for criteria on using the MOTS airfield lighting system in a TO.

Runway Lighting

4-42. RWY lighting, the principal element of airfield lighting, provides the standard pattern of lights to outline the RWY and show side and end limits. Side limits are marked by two parallel rows of white lights, one row on each side and equidistant from the RWY centerline. Lights within the rows are uniformly spaced, with the row extending the entire length of the runway. Green runway threshold lights outline the end limits.

4-43. Space RWY threshold lights along the threshold line are 0 to 3.048 meters (10 feet) from the end of the RWY and perpendicular to the centerline extended off the RWY. RWY lighting is divided into two classes:

- High intensity, to support aircraft operations under instrument flight rules (IFR) conditions.
- Medium intensity, to support aircraft operations under visual flight rules (VFR) conditions.

Approach Lighting

4-44. This light system is used to guide aircraft safely to the RWY on airfields intended for instrument flying and all-weather operations. Its use is generally confined to airfields provided with precision, electronic, and low-approach facilities. Never use approach lighting with a medium-intensity RWY lighting system.

Taxiway Lighting

4-45. When an airfield becomes fully operational, lights and reflectors are used to increase safety in aircraft ground movements. TWY lighting is standardized. In general, blue TWY lights mark the lateral limits, turns, and terminals of TWY sections.

4-46. Reflectors are also used to delineate TWYs. Standard TWY reflectors are panels approximately 30.48 centimeters (12 inches) high by 22.86 centimeters (9 inches) wide. Both sides of the panels consist of a retro reflective material that reflects incident light back to the light source (aircraft landing or taxiing lights). Mounting wickets can be manufactured locally from galvanized steel wire, size number six or larger. The wire, cut into 106.68 centimeters (42-inch) pieces, is bent into a U-shape making the parallel sides 19.05 centimeters (7.5 inches) apart. Install reflectors along straight sections and long-radius curves at 30.48 meters (100 feet) intervals. At intersections and on short-radius curves, set the reflectors 6.096 meters (20 feet) apart and perpendicular to one another. Embed wickets 30.48 to 38.1 centimeters (12 to 15 inches) in the ground and set them firmly. When reflectors are set where grass or other vegetation grows 5.08 centimeters (2 inches) or more in height, treat the ground surface to prevent this growth.

Beacons

4-47. Airport-type beacons are not commonly used in a combat area. They may be used in sustainment areas of the TO. Beacons are considered organizational equipment and not part of the construction program.

Expedient Lighting

4-48. Expedients may be used for lighting if issue equipment is not available. Lanterns, smudge pots, vehicle headlights, or reflectors may be used to distinguish RWY edges. Reflectors are also useful when placed along TWYs and at hardstands to guide pilots in dark or limited visibility. An electrical circuit may be laid around the RWY with light globes spaced at regular intervals and covered by improvised hoods made from cans. A searchlight, pointed straight in the air, is sometimes used as a substitute for beacon lights. The searchlight is placed beyond the downwind end of the RWY. Portable airfield lighting is used when permanent lighting has been damaged or is not available.

Obstruction Lighting

4-49. Obstruction lights reveal the existence of obstructions. These lights are aviation red, with an intensity of not less than 10 candlepower. The number and arrangement of lights at each level should be such that the obstruction is visible from every angle.

Vertical Arrangement

4-50. Locate a minimum of two lamps at the top of the obstruction, operating either simultaneously or circuited so if one fails the other operates. An exception is made for chimneys of similar structures. The top lights on such structures are placed between 1.524 to 3.048 meters (5 to 10 feet) below the top. Where the top of the obstruction is more than 45.72 meters (150 feet) above ground level, provide an intermediate light or lights for each additional 45.72 meters (150 feet) or fraction thereof. Space the intermediate lights equally between the top light or lights and ground level.

Horizontal Arrangement

4-51. Built-up and tree-covered areas have extensive obstructions. Where an extensive obstruction or group of closely spaced obstructions is marked with obstruction lights, display the top lights on the point or edge of the highest obstruction. Space the lights at intervals of not more than 45.72 meters (150 feet) so they will reflect the general definition and extent of the obstruction. If two or more edges of an obstruction located near an airfield are at the same height, light the edges nearest the airfield.

Lighting of Overhead Wires

4-52. When obstruction lighting of overhead wires is needed, place the lights not more than 45.72 meters (150 feet) apart at a level not below the highest wire at each point lighted. When the overhead wires are more than 4572 meters (15,000 feet) from the center of the landing area, the distance between the lights may be increased to no more than 182.88 meters (600 feet).

AIRFIELD PARKING

4-53. Aircraft parking aprons are paved areas for aircraft parking, loading, unloading, and servicing. They include the necessary maneuvering area for access and exit to parking positions. Aprons are designed to permit safe and controlled movement of aircraft under their own power. Aircraft apron types are described as follows:

- Aircraft parking apron.
- Transient parking apron.
- Mobilization apron.
- Aircraft maintenance apron.
- Hangar access apron.
- Warm-up pad (holding apron).
- Unsuppressed power check pads.
- Arm/disarm pad.
- Compass calibration pad.
- Hazardous cargo pad.
- Alert pad.
- Aircraft wash rack.

4-54. Army aircraft parking aprons are divided into the following three categories:

- **Unit Parking Apron.** The unit parking apron supports FW and RW aircraft assigned to the facility.
- **General Purpose Apron.** When no tenant units are assigned to an aviation facility and transient aircraft parking is anticipated, a personnel loading apron or aircraft general purpose apron should be provided in lieu of a mass parking apron.
- **Special Purpose Apron.** Special purpose aprons are provided for specific operations such as safe areas for arming/disarming aircraft and other specific mission requirements that demand separation or distinct handling procedures for aircraft.

PARKING APRONS FOR FIXED-WING AIRCRAFT

4-55. FW parking at an aviation facility may consist of separate aprons for parking operational, transient, and transport aircraft, or an apron for consolidated parking. Parking aprons should be located near and contiguous to maintenance and hangar facilities. Do not locate within RWY and TWY lateral clearance distances. Figure 4-4 (page 4-14) depicts FW apron criteria.

4-56. As a general rule, there is no standard size for aircraft aprons. Aprons are individually designed to support aircraft and missions at specific facilities. Actual apron dimensions are based on the number of authorized aircraft, maneuvering space, and type of activity the apron serves. Parking apron dimensions for AF facilities are based on the specific aircraft assigned to the facility and criteria presented in AFMAN 32-1084. Navy and Marine Corps criteria can be found in UFC 2–000–05N and MIL–STD 3007G. A typical mass parking apron should be arranged in rows. The ideal apron size affords maximum parking capacity with a minimum amount of paving. Generally, this is achieved by reducing the area dedicated for use as taxi lanes by parking aircraft perpendicular to the long axis of the apron.

Army Parking Apron Layout

4-57. Where there is a large variety of FW aircraft, mass parking apron dimensions are based on the C-23. The C-23 parking space is 22.86 meters (75 feet) wide and is 22.5552 meters (74 feet) long. If assigned aircraft are predominantly one type, the mass parking apron is based on specific dimensions of that aircraft.

Layout for Combined Army and Air Force Parking Aprons

4-58. Parking apron dimensions for combined Army and AF facilities are based on the largest aircraft assigned to the facility. Figure 4-5 (page 4-15) depicts Army and AF parking plan.

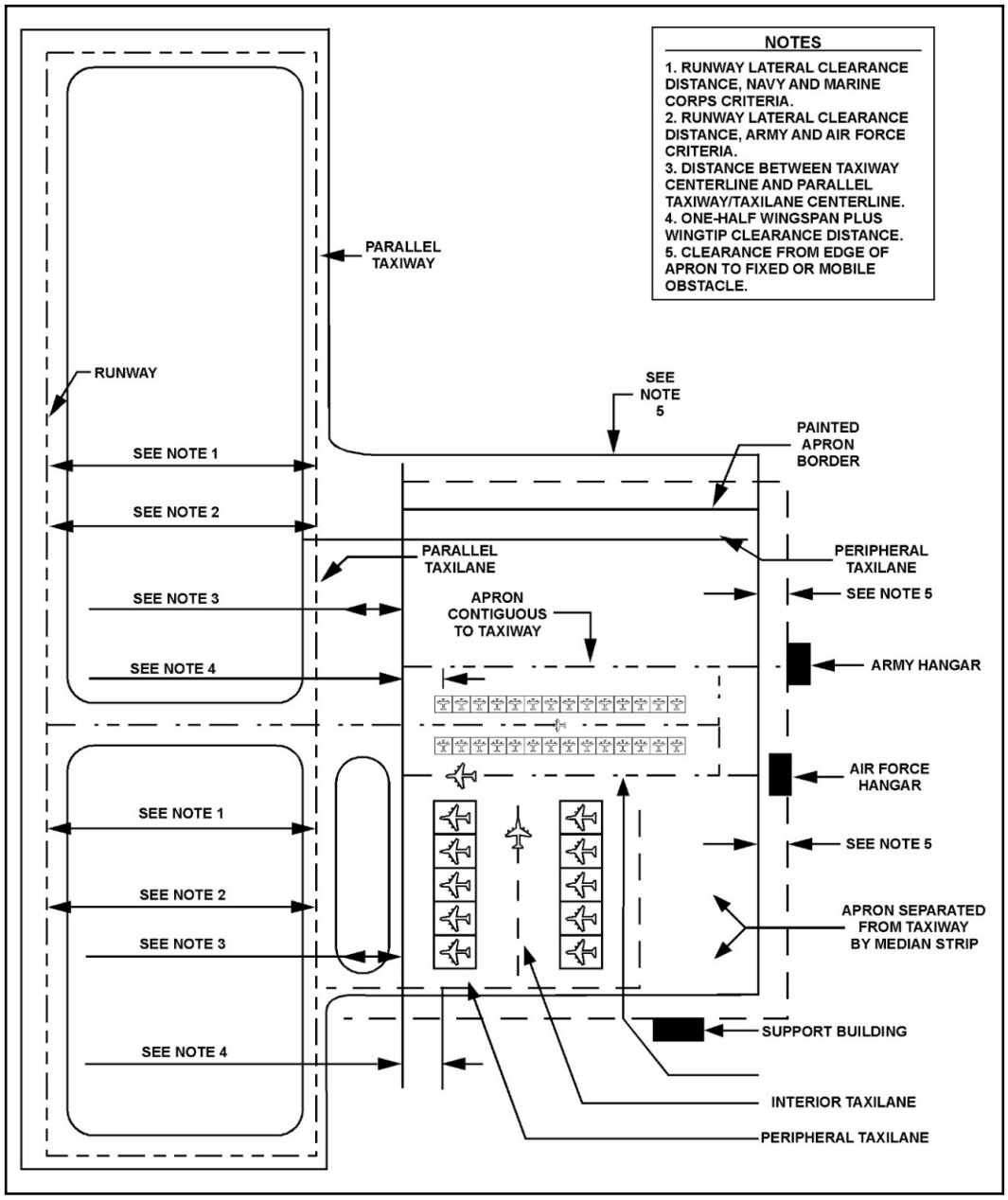


Figure 4-4. Fixed-wing apron criteria

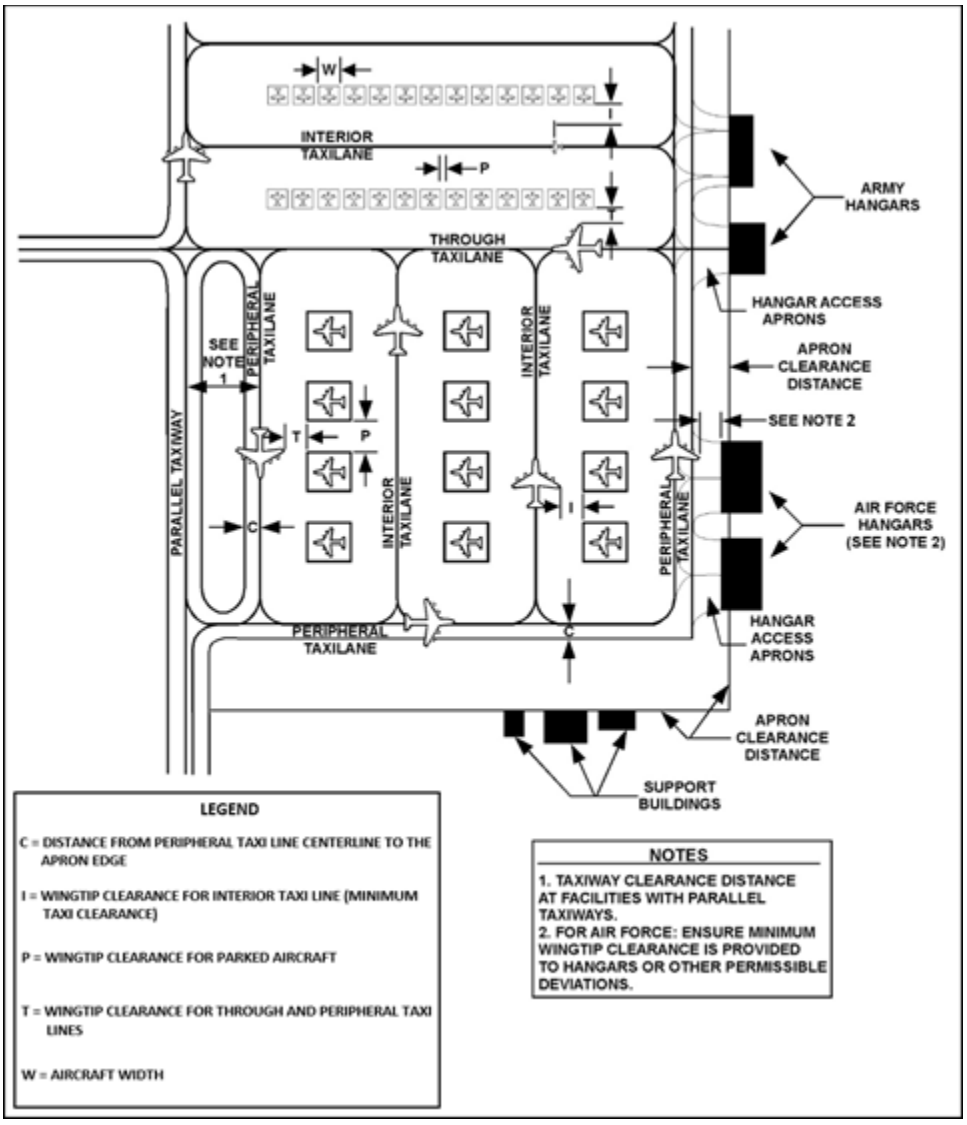


Figure 4-5. Army and Air Force parking plan

Parking Dimensions

4-59. When designing new aprons for AMC bases hosting C-5, C-17, KC-10, andKC-135 aircraft, provide 15.3-meter (50 foot) wingtip separation.

> ***Note.*** When rehabilitating an existing apron, provide the maximum wingtip separation the existing apron size will allow (up to 15.3 meters [50 feet], but not less than 7.7 meters [25 feet]). This additional separation is both desirable and permitted. At non- AMC bases, the maximum separation that can reasonably be provided for these aircraft is desirable. Table 4-4, page 4-16, describes cargo apron areas needed for current AF transport aircraft.

Table 4-4. Cargo apron areas

Aircraft Type	*Area per Aircraft (square meters/yards)*
C-130	3,913.632 square meters (4,280 square yards)
C-5A	11,384.28 square meters (12,450 square yards)
C-17	10,287 square meters (11,250 square yards)

Jet Blast Considerations

4-60. The effects of jet blast are far more serious than those of prop wash and must be considered when designing aircraft parking configurations for all military and civil aircraft. These high velocities can cause bodily injury to personnel or damage to airport equipment, certain pavements, and other erodible surfaces.

4-61. High temperatures are also a by-product of jet exhaust. The area exposed to hazardous high temperatures is typically smaller than the area subjected to hazardous blast velocities.

4-62. Blast velocities greater than 48 kilometers (30 miles) per hour can cause loose objects on the pavement to become airborne and cause injury and damage to personnel and equipment that may be a considerable distance behind the aircraft. The layout of aviation facilities must protect personnel and equipment from projectiles.

4-63. The minimum clearance from the rear of a jet operating at military power needed to dissipate the temperature and velocity to levels that will not endanger aircraft personnel and damage other aircraft is referred to as the safe distance.

Protection From Jet Blast Effects

4-64. Equipment such as blast deflectors may be required at locations where continued jet engine run-up interferes with aircraft parking or taxiing, vehicle movement, and activities of maintenance or aircraft personnel. Jet blast deflectors can substantially reduce the damaging effects of jet blast on structures, equipment, and personnel. Jet blast deflectors can also reduce the effects of noise and fumes associated with jet engine operation. Blast deflectors can mitigate erosion of shoulders not protected by asphalt-concrete surfacing. Blast deflectors consist of a concave corrugated sheet metal surface, with or without baffles, fastened and braced to a concrete base to withstand the force of the jet blast and deflect it upward. The deflector is usually located 20 to 40 meters (66 to 120 feet) aft of the jet engine nozzle, but not less than 15 meters (50 feet) from the aircraft tail. Size and configuration of jet blast deflectors are based on jet blast velocity, and location and elevation of nozzles. Commercially available jet blast deflectors should be considered when designing jet blast protection.

4-65. When blast deflectors are placed off the edge of a paved apron, a shoulder is required between them. Airfield unprotected areas that receive continued exposure to jet blast can erode and cause release of soil, stones, and other debris that can be ingested into jet engines and cause engine damage.

4-66. Protection against noise exposure is required whenever the sound level exceeds 85 decibels weighted continuous, or 140 decibels weighted impulse, regardless of the duration of exposure.

Jet Blast Requirements

4-67. AFMAN 32-1084 criteria states that a minimum clearance is needed to the rear of an engine to dissipate jet blast to less than 56 kilometers per hour (35 miles per hour) and not endanger personnel. Velocities of 48 to 56 kilometers (30 to 35 miles) per hour can occur over 490 meters (1,600 feet) to the rear of certain aircraft with their engines operating at takeoff thrust. These velocities decrease rapidly with distance behind the jet engine.

PARKING APRON FOR ROTARY-WING AIRCRAFT

4-68. Mass parking of RW aircraft requires an apron designated for RW aircraft. Parking for transient RW aircraft, and at aviation facilities where only a few RW aircraft are assigned, may be located on aprons for FW aircraft or TWYs and sod areas. At aviation facilities with assigned RW aircraft, a transport apron for FW aircraft is desirable.

Location

4-69. Parking aprons for RW aircraft should be located similar to those for FW aircraft. Generally, company units should be parked together in rows for organizational integrity in locations adjacent to their assigned hangars. Parking aprons for small helicopters (OH, UH, and AH) should be separate from parking areas used by cargo helicopters due to the critical operating characteristics of larger aircraft.

Apron Size

4-70. There is no standard size for RW aircraft aprons. The actual dimensions are based on the number of authorized aircraft, maneuvering space, and type of activity the apron serves. The layout of RW parking should allow aircraft maneuverability to airfield locations. For additional information on RW aircraft parking refer to UFC 3–260–1.

4-71. RW aircraft are parked in one of two configurations referred to as Type 1 or Type 2.

- **Type 1**. In this configuration, RW aircraft are parked in a single lane perpendicular to the taxi lane. This arrangement resembles FW aircraft parking and is preferred for wheeled aircraft. Parking space dimensions for all RW aircraft (except the CH-47) measure 25 meters (80 feet) in width and 30 meters (100 feet) in length. Parking space dimensions for the CH-47 measure 30 meters (100 feet) in width and 46 meters (150 feet) in length. Figures 4-6 (page 4-18) and Figure 4-7 (page 4-19) depict Type 1 RW parking.
- **Type 2.** RW aircraft are parked in a double lane parallel to the taxi lane. This arrangement is preferred for skid-gear aircraft. Parking space dimensions for skid-gear RW aircraft measure 25 meters in width (80 feet) and 30 meters (100 feet) in length. Parking space dimensions for all wheeled RW aircraft measure 30 meters (100 feet) in width and 50 meters (160 feet) in length. Figure 4-8 (page 4-20) and figure 4-9 (page 4-21) depict Type 2 RW parking.

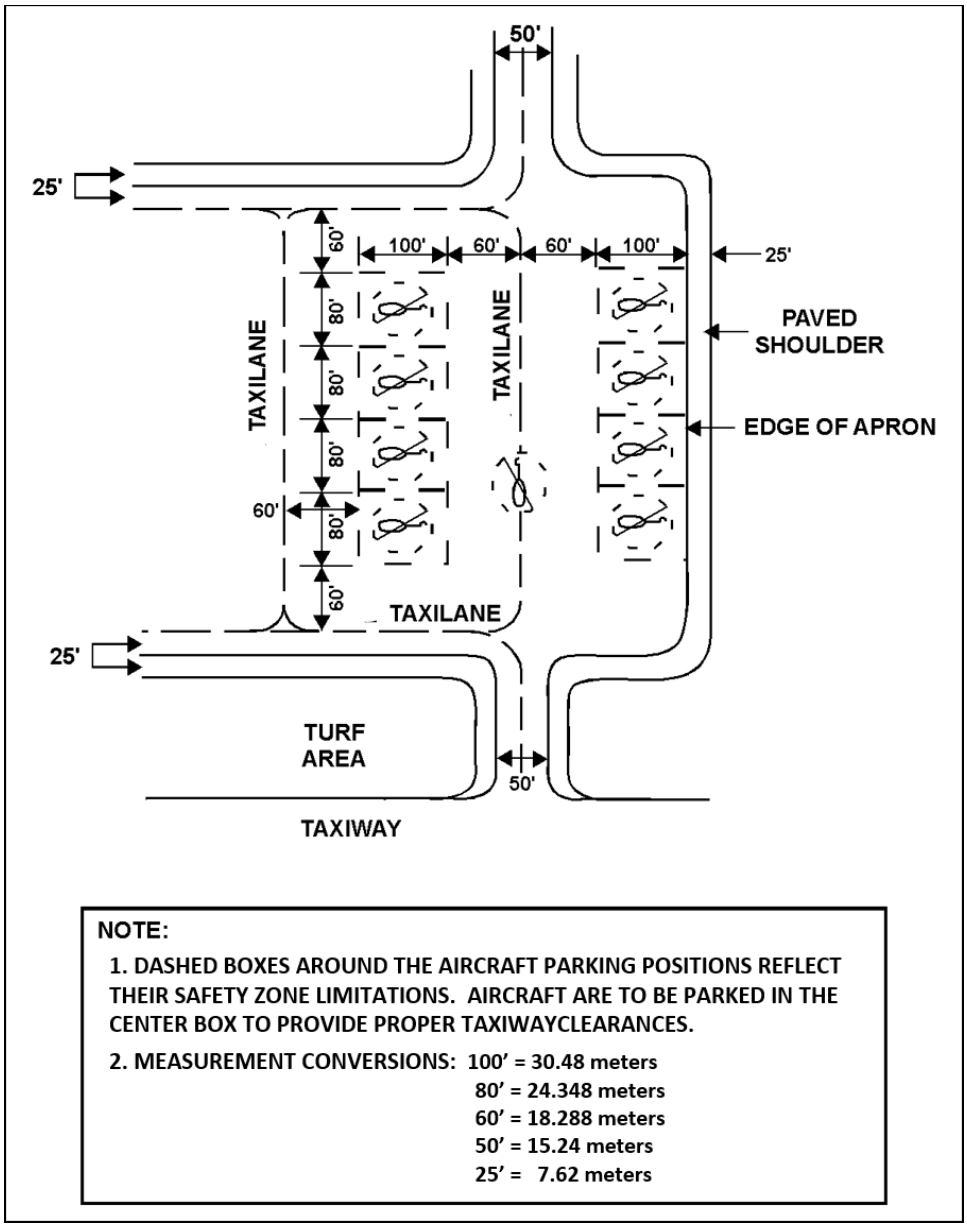


Figure 4-6. Type I parking for all rotary-wing aircraft (except CH-47)

