FM 3-09

Fire Support and Field Artillery Operations



AUGUST 2024

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Fire Support and Field Artillery Operations

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Preface

This publication is the Army's field manual for fire support and field artillery operations. It provides principles and functions for fire support elements and field artillery units conducting operations in a multidomain environment. It establishes the basis for understanding fire support and field artillery as critical components of the fires warfighting function tasks. FM 3-09 establishes the core competencies, functions, characteristics, and principles of fire support and field artillery.

To comprehend the doctrine contained in FM 3-09, readers must understand the fundamentals of large-scale combat operations and multidomain operations described in ADP 3-0 and FM 3-0. They must understand the language of tactics and the fundamentals of the offense and defense, and echelons above brigade described in FM 3-90 and FM 3-94. Users of FM 3-09 should also understand the fundamentals of stability operations described in ADP 3-07 and the functions and principles of intelligence and sustainment found in FM 2-0 and FM 4-0.

Army leaders must understand joint doctrine and use it when communicating and coordinating directly with the joint force. JP 3-0 establishes the baseline operations doctrine for the joint force.

The principal audience for FM 3-09 is all commanders and their staffs. This publication is intended to provide guidance for echelons above brigade for the planning, preparing, execution, and assessment of fire support and the employment of field artillery in all operations. Trainers and educators throughout the Army will also use this manual. This manual should be studied by those members of the combined arms team or other services who are responsible for the delivery of fires in support of large-scale combat operations.

Commanders, staffs, and subordinates ensure that their decisions and actions comply with all applicable United States, international, and host-nation laws and regulations, and all applicable international treaties and agreements. Commanders at all levels ensure that their Soldiers operate in accordance with the law of armed conflict and applicable rules of engagement. (See FM 6-27 for more information on the law of war.) They also adhere to the Army Ethic as described in ADP 6-22.

FM 3-09 implements North Atlantic Treaty Organization (NATO) standardization agreements (STANAG) 2484 and 3680.

FM 3-09 uses joint terms where applicable. Selected joint and Army terms and definitions appear in both the glossary and the text. Terms for which FM 3-09 is the proponent publication (the authority) are presented in italics and bold font in the text and marked with an asterisk (*) in the glossary. When first defined in the text, a term for which FM 3-09 is the proponent publication is boldfaced and italicized, and the definition is, boldfaced. When first defining other proponent definitions in the text, the term is italicized, and the number of the proponent publication follows the definition.

FM 3-09 applies to the Regular Army, the Army National Guard/Army National Guard of the United States, and the United States Army Reserve unless otherwise stated.

The proponent of FM 3-09 is the Commandant, United States Army Field Artillery School and Chief of the Field Artillery. The preparing agency is the United States Army Fires Center of Excellence, Directorate of Training and Doctrine. Send comments and recommendations on a Department of the Army (DA) Form 2028 (*Recommended Changes to Publications and Blank Forms*) to Directorate of Training and Doctrine, 700 McNair Avenue, Suite 128, ATTN: ATSF-DD, Fort Sill, OK 73503; by e-mail to: usarmy.sill.fcoe.mbx.dotd-doctrine@mail.mil; or submit an electronic DA Form 2028.

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Introduction

This version of FM 3-09 codifies the multidomain approach to fire support and field artillery operations in terms of the combined arms employment of capabilities from multiple domains. A *domain* is a physically defined portion of an operational environment requiring a unique set of warfighting capabilities and skills (FM 3-0). The aim of this publication is to establish the functions and principles of fire support planning, coordination, execution, and assessment and to describe the fire support system in terms of its major components, functions, and required products. This publication describes the fire support system as a complete entity and gives equal treatment to all the diverse assets and capabilities that are designated as elements of the fire support system.

The theme of this publication is that the successful delivery of fires depends on the rapid and continuous integration and synchronization of all forms of fire support assets with all dynamics of combat power, and across all domains for one purpose. This is to place the correct types and volume of fire at the right time and on the right targets, across all domains to ensure the success of the supported commander's concept of operations.

This publication provides the foundation for the development of subordinate fire support and field artillery doctrine, force design, materiel acquisition, professional education, and individual and unit training. Fire support and field artillery techniques manuals go into further detail to explain specific duties for those individuals who work within the fire support system. This publication will not describe prototype or non-validated systems.

The source document for FM 3-09 continues to be FM 3-0, Operations. Figure 1 on page xii, shows the logic diagram for this publication.

The major changes from the 2020 FM 3-09 are listed below:

- Aligns with FM 3-0, on the Army strategic context and joint competition continuum, competition below armed conflict, crisis, and armed conflict.
- Aligns terms and definitions with FM 3-0.
- Updated the logic chart.
- Formally recognizes multidomain operations and its tenets.
- Added tables aligning the tenets and imperatives of operations with fire support and field artillery procedures.
- Updated the difference between the theater fires command and the theater fires element for clarity.
- Introduces operational fires command.
- Modified multiple fire support definitions to align with multidomain operations doctrine (see introductory Table 1).
- Adds a large-scale combat battlefield framework figure in chapter 6.
- Adds a maritime section to the appendix on environmental and terrain considerations.
- Modified use of maneuver commander to supported commander in appropriate areas to facilitate alignment with multidomain doctrine.

FM 3-09 contains six chapters and four appendices:

Chapter 1 Covers an overview of the foundations of fire support. Chapter 1 begins by defining fire support, describes the characteristics of fire support, adds fire support considerations for the tenets and imperatives of operations, defines the fire support system, and fire support functions to include joint and multidomain operations.

Chapter 2 Covers the components of the fire support system, this includes fire support command and control elements, target acquisition, and attack/delivery systems.

Chapter 3 Covers fire support and the operations process. It describes the basic fire support functions it also covers fire support planning, fire support planning principles, and fire support and the military decision-making process.

Chapter 4 Covers the role of the field artillery, command and support relationships, field artillery inherent responsibilities, the key considerations for field artillery employment, and fire direction.

Chapter 5 Covers fire support operations during competition and crisis.

Chapter 6 Covers fire support in large-scale combat operations. Describes general fire support considerations, provides tactics for fire support for the defense, addresses tactics for fire support for the offense, and covers enabling, stability and reconstitution operations.

Appendix A Covers the development of essential fire support tasks, and essential field artillery tasks.

Appendix B Covers fire support coordination measures to include permissive, and restrictive, coordination measures.

Appendix C Covers denied, degraded, and disrupted operations to include types of conditions, and the five requirements for accurate predicted fire during these operations.

Appendix D Covers environmental and terrain considerations for fire support and field artillery.

Appendix E Targeting and Army air support requests.

NEW, RESCINDED, AND MODIFIED TERMS

FM 3-09 becomes the proponent of Army terms, introduces new army terms and modifies the following Army terms. See introductory table 1.

Introductory Table 1. New, modified, and rescinded terms

Term	*Remarks*
critical friendly zone	Modified
danger close	Modified and FM 3-09 becomes proponent
defensive fires	Removed, ADP 3-19 will become proponent when updated.
diversion	FM 3-09 becomes proponent
fire support	Modified
fire support coordinator	Modified
fire support officer	Modified
fire support plan	Modified
fire support planning	Modified
force field artillery headquarters	Modified
harassing fire	Modified
indirect fire	FM 3-09 becomes proponent
offensive fires	Removed, ADP 3-19 will become proponent when updated.

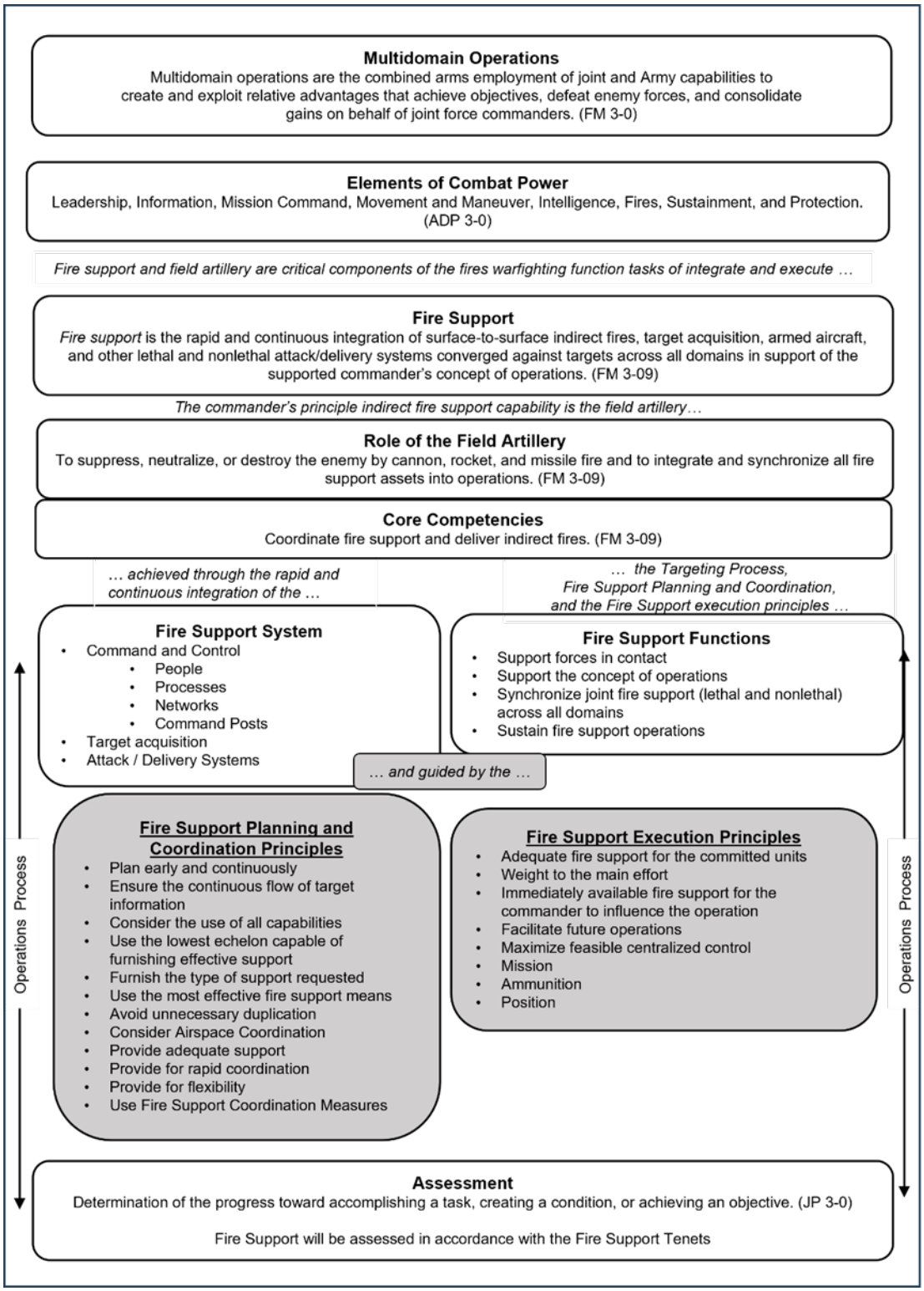


Figure 1. Fire support logic chart

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Chapter 1
Foundations of Fire Support and the Role of the Field Artillery

Fire support **is a rapid and continuous integration of surface-to-surface indirect fires, target acquisition, armed aircraft, and other lethal and nonlethal attack/delivery systems that converge against targets across all domains in support of the supported commander's concept of operations.** The functions, characteristics, and principles of supporting maneuver with fire and giving depth to operations across all domains--land, sea, air, space, and cyberspace--have origins which are deeply rooted in the universal military experience. They are constant, and in conjunction with the role and core competencies of the field artillery (FA), will apply to future multidomain operations just as they apply to the present. Rapidly emerging technology and future missions and capabilities will change the methods of employing fire support (FS) as well as the degree by which FS is balanced with maneuver. However, the basic premise for why we provide FS will remain unchanged.

1-1. FS is inherently joint, conducted in all domains, and across all dimensions while simultaneously executed at all echelons of command. The commander will utilize organic and joint attack/delivery assets and capabilities to provide joint FS. *Joint fire support* is joint fires that assist the joint force in creating effects and achieving objectives. (JP 3-0). *Fires* are the use of weapons systems to create a specific lethal or nonlethal effect on a target (JP 3-0).

1-2. FS is a critical component of the fires warfighting function tasks of integrate and execute that allow the commander to converge effects across all domains to achieve positions of relative advantage in the context of large-scale combat operations (see ADP 3-19). *Relative advantage* is location or condition, in any domain, relative to an adversary or enemy that provides an opportunity to progress towards or achieve an objective (FM 3-0).

1-3. The commander employs lethal and nonlethal capabilities to support the scheme of maneuver, to mass firepower, and to destroy, neutralize, and suppress enemy forces. Lethal FS attack and delivery systems consist of indirect fire weapons and armed aircraft to include FA, mortars, naval surface fire support, and air-delivered munitions from fixed wing and rotary wing aircraft. ***Field artillery*** **is equipment, supplies, ammunition, and personnel involved in the use of cannon, rocket, or surface-to-surface missile launchers.** In large-scale combat operations, FS could be the principal means of destroying enemy forces. In this event, the scheme of maneuver would be designed specifically to capitalize on the effects of FS.

1-4. Nonlethal capabilities include cyberspace electromagnetic activities (CEMA), information activities, space, and munitions such as illumination and smoke. A *nonlethal weapon* is a weapon, device, or munition that is explicitly designed and primarily employed to incapacitate personnel or materiel immediately, while minimizing fatalities, permanent injury to personnel, and undesired damage to property in the target area or environment (JP 3-09).

FIRE SUPPORT AND THE THREAT

1-5. Strategic competitors and adversaries have studied our military operations closely over the last thirty years. They know that we excel by emphasizing joint and combined operations; technological dominance; global power projection; strategic, operational, and tactical maneuver; joint fires; sustainment at scale; and mission command initiative. Strategic competitors like China and Russia are synthesizing emerging technologies like artificial intelligence, hypersonics, nanotechnology, and robotics with their analysis of

military doctrine and operations. They deploy these capabilities through multiple layers of stand-off in all domains - space, cyber, air, sea, and land by establishing zones of antiaccess (A2)/area denial (AD). Enemy A2 refers to those actions and capabilities, usually long-range, designed to prevent an opposing force from entering an operational area (OA). *Operational area* is an overarching term encompassing more descriptive terms (such as area of responsibility and joint operations area) of locations for the conduct of military operations (JP 3-0). AD refers to those actions and capabilities, usually of shorter range, designed not to keep an opposing force out, but to limit its freedom of action within the OA.

1-6. Both China and Russia utilize an integrated fires command to employ FS assets. The integrated fires command executes all fire support tasks for the supported command. An integrated fires command is a dedicated combination of command and control (C2) structures and organic and attached joint FS units. The integrated fires command exercises centralized C2 of all allocated, dedicated FS assets retained by its level of command. This can include aviation, artillery, naval gunfire, and surface-to-surface missile units from different commands and services. It also exercises C2 over all reconnaissance, intelligence, surveillance, and target acquisition (TA) assets dedicated to its support. An integrated fires command is tasked to engage designated operational and strategic targets. Integrated fires commands are typically associated with campaign-level headquarters.

1-7. An integrated fires command and its component systems have key vulnerabilities that Army forces can target when supporting joint force operations. Like any military system, it requires sustainment capabilities and other support that Army forces can detect and attack. It has electromagnetic signatures that enable detection from friendly joint intelligence, surveillance, and reconnaissance (ISR) from all domains. Enemy networks depend on C2 nodes Army forces can target. Perhaps most importantly, systems within an integrated fires command are comprised of land-based capabilities, including sensors, fires capabilities, and C2 nodes, all of which Army forces can attack (FM 3-0). For more information on Chinese and Russian integrated fires commands see FM 3-0 and ATP 7-100.3, and the worldwide equipment guide website.

1-8. A peer or near-peer force represents the greatest potential threat to the U.S. forces. Peer threats employ their resources across all domains to attack the vulnerabilities of the U.S. and our allies. The *threat* is any combination of actors, entities, or forces that have the capability and intent to harm U.S. forces, U.S. national interests, or the homeland (ADP 3-0). They use their capabilities to create lethal and nonlethal effects throughout an operational environment (OE). An *operational environment* is the aggregate of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander (JP 3-0). In a new era of great power competition, our nation's adversaries seek to achieve their strategic aims, short of conflict, by the use of layered stand-off in the political, military and economic realms to separate the U.S. from our unified action partners. During large-scale combat operations they will employ A2/AD systems and tactics to separate U.S. forces and our allies in time, space, and function in order to defeat us. *Large-scale combat operations* are extensive joint combat operations in terms of scope and size of forces committed, conducted as a campaign aimed at achieving operational and strategic objectives (ADP 3-0). Technological achievements over the past decades have made possible great qualitative improvements in their weaponry to match observed vulnerabilities in U.S. systems and forces. U.S. adversaries seek to delay friendly forces long enough to achieve their goals and end hostilities before they reach culmination. Peer threats will employ various methods to employ their national elements of power to render U.S. military power irrelevant.

1-9. To defeat peer forces in large-scale combat, U.S. forces must first penetrate A2/AD systems, establish a position of relative advantage, retain the initiative and prevent enemy forces from achieving mass, momentum, and sustaining land combat. A balanced application of both firepower and maneuver is essential for US forces to achieve these goals. This calls for FS system synchronization and convergence of effects to attack high-payoff targets (HPTs) across the width and depth of the OA. Convergence is an outcome created by the concerted employment of capabilities from multiple domains and echelons against combinations of decisive points in any domain to create effects against a system, formation, decision maker, or in a specific geographic area (FM 3-0). A *high-payoff target* is a target whose loss to the enemy will significantly contribute to the success of the friendly course of action (JP 3-60).

1-10. Some threat actors have chemical, biological, radiological, and nuclear (CBRN) weapons capabilities and the ability to employ such weapons. Therefore, threat intent to employ CBRN weapons must be assessed. Preparation and planning to conduct operations in a CBRN environment are of paramount importance in any

confrontation with a threat actor armed with CBRN capabilities. Understanding threat CBRN weapons doctrine is important, particularly during large-scale combat operations.

1-11. The functions and principles of FS must apply to an ever-increasing number of hostile global situations that extend across the range of military operations. The FS system must be flexible enough to respond to any number of operations across the conflict continuum. Threat operations across all domains will attempt to degrade all aspects of FS, from C2, to TA, and delivery.

FIRE SUPPORT IN JOINT AND MULTIDOMAIN OPERATIONS

> *"Employing Army and joint capabilities makes use of all available combat power from each domain to accomplish missions at least cost. Multidomain operations are the Army's contribution to joint campaigns, spanning the competition continuum. Below the threshold of armed conflict, multidomain operations are how Army forces accrue advantages and demonstrate readiness for conflict, deterring adversaries while assuring allies and partners. During conflict, they are how Army forces close with and destroy the enemy, defeat enemy formations, seize critical terrain, and control populations and resources to deliver sustainable political outcomes." (FM 3-0)*

1-12. *Multidomain operations* are the combined arms employment of joint and Army capabilities to create and exploit relative advantages that achieve objectives, defeat enemy forces, and consolidate gains on behalf of joint force commanders (FM 3-0). Joint operations encompass all five domains: air, land, maritime, space, and cyberspace that includes, the electromagnetic spectrum (EMS) and the information environment. The employment of joint and Army capabilities, integrated across echelons and synchronized in a combined arms approach, is essential to defeating threats able to contest the joint force in all domains. Army forces integrate land, maritime, air, space, and cyberspace capabilities that facilitate maneuver to create physical, information, and human advantages joint force commanders exploit across the competition continuum (FM 3-0). FS is most effective when its effects are converged across all domains, and understood through the three dimensions (human, physical, and information).

1-13. *Combat power* is the total means of destructive and disruptive force that a military unit/formation can apply against an opponent at a given time (JP 3-0). FS must also be integrated with our unified action partners. *Unified action partners* are those military forces, governmental and nongovernmental organizations, and elements of the private sector with whom Army forces plan, coordinate, synchronize, and integrate during the conduct of operations (ADP 3-0). An example of an Army FS capability employed as part of the joint force is long range precision surface-to-surface fires used to penetrate and disintegrate the enemy's A2/AD systems both on land and at sea. *Disintegrate* is to disrupt the enemy's command and control, degrading the synchronization and cohesion of its operations (FM 3-0). They are closely integrated into the joint force commander's (JFC's) scheme of operations as part of the Army's overall FS contribution. The *joint force commander* is a general term applied to a combatant commander, subordinate unified commander, or joint task force commander (JP 1, Vol 1).

1-14. The Army supports the joint force by conducting the four strategic roles of shape OEs, counter aggression on land during crisis, prevail during large-scale ground combat, and consolidate gains. The strategic roles clarify the enduring reasons for which the U.S. Army is manned, organized, trained, and equipped. Strategic roles are not phases of an operation or a task, and they do not necessarily occur sequentially or on distinct terrain. Rather, the Army contributes to the joint operation specifically by providing forces and conducting operations across all four strategic roles. The supported commander is responsible for conducting these operations on a simultaneous basis. The requirement to integrate and synchronize FS with these strategic roles is inherent with this responsibility.

1-15. The Army's multidomain operations concept accounts for the constant nature of war and the changing character of warfare. Its balanced approach guides how Army forces operate across the competition continuum given the prevailing characteristics of anticipated OEs now and in the near future (FM 3-0).

TENETS OF OPERATIONS

1-16. The tenets of operations are desirable attributes that should be built into all plans and operations; they are directly related to how the Army's operational concept should be employed. Commanders use the tenets

of operations to inform and assess course of action (COA) development throughout the operations process. The extent to which an operation exhibits the tenets provides insight into the probability of success. The tenets of operations are agility, convergence, endurance, and depth. Table 1-1 lists several fire support considerations for the tenets of operations. For more information on the tenets of operations see FM 3-0.

Table 1-1. Fire Support considerations for the tenets of operations

Tenet of operations	*Fire Support Considerations (not all inclusive)*
Agility is the ability to move forces and adjust their dispositions and activities more rapidly than the enemy (FM 3-0). Agility requires sound judgment and rapid decision making, often gained by creating and exploiting information advantages. Agility requires leaders to anticipate needs or opportunities and trained formations to change direction, tasks, or focus as quickly as the situation requires. Change can include a transition between phases of an operation or the requirement to adapt to a new opportunity or hazard.	• Use of Support relationships to dynamically meet FS requirements. • Balancing centralized vs. decentralized control based on OE variables. • Coordinated Sensor and Zone management based on enemy SITEMP. • Forward positioning of firing units to extend range fans. • Observation/ISR/Information nested within targeting process. • Planning FSCM/ACMs to facilitate permissive fires environment and expedite deconfliction. • Execute FA Tech Rehearsals to validate MCIS information routing and processing.
Convergence is an outcome created by the concerted employment of capabilities from multiple domains and echelons against combinations of decisive points in any domain to create effects against a system, formation, decision maker, or in a specific geographic area (FM 3-0). Its utility derives from understanding the interdependent relationships among capabilities from different domains and combining those capabilities in surprising, effective tactics that accrue advantages over time. When combined, the complementary and reinforcing nature of each friendly capability present multiple dilemmas for enemy forces and produce an overall effect that is greater than the sum of each individual effect. The greater the extent to which forces achieve convergence and sustain it over time, the more favorable the outcome.	• Mass effects at decisive points. • Integrate and synchronize organic and joint assets across all domains. • Plan continuously throughout the targeting process and adjust dynamically. • Immediate availability of FS system for the commander. • Maximize centralized control to increase synchronization and streamline deconfliction. • Plan FSCM/ACMs to facilitate permissive fires environment and expedite deconfliction. • Synchronize ISR/Observation Plans to aid in target development and execution of convergence operations.
Endurance is the ability to persevere over time throughout the depth of an operational environment (FM 3-0). Endurance enhances the ability to project combat power and extends operational reach; it is about resilience and preserving combat power while continuing operations for as long as is necessary to achieve the desired outcome. During competition, Army forces improve endurance by setting the theater across all warfighting functions and improving interoperability with allies and other unified action partners. Endurance stems from organizing, protecting, and sustaining a force.	• Use principles of FS execution and Command and Support relationships to best task organize the FS system to meet commander's intent. (see chapter 3) • Leverage all available assets. (Joint/Multinational/National) across all domains. • Distributed and redundant C2 Nodes. • Effective Primary-Alternate-Contingency-Emergency communications plans. • Plan, request, and incorporate protection assets. • Develop effective HPTL, AGM, and TSS. • Implement responsive maintenance processes which minimize down-time. • Forecast sustainment requirements to meet targeting objectives.

Table 1-1 Fire Support considerations for the tenets of operations (continued)

Tenet of operations	*Fire Support Considerations (not all inclusive)*
Depth is the extension of operations in time, space, or purpose to achieve definitive results (ADP 3-0). While the focus of endurance is friendly combat power, the focus of depth is enemy locations and dispositions across all domains. Commanders achieve depth by understanding the strengths and vulnerabilities of the enemy's echeloned capabilities and then attacking them throughout their dispositions simultaneously and sequentially. Although simultaneous attacks through all domains in depth are not possible in every situation, leaders seek to expand their advantages and limit enemy opportunities for sanctuary and regeneration. Leaders describe the depth they can achieve in terms of operational reach.	• Position assets forward to maximize range. • Develop HPTL with multiple categories (Sustain, C2, Protection), not just FS; update HPTL categories and priorities IAW operational demands. • Leverage collection assets from across multiple domains. • Allocate ISR/Collection to identify HPTs and inform enemy SITEMP. • Manage sensors and zones to aid in identifying enemy IFC. • Plan for transitions as targeting objectives are met. • Target systems (Sustainment, IFC, IADS) as opposed to formations.
ACM – airspace coordinating measure, AGM – attack guidance matrix, C2 – command and control, FA – field artillery, FS – fire support, FSCM – fire support coordination measure, HPT – high-payoff target, HPTL – high-payoff target list, IAD – integrated air defense, IFC – integrated fires command, ISR – intelligence, surveillance, and reconnaissance, MCIS – mission command information systems, OE – operational environment, SITEMP – situation template, TSS – target selection standards	

IMPERATIVES OF OPERATIONS

1-17. Imperatives are actions Army forces must take to defeat enemy forces and achieve objectives at an acceptable cost. They are informed by the OE and the characteristics of the most capable threats that Army forces can encounter. For more information on imperatives of operations see FM 3-0.

1-18. Table 1-2 lists several FS considerations for the imperatives of operations.

Table 1-2. Fire support considerations for the imperatives of operations

Imperatives	*Fire support considerations (not all inclusive)*
See yourself, see the enemy, and understand the OE. Commanders visualize OEs in terms of factors that are relevant to decision making. OEs are dynamic and contain vast amounts of information that can overload C2 systems and impede decision making. Commanders simplify information collection, analysis, and decision making by focusing on how they see themselves, see the enemy, and understand the OE. These three categories of factors are interrelated, and leaders must understand how each one relates to the others in the current context.	• Understand the domains and dimensions through pre-mission analysis of the OE in conjunction with cultural intelligence and civil information. • Conduct "artillerized" IPOE at echelon to determine how OE impacts friendly and enemy. • Develop enemy SITEMP derived from OE impacts to enemy doctrine template. • Utilize multiple domains for collection management. • Understand friendly combat power in relation to the threat. • Conduct systems analysis throughout targeting process.
Account for being under constant observation and forms of enemy contact. Air, space, and cyberspace capabilities increase the likelihood that threat forces can gain and maintain continuous visual and electromagnetic contact with Army forces. Enemy forces possess a wide range of land-, maritime-, air-, and space-based intelligence, surveillance, and reconnaissance capabilities that can detect U.S. forces. Leaders must assume they are under constant observation from one or more domains and continuously ensure they are not providing lucrative targets for the enemy to attack.	• Integrating threats across all domains and dimensions into planning considerations and execution of operations. • Distributed and redundant C2 Nodes. • Effective Primary-Alternate-Contingency-Emergency (PACE) communications plans. • Tailoring survivability move criteria and positioning guidance to mitigate enemy observation capabilities. • Conduct "artillerized" IPOE at echelon to determine effects of terrain, line of sight, weather, and EW on friendly operations. • Use of natural or artificial cover and concealment when positioning units or C2 nodes.

Table 1-2. Fire support considerations for the imperatives of operations (continued)

Imperatives	*Fire support considerations (not all inclusive)*
Create and exploit positions of physical, information and human advantage in pursuit of decision dominance. The employment of lethal forces is based on the premise that destruction and other physical consequences compel enemy forces to change their decision making and behavior, ultimately accepting defeat. The type, amount, and ways in which lethal forces compel enemy forces varies, and this depends heavily on enemy forces, their capabilities, goals, and the will of relevant populations. Understanding the relationship between physical, information, and human factors enables leaders to take advantage of every opportunity and limit the negative effects of undesirable and unintended consequences.	• Target physical, information, and human factors through use of lethal and non-lethal methods. • Coordinated Sensor and Zone management to proactively target IFC. • Position assets forward to maximize range. • Ongoing military decision-making process and updated running estimates to inform current and future decisions. • Leverage all available assets (Joint/Multinational/National) across multiple domains. • Understand enemy critical capabilities and critical vulnerabilities to create windows of opportunity and relative advantage.
Make initial contact with the smallest element possible. Army forces are extremely vulnerable when they do not sufficiently understand the disposition of enemy forces and become decisively engaged on terms favorable to enemy forces. To avoid being surprised and incurring heavy losses, leaders must set conditions for making enemy contact on terms favorable to the friendly force. Leaders should anticipate when and where to make enemy contact, the probability and impact of making enemy contact, and actions to take on contact. Quickly applying multiple capabilities against enemy forces while preventing the bulk of the friendly force from being engaged itself requires understanding the forms of contact.	• Use the lowest echelon possible to produce the desired effect. • Manage cueing schedule to minimize radar signature. • Develop AGM to standardize fire orders. • Target systems as opposed to large formations. • Focus on execution of HPTs as opposed to “random” targets. • Leverage all available assets (Joint/Multinational/National) across multiple domains.
Impose multiple dilemmas on the enemy. Imposing multiple dilemmas on enemy forces complicates their decision making and forces them to prioritize among competing options. This is a way of seizing the initiative and making enemy forces react to friendly operations. Simultaneous operations encompassing multiple domains conducted in depth and supported by deception present enemy forces with multiple dilemmas. Employing capabilities from multiple domains degrades enemy freedom of action, reduces enemy flexibility and endurance, and disrupts enemy plans and coordination. The application of capabilities in complementary and reinforcing ways creates more problems than an enemy commander can solve. This erodes enemy effectiveness and the will to fight.	• Target the depth of enemy zones (Disruption/Battle/Support). • Leverage all available assets (Joint/Multinational/National) across multiple domains. • Provide deception fires in support of deception operations to reinforce pre-conceived notions of the enemy commander. • Distribute C2, collection, and firing unit locations. • Use reactive and proactive counterfire to deny enemy permissive fires environment.
Anticipate, plan, and execute transitions. Transitions mark a change of focus in an operation. Leaders plan transitions as part of the initial plan or parts of a branch or sequel. They can be unplanned and cause the force to react to unforeseen circumstances. Transitions can be part of progress toward mission accomplishment, or they can reflect a temporary setback.	• Forecast changes to Command and Support relationships based on demands for future operations. • Anticipate how the FS system will adjust for branches, sequels, and significant operational changes (Offense, Defense, Stability). • Plan for CP transitions (Main CP/Tactical CP) based on mission requirements. • Understand the effects of how weather/seasonal transitions will impact operations and support capabilities (weaponeering).
Designate, weight, and sustain the main effort. Commanders frequently face competing demands for limited resources. They establish priorities to resolve these demands by designating, weighting, and sustaining the main effort. They provide the main effort with the appropriate resources and support necessary for its success. When designating a main effort, commanders consider augmenting a unit’s task organization and giving it priority of resources and support. The commander designates various priorities of support, such as for air and missile defense, close air support and other fires, information collection, mobility and countermobility, and sustainment.	• Use FS execution principles (see chapter 3) to anticipate the dynamics of large-scale combat operations, maintain situational awareness of the OE, and leverage interoperable FS C2 systems and attack/delivery capabilities. • Assign Command and Support Relationships to provide adequate support, flexibility, and most effective fire support means. • Suitably allocate joint assets to the main effort.

Table 1-2. Fire support considerations for the imperatives of operations (continued)

Imperatives	*Fire support considerations (not all inclusive)*
Consolidate gains continuously. Leaders add depth to their operations in time and purpose when they consolidate gains. Commanders consolidate gains at the operational and tactical levels as a strategically informed approach to current operations, considering the desired political outcome of the conflict. During competition and crisis, commanders expand opportunities created from previous conflicts and activities to sustain enduring U.S. interests, while improving the credibility, readiness, and deterrent effect of Army forces. During large-scale combat operations, commanders consolidate gains continuously or as soon as possible, deciding whether to accept risk with a more moderate tempo during the present mission or in in the future as largescale combat operations conclude.	• Use FSCMs to account for civil considerations (NFA, RFA). • Evaluate appropriate time windows for effects to appear within the OE (to include cyber effects in populated areas, destruction of bridges). • Methodical decision for use of dud-producing munitions and their long-term effects when transitioning to civil authorities. • Weight support to rear and security operations against current or future operations.
Understand and manage the effects of operations on units and leaders. Continuous operations rapidly degrade the performance of people and the equipment employed, particularly during combat. In battle, Soldiers and units are more likely to fail catastrophically than gradually. Commanders and staffs must be alert to small indicators of fatigue, fear, indiscipline, and reduced morale; they must take measures to deal with these indicators before their cumulative effects drive a unit to the threshold of collapse. Staffs and commanders at higher echelons must consider the impact of prolonged combat on subordinate units. This causes efficiency to drop, even when physical losses are not great.	• Implement "hot/cold" cycles for FDCs, radars, and firing units to afford time for rest, maintenance, and preparations. • Adhere to preventative checks (Before/During/After) and service cycles (hour usage) to maintain equipment serviceability. • Develop shifts or duty cycles for Soldiers within CPs or C2 nodes which are practical for extended-duration operations.
AGM – attack guidance matrix, C2 – command and control, CP – command post, EW – electromagnetic warfare, FDC – fire direction center, FS – fire support, FSCM – fire support coordination measure, HPT – high-payoff target, HPTL – high-payoff target list, IFC – integrated fires command, IPOE – intelligence preparation of the operational environment, OE – operational environment, SITEMP – situation template	

OPERATIONAL APPROACH AND OPERATIONAL FRAMEWORK

1-19. An operational approach provides the logic for how tactical tasks ultimately achieve the desired endstate. It provides a unifying purpose and focus to all operations. Sound operational approaches balance risk and uncertainty with friction and chance. The operational approach provides the basis for detailed planning, allows leaders to establish a logical operational framework, and assists in producing an executable order. (See ADP 3-0 and ADP 5-0 for doctrine on operational art and planning, respectively.)

1-20. An operational framework organizes an area of geographic and operational responsibility for the commander and provides a way to describe the employment of forces. The framework illustrates the relationship between close operations, operations in depth, and other operations in time and space across domains. As a visualization tool, the operational framework bridges the gap between a unit's conceptual understanding of the environment and its need to generate detailed orders that direct operations.

OPERATIONAL APPROACH

1-21. Through operational art, commanders develop their operational approach. *Operational approach* is a broad description of the mission, operational concepts, tasks, and actions required to accomplish the mission (JP 5-0). An operational approach is the result of the commander's visualization of what needs to be done in broad terms to solve identified problems. Table 1- 3 lists several operational and FS considerations for operational approach. It is the main idea that informs detailed planning. When describing an operational approach, commanders:

- Consider ways to defeat enemy forces in detail and potential decisive points. *Defeat in detail* is concentrating overwhelming combat power against separate parts of a force rather than defeating the entire force at once (ADP 3-90).
- Employ combinations of defeat mechanisms to isolate and defeat enemy forces, functions, and capabilities.

- Assess options for assuming risk.

Table 1-3. Operational and fire support considerations for operational approach

Operational approach	*Operational and fire support considerations (not all inclusive)*
Defeating enemy forces in detail**.** Armed conflict implies the need to defeat enemy forces. *Defeat* is to render a force incapable of achieving its objectives (ADP 3-0). When used as a task or effect in operations, defeat provides the commander maximum flexibility to accomplish the mission. Senior leaders assign defeat as a task when the situation is still developing, or when the commander on the ground, by virtue of experience and proximity to the problem, is uniquely capable of deciding how to employ lethal force to accomplish objectives.	• Understand enemy functions, capabilities, and echelonment. • Target systems (IADS, IFC, Sustainment) as opposed to large formations. • Understand enemy critical capabilities and critical vulnerabilities to create windows of opportunity and relative advantage. • Leverage all available assets (Joint/Multinational/National) across all domains. • Ensure immediate availability of FS system to supported commander.
Defeat mechanism is a method through which friendly forces accomplish their mission against enemy opposition (ADP 3-0). Army forces at all echelons commonly use combinations of the four defeat mechanisms. Applying more than one defeat mechanism simultaneously creates multiple dilemmas for enemy forces and complementary and reinforcing effects not attainable with a single mechanism. Commanders may have an overarching defeat mechanism or combination of mechanisms that accomplish the mission, with supporting defeat mechanisms for components of an enemy formation or warfighting system. Defeat mechanisms can guide the subordinate development of tactical tasks, purposes, and effects in operations, facilitating control and initiative.	• Defeat mechanisms: ▪ *Destroy* is a tactical mission task that physically renders an enemy force combat-ineffective until reconstituted (FM 3-90). ▪ *Dislocate* is to employ forces to obtain significant positional advantage in one or more domains, rendering the enemy's dispositions less valuable, perhaps even irrelevant (FM 3-0). ▪ *Isolate* is to separate a force from its sources of support in order to reduce its effectiveness and increase its vulnerability to defeat (ADP 3-0). ▪ *Disintegrate* is to disrupt the enemy's command and control, degrading the synchronization and cohesion of its operations (FM 3-0). • Use assessments to confirm or deny if targeting is meeting desired effects and adjust, as necessary. • Utilize entirety of FS system to achieve commander's intent.
A *stability mechanism* is the primary method through which friendly forces affect civilians in order to attain conditions that support establishing a lasting, stable peace (ADP 3-0). As with defeat mechanisms, combinations of stability mechanisms produce complementary and reinforcing effects that accomplish the mission more effectively than single mechanisms.	• Stability Mechanisms. ▪ Compel refers to using, or threatening to use, lethal force to establish control and dominance, affect behavioral change, or enforce compliance with mandates, agreements, or civil authority. ▪ Control involves imposing civil order. ▪ Influence refers to altering the opinions, attitudes, and ultimately the behavior of foreign, friendly, neutral, and threat audiences through messages, presence, and actions. ▪ Support establishes, reinforces, or sets the conditions necessary for the instruments of national power to function effectively. • Effectively utilize nonlethal effects through multiple domains to account for civil considerations and to consolidate gains. • Use FSCMs to account for civil considerations (NFA, RFA). • Perform IPOE to better understand the complexity of OE. • Clearly define MOP/MOEs to gauge success and inform decision making.

Table 1-3. Operational and fire support considerations for operational approach (continued)

Operational approach	*Operational and fire support considerations (not all inclusive)*
Risk. Commanders accept risk on their own terms to create opportunities and apply judgment to manage those hazards they do not control. Risk is an inherent part of every operation and cannot be avoided. Commanders analyze risk in collaboration with subordinates to assist in determining the risk level and type and how to mitigate the risk. When considering how much risk to accept with a course of action, commanders consider risk to the force against the probability of mission success during current and future operations. They assess options in terms of weighting the main effort, economy of force, and physical loss based on what they have been tasked to do.	• Leaders considering risk across the domains. Accepting risk in one domain may create opportunities in other domains. • Waiting for near-perfect intelligence and synchronization may increase risk or close a window of opportunity. • Weighting Civil considerations vs targeting opportunities and FS system responsiveness. • Tactical Risks, such as forward positioning of firing units, may increase FS system effectiveness but increases risk of interdiction from enemy IFC.
FS – fire support, FSCM – fire support coordination measure, IADS – integrated air defense system, IFC – integrated fires command, IPOE – intelligence preparation of the operational environment, MOE – measures of effectiveness, MOP – measures of performance, NFA – no fire area, RFA – restricted fire area	

STRATEGIC FRAMEWORK

1-22. The strategic framework accounts for factors in the strategic environment and the connection of strategic capabilities to operational- and tactical-level operations. It includes the strategic support area, joint security area, extended deep area, and assigned OA.

1-23. The strategic framework has importance in terms of joint operations and Army operational-level operations. For most Army operations, understanding the Army operational framework in the context of the strategic framework, is important. For more information on strategic and operational frameworks see FM 3-0, JP 3-0, and JP 3-10.

OPERATIONAL FRAMEWORK

1-24. An operational framework is a cognitive tool used to assist commanders and staffs in clearly visualizing and describing the application of combat power in time, space, purpose, and resources in the concept of operations (ADP 1-01). Commanders build their operational framework on their assessment of the OE, including all domains and dimensions. They may create new models to fit the circumstances, but they generally apply a combination of common models according to doctrine. The three models commonly used to build an operational framework are:

- Assigned areas.
- Deep, close, and rear operations.
- Main effort, supporting effort, and reserve.

Note. Commanders may use any operational framework model they find useful, but they must remain synchronized with their higher-echelon headquarters' operational framework. FM 3-0 provides a detailed discussion on each model.

1-25. FS personnel must understand and properly use the doctrinal terminology, concepts, and considerations for the operational framework. Table 1-4 on pages 1-10 and 1-11 lists several FS considerations for the three operational framework models.

Table 1-4. Fire support considerations for operational framework

Operational framework models		*Fire support considerations (not all inclusive)*
Assigned Areas	An *area of operations* is an operational area defined by a commander for the land or maritime force commander to accomplish their missions and protect their forces (JP 3-0).	• Area of Operations: Coordinate with supported command to position C2, firing units, and collection platforms where most advantageous to provide greatest support. • Area of Operations: Understand higher-echelon and adjacent-unit delivery and collection capabilities to limit duplication and provide mutual support. • Area of Operations**:** Establish FSCMs and ACMs to reduce coordination; understand higher-echelon FSCMs and their effects, limitations, or restrictions within the supported AO.
	A *zone* is an operational area assigned to a unit in the offense that only has rear and lateral boundaries (FM 3-0).	• Zone: Establish and understand presence of NAIs, and TAIs to support units in offense.
	A *sector* is an operational area assigned to a unit in the defense that has rear and lateral boundaries and interlocking fires (FM 3-0).	• Sector: Establish and understand presence of NAIs, EAs, and TAIs to support units in defense.
Deep Operations	*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 (FM 3-0).	• Establish FSCMs and ACMs to expedite delivery and increase responsiveness. • Create multiple dilemmas for the enemy in their support area by targeting in depth through use of multiple domains and joint assets (Air Interdiction). • Target and disintegrate enemy structures and systems (IADS, IFC, Sustainment), prioritizing HPTs necessary to meet commander's intent. • Set favorable correlation of forces and means for supported command to contact the enemy with the greatest force ratio possible.
Close Operations	*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 (FM 3-0).	• Support Forces in Contact. • Establish FSCMs and ACMs to aid in rapid coordination and air/ground deconfliction. • Weight benefits of centralized vs. decentralized control based on conditions and proximity to friendly forces. • Incorporate multiple domains, in addition to FA assets, to create windows of opportunity and increase effectiveness of FS system. • Allocate joint assets (CAS) for immediate response.

Table 1-4. Fire support considerations for operational framework (continued)

Operational framework models		*Fire support considerations (not all inclusive)*
Rear Operations	*Rear operations* are tactical actions behind major subordinate maneuver forces that facilitate movement, extend operational reach, and maintain desired tempo (FM 3-0).	• Assess and weight risk of diverting FS C2, delivery, and collection assets from supporting deep/close operations to supporting rear operations. • Allocate multi-domain and joint assets to support rear operations and bolster security for rear operations.
Main Effort	A *main effort* is a designated subordinate unit whose mission at a given point in time is most critical to overall mission success (ADP 3-0).	• Use principles of execution (see chapter 3).
Supporting Effort	A *supporting effort* is a designated subordinate unit with a mission that supports the success of the main effort (ADP 3-0).	• Use principles of execution to inform resourcing and types of command and support relationships to the supporting effort (see chapter 3).
Reserve	A *reserve* is that portion of a body of troops that is withheld from action at the beginning of an engagement to be available for a decisive movement (ADP 3-90).	• Field artillery is never in reserve. (see principles of execution chapter 3).
ACM – airspace coordinating measure, AO – area of operations, C2 – command and control, CAS – close air support, EA – engagement area, FA – field artillery, FS – fire support, FSCM – fire support coordination measure, HPT – high-payoff target, IADS – integrated air defense systems, IFC – integrated fires command		

THE FIELD ARTILLERY'S ROLE AND CORE COMPETENCIES

1-26. A *role* is the broad and enduring purpose for which the organization or branch is established (ADP 1-01). A branch has only one role. The role of the FA is to destroy, neutralize, or suppress the enemy by cannon, rocket, and missile fire and to integrate and synchronize all FS assets into operations. This role clearly establishes why the FA was created-what our branch uniquely contributes to the conduct of combined and joint operations.

1-27. A *core competency* is an essential and enduring capability that a branch or an organization provides to Army operations (ADP 1-01). The FA has two core competencies that describe what our branch contributes to our Nation's security and to the JFC:

- To coordinate fire support, which is the planning and executing of fire so targets are adequately covered by a suitable weapon or group of weapons (see JP 3-09).
- To deliver indirect fire. ***Indirect fire*** **is fire delivered at a target not visible to the firing unit**.

THE FIRE SUPPORT SYSTEM

1-28. Fire support is achieved through simultaneous and coordinated interaction of all the elements of the joint FS system, thorough continuous planning, aggressive coordination, and vigorous execution at all echelons of command. The FS system elements (figure 1-1 on page 1-13) are:

- C2 (personnel, command posts (CPs), networks, processes, and procedures).
- TA.
- Attack/delivery systems.

1-29. These elements are the tools commanders use to make FS work. How they use these tools depends on how well commanders and staffs understand and integrate the core competency of the FS coordination process. This process must occur simultaneously at all echelons of command, but it is more complex at echelons above brigade.

1-30. The rapid and continuous integration of the FS system at all echelons of command across the joint forces must be synchronized with maneuver forces. For this reason, the commander seeks and may accept counsel on FS from his fire support coordinator (FSCOORD), but the commander must decide how the command will accomplish its mission.

1-31. **The *fire support coordinator* is the senior field artillery commander for the theater, corps, division, or brigade combat team who is the supported commander's primary advisor to plan, coordinate, integrate fires, field artillery, and fire support in the execution of assigned tasks.** This dual responsibility institutionalizes FS as commander's business and requires the FA commander to know the functions and objectives of the ground force, the operation of the FS system, and the technical aspects of FA fire as the supported commander's most available attack/delivery system. To further understand the FS System, it is necessary to examine each element in greater detail; this will be done in Chapter 2.

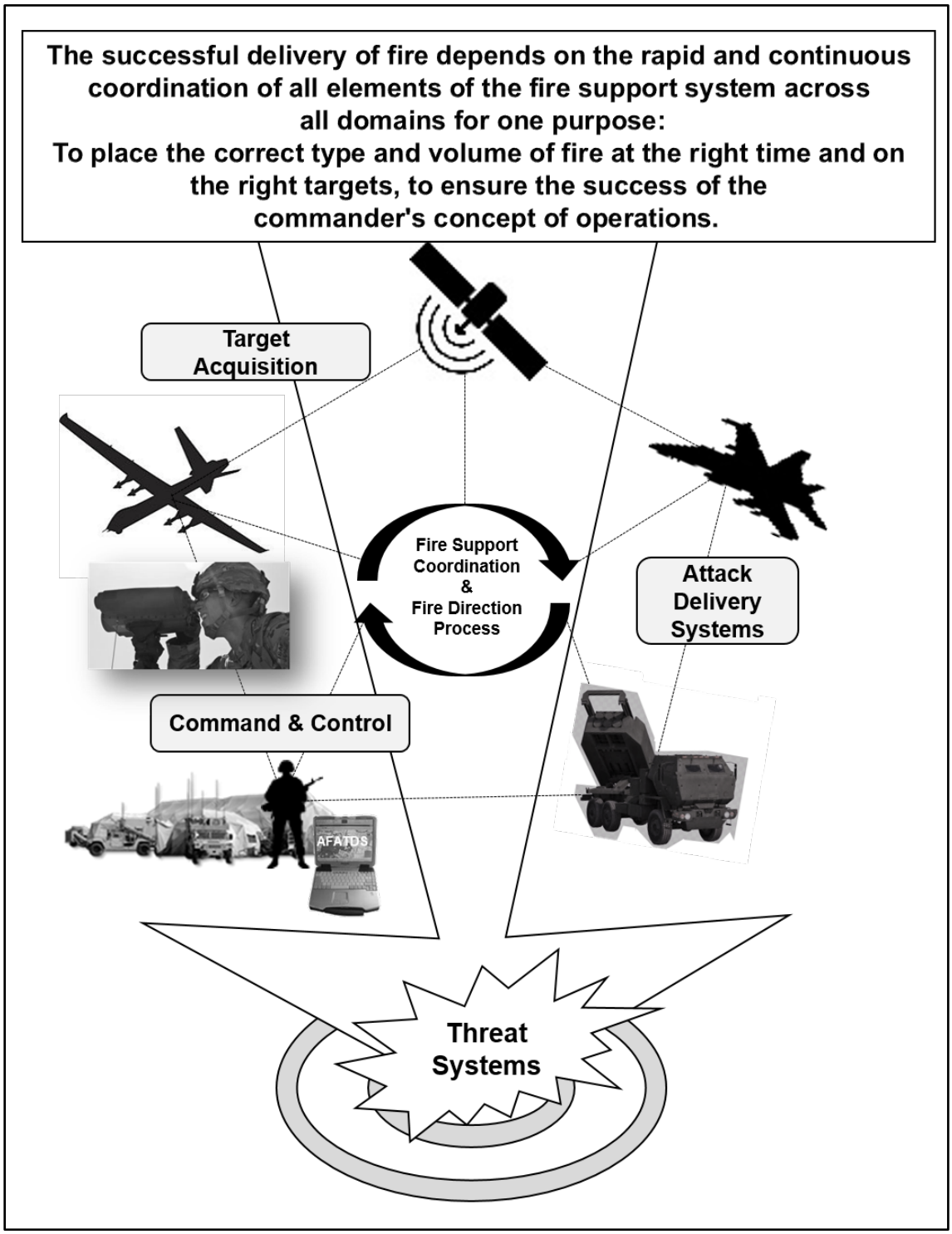


Figure 1-1. The elements of the fire support system

FIRE SUPPORT FUNCTIONS

1-32. A *function* is the broad, general, and enduring role for which an organization is designed, equipped, and trained (JP 1, Vol 1). By applying the functions, guided by characteristics and principles, an organization

or branch generates effects in the unique environment of the land domain to support the Army's operational concept. The four FS functions are the minimum requirements the FS system must fulfill to destroy, neutralize, or suppress the enemy. They give the commander and FSCOORD a frame of reference to evaluate and assess the overall effectiveness of the FS system. These four FS functions are:

- Support forces in contact.
- Support the concept of operations.
- Synchronize and converge FS systems, and effects (lethal and nonlethal) across all domains.
- Sustain and protect the FS system.