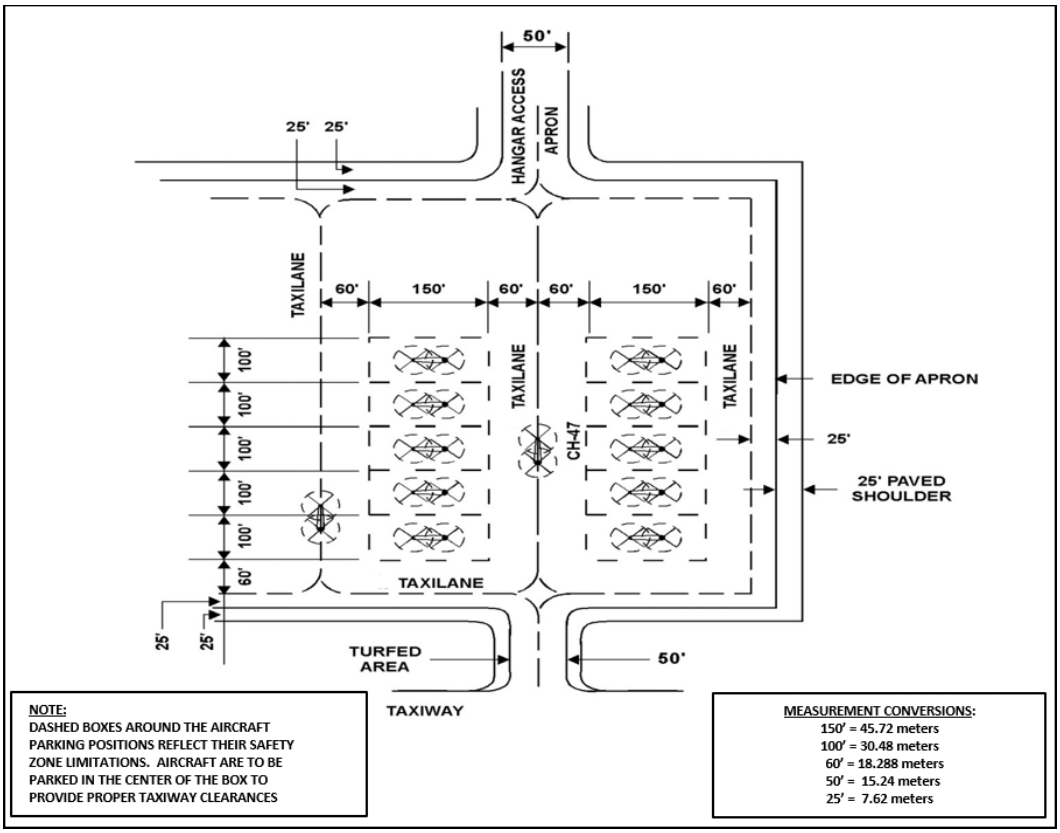


Figure 4-7. Type I parking for CH-47

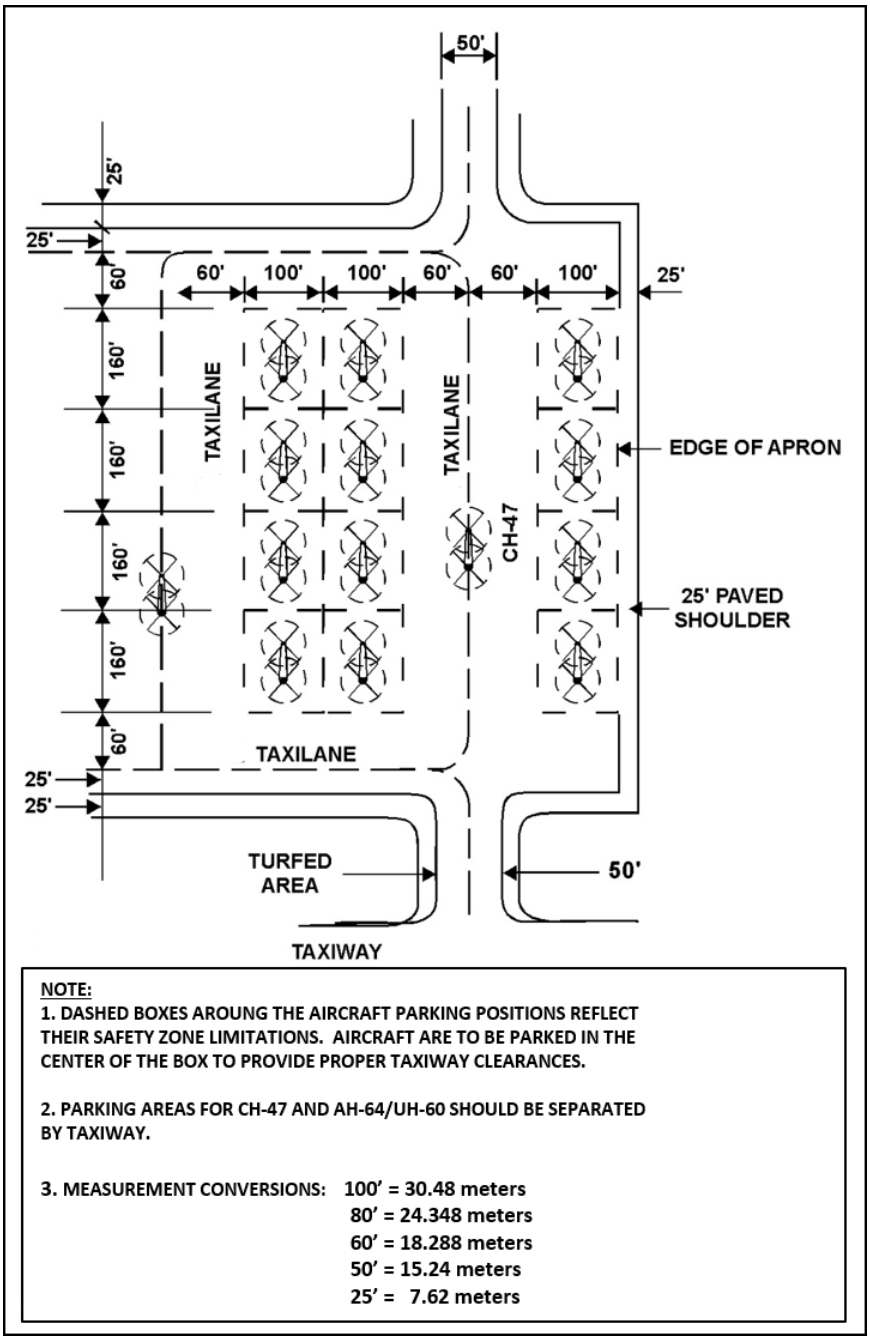


Figure 4-8. Type 2 parking for wheeled rotary-wing aircraft

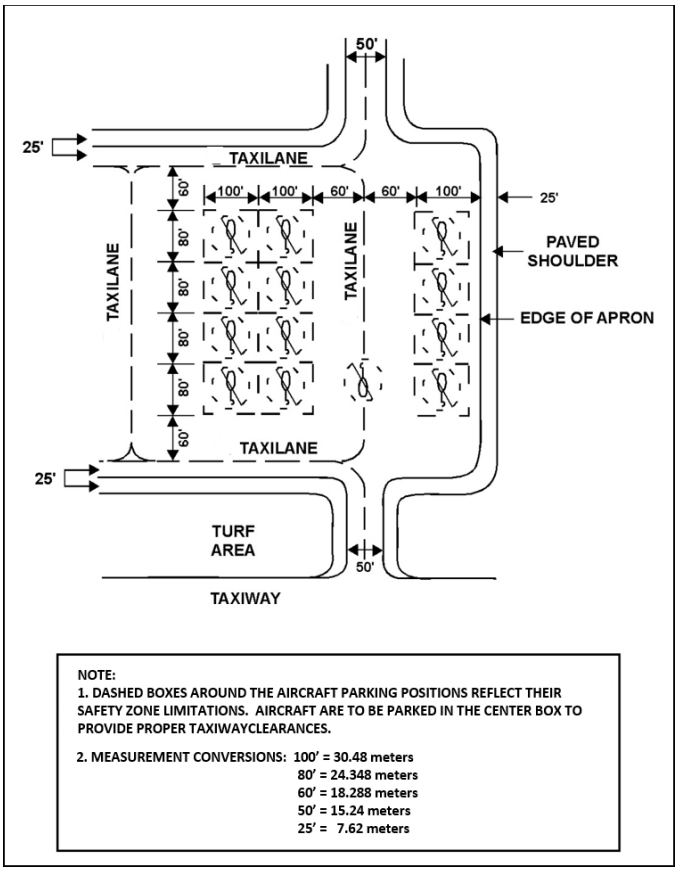


Figure 4-9. Type 2 parking for skid rotary-wing aircraft

REFUEL, ARMAMENT, AND HAZARDOUS CARGO

4-72. This section covers considerations for refueling operations, armament pads, and hazardous cargo/materiel pads.

REFUELING CONSIDERATIONS

4-73. Layout of aircraft parking locations and taxi lanes should consider aircraft taxiing routes when an aircraft is refueled. Refueling operations should not prevent an aircraft from leaving the parking apron. Two routes in and out of the apron may be required.

Fixed-Wing Aircraft

4-74. During refueling, active ignition sources such as sparks from ground support equipment or jet engines (aircraft) are prohibited from a zone around the aircraft. The Army and Air Force refer to this zone as the fuel servicing safety zone; the Navy and Marine Corps refer to this zone as the refueling safety zone. The safety zone is the area within 15 meters (50 feet) of a pressurized fuel carrying servicing component (servicing hose, fuel nozzle, single-point receptacle, hydrant hose car, and ramp hydrant connection point) and 7.6 meters (25 feet) around aircraft fuel vent outlets. The fuel servicing safety zone is established and maintained during pressurization and movement of fuel. For additional information, refer to AF technical order 00-25-172. For Navy, refer to Military Handbook 274A.

Rotary-Wing Aircraft

4-75. The safety zone for RW aircraft is the area 3 meters (10 feet) greater than the area bounded by the blades and tail of the aircraft. For additional information, refer to AF technical order 00-25-172.

ARMAMENT PADS

4-76. Armament pads are used for arming aircraft immediately before takeoff and disarming (safing) weapons retained or not expended on their return.

Location

4-77. Armament pads should be located adjacent to RWY thresholds and sited such that armed aircraft are oriented in the direction of least populated areas or towards revetments. Barricades should be built around the ready ammunition supply area (also called RASA), basic load storage area, and rearm pads. Barricades should be at least 3 feet (0.9144 meters) thick to effectively reduce hazards from a fire or explosion.

4-78. Table 4-5 shows the minimum distances permitted between rearm points, ready ammunition supply areas (also called RASAs), and non-ammunition related activities that require safety distances. These distances are based on rotor clearances.

Table 4-5. Minimum safe distances (in feet)

From	*To*	*Barricaded*	*Unbarricaded*
Rearm point	Rearm point	100-180	100-180
Rearm point	Inhabited building and unmanned aircraft	400	800
Rearm point	Public highways	240	480
Rearm point	POL storage areas	450	800
Ready ammunition	Rearm point	75	140
Ready ammunition	Inhabited buildings and unmanned aircraft	505	1010
Ready ammunition	Public highways	305	610
Ready ammunition	POL storage areas	505	1010

*Distances are based on rotor clearance.

Legend: POL= petroleum, oils, and lubricants

Armament Pad Setup

4-79. Armament pad setup affects overall aircraft turnaround times. During combat missions, enough ammunition for at least one arming sequence should be placed on the armament pad before aircraft arrive and laid out in the order it will be loaded. A full load of ammunition must be ready to load in the event the aircraft has expended its entire initial load. Figure 4-10 shows an example of two typical layouts for helicopter rearm points. Figure 4-11, page 4-23, shows a two and three-dimensional comparison of one plan.

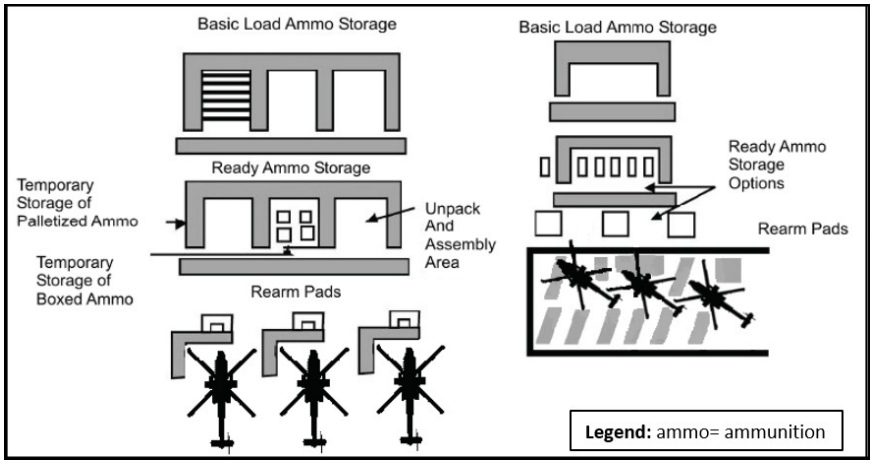


Figure 4-10. Two typical layouts for helicopter rearm points

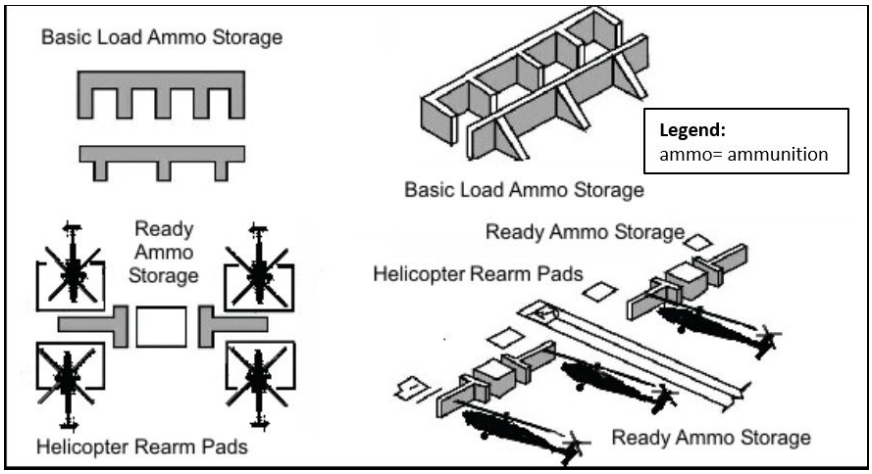


Figure 4-11. Two and three-dimensional comparison of a helicopter rearm point plan

HAZARDOUS CARGO/MATERIALS PADS

4-80. Hazardous cargo pads are paved areas for loading and unloading explosives and other hazardous cargo from aircraft. Hazardous cargo pads are required at facilities where existing aprons cannot be used for loading and unloading hazardous cargo.

Hazardous Cargo Pad Setup

4-81. Hazardous cargo pad setup is as follows:

- **Circular Pad.** At aviation facilities used by small cargo aircraft, a circular pad shown in Figure 4-12, page 4-24, is used.
- **Semi-Circular Pad.** At aviation facilities used by large cargo aircraft, aerial ports of embarkation, and APOD, a semi-circular pad as shown in Figure 4-13, page 4-24, is used. This pad is adequate for aircraft up to and including a C-5.
- **Other Pad Size.** The geometric dimensions shown in Figure 4-12 and Figure 4-13 are minimum requirements. Hazardous cargo pads may be larger in design if aircraft cannot maneuver on the pad.

4-82. An access TWY is provided from the primary TWY to the hazardous cargo pad. The TWY should be designed for aircraft to taxi into the hazardous cargo pad under its own power.

4-83. All explosives locations, including locations where aircraft loaded with explosives are parked, must be sited per Defense Explosive Safety Regulation (DESR) 6055.09 and applicable service explosives safety regulations.

4-84. Explosives site plans, approved through command channels to DOD, ensure minimal acceptable risk exists between explosives and other airfield resources. To prevent inadvertent ignition of electro-explosive devices (also called EEDs), separation between sources of electromagnetic radiation is required.

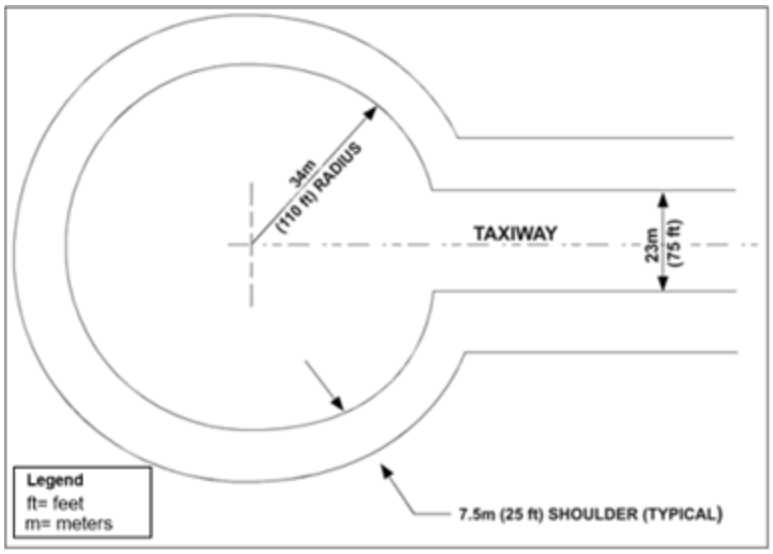


Figure 4-12. Sample of a circular pad for small cargo aircraft

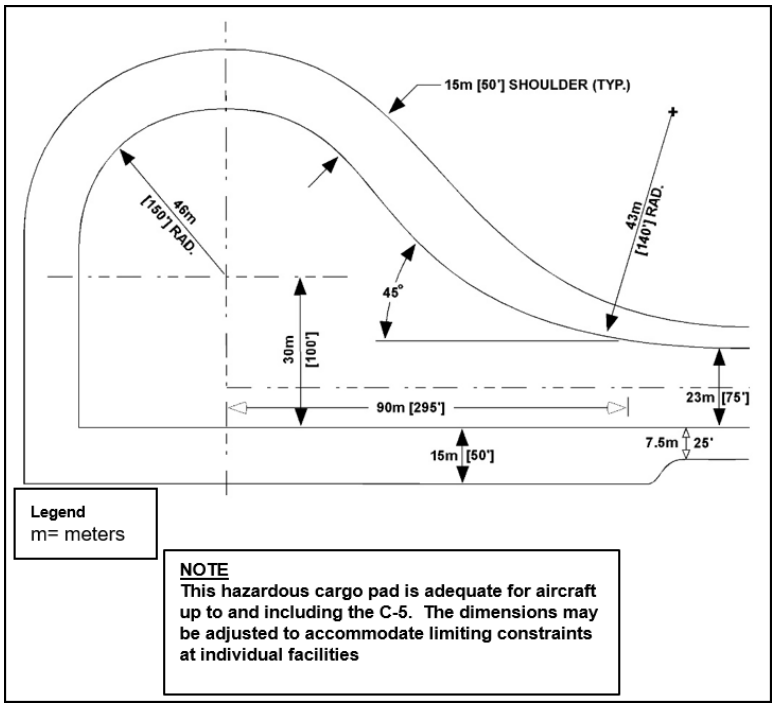


Figure 4-13. Sample of a semi-circular pad for large cargo aircraft

Separation Distance Requirements

4-85. Minimum standards for separating explosives (explosion separation distances and quantity-distance [also called Q-D] relationships) loaded aircraft from RWYs, TWYs, inhabited buildings, and other loaded aircraft are established in AR 385-10 and AFMAN 91-201-201SWSUPI-O. These documents also establish quantity-distance (also called Q-D) relationships for separating related and unrelated potential explosion sites and explosive and nonexplosive exposed sites.

Prohibited Zones

4-86. Explosives, explosive facilities, and parked explosives-loaded aircraft (or those loading or unloading) are prohibited from being located in Accident Potential Zones I and II and clear zones as set forth in AR 385-10 and AFMAN 91-201-201SWSUPI-O.

Hazards of Electromagnetic Radiation to Electro-Explosive Devices

4-87. Electro-explosive devices on aircraft are initiated electrically. Accidental firing of Electro-explosive devices carried on aircraft initiated by stray electromagnetic energy is a possible hazard on an airfield. A large number of these devices are initiated by low levels of electrical energy and susceptible to unintentional ignition by many forms of direct or induced stray electrical energy, such as radio frequency energy from ground and airborne emitters (transmitters). Additional sources of stray electrical energy are—

- Lightning discharges.
- Static electricity.
- Triboelectric (friction-generated) effects.
- Operation of electrical and electronic subsystem onboard weapon systems.

Lightning Protection

4-88. Lightning protection must be installed on open pads used for manufacturing, processing, handling, or storing explosives and ammunition. Lightning protection systems must comply with Defense Explosives Safety Regulation (also called DESR) 6055.09,UFC 3–550–01, TM 5-811-1/AFJMAN 32-1080, AFMAN 32-1065, and National Fire Protection Association (NFPA) 780. Aircraft loaded with explosives must be grounded at all times. Aircraft grounding is per applicable weapons systems technical orders.

NAVIGATIONAL AIDS AND FLIGHT INSPECTION

4-89. The potential for a major military contingency or natural disaster underlines the need to respond quickly to a military emergency. This necessitates advanced planning and the definition of operational requirements. In such circumstances, military flight inspection resources become critical in restoration of NAVAIDs. The ability to provide sustained flight inspection support for numerous and diverse requirements that may exist is predicated on the use of abbreviated flight inspection procedures. Flight inspections for restoration and commissioning of NAVAIDs depend greatly on the AOB's airfield management, air traffic, and communication/navigational aid maintenance support and preparations prior to the flight inspection.

4-90. The guidance, procedures, and tolerances contained in this section describe minimum facility performance standards for emergency military situations requiring deviation from normal standards. Basic flight inspection requirements and methods of taking measurements apply to the emergencies unless specific guidance or tolerances are given. Operational facilities using these procedures shall be reinspected to normal standards when circumstances permit.

4-91. Only special and commissioning type flight inspections will be conducted under emergency conditions using the procedures in TM 95-225. After-accident flight inspections may also be conducted under emergency conditions; however, normal procedures shall be followed. Priorities shall be established by the component commander or their designated representative.

PRE-INSPECTION REQUIREMENTS

4-92. Prior to arriving on location, the AOB's airfield management element and communication/navigation maintenance section coordinate the following items for the flight inspector:

- Arrival time.
- Emergency operational requirements as defined by the terminal services platoon leader.
- Airspace requirements for conducting the flight inspection profile.
- Anticipated support such as refueling and ground transportation for a theodolite operator.

4-93. The terminal services platoon leader accomplishes the following actions prior to arrival of the flight inspection aircraft:

- Assists in the development of emergency operational requirements for the facilities and special instrument approach procedures (SIAPs) requiring flight inspection; is prepared to brief changes on initial contact.
- Coordinates airspace requirements and obtains necessary clearances from appropriate airspace control authorities for conducting the inspection.
- If required, designates and briefs the air traffic controller to work the flight inspection aircraft.
- If available, provides current facility data on FAA Form 7900-7 (*Radar Instrument Approach Data*) for each facility to be inspected.

4-94. The ATC systems maintenance supervisor—

- Ensures adequate radio communications are available and operational.
- Assigns qualified maintenance personnel to support flight inspection of the equipment being inspected.
- Assists terminal services platoon leader in completing FAA Form 7900-7 for each facility inspected.
- Arranges ground transportation for the theodolite operator if necessary.

APPROACH PROCEDURES

4-95. The minimum flight inspection required to certify published SIAPs is inspection of the final and missed approach segments.

4-96. If an approach must be established, the flight inspector may be responsible for establishing final and missed approach procedures. Both segments of the procedure are flown and recorded to establish and document flyability, accuracy, reliability, and obstacle clearance. The flight inspector records the emergency SIAP procedures on the flight inspection report and provides the ATC supervisor with adequate detail for issuance of the NOTAM by the airfield management element.

4-97. The flight inspector determines, through visual evaluation, that the final and missed approach segments provide adequate terrain and obstacle clearance.

FACILITY STATUS AND NOTICES TO AIR MISSION

4-98. The flight inspector ascertains from ATC the intended operational use of the facility. After completing the inspection, the flight inspector determines the facility status for emergency use and advises the ATC supervisor prior to departing the area.

4-99. The ATC supervisor ensures issuance of a NOTAM by the airfield management element. Unusable SIAPs, or portions thereof, are included in the NOTAM. The NOTAM for a civil facility must be issued as a NOTAM D to ensure information is made available using the most expeditious method.

4-100. NOTAMs that are lengthy and describe emergency-use NAVAIDs in great detail will not be issued. The flight inspector subsequently records the NOTAM text in the remarks section of the applicable flight inspection report.

4-101. The flight inspector has the authority and responsibility for determining whether a NAVAID can safely and adequately support operations intended under emergency conditions. However, the local commander has final authority and responsibility for operation of military facilities not part of an existing common system and may elect to use those facilities for military missions. Additionally, the military may elect to use a military or civil NAVAID, which is part of a common system, even though that NAVAID is considered unusable by the flight inspector. In all such cases, the local commander is responsible for issuance of an appropriate NOTAM advising that the NAVAID is in operation "For Military Emergency Use Only" to support emergency operations.

FLIGHT INSPECTION DOCUMENTATION AND REPORTS

4-102. Flight inspection recordings are retained until the facility is inspected using normal procedures and tolerances. In the event flight inspection equipment is inoperative or not available, flight inspections continue to meet emergency operational requirements until replacement or repair is practical. Under these circumstances, the flight inspection pilot and airborne electronic technician are jointly responsible for documenting all applicable data displayed by instrumentation at their crew duty positions. All such manually acquired data are identified in the remarks section of the flight inspection report. The facility/SIAP is reflown with operational flight inspection equipment when conditions permit.

4-103. Completion and distribution of flight inspection reports are secondary to the accomplishment of emergency flight inspection. After completing the inspection, the flight inspector passes the facility status to the ATC supervisor on an air traffic frequency. This suffices as the official report until the written report is completed and distributed.

4-104. The flight inspector ensures flight inspection reports are completed and submitted for processing. Each parameter specified in the emergency flight inspection procedures checklists contained herein is reported. Recordings and reports reflect the inspection was accomplished using "**MILITARY EMERGENCY AND NATURAL DISASTER FLIGHT INSPECTION PROCEDURES**".

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Chapter 5

Joint Considerations

The formation of a major airfield requires a joint effort from its seizure or construction to its opening and daily operations. Each service possesses unique assets and capabilities contributing to the establishment and operation of theater airfields. AOBs normally are used to support theater Army airfield operations and may be tasked to provide support for joint, combined, or multinational operations in an austere environment. Cooperation and coordination ensures that service-specific requirements are met, and joint air operations are safe, efficient, and provide the required support necessary to ensure overall mission success.

AIRFIELD ASSESSMENT

5-1. Airfield planners use the military aspects of terrain and the mission variables when selecting airfields and areas for use in decisive action. The operational environment may require the seizure of enemy airfields or bases or may require the use of urban structures (such as stadiums and playing fields) to facilitate operations. Maximizing information gained from intelligence preparation of the battlefield, maps, and aerial observation assist planners in making recommendations for airfield sites to the commander.

5-2. Tentative enemy airfield sites are selected using maps and digital imagery, supplementing data from reports of aerial observers or other intelligence sources. These sites may be undeveloped areas or operating enemy installations. For an undeveloped site, the object of reconnaissance is to verify or amend tentative selections and layouts, and to estimate the material, equipment, and troop requirements for the planned construction. If the area is a captured airfield, estimates of the engineering necessary to restore the airfield may be required due to battle damage assessment.

5-3. Airfields are critical theater assets that commanders must plan to protect and sustain as the mission requires. The types of security protection and mitigation measures required are determined early in the planning cycle. In any environment, aircraft on the ground must be protected, airfield systems must be kept operational, and logistics support must survive to ensure continuous air operations. The threat will determine—

- How individual facilities and facility groups should be configured, dispersed, or concentrated.
- Whether utility plants can be centralized or dispersed.
- How much and what kind of protection will be required for parked aircraft.
- Whether vulnerability reduction measures (such as facility protection, camouflage, or concealment) are needed.

5-4. Surface area requirement estimations should include space for immediate development and contemplated expansion. Area requirements include—

- Mission.
- Number and type of aircraft.
- Length of stay.
- Size of airfield.
- Maintenance.
- Housing.
- Administration.
- Supply.
- Transportation.

- Security.
- Air traffic control.

AIRFIELD SEIZURE/OPENING

5-5. An airfield seizure is executed to clear and control a designated airstrip. The purpose may be to allow follow-on airfield and air traffic management forces to conduct sustainment operations or to establish a lodgment to continue combat operations from that location. Airfields can be seized and occupied by friendly forces for a definite or indefinite period.

5-6. Requirements for seizure and subsequent securing of the airfield, and the introduction of follow-on forces depend heavily on the factors of METT-TC (I) and the commander's concept of the operation.

PLANNING FACTORS

5-7. Certain factors must be considered when conducting the estimate for an airfield seizure:

- The key element of airfield seizure is surprise. Assault of the airfield should be conducted at night to maximize surprise, security, and protection of the force. Timing is critical; the assault should be executed so that the follow-on assault echelon (airdrop or airland) can also be delivered under the cloak of darkness.
- Enemy air defenses near the airfield and along aircraft approach and departure routes must be suppressed.
- The size of the airfield must be sufficient for landing and takeoff of aircraft to be used there. Minimum operating length determines how much of the airfield must be cleared.
- The configuration and condition of the airfield, including TWYs and parking, determines the maximum-on-ground capacity for aircraft at one time. This combined with offload/transload time estimates impacts directly on scheduling follow-on airflow into the airfield. Surface composition and condition and predicted weather conditions must permit the airfield to accept the required number of sorties without deteriorating the surface below minimum acceptable safety standards.
- The airfield location must facilitate follow-on operations. If transload operations must occur, the follow-on target must be within the range of the aircraft to be used. If the target is not in range, then forward area rearm/refuel assets must be available and positioned to support the follow-on operation.
- The airfield must be defensible initially with assault forces against any immediate threat and with planned follow-on forces against larger, coordinated counterattacks.