1-33. These functions serve as unifying factors for the entire FS system and apply to the systems individual components. The four functions do not change or replace the traditional missions, roles, and operations of the different Army and joint FS assets. They do, however, provide a common point of departure for an operationally unified FS system. For example, U.S. Air Force aircraft in support of ground operations must accomplish the four functions simultaneously. However, the Air Force does not consciously plan to work the four functions. Rather, it accomplishes its ground support mission through its execution of close air support (CAS), and air interdiction (AI). The final assessment of the ground support mission must be made in terms of the four functions. The mission command principles in general – disciplined initiative in particular – underpin these functions at all warfighting echelons. To further clarify these points, it is necessary to examine each function in greater detail; this will be done in Chapter 3.

CHARACTERISTICS OF FIRE SUPPORT

"Get the job done, tidy up the battlefield later." Gen. Jack N. Merritt (Field Artillery)

1-34. The purpose of a characteristic is to clearly establish essential attributes that the organization or function must possess to be effective. These characteristics are inherent in the design, mind-set, and equipment for the FA and provides our branch the ability to accomplish our role. The characteristics of FS are:

- To violently apply lethal fires in accordance with the law of war and established rules of engagement (ROE).
- To always operate in the spirit of the offense.
- To always operate as a single entity.

VIOLENTLY APPLY LETHAL FIRES WITHIN THE LAW OF WAR AND ROE

1-35. In large-scale combat operations, the goal of every FSCOORD, is to orchestrate a perfect harmony of intense violence within the law of war and established ROE in support of the supported commander's concept of operations. *Law of war* is that part of international law that regulates the conduct of armed hostilities (JP 3-84). *Rules of engagement* are directives issued by competent military authority that delineate the circumstances and limitations under which U. S. forces will initiate and/or continue combat engagement with other forces encountered (JP 3-84). Unit commanders always retain the inherent right and obligation to exercise self-defense in response to a hostile act or demonstrated hostile intent.

"If you would make war, wage it with energy and severity; it is the only means of making it shorter and consequently less deplorable for mankind." Gen. Napoleon Bonaparte

ALWAYS OPERATE IN THE SPIRIT OF THE OFFENSE

1-36. Fire support must always be conducted in the spirit of the offense. Regardless of whether the maneuver or supported force is engaged in the offense or defense, its FS must be offensively minded as it rapidly and continuously strikes HPTs across all domains. For example, when a maneuver unit seizes an assigned objective and transitions to the defense its FS system continues to aggressively search for and attack HPTs throughout the depth of the maneuver unit's assigned area of operations (AO) in a proactive and responsive manner.

OPERATE AS A SINGLE ENTITY

1-37. The FS system is a single entity composed of a diverse group of attack and delivery systems, personnel, and materiel, most of which operate in different ways. All FS capabilities in all three elements of the FS system must function with a unity of effort and purpose. The methods of providing individual FS assets may vary in terms of C2, command and support relationships, and tactics, techniques, and procedures (TTPs). However, individual interests and concerns of each FS organization or asset must be made subordinate to the overall mission and to the supported commander to integrate across all domains and function rapidly and continuously as a unified force.

> *"There is a tendency in each separate unit…to be one-handed puncher. By that I mean that the rifleman wants to shoot, the tanker wants to charge, the artilleryman to fire…That is not the way to win battles. If the band played a piece first with the piccolo, then with the brass horn, then with the clarinet, and then with the trumpet, there would be a hell of a lot of noise but no music." GEN George Patton (Armor)*

PRINCIPLES OF FIRE SUPPORT PLANNING, COORDINATION, AND EXECUTION

1-38. A *principle* is a comprehensive and fundamental rule or an assumption of central importance that guides how an organization approaches and thinks about the conduct of operations (ADP 1-01). The key to effective FS is the supported commander's ability to bring assets to bear on the enemy in an integrated and coordinated manner that is synchronized with the scheme of maneuver. How well this occurs depends on how well FSCOORDs and staff understand and operate the FS coordination and execution processes. *Execution* is the act of putting a plan into action by applying combat power to accomplish the mission and adjusting operations based on changes in the situation (ADP 5-0). The principles of FS planning, coordination, and execution are listed below, and will be further described in chapters 3 and 5.

1-39. The principles of FS planning and coordination listed below facilitate integration into the Army's operations process.

- Plan early and continuously.
- Ensure the continuous flow of target information.
- Consider the use of all capabilities.
- Use the lowest echelon capable of furnishing effective support.
- Furnish the support requested.
- Use the most effective FS means.
- Avoid unnecessary duplication.
- Consider airspace coordination.
- Provide adequate support.
- Provide for rapid coordination.
- Provide for flexibility.
- Use fire support coordination measures (FSCMs).

1-40. The principles of FS execution utilize the memory aid AWIFM-N:

- Adequate FS for the committed units.
- Weight to the main effort.
- Immediately available FS for the commander to influence the operation.
- Facilitate future operations.
- Maximum feasible centralized control (especially in the defense).
- Never place artillery in reserve.

FIRE SUPPORT AND FIELD ARTILLERY TRAINING CONSIDERATIONS

1-41. FA commanders and leaders at echelon are responsible and accountable for the training and performance of their units to ensure readiness in accordance with headquarters department of the Army standardized mission essential tasks and regionally aligned forces requirements. Commanders must incorporate joint mission essential tasks to ensure interoperability within the joint force.

1-42. FA units that are trained, ready, and can win at the section, team, and platoon level are the foundational requirements to ensuring our supported maneuver formations can win in large-scale combat operations. FA commanders must balance this necessity for small unit proficiency against the requirement for higher level (battalion [BN] and battery) collective training and qualification. For example, a commander may choose to assume risk by reducing resources for qualification of higher qualification tables in order ensure readiness at section, team, and platoon levels by increasing resources for this lower-level training. However, this does not negate the requirement for proficiency at the battery and BN levels (see figure 1-2).

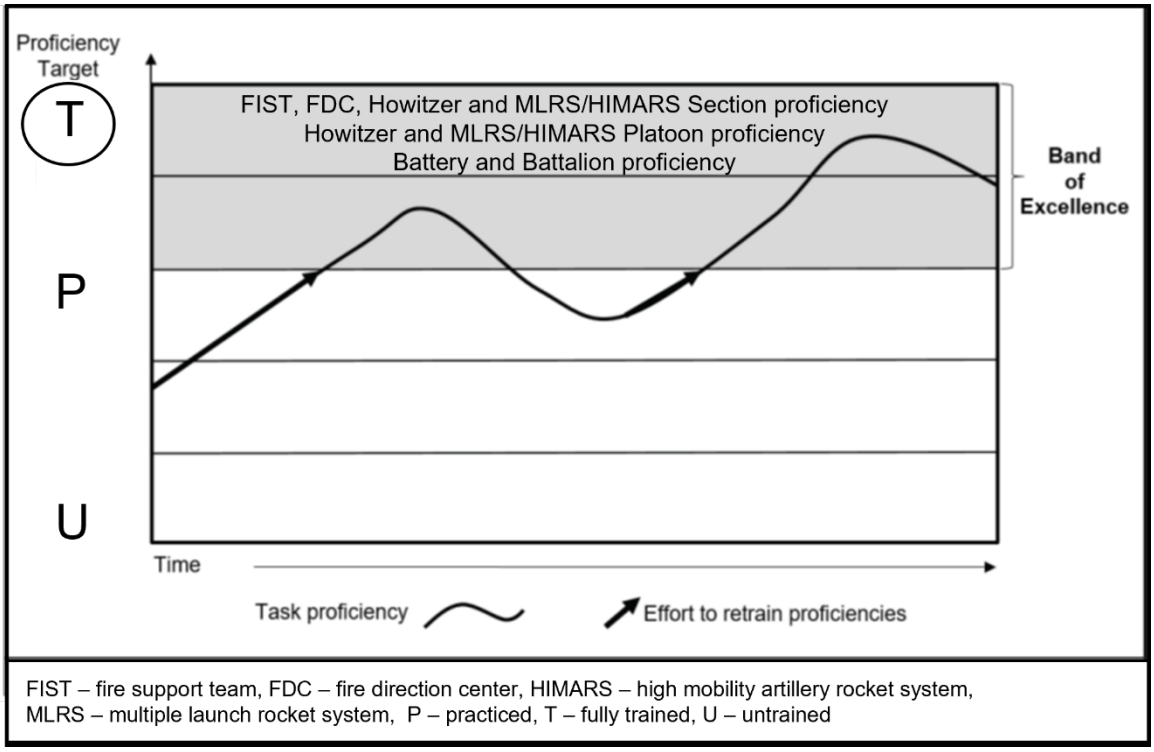


Figure 1-2. The band of excellence

1-43. FA and FS training considerations must be in line with the Army's principles for training found in FM 7-0:

- Commanders are the primary trainers.
- Noncommissioned officers train individuals, crews, and small teams; advise commanders on all aspects of training.
- Train using multi-echelon techniques to maximize time and resource efficiency.
- Train as a combined arms team.
- Train to standard using appropriate doctrine.
- Train as you fight.
- Sustain levels of training proficiency over time.
- Train to maintain.
- Fight to train.

1-44. FA and FS training must be efficiently planned, resourced, and executed. FA and FS training must adhere to the operations process (plan, prepare, execute, and assess). Utilizing virtual and constructive training resources enables units to enter into live training better prepared. Simulation can build proper muscle memory without expending valuable, limited live training resources. Constructive training enables the staff to replicate the tempo of targeting and execution in large-scale combat operations. Fully incorporating systems such as warfighter simulation (referred to as WARSIM), call for fire trainer (referred to as CFFT), training aids, devices, simulators, and simulations (referred to as TADSS), and all the capabilities the combat training centers (referred to as CTCs) offer is vital to collective training. Live fire training not only ties this all together with a heightened sense of things, but also places the necessary stresses on the platforms and systems, validating that these weapons with operators can do what they are designed to do under all conditions.

COMMANDERS ARE THE PRIMARY TRAINERS

1-45. Commanders and leaders at echelon are responsible and accountable for the training and performance of their units. Commanders train and resource training one echelon down and evaluate to two echelons down. They are responsible for assessing unit training proficiency and prioritizing unit training. Subordinate unit leaders are the primary trainers of their elements. For example, a platoon leader is responsible for the training and performance of the platoon.

1-46. The FA certification and qualification program is a commander's program and is a collaborative effort between the institutional and the operational force. FA commanders continuously assesses the unit's proficiency and readiness to perform its mission essential tasks. Each commander implements gunnery programs to achieve and sustain unit readiness and proficiency in these tasks. The commander uses all the resources available to implement an efficient gunnery program, which maximizes the use of ammunition, training area availability, and Soldier training time to sustain proficiency. Commanders at echelon are required to continuously evaluate readiness within their organizations to ensure their subordinate units are prepared for combat. The FA Certification and Qualification program provides everyone between the commander and the individual section with an objective means to gain that confidence. Through training, education, and experiences, sections, and thereby entire units, proficiency grows in supporting the commander's concept of the operation.

NONCOMMISSIONED OFFICERS TRAIN INDIVIDUALS, CREWS, AND SMALL TEAMS; ADVISE COMMANDERS ON ALL ASPECTS OF TRAINING

1-47. Noncommissioned officers set the foundation for Army training. They train Soldiers, crews, and small teams to be battle-ready. They provide crucial input and advice to the commander on what is trained and how it is trained. This ensures the organization trains on its most important tasks down to the individual Soldier. Noncommissioned officers:

- Maintain responsibility for Soldier and small unit training proficiency.
- Identify and train Soldier, crew, and small-team tasks. Help identify and prioritize unit collective tasks that support unit mission-essential tasks.
- Train and enforce task standards.
- Continually focus training on sustaining strengths and improving weaknesses.
- Develop junior non-commissioned officer and help officers develop junior officers.
- Provide timely and objective training advice to their officers.
- Assist in planning, resource coordination, support, risk mitigation, supervision, and evaluation of training.

TRAIN USING MULTI-ECHELON TECHNIQUES TO MAXIMIZE TIME AND RESOURCE EFFICIENCY

1-48. The Army fights as a team, and whenever possible, trains at echelon as a team. Additionally, the simultaneous training of multiple echelons on complementary tasks is the most efficient and effective way to train because it optimizes the use of time and resources.

1-49. Additionally, individual and unit maintenance tasks represent important training opportunities that leaders must exploit. Disciplined units conduct disciplined maintenance to Army standards in garrison, during training, and when deployed. Training to maintain also means leaders train subordinates to be good stewards of Army resources. Building a sense of stewardship and frugality conditions leaders and units to operate more effectively in austere operational conditions.

TRAIN AS A COMBINED ARMS TEAM

1-50. The Army fights and trains as a combined arms team by training tasks and weapons by associated warfighting function and functional units. Fire supporters and FA also train using multi-echelon training techniques capitalizing on the inherent relationships among higher, lower, and adjacent units that habitually operate together.

1-51. Commanders must create and integrate realistic training environments. This is accomplished by replicating the complexities of the expected OE, including electronic warfare (EW), denied, degraded, or disrupted space operational environment (D3SOE) across their formations, in addition to operations in a CBRN OE.

TRAIN TO STANDARD USING APPROPRIATE DOCTRINE

1-52. Commanders train both the FS and FA components of the FS system within their formations to ensure readiness. They consider their supported commanders' strategy for training the entire combined arms team. They rely on their firm grasp of FA and FS doctrine and TTP, tempered by their experience and military skills when developing training plans.

1-53. The responsibility for training includes the authority to determine the frequencies of the certification and qualification tables described in TC 3-09.8. Critical in determining these frequencies is a dialogue between FA commanders and their supported commanders.

TRAIN AS YOU FIGHT

1-54. Commanders must incorporate digital sustainment in their unit training plans. Digital sustainment training must be conducted with attention to detail and adherence to time standards. Digital tasks and troubleshooting procedures are perishable skills that need to be reinforced on a regular basis. Focus of this training must be at the end user level of the FS and FA C2 systems.

1-55. Whenever possible, incorporate multinational partner personnel and units during training events to increase interoperability and shared understanding of capabilities and limitations of FS systems. *Multinational operations* is a collective term to describe military actions conducted by forces of two or more nations, usually undertaken within the structure of a coalition or alliance (JP 3-16).

1-56. All efforts must be expended to conduct this training in a field environment or over distances to replicate a field environment. The speed, accuracy, and responsiveness of fires in support of a commander's concept of operations depends on the proficiency with which firing units and TA capabilities utilize when communicating with digital systems.

SUSTAIN LEVELS OF TRAINING PROFICIENCY OVER TIME

1-57. Once the unit achieves required task and weapon proficiencies it strives to maintain these proficiencies within the band of excellence. Many factors affect FS and FA training proficiency such as personnel turbulence, skill atrophy, and maintenance of equipment, physical fitness, and new equipment fielding and training. Successful commanders understand these factors and ensure that the training proficiencies attained do not degrade to a less than acceptable level.

1-58. To overcome the anticipated highs and lows of training proficiency, commanders continually re-evaluate training plans, current proficiencies, and strategies. Sustaining high levels of proficiency sometimes proves more difficult than developing proficiency from a starting point.

TRAIN TO MAINTAIN

1-59. As discussed earlier in this chapter, we will likely commence combat at a numerical disadvantage in attack/delivery platforms. For that reason, every gun, launcher, fire direction center (FDC), fuel truck, digital system, etc. is a precious commodity. Commanders ensure maintenance occurs at the highest of standards and with competent leader involvement.

1-60. The purpose of command emphasis on maintenance is to maintain combat power by keeping every gun and launcher in the fight during large-scale combat operations. Units train maintenance tasks continuously according to Army standards under a variety of conditions that replicate the challenges of combat operations.

FIGHT TO TRAIN

1-61. It is a FA commander's duty to fight through distractions and protect training. It is the higher echelon commander's responsibility to defend their subordinate organization's approved training from un-forecasted requirements and to underwrite associated risk to lower priority missions. Regardless of the quality of planning and preparation, there will be challenges to the execution of training. The ethic, fight to train, separates great trainers and units from the others.

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Chapter 2
The Fire Support System

As discussed in chapter 1, FS is the product of a system consisting of three parts. FS C2, TA, and FS attack/delivery systems. Section 1 discusses the C2 element of the FS system including personnel, CPs, and networks. Section II discusses the TA element and section III discusses attack/delivery systems. Because of the diversity of the individual FS parts, the total FS system does not function through a common chain of command as does a maneuver organization. The supported commander does exercise C2 over their organic and attached FS assets, but the commander has limited control over external FS capabilities that are available for use. The commander's ability to employ FS, as a system, and to integrate and synchronize FS results from an established process known as FS planning and coordination (further discussed in Chapter 3).

SECTION I – FIRE SUPPORT SYSTEM: COMMAND AND CONTROL

2-1. The elements of the FS system collectively deliver fires where and when needed to support the commander's objectives. Responsibility for command, control, and coordination of the fire support system belongs to the ground force commander. The commander's guidance is reflected in the scheme of fires, which must be synchronized with all the dynamics of combat power, but especially with information, mobility, and survivability. The *scheme of fires* is the detailed, logical sequence of targets and fire support events to find and engage targets to support the commander's objectives (JP 3-09).

2-2. Direction of the FS system is the responsibility of the FA commander. The supported commander charges the FA commander to ensure that all available FS capabilities are fully integrated and synchronized with the concept of operations. The FA commander serves as the supported commander's FSCOORD and speaks for the commander on all matters pertaining to FS.

2-3. *Command and control* is the exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission (JP 1, Vol 2). Commanders perform C2 using a C2 system. A *command and control system* is the arrangement of people, processes, networks, and command posts that enable commanders to conduct operations (ADP 6-0).

2-4. Cooperation among the various FS C2 organizations is necessary for the effective delivery of fires in time and in all domains. This is especially true in joint operations and in operations with unified action partners. Cooperation must be thought of as a product of the C2 the commander exerts to drive the FS system as a whole and the authority the commander gives the FSCOORD to orchestrate it.

FIRE SUPPORT PERSONNEL

2-5. FS personnel are located at FA and supported commander's CPs at every echelon of command. Commanders and staffs use several integrating processes to synchronize functions, organize activities, and create effects based on the commander's intent. For FS personnel, the critical processes include military decision-making process (MDMP) and the targeting process and are discussed in chapter 3. These processes and procedures enable the FA commander to accomplish both aspects of the mission as a commander and FSCOORD. The FSCOORD splits time between the FA CP and supported commander's CP. Army and joint FS personnel, and their duties are described in the following paragraphs.

FIRE SUPPORT COORDINATOR

2-6. The FSCOORD commands their respective FA organization and advises the supported commander on all aspects of FS. As the FSCOORD, the FA commander will spend most of his time either with the supported commander or in the respective fire support element (FSE). Both staffs must understand their responsibilities and assist the FSCOORD in facilitating essential fire support tasks (EFSTs).

2-7. It is important that the commander and key staff officers within the supported command recognize and understand that the FA commander is equally responsible for both aspects of the FA and FS mission. Also, the FA commander must recognize and understand that they have full responsibility for ensuring the efficient, effective operation of the FSE, just as they have command responsibility for ensuring timely and effective FA fire. See table 2-1 for FSCOORD titles at command echelon.

Table 2-1. Fire support titles at brigade and above

Force Echelon	*FSCOORD or Chief of Fires*	*Assisted by*
ASCC/TFC	FSCOORD (TFC CDR)	DFSCOORD
ASCC/ TFE	Chief of Fires	Deputy Chief of Fires
Corps	FSCOORD (FAB CDR/OFC CDR)	DFSCOORD
Division	FSCOORD (DIVARTY CDR)	DFSCOORD
Brigade	FSCOORD (FA BN CDR)	FSO

ASCC – Army Service component command, BN – battalion, CDR – commander, DFSCOORD – deputy fire support coordinator, DIVARTY – division artillery, FA – field artillery, FAB – field artillery brigade, FSCOORD – fire support coordinator, FSO – fire support officer, JFE – joint fires element OFC – operational fires command, TFC – theater fires command, TFE – theater fires element

2-8. The theater fires command (TFC) commander is always the FSCOORD for the theater. The operational fires command (referred to as OFC) commander is the FSCOORD for the corps. If an operational fires command is not available, the corps commander can designate a field artillery brigade (FAB) commander as the FSCOORD. The division artillery (DIVARTY) commander is always the FSCOORD for the division. The FSCOORD for the brigade combat team (BCT) is the organic, assigned, or attached FA BN commander. The FSCOORD works closely with the chief of staff or executive officer, the assistant chief of staff, intelligence (G-2) and assistant chief of staff, operations (G-3) to ensure mutual understanding of all aspects of planning, preparation, execution and assessment of fires for operations. At echelons above division, the FSCOORD works closely with the respective air operations center (AOC), battlefield coordination detachment (BCD), and other unified action partners. Some of the FSCOORD's responsibilities include:

- Plan, prepare, execute, and assess all EFSTs in support of offensive, defensive and stability operations and provide inputs to the preparation of the operation plan (OPLAN) and operation order (OPORD), including Annex D (Fires).
- Develop, with the commander and S-3/G-3, a scheme of fires to support the operation.
- Provides oversight and guidance for all effects.
- Coordinate the use of named area of interest (NAI) and target area of interest (TAI), HPTs, and additional events that may influence the positioning of FS attack/delivery systems.
- Supervise development of proposed high-payoff target lists (HPTL), target selection standards, and attack guidance matrices.
- Coordinate positioning of indirect FS assets.
- Recommend FSCMs to support current and future operations and manage changes to them.
- Recommend and implement the commander's counterfire and target engagement priorities.
- Recommend to the commander the establishment, responsibilities, authorities, and duties of a force field artillery (FFA) headquarters (HQ).

- Integrate and synchronize joint FS and multinational fires with the other dynamics of combat power.
- Lead the targeting working group and facilitate the targeting board.
- Accompany the commander during execution of tactical operations (when directed).
- Provide for consolidated and focused FS and FA specific certification, readiness, and oversight (personnel management, equipment issues, and training).
- Establish standard operation procedures across the brigade, division, corps, and theater.
- Oversee the professional development of the 13-series career management field Soldiers.
- Mentor, train, and educate junior FS and FA leaders on all aspects of the FS system.

CHIEF OF FIRES

2-9. The *chief of fires* is the senior fires staff officer at echelons above corps who advises the commander on the best use of available fires resources, and provides input to necessary orders (ADP 3-19). The chief of fires is located at the theater Army fires cell or joint task force (JTF), joint fires element (JFE) that does not have a TFC to execute joint fires. *Joint fires* are fires delivered during the employment of forces from two or more components in coordinated action to produce desired effects in support of a common objective (JP 3-0). The chief of fires facilitates the fires warfighting function and works closely with the J-3 (referred to as the operations directorate of a joint staff) to ensure mutual understanding of all aspects of planning, preparation, execution, and assessment of fires for operations.

DEPUTY FIRE SUPPORT COORDINATOR

2-10. The deputy fire support coordinator (DFSCOORD) is a permanently assigned coordinating staff officer on the TFC, corps, and division staff. The DFSCOORD provides oversight of FS personnel, working groups and boards, and the joint air-ground integration center (JAGIC) when formed. When the FSCOORD is not present, the DFSCOORD performs the duties of the FSCOORD.

TARGETING OFFICER

2-11. FSEs from FA BNs through corps, and fires cells at echelons above corps have assigned targeting officers. The targeting officer will drive the targeting process and is the technical subject matter expert on all matters relating to Army and joint targeting. Targeting officers will participate in the MDMP to develop the targeting products HPTL, attack guidance matrix (AGM), and target synchronization matrix.

2-12. The targeting officer recommends weapons locating radar (WLR) guidance and oversees counterfire operations, to include, radar deployment orders, queuing schedules, and threat patterns in support of the targeting process. ***Weapons locating radar*** **is a continuous target acquisition counterbattery system that detects in-flight projectiles, and communicates point of origin and point of impact locations.** Targeting officers will manage requests to higher for effects outside of organic capability. For more information see FM 3-60.

FIELD ARTILLERY INTELLIGENCE OFFICER

2-13. The field artillery intelligence officer (FAIO) coordinates with brigade, corps and division internal and external intelligence elements to provide input to the development, nomination, and prioritization of high-value targets originating from the G-2/ or battalion or brigade intelligence staff officer (S-2) all source analysis section. A *high-value target* is a target the enemy commander requires for the successful completion of the mission (JP 3-60). During planning FAIOs assist the S-2/G-2 targeting (referred to as the G-2T) with target development, coordinate with the targeting officers for no-strike list and restricted target list management, the HPTL and AGM.

2-14. The FAIO is primarily responsible for the development of the target selection standards working with both the information collection manager and the FS noncommissioned officer to determine cutoff values. The FAIO nominates targets to the FSE that are provided by the all-source analysts and fusion cell chiefs. The FAIO assists the S-2/G-2 with target value analysis and NAI/TAI development. When an Army, corps or division is serving as a JTF or joint force land component commander (JFLCC), the FAIO works closely

with the J-2 and J-2T for target development. The FAIO is also responsible for the integration of FA C2 systems into the mission command networks in coordination with the FFA HQ S-6 and brigade, division or corps G-6. For more information on the FAIO see FM 3-60.

BRIGADE FIRE SUPPORT OFFICER

2-15. A ***fire support officer*** **is the operational to tactical level field artillery officer responsible for advising the supported commander or assisting the fire support coordinator on fires functions and fire support**. The brigade fire support officer (FSO) is the senior FA staff officer responsible for planning, preparing, and executing all aspects of FS for BCT operations. More than any other officer, the FSO must understand the FSCOORD's intent in supporting the operation and understands all of the duties of the FSCOORD listed in paragraph 2-6. For information on the BCT FSO duties see ATP 3-09.42.

BATTALION FIRE SUPPORT OFFICER

2-16. The BN FSO is the senior FA staff officer at the supported BN or aviation BN. The BN FSO advises the respective BN commander on fire support planning and employment considerations. The BN FSO plans, prepares, executes, and provides assessment of all aspects of fire support for BN operations and provides bottom-up refinement of the fire support plan. For more information on the BN FSO duties see ATP 3-09.42.

COMPANY FIRE SUPPORT OFFICER

2-17. The company/troop FSO works for the company/troop commander during combat operations to accomplish all EFSTs. The FSO is assigned to the FA BN and under the functional supervision of the BN FSO. The FSO devises the FS plan based on the commander's guidance and submits the plan to the commander for approval. The FSO plans, prepares, executes, and provides assessment of all aspects of FS for company operations and provides bottom-up refinement of the FS plan. For more information on the company FSO duties see ATP 3-09.42.

FIRE SUPPORT SERGEANT

2-18. The company FS sergeant or FS non-commissioned officer is the senior enlisted assistant to the company FSO. The fire support sergeant performs the duties of the FSO in their absence. The fire support sergeant advises the FSO on the allocation and tasking of joint fires observers, other observers, and trains the fire support team (FIST) and the forward observer (FO) in applicable FS tactics and techniques. A *fire support team* is a field artillery team provided for each maneuver company/troop and selected units to plan and coordinate all supporting fires available to the unit, including mortars, field artillery, naval surface fire support, and close air support integration (JP 3-09.3). For more information on the FIST and FS sergeant's duties see ATP 3-09.42.

FORWARD OBSERVER

2-19. The FO is the fire support representative for the maneuver platoon. The FO's primary duty is to accurately locate targets, then call for, and adjust FS. The *forward observer* is an individual operating with front line troops and trained to adjust ground or naval gunfire and pass back battlefield information (JP 3-09). The FO must fully understand their responsibility within the observation plan and provide refinement or submit key targets for inclusion in the company fire plan. **A *fire plan* is a tactical plan for using the weapons of a unit or formation so that their fire will be coordinated.** For more information on FO duties see ATP 3-09.30.

JOINT FIRES OBSERVER

2-20. A *joint fires observer* is a certified and qualified Service member who requests, controls, and adjusts surface-to-surface fires; provides targeting information in support of close air support; and performs terminal guidance operations (JP 3-09.3). A joint fires observer cannot perform terminal attack control of CAS missions and does not replace a qualified joint terminal attack controller (JTAC) or forward air controller (airborne) (FAC(A)). *Terminal guidance operations* are actions that provide electronic, mechanical, voice or

visual communications that provide approaching aircraft and/or weapons additional information regarding a specific target location (JP 3-09).

OTHER JOINT AND SPECIAL OPERATIONS FORCES PERSONNEL AND DUTIES

2-21. FS is inherently joint and executed across all domains. As such, all Army FS personnel routinely interface with multiple joint FS and special operations forces (SOF) personnel at every echelon of command. The following are key personnel that Army FS personnel routinely work with during joint operations. For more information on joint special operations forces and personnel see JP 3-09 and JP 3-30:

- Director, AOC: Responsible to the joint force air component commander (JFACC) for integrating the planning, coordinating, allocating, tasking, executing, and assessing tasks for all joint air operations.
- *Air liaison officer* is the senior tactical air control party member attached to a ground unit who functions as the primary advisor to the ground commander on air power (JP 3-09.3).
- Naval Ground Liaison Officer: acts as the liaison for a supporting naval task force. They coordinate all naval gunfire that is supporting the ground force commander or that may affect the operations of the ground force commander. They also advise the ground force commander and FSCOORD on all matters pertaining to naval gunfire employment.
- Maritime Operations Center Fires Element. Fires and targeting personnel who contribute to the various maritime operations center (MOC) fires functions are organized in the fires element for standardization and coordination. The fires element is led by the fires lead, who coordinates all fires functions. For more information see JP 3-09.
- J-2T (Targeting): The deputy director for targets for a joint staff.
- United States Air Force (USAF) ISR director: Provides the JFACC with timely, relevant, accurate, and predictive intelligence, targeting support, and collection management expertise to support the air tasking cycle.
- *Forward air controller (airborne)* is a specifically trained and qualified aviation officer, normally an airborne extension of the tactical air control party, who exercises control from the air of aircraft engaged in close air support of ground troops (JP 3-09.3).
- *Joint terminal attack controller* is a qualified (certified) Service member who, from a forward position, directs the action of combat aircraft engaged in close air support and other offensive air operations (JP 3-09.3).
- SOF JTAC: Although all SOF operators are capable of employing surface fires and aviation fires from AC-130 aircraft, current and qualified SOF JTACs are recognized across all components of US Special Operations Command as the primary fires employment capability at the strategic, operational, and tactical levels. These personnel are specifically organized, trained, and equipped to conduct and support special operations. SOF JTACs are carefully selected to conduct special operations using modified equipment and trained in irregular warfare activities to achieve strategic and operational objectives in austere environments worldwide. SOF also employ SOF aviators as forward air controller, airborne.
- Shore Fire Control Party: The supporting United States Marine Corps (USMC) artillery BNs provide shore fire control party's to supported units. The shore fire control party consists of a naval surface fire support liaison team and spotting team. The naval surface fire support liaison team is specifically organized to handle liaison matters for the supported commander, while the spotting team is charged with requesting and adjusting fires of assigned direct support (DS) ships and general support (GS) ships.

COMMAND POSTS

2-22. FSEs and fires cells are located in supported commander’s CPs from BN through theater levels. FSEs are located at CPs at every echelon above company and are responsible for targeting coordination and for integrating fires under the control or in support of the force (see JP 3-09). These elements and cells are central clearing houses for planning, coordinating, and synchronizing fire support for the supported commander. The exact way they are organized varies among different organizations. The organization depends on the unit

mission, availability of FS assets, and command preferences. The actual makeup of FS elements and cells is flexible. However, it ensures that all FS assets respond to the supported commander's intent. At corps and division levels, FSEs at tactical and rear area CPs are extensions of the main CP FSE. They assist the main FSE and JAGIC controlling assets engaged in close and rear area operations. Below are descriptions of FS elements and cells within each echelon of Army and joint commands.

THEATER FIRES COMMAND

2-23. An Army TFC provides C2 of assigned strategic fires capabilities, serves as the senior HQ assigned to a theater Army to integrate theater fires assets, and executes critical FS functions in all phases of operations. The TFC is designed to develop, nominate, and converge effects on joint targets across the theater. This support to joint targeting will shape the OE, to enable JFLCC/Field Army and Corps operations and counter aggression on land during crisis.

2-24. The TFC ensures the Army's contribution to the joint targeting process is effectively planned and executed and can seamlessly transition to large-scale combat operations in accordance with the ground force commander's priorities. This also provides greater deterrence options for the theater. For more information on the theater Army operations see ATP 3-93.

JOINT FIRES ELEMENT

2-25. The JFE is an optional staff element established by the JFC and composed of representatives from the J-3 (referred to as the operations directorate of a joint staff); the components (land, maritime, air, and special operations); and other elements of the JFC's staff, to include space and cyberspace operations representatives and the directorates (to include intelligence, logistics, plans, and civil-military operations). The JFE integrates and synchronizes fires planning and coordination on behalf of the JFC and should be near the joint operations center. The JFE works closely with the command's J-2 to ensure the successful execution of the joint targeting cycle. For more information on the JFE see JP 3-09.

MULTIDOMAIN TASK FORCE

2-26. The multidomain task force provides the joint force with a formation capable of employing long-range precision fires and other effects from multiple domains in support of the commander’s objectives. It is designed to defeat complex enemy systems through the collection of information and different forms of lethal and nonlethal effects. When required, it can be task-organized to provide capabilities to the JTF or component commander. During competition, the multidomain task force may be forward stationed in a combatant commander’s area of responsibility to employ joint and Army capabilities in support of target development. The multidomain task force all domain operations center (referred to as the ADOC) coordinates and synchronizes the information collection operations of its assigned formations with other theater and national assets. For more information on the multidomain task force see FM 3-0.

BATTLEFIELD COORDINATION DETACHMENT

2-27. The BCD is a specialized, regionally focused Army element that serves as the senior Army operational commander’s liaison with the air component. A BCD is co-located with the joint or combined AOC. The BCD is the Army’s interface for systems connectivity to the joint air operations center (JAOC) and for personnel integration with their JAOC counterparts. When a U.S. Army HQ is designated as the JFLCC, the BCD may serve as the land component commander’s liaison to the air component commander when augmented with other unique land force representatives. For more information on the BCD see ATP 3-09.13. BCD tasks include:

- Integrate ARFOR/Land Component requirements during joint air tasking cycle.
- Facilitating the exchange of current intelligence and operational data.
- Processing air support requests.
- Monitoring and interpreting the land battle situation.
- Coordinating for air and missile defense (referred to as AMD).
- Coordinating for airlift.

- Integrating airspace requirements.

JOINT FORCE LAND COMPONENT FIRES CELL

2-28. The *joint force land component commander* is the commander within a unified command, subordinate unified command, or joint task force responsible to the establishing commander for recommending the proper employment of assigned, attached, made available for tasking land forces; planning and coordinating land operations; or accomplishing such operational missions as may be assigned (JP 3-0). At echelons performing the role of the JFLCC, the fires cell coordinates, integrates, and assigns joint, interagency, and multinational fires to targets. It synchronizes fires, to include Army, joint, interagency, and multinational component air assets; SOF; naval surface fire support (NSFS); cyberspace operations; and EMS operations (JP 3-09). The JFLCC's primary agency to synchronize and coordinate joint fires and their effects-is either an Army fires cell or a USMC force fires coordination center or fire support coordination center of the J-3 (referred to as the operations directorate of a joint staff). The fires cell or center reviews the JFC's guidance and intent and makes recommendations for the JFLCC to create the desired effects that support achievement of the objectives. The primary responsibility of the JFLCC is to advise the JFC on the best use of available land component fires capabilities and execute the OPORD. For more information on the JFLCC and associated fires cell see JP 3-09 and JP 3-31.

OPERATIONAL FIRES COMMAND

2-29. When established, an operational fires command coordinates, synchronizes and employs surface-to-surface fires and integrates lethal and nonlethal effects in all domains to support corps operations. The operational fires command provides the Army corps with a FFA HQ that is also capable of integrating fires across all domains. The operational fires command contains the resident combat power and ISR capabilities to deliver artillery fires and integrate nonlethal effects into multidomain operations, providing the corps the ability to shape its operations. The operational fires command operates in theater, or rapidly deploys into theater, to support an Army corps.

2-30. The commander of the operational fires command performs the duties and responsibilities of the FSCOORD for the corps. The operational fires command maintains the standard staff organization normally utilized across Army formations for functional activities. This functional backbone facilitates normal organization activities to include personnel services, intelligence, operations and planning, sustainment, and communication requirements.

CORPS FIRE SUPPORT ELEMENT

2-31. The corps FSE coordinates Army lethal and nonlethal attack/delivery capabilities and joint fires. The corps FSCOORD ensures that the corps FS system supports the corps commander's guidance for fires, meets joint force requirements, and reacts responsively to the changing operational environment. The FSE accomplishes these actions by developing, recommending, and coordinating the scheme of fires. The FSE may perform artillery sensor management and provide input to information collection.

2-32. The FSE assists the G-2 with target development, conducts targeting within the HQs and provides representatives to the current operations integration cell and rear area CP. When the corps serves as the base organization for a JTF or land component command (referred to as LCC) HQs, the FSE performs functions IAW joint publications. (See JP 3-01, JP 3-03, JP 3-09, JP 3-31, and JP 3-60). The FSE works closely with the FFA HQ, if one is established. A designated FSE can provide augmentation to the corps FSE as necessary.

2-33. To ensure unity of effort and fully integrated use of capabilities in setting the conditions, an emerging TTP within the corps HQ could be used to synchronize all FS assets in consonance with the commander's guidance. This TTP forms a cell designated as the joint targeting and execution cell (referred to as JTEC), which integrates with the corps FSE, and other Army, joint, and multinational elements of the FS system.

DIVISION FIRE SUPPORT ELEMENT

2-34. The division FSE develops, recommends, and briefs the scheme of fires, including effects, recommends targeting guidance to the commander, develops HPTs, selects targets for attack, and

coordinates, integrates and assigns allocated joint, interagency and multinational fires to specific targets and target systems. The division FSE synchronizes all fire support for the command to include Army, joint and multinational. Division FSEs also participate in assessment (battle damage, munitions effectiveness, re-attack recommendations); develops planning guidance; provides target intelligence for planning and execution and coordinate with the respective air support operations center (ASOC) as part of the JAGIC.

JOINT AIR-GROUND INTEGRATION CENTER

2-35. Located in the Army division current operations integration cell, the JAGIC provides commander's a technique to coordinate, integrate, and control operations in division-assigned airspace and efficiently collaborate requirements with external airspace elements outside of the division area. The JAGIC co-locates decision making authorities from the land and air component to support the supported commander's objectives and intent. The JAGIC facilitates effective mission execution while managing the level of risk. For more information on the JAGIC see ATP 3-91.1.

FIELD ARTILLERY BRIGADE FIRE SUPPORT ELEMENT

2-36. The FAB has an FSE HQs, an air support section, an air defense airspace management element, a protection, and a lethal effects element. Each of the elements assists the current operations integration cell by providing additional expertise or dedicated manpower on an as needed basis. All elements in the FSE assist with planning by providing expertise or dedicated manpower on an as needed basis. The FAB FSE can augment a corps FSE as needed. For more information on the FAB FSE see ATP 3-09.24.

GENERAL FIRE SUPPORT ELEMENT FUNCTIONS AT ECHELONS ABOVE BRIGADE

2-37. General FSE functions include:

- Plan, integrate, coordinate, and synchronize joint fires.
- Conduct target management including recommendations, receipt, and distribution to subordinate fires units for ROE, HPTL, time sensitive targets, and restricted target and no-strike list.
- Lead the targeting working group and facilitate the targeting board as determined by the commander.
- When authorized, executes the clearance of fires process for the commander.
- Participate in the joint targeting process and development of targeting objectives.
- Participate in joint targeting working groups and boards.
- Provide access to joint fires for interagency and multinational forces.
- Provide input to the air tasking order (ATO), airspace control plan, and airspace control order (ACO) which includes FSCMs and airspace coordinating measures (ACM).
- Process and submit AI nominations and remain in continuous contact with AOC/BCD.
- Request and coordinate CAS, AI, EW.
- Team with the airspace element, air and missile defense cell, and the USAF's ASOS and tactical air control party (TACP) to perform airspace control responsibilities within division assigned airspace.
- Provide input to the information collection plan to synchronize surveillance and reconnaissance assets with named areas of interest and designated targets in coordination with the all source analysis section.
- Coordinate position areas for FA units under corps control with maneuver and airspace control agencies.
- Monitor the ATO and process joint-surveillance and target attack radar systems targets.

BRIGADE COMBAT TEAM FIRE SUPPORT ELEMENT

2-38. The BCT FSE plans, coordinates, integrates, synchronizes and deconflicts the employment and assessment of FS for both current and future operations. This includes FA, mortar, electronic attack, air

support, naval surface fires support and other joint assets. The Air Force TACP typically collocates with the BCT FSE. The BCT FSE works closely with BN FSEs and company FIST. These organizations ensure responsive and effective fire support is provided to their respective supported commanders and actions are closely coordinated through the BCT main CP and FSE. For more information on the BCT FSE see ATP 3-09.42.

COMBAT AVIATION BRIGADE FIRE SUPPORT ELEMENT

2-39. The combat aviation brigade (CAB) FSE integrates FS into the scheme of maneuver by developing a scheme of fires and leading the targeting working group in close coordination with the CAB battalion or brigade operations staff officer (S-3), S-2, and commander. Both missions are critical to the success of aviation operations. For more information on the CAB FSE see ATP 3-04.1.

BATTALION FIRE SUPPORT ELEMENT AND COMPANY FIRE SUPPORT TEAM

2-40. FSEs in the BCT's maneuver BNs and CABs air reconnaissance squadron provide a fire support coordination capability for BN operations and are organized with an FSO and FS non-commissioned officer an EW non-commissioned officer, and digital systems operators. The BN HQ may also have an Air Force TACP. Infantry and armor company and troop FIST enable effective artillery, mortar, and joint FS for the maneuver force. For more information on the BN and company FSE see ATP 3-09.42.

FIELD ARTILLERY COMMAND POSTS

2-41. FA CPs integrate FA operations, targeting, and attack elements and synchronize the execution of FA missions. CPs must aggressively seek information about the current tactical situation (friendly unit locations, obstacles, cleared lanes, and bypassed units), while disseminating this information to all subordinate and supporting units. Because FA CPs are primary enemy targets, they should be as small and mobile as possible to allow for rapid and frequent displacement – this practice enables FS leaders to effectively account for being under constant enemy observation.

FIELD ARTILLERY BRIGADE COMMAND POST

2-42. FAB CPs C2 the operations of subordinate FA BNs. They integrate FS planning and coordination, execution, target production, and information from all intelligence sources. A FAB can serve as the FFA HQ for a Corps or JTF, or the counterfire HQ for a JTF, corps, or division. Army National Guard FABs have a dual role, serving as both the Army National Guard division commander's FFA HQ and as a FAB when required. For more information on the FAB see ATP 3-09.24.

DIVISION ARTILLERY COMMAND POST

2-43. As a division's FFA HQs, the DIVARTY plans, directs, coordinates, and controls the fires of all organic, attached, and reinforcing (R) FA units supporting the division. The CP develops FA support plans and ensures that available firepower adequately supports the division concept of operations. The DIVARTY can serve as the counterfire HQs for the division or can delegate that role to a R FA unit since divisional assets engaging division HPTs beyond the close area are limited in large-scale combat operations.

2-44. If the counterfire HQ is delegated to a R FA unit, it is important to remember that the DIVARTY commander remains responsible for the overall division counterfire fight as the division commander's FSCOORD. The DIVARTY CP provides the division with the ability to have an alternate CP if the division CP must displace or is incapacitated. The DIVARTY CP may perform C2 tasks for the division for a limited period only. For more information on DIVARTY organization and operations see ATP 3-09.90.

FORCE FIELD ARTILLERY HEADQUARTERS COMMAND POST

2-45. A ***force field artillery headquarters*** **is a battalion size or higher units designated by the supported commander who specifies its duration, duties, and responsibilities.** A command's organic FA HQ is normally the FFA HQ (DIVARTY). When formations do not have an organic FA HQ (to include a JTF), the respective commander may designate an FFA HQ such as a FAB. Functions of the FFA HQ may include:

- Provides C2 for subordinate units which could include an FA BDE, rocket BNs, or cannon BNs to support the commander's concept of operations.
- Facilitates single point of contact for outside agency coordination for force protection and additional fires.
- Accepts or passes control of fires during passage of lines operations.
- Coordinates sustainment and protection of subordinate FA units.
- Plans fires and positions all FA units with a support relationship of GS or general support-reinforcing (GSR).
- Recommends command and support relationships of FA units to the G-3 and the Commander.
- Establishes meteorological (MET), survey, and radar TA plans for the command.
- Produces a FA support plan or OPORD.
- Assists the corps or division FSE in the production of Annex D (Fires) of the OPORD.
- Facilitates targeting for the division and corps deep fight.
- Orchestrates the counterfire fight for the commander.
- Assigns a subordinate or R FA unit the duties of the counterfire HQ.
- Serves as alternate corps or division CP for limited durations.

Note: North American Treaty Organization (NATO) FA units are given missions and responsibilities in accordance with NATO Standardization Agreement 2484. Other multinational FA units that are attached or operational control (OPCON) are given missions and responsibilities in accordance with their national guidance.

COUNTERFIRE HEADQUARTERS COMMAND POST

2-46. *Counterfire* is fire intended to destroy or neutralize enemy weapons (JP 3-09). This includes counterbattery and countermortar fire. The counterfire fight is not a separate fight, but one aspect of the overall combined arms fight. Counterfire contributes by providing fires against the enemy indirect fire system; it protects friendly forces, combat functions, and facilities from enemy indirect fires by suppressing, neutralizing, or destroying enemy indirect fire weapons systems. It is also used against the enemy's C2, ammunition, logistics, and TA capabilities. Counterfire is an integrated aspect of the overall combined arms approach to achieve fire superiority. For more information on counterfire see ATP 3-09.12.

2-47. In large-scale combat operations, the corps and division commanders are responsible for counterfire throughout the depth of their AO. The corps or division commander can assign the role of counterfire HQ to a FAB, DIVARTY, or a separate FA BN. The counterfire HQ must be allocated the necessary assets to conduct the counterfire fight. During large-scale combat operations a corps should be allocated two FABs, one to serve as the counterfire HQ and one to serve as the FFA HQ. The counterfire HQ will coordinate with the division and corps G-2 for sensor tasking authority and additional intelligence capabilities to integrate all available assets into the counterfire fight in a proactive manner. The counterfire HQ duties include:

- Plan and coordinate sensor management.
- Conduct pattern analysis of enemy indirect fire systems.
- Establish artillery target intelligence zones, call for fire zones (CFFZs), critical friendly zones (CFZs), and censor zones.
- Based off pattern analysis conduct WLR zone management in support of the counterfire fight.
- Recommend positioning of counterfire delivery systems.
- Write the TA tab to Annex D.
- Recommend counterfire TTP to facilitate permissive fires.
- Participate in the targeting process.
- Establish counterfire mission digital and voice procedures and communications architecture using primary computer/digital system.

JOINT FIRE SUPPORT COMMAND POSTS

2-48. Below are descriptions of additional joint FS agencies that most commonly interface with the Army during joint and multidomain operations. For more detailed information on each of these elements of the joint FS system see JP 3-09.

JOINT AIR OPERATIONS CENTER

2-49. The JAOC is structured to operate as a fully integrated command center and should be staffed by members of all participating components, to include key staff positions, to fulfill the JFACC's responsibilities. A JAOC provides the capability to plan, coordinate, allocate, task, execute, monitor, and assess the activities of assigned or attached forces.

2-50. Through the JAOC, the JFACC monitors execution of joint air operations and directs changes as the situation dictates. As the lead C2 mechanism of the theater air-ground system, the JAOC should have secure and redundant communications with operations, logistics, weather, intelligence centers, and higher and lateral HQ, as well as subordinate units, to preclude degradation in its ability to control joint air forces. More information on the JAOC see JP 3-30.

AIR SUPPORT OPERATIONS CENTER

2-51. The ASOC is the primary control agency within the theater air control system for execution of air operations that directly support land operations within division-assigned airspace. The ASOC is an extension of, and directly subordinate to, the JAOC.

2-52. Normally co-located with the division FSE, the ASOC performs a current operations function, while planning and execution functions are performed by members of the TACP. ASOC and TACP personnel at the Army division may be integrated with the division FSE and airspace element to form a JAGIC.

JOINT AIR COMPONENT COORDINATION ELEMENTS

2-53. The JFACC may establish one or more joint air component coordination elements (JACCEs) with other functional component commanders' HQ to include the JFLCC, joint force special operations component command, joint force maritime component command to better integrate joint air operations with their operations. When established, the JACCE is a component-level liaison that serves as the direct representative of the JFACC.

2-54. The JACCE does not perform any C2 functions and the JACCE director does not have command authority over any air forces. The JACCE may be provided to the supported JTF HQ (if the theater JFACC is designated in support to a JTF) to better integrate air component operations within the overall joint force.