5-8. Specialized ATC units such as an Army tactical aviation control team, a Marine air traffic control mobile team, or an AF combat control team provide LZ survey or airfield assessment, ATC, navigation aids, tactical airfield lighting, and marshaling services during airfield seizures. Additionally, they may be attached to the contingency response force with specification of tactical control during airfield opening for a specified duration.

5-9. Engineer units should also accompany the assault force. Their task is to clear RWYs of obstacles. Special consideration is given to the type and quantity of obstacles on the RWY. These obstacles have a major impact on engineer assets required by the task force, the time for clearance, and the planned time of arrival of airland sorties. To assist engineers, bulldozers and mine detectors (metallic and nonmetallic) can be dropped in the initial assault. Selected personnel can be tasked to jump-start disabled or airfield support vehicles required to assist the offload. Once the assault echelon has seized initial objectives, RWY clearance teams (engineers, infantry, and other designated personnel) begin clearing or repairing the RWY(s).

5-10. During airfield clearance the high usage of sub-munitions is likely and therefore is a critical planning consideration. Explosive ordnance will almost certainly be present because of the amount of ordnance that may have been dropped or projected onto an airfield, and into the surrounding area. Explosive ordnance disposal teams should be positioned with the airfield seizure forces to immediately begin clearing the airfield as well as the surrounding area. For additional information on Explosive Ordnance Disposal see ATP 4-32, ATP 4-32.1, and 4-32.3

5-11. Certain objectives near the airfield and key terrain surrounding it (control towers, communications nodes, terminal guidance facilities) should be secured at the same time units are clearing the RWYs. This requirement increases the number of personnel designated to participate in the initial assault.

REHABILITATION OF CAPTURED AIRFIELDS

5-12. The decision to rehabilitate a captured enemy airfield and the decision as to the type and construction standard of the rehabilitated field are Air Force and Army responsibilities. The work is ordinarily accomplished by an engineer battalion.

5-13. The engineering mission is to convert existing facilities, which are usually damaged, to the standard decided on by the Air Force and Army, with a minimum outlay of labor, equipment, and materials. Considerable discretion must be exercised in applying standard specifications to captured airfields. No large-scale relocation of facilities should be undertaken merely to conform to standard patterns if existing patterns serve the same purpose in a satisfactory manner. Sensible, existing substitutions and deviations from specified agreements must be recognized and accepted.

5-14. An appraisal of the damage to a captured field precedes the decision to rehabilitate it. Occasionally, it is necessary to expend more effort to restore a badly damaged airfield than to construct a new one. Installation damage includes war damage by our forces securing the airfield. Complete destruction of an airfield is a major undertaking; therefore, the enemy will likely resort to one or more of the following less destructive measures:

- Placing delayed-action bombs, mines, and booby traps.
- Demolishing drainage systems and pavements.
- Placing obstacles and debris in the RWY.
- Plowing turfed areas.
- Flooding surfaced areas.
- Blowing craters in RWYs, TWYs, and hardstands.
- Demolishing buildings, utilities, and similar installations.

5-15. Commanders should plan for worst case scenarios and assume these damages were inflicted when conducting an assessment of the airfield. Use the following criteria to prioritize rehabilitation operations:

- Establish minimum facilities and utilities to include the establishment of an operating strip for immediate use by friendly aircraft. This includes removing UXO, delayed-action bombs, mines, and booby traps from the traffic areas, clearing debris from those areas and repairing craters on the RWY and TWY surfaces. Promptly repair the drainage system. Concentrate RWY work first on a minimum operating strip; second, on an access route; and finally, on other traffic areas. Give early attention to the provision of suitable sanitary and water facilities. TC 5-340 provides detailed information regarding these areas.
- The second priority is improvements to the minimum operational facilities. Restore remaining RWYs, TWYs, hardstands, parking aprons, access and service roads, and fuel and bomb storage areas before rehabilitating other less vital facilities.
- The third priority is the repair of buildings such as the control tower, operational buildings, crew shelters, communication centers, and other maintenance facilities.
- The fourth priority is the camouflage of installations; the restoration of utilities (making use of any utility map and any available citizen labor familiar with the installation’s utilities); and the repair or establishment of bathing, dining, and recreational facilities. A complete cleanup of the grounds, including the removal of debris and seeding and sodding, is the last phase of a rehabilitation project.

DAMAGE REPAIR RESPONSIBILITIES FOR AIRFIELDS

5-16. The immediate, emergency-damage recovery of an airfield is considered to be the minimum work required to permit aircraft to land and take off. The Air Force is primarily responsible for the emergency RWY repair. This is accomplished through the employment of AF base civil engineering troop assets; prime base engineer emergency forces (Prime BEEF) and rapid engineering deployable heavy operational repair squadrons engineering (RED HORSE) units.

Army Responsibilities

5-17. The Army is responsible for semi-permanent construction beyond emergency repair of the airfield and, upon request, emergency repairs that exceed Air Force capabilities. This support includes—

- Assisting in emergency repair of war damaged airfields where requirements exceed the Air Force's organic repair capability.
- Repairing and restoring damaged airfields beyond emergency repair.
- Developing engineer designs, plans and materials to meet Air Force needs as agreed upon by the Air Force. Where practicable, designs are based on the Army Facilities Components System.
- Supplying construction materials and equipment, except for that provided by the Air Force.
- Upon request, EOD units assist render safe UXO to enable damage assessment and airfield repair operations.
- Managing and supervising the repair and restoration of war damage performed by Army personnel.

Air Force Responsibilities

5-18. The Air Force provides military troop engineering support from its resources and ensures that units are equipped, manned, and trained adequately to support its needs. This support includes—

- Emergency repair of war damage to airfields.
- Organizing host-nation support (overseas).
- Force bed down of units and weapon systems, excluding Army base development responsibilities.
- Operation and maintenance of facilities and installations.
- Crash rescue and fire suppression.
- Managing force bed down and the emergency repair of war damage.
- Supplying material and equipment to perform its engineering mission.
- Providing logistical support to the Army for all classes of supply except Classes II, V, VII, and IX.
- Conducting damage assessment and render safe removal of UXO.
- Providing CBRN collective shelters and establishing and operating personnel and equipment decontamination sites for the airfield and the Army. There are shortages of these assets on airfields, and support to Army units may be limited.

5-19. Airfield support agreements may be established in some theaters between the Air Force and the host nation where ADR support capability exists. These host-nation support agreements may include equipment, materials, and manpower assets.

5-20. For a detailed description of personnel, equipment, and material requirements and critical path schedules for repair of RWYs cratered by high-explosive bombs, refer to AF pamphlet 10-219V4. For a detailed discussion of general ADR, refer to TC 5-340.

AIRFIELD OPERATIONS AUGMENTATION REQUIREMENTS

5-21. Organizations operating theater airfields provide services such as airfield management, safety and standards, flight dispatch, and ATC. To provide a full range of airfield services, these organizations rely on TSC support for—

- Refuel.
- Aircraft rescue firefighting.
- Aircraft maintenance.
- Cargo handling.

Note. Weather support will be provided according to AR 115-10/AF instruction (AFI) 15-157 (IP).

UNITED STATES AIR FORCE WEATHER SUPPORT

5-22. Weather support for Army tactical operations is based on the following principles:

- Tactical units must consider weather effects during all planning and operational phases, including deployment and employment.
- Commanders must consider favorable and unfavorable weather conditions to determine the best course of action to accomplish the mission.
- Accuracy of weather forecasts depends on the density and timeliness of weather observations. Weather observations, particularly those taken by Army personnel forward of the division command post, must have high priority and be rapidly transmitted to the supporting AF weather organization.
- Timely, reliable primary and alternate communications must be provided.
- Because of continually changing atmospheric conditions, weather information is highly perishable. Weather observations and forecasts must be monitored and updated continually.

5-23. The Air Force provides the bulk of weather support required by the Army. AR 115-10/AFI 15-157 (IP) specifies each service's functions and responsibilities. Weather personnel supporting Army tactical organizations depend on the supported Army unit for sustainment. The Air Force provides specialized meteorological equipment, and the maintenance and supplies required to support it according to the above listed publications.

REFUEL SERVICES

5-24. The petroleum group is the principal organization responsible for bulk fuel distribution. It is assigned to the TSC and may have a petroleum support battalion attached to a sustainment brigade or MEB. AOBs receive their bulk supply of jet propulsion fuel type 8 through the TSC assigned petroleum distribution unit in their AO. If petroleum distribution does not come from a TSC subordinate unit, it may come from the following:

- Contractor support.
- Local nationals.
- Host-nation capabilities.

AIRCRAFT RESCUE FIREFIGHTING OPERATIONS

5-25. Aircraft rescue firefighting (ARFF) operations include aircraft incidents and accidents, medical evacuation (MEDEVAC), search and rescue, refuel/defuel, and maintenance standby operations.

Engineer Fire And Emergency Services Teams

5-26. Engineer fire and emergency services (F&ES) teams are currently organized into two types of teams: the engineer F&ES HQ team and the engineer F&ES fire truck team. These teams are assigned or attached to support units and base camps anywhere in the TO. Typically, engineer F&ES truck teams collocate with a supporting engineer F&ES HQ team, but not always. Engineer F&ES teams provide ARFF support to United States military, allied, host nation, and civil aviation assets in support of Army operations. Engineer F&ES teams providing ARFF services may be assigned under direct supervision of the airfield activities division. These are critical functions that must be closely coordinated with all branches of the airfield activities division. AR 420-1 establishes basic procedures and responsibilities for ARFF actions at airfields under department of the Army jurisdiction. ARFF actions provide 24-hour emergency response capabilities for the following scenarios:

- Aircraft incidents, accidents, and mishaps.
- Search and rescue of injured, sick, or entrapped personnel either on board or ejected from an aircraft.
- Initial emergency medical care of victims.
- MEDEVAC standby actions.
- Maintenance standby actions.
- "Hot" refueling/rearming actions (forward arming and refueling point [FARP] actions).
- Operations level (defensive) response to airfield incidents involving hazardous material.
- Emergency response to fires and incidents on the airfield that endanger adjacent aircraft or related facilities.
- ARFF actions also include the following ongoing activities in support of the airfield management team:
  - Assist the airfield commander in drafting, testing, and implementing airfield emergency plans.
  - Perform the incident command function during emergency response periods on and around the airfield.
  - Train, supervise, and direct the activities of emergency responders from outside the engineer F&ES teams.
  - Conduct fire prevention, inspection, and education programs intended to lessen risk to aircraft, airfield facilities, and personnel.

Headquarters Team

5-27. On a 24-hour concept, the engineer F&ES HQ team is normally assigned to the Army Service Component Command to provide command and control over one and up to five assigned subordinate engineer F&ES teams. The HQ team must have functionality to direct the protection of property, preservation of life, conduct maintenance and logistical support to engineer F&ES teams, conduct fire prevention, and provide command and control for major emergencies. Commanders attach or assign the team to a subordinate HQ or task-organize with the supporting units to provide direct support engineer F&ES capabilities. The HQ team capabilities include:

- Developing plans for engineer F&ES on an installation or within an AO.
- Conducting fire prevention inspections and training.
- Conducting fire investigations.
- Supervising rescue and firefighting during aircraft crash incidents, structural fires, ground vehicle emergencies, wildland fires, emergency response during hazardous material incidents, rescue air mobility squad, technical and specialized rescue, and emergency medical services (EMS).
- Establishing, directing, and supervising a 24-hour-per-day fire alarm communications center.
- Commanding the engineer F&ES teams within an AO.
- Inspecting fixed fire protection systems on an installation in an AO.
- Coordinating for the resupply of engineer F&ES assets, fire suppression agents, self-contained breathing apparatus, compressed breathing air, fuel, and the maintenance of firefighting vehicles, and technical equipment.

- Coordinating mutual aid and training support with other joint service and coalition fire protection entities, domestic, and host nation F&ES assets.
- Participating in homeland security missions related to engineer F&ES as required.

Fire Truck Team

5-28. On a 24-hour concept, the engineer F&ES teams perform fire suppression, administer emergency medical care to victims, respond to hazardous material incidents, perform personnel rescue, and maintain a fire prevention program within the AO. This team is normally assigned to a supporting HQ but may be deployed separately without the presence of a HQ in the AO. When not assigned to the HQ, the engineer F&ES team is normally assigned to the Army Service Component Command and may be attached or assigned to a subordinate HQ or task-organized supporting units to provide direct support engineer F&ES capabilities. The engineer F&ES team identifies all bodies of water that may be used to combat a fire or resupply empty firefighting vehicles. It then develops a plan that identifies the locations and the equipment needed to use these water sources. The sources should be within a camp's perimeter or within a 2-mile radius of a camp. The engineer F&ES fire truck team:

- Provides ARFF.
- Conducts fire prevention inspections on base camps, airfields, or within an AO.
- Provides command and control of the minimum operating strip (also called MOS) -immaterial firefighting personnel and associated assets used to support wildland firefighting (such as heavy equipment and operators).
- Executes fire suppression missions for structures, aircraft, wildland areas, and ground vehicles.
- Provides EMS assistance to victims.
- Provides an initial response capability to explosive detonations.
- Executes rescue air mobility squad missions.
- Coordinates and conducts the training of auxiliary and host nation fire protection assets, to include tactical convoy emergency fire responder training.
- Executes technical and specialized rescue tasks.
- Provides a minimum of 2,500 gallons of water per trip with the heavy-expanded mobility tactical truck (HEMTT)-based water tender to support the tactical firefighting truck in all engineer F&ES.

Aircraft Rescue and Fire Fighting Manning and Vehicle Requirements

5-29. ARFF teams provide support to Army aviation, and Air Force, Navy, Marine, allied, and civil aviation assets, in support of Army operations. The types of support include crash rescue, emergency evacuation, and basic life support.

5-30. Airfield engineer F&ES staff the ARFF apparatus to provide flight line protection 24-hours per day, even if the air traffic control tower is closed for flight activities. The engineer F&ES provides a coordinated program of emergency response/stand-by and rescue services for ARFF to announced and unannounced in flight/ground emergencies, and crashes and mishaps, including ordnance and spill containment and other related incidents, if required. Engineer F&ES teams consider outside resources and coordinate their program with local airports, municipal ARFF organizations, medical activities, and other federal agencies as required.

5-31. The number of ARFF vehicles required varies according to the type of aircraft assigned to the installation or the type of aircraft at the installation more than 50 percent of the time. This indicates the ideal core set of vehicles (see TM 3-34.30) and engineer F&ES teams required for fire ground actions.

5-32. Wherever there are more than 40 or more aircraft movements (average) per day, —

- An ARFF apparatus or equivalent (with assigned staffing) for RW and small FW aircraft (less than 60 feet) is required. Minimum optimal manning for 24-hour-per-day activities is one engineer F&ES fire truck team on duty per shift.
- A CH-47 and larger aircraft averaging six or more movements above the 40 movements per day (for example, 46 per day average at airfield) require an additional ARFF apparatus or four engineer F&ES teams for 24-hour-per-day activities (with assigned staffing) for two rotating shifts.

- HQ, DA may approve additional ARFF apparatuses to meet the requirements of AF pamphlet 32-2004.
- AR 385-10, AF technical order 00-105E-9, and International Fire Service Training Association contain suggested pre-accident plans and give detailed information on ARFF techniques.

Aircraft Pre-Fire Plans

5-33. Firefighters encounter many different types of aircraft in a TO. The armament and hazards of these aircraft can be varied, extensive, and quite lethal. Firefighters must acquire and maintain knowledge of the aircraft particular to their AO. A copy of AF technical order 00-105E-9 and NATO Standardization Agreement 3896 should be available to Code of Federal Regulations crews. This manual contains information on most FW and RW aircraft, crash rescue data, and aircraft specifications for all services.

5-34. Pre-fire plans for aircraft crash rescue operations require more flexibility than pre-fire plans for structural fires. Because the exact crash location is unknown, units should only make general plans as to likely crash sites. When developing pre-fire plans, consider the following factors relating to the airfield:

- Location.
- Mission.
- Climate.
- Terrain.

5-35. Pre-fire plans should include information on the different types of aircraft handled at an installation according to TM 3-34.30. The control tower can obtain specific information (number of personnel, amount of fuel, amount and type of ordnance onboard, nature of an emergency) at the time of the emergency.

5-36. Weather, terrain, RWY conditions, amount of available equipment and remaining fuel, and crash location are some factors that govern placing equipment at an aircraft's crash operation. Pre-fire plans can only cover general placement procedures and should allow for flexibility, based on the situation. Other factors to consider include—

- Aircraft landing speed.
- Wind direction and speed.
- Aircraft stopping distance.

5-37. Pre-fire plans should also include provisions for acquiring additional equipment.

AIRFIELD DEVELOPMENT

5-38. This section discusses engineer responsibilities for airfield development and the organizations and requirements for bare base airfields.

ENGINEER RESPONSIBILITIES

5-39. When executing emergency restoration plans, engineer units receive detailed operational requirements from the supported commander. The engineer commander is concerned with site reconnaissance, location, alignment recommendations, airfield design and construction, and the support facilities available. The engineer is usually furnished standard designs for the type and capacity of the airfield required. However, these designs must often be altered to meet time and material limitations or limitations imposed by local topography, area, or obstructions. The engineer in charge of construction may alter designs within the limits prescribed by the HQ directing construction; however, major changes must be approved by the HQ before work begins. The following are standard design requirements for most airfield construction or restoration missions:

- Design of drainage system structures.
- Geometric design of RWY, TWYs, and hardstands (including overruns, blast areas, and turnarounds).
- Selection of soils found in cuts and use of soil to improve subgrade.
- Compaction or stabilization requirements of the subgrade.

- Determination of type and thickness of the base and surface courses.
- Selection of grade to minimize earthwork while still meeting specifications.
- Design of access and service roads.
- Design of ammunition and POL storage areas, NAVAIDs; hardstands, maintenance and warm up aprons, corrosion control facilities, control towers, airfield lighting, and other facilities.

BARE BASE AIRFIELDS (AIR FORCE)

5-40. A bare base airfield is a site with a usable RWY, a TWY, parking areas, and a source of water that can be made potable. It must be capable of supporting assigned aircraft and providing other mission-essential resources, such as a logistical support and services infrastructure composed of people, facilities, equipment, and supplies. This concept requires mobile facilities, utilities, and support equipment that can be rapidly deployed and installed.

5-41. Undeveloped real estate must be transformed into an operational air base virtually overnight. In today's world, the concept of the bare base is more important than ever before.

5-42. While many foreign countries resist development of major fixed installations on their soil, these underdeveloped nations may have RWYs, TWYs, and air terminal facilities that could be offered to our forces during contingency situations.

5-43. There are roughly 1,200 airfields in the free world that could support air operations, although many bare bases are limited and inadequate. Since most of these underdeveloped nations are subject to aggression, the military must be able to deploy and operate from their facilities.

5-44. During contingency operations, efficient and effective use of limited airfield capacity and resources is often critical to a successful military response. The task is complicated when foreign airfields are host to a variety of allied military, NGOs, and commercial air activities. To achieve a unity of effort of airfield operations, there should always be a senior airfield authority (SAA) appointed for each airfield. The SAA is an individual designated by the joint force commander to be responsible for the control, operation, and maintenance of an airfield to include RWYs, associated TWYs, parking ramps, land, and facilities whose proximity affect airfield operations. This has traditionally been an Air Force mission; however, with the airfield management and operations capability in AOBs, the joint force commander may designate them as the SAA based on airfield mission and the assets available.

Organizations

5-45. Today's mobility concept is to rapidly deploy a force, complete with shelters and support facilities, capable of independently supporting and launching sustained combat operations with the same independence as fixed theater installations.

Contingency Response Group

5-46. A contingency response group is an Air Force designated composite group of forces that provides the combatant commander with a majority of the open airbase force module. This deployed capability bridges the gap between seizure forces (when present) and sustainment forces (in subsequent force modules). Their mission is to assess, open, and initially operate airfields. The group consists of a standardized force module dedicated to the airfield opening task. This module includes a tailored selection of all forces needed after seizure, or handoff from seizure forces, to assess an airfield, establish initial air mobility, C2, and operate the flow of air mobility into and out of that airfield. contingency response group may open an airfield for the Air Force, another service, or a coalition partner. To ensure continuity of operations, contingency response group coordinate planning and agreements with the theater Commander of Air Force Forces/joint force air component commander staff.

Contingency Response Element

5-47. The contingency response element (CRE) is a deployed organization at forward locations where air mobility support is insufficient or non-existent. The CRE's core capability sets consist of C2, aerial port and aircraft maintenance. CREs provide minimum essential on/offload and en route aircraft mission support

during deployment, employment, and redeployment operations. Commanded by a commissioned officer, CREs deploy to provide air mobility mission support when C2, mission reporting, and/or other support functions are required. CREs also provide aerial port, logistics, maintenance, weather, medical, and intelligence services, as necessary. The CRE's size is based on projected operations flow and local conditions.

Airfield Survey Team

5-48. Each contingency response group possesses an airfield survey team as part of their capability. These personnel are trained and equipped to assess the capabilities of the airfield and its supporting facilities. They relay that information to the appropriate authorities who deploy any needed augmentation or engineer forces.

Requirements

5-49. The assumption is that joint tactical forces will continue to have a bare base requirement to conduct sustained air operations on a worldwide basis. This requires the use of joint assets in the management and operation of theater-level airfields as determined by the joint force commander and coordinated between the service organizations charged with the operation of theater airfields. Written agreements such as joint manning documents or support requirements may be necessary to effect coordination between the services.

5-50. It is important in the preliminary planning stage to know the location of existing facilities and utilities. As a result, any layouts, drawings, or aerial photographs are vitally needed. As equally important are the lengths and widths of the RWY, TWYs, ramps, and aprons. Commanders must answer the following questions:

- Does RWY lighting exist? If so, is it adequate?
- Is there a requirement for aircraft arresting barriers?
- What kinds of water sources are available?
- Does the water come from a well, river, lake, or ocean? What is the water temperature?
- How far away is the water source?
- Is the site being developed using hard or soft-wall shelters? (If the answer is soft wall shelters, latrines will be field expedient.)

PART TWO

Aviation Unit and Installation Airfield Operations

Chapter 6

Fundamentals

The specific organization of an aviation battalion depends on several factors including the unit's primary mission and official table of organization and equipment (TO&E). The main command post provides the aviation commander a central location to exercise command and control. Operations personnel coordinate activities and work directly with all other staff sections. Aviation unit operations track, monitor, and control unit missions, daily operations, flight operations, and training. This chapter discusses fundamentals of the basic operations organization, principal mission focus, and capabilities of operations personnel.

ORGANIZATION AND STAFF

6-1. Theater-level airfield management elements may not always reside at all airfields within the TO. The combat aviation brigade or its aviation battalions may be required to conduct limited airfield management tasks in areas where primacy of effort is weighted for Army aviation operations. In this capacity, a member of the aviation brigade or battalion staff may be designated as the SAA with the task of integrating tenant units such as military intelligence operating unmanned aerial systems or other aviation forces operating from the same airfield. Airfield management functions may be limited in scope and could include—

- Use and coordination of airfield services and facilities.
- Development of airfield procedures and terminal airspace.
- Development of space and facilities to support transient aircraft.
- Coordination of construction and expansion efforts for the airfield.
- Establishment of airfield pre-accident plan.
- Integration of aviation support into base defensive measures.
- Dissemination of airfield NOTAMs.

6-2. The flight battalions, as directed by the combat aviation brigade commander, may share the above responsibilities. The aviation unit operations approved structure will be determined by the modified TO&E.

OPERATIONS SECTION

6-3. The S-3 section maintains routine reporting, coordinates activities of liaison personnel, and plans. The S-3 section produces orders for battalion operations (including recovery of personnel) and ensures procedures are in place to resolve complexities posed by different communications systems, command post information systems and connectivity with aircraft.

Operations Staff Officer

6-4. The operations staff officer (S-3) is responsible for matters pertaining to operational employment, training, and mission execution of battalion and supporting elements. The S-3 monitors the battle, ensures necessary assets are in place when and where required, develops the information collection plan, and anticipates developing situations. The S-3 maintains close coordination with the logistics staff officer (S-4) and personnel staff officer (S-1) for logistics and personnel statuses.

Senior Aviation Operations Sergeant

6-5. The operations noncommissioned officer in charge (also called NCOIC) obtains training information, coordinates tasks and training, supervises enlisted personnel, and compiles reports. They should be a graduate of the battle staff noncommissioned officer and Joint Firepower Control courses. The operations noncommissioned officer in charge (also called NCOIC) is responsible for—

- Establishing the main command post (CP) or tactical command post, serving as the key enlisted member of the quartering party to establish CPs.
- Planning, coordinating, and supervising the emplacement of Army battle command systems and communication systems throughout the CP.
- Establishing CP manning, shift schedules, and CP operational guidelines/SOPs.
- Conducting or directing enlisted training of all operations personnel.
- Providing tactical and technical expertise regarding aviation operations.
- Assisting with the preparation of operation orders and plans.
- Supervising the maintenance of daily staff journals.
- Monitoring current operations and assisting the battle captain as appropriate.

Flight Operations Officer

6-6. The commander may designate a battalion flight operations officer. Aviation operations sergeants and specialists assist the flight operations officer. Their responsibilities include—

- Monitoring and briefing applicable portions of special instructions (also called SPINS) and the air tasking order relevant to operations.
- Providing relevant airspace coordinating measures to mission aircrews.
- Maintaining airspace overlay.
- Establishing and maintaining flight following net for unit aircraft, when required.
- Coordinating ATS requirements.
- Maintaining the aircrew information reading file.
- Maintaining the flying-hour program and individual flight record folders.

Aviation Mission Survivability Officer

6-7. The aviation mission survivability officer (AMSO) is the commander's primary advisor and tactical and technical expert on aviation mission analysis for tactical employment of Army aircraft, aircraft combat survivability, and personnel recovery including TTP designed to reduce aviation mission threat risk to the lowest extent possible. AMSOs are critical staff officers who participate in all phases of the operations process. The AMSO conducts combat survivability analysis throughout tactical aviation operational planning. The AMSO provides support to the intelligence section, characterizing enemy threat capabilities and limitations that affect the commander's ability to conduct aviation missions in the assigned area of operations. The AMSO assists in the integration of aviation operational airspace requirements into theater and joint airspace control systems. The AMSO also assists in integrating joint capabilities to Army Aviation operations. AMSOs are responsible for training programs with respect to aviation survivability, personnel recovery, and the AMPS.