TACTICAL AIR CONTROL PARTY

2-55. The TACP is an air liaison element co-located with ground maneuver units. TACPs are under the OPCON of the ASOC and have two primary missions: to advise ground commanders on the capabilities and limitations of air operations (the responsibility of the air liaison officer [ALO]) and provide terminal attack control of CAS aircraft (the responsibility of the JTACs). *Terminal attack control* is the authority to control the maneuver of and grant weapons release clearance to attacking aircraft (JP 3-09.3).

MARITIME COMPONENT COMMAND AND CONTROL

2-56. The JFC may designate a joint force maritime component commander (JFMCC) to conduct joint maritime operations. The JFMCC is the supported commander for operations within the JFC-designated maritime AO (including airspace above the AO). When designated the supported commander, the JFMCC has authority to designate target priorities, effects, and timing of fires within the AO.

2-57. The primary responsibilities of the JFMCC regarding joint FS are to advise the JFC on the best use of available maritime component fires capabilities, provide maritime component joint FS requirements to the

supporting commander(s) (if designated the supported commander), conduct component planning, and execute the OPORD.

MARITIME OPERATIONS CENTER

2-58. The MOC is the organization within the joint force maritime component command HQ through which the commander employs assigned and attached forces. The MOC should be viewed as integral to the joint force maritime component commander's decision-making process at the operational level of warfare, especially during crisis or conflict.

2-59. Provides maritime capabilities in support of the combatant commander and JFC, the mission of the MOC is to assess, plan and direct maritime operations for all forces assigned. MOCs function as the core organizational construct for a numbered fleet commander or a joint force maritime component commander to support operational level assessment, planning and execution. For more information see JP 3-32. The MOC provides the commander with a functionally organized staff and C2 suite capable of executing Navy, joint and combined responsibilities. Duties of the MOC include:

- Position organic and joint air assets (if assigned) to enable subordinate commanders.
- Coordinate maneuvers with JFLCC and JFACC when appropriate, to include the positioning of air defense units.
- Take joint air support requests (AIRSUPREQ) from the tactical commander.
- Request joint air support from the JFACC if needed.
- Coordinate with the airspace control authority for local and regional airspace around assets under OPCON.
- Nominate targets.
- Develop dynamic targeting guidance.
- Synchronize the MOC's maritime targeting cycle with the joint targeting cycle to include the MOC fires element representative at the joint targeting working group.
- Orchestrate a battle rhythm that incorporates air operations.

UNITED STATES MARINE CORPS COMMAND AND CONTROL AGENCIES

2-60. USMC forces may be employed as, or part of, the joint force land component; as, or part of, the joint force maritime component; or as the joint force air component. USMC forces will operate as a Marine air-ground task force (MAGTF) consisting of a command element, a ground combat element, an aviation combat element, and a logistics combat element. Various agencies and elements within the MAGTF help commanders to execute fires.

2-61. These agencies may be used for either a landing force or sustained land operations. The MAGTF command element organizes a fires and effects coordination center, which coordinates overall fires. At each level below the command element (division, regiment, and BN), a fire support coordination center is established to advise and coordinate fires within the ground combat element. The fires and effects coordination center and each fire support coordination center are staffed with subject matter experts and representatives of the various USMC and Navy supporting arms.

Commander Amphibious Task Force

2-62. In the initial phases of an amphibious operation, commander, amphibious task force (referred to as a CATF) exercises overall responsibility for coordination of naval surface fire support, air support, and landing force (referred to as a LF) artillery fire support. When the commander landing force (referred to as a CLF) is established ashore, the commander amphibious task force may pass this responsibility to the commander landing force. Once the passage of control ashore is executed, the commander landing force will coordinate fires within designated operational areas. While embarked, the MAGTF commander and staff direct the actions of the LF from C2 facilities aboard the amphibious ships. The MAGTF C2 may remain afloat throughout the expeditionary operation.

Air-Naval Ground Liaison Company

2-63. The air-naval ground liaison company provides the MAGTF commander a liaison capability to plan, coordinate, and conduct the terminal control of fires in support of joint and multinational forces operating within or adjacent to the MAGTF AO. Each air-naval ground liaison company contains USMC and Navy personnel qualified to plan, coordinate, and integrate all fire support assets available to the MAGTF, as well as joint and multinational forces.

SPECIAL OPERATIONS COMPONENT FIRE SUPPORT COMMAND AND CONTROL ORGANIZATIONS AND ELEMENTS

2-64. The joint force special operations component commander (referred to as JFSOCC) coordinates all FS in support of special operations and, when tasked, FS using SOF assets in support of other elements of the joint force. Special operations coordinate FS through both external and SOF channels.

2-65. Liaison between SOF and other elements of the joint force is critical to both effective support and the prevention of friendly fire incidents. SOF liaison elements provide special operations expertise to coordinate, synchronize, and deconflict operations in support of conventional forces and when special operations are conducted unilaterally. SOF C2 organizations, such as a special operations C2 element, may provide (or act as) liaison elements to coordinate FS with their respective Service components. Within SOF channels, various elements are established to assist commanders in the execution of their FS responsibilities. SOF organizations and elements that provide C2 capabilities with integrated FS functions include:

- Special operations joint task force (referred to as SOJTF). A SOJTF is the principal organization designed to meet all special operations requirements in major operations, campaigns, or a contingency. The SOJTF commander plans, integrates, and executes all special operations in a designated OA. The SOJTF is a general officer-/flag officer-led modular, tailorable, and scalable special operations task force (SOTF) designed to integrate and enable joint SOF made available to the combatant commander (CCDR) and JFCs.
- Joint special operations task force (referred to as JSOTF). The JSOTF is formed to execute special operations in support of a campaign or other operations. The JSOTF is normally an O-6-led modular, tailorable, and scalable SOTF designed to provide a capability to C2 multiple SOTFs or a SOJTF consisting of both conventional forces and SOF.
- Joint special operations air component (referred to as JSOAC). The JSOAC plans and executes joint special operations air activities and ensures effective coordination, synchronization, and deconfliction of such activities with conventional air operations. Another key responsibility of the JSOAC is to ensure close liaison is accomplished with other SOF components. The JSOAC also has direct liaison with the special operations liaison element (referred to as SOLE). The JSOAC commander will normally be the commander with the preponderance of aviation assets or the greatest capacity to plan, coordinate, allocate, task, control, and support assigned and attached special operations aviation assets.
- Special operations task force (SOTF). A SOTF is a grouping of SOF assets formed to carry out a specific operation or a continuing mission. SOTFs are scalable organizations built around the nucleus of Army SOF, USMC special operations units, or naval special warfare units. A SOTF establishes a FSE for targeting coordination and for integrating fires delivered on surface targets by fire-support means, under the control, or in support, of the tactical-level force.
- Special operations command and control element (referred to as SOCCE). The SOCCE synchronizes special operations with land and maritime operations. The SOCCE is normally employed when SOF conduct operations in conjunction with a conventional force. It co-locates with the command element of the supported commander and performs C2, or liaison functions directed by the special operations commander. The focus of fires coordination is on the synchronization and deconfliction of joint fires.

FIRE SUPPORT NETWORKS

2-66. FS digital systems provide C2, deconfliction and targeting architecture in an automated environment. FS and C2 systems that are interoperable with all forces help maintain information flow between

commanders, their staffs, and subordinate units. The primary FS systems used by Army FS personnel include Advanced Field Artillery Tactical Data System (AFATDS), Joint Automated Deep Operations Coordination System (JADOCS), joint targeting integrated command and coordination suite (referred to as JTIC2S), and the forward observer system, both mounted and dismounted.

2-67. The JADOCS is a software application that presents and manipulates command, control, communications, intelligence, information, and communications interfaces to and from various systems to obtain, coordinate, and disseminate information. It maintains a comprehensive fires common operation picture, through the visualization of friendly air and land tracks, including artillery and radar positions as well as hostile air tracks received from the air defense systems integration server. It maintains comprehensive target entity databases including access to the modernized integrated database as well as enemy and friendly order of battle databases received digitally from the intelligence distributed common ground station - Army. This digital integration of U.S. and allied fires provides a forum for nominating, vetting and validating suspect targets, determining methods of engagement, conducting target area risk mitigation in a coordinated and collaborative digital environment for both deliberate and dynamic targeting. JADOCS can be utilized on any classification of network and resides at BCT and above. JADOCS works with AFATDS via a direct server-client interface to execute both deliberate and dynamic targeting.

2-68. The AFATDS is a multi-service, integrated FA system that receives call for fires, processes fire missions, air support requests, counterfire missions, conducts technical and tactical fire direction of firing units, issues orders to firing batteries and WLRs, and communicates other related information to coordinate and maximize the use of all attack/delivery assets. It meets the needs of the FS community for planning the use of critical resources and for managing, collecting, and passing vital fires data. AFATDS can create, store, and check FSCMs and ACMs for violations during fire mission processing. It establishes attack guidance and target selection standards for the expedited execution of the scheme of targeting. It performs detailed weaponeering and attack analysis for effective target engagement in accordance with the commander's desired effects. AFATDS can send both preplanned and immediate AIRSUPREQs through each echelon of command to the supporting AOC via the BCD. AFATDS transmits preplanned and immediate AIRSUPREQs to the theater battle management core system (referred as TBMCS) via the United States message text format D670 message. AFATDS can export the United States message text format (USMTF) D670 AIRSUPREQ message as an excel file formatted like a DD Form 1972 (*Joint Tactical Air Strike Request)*, for record keeping or email transmittal. AFATDS possesses limited capabilities to validate suspect targets and should be used with JADOCS for execution of deliberate and dynamic targeting. It is fielded from echelons above corps down to firing battery levels. The AFATDS can link digitally into the artillery and TA channels to achieve a rapid counterfire capability from either ground or air systems. AFATDS can communicate over a variety of networks using standard messaging formats such as variable message format, U.S. message text format, and Link-16. It is interoperable with select coalition partner fire control systems via the artillery systems cooperative agreement protocol.

2-69. The forward observer system is an automated FS system used by commanders, FSEs/FSCOORDs, FSOs, FOs, and surveyors located at or employed remotely from the FS agencies at corps, division, regiment, brigade, squadron, BN, company, battery, troop, and platoon echelons. The forward observer system provides automated decision-making, planning, and execution capability, which provides seamless integration of synchronized and accurate fires into the supported commander's scheme of maneuver. The forward observer system performs automated, calls for fire, fire mission processing, artillery target intelligence, fire planning, clearance of fires, and survey and geometry processing supporting the FA mission. Forward observer system networks with AFATDS which receives its digital messaging using variable message format transmitted on either tactical radio networks or local area networks.

JOINT AIR OPERATIONS COMMAND AND CONTROL NETWORKS

2-70. Normally, the joint air operation C2 system will be built around the C2 system of the Service component commander designated as the JFACC. Each Service component has an organic system designed for C2 of their air operations. Those service systems provided are: the Air Force's theater air control system (referred to as TACS), the Army air-ground system (referred to as AAGS), Navy tactical air control system (referred to as NTACS), Marine air command and control system (referred to as MACCS) and the special operations air-ground system (referred to as SOAGS). When all elements of the theater air control system, Army air-ground system, NTACS, MACCS hierarchy, and SOAGS integrate, the entire system is labeled the

theater air-ground system (referred to as TAGS). For more information on joint air operations and control networks see JP 3-30.

SECTION II – FIRE SUPPORT SYSTEM – TARGET ACQUISITION

2-71. Success in battle relies heavily on the ability to accurately identify, locate, and attack HPTs. This calls for rapid and accurate target development, TA, and post-strike assessment. FS planners and FSCOORDs work closely with intelligence personnel and the FAIO to identify TA requirements and focus on detecting HPTs. As an element of the FS system, *Target Acquisition* is the detection, identification, and location of a target in sufficient detail to permit effective employment of capabilities that create the required effects (JP 3-60). Staffs evaluate target information from all sources and route it to the appropriate supporting commands. This includes information from all echelons and from adjacent and supporting elements. A *target* is an entity or object that performs a function for the threat considered for possible engagement or other action (JP 3-60).

2-72. Target acquisition is conducted in accordance with the five principles of the law of war/law of armed conflict to permit the effective employment of weapons. TA can occur at numerous points along the execution timeline and at all levels of command, including the attack and deliver system performing the final attack (for more information see JP 3-09). The target engagement authority utilizes information collection, TA assets and NAI/TAIs to detect and engage targets.

TARGET ENGAGEMENT AUTHORITY

2-73. *Engagement authority* is an authority vested with a joint force commander that may be delegated to a subordinate commander, that permits an engagement decision (JP 3-01). The authority and responsibility to engage targets rests with the JFC responsible for the AO. The JFC communicates engagement criteria to the force through ROE specific to each AO. The JFC may delegate target engagement authority to subordinate commanders. In large-scale combat operations, especially during the offense, it is critical that Target engagement authority be delegated to the absolute lowest echelon that has the proper resources to identify and attack enemy formations, facilities, and other capabilities in-accordance with the Law of War and established ROE. This empowers agility by entrusting engagement decisions to leaders at the tactical edge.

INFORMATION COLLECTION AND TARGET DETECTION

2-74. Target acquisition requirements often comprise a large portion of the overall information collection effort especially when conducting deep operations or employing sophisticated cross domain fires like cyberspace operations. In some cases, especially during large-scale combat operations, units must be prepared to fight in order to acquire targets. The challenges to TA against a peer threat include integrated air defense systems, long-range fires, counter reconnaissance, cyberspace and EW operations, deception operations, and camouflage. Commanders allocate maneuver, fires, and multidomain ISR capabilities to enable TA. For more information on how the staff and intelligence sections overcome collection gaps see FM 2-0.

NAMED AREA OF INTEREST TO TARGET AREA OF INTEREST

2-75. To effectively target the enemy, the intelligence and FS staffs develop NAIs and TAIs. The staff also develops an HPTL that can include geographic NAIs and TAIs as well as enemy organizations, networks, and individuals identified as key or critical to the OE and are taken into account in each COA, and branches and sequels. NAIs should not be tied to a specific terrain; rather, they should be based upon the enemy locations or suspected locations. NAIs are used both to confirm or deny an enemy COA and locate HPTs. TAIs cannot exist outside of an NAI as they are both inextricably linked to the commander's priority information requirements and decision points. For a graphic example of a TAI see figure 2-1. The G-3 tasks ISR assets to observe NAIs and TAIs.

- A *named area of interest* is the geospatial area or systems node or link against which information that will satisfy a specific information requirement can be collected, usually to capture indications of enemy and adversary courses of action (JP 2-0).
- A *target area of interest* is the geographical area where high-value targets can be acquired and engaged by friendly forces (JP 2-0). Not all TAIs (see figure 2-1) will form part of the friendly

COA; only TAIs associated with high priority targets are of interest to the commander. These are identified during the COA development and refined during wargaming and the targeting integrating process. TAIs differ from engagement areas (EAs) in degree. EAs plan for the use of all available weapons; TAIs might be engaged by a single weapon and lead to the establishment of geographical targets, to include point, area, and linear, as recorded on the target list worksheet.

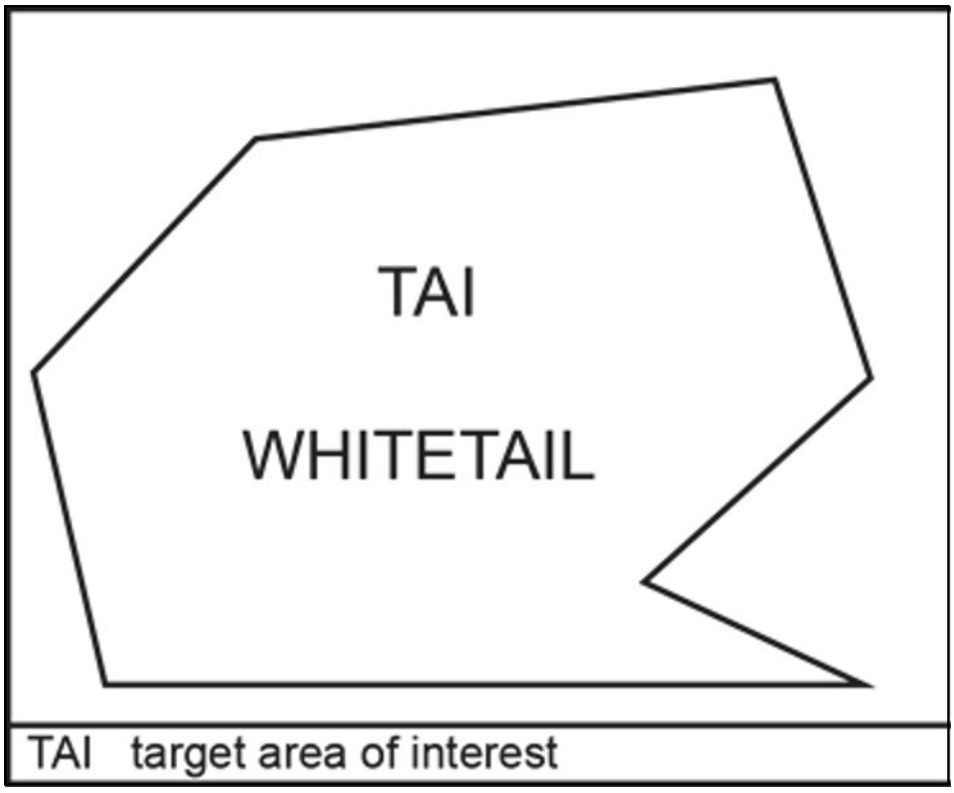


Figure 2-1. Example of target area of interest

TARGET ACQUISITION ASSETS

2-76. Target acquisition capabilities range from visual identification by Soldiers to sophisticated electronic means. Target acquisition is most effective when comprised of complementary and unique collection assets and capabilities across echelons and warfighting functions. The expression of accuracy of TA assets is target location error and is criteria captured by the targeting team on the target selection standards. Target selection standards are criteria applied to enemy activity (acquisitions and battlefield information) and used in deciding whether the activity is a target. Target selection standards put nominations into two categories: targets and suspected targets. Targets must meet accuracy and timeliness requirements for engagement. Suspected targets must be confirmed before any engagement.

2-77. Some of the many possible TA assets include satellites and other national assets, joint ISR systems to include the USAF distributed common ground system, unmanned aircraft system (UAS), WLR, FOs, scouts, and SOF. When planning the TA portion of information collection, it is useful to group those assets into the four primary information collection tasks and missions of reconnaissance, surveillance, security operations, and intelligence operations. For more information on intelligence collection capabilities by command echelon, see FM 2-0.

SECTION III – FIRE SUPPORT SYSTEM – ATTACK AND DELIVERY CAPABILITIES

2-78. This section discusses lethal and nonlethal weapon systems capabilities including –

- Joint FS surface-to-surface and air-to-surface capabilities.
- CEMA.
- Space operations.
- Information activities.

2-79. For more technical information on joint surface-to-surface and air-to-surface capabilities see ATP 3-09.32.

SURFACE TO SURFACE CAPABILITIES

2-80. Army, Navy, and USMC surface-to-surface indirect fires include cannon, rocket, and missile systems as well as mortars organic to maneuver elements. FA attack/delivery systems provide continuously available fires under all weather conditions, and in all but the most restrictive terrain. FA provides close-support fires to supported forces. FA can perform counterfire, interdiction, suppression of enemy air defenses (SEAD), and integrate into strike coordination and reconnaissance (SCAR) missions. FA employs a wide range of munitions, to include long range precision and near precision munitions that provide all-weather precision strike capability at great distances. FA support can range from tactical fires in a company AO to strategic fires across combatant command boundaries. Units must be cognizant that FA units have inherent limitations. These limitations include:

- A firing signature that makes the unit vulnerable to detection by enemy TA assets.
- Limited self-defense capability against ground and air attacks.
- Limited ability to adequately engage moving targets.

ROCKETS AND MISSILES

2-81. The multiple launch rocket system (MLRS) and High Mobility Artillery Rocket System (HIMARS) supplements cannon artillery by delivering a large volume of fires in a very short period of time against HPTs at increasingly greater ranges. MLRS/HIMARS is used for counterfire and deliberate attacks against enemy air defense, light materiel, and personnel targets. The all-weather MLRS/HIMARS fires free-flight and guided rockets and missiles. Free-flight or guided rocket options include warheads with either unitary high-explosive or dual-purpose improved conventional munitions or alternate warhead munitions such as the Global Positioning System Multiple Launch Rocket System (GMLRS) – alternate warhead.

2-82. The GMLRS conventional and alternate warheads provide commanders with increased accuracy and much greater range. The extended range GMLRS will double the range of the current capability. Their extremely high altitude of delivery (apex of missile trajectory, maximum ordinate) requires close coordination with air planners and liaisons to ensure aircraft are not in the vicinity during launches and descents.

2-83. The Army Tactical Missile System (ATACMS) provides long-range, fire support. ATACMSs are fired from an MLRS/HIMARS platform and may consist of antipersonnel/antimaterial submunitions or a unitary high-explosive warhead. The ATACMS retains the responsiveness of rockets, though it possesses a much greater range. The ATACMS antipersonnel/antimaterial warhead is designed to engage soft targets and the unitary high-explosive warhead is designed to engage fixed infrastructure. Due to the range and altitude of the ATACMS, target engagements require detailed airspace coordination and integration. For more information on MLRS/HIMARS and ATACMS, see ATP 3-09.60.

2-84. The Precision Strike Missile is a surface-to-surface long range missile fired from MLRS/HIMARS systems with greater range and lethality. This missile will be able to attack targets on the ground or at sea and will be a key capability used to penetrate and disintegrated adversary A2/AD capabilities.

2-85. The U.S. Navy Tomahawk is an all-weather, long-range, subsonic cruise missile used for deep land attack warfare, launched from U.S. Navy surface ships and submarines. The Tomahawk conventional variant adds the capability to reprogram the missile while in-flight via two-way satellite communications to strike any of fifteen pre-programmed alternate targets or redirect the missile to any Global Positioning System (GPS) target coordinates.

CANNON ARTILLERY AND MORTARS

2-86. Cannon artillery can perform close support of maneuver, counterfire, interdiction, obscuration, and SEAD at increasingly extended ranges which will allow these systems to strike operationally or strategically relevant targets. Cannon artillery provides near immediate response times, 24-hour availability, and 6400 mil coverage. Cannon artillery offers area and precision fires, such as the Excalibur and precision guidance kit (referred to as PGK). The Excalibur is a precision-guided, extended-range, 155-millimeter (mm) high-explosive cannon artillery projectile with an integrated global-positioning system that utilizes an inertial navigation system (INS) guidance and unitary warhead. It provides artillery capabilities in urban areas and restrictive terrain, while minimizing collateral damage. The precision guided kit is a trajectory-correcting fuse kit compatible with standard 155mm munitions. It operates in all weather conditions, engages targets with increased accuracy, and has a near-vertical terminal trajectory. The replacement for dual purpose improved conventional munition, is the cannon-delivered area effects munitions. Until this is fielded, units plan on utilizing the Bonus Mk 2 projectile currently in use by unified action partners. The projectile carries two sensor-fuzed munitions expelled during flight that detect and attack armored vehicles from above.

2-87. Extended range cannon artillery will provide increased lethality, and range, to provide the division commander with overmatch and accuracy. Its increased rate of fire will provide the capability to mass fires at specific points and, to strike targets in the division deep area in order to shape for BCTs.

2-88. Organic mortars are organized as platoons in maneuver and ranger BNs and as sections in Stryker and infantry BCT rifle companies. Mortars are high-angle, relatively short-range, high rate-of-fire, area fire weapons. Their mobility makes them well suited for close support of maneuver. Mortars can also be used for final protective fire (FPF), obscuration, and illumination. For more information on mortars see TC 3-22.90.

NAVAL SURFACE FIRE SUPPORT

2-89. *Naval surface fire support* is fire provided by Navy surface gun and missile systems in support of a unit or units (JP 3-09.3). When supporting an amphibious assault, the commander, amphibious task force, prepares the overall NSFS plan. In general, the mission of NSFS units in an amphibious assault is to support the assault by destroying or neutralizing shore installations that oppose the approach of ships and aircraft and to deliver fires against enemy forces that may oppose the landing force, including its post-landing advance.

2-90. When the number of ships permits, individual ships will be assigned as DS to BNs conducting an amphibious assault. The DS mission establishes the priority in which the ship will process calls for supporting fire and the anticipated zone of fire (ZF). The ship delivers fires on planned targets and targets of opportunity in the ZF, which normally corresponds to the zone of action of the supported unit. The GS mission requires an NSFS ship to support the force, or that portion of the force assigned to the ship, by attacking targets in the ZF.

2-91. Limitations of naval surface fire support include the observer must remain abreast of the gun-target-line relationship because the characteristic flat trajectory of naval gunfire results in a pronounced dispersion pattern along the gun target line (referred to as the GTL) range dispersion. The flat trajectory and high muzzle velocity of naval gunfire make the adjustment of naval gunfire difficult, particularly on flat terrain. The fall of shot of naval gunfire can be described as a narrow, elongated pattern as seen along the gun-target-line. The size of the pattern varies with range.

AIR TO SURFACE CAPABILITIES

2-92. Fixed-Wing Aircraft. Fixed-wing aircraft provide flexibility, range, speed, lethality, precision, and the ability to mass fires at a desired time and place. Fixed wing aircraft support the joint fires tasks of strategic attack, countering air and missile threats (including SEAD and offensive counterair), and interdiction. Fixed-wing aircraft provide joint FS with AI, CAS, airborne C2, ISR, SCAR, SEAD, and FAC(A). The capacity of aircraft to deliver precision-guided munitions limits collateral damage. Also, aircraft may provide real-time attack assessment.

- *Air interdiction* is air operations to perform interdiction conducted at such distances from friendly forces that detailed integration of each air mission with the fire and movement of friendly forces is not required (JP 3-03).

- *Close air support* is air action by aircraft against hostile targets that are in close proximity to friendly forces and that require detailed integration of each air mission with the fire and movement of those forces (JP 3-09.3).
- *Strike coordination and reconnaissance* is an air mission to detect targets and coordinate or perform attack or reconnaissance on those targets. (JP 3-03). SCAR missions are flown in a specific geographic area and are an element of the C2 interface to coordinate multiple flights, detect and attack targets, neutralize enemy air defenses, and provide battle damage assessment (BDA).
- *Suppression of enemy air defenses* is activity that neutralizes, destroys, or temporarily degrades surface-based enemy air defenses by destructive and/or disruptive means (JP 3-01).

2-93. Rotary-wing aircraft can employ a variety of weapons, including precision-guided weapons beyond line of sight. They can quickly reach and move throughout the depth and breadth of the battlefield. This mobility and flexibility help the commander seize or retain the initiative. They can also provide terminal guidance for other weapon platforms, as well as operate during periods of limited visibility. The US Army normally employs attack helicopters as maneuver units to conduct two basic types of attack missions: attacks against enemy forces in close, friendly contact with other Army maneuver forces and attacks against enemy forces out of direct fire contact with friendly forces. Both can be executed as either hasty or deliberate attacks and are typically supported with integrated joint fires. This type of attack requires detailed planning and the full integration of manned and unmanned aircraft (UA), and the simultaneous or sequential employment of CAS, indirect fires, and other enabling capabilities to mass effects, isolate, and destroy key enemy forces and capabilities. U.S. Army attack helicopters can also perform CAS in support of another component. The USMC employs its attack rotary-wing aviation primarily as a CAS platform. For more information on Army fixed-wing aircraft and attack helicopters see ATP 3-09.32.

2-94. In addition to Army aviation responsibilities during SCAR, tactical level maneuver commanders can employ a method similar to the SCAR - a coordinated attack interdiction mission in which the ground maneuver commander plans/coordinates/employs a coordinated attack using supporting CAS, Attack Aviation, UAS, and artillery against HPTs and targets of opportunity inside the ATO cycle planning horizon and in close proximity to friendly forces (examples include EAs, enemy penetrations, and Level III threats in a rear area). This method, previously referred to as a joint air attack team or JAAT is a capability a tactical maneuver commander retains to ensure they can integrate rotary wing and fixed wing aircraft, supported by other fire support attack/delivery platforms (artillery, CEMA, NSFS, mortars) to locate and attack targets of opportunity in the close fight.

2-95. In situations such as this, the maneuver commander can designate the Army aviation commander with the highest situational awareness and ability to provide C2 as the on-scene commander (usually the Air Mission Commander). The *on-scene commander* is an individual in the immediate vicinity of an isolating event who temporarily assumes command of the incident (JP 3-50). The commander will coordinate directly with the appropriate tactical maneuver HQ FSE and FAC(A)/JTAC to execute the attack. The aviation commander designated as the on-scene commander temporarily assumes command of the coordinated attack. This method can be employed anywhere on the battlefield (including the rear area), across the range of military operations. CAS procedures may or may not be required depending on the proximity to friendly forces. Maximum synergy occurs when the on-scene commander of the coordinated attack possesses the authority to coordinate the attack directly with the other team members. When CAS is not available, direct attack coordination is more efficient because there is no requirement for JTAC/FAC(A) control.

2-96. The long endurance of UA enables them to provide extended support to time sensitive targets (TST), high-value targets, and HPT missions. UA can also support or conduct CAS, SCAR, AI, and other joint fires missions. Specific tasks for the UA may include TA and marking, terminal guidance of ordnance, providing precision coordinates for GPS-aided munitions, delivery of onboard precision-guided ordnance, BDA, signals intelligence, communication/data relays, and retargeting to include shoot-look-shoot. UA should be requested, tasked, routed, controlled, and deconflicted in a manner similar to methods used for fixed-winged and rotary-winged manned aircraft, with exceptions made for their unmanned nature (such as the inability to see and avoid other air traffic). When the necessary equipment, network, and personnel are included it becomes a UAS. For more information on UAS employment see ATP 3-04.1.

STANDOFF WEAPONS

2-97. A standoff weapon is a medium-range, precision-guided, air to-surface glide weapon employing a variety of munitions that can be employed against land and sea targets. It is a launch-and-leave weapon that employs a GPS-aided INS and is capable of day, night, and adverse weather operations. Standoff weapons provide an ability to engage targets at extended ranges while minimizing the risk to friendly forces. Some examples of air-to-surface standoff capabilities include:

- The Joint Air-to-Surface Standoff Missile (referred to as JASSM) and its extended-range variant, which are air-launched, low-observable, subsonic cruise missiles specifically designed to penetrate air defense systems. The missiles incorporate GPS-aided INS guidance with an infrared seeker in the terminal phase of flight. Optimizing JASSM's full-precision and low-observable capabilities requires prior coordination with both strike units and target intelligence agencies.
- The small diameter bomb (referred to as SDB), which is an air-launched, precision guided, glide weapon. It provides strike aircraft with high-loadout, all-weather, autonomous, standoff-attack capability outside of point defenses. SDB increment I provides precision capability through a GPS-aided INS against fixed targets, while SDB increment II incorporates a GPS-aided INS and additional tri-mode seeker, optimized for engaging fixed, relocatable, moving targets, at any time of day and in adverse weather conditions.

CYBERSPACE OPERATIONS

2-98. *Cyberspace operations* are the employment of cyberspace capabilities where the primary purpose is to achieve objectives in or through cyberspace (JP 3-0). Both the offensive cyberspace operations and defensive cyberspace operations-response action missions may rise to the level of use of force, where physical damage or destruction of enemy systems require use of fires in cyberspace. offensive cyberspace operations are intended to project power by the application of force in and through cyberspace and defensive cyberspace operations-response action uses defensive measures, including fires, outside the defended network to protect it.

2-99. *Cyberspace attack* are actions taken in and through cyberspace that create denial (i.e., degradation, disruption, or destruction) or manipulation effects in cyberspace and are considered a form of fires (JP 3-12).

2-100. Cyberspace attack actions are a form of fires, are taken as part of an offensive cyberspace operations or defensive cyberspace operations-response action mission, are coordinated with other USG departments and agencies, and are carefully synchronized with planned fires in the physical domains. For more information on CEMA see FM 3-12.

SPACE OPERATIONS

2-101. Many lethal and nonlethal fires capabilities depend on space capabilities to support, integrate, and deliver fires. Army space capabilities are integrated throughout the fires warfighting function, providing robust and reliable planning, contributing to target development, and providing positioning, navigation, and timing, satellite communications, imagery, geolocation, weather, and terrain capabilities.

2-102. As a FS attack/delivery capability, space control operations that create a desired effect on enemy space systems across all domains by employing a variety of measures to assure the use of space and attribute enemy attacks. These include terrestrial fires to defend space operations and assets. A capability for, or employment of, fires may deter threats and/or contain and de-escalate a crisis.

2-103. When deliberate, nonlethal FS attack/delivery capabilities are directed into the space domain, they must be coordinated between the affected combatant commands if time permits. By honoring the boundaries of the space domain, CCDRs help preserve space situational awareness, spacecraft life span, and space system performance. For more information on space operations see JP 3-14. *Space domain* is the area above the altitude where atmospheric effects on airborne objects become negligible (JP 3-14).

INFORMATION

2-104. Army forces integrate all relevant military capabilities through the execution of five information activities (enable, protect, inform, influence, and attack). An *information activity* is a collection of tasks linked by purpose to affect how humans and automated systems derive meaning from, use, and act upon, or are influenced by, information (ADP 3-13). Each information activity incorporates several tasks and subtasks from the warfighting functions to achieve a variety of friendly and threat-based objectives. The five information activities are as follows:

- Enable.
- Protect.
- Inform.
- Influence.
- Attack.

2-105. The fires warfighting function is the related tasks and systems that create and converge effects in all domains against the threat to enable operations across the range of military operations. These tasks and systems create lethal and nonlethal effects delivered from Army, joint, and multinational forces. The fires warfighting function contributes to the enable, protect, influence, and attack information activities.

2-106. The fires warfighting function contributes to enabling the exercise of C2 through the targeting process. The delivery of fires contributes to protecting data and information, affecting threat C2 targets, and influencing target audiences. Through the targeting process, commanders identify, select, and prioritize targets and match the appropriate capability (or delivery platform) to targets to create desired effects. This includes identifying and attacking enemy C2 nodes, information systems, radars, ground control stations, and sensors to affect the enemy's decision cycle. Capabilities used to attack these targets range from cannons, rockets, and missiles to offensive cyberspace operations, electromagnetic attack, and offensive space operations. See ADP 3-19 for more information on the fires warfighting function. See ADP 3-13 for more information on information and information activities.

DECEPTION

2-107. Army forces support or conduct three types of deception, military deception, tactical deception, deception in support of operations security.

2-108. Deception applies to all levels of warfare, across the range of military operations, and is conducted during all phases of military operations. Physical attack/destruction can support military deception by shaping an enemy's intelligence collection capability through destroying or nullifying selected ISR capabilities or sites. Attacks can mask the main effort from the enemy. When properly integrated with operations security and other information activities, deception can be a decisive tool in altering how the enemy views, analyzes, decides, and acts in response to friendly military operations. For more information on Army support to military deception, tactical deception, and deceptions in support of operations security see ADP 3-13 and FM 3-90.

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Chapter 3

Fire Support and the Operations Process

This chapter further discusses FS in the Operations Process in detail. Section 1 further explains the four FS functions. Section II describes key FS processes and procedures (as an element of C2) and the principles of FS planning and coordination. Section III describes FS preparation, primarily rehearsals. Section IV discusses the principles of FS execution (AWIFM-N). Section V discusses operational and combat assessment as they relate to FS.

"The artillery was my strongest tool. I repeatedly said it was more a matter of the infantry supporting the artillery than the artillery supporting the infantry…. I wish I knew the countless times that positions were taken or held due solely to TOT's …."

– Major General R.O. Barton, US 4th Infantry Division World War II

SECTION I – FIRE SUPPORT FUNCTIONS

3-1. The four functions of FS are the basic requirements the FS system must fulfill to destroy, neutralize, or suppress the enemy. The basic FS functions describe what FS must do and are used as screening criteria during FS planning, rehearsals, and assessment of the overall conduct of the FS system.

SUPPORT FORCES IN CONTACT

3-2. The commander must provide responsive FS that ensures freedom of maneuver to forces engaged with the enemy in the close, deep, and rear areas. A force is always in some form of contact. FM 3-90 describes the nine forms of contact as: visual; direct; indirect; non-hostile; obstacles; aircraft; CBRN; electromagnetic, and influence. Units may experience all forms of contact simultaneously. Commanders should assume that friendly forces are always in contact in one or more domains, both during competition and conflict. Peer adversaries or enemies have both the cyberspace and space enabled capabilities to observe friendly forces routinely.

3-3. Throughout large-scale combat operations, FS must:

- Provide deep fires to disrupt, delay, and destroy uncommitted enemy forces before they can engage friendly forces. This includes enemy A2/AD, CPs, airfields, air defense artillery (ADA), missiles, bridges and logistical infrastructure.
- Plan counterfire to destroy, neutralize, or suppress the enemy's indirect fire weapon systems. It Includes counterbattery and countermortar fire.
- Provide close supporting fires. *Close support* is action of the supporting force against targets or objectives that are sufficiently near the supported force as to require detailed integration or coordination of the supporting action with fire, movement, or other actions of the supported force (JP 3-31). These fires are used to engage enemy troops, weapons, or positions that are threatening or can threaten the force in either the offense or defense. They allow the commander to multiply combat power effects. Close support expands the battlefield depth, erodes enemy forces, and inflicts damage well beyond direct fire ranges.
- Provide fires to suppress known enemy air defense weapons immediately before and during flight by friendly aircraft within the AO.
- Provide fires in support of rear area operations.

SUPPORT THE CONCEPT OF OPERATIONS

3-4. The FS system responds to the supported commander's plan through the scheme of fires, with integration and delivery of proactive, timely, and accurate FS. The *concept of operations* is a statement that directs the manner in which subordinate units cooperate to accomplish the mission and establishes the sequence of actions the force will use to achieve the end state (ADP 5-0).

3-5. The supported commander must retain direct control over sufficient firepower to influence the battle by attacking HPTs. Of particular concern to the supported commander in large-scale combat operations is counterfire, SEAD, deep fires, and support of rear area operations.

SYNCHRONIZE AND CONVERGE FIRE SUPPORT (LETHAL AND NONLETHAL) ACROSS ALL DOMAINS

3-6. *Synchronization* is the arrangement of military actions in time, space, and purpose to produce maximum relative combat power at a decisive place and time (JP 2-0). It is essential that FS planning is performed concurrently with the development of the scheme of maneuver and unit airspace plan. Synchronization must occur within the FS system itself and with the other dynamics of combat power.

3-7. FS must be synchronized with other joint force activities to include air operations, cyberspace operations, ISR functions, special operations, personnel recovery, and information related activities to optimize limited resources and avoid friendly fire incidents. Synchronization of FS is primarily done through the Army's targeting process decide, detect, deliver, and assess and the joint targeting cycle. Tactical and technical rehearsals of the FS plan are also key to synchronization of FS across all domains. Successful use of this methodology helps attack the right target with the best weapon at the right time.

SUSTAIN AND PROTECT THE FIRE SUPPORT SYSTEM

3-8. Sustainment is a central, potentially decisive aspect of ensuring the FS system functions effectively; additionally, it is an essential component of the endurance tenet of multidomain operations and as such leaders should strive to integrate it into all FS plans and operations (see table 3-1 on page 3-13). It is not a separate function or afterthought. *Sustainment* is the provision of logistics, financial management, personnel services, and health service support necessary to maintain operations until successful mission completion (ADP 4-0). FS and FA planners must enable sustainment operations to ensure all elements of the FS system can continuously and rapidly integrate FS in all domains and ensure proper personnel services and health support. Ammunition, fuel, food, water, maintenance, transportation, and medical support are all critical to sustaining the FS system.

3-9. FS planners must also ensure proper protection measures are executed to ensure survivability of CPs, personnel, networks, TA, and attack/delivery systems. *Protection* is the preservation of the effectiveness and survivability of mission-related military and nonmilitary personnel, equipment, facilities, information, and infrastructure deployed or located within or outside the boundaries of a given operational area (JP 3-0). The FSCOORD, who is also a commander, is responsible for providing the leadership that ensures that the FS system is sustained, protected, and can support the operation. FSCOORD identifies sustainment and protection requirements associated with all the elements of the FS system and takes necessary actions to ensure that they are satisfied. The FSCOORD plans and monitors logistics readiness and training within the command and ensures that subordinate leaders understand and use external sustainment resources to the best effect. The FSCOORD ensures that coordination is made with supporting sustainment and protection elements outside the command.

SUSTAINMENT

3-10. The FSCOORD must ensure the following:

- Formulate tactical plans to reflect logistics limitations and to exploit logistics capabilities.
- Stocks and supplies are properly positioned to sustain FS systems. In large-scale combat operations, this is particularly critical for FA systems because of the high tonnage of munitions.

- Weapon systems and all other equipment are maintained in a high state of readiness and sustainment systems are properly understood and used.
- Strict controls and priorities on supplies are employed to ensure strength at the decisive point. While fire support plans help determine a required supply rate. *Required supply rate* is the amount of ammunition expressed in terms of rounds per weapon per day for ammunition items fired by weapons, in terms of other units of measure per day for bulk allotment, and other items estimated to be required to sustain operations of any designated force without restriction for a specified period (ATP 3-09.23). They must be adjusted to conform to the controlled supply rate (CSR). *Controlled supply rate* is the rate of ammunition consumption that can be supported, considering availability, facilities, and transportation. It is expressed rounds per unit, individual, or vehicle per day (ATP 3-09.23). The FSCOORD must identify and mitigate the risk in the gap between the required supply rate and CSR. The FSCOORD advised by their staffs will determine an appropriate CSR and how supplies will be distributed to achieve their assigned mission.
- Develop and communicate clear logistical requirements to supporting sustainment elements. FA personnel must ensure that logistics personnel understand the types and amounts of ammunition required to support each phase of an operation. Properly submitting required logistical status reports is critical to this effort. FA units must identify and maintain situational awareness of their and the supporting logistical units' ammunition haul capacity. At times, FA units may be required to draw ammunition in excess of their CSR for a specific requirement such as a preparation. The additional haul capacity will also need to be forecasted. In this case, ammunition may be issued for immediate consumption and is considered expended when issued.
- Synchronize combat configured loads to support the current and future fires plans informed by the FS planning and coordination process. Combat configured loads are preplanned packages of ammunition transported as a single unit for routine resupply, yet flexible enough to provide for a variety of operations.
- Resupply triggers across all classes of supply are aligned against essential field artillery tasks (EFATs) and are understood by the unit's sustainment personnel.
- Ensure adequate reconstitution operations are planned and rehearsed for the FS System.

PROTECTION

3-11. The FSCOORD must ensure the following:

- Additional force protection resources (air defense, engineer, military police, maneuver, and aviation assets) are dedicated or designated as needed. Consider the use of multinational capabilities whose national caveats allow defensive actions, but not offensive actions. (See table 3-1 on page 3-13).
- Subsequent firing positions for FA units are prepared before the operation, if possible.
- All elements of the FS system take action to counter the enemy's firepower and maneuver by ensuring that personnel, equipment, and systems are difficult to locate, strike, and destroy using dispersion, decoys, camouflage, and frequent survivability moves.
- Deception is employed to mislead the enemy (see FM 3-13.4).
- Communication networks are protected, resilient, and redundant.
- Conduct appropriate adjacent unit coordination for mutual support opportunities.
- Engineers provide survivability and mobility assets for radars and firing units.
- Plan and coordinate for opportunity surveillance by manned and unmanned air platforms as well as maneuver forces transiting the area to include routes, position areas artillery and CPs.
- Ensure protection battle drills are developed and rehearsed to account for reaction to enemy air, ground, CBRN, indirect fire, jamming, or CEMA attacks.
- Coordinate for and utilize handheld UASs to recon and surveil NAIs developed for protection.

TECHNICAL SUPPORT OF THE NETWORK

3-12. The FSCOORD must ensure the following:

- Establish the communications priorities, primary, alternate, contingency and emergency (PACE) plan.
- C2 (CPs, people, processes, and networks) is redundant where possible.
- FS personnel are well trained and proficient with analog and digital systems, and training must be continuous. Ensure unit digital sustainment training is planned, resourced, and emphasized at command levels.
- Develop and utilize a detailed digital standard operating procedure (SOP).
- FS meteorology, survey, and communications are accurate, redundant, and timely.
- Request additional communications support if needed.

SECTION II – PROCESSES AND PROCEDURES

3-13. As discussed in chapter 2, processes and procedures are a component of the overall C2 system. The primary FS processes are targeting, FS planning and coordination, and the MDMP process. It is important to understand that all these processes occur continuously and simultaneously with the overall operations process (see table 3-1 on page 3-13). Two critical FS procedures that all FS planners must understand and integrate into the operations process are SEAD and counterfire. Since these are so critical, they are described up front in this section. For more detail on SEAD refer to JP 3-01. For more information on counterfire see ATP 3-09.12.

SUPPRESSION OF ENEMY AIR DEFENSES

3-14. Army SEAD operations are designed to support operational and tactical plans by protecting Army aviation assets near the forward line of own troops (FLOT) or during cross-FLOT operations. SEAD also includes the protection of air component aircraft (such as CAS aircraft) supporting the ground commander's operation. The basic principle of Army SEAD operations is see-kill. This means that enemy air defense systems are attacked immediately upon detection, consistent with the commander's intent and the best application of resources. SEAD fire planning can be conducted and coordinated at division level or higher and may involve other services. For more information on countering air and missile threats see JP 3-01.

TARGETING AND SYNCHRONIZATION

3-15. The targeting process for SEAD is the same as for any other target set: it is conducted within the intelligence preparation of the operational environment (IPOE) framework; it leverages the decide, detect, deliver, and assess process; and it must support the four FS functions identified in CH 1. The synchronization of SEAD is even more critical and difficult than the synchronization of FS for ground maneuver forces because of the time sensitivity of air operations. The responsibilities for SEAD targeting and synchronization run across the corps and division staff sections and are directed through the FSE. The FSCOORD manages and directs the corps or division SEAD effort.

3-16. SEAD objectives are specified by the JFC, who will consider the unique capabilities of each component to contribute to counterair operations. *Counterair* is a mission at the theater level that integrates offensive and defensive operations to attain and maintain a desired degree of control of the air and protection by neutralizing or destroying enemy aircraft and missiles, both before and after launch (JP 3-01). Traditionally, there are three categories of SEAD (AO-/joint operations area-wide joint air defense system suppression, localized suppression, and opportune suppression), each of which reduces friendly attrition from an adversary's air defense system and creates more favorable conditions for friendly air operations. For each category, there are two means of executing SEAD, destructive and disruptive.

AIR COMPONENT CAPABILITIES

3-17. SEAD assets are often used in conjunction with other air operations such as AI, offensive counterair, attack operations, and airborne operations when surface air defenses are a factor. Specially trained aircrew and specially equipped aircraft are designed for SEAD missions, especially against an enemy integrated air defense system (IADS). SEAD dedicated aircraft are normally equipped with special electronic detection and EA equipment capabilities (directed energy, antiradiation missiles, electromagnetic jamming, flares, chaff,

and decoys). SEAD assets may be scarce and categorized as high demand/low-density assets. Thus, during large-scale combat operations, they usually will not be tasked for missions without a SEAD requirement. Other fighter-attack and multi-role fighter crews normally are trained to support the SEAD mission, especially against the enemy air defense infrastructure.

SURFACE COMPONENT CAPABILITIES

3-18. Based on the JFC guidance, the land and maritime surface components' fires cells and FSEs will determine the weapon systems available to conduct SEAD. Examples of these capabilities include FA, mortars, naval surface fire, attack helicopters, EW, and surface-to-surface missiles (referred to as SSMs). To ensure unity of effort and conservation of force, components need to coordinate SEAD activities within their AO with the JFACC to ensure they meet mission requirements and do not interfere with other planned operations. The BCD can assist localized suppression operations by coordinating the means to request surface FS. A rapid and free exchange of SEAD target information between the JFACC and Army commanders is required for effective surface suppression.

THREAT

3-19. Air defense threats can encompass many national or multinational systems normally integrated into an IADS. Adversaries' IADS have become increasingly complex and can differ widely from country to country in terms of organization, sophistication, and operational procedures. An adversary's IADS needs to be analyzed in-depth for strengths and weaknesses, especially seams in coverage. The goal is to identify target critical capabilities and vulnerabilities, C2 reliability/redundancy, and defensive weapons systems. SEAD operations target the HPTs of an IADS:

- C2 nodes/centers.
- Surface-to-air missile sites.
- Surface-to-air missile carriers and storage bunkers.
- Antiaircraft artillery.
- Early warning and fire control radars and ground control intercept sites.
- Air defense operations and maintenance personnel.
- Naval air defense assets.
- Directed energy weapons.
- EW systems.

3-20. SEAD operations are accomplished through denial, degradation, destruction, and disruption.

- Denial eliminates the utility of an enemy's targeted system, usually without physical damage. Denial prevents an enemy from acquiring accurate information about friendly forces.
- Degradation permanently impairs (partially or totally) the enemy's targeted systems, usually with physical damage. Degradation may confuse or delay the actions of an enemy.
- Destruction seeks the destruction of the target system or operating personnel.
- Disruption temporarily denies, degrades, delays, or neutralizes enemy surface air defense systems.
  - Means include offensive cyberspace operations, EA, and tactics such as avoidance or evasive flight profiles.
  - UA can be used to actively employ disruptive means.

COUNTERFIRE

3-21. Like friendly FS systems, threat FS systems can inflict serious damage on friendly maneuver forces, FS systems, and supporting infrastructure; therefore, the enemy's FS system must be acquired and eliminated. Counterfire contributes to the combined arms fight by providing fires against the enemy integrated fires complex; it protects friendly forces, combat functions, and facilities from enemy indirect fires by neutralizing, or destroying enemy weapons, TA assets, observers (to include special purpose forces), C2 facilities, and communications and logistics sites. Counterfire gains freedom of maneuver for all friendly forces.

Counterfire is tied to current and future operations and is part of the overall combined arms fight to achieve fire superiority.