Aviation Master Gunner

6-8. The aviation master gunner is the primary advisor to the commander for aircraft gunnery training programs. The aviation master gunner assists, advises, implements, and executes live fire training, qualification, and proficiency exercises to meet unit readiness standards. The aviation master gunner also assists the AMSO in selection of weapons and employment techniques during the mission planning process. They assist the S-3 in forecasting and allocating ammunition and monitors gunnery training device usage. They also develop gunnery training to include realistic target arrays and coordinates scheduling with local range-control officials. During training events, the aviation master gunner serves as the primary scorer/evaluator on unit live-fire ranges. The aviation master gunner works with the armament officer ensuring the readiness of the unit's helicopter armament.

Chemical, Biological, Radiological, Nuclear, and High Yield Explosives Officer

6-9. The CBRN officer advises the commander on CBRN operations, which includes assessing and protecting against and mitigating the entire range of CBRN threats and hazards. The CBRN officer works directly for the S-3 and is responsible for integrating CBRN into all aspects of operations. The CBRN officer may have other S-3 section responsibilities and can act as an assistant S-3 or battle captain when directed.

6-10. The Explosive Ordnance Disposal (EOD) officer advises the commander on high yield explosive operations, which includes assessing and protecting against and mitigating the entire range of explosive ordnance threats and hazards. The EOD officer works directly for the S-3 and is responsible for integrating EOD into all aspects of operations. The EOD officer may have other S-3 section responsibilities and can act as an assistant S-3 or battle captain when directed.

Aviation Operations Sergeant

6-11. The aviation operations sergeant is concerned with the technical aspects of flight operations. They also act as the operations platoon sergeant. The duties of the aviation operations sergeant are to—

- Coordinate mission requirements.
- Requisition FLIPs.
- Assist aircrews in processing flight plans and manifests.
- Ensure the availability of current flight and weather information.
- Supervise the maintenance of individual flight logs and records and operations maps and charts.
- Ensure that personnel observe operations security (OPSEC) procedures when using communications equipment.
- Supervise the work of subordinates in installing, operating, and/or maintaining platoon and/or section vehicles and equipment.
- Manage search and rescue procedures for overdue aircraft.
- Assist flight operations officer on flying-hour reports.
- Provide and monitor training for aviation operations specialists.

Aviation Operations Specialist

6-12. The senior aviation operations sergeant or the aviation operations sergeant supervises the operations of the aviation operations specialist. The duties of the aviation operations specialist are to—

- Update the NOTAMs.
- Interpret and process flight plans.
- Maintain individual flight record folders.
- Post current flight and weather information.
- Maintain the aircrew and aircraft status boards.
- Maintain functional files and type correspondence pertaining to operations.
- Maintain and operate assigned vehicles and equipment.
- Assist in search and rescue procedures for overdue aircraft.

- Post changes to the aircrew reading file.
- Issue, receive, and inventory items as required by the unit SOP.

TACTICAL COMMAND POST

6-13. The tactical command post is a facility containing a tailored portion of a unit HQ designed to control portions of an operation for a limited time (See FM 6-0 for more information). The tactical command post is established to enhance mission command of current operations and includes, at a minimum, operations, fire support (also called FS), and intelligence staff representatives. It monitors the battalion and higher HQ command and operations and intelligence (also called O&I) nets. When employed, tactical command post functions include, but are not limited to—

- Monitoring and controlling current operations.
- Monitoring and assessing the progress of higher and adjacent units.
- Performing short-range planning.
- Providing input to targeting and future operations planning.

6-14. The tactical command post is fully mobile and small in size to facilitate security and rapid and frequent displacement. Its organizational layout, personnel, and equipment is mission variable dependent and should be detailed in the unit SOPs. The tactical command post must be augmented to operate on a continuous basis.

6-15. While the S-3 section is responsible for the tactical command post it is normally comprised of the command group, intelligence section, S-3 section, and the fire support (also called FS), cell. Augmentation may also include the standardization officer, AMSO, ASO, air liaison officer, S-1 and/or S-4 (if the main CP is displacing).

6-16. METT-TC (I) may dictate that an effective tactical command post operates from a C2-equipped UH-60. In this situation, the number of personnel must be reduced.

AVIATION LIAISON TEAM

6-17. Liaison teams from the S-3 liaison element represent the battalion at the HQ of another unit to facilitate coordination and communication between the units. Preliminary air-ground coordination at brigade combat team level is executed by the brigade aviation element at the respective brigade combat team HQ. Aviation liaison teams are organic to the aviation battalions and represent their units as directed to facilitate air-ground operations and planning. Although a brigade aviation element conducts many of the functions traditionally performed by liaison officers (LNOs), the aviation liaison team remains a critical part of the operations process and execution of air ground operations.

6-18. An experienced LNO heads the team. The LNO must be well versed in all aspects of aviation operations. The team is expected to act as a cell in planning and battle tracking, so operations can continue in the absence of the LNO. The battalion should certify liaison teams via a standard process before deploying to a supported unit.

6-19. LNOs participate in the supported unit's operations process ensuring aviation is effectively integrated into planning. LNOs ensure supportability of the course of action and relay a clear task and purpose to the parent aviation unit. Battalion commanders empower LNOs to act on their behalf and ensure liaison teams are fully resourced. LNOs maintain positive two-way communications with their parent aviation unit and do not commit assets or approve changes to a plan without coordinating with the aviation battalion S-3 or commander. LNOs perform the following tasks:

- Understand and incorporate capabilities, limitations, and tactical employment of aviation assets.
- Assist in the preparation of aviation estimates, plans, orders, and reports.
- Assistance in planning aviation missions.
- Coordinate with airspace users and the higher airspace element for airspace management.
- Maintain the operational status of aviation assets and their impacts on the supported unit's mission.
- Inform appropriate aviation units of current and possible future operations.
- Maintain continuous communications with aviation units supporting the ground unit.

6-20. Liaison teams must have access to current battalion status information to provide the most accurate picture of aviation capabilities. Constant communication with the parent unit is essential for updates on aircraft, maintenance, aircrews, and FARP status.

6-21. Liaison teams must be properly equipped and manned to support 24-hour operations. Minimum equipment includes—

- Compatible automation equipment to provide connectivity between supported unit and battalion HQ.
- Necessary vehicles and equipment required to operate on the move.
- Two single channel air-ground radio system radios and supporting antennas/equipment to monitor command nets and communicate with aviation units.
- Map of the AO with supporting battle-tracking tools and equipment.
- Aviation FMs, SOPs, charts (equipment weights), and checklists (movement tables) to assist in aviation planning and integration.

FIRE SUPPORT ELEMENT

6-22. The fire support element is organized under the attack/reconnaissance aviation battalions and provides fires planning, coordination, and execution. The principal officer of this section is the FSO. The FSO provides fires integration for the scheme of maneuver by developing a scheme of fires and leading the targeting working group in close coordination with the S-3 and commander. Both missions are critical to the success of aviation operations. The FSO plans, controls, and synchronizes all fire support for operations. They coordinate Army and joint suppression of enemy air defenses and integrates and coordinates offensive information operations into fire support planning. They work with the S-3 and airspace control element regarding field artillery firing unit locations and changes to FSCM and airspace coordinating measures. The FSO maintains digital and voice communications with supporting artillery.

MISSION SCHEDULING

6-23. Mission scheduling is a major responsibility of the operations section. The S-3 determines which element within the battalion is best qualified to perform the mission; however, missions are normally assigned as required by the SOP. A close working relationship between company commanders and operations personnel ensures the most qualified personnel are assigned missions. Commanders and operations officers must continually update flight crew availability, proficiency, currency, and crew rest requirements.

6-24. The battalion S-3 receives mission requests from supported units and transmits them to the unit flight operations of the tasked unit. These missions are entered on a mission request form maintained by flight operations. Flight operations maintains unit flight schedules for all flights. The S-3 reviews mission requests ensuring they are within unit capabilities and at an acceptable risk.

6-25. Commander reviews mission requests and selects crews for each mission; operations then assigns aircraft for each mission. Operations is responsible for making initial contact with the supported unit and obtaining mission details. Commanders or flight crews follow-up with unit points of contact completing pre-mission coordination. Commanders, platoon leaders, or the authorized briefing officer will—

- Conduct a preliminary pre-mission brief for each crew.
- Analyze missions identifying hazards, assessing risk, and implementing control options to reduce risks to the lowest levels.
- Explain the procedures for aborted missions.
- Keep operations informed of mission progress.

6-26. Aircrews complete after action reviews (AARs) and forward them to operations. Aircrews use DA Form 5484 (*Mission Schedule/Brief*) for the AAR vehicle as per AR 95-1. Conflicts are resolved by the S-3 or commanding officer prior to mission assignment.

MISSION BRIEFING

6-27. Missions, including single-ship or single-pilot missions, are briefed by the commander or their designated representative that interacts with the mission crew or air mission commander to identify, assess, and mitigate risk for the specific mission. Mission briefers are authorized to brief regardless of risk level. (Manned) briefing officers must be a qualified and current pilot in command (also called PC) in the mission profile as determined and designated by the commander. (Unmanned) briefing officers are leaders designated by the commander. If the designated individual is an UAS operator, they will be a qualified and current aircraft commander. Pilots must understand the precise nature and execution of the support and command relationships affecting the mission. Aviation units supporting ground or other aviation units are designated attached, (also called OPCON), direct support (also called DS), or general support (GS) with the command relationships and responsibilities associated with these terms.

6-28. When aircrews are separated from their parent units, supporting, and supported unit commanders coordinate and designate command relationships to execute the mission briefing. If there are no significant changes to mission parameters, briefings are not required for each individual aircraft flown. Briefings follow the operations order format and include the information in Table 6-1.

Table 6-1. Mission briefing format

Situation
Weather
Current weather. Forecast weather.
Special environmental considerations
Threat. Friendly units. Other aviation operations in the area. Attached or detached units.
Mission
Mission statement. Mission unit. What is to be accomplished. Mission start time and duration. Where the mission will take place.
Execution
Describe how the mission will be conducted. Specify the execution parameters and limits. Type of mission. Flight conditions authorized. Modes of flight authorized. Aircraft and crew assignment. Mission specific equipment. Passenger, cargo, and ammunition loads. Flight routes.
Restrictions. Brief any restrictions not already covered
Safety
Service support
Refueling and/or rearming locations. Ration support. Assembly area, bivouac, and remain overnight locations. Maintenance support.
Command and signal
Command. Designate the pilot in command, flight commanders. Chain of command in effect, if other than the normal. Signal. Brief frequencies, special signals, or code words.

MISSION BRIEF-BACK

6-29. Mission brief-backs are given to the original mission briefer by the pilot in command (also called PC) or flight commander. Brief- backs ensure a clear understanding of the mission and execution parameters, verifying all pre-mission planning was accomplished. Brief-backs include—

- Restated mission to include information developed during planning phase causing deviations.
- Weather. Verify current and forecasted weather meet minimums.
- Crew rest status.
- Estimated mission completion time.
- Aircraft status.
- Special mission equipment.
- NOTAMs.
- Passenger, cargo, and ammunition loads.
- Passenger manifests.
- Flight routes.
- Refueling points.

POST-MISSION BRIEFING

6-30. Pilots in command (also called PCs) and flight commanders give post-mission briefings to the chain of command or S-3. Post-mission briefings consist of the following:

- Mission status (mission complete or not complete with explanation including significant changes).
- Weather. Pilot weather report for significant changes from forecasted weather.
- Crew rest status.
- Aircraft status.
- Maintenance.
- Fuel.
- Ammunition.
- Remarks. Provide any information that may impact future missions.

MISSION COMPLETION DEBRIEFING

6-31. On mission completion, aircrews complete AARs and are debriefed by platoon leaders or a designated representative. Debriefings provide commanders with critical information obtained during missions. Debriefs or AARs include—

- Estimate of mission results and degree to which mission was completed.
- Enemy activity encountered (who, what, when, where).
- Damage and casualty report.
- Aircraft damage and personnel casualty report.
- OPSEC violations.
- Safety hazards not previously identified.
- Other information of value.

OPERATIONS TRAINING AND EVALUATION

6-32. Aviation operations specialists (15P) should be evaluated when arriving in the unit. This evaluation determines their ability to perform tasks at the appropriate skill level. Tasks involving Centralized Aviation Flight Records System should also be evaluated. Tasks that cannot be adequately performed should be incorporated into a formalized on-the-job training program.

AIRFIELD OPERATIONS TRAINING

6-33. The operations officer and operations sergeant are responsible for ensuring assigned personnel are adequately trained and competent in all aspects of unit operations. Training must be conducted prior to unit deployments.

6-34. Training requirements include, but are not limited to:

- Army airfield/Army heliport organization (AAF/AHP), roles, and responsibilities.
- Physical security.
- Airfield criteria (pavement, signs, lighting, markings, obstructions, imaginary surfaces).
- Procedures for conducting airfield inspections and checks.
- AAF/AHP construction management.
- FOD prevention.
- AAF/AHP hazard analysis and risk management.
- AAF/AHP condition reporting.
- Aircraft rescue and firefighting operational requirements.
- Establishing and monitoring flight-following activities.
- Monitoring and supervising normal administrative flight operations functions.
- Handling HAZMAT.
- Wildlife hazard management.

TACTICAL OPERATIONS TRAINING

6-35. Before the unit conducts operations in a tactical environment, the operations sergeant should develop an operations training plan based on the unit mission essential task list and tactical SOP. The plan should begin with an evaluation of operations personnel identifying training strengths and weaknesses. The operations sergeant is responsible for training assigned personnel in the following duties:

- CP security.
- Setup and teardown of the CP.
- Manual and electronic overlay development and maintenance.
- Correctly completing and timely submission of unit reports.
- Missions review and processing.
- Mission compliance with airspace coordinating measures.
- Proper equipment operation and maintenance.
- Establishing and monitoring search and rescue (SAR) procedures.
- Establishing and monitoring advisory activities.
- Monitoring and supervising normal administrative flight operations functions.
- Assist in developing a pre-accident plan.
- SAR operations.
- MEDEVAC operations.
- Crash rescue and downed aircraft procedures.
- Miscellaneous support operations (such as water, fuel, meals, trash collection, and courier).
- Advance party operations.

PERSONNEL TRAINING

6-36. Shift supervisors are responsible for the training and conduct of aviation operations personnel assigned to their shift. Their training duties include—

- Coordinating advisory activities.
- Coordinating SAR procedures.
- Maintaining noise, light, and litter discipline.

- Use of proper radio operating procedures.
- Properly maintaining flight records.
- Maintaining control of the command post environment by limiting personnel access.
- Ensuring digital and analog maps are posted and updated with the most current graphics in a timely manner.
- Ensuring appropriate records, reports, and other documentation are maintained during training exercises and combat operations per unit SOP. Accuracy and validity of these records and reports are vital for providing commanders with situational awareness and unit status. Reports trained by operations personnel include, but are not limited to:

  - CBRN report.
  - Spot report.
  - Weather report.
  - Closing report.
  - Casualty report.
  - Fuel status report.
  - Combat loss report.
  - Vehicle status report.
  - Aircraft status report.
  - Flying-hour report.
  - Ammunition status report.
  - Aircraft accident and incident report.
  - Sensitive item report.
  - Unit FARP location and status report.
  - Downed aircraft report.

COMMAND POST TRAINING

6-37. Operations personnel should be trained in command post operations. Training is conducted according to FM 6-0. Personnel should also attend the Joint Firepower Control course and Echelons Above Brigade Airspace course.

DRIVER TRAINING

6-38. Drivers and assistant drivers should be trained and licensed in the type of vehicles, trailers, and life support equipment assigned to the operations section. Drivers' training consists of:

- Safety and management of risk.
- Load plans.
- Vehicle preventive maintenance checks and services (PMCS).
- Radio procedures.
- Convoy operations.
- Ambush procedures.
- Vehicle emplacement.
- Cover and concealment.
- Blackout driving procedures.
- Night vision device driving.
- CBRN detection and decontamination procedures.
- Vehicle recovery operations and emergency repairs.

GUARD AND GUNNER TRAINING

6-39. Guard and gunner training consists of:

- Range cards.
- Fighting positions.
- Perimeters of fire.
- Air guard procedures.
- Cover and concealment.
- Perimeter guard and command post security.
- Challenge and password procedures.
- Enemy prisoner of war procedures.

RADIO AND COMMAND POST INFORMATION SYSTEMS

6-40. Radio and command post information systems operators should be trained and proficient in all warfighting function systems available to the unit and radio procedures such as the following:

- Radio net procedures.
- Antenna setup and siting.
- Radio and equipment PMCS.
- Signal operation instructions and secure equipment usage.
- Digital CP systems interoperability.

POWER GENERATION SYSTEM TRAINING

6-41. Power generation system training includes:

- Generator PMCS.
- Safety procedures.
- Generator operations.
- Setup and siting procedures.

AVIATION MISSION PLANNING

6-42. Refer to ATP 3-04.1 for detailed information addresses aviation mission plan processes and procedures.

PLANNING

6-43. This section discusses brigade and below mission planning and the AMPS.

Brigade and Battalion

6-44. The brigade and battalion use the AMPS to perform tasks to prepare a plan that is supportable and fits in the ground commander's scheme of maneuver. It is also used to transmit these plans into the mission command system for deconfliction of airspace. Aviation battalion ATC sections plan the emplacement of mobile ATS equipment and NAVAIDs and develop emergency recovery procedures with initial TERP data to serve the airfield, airstrip, LZ, or FARP with METT-TC (I) considerations. Transient aircrews can initiate and change flight and mission plans while at an airfield serviced by an aviation battalion.

Company

6-45. The company mission planner is used to conduct rehearsals and select battle positions, routes from the release point, routes to rally points, AOs of fire, and other company details to complete the plan. The company also uses the mission planner to load data cartridges that aircrews take to each individual aircraft to load mission parameters into their aircraft mission computers.

SYSTEM

6-46. The primary function of the AMPS is to manage mission planning data and load Army aircraft with mission data via data transfer devices. The AMPS provides the aviation commander, their staff, LNO(s), aviators, and AOBs with the ability to automate all mission planning tasks providing greater accuracy, timeliness, and efficiency over manual processes. AMPS tools can assist the commander's visualization of the operational environment through graphic portrayal of many of the mission variables consisting of METT-TC (I).

6-47. The AMPS is a multi-layered system of several separate but tightly integrated components covering a wide range of mission planning tasks. AMPS components include FalconView, Xplan, and other AMPS tools.

FalconView

6-48. FalconView displays several types of charts, maps, imagery, and digital terrain elevation data (DTED) to provide detailed terrain information for the operational environment. FalconView contains tools for plotting local points of interest, drawing items, threats, tactical graphics, obstacles, and other flight planning items. It arranges these items in overlays to allow tailoring the display. FalconView includes tools for analyzing terrain, computing range and bearing, and managing digital flight information files (DAFIF), FLIPs, and vertical obstructions. FalconView provides a system health interface to assist planners in maintaining current charts and flight data.

Xplan

6-49. Xplan is a group of tools that form the core of the route planning functionality of the AMPS. Xplan includes Xplorer, Xprint, and a vehicle editor.

6-50. Xplan's main user interface is Xplorer, a tailorable grid that provides a means to input route information and select and tailor vehicle configuration for the route. Xplorer calculates time, distance, heading information, and aircraft performance for each leg of the route. Xplorer interfaces with DAFIF data to allow users to insert waypoints, NAVAIDs, airways, departures, arrivals, and approaches into the route automatically.

6-51. Xprint is the print engine for Xplan. Xprint populates and prints forms for kneeboard mission packets organically or through Excel. Users can tailor Xprint forms with an included form designer.

6-52. Xplan's vehicle editor includes standard Army helicopters, a generic aircraft, and generic ground vehicles. Users can tailor vehicles to match configurations of their unit's specific tail numbers in order to calculate performance data more accurately.

Other AMPS Tools

6-53. The AMPS adds a communications planner and aircraft, weapons, and electronics (AWE) components for each current model and software version of Army helicopters. The AMPS also includes an Army Interoperability Module (AIM) to connect to other Army mission command systems.

6-54. The communications planner manages call sign and frequency data for voice radios and other data for digital communication between manned and unmanned platforms.

6-55. The AWEs arrange flight data and load them to data transfer devices for use in Army aircraft. AWEs tailor data to specific mission, design, and series (MDS) and software version. AWEs load navigational databases, route information, digital communication subscriber identification, Blue Force Tracker, unit table of organization and unit reference numbers, digital maps for aircraft displays, target coordinates, laser codes, and settings for sensors and weapons.

6-56. AIM connects AMPS to Army mission command systems including the tactical airspace integration system (also called TAIS). AMPS connects to mission command information systems (also called MCIS) by using AIM and tactical airspace integration system (also called TAIS).

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Chapter 7
Installation Airfield Management

The safe and efficient management of airfields enhances operations and allows Army Aviation units to concentrate on mission readiness and training. The ratio of military to civilian airfield operations personnel varies greatly from one installation to the next. A majority of fixed-base installation airfields are managed and operated by DA Civilians. Except for select locations, Soldiers are primarily used in a training and augmentation manner in these fixed-base facilities. This chapter describes organization and staffing for both military and civilian airfield operations positions; however, the command for each airfield will ultimately determine personnel requirements necessary for daily operations.

ORGANIZATION

7-1. The command element of the airfield has supervisory and management authority for airfield functions. Day-to-day operations of the ATC facility are under the control and authority of the airfield chain of command or ATC parent unit depending on the airfield's mission and location. Airfield operations at locations managed and operated by DA Civilians will use AR 95-2 for policy and guidelines as the primary source document. This ATP may be used to expand on the guidance provided in the primary source document, however, the regulatory policy remains in AR 95-2.

AIRFIELD DIVISION

7-2. The airfield division consists of airfield operations, airfield safety office, ATC, and ATC maintenance branches. The airfield division chief is overall responsible for all airfield functions at primary and secondary airfields, heliports, and helipads within the division. Normally, the airfield division chief is the airfield manager for the primary airfield. In this situation, the airfield division chief performs all functions and tasks as noted below.

7-3. The airfield division's staff consists of an airfield manager (at secondary airfields), airfield operations officer, airfield safety officer, ATC maintenance chief, and ATC chief. Appropriate administrative staff may also be assigned. When there is only one airfield at the installation, the airfield division chief performs all functions of the airfield manager.

AIRFIELD DIVISION CHIEF/COMMANDER/MANAGER

7-4. The airfield division chief/commander/manager should have a strong aviation, airfield, airspace, and/or ATC background with a minimum of three years of experience in airfield operations and completion of a military or civilian airfield manager's course is highly recommended. The airfield division chief/commander/manager is responsible for tasks stated in AR 95-2 including, but not limited to—

- Overseeing the operation and condition of the airfields within the scope of the appointment.
- Managing AAFs or AHPs in accordance with applicable Army regulations, UFCs, and engineer technical letters. Applicable FAA advisory circulars may be used as guidelines in the absence of specific Army guidance.
- Providing guidance and information at installation planning board meetings concerning airfield facilities, operations, and construction.
- Providing representation at installation aviation safety and standardization council meetings.
- Developing and implementing an airfield/heliport safety program.

- Conducting daily and annual airfield inspections to ensure a safe airfield environment. (See appendixes C and D for checklists)
- Conducting an annual quality assurance self-assessment to ensure compliance with applicable directives and safe airfield operations.
- Processing civil aircraft landing permits and accomplishing appropriate actions (see para 9-27 and 9-28) in the event of an unauthorized civilian aircraft landing.
- Establishing noise abatement procedures (see AR 95-1).
- Coordinating with the Directorate of Public Works (DPW) for the maintenance and repair of RWYs, landing zones, TWYs, loading ramps, and parking areas on the airfield. Maintain unpaved areas in accordance with UFC 3–260–1.
- Working with local civil authorities, public relations personnel, and liaison officers concerning public relations matters (such as environmental issues, public events, and aircraft accidents or incidents).
- Coordinating with DPW for the maintenance and repair of RWYs, landing zones, TWYs, loading ramps, and parking areas on the airfield. Maintain unpaved areas in accordance with UFC 3–260–01.
- Coordinating with local contracting offices on airfield services not provided by permanent airfield facilities or DPW.
- Working with the Directorate of Human Resources and Civilian Personnel Advisory Center on matters relating to hiring, terminating, transferring, and evaluating civilian employees.
- Recommending and implementing airfield policy and providing guidelines for use of airfield property by tenant organizations (such as parking areas, hours of operation, airfield services, complaint procedures, and interorganizational working agreements).
- Maintaining accountability of airfield installation property.
- Developing air crash, search, and rescue requirements in coordination with the airfield safety officer, medical personnel, firefighters, and other appropriate authorities.

7-5. Developing and implementing an airfield operations training program. The airfield management branch consists of an airfield manager position for secondary airfields at installations with more than one airfield. The airfield manager works directly for the airfield division chief and manages the secondary airfield under that authority.

AIRFIELD OPERATIONS BRANCH

7-6. The airfield operations branch consists of a base operations (BASEOPS) section, airfield services section, and POL services section.

7-7. The airfield operations officer should be an experienced airfield management/operations manager (civilian or military) and meet civilian hiring qualification requirements for this job specialty (GS-2150). If the position is filled by a Soldier, their training, qualification, and experience should match requirements as outlined in this ATP. The airfield operations officer is responsible for—

- Providing input to the airfield operations manual that pertains to aircrew procedures such as—
  - Filing flight plans.
  - Use of airfield services.
  - Joint use of airspace.
  - Airfield facility use.
  - Night operation agreements.
  - Noise abatement.
  - Other special interest areas.
  - Inspect airfield annually. See AR 95-2 appendix D for checklist.
- Supervising the BASEOPS section, airfield services section and POL services section.
- Ensuring local hazard maps are current.
- Ensuring airfield facilities are adequate and in good repair.

- Developing pre-accident plans in cooperation with the ATC chief, senior sergeant, airfield safety officer, airfield operations sergeant or lead airfield operations specialist, BASEOPS sergeant or airfield operations specialist, and other personnel from responding agencies.
- Reviewing personnel training programs for BASEOPS section, airfield services section, and POL services section.
- Recommending personnel for appointment to accomplish specific duties not covered in the general duty description.
- Ensuring proper courtesies and services are provided to distinguished visitors, very important persons (VIPs), and transient personnel using airfield facilities.