3-22. In large-scale combat operations, the corps commander is responsible for counterfire throughout the depth of the corps AO. They determine the best way to protect the corps combat forces and to defeat, delay, or disrupt the threat array. This estimate or analysis includes an assessment of the counterfire capabilities of the corps and its subordinate divisions. For more information on corps operations see ATP 3-92. The corps commander's counterfire responsibilities include the following:

- Segmenting the battlefield by delineating maneuver boundaries and assigning areas of responsibility for corps and its subordinate divisions. This helps establish the delineation of counterfire responsibilities within the corps zone.
- Assigning missions and responsibilities, to include specific requirements to information collection assets through the collection manager.
- Allocating resources. Corps assets may be retained at corps or allocated to subordinate divisions. Conversely, in some situations, the corps commander may require the use of division assets to support a corps counterfire responsibility. They should provide guidance for use of certain critical assets such as the any corps aviation assets, AI, ISR capabilities, SOF, and CEMA resources.
- Requesting additional TA and attack/delivery systems from theater or JTF level or from other joint HQ.
- Detecting and attacking. The corps detects and attacks targets within its AOR, the corps also may attack targets within a division AO when the division has forwarded such a request to corps based on priority and need. Within its capability, the corps may respond to requests for additional fires from adjacent units.
- Assessing. Finally, the corps commander must assess the protection of his combat units and the effects of counterfire against threat fire support systems. As appropriate, commander adjusts information collection and/or attack priorities for protection of his force and attack of enemy targets. Commander may reallocate assets and modify the missions of subordinate units.

3-23. The corps commander decides how the corps will conduct counterfire operations. They influence how subordinate division commanders fight through the allocation of corps assets, the issuance of attack guidance, and the identification of corps HPTs. The corps commander can support a division commander's counterfire efforts by attacking threat fire support systems at depth; by setting the conditions division counterfire fight. In addition to allocating assets to divisions, the corps commander can further support a division counterfire fight by responding to the division requests with AI, MLRS, CEMA, and EW. With respect to counterfire in the division AO, the corps commander:

- Assigns missions to division and corps fire support assets and delineates their areas of responsibility by establishing boundaries.
- Detects and attacks targets forwarded by the division. As appropriate, the corps, after coordinating with the division FSE, may attack threat fire support targets within the division zone by massing fires to achieve required effects. Procedures for attacking threat systems firing from across boundaries also must be coordinated.
- Task-organizes and allocates assets based on the commander's intent and the mission variables of mission, enemy, terrain and weather, troops and support available, time available, and civil considerations, each of which have informational considerations (METT-TC (I)), the corps commander can give the divisions' added assets for detection and attack of threat fire support. Most often, corps provides non divisional FA delivery assets to augment DIVARTY fire support capabilities. This can be done by either of the following actions:
- Assigning a FAB, a support relationship of R or GSR to a DIVARTY.
- Attaching the FAB to the division requiring augmentation. The FAB is normally further attached to the DIVARTY.

3-24. Typically, most of the reactive counterfire fight takes place within the division AO. Most of the threat active fire support systems are in this area. The responsibilities of the division commander mirror those of the corps commander. Although his assets are fewer in number and variety, the division commander does have organic TA, target processing, and delivery assets to conduct counterfire. The FSCOORD for the

division is responsible for orchestrating the division counterfire effort. When a FAB from corps is available to the division, the DIVARTY commander may assign it the counterfire role. Responsibility for the execution of the division counterfire effort, however, remains with the DIVARTY commander.

PROACTIVE COUNTERFIRE

3-25. Proactive counterfire is the specific targeting of enemy indirect fire systems including their C2, sensors, platforms, and logistics before they engage friendly forces. The goal of proactive counterfire is to identify, locate, and attack to eliminate the enemy's strike capability before it can impact friendly operations. The proactive measures consist of zone management, site analysis, and position survivability considerations. The proactive counterfire process begins with targeting and continues throughout the operation. The G-2 and the targeting officer develop named areas of interest and target areas of interest where the enemy indirect fire assets are expected. Rocket BNs from the FAB and AI aircraft normally perform the bulk of proactive counterfire in support of division operations, using TA and fires as well as allocated, joint, national, or multinational assets to acquire and disable attack components of the enemy's strike capability. Examples of target sets include cannon, rocket, and missile delivery units, prepared launch sites, artillery ammunition storage facilities, FDCs, counterfire radars, FOs, fixed or rotary wing airfields and fire support communication infrastructure. Information collection assets must be synchronized and integrated to accurately locate targets; and attack assets (such as artillery, mortars, CAS, attack helicopters, naval surface fire support, and CEMA) must be dedicated against the threat total FS system. Considerations for conducting proactive counterfire include:

- All available artillery units participate.
- Integrate all available joint FS attack/delivery systems.
- Requires augmentation by Army and joint collection assets to locate and accurately target the enemy indirect fire systems.
- The G-2/S-2 typically has a leading role in managing this effort; intelligence feeds into common ground station and cross-cueing radars and UAS are critical.
- Establishing digital interface between the MLRS/HIMARS and cannon FA BN S-2s and the S-2/liaisons is critical.
- Making maximum use of permissive FSCMs to facilitate the clearance of fires; for example, in defense the fire support coordination line (FSCL) may be positioned close to friendly troops to facilitate quick engagements.
- Managing no-fire areas (NFAs) that protect SOF, long-range surveillance detachments, reconnaissance troops, and scouts is critical.
- Use of AFATDS to clear fires should be maximized.
- Establishing radar zones as required.

REACTIVE COUNTERFIRE

3-26. Reactive counterfire provides immediate indirect and joint fires to neutralize, destroy, and suppress enemy indirect fire weapons once acquired. The FS system responds primarily to enemy mortar and artillery fires during or immediately following enemy engagement of friendly forces. Reactive counterfire usually requires quick response capabilities for optimum effectiveness and can benefit from the establishment of quick-fire channels.

3-27. FA units employ a variety of counterfire acquisition assets to accurately locate enemy indirect fire assets as they are engaging friendly forces establishing sensor-to-shooter links to attack the enemy systems. Ensure that the mission fired report and artillery target intelligence is sent to the all-source analysis section. Other key considerations for conducting reactive counterfire include airspace clearance, the use of both permissive FSCMs that facilitate quick engagements and restrictive measures such as NFAs to protect critical assets, establishing quick-fire channels with sensor-to-shooter links, and designating radar zone managers.

THE COUNTERFIRE IMPERATIVES

3-28. Nested with the FS planning, coordination, and execution principles are the 10 counterfire imperatives. These 10 imperatives are a good tool to use in assessing and coordinating the overall counterfire fight.

- Provide commander's intent and guidance to enable counterfire operations and scheme of fire in support of the commander's objectives. Counterfire planning begins during the MDMP and continues throughout the targeting process feeding the targeting working group, targeting decision board, and information collection plan. Commander's guidance (corps, division, BCT) sets the conditions for planning counterfire operations. The commander's guidance must be clear, concise, and easily understood. Whenever commander's guidance for counterfire and targeting is not clearly understood during the planning of an operation, fire support planners should solicit that guidance from the commander. Commanders must include endstate in their planning guidance for counterfire, to promote unity of effort and the integration, and synchronization of available FS and collection assets. Successful counterfire operations may require commanders to accept risk elsewhere while seeking to exploit opportunities.
- Develop and execute an information collection plan that supports the targeting and counterfire fight. Successful counterfire operations require proactive and continuous collection and analysis of the enemy FS system. WLRs and collection assets must be prioritized, integrated, and synchronized with counterfire operations. The counterfire officer and the information collection manager at each echelon ensures that TA assets are properly integrated and synchronized into the overall collection and FS plan. The FSCOORD is responsible for positioning FS assets to respond to counterfire requirements. Position radars to support the observation and collection plans considering the enemy FS capabilities and range. Combat assessments, BDA, munition effectiveness assessment (MEA) and reattack criteria will drive intelligence collection requirements for counterfire operations.
- Develop a permissive battlefield design using geometries and FSCMs. Using battlefield geometries to delineate the AO between corps and divisions is essential to effective counterfire operations and future planning. Permissive FSCMs allow for maximum use of destructive combat power to facilitate the attack of enemy indirect fire systems, while mitigating the risk to friendly forces. The commander adjusts battlefield geometries and FSCMs as required to keep pace with operations.
- Plan and manage terrain and distribute on common graphics (logistics sites, position area for artillery (PAA) - primary and alternate). Ensure FA units and sensors are positioned to support counterfire operations at points of vulnerability such as obstacles, canalizing terrain, bridges or gap crossings. The counterfire HQ is responsible for logistic support and recommends positioning of sensors and counterfire delivery systems and ensures PAA and radar position areas are distributed and common graphics. Plan for primary, alternate, and tertiary PAA and radar position areas.
- Plan airspace that allows for responsive counterfire (ACMs/airspace coordination areas/counterair). Close coordination is required to integrate air and space with counterfire operations. Counterfire operations in large-scale combat operations will require high volumes of air and space. ATACMS and guided multiple launch rocket system target engagements will require detailed airspace planning, coordination, and de-confliction. Unit airspace plans must be developed during MDMP and throughout the targeting and operational process to account for counterfire operations. When division-assigned airspace is delegated from the airspace control authority, the JAGIC is the airspace control element serving as the execution node for fires and airspace control.
- Designate and resource the counterfire HQ (role/manning/location). Define the FFA HQ role verses counterfire HQ role in the counterfire fight. The corps or division commander can designate the role of the counterfire HQ to a DIVARTY, FAB, or separate FA BN. The DIVARTY can provide the counterfire HQ for the division if task organized with the necessary firing units, sensors, target production section, and TA platoon to coordinate the counterfire fight. FABs can serve as the FFA HQ or the counterfire HQ for a division or corps. Army National Guard FABs are routinely assigned to support the divisions and corps as the counterfire HQ.

- Develop a sustainment and protection plan for all TA and attack/delivery capabilities. The execution of sustainment operations across all class of supply are critical to counterfire operations. CL V sustainment, haul capability, triggers, required supply rate and CSR are crucial to the counterfire fight. Radar sections do not have the capability to provide force protection for themselves and firing units often need protection augmentation. A protection plan must be developed during MDMP to include engineer support, local force protection to secure movement along main supply and alternate supply routes, short-range air defense, cueing schedules, frequency management, and deception.
- Communicate at distance using PACE plans, digital architecture, AFATDS database management, and liaison officers. When conducting counterfire in large-scale combat operations be prepared to operate in a degraded environment. Establish a PACE plan for the analog and digital architectures from sensor to shooter. AFATDS database must be verified and continuously updated to include FSCMs, firing unit data, sensor data, targeting data, and communications architecture. Establish liaison officers at echelon and in adjacent units for cross boundary fires.
- Conduct tactical fire direction: Tactical fire direction and firing unit management is key to ensuring responsive fires. During MDMP and the targeting process develop target selection standards and attack guidance that enables rapid decision making and responsive fires. Plan for a dedicated all weather counterfire shooter using hot and cold status.
- Maximize radar foundational training strategy. Develop and rehearse the counterfire fight drill from sensor to shooter covering all elements of the PACE plan and all TA resources possible. Develop a weekly digital sustainment program that is focused, and event driven at all echelons.

DANGER CLOSE

3-29. ***Danger close*** **for air-to-surface and surface-to-surface missions is a mandatory call alerting of an elevated risk to the closest friendly troops from the intended point of a weapon's impact requiring specific procedures for risk mitigation.** This is included with the method of engagement when the predicted impact of around or shell is within 600 meters (m) of friendly troops for mortars or artillery and 750 m for naval surface fires. The creeping fire method of adjustment (no adjustment greater than 100 m for mortars/artillery or 200 m for NSFS) will be used exclusively during danger close missions. Do not confuse the creeping fire method with risk-estimate distances or minimum safe distances. See JP 3-09.3 for procedures on air-to-surface danger close engagement.

THE TARGETING PROCESS

3-30. The supported commander's FS requirements are continually identified, planned, and executed as part of the targeting process. *Targeting* is the process of selecting and prioritizing targets and matching the appropriate response to them, considering operational requirements and capabilities (JP 3-0). Targeting helps integrate and synchronize FS with other Army and joint functions (C2, intelligence, movement and maneuver, protection, sustainment, and information). The Army targeting process and the joint targeting cycle coordinates and synchronizes fire support to shape enemy forces in the deep area to set conditions for subordinate units. Units use the Army targeting process for their organic systems and the joint targeting cycle for joint systems as appropriate according to organizational echelon.

3-31. The Army targeting process is integrated with the operations process, joint targeting cycle, and the MDMP (see figure 3-1 on page 3-10, and table 3-1 on page 3-13). Targeting occurs continuously throughout an operation. decide, detect, deliver, and assess functions nest with the operations process: planning, preparing, executing, and assessing. Furthermore, Army units that require joint capabilities to conduct shaping operations employ and interface with joint planning and processes, for example, the joint targeting cycle. Therefore, echelons above brigade Army commanders and staffs must understand and interface with both the Army's decide, detect, deliver, and assess targeting processes, and those processes used within the joint targeting cycle.

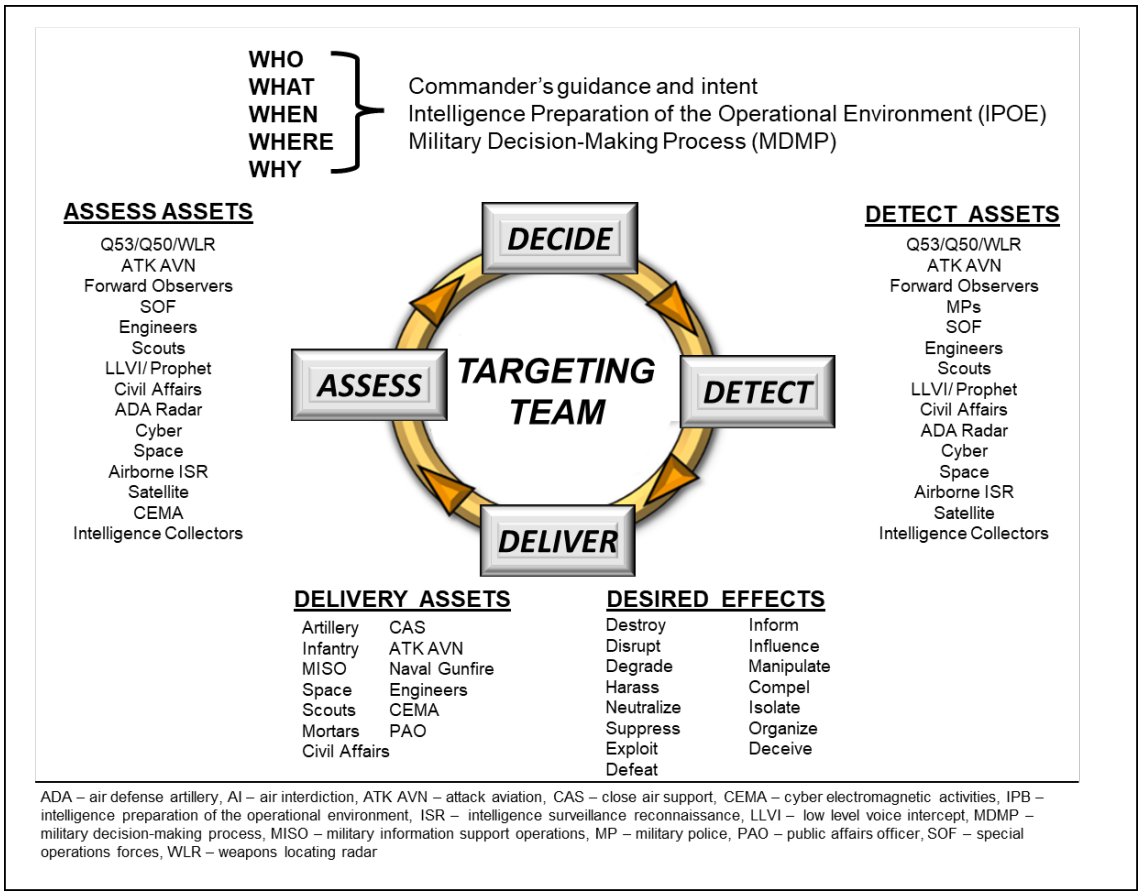


Figure 3-1. The Army targeting process

3-32. The joint targeting cycle is a six-phase iterative process: commander's objectives, targeting guidance and intent, target development and prioritization, capabilities analysis, commander's decision and force assignment, mission planning and force execution, and combat assessment (see figure 3-2). Steps may occur concurrently, but it provides an essential framework to describe the steps that must be satisfied to conduct joint targeting successfully. To enable joint targeting the JFC establishes a joint targeting coordination board. A *joint targeting coordination board* is a group formed by the joint force commander to accomplish broad targeting oversight functions that may include, but are not limited to, coordinating targeting information; providing targeting guidance, synchronization, and priorities; and approving the joint integrated prioritized target list (JP 3-60). For more information on the Army targeting process and the joint targeting cycle see FM 3-60 and JP 3-60.

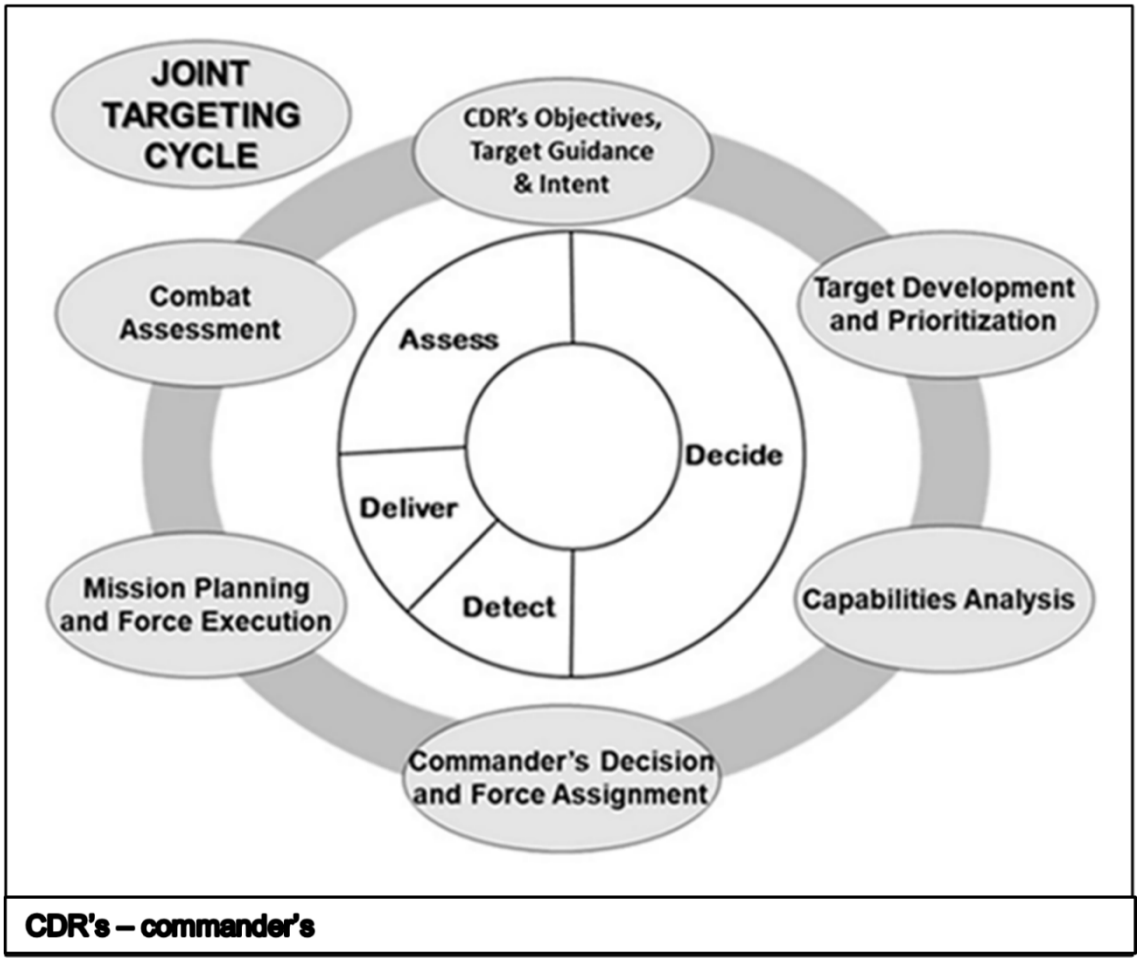


Figure 3-2. D3A Crosswalk and joint targeting process

3-33. The joint air tasking cycle begins with the JFC's objectives, incorporates guidance received during JFC and component coordination, and culminates with assessment of previous actions. The ATO (see figure 3-3 on page 3-12) articulates the tasking for joint air operations for a specific execution timeframe, normally 24 hours. The joint air tasking cycle is synchronized with the JFC's battle rhythm. The JAOC normally establishes a 72- to 96-hour ATO planning cycle. The battle rhythm articulates briefings, meetings, and report requirements. It provides suspense for targeting, friendly order of battle updates to produce the air battle plan that includes the ATO message and other products. The battle rhythm is essential to ensure information is available when and where required to provide products necessary for the synchronization of joint air operations with the JFC's concept of the operation and supporting other components' operations. Nonetheless, air operations must be responsive to a dynamic OE and the joint air tasking cycle must be flexible and capable of modification during ATO execution.

3-34. The timing of targeting working group sessions is critical. While the time-focus for sessions of the targeting working group is normally 24 to 96 hours out, the employment of assets and certain targeting decisions, such as target nominations and air support requests, and other effects requests must be planned in advance and in conjunction with the division, corps, theater Army, and the joint air tasking cycle. However, commanders must choose a targeting cycle based on the pace of operations. These cycles may be 6-12 hours apart if required. The targeting officer at echelon schedules internal targeting huddles so that lethal and nonlethal effects, to include EW activities related to target nominations, arrive within the BCT and higher echelon target nomination windows.

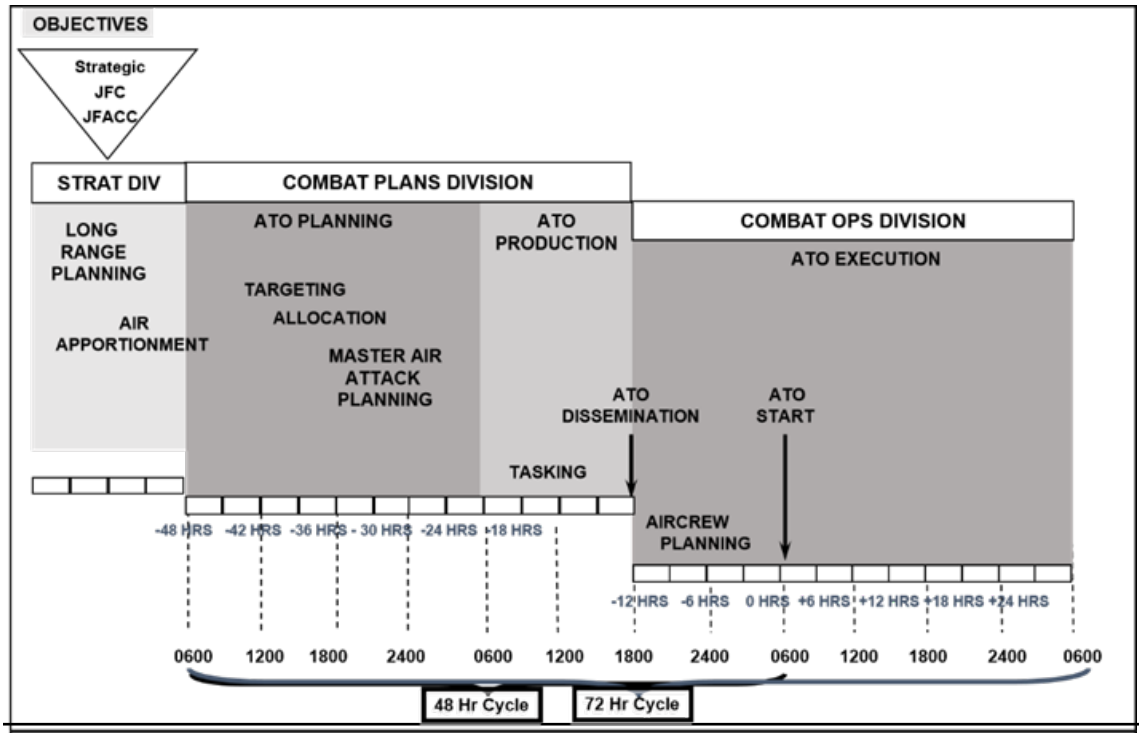


Figure 3-3. Air tasking cycle

Table 3-1. Crosswalk of operations, joint targeting cycle, D3A, MDMP, and fire support tasks

Operations Process		*Joint Targeting Cycle*	*D3A*	*MDMP*	*Fire Support Task*
Continuous Assessment	Plan	Commander's Objectives, Targeting Guidance, and Intent	Decide	Mission Analysis	Perform target value analysis to develop high- value targets. Begin identifying high-payoff targets based on initial high-value target and initial fire support tasks. Provide fire support activities input to the commander's targeting guidance and desired effects.
		Target Development and Prioritization		Course of Action Development	Further develop and refine high-payoff target lists. Deconflict and coordinate potential high-payoff targets. Develop high-payoff target list. Establish target selection standards. Develop attack guidance matrix. Develop fire support tasks. Develop associated MOP, and MOE.
		Capabilities Analysis Commander's Decision and Force Assignment		Course of Action Analysis	Refine the high-payoff target list. Refine target selection standards. Refine the attack guidance matrix. Refine fire support tasks. Refine associated MOP. Refine associated MOE. Develop the target synchronization matrix. Draft airspace control means requests.
		Mission Planning and Force Execution		Orders Production	Finalize the high-payoff target list. Finalize target selection standards. Finalize the attack guidance matrix. Finalize the targeting synchronization matrix. Finalize fire support tasks and execution matrices. Finalize associated MOP and MOE. Submit information requirements to battalion or brigade intelligence staff officer.