BASE OPERATIONS SECTION

7-8. The aviation operations sergeant (15P) or lead airfield operations specialist (GS-2150) must have knowledge of base operations and dispatch procedures and completed the Aviation Accident Prevention Course. Aviation operations sergeant or lead airfield operations specialist responsibilities include—

- Performing airfield management supervisory duties.
- Assisting the airfield operations officer.
- Assisting the airfield safety officer.
- Supervising the BASEOPS section.
- Writing SOPs for the airfield operations division and the BASEOPS branch ensuring they provide current information regarding immediate notification criteria.
- Assisting in the development of LOAs and letters of procedure (LOPs).
- Developing and executing a standardized airfield training program for current and newly assigned airfield operation specialists that emphasizes local operating procedures.
- Providing flight-planning services to include—
  - Current publications.
  - Maps and charts.
  - NOTAM display.
  - Weight and balance forms on each assigned Class II aircraft.
- Maintaining accountability for flight operation and dispatch installation property.
- Coordinating section activities under supervision of the airfield operations officer.
- Serving as the assistant airfield operations officer.
- Preparing work schedules for airfield operations specialists and ensuring adequate coverage during peak periods.
- Processing required reports concerning all airspace violations.
- Ensuring airfield advisory procedures are established per FAA Order JO 7110.10BB.
- Briefing all ground personnel operating near or on TWYs or RWYs regarding two-way radio communication procedures and ATC light signals found in the Aeronautical Information Manual and FAA Order JO 7110.65Z.
- Establishing and maintaining a FLIP account as outlined in AR 95-2.
- Ensuring VIP and transient facilities are clean, comfortable, and properly equipped.

7-9. The airfield operations specialist—

- Posts and disseminates NOTAMs.
- Provides mission support to tenant units.
- Transmits and records flight data.
- Advises the local control tower on proposed departures and arrivals.
- Initiates search and rescue coordination procedures.
- Notifies the operations sergeant/lead airfield operations specialist when an arriving flight is overdue, as required by the local SOP and overdue aircraft procedures.

- Notifies airfield services of estimated arrival and departure times to ensure timely servicing of aircraft.
- Notifies operations sergeant/lead airfield operations specialist of arriving and departing VIPs so proper honors can be extended.
- Disseminates weather watches, warnings and advisories to appropriate individuals or agencies according to local SOPs and emergency plans.
- Informs the operations sergeant/lead airfield operations specialist of any OPSEC violations.
- Inspects airfield daily to ensure a safe airfield environment. See AR 95-2, Appendix C checklists.
- Provides advisory service when the ATC tower facility is closed or not available.

AIRFIELD SAFETY OFFICE BRANCH

7-10. The airfield safety office branch consists of an ASO that works directly for the airfield division chief/commander/manager. The branch may include an assistant ASO at installations with more than one airfield or high operations volume. The airfield safety officer implements the airfield safety program for all airfields, heliports, and helipads within the airfield division.

7-11. The ASO should be a DA Civilian employee, occupational series GS-0018, and a graduate of the Aviation Safety Officer's Course or completed equivalent training. They are rated by the airfield division chief/commander/manager. Aviation safety officer responsibilities include—

- Representing the airfield division chief/manager/commander on all safety-related matters.
- Performing duties outlined in AR 385-10, DA pamphlet (DA Pam) 385-40,and TC 3-04.11.
- Investigating accidents or incidents involving aircraft or airfield personnel or equipment.
- Assisting the operations officer in writing the aircraft mishap plans.
- Conducting airfield safety inspections.
- Advising airfield personnel on safety-related matters.
- Scheduling and conducting safety meetings.
- Advising the airfield division chief/manager/commander of potential problem areas.
- Providing safety input to the local flying rules.

AIR TRAFFIC CONTROL BRANCH

7-12. The ATC branch consists of an ATC chief and facility chiefs for each type of facility located at the installation (such as, control tower, Army radar approach control, airspace information center, and/or ground control approach). The organization of the ATC branch depends on the number and type of NAVAIDs and services provided by the airfield.

7-13. AR 95-2 outlines the qualification requirements for the ATC chief. The ATC chief is responsible for— Supervising all ATC activities on and around the airfield including notifying the base operations branch of outages in navigational or communication systems so it can notify aircrews operating in the area.

- Providing input to the airfield operations manual on ATC-related matters.
- Developing and reviewing LOAs and LOPs
- Establishing ATC training programs.
- Coordinating with the operations division so aircrews fly maneuvers needed for ATC currency requirements.
- Nominating ATC control tower operator and ATC specialist examiners.
- Assisting the operations officer in writing aircraft or other mishap plans.
- Maintaining accurate air traffic records. These records help personnel investigate aircraft accidents or incidents, operational hazard reports, and missing aircraft.
- Administering ATC facilities per AR 95-2 and TC 3-04.15.
- Advising the air traffic and airspace (AT&A) officer on airspace matters and assisting them in performing their duties.

7-14. At Army airfields where unit missions impact the national airspace or host nation national airspace system, the appropriate commander will designate an installation AT&A officer per AR 95-2. The appointed person should be a member of the installation planning board. The AT&A officer's responsibilities include representing the installation on all airspace-related matters such as—

- Joint use airspace.
- Special use airspace (SUA).
- Altitude restrictions.
- Restricted areas.
- Range restrictions.
- Training areas.
- ATC procedures in areas of overlapping control.
- Joint service agreements.
- Providing input to the local flying rules on airspace-related matters.
- Maintaining liaison with local FAA and/or host government agencies.

AIR TRAFFIC CONTROL MAINTENANCE BRANCH

7-15. The ATC maintenance branch consists of an ATC maintenance chief and additional airfield maintenance personnel as required.

7-16. The ATC maintenance chief is responsible for all ATC equipment maintenance. Refer to TC 3-04.15 for additional information on ATC maintenance.

PERSONNEL CONSTRAINTS

7-17. Personnel organization and duties performed depend on the size and structure of aviation units the airfield supports. Airfields not having all positions outlined in the preceding paragraphs may combine positions and functional areas. Consolidation of functions can be accomplished only when the personnel selected meet all requirements of the position, and the size and traffic density of the airfields are compatible with a smaller staff. Over-consolidation can become a safety hazard and cause degradation of services. The following are typical consolidations and are recommended for small airfields:

- Airfield division chief and airfield manager.
- AT&A officer and the ATC chief position.

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Chapter 8

Flight Planning and Operations

An Army airfield is normally the hub for aviation operations, training, and support activities. Flight planning and operations provide a link for the aviation units and the airfield management and its organizations, ensuring the necessary and responsive airfield services are available to the aviation units.

ORGANIZATION

8-1. This section discusses the weather personnel and requirements, airfield operations branch, and other considerations. In addition, the BASEOPS section, staffing, equipment, and flight planning resources are also discussed.

WEATHER SECTION

8-2. The supporting weather unit provides weather forecasting and briefings to aircrews. If weather support is part-time or not available, a direct landline or defense switched network line to an approved weather facility is required. National Weather Service forecast offices may be contacted when other DOD weather providers (such as AF Weather) cannot be reached.

8-3. When weather services are not available, BASEOPS personnel will contact the nearest weather servicing facility to obtain local area hourly weather reports. These reports will be updated immediately when weather conditions occur that were not forecasted. Aircrews planning to fly outside the coverage area will contact the servicing weather facility for specialized weather briefings.

8-4. Local area weather briefings contain the following information:

- Date and valid times in Coordinated Universal Time (UTC).
- Cloud layers in hundreds of feet and sky coverage.
- Visibility (in local format) and obstructions to visibility.
- Surface wind direction and speed.
- Any forecast changes during the valid period, when changes are expected to occur, and any pertinent remarks.
- Area covered by the report in nautical miles.
- Weather watches, warnings, or advisories.
- Maximum surface temperature and pressure altitude.
- Minimum ceiling and visibility.
- Forecast surface turbulence and altitude where turbulence ends.
- Forecast icing at surface or low altitude.
- Forecaster and base operation dispatcher's initials.

8-5. Specialized weather reports may be required to provide the following information:

- Wind direction and speed and temperature data at intervals of 1,000 feet from the surface. (This information should be provided up to the highest altitude flown by aircraft operating in the area covered by the report.)
- Freezing level.
- Maximum temperature, pressure altitude, and density altitude in Fahrenheit and Celsius.
- Minimum temperature in Fahrenheit and Celsius.

- Sunrise and sunset times.
- Moonrise and moonset times and percentage of illumination.

AIRFIELD OPERATIONS BRANCH

8-6. An Army airfield is normally the hub for aviation operational and tactical aviation training activities. The airfield operations branch functions as the coordination link for the aviation units and each branch in the airfield organization. The airfield operations branch executes specific responsibilities assigned to it as part of the airfield operations organization. This chapter discusses functions and responsibilities of the airfield operations branch.

Base Operations Section

8-7. The BASEOPS section must be located near main aircraft parking areas and RWYs. All base operations services should be located in the same building. This allows for better coordination and services provided to airfield users. The flight planning room, pilots' ready area, VIP lounge, weather and flight operations section are normally co-located or within close proximity to each other. The BASEOPS section is responsible for processing flight plans and other air traffic related data through national and international air traffic systems.

Staffing

8-8. The number of specialists assigned to the BASEOPS section depends on the services provided, hours of operation, and Table of Distribution and Allowance (also called TDA) for the airfield.

8-9. A minimum of two persons shall be on duty during hours of operation. This requirement may be modified during periods of critical manning or as necessary. Shift personnel must not be scheduled for additional duties and details outside the scope of the flight dispatch function unless the above requirement has been met. This does not excuse or preclude personnel from completing military training requirements. Other important considerations and procedures include—

- Individuals working in the BASEOPS section must be assigned two-letter operating initials for use during daily operations.
- Comprehensive procedures are established to ensure a thorough shift change briefing is given to incoming shift personnel.
- Recording significant incidents occurring during each tour of duty. Airfield commanders must specify the items or issues that require documentation.

8-10. The lead airfield operations specialist assigns the operating initials and maintains a current list. No two people should be assigned the same operating initials. Operating initials usually are based on the first and last letters of the individual's last name.

Recommended Equipment

8-11. The recommended equipment for the BASEOPS section includes—

- Four-wheel drive or suitable vehicle for off-road use for the airfield manager, airfield safety officer, and staff.
- FM, UHF, and VHF radios for communications with personnel operating on the airfield (such as disaster response agencies, civil engineers, and the control tower).
- Emergency lighting equipment with an automatic back-up power generation system.
- Telecommunications equipment to process flight data and other air traffic information.
- Console with direct voice line communication with control tower, radar approach control, FAA, rescue agencies, supported aviation units, primary and secondary crash alarms system, and additional administrative circuits, as required.
- Classified materiel facilities capable of storing, issuing, and receiving.

- Current set of operating instructions and ready reference files available, as required by the airfield commander. These publications must have detailed operating instructions so airfield operations specialists can complete actions without referring to other directives.
- BASEOPS personnel must maintain local checklists, logs, or similar documentation to support functional area responsibilities. Examples of local instructions include procedures for airfield inspections, inbound and outbound aircraft, distinguished visitors, aircraft requiring special handling (such as air evacuation or hazardous cargo), airfield restrictions (such as prior permission required), crash alarm system, FLIPs, weather watches, warnings, and advisories, in- flight advisories and bird strike hazard responses.

Flight Planning Room

8-12. The airfield operations officer is responsible for establishing and operating a flight planning room. The flight planning room is a separate work area suitable for aircrew briefings and mission planning located near the weather office and flight dispatch desk. The area must be equipped with current aeronautical information enabling aircrews to complete self-briefings and flight planning. Airfield operations specialists are available to assist pilots and provide briefings on local arrival and departure procedures.

8-13. Physical space and equipment availability dictates how the flight planning room is furnished. The following equipment and furnishings are recommended:

- A telephone available for authorized use by aircrews.
- An installation and local telephone directory to include the number to the nearest weather facility.
- A chart listing important telephone numbers (billeting, transportation, mess hall, flight surgeon, maintenance, operations officer, and safety officer).
- One clock with dual time (UTC and local) or two clocks (one set on UTC and the other on local time).
- A flight-planning table large enough to lay out an entire en route chart or sectional navigational chart.
- Other items included in the flight planning room are an ear protection dispenser and pencil sharpener.

Flight-Planning Table

8-14. The table should be tilted up slightly with plexiglass or glass mounted on the table and a local area en route chart and sectional chart placed under the glass. Other items that could be placed under the glass for aircrew convenience are—

- Sample flight plans.
- Sample weight and balance forms.
- Other appropriate sample forms.

8-15. Table 8-1, page 8-4, provides a list of planning resources to be located at the flight-planning table.

Table 8-1. Flight planning resources

<table>
<tr><th>Blank Forms</th><th>Reference publications</th></tr>
<tr><td>DA Form 2696 (Operational Hazard Report).</td><td>Flight information publications</td></tr>
<tr><td>DD Form 175 (Flight Plan, Military)</td><td>Local airfield SOP</td></tr>
<tr><td>DD Form 175-1 (Flight Weather Briefing)</td><td>Aeronautical charts</td></tr>
<tr><td rowspan="2">DD Form 365-4 (Weight and Balance Clearance Form F-Transport/Tactical)</td><td>Airfield reading file</td></tr>
<tr><td>FAA regulations</td></tr>
<tr><td>DD Form 1801 (International Flight Plan)</td><td>Aircrew training manuals</td></tr>
<tr><td>Performance planning cards</td><td rowspan="2">Aircraft operator's manuals for each type of aircraft that normally uses the airfield</td></tr>
<tr><td>Flight computers and plotters</td></tr>
<tr><td colspan="2">Note: These are only a sample of reference publications. The local operational area may dictate additional materials be available.

Legend: DA= Department of the Army, DD= Department of Defense, FAA= Federal Aviation Administration, SOP= standard operating procedures.</td></tr>
</table>

Wall Displays and Charts

8-16. Wall displays and charts for planning and other aeronautical information pertinent to the airfield should also be located in the flight planning area. Examples include—

- Air crash and rescue and local crash grid map or overlays.
- Traffic pattern diagrams.
- VFR and IFR planning charts.
- Sectional aeronautical chart depicting the local flying area, military operating areas, special VFR corridors and altitudes, and traffic routes to and from other airports that may conflict with local or transient traffic.
- A 1:50,000 map of the installation showing range information, flight and wire hazards, and Nap-of-the-Earth (also called NOE) and instrument training areas. (This map should be updated, at a minimum, every 30 days. The latest date the map was updated should be posted on or near the map.)
- NOTAM system as prescribed in AR 95-10/AFI 11-208/OPNAVINST 3721.20D.
- Large-scale airfield diagram depicting RWYs, TWYs, ramps, aprons, field elevation, controlled movement area, precision approach critical areas, traffic pattern directions and altitudes, airfield obstructions, and other pertinent airfield information.
- Planning charts with a cord-type mileage indicator that shows statute and nautical miles.
- Weather briefings.
- Radio frequencies for ground control, tower, approach control, ground-controlled approach, and departure control.
- Nondirectional radio beacon frequencies for use in radio checks.
- Bulletin boards or displays containing pertinent flight information and reference material such as local IFR recovery and lost communication procedures.
- An airfield safety bulletin board containing current safety-related publications and posters should also be displayed.

OTHER CONSIDERATIONS

8-17. The pilot ready room should be established in an area easily accessible to the flight planning and dispatch facilities. It should be furnished with comfortable furniture. If a snack bar or eating facility is not available in the immediate vicinity, food- and drink-dispensing machines should be placed in the ready room. Class A telephones should be made available with installation phone numbers displayed.

8-18. Airfield operations personnel in the BASEOPS are responsible for—

- Transmitting flight plan proposals by Service B or F to the regional flight service station.
- Providing airfield advisory service to aircraft that use the airfield when the control tower is nonoperational.
- Transmitting flight movement messages per AR 95-11/AFMAN 11-213/NAVAIR 00-80T-114 and FAA Order JO 7110.10BB. Military and civilian United States based airfields use FAA communication systems.

8-19. Military airfields based outside the United States may have additional requirements placed on them by host nation air traffic procedures. In those cases, a host nation LOA pertaining to air traffic service support may be required.

8-20. The flight service communications system is a series of microprocessors located at air route traffic control centers (ARTCCs) nationwide. The microprocessors are connected by high-speed circuits to the aeronautical fixed telecommunications network computer in Kansas City, Missouri. Remote BASEOPS and FAA facility users are connected to a microprocessor at their host ARTCC. These microprocessors are known as Service B. Service B is part of the National Airspace Data Interchange Network. Service F is a system of interphone circuits used as a backup system to Service B or when a BASEOPS or FAA facility does not have a Service B capability. Service B or interphone circuits interconnect all stations. Military airfield tie-in services are described in FAA Order JO 7350.9CC. Military BASEOPS send flight movement messages to the appropriate military BASEOPS and tie-in FAA facilities. The tie-in FAA facility relays movement messages to and from the sending BASEOPS when necessary.

AIRFIELD MANAGEMENT RESPONSIBILITIES

8-21. This section discusses the responsibilities of airfield management regarding airfield recreational use, authorization to land foreign owned aircraft, joint use airfields, airfield markings, and snow and ice removal.

AIRFIELD FACILITY RECREATIONAL USE

8-22. AR 215-1 contains the rules that govern the operation of flying clubs. When an Army flying club is established, the airfield operations officer may be responsible for carrying out supervisory and administrative duties. The operations officer will assist the flying club in establishing local flying rules and safety programs. They ensure FAA rules and regulations are followed. BASEOPS will provide the flying club with DOD FLIPs at the level authorized by AR 95-2.

AUTHORIZATION TO LAND FOREIGN OWNED/OPERATED AIRCRAFT AT ARMY AIRFIELDS

8-23. All foreign aircraft operators landing at Army installations in the United States must obtain an Army aircraft landing authorization number (also called AALAN). AR 95-2 outlines the required procedures for obtaining an Army aircraft landing authorization number. This requirement ensures security, diplomatic coordination, customs control, and liability protection. If an unauthorized foreign aircraft lands at an Army installation, the following information (if known) is relayed to the United States Army Aeronautical Services Agency for coordination with the state department:

- Type of aircraft.
- Tail number.
- Call sign.
- Name of pilot.
- Total number of personnel in crew.

- Total number of passengers (also identify VIPs or special passengers and any honors or special requests).
- Purpose of trip.
- Aircraft itinerary, estimated time of arrival, location, and estimated time of departure foreach stop. (Identify location of United States customs stop.)
- Hazardous cargo and number of weapons onboard for each leg of flight.
- Requirements for fuel or services at each stop.
- Method of payment for fuel and services.
- Additional remarks or special requirements (such as hotel reservations or ground transportation requests).
- Point of contact and telephone number.

JOINT USE AIRFIELDS

8-24. A joint use airfield is an Army installation where agreements exist between the Army and civil authorities for civil aviation use of Army airfield facilities. AR 95-2 contains information on the policies and procedures for joint use airfields. Civil aircraft are not permitted to use an Army airfield unless they possess an approved civil aircraft landing permit. AR 95-2 outlines requirements for obtaining civil aircraft landing permits. Operations personnel should require the pilot of a civil aircraft to send an approved CALP to operations before granting a prior permission required (Also called PPR).

AIRFIELD MARKINGS

8-25. UFC 3–260–04 contains criteria for marking airfields. This publication dictates the proper procedures for layout and marking of a new airfield. This section covers specific information on repainting existing markings.

Color Markings

8-26. RWYs will be marked with white reflective paint. TWYs will be marked with yellow reflective paint. Paint used to mark or re-mark RWY and TWY pavement will conform to the criteria in UFC 3–260–04. Markings will be painted on paved areas only after the pavements have been allowed to cure thoroughly. The pavement surface must be dry and clean before the paint is applied.

8-27. Markers and markings will be used to indicate usable limits of snow-covered RWYs. Markers will be spaced at intervals of not more than 330 feet and located symmetrically about the axis of the RWY along the sides of the usable portion. Sufficient markers will be placed to indicate the RWY threshold. Markers must be kept free of snow and grime.

Compass-Swinging Bases

8-28. Compass-swinging bases are not required on Army airfields. However, when constructed and operational, they must be equipped according to UFC 3–260–04. These bases align an aircraft for the precise calibration of all types of air navigation equipment. The compass-swinging base pad will be marked with precision alignment indicators that are accurate to within 0.25 percent of 1 degree. A minimum distance of 275 feet will be provided from the center of the compass-swinging base pad to the nearest significant quantity of iron and TWY or engine run-up area. The same distance will be allowed from the center of the pad to the nearest parking area or hardstand for aircraft, vehicles, or equipment. Compass-swinging bases will be painted with nonreflective white paint.

Air Navigation Obstruction Marking and Lighting

8-29. Obstruction marking and lighting will be limited to objects that penetrate the clearance planes and surfaces described in UFC 3-260-01and, by their nature and position, constitute a hazard to navigation.

8-30. Obstruction markings should never be placed on objects that are not obstructions. Obstruction marking will be made with aviation surface orange or a combination of aviation surface orange and aviation surface

white. Obstruction marking patterns may be solid orange, alternate bands of orange and white, checkerboard pattern, or beach ball pattern. FAA Advisory Circular 70/7460-1M contains specific instructions on which pattern to use. Obstruction lighting will be according to UFC 3–260–04 and FAA Advisory Circular 70/7460-1M. Wheel chocks will be marked on all sides with a yellow reflective paint or tape.

Fire Hydrants

8-31. Fire hydrants will be painted per Army installation design standards. Flow capacity will be indicated by color scheme per NFPA 291, flow testing and marking of hydrants. As a minimum, there shall be a 360-degree, color coded, light reflective band on the bonnet of all hydrants.

Fire Extinguishers

8-32. All fire extinguisher containers will be red or the color required by local fire prevention standards. Each extinguisher will be marked with a symbol designating the class of fire for which it is intended. (Class A, B, C, or D fires will be marked as established in NFPA Standard 10.) Multiple symbols will be placed on the extinguisher if it is suitable for more than one class of fire. The symbols must conform to the configurations in NFPA Standard 10. Fire extinguishers placed in an area that has aircraft movement will be marked near the top by a 4-inch-wide strip of reflective tape encircling the extinguisher. If a fire extinguisher is stored in a shelter that adjoins areas used by aircraft or aircraft-servicing vehicles, the shelter will be painted with nonreflective red paint and marked with a 4-inch-wide strip of reflective tape along its length.

Airfield Maintenance

8-33. Housekeeping of the grounds around the operations building and parking areas will be accomplished to ensure FOD materials are policed and disposed of properly. The first impression of an airfield is often a lasting impression; therefore, a neat and orderly appearance of the airfield and facilities must be maintained. Important considerations include—

- Fire extinguishers should be checked for broken seals and proper charging. They must be taken annually to the firefighting facility for recharging. Other checks will be conducted according to Technical Bulletin 5-4200-200-10.
- Aircraft tie-down ropes and anchors will be inspected periodically for serviceability. These anchors secure parked aircraft during periods of high ground winds. Each of the tie-downs (or mooring points) shall only be used as a ground if they've been tested with proper documentation every five years and properly marked according to ATP 4-43.

8-34. A plan should be established for periodic sweeping of RWYs, TWYs, and ramp areas. This plan should include procedures for mowing grass on the airfield.

Airfield Inspection

8-35. Daily and periodic airfield inspections will be conducted and documented per AR 95-2 to ensure quality service and facility maintenance. Inspection checklists should include those items essential to maintaining a well-organized and functional airfield. The checklists should be expanded or modified to suit the airfield. Checklists should be furnished to the branch chiefs to ensure they fully understand their duties.

8-36. Department of Public Works personnel should inspect the extended RWY centerline annually. They will resolve any disparity between the painted RWY numbers and actual magnetic heading of the extended RWY centerline. Air traffic facility managers will annually review and update RWY centerline heading information. They will also review any local departure procedures that might be affected by heading changes.

Vehicle Movement and Markings

8-37. Vehicle movement on the RWY will be held to the minimum required for RWY inspection and maintenance. Airfield operations/management and airfield safety vehicles that operate regularly on the airfield shall be equipped with a rotating beacon or strobe light system atop the vehicle. Other vehicles that operate on the airfield shall have, at minimum, a flag displayed atop the vehicle to assist aircraft crew and/or air traffic controllers in identifying the vehicle. The flag must be at least 3-foot by 3-foot square having a

checkered pattern of international orange and white squares at least 1 foot on each side. ATC light signals descriptions will be displayed on the dashboard of vehicles that regularly operate on the airfield. Vehicle operation near POL and aircraft refueling areas will be closely supervised. Sparks from the exhaust systems of these vehicles can create a hazardous situation. ATP 4-43 describes the use of spark arresters for internal combustion engines.

8-38. The maximum speed limit for all vehicles on the flight line is 15 mph (excluding emergencies). The maximum speed limit for all vehicles operating within 25 feet of an aircraft is 5 mph, however, the speed of vehicles will not exceed 3 mph (walking speed) when within 10 feet of the aircraft, to include movement inside the aircraft. Drivers of vehicles that operate on ramps, TWYs, or RWYs will have on file evidence of satisfactorily passing a written examination. The examination will include clearance requirements between aircraft and vehicles, light signals, and radio procedures if vehicles are so equipped. All drivers for the Airfield Services Branch should possess the appropriate military driver's license and special authority to operate on the airfield movement area.

Exception: Airfield Operations may exceed 15 MPH while performing runway condition reading checks, and wildlife hazard response activities, commensurate with safety.

8-39. Good preventive maintenance procedures enhance efficient operations. AR 420-1 contains criteria and responsibilities for initiating and accomplishing preventive maintenance programs. TM 1-1500-204-23-1 and TM 1-1500-204-23-2 contain standard inspection and maintenance procedures for auxiliary power units, maintenance workstands, portable air compressors, aircraft jacks, and other ground support equipment.

Snow And Ice Removal

8-40. At installations where snow and ice may constitute a hazard, AR 420-1 requires establishment of a snow removal and ice control plan. This plan will include instructions and procedures for—

- Establishing priorities for prompt removal or control of snow, ice, and slush on each movement area.
- Positioning snow from movement area surfaces so aircraft propellers, engine pods, rotors, and wingtips will clear any snowdrift and snowbank as the aircraft landing gear traverses any full-use portion of the movement area.
- Selecting and applying approved materials for snow and ice control to ensure they adhere to snow and ice sufficiently to minimize engine ingestion.
- Beginning snow and ice control operations in a timely manner.
- Identifying equipment to be used.
- Listing quantities and storage location of materials (such as snow fences, chemicals, and abrasives).
- Scheduling training of equipment operators and supervisors.
- Scheduling preseason operational trial run sessions.
- Ensuring around-the-clock cooperation and integration with authoritative weather agencies according to AR 115-10/AFI 15-157 (IP) and AFI 15-127 for notification of forecasts of snow and ice storm intensities and durations.

8-41. Calcium chloride, sodium chloride, and abrasives will not be used on airfield or heliport pavements. Only materials that do not corrode aircraft will be used on airfield or heliport pavements.

FLIGHT PLANNING PROCEDURES

8-42. AR 95-1, states, "Aircraft will not be flown unless a flight plan (military or civil) has been filed or an operation's log completed. Local commanders will establish policies specifying the flight plans to be used." FAA Order JO 7110.10BB, Aeronautical Information Manual, and DOD FLIP general planning (also called GP) provide details on flight plan procedures. Specific information transmitted depends on the type of flight plan and agency to receive it. The information in Table 8-2, page 8-9, will be sent to the agencies listed when filing a flight plan CONUS or sending flight information internationally.

Table 8-2. Flight plan information

Proposal to tower		
Type of proposal (VFR or IFR)	Proposed time of departure	
Aircraft identification	Destination	
Aircraft designation/TD code	VIP code; pertinent remarks	
	Operating initials	
IFR flight plan (proposal) message to ARTCC		
Type of message (IFR flight plan)	Initial cruising altitude	
Aircraft identification	Standard instrument departure and route of flight (first leg only)	
Aircraft designation/TD code	Destination (first stop)	
Estimated true airspeed	Estimated time en route	
Point of departure	Remarks (capabilities and limitations of the aircraft)	
Proposed departure time	Operating initials	
Outbound to the FAA facility		
Type of outbound (VFR or IFR)	Destination	Aircraft identification
Estimated time of arrival	Aircraft designation/TD code	VIP code, pertinent marks
Point of departure	Operating initials	
Outbound with stopover to FAA facility		
Type of outbound (VFR or IFR with stopover)	Destination (first stopover)	
Aircraft identification	Estimated time of arrival for first stopover	
Aircraft designation/TD code	Remarks applicable to this leg only	
Point of departure	Slant (This word is interpreted by the FAA facility subsequent legs are to follow)	
On VFR flight plan		
Destination (subsequent to first leg)	Void time (date-time group in six digits)	
Estimated time en route	Repeat from the slant as necessary for subsequent VFR legs	
Remarks (applicable to this leg, then to the entire flight)		
	Operating initials	
On IFR flight plan		
True airspeed	Estimated time en route	
Point of departure	Remarks (capabilities and limitations of the aircraft)	
Proposed departure time	Void time (date-time group in six digits)	
Altitude	Repeat of IFR steps, to include the slant, as necessary, for subsequent IFR legs	
Standard instrument departure and route of flight		
	Operating initials	
Destination		
Inbound from the FAA facility		
Type of inbound (IFR or VFR)	Destination (only if servicing more than one)	
Aircraft identification	Estimated time of arrival	

Table 8-2. Flight plan information (continued)

Inbound from the FAA facility		
Aircraft designation/TD code	Remarks	
Point of departure	Their operating initials (reply with yours)	
Inbound to tower		
Type of inbound (VFR or IFR)	Estimated time of arrival	
Aircraft identification	VIP code, pertinent remarks	
Aircraft designation/TD code	Your operating initials	
Point of departure		
Arrival from tower (of previous inbound)		
Type of arrival (IFR or VFR)	Actual time of arrival	
Aircraft identification	Their operating initials (reply with yours)	
Arrival to FAA facility (of previous inbound)		
Type of arrival (IFR or VFR)	Actual time of arrival	Aircraft identification
Point of arrival	Point of departure	Your operating initials
Legend: ARTCC= air route traffic control center, FAA= Federal Aviation Administration, IFR= instrument flight rules, TD= transmitter distributor, VFR= visual flight rules, VIP= very important person.		

REGIONAL FEDERAL AVIATION ADMINISTRATION FACILITIES

8-43. Regional FAA facilities are operated by the FAA and perform the services described below for aviation personnel.

Receiving Air Traffic Control Clearances

8-44. When filing an IFR flight plan, the dispatcher transmits it by Service B to the ARTCC servicing the departure area. If Service B is not available, the dispatcher transmits the flight plan by telephone to the tie-in FAA facility or ARTCC servicing the departure area. The IFR clearance is then delivered directly by Service B by the host ARTCC to the tower. It may also be delivered indirectly by Service B to the appropriate approach control or FAA facility who, in turn, will relay the clearance by interphone to the tower or BASEOPS.

Forward Departure and Inbound Messages

8-45. After the aircraft departs a military installation, the dispatcher transmits the VFR and/or IFR departure message to the appropriate military BASEOPS or tie-in FAA facility. If required, the FAA facility relays the departure and/or inbound message to the destination of intent. Local flights do not require a departure message.

Receive And Coordinate In-Flight Changes to Destination

8-46. If a change in the destination is made in flight, the pilot transmits this information to the nearest FAA facility. The FAA facility advises the original point of destination, new point of destination, and point of departure.

Destination Operations Office

8-47. Destination operations offices acknowledge receipt of inbound flight messages from the destination FAA facility or military BASEOPS. It then—

- Transmits the actual arrival time of VFR and/or IFR aircraft to the tie-in FAA facility, if the destination is not equipped with Service B, so the flight plan may be closed.
- Advises the tie-in FAA facility, if the destination is not equipped with Service B, a part of a VFR and/or an IFR stopover flight plan may be closed.
- Notifies tower of the impending arrival.
- Advises the pilot of hazardous conditions that have developed at the pilot's destination. The destination operations office for military airports or the FAA for civilian airports initiates an in-flight advisory.
- Sends the advisory through ATC en route or terminal facilities to the pilot for IFR flights and sends the advisory through the FAA facility or terminal ATC facilities for VFR flights.
- Conducts a local search of all adjacent flight plan area airports and communications search when an aircraft is overdue.

Message Priority

8-48. Multiple messages require transmission by priority. Priority 1 and 2 messages are transmitted within 5 minutes after receipt of the required information. The following is a description of priority 1, 2, 3, and 4 messages:

- **Priority 1:** Emergency messages include essential information on aircraft accidents or suspected accidents. After an actual emergency, give a lower priority to messages relating to the accident.
- **Priority 2:** Clearance and control messages.
- **Priority 3:** Movement and control messages in the following order:
  - Progress reports.
  - Departure/arrival reports.
  - Flight plans.
  - Movement messages on IFR aircraft.
- **Priority 4:** Movement messages on VFR aircraft.

8-49. When transmitting an emergency or control message, use "emergency" or "control" to interrupt lower priority messages. FAA Order JO 7110.10BB and FAA Order JO 7110.65Z outline procedures for transmission of movement control messages.

Remain Overnight Messages

8-50. When transmitting remain overnight (RON) messages to the tie-in FAA facility, only the following information will be sent in the order shown:

- Base or bases to receive the message (name or location identifier).
- Other addressees at the base of delivery.
- Aircraft identification.
- Aircraft designation.
- Pilot's last name.
- The term RON.
- Location identifier of base where aircraft will remain overnight.
- Date or dates.
- Remarks (keep to absolute minimum).

8-51. The FAA transmits RON messages to BASEOPS. BASEOPS is responsible for delivering final or multiple RON messages to additional addressees at the same station. RON messages regarding VIPs require immediate delivery.

Service B Message

8-52. AR 95-11/AFMAN 11-213/NAVAIR 00-80T-114 and FAA Order JO 7110.10BB contain information on the transmission of flight movement messages within both the national and international airspace systems via Service B.

MILITARY AIRCRAFT IDENTIFICATION

8-53. Military aircraft are identified according to visual aircraft recognition procedures and DOD FLIP general planning (also called GP). The following is a description of some of the aircraft mission identification procedures.

Special Mission Aircraft

8-54. When special mission aircraft cannot be identified by their call sign, explain under "REMARKS" in the flight plan. For example, if AF Systems Command (AFSC) aircraft are engaged in flight test operations, enter “AFSC flight test mission” in the remarks section of each flight plan or message.

Military Search and Rescue Flights

8-55. When military aircraft are on a SAR flight, insert the word "Rescue" between the service prefix and prescribed markings (for example, "Air Force Rescue 12345").

Military Code System

8-56. DOD FLIP general planning (also called GP) contains information on flight plan, mission, and service codes.

FLIGHTS NEAR SENSITIVE BORDERS

8-57. Commanders responsible for flight operations near politically sensitive borders will publish specific and detailed instructions. These instructions prescribe—

- Procedures for border orientation flights, pilot proficiency qualifications, currency requirements for both visual and instrument flight procedures, and all OPSEC procedures.
- Detailed emergency procedures for all foreseeable contingencies (such as equipment malfunction and pilot disorientation).
- Sufficient map and chart coverage of the general area for the planned flight route. Minimum requirements for preflight briefings and flight planning.
- Periodic review of operating instructions in FLIPs to preclude inadvertent border overflights.
- Publication requirements for instrument and radio navigation.

8-58. As a result of an in-flight emergency or through bilateral agreements between NATO nations, restricted areas may be used when a request is sent through diplomatic or NATO channels by the visiting nation or NATO command.

Chapter 9
Airfield Services and Safety

The airfield and POL services branch is responsible for the servicing of aircraft, airfield inspections, and general policing of the airfield and its facilities. This chapter briefly discusses the branch responsibilities, airfield safety, and HAZMAT.

PERSONNEL AND RESPONSIBILITIES

9-1. The Airfield Services Branch includes the following positions:

- The branch chief—
  - Coordinates branch activities under supervision of the operations officer.
  - Prepares an SOP that outlines duties and responsibilities of branch personnel.
  - Ensures branch personnel are properly trained and qualified to perform their assigned duties.
  - Assigns specific personnel responsibilities and ensures duty rosters and performance records are properly maintained.
  - Ensures a daily inspection of the airfield is conducted.
- Shift supervisors—
  - Inspect the airfield (including RWYs and TWYs) for maintenance, police, FOD, and OPSEC considerations and requirements, at least once during the shift.
  - Supervise and train assigned personnel in their duties.
  - Coordinate with other branches concerning VIPs, transient and assigned aircraft, transportation requirements, and airfield conditions.
- Aircraft service personnel—
  - Provide and operate vehicles, as required, and perform operator maintenance in compliance with applicable technical manuals.
  - Maintain FOD controls while performing their duties.
  - Stand fireguard for all aircraft starting, if required.
  - Look for and report OPSEC violations.
  - Serve as aircraft ground guides and marshals.

9-2. Personnel organization and duties performed depend on size and structure of the airfield and size of the unit or units the airfield supports. As a general rule, a minimum of two airfield services personnel are required per shift during airfield operating hours to satisfy operational requirements.

GROUND HANDLING

9-3. When directing aircraft movements during land operations, aircraft service personnel (guides or marshals) should use the appropriate hand and arm (marshaling) signals in chapter three of TC 3-21.60. When available, signal flags may be used with hand and arm signals during daylight hours. Ground guides or marshals will wear hearing and eye protection and reflective gear when guiding FW and RW aircraft. At night, a ground guide will signal with a lighted baton (wand) in each hand. The intensity of these lights will vary, depending on whether the aircrew is aided or unaided. Signals given with wands will be identical to the day signals unless stated otherwise in TC 3-21.60. Wands should remain lighted at all times during use. During surface taxiing and parking, the pilot will stop immediately when one or both of the ground guide wands fail.

9-4. When required, a flagman will be stationed so as to be clearly visible to approaching aircraft. This person will direct the pilot to the ground guide. The ground guide will indicate when he or she is ready to guide the aircraft. The position of the ground guide for a FW aircraft is on a line extending forward of, and at an oblique angle from, the left (port) wing. The pilot's eyes must be visible to the ground guide from this position. The position of the ground guide for a RW aircraft is relatively the same as a FW aircraft. However, the ground guide may be on either side of the aircraft as long as the pilot's eyes are visible to them.

9-5. To ensure the safety of aircraft and vehicles on the airfield movement area, two-way radio communication is mandatory for tower controllers. The SOP must require pilots and vehicle drivers to obtain tower clearance before they proceed onto the aircraft movement area.

PETROLEUM, OILS, AND LUBRICANTS

9-6. The POL services branch includes the following positions:

- The branch chief—
  - Coordinates branch activities under supervision of the operations officer.
  - Prepares an SOP that outlines duties and responsibilities of branch personnel.
  - Ensures personnel are properly trained and qualified to perform their assigned duties.
  - Assigns specific personnel responsibilities and ensures duty rosters and performance records are properly maintained.
  - Ensures POL handlers are checked semiannually for body contamination.
  - Inspects POL facilities daily.
  - Ensures supplies of aviation fuels, oils, and lubricants are adequate to meet current and emergency operational requirements.
- Shift supervisors—
  - Inspect POL facilities at least once during a shift.
  - Supervise and train assigned personnel in their duties.
  - Coordinate with other branches concerning VIPs and assigned and transient aircraft refueling requirements.
- Petroleum storage specialists—
  - Provide refueling and other related services for assigned and transient aircraft and ensure transient aviators complete DD Form 1898 (*Energy Sale Slip*) for credit card purchases.
  - Receive, store, and inspect all petroleum products delivered to the storage area.
  - Use appropriate safety equipment specified in ATP 4-43.
  - Perform operator maintenance on lines, tanks, pumps, and valves in the POL storage area.
  - Ensure that refuel vehicles parked on the airfield have no leaks and are grounded to a properly tested and marked grounding point or grounding rod.

AIRCRAFT REFUELING

9-7. Normally, refuelers (refuel vehicles) are used to refuel aircraft on the flight line. They should be used when it is more practical to take fuel to the aircraft than to bring the aircraft to the fuel. Due to the inherent dangers of rapid refueling operations, a refueler is used only in unusual situations. Rapid aircraft refueling can also be accomplished using a pantograph or fuel cabinet. ATP 4-43 discusses operating procedures to follow in rapid refuel operations.

STAFFING

9-8. A minimum of two persons are required for refueling from a tank vehicle. If only the vehicle operator and their assistant are present, the operator will attend the pump and the assistant will handle the nozzle. A fire extinguisher will be within reach of each. Where possible, the aircraft crew chief will be present to oversee the entire operation and another member of the aircraft or ground crew will man the fire extinguisher at the nozzle.

9-9. A minimum of three persons are required for rapid refueling or hot refueling of an aircraft. One person operates the fuel nozzle, the second person remains at the emergency fuel shutoff valve, and the third person mans a suitable fire extinguisher. The third person then stands outside the main rotor disk of the aircraft at a point where they can see both the pilot at the controls and the refueler with the nozzle. This person may be from the FARP or one of the aircraft crewmembers. In a combat situation, METT–TC may override the availability of a third person to operate the fire extinguisher.

AIRCRAFT RESCUE FIREFIGHTING AND CRASH RESCUE SERVICES

9-10. ARFF and crash rescue services may be provided by installation engineers or personnel, and equipment may be assigned under direct supervision of the airfield operations division. These are critical functions that must be closely coordinated with the branches of the operations division. AR 420-1 establishes basic procedures and responsibilities for crash and rescue operations at airfields under DA jurisdiction.

9-11. The installation commander having jurisdiction over an airfield is responsible for maintaining an effective organization of trained personnel and adequate and reliable equipment. The commander ensures the airfield provides emergency protective services for flight activities and the types of aircraft operating at that airfield. These services include publishing detailed procedures for ARFF, crash rescue, and handling of hazardous cargo and defueling operations as outlined in AR 420-1. These procedures should be posted at each location where emergency calls are received.

AIRFIELD SAFETY

9-12. Commanders and leaders are responsible for managing risks inherent to aviation operations. Developing and implementing an integrated, imaginative, and comprehensive accident prevention program will ensure identification of hazards and implementation of appropriate control measures. This section discusses aircraft accident prevention and describes pre-accident and contingency plans. It also outlines requirements for aircraft accident investigations and describes the operational hazard report. This section also references several safety regulations and procedures for handling hazardous material.

AIRCRAFT ACCIDENT PREVENTION

9-13. Accident prevention is a command responsibility. Commanders must establish and ensure a safety program that involves all personnel, equipment, and activities of the organization. Commanders establish a formal process to identify, assess, and control risks in aviation operations. Management of risk is an operations function of a unit.

9-14. Command levels from Army command through aviation companies have a TO&E or Table of Distribution and Allowance (also called TDA) -authorized, full-time position for a qualified ASO. The ASO assists in administering the aviation accident prevention program. A safety-trained noncommissioned officer (also called NCO) will be appointed to assist the ASO at brigade level and below. These appointments are made according to AR 385-10.

Pre-Accident Plan

9-15. A pre-accident plan lists actions to be taken if an accident occurs. A good plan includes care for injured personnel, security of the accident scene, and procedures for safe airfield operations during a crash rescue and recovery operation. A pre-accident plan will be developed and maintained for each operational Army airfield, heliport, and aviation activity. The ASO is responsible for rehearsing and reviewing the unit pre-accident plan with the operations officer (quarterly, at a minimum). The airfield operations officer is responsible for preparing, disseminating, and testing the pre-accident plan.

Emergency Plans

9-16. Emergency plans should provide enough guidance to ensure immediate issue of vital information to personnel who have responsibilities during an emergency.

Hurricane and High Wind Plan

9-17. During a hurricane evacuation, Army commanders of airfields and flight activities will, at their discretion, evacuate assigned aircraft and impose temporary restrictions on use of flight facilities under their control. A detailed plan should be outlined in the local SOP and implemented when a hurricane or high wind warning is received. The plan should include, but not be limited to—

- Evacuation, storage, or tie-down of aircraft. (Tie-down instructions in the aircraft operator's manual must be followed.)
- Removal of loose objects from parking areas (for example, chocks, fire extinguisher, boarding ramps, toolboxes, FOD containers, and work platforms).
- Protection of window glass and interiors by using prefabricated window covers. (To allow for pressure equalization, the building should not be made airtight.)
- Conducting checks on backup power sources to ensure efficient operation and availability of required fuel and oil.

Air Crash, Search, and Rescue/Local Crash Grid Map

9-18. All Army airfields are required to develop and maintain an air crash, search, and rescue map or local crash grid map according to AR 385-10 and AR 420-1. Both air and ground rescue personnel use the map to locate and reach the site of an aircraft accident. All personnel who assist in the rescue must be familiar with the map and area depicted.

9-19. The air crash, search, and rescue or local crash grid map will be marked with concentric circles with a minimum radius of7 nautical miles. An appropriate grid method for navigation reference will be provided as an overlay or overprint. The grid overlay or template will be issued for rapid exchange of information between personnel involved in rescue operations using a common map.

9-20. The air crash, search, and rescue or local crash grid map will be coordinated with rescue agencies of adjacent airfields to ensure a compatible design for effective rescue operations. The airfield commander is responsible for ensuring all agencies providing emergency assistance are given a standardized map. Failure to provide a standardized scale map to each agency may cause confusion and unnecessary delay when emergency assistance is required.

9-21. Airfield diagrams should be sectioned off in the alphanumeric format or have predetermined crash response points indicated. These diagrams are provided to each agency for easy airfield reference when responding to emergencies.

Aircraft Accident Investigation

9-22. A successful aircraft accident investigation requires proper planning and organization, a vital part of which is the pre-accident plan. These plans ensure personnel and equipment will be effectively used. DA Pam 385-40 provides instruction for conduct of an aircraft accident investigation.

9-23. Commanders should consult their servicing legal advisor and ensure all Army accidents that result in injury, occupational illness, or property damage are investigated, analyzed, reported, and recorded as prescribed in AR 385-10.

Operational Hazard Report

9-24. An operational hazard is any condition, action, or set of circumstances that compromises the safety of Army aircraft, associated personnel, airfields, or equipment. Operational hazards should be corrected at the lowest level possible. Operational hazards include inadequacies, deficiencies, or unsafe practices (see DA Pam 385–90). DA Form 2696 (*Operational Hazard Report*) will be used to record information about a hazardous condition. AR 385-10 contains information on preventing accidents caused by operational hazards. Operational hazards include inadequacies, deficiencies, or unsafe practices in—

- ATC.
- Airways and NAVAIDs.
- Controller procedures and techniques.

- Near midair collisions between aircraft or near collisions between aircraft and other objects in the air or on the ground.
- Aircraft operations.
- Aircraft maintenance or inspection.
- Weather services.
- Airfields and heliports (facilities or services).
- Flight or maintenance training and education.
- Regulations, directives, and publications issued by DOD agencies, the FAA, International Civil Aviation Organization, and host nations.

9-25. Operational hazard reports (OHRs) are not submitted after corrective action has been taken for materiel failure of aircraft components and ground support equipment. See DA Pam 738-751 for handling these occurrences.

9-26. Commanders will establish procedures for reporting operational hazards and ensure all such reports are investigated and hazardous conditions are corrected.

9-27. OHRs will be submitted to the ASO or Army flight operations office at the unit or installation where the hazard was observed, or at the home airfield or next airfield at which the reporting individual lands. The ASO will immediately forward the OHR to the installation concerned. The ASO will thoroughly investigate the report and submit recommendations to the commander. When corrective action cannot be taken at unit level, the report will be forwarded through channels to the command level at which appropriate corrective action can be taken.

9-28. Commanders will ensure procedures are established to manage the OHR system including signing and returning completed OHRs to the ASO within 10 working days of receiving the report. The completed action will be returned to the originator within 20 working days of receipt.

9-29. Reports that have DOD, host nation, FAA, and/or National Transportation Safety Board applications will be forwarded to Commander, United States Army Combat Readiness Center, Bldg. 4905, Fort Novosel (formerly known as Fort Rucker), Alabama 36362-5363. Information copies of all OHRs not correctable at or below Army command level and reports that indicate possible involvement or deficiency of FAA personnel or facilities should also be forwarded to the United States Army Combat Readiness Center. OHRs concerning Army ATC personnel, services, procedures, and equipment will be forwarded through the respective Army HQ to the Director, United States Army Aeronautical Services Agency, 9325 Gunston Road, Suite N319, Fort Belvoir, VA 22060-5582.

HAZARDOUS MATERIAL

9-30. Hazardous material is defined as any material that is flammable, corrosive, explosive, toxic, radioactive, nuclear, unduly magnetic, biologically infective, or acts as an oxidizing agent. It also includes any other material that may endanger human life or property due to its quantity, properties, or packaging. Special storage, use, handling, and shipment procedures and protocols must be followed to help protect against accidental exposure.

9-31. BASEOPS personnel must comply with special procedures governing the transport of hazardous material. AR 95-27/AFJI 11-204 and AF Joint Instruction (AFJI) 11-204 outline the operational procedures for aircraft transporting hazardous material. AR 200-1, AR 420-1, ATP 3-35, and AFMAN 24-604 contain additional information on the transport of hazardous material. Before takeoff, the supported unit briefs the aircrew on special handling requirements. Aircraft loaded with ammunition or fuel requesting takeoff or landing will notify ATC with classification of the load and the quantity and type of load.

9-32. Should the contents be classified, the pilot will inform ATC they are unable to divulge aircraft contents due to its sensitive nature. Procedures for handling these aircraft remain the same as any aircraft carrying hazardous cargo.

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Appendix A

Contingency Airfield Opening Checklists

TAOGs and AOBs are the primary organizations tasked with opening and operating contingency airfields. For this to occur, AOBs must be aggressively involved during seizure planning when identifying airfields that meet mission requirements. Engineers are also an important element when evaluating airfields. The engineer assessment and future airfield needs must be incorporated into the overall information collection plan as this information determines the feasibility of use for the airfield and the tasks required for the airfield opening force. The airfield assessment and opening plan should be developed as soon as the mission is assigned. Many tools are available to engineers and the AOB to begin airfield assessment prior to actual arrival at the field. After arrival, the airfield assessment team verifies the information gained during pre-mission planning, collects additional data, and provides a recommendation to the airfield opening force. This appendix details the numerous checklists necessary for adequate airfield assessment and the duties required for airfield opening. These sample checklists are not all inclusive and will depend on the unit's assessment of the mission variables and other mission requirements.

AIRFIELD CHECKLIST

A-1. Tables A-1 through A-7 are examples of airfield checklists.

Table A-1. Airfield data checklist

Item
Airfield name
Runway data/condition Usable/unusable Damaged UXO present Drainage problems Rutting Runway length Runway width Surface type Weight bearing capability Slope gradient Longitudinal lateral transverse gradient Glide – slope Runway markings Centerline Runway edge Distance ***Note.*** For semi-prepared (dirt) surfaces, determine runway friction factor for C-17
Lighting Edge

Table A-1. Airfield data checklist (continued)

Item
Approach Threshold VASI/PAPI ***Note.*** PCN values should be based on 50,000 C-17 passes
Shoulder width
Overrun data Length Surface type Condition Slope
Arresting system Type Location
Obstructions Approach illusions Visual terrain Zero city lights
Engine blast information
Obstacles on airfield Height Location
Graded area Width Slope Obstacles
Maintained area Width Slope Obstacles
Clear area Obstacles Glide slope
Approach area Obstacles Clearance slopes
Hazards to flight
Capability to support airlift operations
Maximum on ground by aircraft type
Legend: PAPI= precision approach path indicator, PCN= pavement classification number, UXO= unexploded ordinance, VASI= visual approach slope indicator

Table A-2. Taxiway assessment checklist

Item
Status Unusable Damaged Check for UXO
Width
Surface type
Weight bearing capability/source
Markings
Lighting
Runway hold lights
Shoulders stabilized
Obstructions
Serve as emergency LZ
Aircraft (fixed/rotary wing) movement on ground Identify any area not accessible to aircraft Identify any specific taxi routes for aircraft
Legend: LZ= landing zone, UXO= unexploded ordinance

Table A-3. Helipad assessment checklist

Item
Dimensions
Surface type
Hot landing area location(s)
Forward arming and refueling location(s)
Existing approach plan
Existing departure plan
Existing emergency egress plan
Hazards to flight

Table A-4. Air traffic assessment checklist

Item	*Remarks*
Field elevation	not applicable
Traffic patterns Altitudes Type Prevailing wind	not applicable
Departure procedures Radar handoff Nonradar handoff Heading	Call sign, FIX, altitude, frequency, location
Reporting points (VFR/IFR) Location	not applicable

Table A-4. Air traffic assessment checklist (continued)

Altitude Pattern Missed approach MSA	
Jettison/bailout/fuel dump areas Location Altitude	not applicable
TERPs	not applicable
NOTAMs	not applicable
Alternate airfields	not applicable
NAVAIDs Location Type Identifier Frequency	not applicable
Obstacles in Class D airspace	not applicable
Legend:, IFR= instrument flight rules, MSA= minimum safe altitude, NAVAID= navigational aid, NOTAM= notice to air mission, TERPs= terminal instrument procedures, VFR= visual flight rules	

Table A-5. Parking area assessment checklist

Item
Maximum on ground
Designation
Dimensions
Surface types
Weight bearing capability/source
Tie down rings
Grounding points
Lighting
Obstructions
Special parking pads HOTPAD Explosive/Hazardous material storage Engine run clearance area Hot refuel Arm/de-arm
Slope of ramp
Breakaway
Taxi power requirements
Taxi area for parking
Factors that may affect aircraft operations

Table A-6. Lighting assessment checklist

Item
Significant local lighting
Surrounding area lighting
Location of airport lighting controls
Point of contact for turning on and off lights (telephone number)

Table A-7. Pavement analysis checklist

Item
Runway/Taxiway Identified
Pavement Type
Pavement Condition Index
Soil Structure
Load Classification Number
Aircraft Classification Number
Pavement Classification Number

AIRFIELD SUPPORT CHECKLISTS

A-2. Tables A-8 through A-11 are examples of airfield support checklists.

Table A-8. Airfield support requirements checklist
Item
Operational
Unrestricted vision of all approaches, departures, runways, and taxiways
Electrical power available
Radio blind spots
Facilities
Bird aircraft strike hazard level history
Bird strike hazard/Bird avoidance model program
Bird hazard reporting signals/system
Airfield photos and maps
Rooms or building available
Space available for operations tents
Sanitation accommodations
Trash disposal
Portable airfield lighting/marking
Power Generation Equipment
Observation capability
Forecast capability
Conditions reporting capability
Braking action reporting capability
UHF
VHF
HF
FM
Satellite communications
Telephones: • Commercial- • DSN-
Friendly forces communications list
Deicer
Water/foam rates
Legend: DSN= Defense Switched Network, FM= frequency modulation, HF= high frequency, UHF= ultra-high frequency, VHF= very high frequency

Table A-9. Transportation/logistics checklist

Item
Covered space available
Dimensions
Outside storage space available: • Location • Dimensions • Fencing • Lights
Hazardous cargo buildup area
Passenger service area
Fire bottles
Power units
Light carts
Aerospace ground equipment
Maintenance stands
Maintenance hangers available
Revetments available
Aircraft type supported
Jet fuel storage facilities
Jet fuel dispensing capabilities
Refueling vehicles
Liquid oxygen
Gaseous oxygen
Gaseous nitrogen
Oil and lubricants
Materials handling equipment available
Host-nation support
Contact transportation assets
Assets available from support agencies
Location of movement control center
Availability of local road maps
Identified arrival/departure air control group procedures
Identified seaport of debarkation: • Location • Route
Procedures

Table A-10. Base support checklist

Item
Billeting area
Messing facilities
Location of medical facilities-Capabilities
Location of military Role 1 through Role 3 medical treatment facilities-Capabilities.
Emergency evacuation procedures
Availability and location of military medical evacuation platforms-Capabilities
Availability and location of military medical logistics-Capabilities
Availability and location of military force health protection-Capabilities
Location of civilian medical treatment facilities-Capabilities
Availability and location of emergency civilian medical transportation
Availability and location of emergency civilian medical supplies
Hours medical services available
Suitability of local water sources
Source of the local drinking water
Location of potable water points
Location of nonpotable water points
Manpower
Facilities
Equipment
Location/response time
Host nation firefighting support
Procedures to request firefighting
Aircraft support: • Type of aircraft • Time duration
Fire/Rescue point of contact
Field latrines: • Locations • Servicing • Status
Contract portable latrine facilities-Service agreements in place
Theater specific health and medical concerns
Preventive measures identified
Trash collection procedures
Burn procedures
Status of commercial power
Augmentation status of commercial power to tactical power
Structure of power limitations

Table A-11. Security/disaster preparation assessment checklist

Item
Airfield security force: • Nationality • Strength • Point of contact
Configuration of security personnel: • Communications procedures • Inner/outer perimeter
Airfield physical security: • Entry points • Observation points • Remote sensors/cameras
ADA threats: • Vulnerabilities • Mitigation measures • Friendly electromagnetic warfare and directed energy considerations
Small arms threats: • Vulnerabilities • Mitigation measures
Mortar threats: • Vulnerabilities • Mitigation measures
Dispersal plans
Danger spaces around airfield
Distance from airfield perimeter to aircraft
Perimeter fencing/barriers in place
Types of security responses
CBRN considerations
Legend: ADA= air defense artillery, CBRN= chemical, biological, radiological, and nuclear

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Appendix B

Airfield Layout Plan

Criterion in this appendix applies to Army and Air Force airfield planning. Use of these criteria produces the right airfields in the right place at the right time. The planning and design of airfields must emphasize flight and ground safety for all types of aircraft that are both permanently assigned and transient. AOB commanders will ensure that the airspace design provides required obstruction clearances and that special facilities and equipment are either constructed or installed to facilitate aircraft maintenance, ground handling, and flight operations.

PLANNING STUDIES

B-1. Prior to establishing a contingency airfield or heliport, a study should be made to determine the conditions under which the facility will be operating. The study should include the items in the following paragraphs.

AIRCRAFT TO BE USED AT THE AIRFIELD (DESIGN AIRCRAFT)

B-2. Airfields typically are designed for a specific aircraft known as the critical or design aircraft, which is the most operationally and/or physically demanding aircraft to make substantial use of the facility. The critical or design aircraft is used to establish the dimensional requirements for safety parameters such as approach protection zones, lateral clearance for RWYs, TWYs and parking positions, and obstacle clearance. In many cases, the "geometric" design aircraft may not be the same aircraft as the "pavement" design aircraft.

SITE CONDITIONS

B-3. Numerous site conditions are considered when establishing a contingency airfield or heliport.

Prevailing Weather and Wind Directions

B-4. To be functional, efficient, and safe, the RWY should be oriented with the prevailing winds to provide favorable wind coverage. Crosswinds exceeding 13 miles per hour should not prevail more than 13 percent of the time. Wind data, obtained from local sources, for a period of not less than five years should be used as the basis for the wind information to be shown on the airfield map (AR 210-20).

Other Considerations

B-5. Other considerations include—

- Topography.
- Vegetation.
- Existing structures.
- Soil conditions.
- Accessibility of roads and utilities.
- Capability for future expansion.
- Air traffic services required and siting of ATC equipment.

AIRFIELD LAYOUT

B-6. The layout of airfield facilities should be functional to permit operational efficiency and provide safety conditions for aircraft operations. Figure B-1 shows an example of an airfield layout intended to provide guidance to AOB planners. The following factors should be considered for functionality.

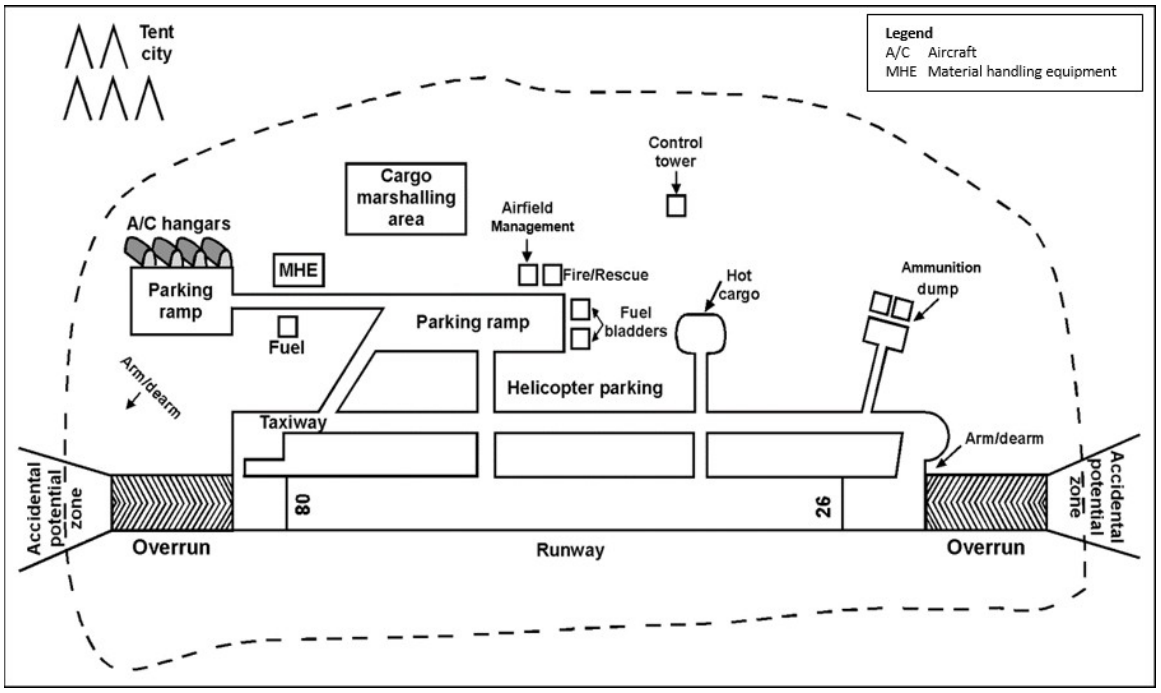

Figure B-1. Airfield layout

Taxiways

B-7. TWYs provide for ground movement of FW and RW aircraft. TWYs connect airfield RWYs with parking and maintenance areas and provide access to hangars, docks, and various parking aprons and pads. TWYs are designated alphabetically, avoiding the use of I, O, and X. Alphanumeric may be used when necessary (for example, A1 and B3). RWY efficiency is best accomplished by development of parallel TWY systems with appropriate connecting laterals. At airfields with low air traffic density, such TWYs may be modified to suit local requirements.

Air Force Missions at Army Facilities

B-8. Airfield flight safety clearances applicable to Army airfields that support AF cargo aircraft missions will be based on an Army Class B airfield. This is coordinated between the Army and Air Force.

Required Clearances

B-9. Paved surfaces will be designed for continuous and safe aircraft operations. Pavement areas will be in compliance with airfield clearances, safety zones, and related areas as described in UFC 3–260–01.

CLASS A AND B RUNWAYS

B-10. Class A RWYs are primarily intended for small light aircraft. These RWYs do not have the potential or foreseeable requirement for development for use by high performance and large heavy aircraft. Ordinarily, these RWYs are less than 2,438.4 meters (8,000 feet) long and have less than 10 percent of their operations that involve aircraft in the Class B category. This is not intended to limit the number of C-130 and C-17 operations conducted on any Class A airfield.

B-11. Class B RWYs are primarily intended for high performance and large heavy aircraft and generally 2,438.4 meters (8,000 feet) or longer.

B-12. Table B-1 describes requirements in detail of Class A and B RWYs.

Table B-1. Army Class A runway lengths

Temperature	***Elevation***				
	Sea Level	***304.8 m (1,000 ft)***	***609.6 m (2,000 ft)***	***1524 m (5,000 ft)***	***1828.8 m (6,000 ft)***
60 degrees F	1,615.44 m (5,300 ft)	1,676.4 m (5,500 ft)	1,767.84 m (5,800 ft)	2,042.16 m (6,700 ft)	2,164.08 m (7,100 ft)
85 degrees F	1,706.88 m (5,600 ft)	1,798.32 m (5,900 ft)	1,889.76 m (6,200 ft)	2,286 m (7,500 ft)	2,438.4 m (8,000 ft)
105 degrees F	1,798.32 m (5,900 ft)	1,889.76 m (6,200 ft)	2,042.16 m (6,700 ft)	2,468.88 m (8,100 ft)	2,682.24m (8,800 ft)
Legend:, , F= Fahrenheit, ft= feet m= meters					

Note. The length of Army Class B RWYs is determined by the AF Major Command (MAJCOM) involved based on the design aircraft being used. See UFC 3–260–01 for more detailed information on RWY construction and standards.

ROTARY-WING RUNWAY DIMENSIONAL CRITERIA

B-13. Table B-2 describes basic layouts for RW RWYs.

Table B-2. Rotary-wing runways

Item Description	***Requirement***	***Remarks***
Basic length	487.68 m (1,600 ft)	For Army and Air Force airfields increase basic length to 609.6 m (2,000 ft) when above 1219.2 m (4,000 ft) MSL.
Width	22.86 m (75 ft)	
Runway lateral clearance zone (measured perpendicularly from centerline of runway)		
VFR operations	45.72 m (150 ft)	
IFR operations	114.3 m (375 ft)	
Distance from centerline of FW runway to centerline of rotary-wing runway, helipad, or landing lane		
Simultaneous VFR operations	213.36 m (700 ft)	For class B runway for Army operations.
Simultaneous VFR operations	304.8 m (1,000 ft)	For class B runway for Air Force, Navy, or Marine Corps.
Non-simultaneous operations	213.36 m (700 ft)	Distance may be reduced to 60.96m (200 ft); waiver is based on wake-turbulence and jet blast. In locating the helipad, consideration is given to hold position marking. Rotary-wing aircraft must be located on the apron side of the hold position markings (away from runway) during runway operations.
	762 m	(Depart-depart) (Depart-approach)

Table B-2. Rotary-wing runways (continued)

IFR using simultaneous operations	(2,500 ft)	
IFR using simultaneous approaches	1310.64 m (4,300 ft)	
Distance between centerlines of rotary-wing runways, helipads, or landing lanes		
VFR without intervening parallel taxiway between centerlines	213.36 m (700 ft)	
IFR using simultaneous operations	762 m (2,500 ft)	(Depart-depart) (Depart-arrival)
IFR operations using simultaneous approaches	13110.64 m (4,300 ft)	
Legend: ft= feet, FW= fixed-wing, IFR= instrument flight rules, m= meters MSL= mean sea level, VFR= visual flight rules		

Note. For more detailed information on RW RWY design and construction, see UFC 3–260–01.

HELIPADS

B-14. Helipads allow for helicopter hovering, landing, and takeoff, except at facilities where helicopter RWYs are provided, and helipads are the landing and takeoff locations for helicopters. The Army and Air Force provide for three types of helipads—VFR helipad, limited use helipad, and IFR helipad. The Navy and Marine Corps provide only the standard size helipad. The helipad type depends on the following operational requirements:

- **Standard VFR helipad.** VFR design standards are used when no requirement exists or will exist in the future for an IFR helipad. Criteria for this type of helipad permit the accommodation of most helipad lighting systems.
- **Limited use helipad.** This is a VFR facility used at sites where only occasional operations are conducted. These sites may be hospitals, headquarter areas, missile sites, and other similar locations. Limited use helipads may also be used to separate light RW traffic (12,500 pounds or less) from medium and heavy RW traffic or FW traffic.
- **IFR helipad.** IFR design standards are used when an instrument approach capability is essential to the mission and no other instrument landing facilities, either FW or RW, are located within an acceptable commuting distance to the site.

B-15. A helipad location should be selected with regard to mission requirements, overall facility development, approach-departure surfaces, and local wind conditions. When a helipad is to be located near FW or RW RWYs, its location should be based on the type of operations per criteria in Table B-3.

B-16. An elevated helipad is above ground level on a building or rooftop or another structure built specifically for the pad. A ground level helipad with the pad on a mound is not an elevated helipad. Elevated helipads require approval from the United States Army Aeronautical Services Agency (USAASA). For Navy and Marine Corps facilities, contact the agency aviation office with safety waiver approval authority.

PARKING PADS

B-17. At individual helipad sites where it is necessary to have one or more helicopters on standby, an area adjacent to the helipad, but clear of the landing approach and transitional surfaces, should be designated for standby parking.

DIMENSIONAL CRITERIA

B-18. Table B-3 presents dimensional criteria for the layout and design of helipads.

Table B-3. Rotary-wing helipads and hover points

Item Description	*Requirement*	*Remarks*
Size	22.86 m x 22.86 m (75 ft x 75 ft-min)	VFR limited use helipads
	30.48 m x 30.48 m (100 ft x 100 ft)	Standard VFR and IFR helipads
Primary surface (center primary surface on helipad)	45.72 m x 45.72 m (150 ft x 150 ft-min)	Hover points, limited use VFR helipads
	91.44 m x 91.44 m (300 ft x 300 ft)	Standard VFR helipads
Grade	Min 1.0% Max 1.5%	Grade helipad in one direction Hover points should be domed to a 6-inch height at the center.
Within primary surface area in any direction	Min 2.0% prior to channelization Max 5.0%	Exclusive of pavement and shoulders. For IFR helipads, grading requirements apply to a 300 ft x 300 ft (91.44 m x 91.44 m) area centered on the helipad.
Clear zone		
Length	121.92 m (400 ft)	Hover points, VFR and standard IFR helipads, begins at the end of the primary zone.
	251.46 m (825 ft)	IFR same direction ingress/egress
Width		Corresponds to primary surface width. Center clear zone area width on extended center of the pad.
	45.72 m (150 ft)	Limited use helipads and hover points
	91.44 m (300 ft)	Standard VFR helipad and VFR helipad same direction ingress/egress
	228.6 m (750 ft)	Standard IFR
Grades of clear zone (any direction)	Max 5.0%	Area to be free of obstructions. Rough grade and turf required.
Accident potential zone		
Length	243.84 m (800 ft)	Hover points, VFR, and standard IFR
	121.92 m (400 ft)	IFR same direction ingress/egress
Width	45.72 m (150 ft)	Limited use VFR helipads and hover points
	91.44 m (300 ft)	Standard VFR
	228.6 m (750 ft)	Standard IFR

Legend: ft= feet, IFR= instrument flight rules, m= meters, max= maximum, min= minimum, VFR= visual flight rules

ROTARY-WING LANDING LANES

B-19. Contingency and combat RW operations create situations where large numbers of helicopters are parked on mass aprons at airfields or heliports. The use of landing lanes enables rapid launch and recovery operations. The efficiency of these operations will be increased when—

- Landing lanes are located in front of the parking apron.
- The locations of touchdown points are designated with numerical markings.

B-20. Table B-4 presents the dimensional criteria for the layout and design of RW landing lanes. For information on overruns, clear zones, accident potential zones, and imaginary approach surfaces for RW landing lanes, refer to UFC 3–260–01.

Table B-4. Rotary-wing landing lanes

Item Description	*Requirement*	*Remarks*
Length	487.68 m to 609.6 m (1,600 ft to 2,000 ft)	Based on the number of touchdown points.
Width	22.86 m (75 ft)	
Distance between		
Touchdown points	121.92 m (400 ft-min)	
Centerlines of lanes	60.96 m (200 ft) 91.44 m (300 ft)	With an operational control tower Without control tower
Landing lane lateral clearance zone	45.72 m (150 ft) 114.3 m (375 ft)	VFR facilities IFR facilities
Grades within primary surface area in any direction	2.0%	
Legend: ft= feet, IFR= instrument flight rules, m= meters, min= minimum, VFR= visual flight rules		

B-21. Figure B-2, page B-7, provides an example of a RW landing lane.

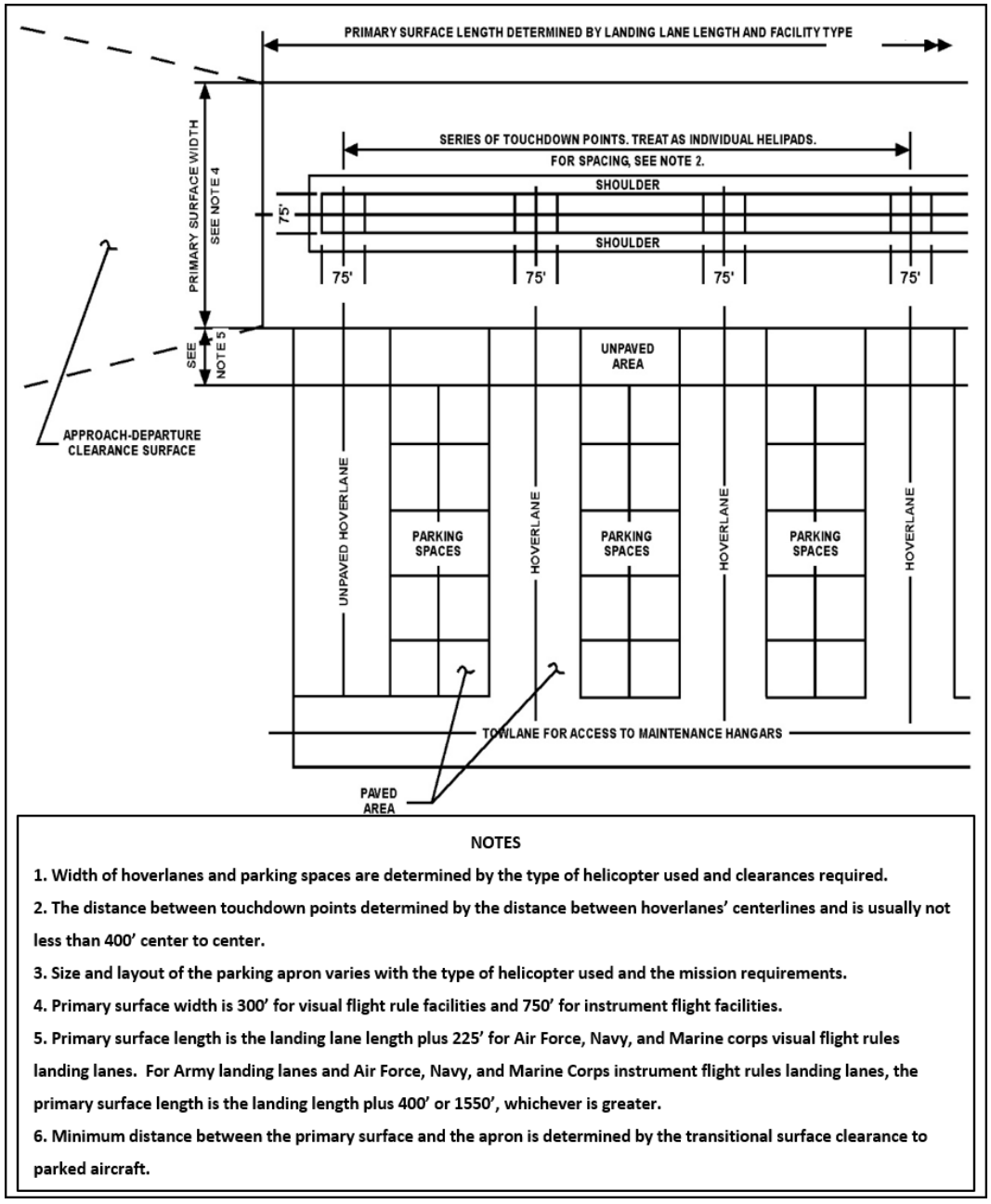

Figure B-2. Rotary-wing landing lane

FIXED-WING TAXIWAYS

B-22. TWY dimensions are based on the class of RWY that it serves. Table B-5, page B-8, presents the criteria for FW TWY design.

Table B-5. Fixed-wing taxiways

Item Description	*Class A Runway*	*Class B Runway*	*Remarks*
Width	15.24 m (50 ft)	22.86 m (75 ft)	Army and Air Force airfields
Clearance from taxiway centerline to fixed or mobile obstructions	45.72 m (150 ft)	60.96 m (200 ft)	
Distance between taxiway centerline and parallel taxiway centerline	53.34 m (175 ft)	56.54 m (187.5 ft) 72.39 m (237.5 ft)	Army airfields Air Force airfields
Legend: ft= feet, m= meters			

ROTARY-WING TAXIWAY DIMENSIONS

B-23. RW TWYs are either paved or unpaved. Wheel-gear configured RW aircraft require a paved surface on which to taxi. Skid-gear configured RW aircraft taxi by hovering along a paved or unpaved TWY. Table B-6 presents the criteria for RW TWY design including clearances, slopes, and grading dimensions. Figure B-3, page B-9, provides an example of a TWY layout.

Table B-6. Rotary-wing taxiways

Item Description	*Requirement*	*Remarks*
Width	15.24 m (50 ft)	Army and Air Force airfields
Longitudinal grade	Max 2.0%	
Transverse grade	Min 1.0% Max 1.5%	
Clearance from centerline to fixed and mobile obstacles	Min 30.48 m (100 ft)	
Grades within clear area	Max 5.0%	Clear area is area between the taxiway shoulder and taxiway clearance line.
Legend: ft= feet, m= meters, max= maximum, min= minimum		

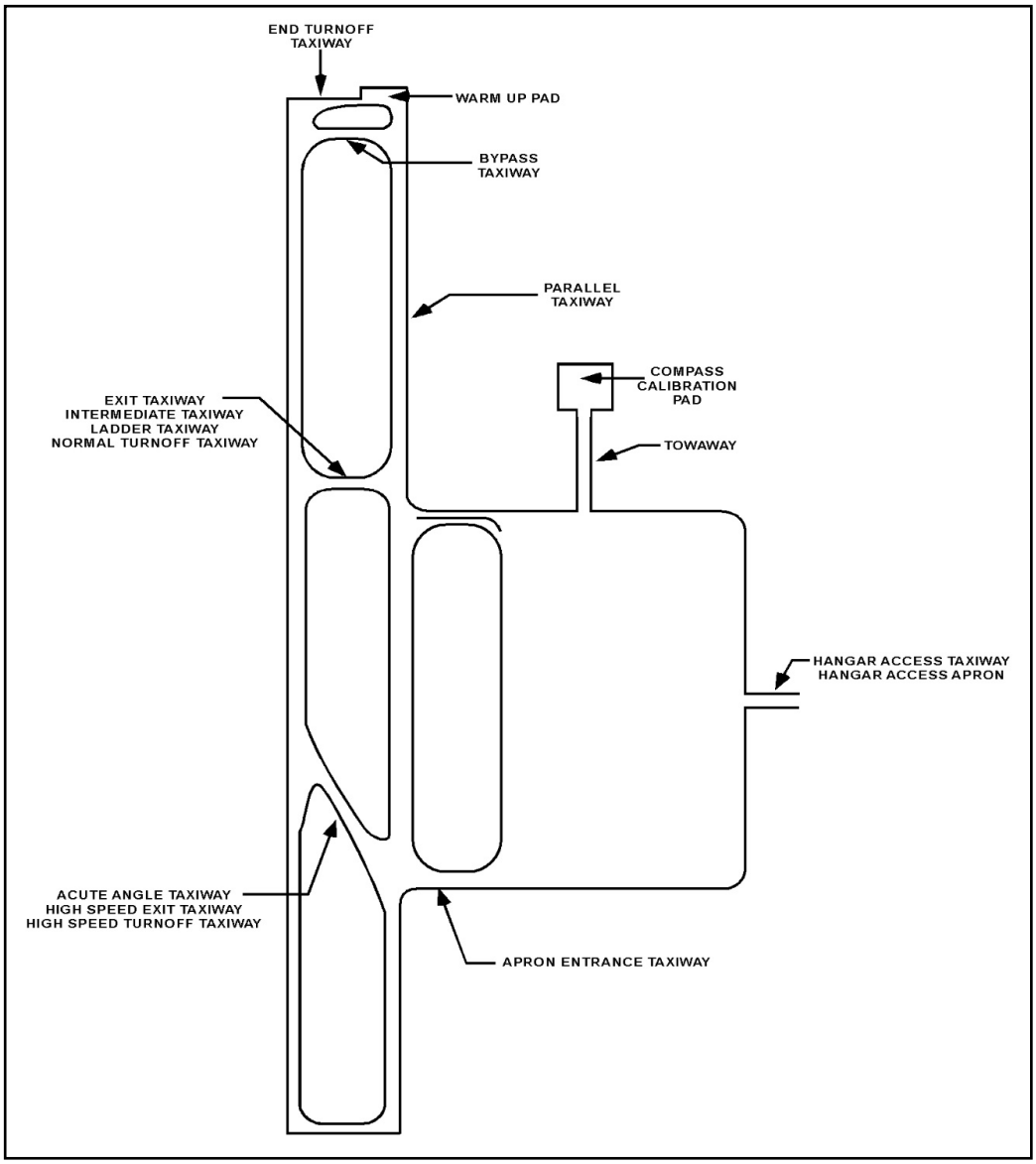

Figure B-3. Taxiway layout

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Appendix C

Letters and Memorandums

Each branch of an airfield organization is required to maintain a file of administrative correspondence. This correspondence includes LOAs, LOPs, and facility memorandums.

LETTERS OF AGREEMENT

C-1. LOAs may apply to a specific facility, group of facilities, or all facilities within a designated geographical area. LOAs are prepared between the United States Army and other services or a host nation. They are also prepared between centers and towers, centers and terminal radar facilities, or ATC facilities located on the same or different airfields. A LOA shall be prepared to—

- Delegate areas of control jurisdiction and conditions of use.
- Define special operating conditions or specific ATC procedures.
- Define inter-facility or interagency responsibilities and coordination requirements.
- Describe procedures that deviate from or are not contained in FAA Order JO 7110.65Z, this publication, or other pertinent directives.

C-2. The branch responsible for developing a LOA shall—

- Confine materiel in each LOA to a single subject or purpose.
- Ensure LOA is properly prepared.
- Describe responsibilities and procedures that apply to each facility and organization involved.
- Attach charts or other visual presentations, as appropriate, to depict conditions of the agreement.
- Delegate responsibility for ATC. Describe the area responsibility that is delegated and define conditions governing use of that area. Specify and explain control, communications, and coordination procedures.
- Coordinate the LOA with the appropriate facilities, agencies, and authorities.
- Coordinate the letter with the United States Army Aeronautical Services Detachment, Europe (USAASD-E)/Eighth U.S. Army (EUSA)/Department of the Army Representative (DAR) before a LOA with a host country is signed.
- Forward all proposed LOAs to the appropriate DAR. The DAR shall review and coordinate each LOA, then return it to the originator with comments.
- Establish effective date of the LOA at 30 days after its distribution. This gives the participants time to familiarize their personnel with the agreement and revise directives and flight charts.
- Prepare the letter in final form.
- Obtain required signatures.
- Distribute copies of the signed LOA according to the distribution stated in the letter.

C-3. A change in requirements of either party signing the agreement creates the need to rewrite or amend the letter. Revisions, attachments, or supplements to the LOA are processed as page replacements. They are coordinated the same as the original letter. Revisions are marked as follows:

- Place an asterisk to the left of each new or revised paragraph or section to signify it is new materiel.
- Identify page revisions by the revision (REV) number (for example, REV 1). Enter effective date in the lower right corner of each revised page.

C-4. To ensure timeliness and conformance to current policies and directives, the branch chief reviews all facility LOAs annually no later than the anniversary date of the original document. They also sign and date the annual reviews. Table C-1, page C-2, shows a sample format for a FAA or an Army LOA.

Table C-1. Sample format for a Federal Aviation Administration/United States Army LOA

__(Name)_ Air Route Traffic Control Center and FAA __(Name)_ Approach Control and___(Name)_

LETTER OF AGREEMENT

EFFECTIVE:___(Date)__

SUBJECT: Special VFR Operations Within___(Name)_ Airport Surface Area

1. PURPOSE: (List responsibilities and describe necessary coordination.)
2. CANCELLATION: (Use as required.)
3. SCOPE: (Specify areas having ATC responsibility and names and types of facilities.)
4. RESPONSIBILITIES: (Specify responsibilities.)
5. PROCEDURES:
   a. ATC-assigned airspace. (List the procedures for requesting and authorizing airspace, handling aircraft to and from airspace, and notifying ATC when the airspace is no longer required.)
   b. Transfer of control. (Specify transfer procedures.)
   c. Departures. (Specify the required advance time for filing flight plans, and outline additional items required in the flight plan. For example, list the type of departure and the control transfer points.)
   d. En route. (Include in the information that ATC is responsible for effecting separation in assigned airspace when nonparticipating aircraft are cleared to operate within that airspace.)
   e. Arrivals. (Outline handoff procedures and special instructions.)
   f. General. (Include, if appropriate, missed-approach procedures, special VFR operations, and provisions for handling movement of national-defense aircraft in emergencies.)

6. ATTACHMENTS: (List, as required, such items as a chart of ATC-assigned airspace areas and common reference or handoff points.)

Airfield Commander,___(Name)____AAF Chief,___(Name)_____ARTCC

Chief, __(Name)_____ATC Facility Director,___(Name)_ Region

(Name and title of appropriate authority)

Legend: AAF= Army airfield, ARTCC= air route traffic control center, ATC= air traffic control, FAA= Federal Aviation Administration, VFR= visual flight rules

LETTERS OF PROCEDURE

C-5. LOPs should be prepared using AR 25-50 and FAA Order JO 7610.4W as administrative guidelines. Consult with servicing legal advisor to ensure LOPs are drafted within limits prescribed by law or regulation. Care must be taken to choose appropriate subject matter, terminology, and correct procedures when negotiating content.

C-6. AT&A officers must ensure LOPs are negotiated when an operational or procedural need requires cooperation or concurrence of other facilities or organizations. LOPs are prepared when it is necessary to–

- Define SUA responsibilities. Supplement established operational or procedural instructions.
- Define responsibilities and coordinating requirements.
- Establish or standardize operating methods.
- Describe airspace to segregate special operations.
- Specify special operating conditions or specific ATC procedures.

C-7. LOP criteria governing SUA includes at a minimum—

- Scheduling procedures and updates, to include requirement and time parameters for providing updates to the schedule.
- Activation and deactivation time and procedures.
- Authorization (signed) by the affected ATC facility manager and military representative of the originating or scheduling activity.
- Address transfer of airspace during emergency conditions. In the event of an emergency, the using agency may approve the controlling agency's request for use of SUA. The using agency, when notified by an FAA manager or supervisor of an emergency, transfers the airspace to the controlling agency as soon as safety permits. The controlling agency returns the airspace to the using agency when the emergency traffic situation is resolved.
- The using agency approves or disapproves the controlling agency's request to use SUA for situations caused by weather by assessing the immediate situation and its impact on Army and civil aircraft operations. The decision is made based on a request from a FAA supervisor and imminent or existing weather conditions (not traffic flow). Weather conditions requiring special considerations are tornadoes, hurricanes, and/or blizzards. The controlling agency returns the airspace to the using agency within 30 minutes after the weather situation is no longer a factor.

Note. The controlling agency provides using agency, on request, an AAR when SUA is transferred.

C-8. LOPs are processed per AR 95-2. The AT&A officer coordinates an LOP with the appropriate DAR prior to discussions with the FAA, during development, and when modifications are made. The DAR is provided a detailed explanation of the LOP purpose, to include a copy of the concept of operation, if applicable. If an AT&A officer is not available, the unit commander or designated representative may need to coordinate directly with the DAR.

C-9. Forward all LOPs to the DAR for review at least 45 days prior to the desired implementation date. Activities or agencies that do not have a DAR, may forward their documents directly to: USAASD-E (locations in Europe, Africa, and the Middle East), EUSA ATS Office (Korea), and HQ, United States Army Aeronautical Services Agency for all other areas. Include the following:

- A cover memorandum that includes any changes to existing LOP, along with background information for each change. If the LOP is new, a brief description of the operation should be outlined. The unit commander approves the memorandum.
- DAR endorsement recommends approval or disapproval of the LOP and any recommended changes.
- Leave effective date and signatures blank until all coordination is complete and all comments are considered and incorporated as required. Once this is accomplished, establish an effective date acceptable to all parties involved. This permits sufficient time for distribution and participating facilities and user groups to familiarize personnel, revise directives, flight charts, and complete other actions as necessary.

C-10. LOPs are reviewed at least once annually on or before the anniversary date. It is mandatory for DARs to review LOPs per AR 95-2. Table C-2, page C-4, is an example of a LOP.

Table C-2. Sample letter of procedure

JOINT USE RESTRICTED AREA LETTER OF PROCEDURE

SUBJECT: Joint use letter of procedure for use of restricted areas R-OOOOA, R-OOOOB, R-OOOOC, R-OOOOD, R-OOOOE

EFFECTIVE: 25 December 2002

Per. AR 95-2, AR 385-63, FAAO JO 7610.4, and FAAO JO 7400.10, this letter establishes the following procedures for the joint use of restricted areas R-OOOOA, R-OOOOB, R-OOOOC, R-OOOOD, R-OOOOE between: Jacks Air Route Traffic Control Center (controlling agency), Commander, Fort Every (using agency), Fort Every Range Control (scheduling agency), and Fort Every Army ARAC.

CANCELLATIONS: This letter of procedure cancels the (title of previous letter) Joint use of letter of procedures, same subject, dated 1 April 2001.

PROCEDURES:

1. ARAC:
   - Inform controlling agency of activation/deactivation times for R-OOOOA, R-OOOOB, R- OOOOC, R-OOOOD, R-OOOOE.
   - Notify controlling agency 30 minutes prior to activation of special use airspace via landline.
   - When notified by controlling agency manager/supervisor personnel of an emergency, Army supervisor will assess the immediate situation and its impact on Army and civil aircraft operations and make a decision to return/denial request for use of restricted area (s).
   - When controlling agency manger/supervisor requests use of restricted airspace for a situation caused by weather, Army supervisor will make a decision to release/deny request based upon imminent/existing weather conditions (not traffic flow). Examples of weather conditions that require special considerations are tornadoes, hurricanes, blizzards, and etcetera.
2. Controlling agency:
   - Will coordinate with the using agency for use of the designated restricted airspace when not per FAAO JO 7400.10.
   - Shall return designated airspace to the using agency within 30 minutes of request.
3. Scheduling agency:
   - Shall coordinate schedule changes between ARAC and controlling agency.
   - Shall forward, as soon as possible, schedule changes to the controlling agency, via dedicated or commercial line.

EXECUTED:

_____	_____
Signed:	Signed:
_____	_____
Title:	Title:
_____	_____
Date:	Date:
_____	
DAR Review By/Date:	

Legend: AR= Army regulation, ARAC= Army radar approach control, DAR= Department of the Army representative, FAAO= Federal Aviation Administration Order, JO= job order

FACILITY MEMORANDUMS

C-11. The branch chief issues memorandums when internal facility operations must be regulated and standardized. Facility memorandums contain instructions on administrative or operational practices and procedures within the facility. The chief may issue a memorandum as a joint document when it applies to two or more ATC facilities under their jurisdiction.

C-12. Facility memorandums follow the standard Army memorandum format and are numbered in sequence (for example, 19-1, 19-2, meaning the first and second memorandum for 2019). They are limited to one subject, operation, or procedure; enclosures and attachments may be included. Facility memorandums are reviewed for currency annually no later than the anniversary date of the original document. The branch chief dates and signs the annual review.

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Appendix D

Emergency Plans and Procedures

Aviation operations inherently involve significant risk. Leaders at all levels must continuously assess both the accidental and tactical risk associated with operations and mitigate appropriately. The prevention of aviation accidents, during training or in the conduct of operations, require unit commanders, supervisors, and safety managers at all levels to emphasize safety and comply with policies regarding aviation safety and force protection.

EMERGENCY PLANS

D-1. Each Army airfield and aviation unit is required to publish, maintain, and test emergency plans. These plans should provide sufficient guidance toward personnel responsibilities and emergency procedures to reduce the probability of personal injury and property damage on the airfield or to unit aircraft.

AIRFIELD COMMANDER RESPONSIBILITIES

D-2. The airfield commander coordinates the emergency plan with law enforcement personnel, rescue and firefighting personnel, medical personnel, principal airfield tenants, and other personnel who have responsibilities under the plan. They conduct a full-scale exercise of the emergency plan at least every three years.

OPERATIONS OFFICER RESPONSIBILITIES

D-3. The airfield operations officer ensures the participation of all personnel who have responsibilities under the plan. They ensure all airfield personnel are familiar with their responsibilities and are trained properly. They review and rehearse the adequacy of the emergency plan annually.

RESPONSE INSTRUCTIONS

D-4. The emergency plan contains instructions for responding to—

- Aircraft accidents and incidents.
- Bomb incidents, including designated parking areas for aircraft involved.
- Structural fires.
- Natural disasters.
- Radiological/biological incidents.
- Sabotage, hijack incidents, and other unlawful interference with airfield operations.
- Power failure for movement area lighting.
- Water rescue situations.
- Hazardous material spills.
- Ammunition handling procedures.

NOTIFICATION PROCEDURES

D-5. The emergency plan includes procedures for notifying appropriate personnel regarding—

- The location of the emergency.
- The number of personnel involved.
- Other information needed to carry out their responsibilities as soon as it is available.

MEDICAL/EMERGENCY PROVISIONS

D-6. The emergency plan must—

- Provide access to Army Health Systems support for the maximum number of persons transported by the largest aircraft the airfield can serve.
- Provide the name, location (business address, hours operation telephone number, and medical treatment and hospitalization capabilities of each military and civilian medical treatment facilities. who have agreed to provide medical treatment and hospitalization.
- Provide the name, location (business address), hours operation and telephone number and medical evacuation platform capabilities of each rescue military and civilian squad, ambulance service, and government agency that has agreed to provide medical evacuation.
- Include provisions for inventorying surface vehicles and aircraft available to transport injured and deceased persons to locations on the airfield and in the communities it serves.
- Identify hangars or other buildings available to accommodate uninjured, injured, and deceased persons.
- Provide the name, location (business address), hours of operation, telephone number, and medical logistics/supply capabilities of each military unit and civilian business that has agreed to provide medical logistics and supplies (to include blood support) and equipment (to include medical maintenance).

RELATED EMERGENCY FUNCTIONS

D-7. The emergency plan must provide for—

- Crash alarm systems.
- Removal of disabled aircraft.
- Coordination of airfield and control tower functions relating to emergency actions.
- Marshaling, transporting, and caring for uninjured and ambulatory injured accident survivors.
- Crash site security.
- Training and equipping accident board members to deal with composite and blood-borne hazards.

WATER RESCUE PROVISIONS

D-8. The emergency plan should provide for the rescue of aircraft accident victims from significant bodies of water or marshlands crossed by aircraft.

CROWD CONTROL

D-9. The emergency plan specifies the name and location of each safety or security agency that has agreed to provide assistance for crowd control in the event of an emergency on the airfield.

DISABLED AIRCRAFT REMOVAL

D-10. The emergency plan includes the names, locations, and telephone numbers of personnel who have disabled aircraft removal responsibilities.

PRE-ACCIDENT PLANS

D-11. Commanders will ensure—

- Crewmembers and other personnel who may have contributed to an Army aircraft accident (Class A through C and selected Class D) are promptly moved by medical evacuation assets to medical treatment facilities where physical examinations and blood and urine testing will be accomplished under the provisions of AR 40-8, AR 40-21, AR 40-501, AR 600-105, DA Pam 385-40, and DA Pam 385-90. Apparent absence of injury is not a factor in determining how or when to move personnel to medical treatment facilities. The dynamics involved in an aircraft accident may

produce injuries that are found only with a detailed medical examination. Post-mishap flight evaluations will be administered per AR 95-1.

- The development of detailed, written, pre-accident plans specifying duties, responsibilities, and immediate actions for personnel involved in accident notification procedures, search and rescue, accident investigation, and equipment recovery. The unit operations officer develops and administers the pre-accident plan with technical assistance from the unit ASO.
- All operations personnel must be familiar with the pre-accident plan and know what to do if an accident occurs.

D-12. The pre-accident plan is coordinated with all commanders and appropriate personnel. Emergency personnel must be familiar with the crash alarm system and the pertinent provisions of AR 385-10 and DA Pam 385-90. All responsible personnel must be ready to respond to an emergency at any time. Pre-accident plans will—

- Interface with airfield/installation and higher HQ plans. Units/facilities on non-Army and non-DOD airfields ensure that plans are coordinated with appropriate local authorities to ensure compliance with applicable Army and DOD requirements.
- Focus on organized rescue of personnel, protection of property, preservation of the accident scene, and notification of appropriate personnel.
- Address both garrison and field/deployment operations.
- Address actions for both aviation and ground accidents.
- Include a crash alarm system, a crash rescue plan, and a means of notifying board members who will investigate the accident, to include the flight surgeon. AR 385-10 discusses the crash rescue plan in detail.
- Require a daily test of the primary and secondary crash alarm systems. Figure D-1, page D-4, provides an example of a unit aviation primary and secondary crash alarm plan.

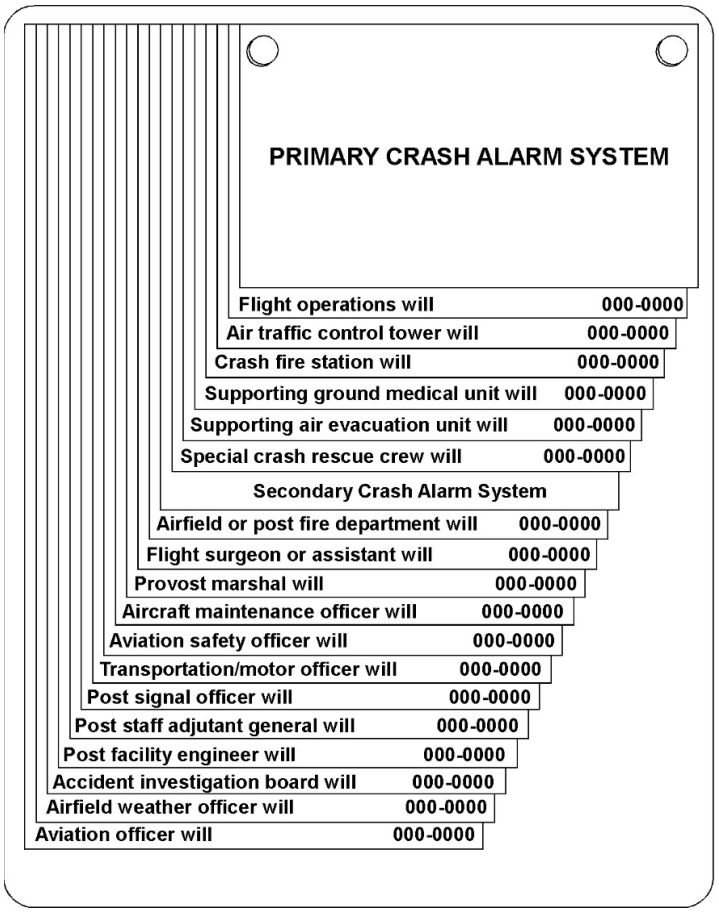

Figure D-1. Sample primary and secondary crash alarm system

- Ensure that an air crash, search, and rescue map of the local area is provided to and maintained by each activity listed for the primary crash alarm systems.
- Direct that wreckage is not disturbed or moved except for purposes of rescue and/or firefighting until released by the president of the aircraft accident investigation board. DA Pam 385-40 contains guidance on the preservation of wreckage.
- Be systematically rehearsed and reviewed for adequacy quarterly (at a minimum).
- Ensure plans rehearsal is coordinated per AR 420-1. Frequent non-tenant user flight crews will be fully knowledgeable of the host installation pre-accident plan.

NATIONAL SEARCH AND RESCUE PLAN

D-13. SAR is a lifesaving service provided by the Federal agencies signatory to the National Search and Rescue Plan and agencies responsible for search and rescue within each state. Operational resources are provided by the United States Coast Guard, DOD components, Civil Air Patrol, Coast Guard auxiliary, state, county, and local law enforcement and other public safety agencies, and private volunteer organizations. Information for national rescue coordination centers can be located at the NOAA homepage.

D-14. Overdue aircraft communications search responsibility is shared between DOD and FAA. The destination host base operations section is responsible for preliminary communication search activities, and the FAA destination tie-in facility is responsible for all extended communication search actions.

D-15. ARTCCs and FAA facilities alert the SAR facilities when information is received from any source that an aircraft is experiencing difficulty, overdue, or missing. A filed flight plan is the most timely and effective indicator that an aircraft is overdue. Flight plan information is invaluable to SAR forces for planning and executing search activities.

D-16. Before departing on a flight, local or otherwise, the pilot advises someone at the departure point of their destination and flight route, if it is not direct. Search efforts are often wasted and rescue is often delayed because pilots take off without informing anyone of their planned route and destination.

D-17. The life expectancy of an injured survivor decreases as much as 80 percent during the first 24 hours. The chance of survival for uninjured personnel rapidly diminishes after the first 3 days.

DESTINATION BASE OPERATIONS

D-18. If an inbound aircraft (including aircraft flying locally and round-robin) has not arrived or communications cannot be established within 30 minutes after the estimate time of arrival, the destination host base operations will initiate the following preliminary communications search actions:

- Contact local ATC agencies. (This action frequently resolves questions regarding IFR aircraft.)
- Initiate a ramp check.
- Check adjacent airports.

D-19. If the above procedures fail to ascertain the aircraft's whereabouts, begin the electronic communications search procedures currently in use (for example, Service B or Aeronautical Information System according to FAA Order JO 7110.10BB, chapter 8.)

D-20. Notify the destination tie-in FAA facility, by voice, of the overdue aircraft and the preliminary communications search actions taken.

HAZARDOUS AREA SEARCH AND RESCUE SERVICES

D-21. When lake, island, mountain, or swamp reporting services have been established and a pilot requests the service, contact is made every 10 minutes—or at designated position checkpoints—with the aircraft while it is crossing a hazardous area. If contact with the aircraft is lost for more than 15 minutes, SAR facilities are alerted.

Note. Hazardous area reporting service and chart depictions are published in the Aeronautical Information Manual, basic FLIPs, and local ATC publications.

SEARCH AND RESCUE PROTECTION

D-22. Military and civilian pilots are required to file a VFR flight plan with the airfield base operations or at a FAA facility. For maximum protection, the pilot should file only to the point of first intended landing and refile for each leg to the final destination. When a lengthy flight plan is filed with several stops en route and an estimated time en route to the final destination, a mishap could occur on any leg of the flight. Unless other information is received, a search will be initiated only when the aircraft's estimated time of arrival at the final destination has exceeded 30 minutes.

Note. The Aeronautical Information Manual contains more information about the emergency services available to pilots.

EMERGENCY LOCATOR TRANSMITTERS

D-23. Emergency locator transmitters (ELTs) are battery operated and emit a distinctive downward swept audio tone on 121.5 megahertz (MHz) and 243.0 MHz or 406 MHz When armed and subjected to crash-generated forces, they are designed to activate automatically and continuously emit these signals. ELTs will operate continuously for at least 48 hours over a wide temperature range. A properly installed and maintained ELT can expedite search and rescue activities.

D-24. Title 14, Part 91 in the CFR authorizes the operational ground testing of ELTs during the first 5 minutes of each hour. If operational tests must be conducted outside this timeframe, coordination must be made with the base operations or control tower. Tests should be no longer than three audible sweeps.

D-25. Caution should be exercised to prevent the inadvertent activation of ELTs in the air or while ELTs are being handled on the ground. Accidental or unauthorized activation will generate an emergency signal that cannot be distinguished from an authentic signal, leading to expensive and frustrating searches. The Aeronautical Information Manual and FAA Order JO 7110.10BB contain additional information on ELTs.

Glossary

The glossary lists acronyms and terms with Army or joint definitions. Where Army and joint definitions differ, (Army) precedes the definition. The Army proponent publication for other terms is listed in parentheses after the definition. Approved Marine Corps acronyms, terms, and definitions can be found in Marine Corps Supplement to the DOD Dictionary of Military and Associated Terms

SECTION I – ACRONYMS AND ABBREVIATIONS

AAAA	Army Aviation Association of America
AAR	after action review
ADP	Army doctrine publication
ADR	airfield damage repair
AF	Air Force
AFI	Air Force instruction
AFMAN	Air Force manual
AFSC	Air Force Systems Command
AIM	Army Interoperability Module
AM	amplitude modulation
AMPS	aviation mission planning system
AMSO	aviation mission survivability officer
AO	area of operations
AOB	airfield operations battalion
APOD	aerial port of debarkation
APOE	aerial port of embarkation
AR	Army regulation
ARFF	aircraft rescue firefighting
ARTCC	air route traffic control center
ASO	aviation safety officer
AT&A	air traffic and airspace
ATC	air traffic control
ATP	Army techniques publication
ATS	air traffic service
BASEOPS	base operations
BDOC	base defense operations center
C2	command and control
CBRN	chemical, biological, radiological, and nuclear
CFR	Code of Federal Regulations
CP	command post
CRE	contingency response element
CTL	commander’s task list
DA	Department of the Army
DA Pam	Department of the Army pamphlet

DAR	Department of the Army representative
DD	Department of Defense (form)
DOD	Department of Defense
DODD	Department of Defense directive
ELT	emergency locator transmitter
EUSA	Eighth U.S. Army
FAA	Federal Aviation Administration
FARP	forward arming and refueling point
FLIP	flight information publication
FM	field manual; frequency modulation
FOB	forward operating base
FOD	foreign object damage
FSCM	fire support coordination measure
FSO	fire support officer
FW	fixed-wing
GS	general support
HAZMAT	hazardous materials
IFR	instrument flight rules
JFC	joint force commander
JP	joint publication
JO	job order
LNO	liaison officer
LOA	letter of agreement
LOP	letter of procedure
LZ	landing zone
MEB	maneuver enhancement brigade
MEDEVAC	medical evacuation
METT-TC (I)	mission, enemy, terrain and weather, troops and support available, time available, civil considerations, and informational considerations.
MHz	megahertz
MIL-STD	military standard
MOTS	mobile tower system
NATO	North American Treaty Organization
NAVAID	navigational aid
NFPA	National Fire Protection Association
NGO	nongovernmental organization
NOAA	National Oceanic and Atmospheric Administration
NOTAM	notice to air mission
OHR	operational hazard report
OPSEC	operations security

PMCS	preventive maintenance checks and services
POL	petroleum, oils, and lubricants
QRF	quick reaction force
RON	remain overnight
RW	rotary-wing
RWY	runway
S-1	battalion or brigade personnel staff officer
S-3	battalion or brigade operations staff officer
S-4	battalion or brigade logistics staff officer
SAA	senior airfield authority
SAR	search and rescue
SIAP	special instrument approach procedure
SOP	standard operating procedure
SUA	special use airspace
TAOG	theater airfield operations group
TC	training circular
TERP	terminal instrument procedure
TM	technical manual
TO	theater of operations
TO&E	table of organization and equipment
TSC	theater sustainment command
TSPWG	tri-service pavements working group
TWY	taxiway
UAS	unmanned aircraft system
UFC	Unified Facilities Criteria
UHF	ultra-high frequency
USAASD-E	United States Army Aeronautical Services Detachment, Europe
UTC	Coordinated Universal Time
UXO	unexploded ordinance
VFR	visual flight rules
VHF	very high frequency
VIP	very important person

SECTION II – TERMS

No terms associated with this publication.

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