Table 3-1. Crosswalk of operations, joint targeting cycle, D3A, MDMP, and fire support task (continued)

Operations Process		*Joint Targeting Cycle*	*D3A*	*MDMP*	*Fire Support Task*
Continuous Assessment	Assess	Combat Assessment	Detect	Orders Production	Execute Information Collection Plan. Update information requirements as they are answered. Update the high-payoff target list, attack guidance matrix, and targeting synchronization matrix. Update fire support tasks. Update associated measures of performance and measures of effectiveness.
	Execute	D3A MDMP	Deliver		Execute fire support tasks in accordance with the attack guidance matrix and the targeting synchronization matrix.
	Prepare		Assess		Execute Information Collection Plan. Assess task accomplishment (as determined by measures of performance). Assess effects (as determined by measures of effectiveness).
D3A – decide, detect, deliver, and assess, MOE – measures of effectiveness, MOP – measures of performance, MDMP – military decision-making process					

FIRE SUPPORT PLANNING AND COORDINATION PRINCIPLES

3-35. The commander's ability to orchestrate and employ all available FS resources as a system and to integrate and synchronize fire support with the concept of operations results from an established process known as fire support planning and coordination. ***Fire support planning*** **is the continuous process of analyzing, allocating, integrating, synchronizing, and scheduling fires to describe how the effects of fires facilitate supported force actions.** Successful FS planning is the result of the FSCOORD's aggressive contribution to the supported commander's planning and decision-making process. *Fire support coordination* is the planning and executing of fire, so targets are adequately covered by a suitable weapon or group of weapons (JP 3-09). Formal coordination binds FS resources together to create a unity of effort so that the multiple effects of each fire support asset across all domains are rapidly and continuously integrated and synchronized with the scheme of maneuver.

3-36. Fighting in large-scale combat operations requires more careful FS planning because of the limited resources available to acquire and attack targets at extended ranges, and requires detailed coordination and employment of TA, attack, and assessment needs across all domains.

3-37. The FSCOORD utilizes the principles of fire support planning and coordination when advising the commander on the execution of fire support. These principles are extensions of our functions of fire support. The fire support planning and coordination principles are:

- Plan early and continuously. To effectively integrate fire support with the commander's concept of the operation, planning must begin when the commander states the mission and provides commander's guidance. The commander's guidance must be clear, concise, and understood. Whenever commander's guidance is not understood during the planning of an operation, fire support planners should solicit that guidance from the commander. Planning is continuous and must keep pace with the dynamics of the operation.
- Ensure the continuous flow of targeting information. The FSCOORD ensures that TA requirements are identified and proactively focused on detecting HPTs within the desired

formation. Ensure that target information from all sources are evaluated and routed to the appropriate attack means to include information from all echelons and from adjacent and supporting elements.

- Consider the use of all lethal and nonlethal attack capabilities. The FSCOORD considers the full range of fires and other capabilities available at all levels. This includes coordinating for attack/delivery assets from available joint and multinational forces.
- Use the lowest echelon capable of furnishing effective support. FS is delivered by the lowest level that has the effective means to accomplish the mission. Planners decide what is needed and, if their assets are inadequate, coordinate for additional support from the appropriate echelon.
- Furnish the type of support requested. The fire support requester is in the best position to determine what is needed. However, the FSCOORD is in a position to weigh the request against the commander's guidance and the current and future needs for fire support. If a request for fire support is disapproved, the FSCOORD notifies all concerned. If possible, a new fire support means is substituted, and all affected agencies must be informed.
- Use the most effective fire support attack/delivery system. The FSCOORD considers the nature and importance of the target, the engagement time window, the availability of attack assets, and the effects desired. In some circumstances, it may be necessary to sequence the attack by fixing the enemy with immediately available fire support assets while coordinating a subsequent, more detailed attack by more effective assets. An example of this is a situation in which air support is the most desired means but is about 20 minutes away. In this case, indirect-fire attack/delivery systems can fix the target until aircraft arrive.
- Avoid unnecessary duplication. A key task for the FSCOORD is to ensure that duplications of fire support requests are resolved when possible while the desired effects are achieved.
- Consider airspace coordination. The FSCOORD at the BCT and higher levels provides input concerning fire support use of airspace to those agencies and personnel engaged in airspace management to ensure that conflicts between surface-based indirect fire and air operations are minimized. For more information on airspace control see FM 3-52.
- Provide adequate support. The commander's guidance determines the amounts and types of FS needed for success. The FSCOORD must inform the supported commander when fire support requirements exceed capabilities.
- Provide for rapid and continuous coordination. The FSCOORD must know the capabilities of the various fire support attack/delivery systems and have immediate information on their availability. The FSCOORD must be aware of changes as they develop in order to attack both planned targets and targets of opportunity and to ensure that coordination channels are functioning smoothly. For rapid coordination, the following must be considered:
  - Exact locations of all friendly forces.
  - Scheme of maneuver of the supported force.
  - Supported commander's guidance and SOP.
  - Active FSCMs.
  - Rules of engagement.
- Provide for flexibility. FS personnel anticipate and provide for future contingencies. On-order missions and careful positioning of assets give the commander the flexibility to respond to changing battlefield conditions.
- Use of FSCMs. A *fire support coordination measure* is a measure employed by commanders to facilitate the rapid engagement of targets and simultaneously provide safeguards for friendly forces (JP 3-0). They ensure that FS will not jeopardize troop safety, will interface with other fire support means, and will not disrupt adjacent unit operations. Any change to a FSCM must be communicated to all units affected. For more information on the use of FSCMs see appendix B.

3-38. In large-scale combat operations, FS planning is a top-down process with bottom-up refinement and continual coordination. FS planning at echelons above brigade involve deep operations, coordination of FS for future and current battles, and allocation of resources to subordinate units. At brigade and below levels,

FSEs are more involved in the execution of the current battles, and they fight within the parameters established by the higher HQ and with the resources they have been allocated see figure 3-4.

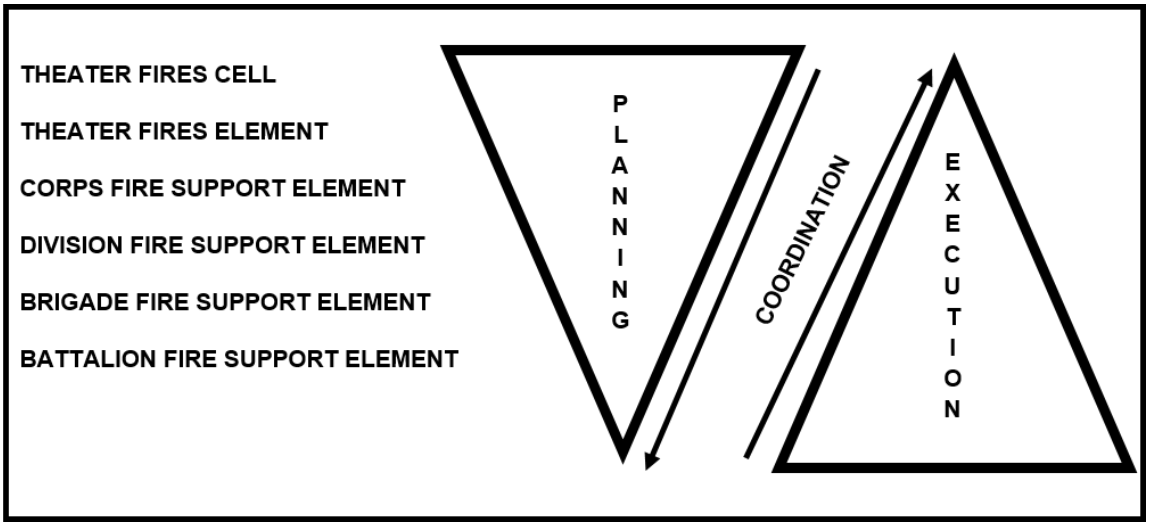


Figure 3-4. Planning and execution relationship

3-39. This is not meant to imply that brigade and BN FSEs need not plan fires in advance of operations. They just don't plan as far into future battles as the FSEs at corps and division. In fact, the FS principle of use the lowest echelon capable of furnishing effective support, must always be considered by FS planners. FS planning, coordination, and execution should be done at the lowest level possible with the fewest number of elements necessary to accomplish the mission. For example:

- A FAB asset with a GSR mission to a DIVARTY makes positioning extremely difficult. A preferred method in the offense is to make that unit R with the necessary restrictions to facilitate future operations.
- SEAD should be planned and fired by the unit using the air support.

FRATRICIDE PREVENTION AND CLEARANCE OF FIRES PROCESSES AND PROCEDURES

3-40. FA personnel must always maintain a mindset of violently applying lethal fires in accordance with the Law of War and established ROE. However, we must simultaneously reduce the risk that lethal fires cause unintentional killing and destruction to a prudent, acceptable level. This is done in a large part through fratricide prevention and clearance of fires processes.

3-41. *Fratricide* is the unintentional killing or wounding of friendly or neutral personnel by friendly firepower (ADP 3-37). Fratricide increases the possibility of mission failure, causes unacceptable loss of personnel and equipment, and erodes leadership effectiveness.

3-42. Minimizing exposure to potential fratricide is a command responsibility. Although the potential for fratricide is greatest during combat when chaos and confusion are at their greatest, it can also occur during training activities and combat simulations. Leaders must be knowledgeable of conditions that cause fratricide and implement fratricide countermeasures regardless of the environment. Efforts must be made to overcome potential hazards such as mistaken identity, navigation errors, or inaccurate or dysfunctional reporting procedures.

3-43. Although weapon systems can detect, engage, and destroy targets at maximum ranges, weapons sighting equipment does not have sufficiently high resolution of targets at extended ranges, especially under limited visibility conditions. Situational awareness helps overcome this deficiency in part and improve friendly capabilities to positively identify potential targets.

FRATRICIDE COUNTERMEASURES

3-44. Fratricide countermeasures preserve and conserve the force. During the wargaming phase of the MDMP, commanders must identify control measures that reduce potential fratricide situations to an acceptable level. These must be incorporated into orders and plans to subordinate and adjacent commanders. In addition, rehearsals can be used to verify and modify the appropriateness of control measures and to ensure subordinates understand the operation. During execution, FSEs and FA CPs must track the location of friendly elements. This is especially critical during rapidly paced advances such as during attacks, exploitations, or pursuits. Specifics include:

- Individual errors are as simple as mistaken identity. If there is a possibility that enemy and friendly forces are intermixed in the target area, units must positively verify their identity after detection prior to engagement. Weapons errors include lapses in unit and individual discipline that allow powder charge errors, accidental discharges, incorrect gun data, and similar incidents. Unit errors include errors in the use of weapons-engagement areas or sectors or in using fire control measures.
- Strict adherence to procedural control measures such as permissive and restrictive maneuver and FSCMs. Fratricides can occur when FSCMs are not used and not disseminated. Continuous FSCM management reduces the risk of fratricide.
- Dissemination and receipt of warnings and reports in sufficient time to allow for appropriate actions and synchronization.
- Preclusion of land navigation errors to prevent units from straying out of sector, reporting wrong locations, becoming disoriented, or unknowingly engaging targets out of sector.
- Adequate unit-leader experience. Ensure that junior leaders have the opportunity to gain the necessary experience and judgment to make rapid decisions under ambiguous, stressful conditions. Crews must be properly trained to increase the likelihood that they will not engage friendly forces.
- Special caution during periods of limited daytime visibility and at night.
- Judicious use of materiel solutions, using active and passive measures to provide friendly forces a unique signature to distinguish friend from foe. These may include marking devices and combat vehicle identification systems such as thermal beacons, thermal tape, and navigational aids.

CLEARANCE OF FIRES

3-45. The scheme of fires must also provide for clearance of fires. ***Clearance of fires*** **is the process by which the supported commander ensures that fires or their effects will have no unintended consequences on friendly units or the scheme of maneuver.** Clearance of fires ensures that fires attack enemy capabilities at the time, place, and with the effects the commander desires without resulting in casualties to friendly forces or noncombatants. It may be accomplished through a staff process and control measures, embedded in automated C2 information systems, or through passive or active recognition systems. Creating a permissive environment begins during planning and is crucial for the rapid delivery of fires, especially during large-scale combat operations. It remains a command responsibility at every level. General clearance of fires responsibilities is shown in table 3-2 on page 3-18.

Table 3-2. Clearance of fires responsibilities

Position	*Responsibilities*
Supported Commander	Clears fires. Normally this is delegated to their CP and executed by the battle staff under the lead of the FSE.
FSCOORD	Recommends clearance of fires guidelines to the commander.
FSE	Ensures friendly force safety through adherence to ROE, and use of coordination measures, MCM, FSCM and ACM. Use MCMs, FSCMs, and ACMs to facilitate clearance of fires. Coordinate airspace for fires with AE at echelon (AE, JAGIC, or ADAM/BAE). Coordinate for clearance of fires across boundaries as required. Use automated systems to request clearance of fires. Warn controlling HQ if FSCMs or commander's attack guidance is about to be violated. Use rehearsals to validate responsibilities for clearance of fires.
ACM – airspace coordinating measure, ADAM/BAE – air defense airspace management brigade aviation element, AE – airspace element, CP – command post, FSCM – fire support coordination measure, FSCOORD – fire support coordinator FSE – fire support element, HQ –headquarters, JAGIC – joint air-ground integration center, MCM – maneuver control measure ROE – rules of engagement	

3-46. During the planning process, staff officers must consider how to position sensors not only to collect information but also to support information requirements that will assist in assessment and the clearance of fires. Although sensor placement may primarily focus on gathering enemy information, information collected on friendly forces is equally important.

3-47. Clear and understandable maneuver control measures are also a significant first step in the clearance of fires. Again, digital systems will enhance the accurate and rapid transmission of these measures. FSCMs not only assist in the integration of fires by facilitating the rapid engagement of targets. They also safeguard friendly forces.

3-48. Permissive measures (if positioned correctly and disseminated to all higher, adjacent, and subordinate units), such as coordinated fire lines (CFLs) and free-fire areas, offer the opportunity for responsive fires on targets of opportunity. The size of restrictive measures such as NFAs, restrictive fire areas (RFAs) should be verified to preclude unwarranted delays for otherwise responsive fires.

3-49. A procedure to consider in certain circumstances is pre-clearing fires. In some very specific instances, units can clear fires during the planning phase. For example, pre-clearing fires on a planned target or into a target engagement zone such as a CFFZ requires coordination of both air and ground. Missile flight paths for selected munitions must be generated and added to the unit airspace plan so that friendly airspace users are aware of planned munition trajectories. The CFFZ must have been planned in advance and published in the radar deployment order. Preplanned targets will have definable triggers, specific target types (HPT), and are engaged according to the scheme of fires.

3-50. When fires are requested that are not pre-cleared or allowed by a permissive FSCM, they must be positively cleared. This procedure should be a battle drill in CPs. The best method is a redundant drill where a call for clearance is transmitted over two nets, the FS net, and the maneuver net.

3-51. Positive clearance of fires is normally facilitated through prior planning, rehearsals, and careful placement of FSCMs. However, the clearance of targets of opportunity often presents special challenges. They must be delivered on short notice without undue delay in responsiveness and without jeopardizing friendly force security. For positive clearance of fires, the following should be obtained:

- Best available method of target location.
- Positive identification of targets as enemy.
- Eyes on target, if possible.
- Clearance from appropriate external elements if target is outside unit boundaries.
- Coordination with affected airspace users based on munition trajectory.

FIRE SUPPORT AND THE MILITARY DECISION-MAKING PROCESS

3-52. The FS staff and FA planners must strive to conduct parallel planning with the higher HQ staff. It is important that staff estimates, to include the intelligence estimate, sustainment estimate, engineer estimate, FS estimate, and the commander's estimate are updated prior to beginning MDMP and updated continuously throughout the process.

RECEIPT OF MISSION

3-53. Upon receipt of mission (see table 3-3), the commander and staff consider implications of the new mission on the current fight and the friendly force current situation. After an initial assessment, FS assets and supporting FA units are alerted as soon as practicable to initiate their own collaborative and parallel planning efforts (first warning order). FSEs, and FAIOs should also ensure that all IPOE products to include likely enemy COAs are released to subordinate HQ as soon as cleared by the force G-2/S-2 to enhance parallel planning and IPOE preparation at the lower levels of command. This warning order should provide subordinate FA elements the following as a minimum: FS planning begins with mission analysis. During mission analysis FS planners provide recommendations for possible FS task inputs based on the commander's guidance for FS and desired effects.

- Type of operation to be conducted.
- General outline of the AO.
- Any known or anticipated changes in the FA organization for combat.
- FSCMs, communications, and sustainment plan.
- Initial timelines.

3-54. The supported commander's planning guidance normally establishes options to be considered and essential tasks to be addressed. They may include enemy and friendly COAs to be pursued or rejected, associated priorities, and a time plan for mission planning, preparation, and execution. The accompanying commander's proposed intent provides the foundation for developing the eventual concept of operations. By outlining considerations for developing a scheme of maneuver, the commander also sets the stage for the allocation of forces and the design of supporting plans and annexes to include the FS and FA support plans.

Table 3-3. Fire support element during receipt of mission

MDMP STEP 1: RECEIPT OF MISSION		
Staff Actions	***Key FSE Actions***	***FSE Output***
• Alert the staff and other key participants. • Gather the tools. • Update running estimates. • Conduct initial assessment. • Issue the commander's initial guidance. • Issue the warning order.	• Collect higher HQ OPLAN/OPORD, maps, current IPOE, and fires running estimate. • Update fires running estimate; gather facts from higher, lower, and adjacent FSEs, Fires Cells, and FA CPs. • Provide FS input during formulation of the commander's initial guidance and initial warning order.	• Updated fires running estimate. • Provide updated facts to higher, lower, and adjacent HQ. • Fire support input to IPOE and reconnaissance and surveillance tasking.
CP – command post, FA – field artillery, FS – fire support, FSE – fire support element, HQ – headquarters, IPOE – intelligence preparation of the operational environment, OPLAN – operation plan, OPORD – operation order		

Fire Support Running Estimate

3-55. The FS running estimate helps the commander build and maintain situational understanding and a realistic analysis of the effort allowing the commander to determine the effectiveness of attacks, revise support plans based on observed results, and re-prioritize the FS requirements. A *running estimate* is the

continuous assessment of the current situation used to determine if the current operation is proceeding according to the commander's intent and if planned future operations are supportable (ADP 5-0).

3-56. Any variable that could affect the mission is a factor. Before the estimate is started, available relevant information must be collected. Once this information has been assembled and the factors that could affect the plan have been identified, they should be listed and arranged in priority. The estimate includes analysis in the context of the commander's intent for the ongoing and future operations. For more information on running estimates see ADP 5-0. The FSCOORD and FSE produce and maintain the FS running estimate and consider:

- The higher HQ specified and implied tasks.
- Active ACMs affecting friendly fires.
- The task organization of subordinate forces and their missions.
- The capabilities and limitations including the status of FA weapons, FA ammunition, FA WLRs, CAS, and other related fixed wing support, and any other possible asset from the holistic FS system at each echelon of command (AI/SEAD).
- The position of friendly and enemy fires capabilities.
- FA and WLR survey support.
- Established and recommended FSCMs.
- The impact of ROE and law of land warfare.
- The impact of terrain, and weather on friendly and enemy forces (such as smoke, CAS, and AI.)
- Information collection plan support and requirements.
- Initial HPTL.
- FS input to the IPOE analysis.
  - COAs open to the enemy artillery commander, especially the most probable COA. These are derived from the intelligence estimate and knowledge of enemy artillery doctrine.
  - The enemy dispositions (including frontage and depth), the degree of protection afforded the enemy, objectives for subordinate forces or units, the number of phases, and the likely frontage and depth of the assault. These will affect the allocation of fire support resources to subordinate units.
  - The mobility of the enemy artillery and its speed of movement to contact and withdrawal.
- The enemy EW situation.
- The identification of HPTs (derived from target value analysis and IPOE).
- The commander's information requirements (derived from the intelligence estimate).
- The availability and condition of roads, trails, and likely position areas. This leads to the coordination of movement and position areas with the operations staff.
- Ammunition consumption factors (type and quantity), pre-positioning requirements, and priority of sustainment.
- The reliability and range of communications.
- EFSTs and purposes.
- The time required for positioning and technical preparation to engage targets.
- The time to be ready to support the operation.

Mission Analysis

3-57. Mission analysis by the FSCOORD and the FA staff starts parallel planning activities. Mission analysis begins with a review of the commander's intent one and two levels higher and focuses on the rapid development of the supported commander’s IPOE; identification of specified, implied, and essential tasks to include those for FA formations; an initial assessment of FS survivability and employment considerations; and a restatement of the mission. By providing the most current running staff estimates after the first warning order, FA CPs can assist in updating the supported HQ FS, graphics, facts and assumptions, and staff running estimates. FA unit input includes but is not limited to analysis on enemy indirect fires systems and formations through the reverse IPOE process and ammunition, positioning, and security requirements.

3-58. A thorough mission analysis is crucial to planning. Mission analysis (see table 3-4) consists of the tasks identified in ADP 5-0. Participation by FS personnel in the IPOE is critical to setting the conditions for EFSTs and targeting decisions later in the MDMP.

Table 3-4. Fire support element during mission analysis

MDMP STEP 2: MISSION ANALYSIS		
Staff Actions	***Key FSE Actions***	***FSE Output***
• Analyze the higher HQ plan or order. • Perform IPOE. • Determine specified, implied, and essential tasks. • Review available assets and identify resource shortfalls. • Determine constraints. • Identify critical facts and develop assumptions. • Begin risk management. • Develop initial commander's critical information requirements and essential elements of friendly information. • Determine initial reconnaissance and surveillance synchronization tools. • Determine initial reconnaissance and surveillance plan. • Update plan for the use of available time. • Develop a proposed problem statement. • Develop a proposed mission statement. • Present the mission analysis briefing. • Develop and issue initial commander's intent. • Develop and issue initial planning guidance. • Develop COA evaluation criteria. • Issue a warning order.	• Understand next two higher HQ operations and fire support plans. • Receive IPOE products and provide FS input to IPOE including enemy courses of action and high-value targets by phase or critical events from G-2 and intelligence cell. • Conduct FS running estimate; organize and analyze facts. • Identify specified and implied tasks for FS. • Translate status of FS assets and resources into fire support capabilities, limitations, and vulnerabilities. • Analyze the effects of IPOE on fire support. • Develop draft EFSTs with task and purpose. • Identify long-lead time fire support tasks. • Update the FS running estimate. • Provide input for restated mission, commander's intent, guidance, and warning including: • Desired effects from fire support. • Initial high-payoff targets from among the high-value targets. • Attack guidance. • Allocation/positioning of fire support assets. • Sustainment and protection for FS.	• FS system status. • Specified targets from higher HQ FS IPOE. • FS asset range arc depictions. • FS limitations and constrains. • FS portion of the mission analysis briefing. • FS related input to the commander's critical information requirements. • Initial FS rehearsal guidance and times. • Commander's approval of initial EFSTs or modification. • Update FS input to the warning order after the mission analysis brief. • FS input to commander's planning guidance. • Updated FS-related operational timeline. • Initial high-payoff target list • Initial target lists / Target List Worksheet.
COA – course of action, EFST – essential fire support task, FS – fire support, FSE – fire support element, G-2 – assistant chief of staff, intelligence, HQ – headquarters, IPOE – intelligence preparation of the operational environment, MDMP – military decision-making process		

Mission Analysis Briefing

3-59. The mission analysis briefing informs the commander of the results of the staff's analysis of the situation. It helps the commander understand, visualize, and describe the operation. Throughout the mission analysis briefing, the commander, staff, and other unified action partners discuss the various facts and assumptions about the situation. Staff officers present a summary of their running estimates from their specific functional area and how their findings impact or are impacted by other areas. This helps the commander and staff to focus on the interrelationships among the mission variables METT-TC (I) and to develop a deeper understanding of the situation. The commander issues guidance to the staff for continued planning based on situational understanding gained from the mission analysis briefing.

3-60. A comprehensive mission analysis briefing helps the commander, staff, subordinates, and other unified action partners develop a shared understanding of the requirements of the upcoming operation. Time permitting, the staff briefs the commander on its mission analysis using the following outline:

- Mission and commander's intent of the HQ two echelons up.
- Mission, commander's intent, and concept of operations of the HQ one echelon up.
- A proposed problem statement.
- A proposed mission statement.
- Review of the commander's initial guidance.
- Initial IPOE products, including civil considerations that impact the conduct of operations to include:
  - Weather.
  - Satellite communication impacts.
- Specified, implied, and essential tasks.
- Pertinent facts and assumptions.
- Constraints.
- Forces available and resource shortfalls.
- Initial risk assessment.
- Initial EFSTs (task and purpose).
- Initial high-payoff target list.
- Proposed commander's critical information requirements and essential elements of friendly information.
- Initial information collection plan.
- Recommended timeline.
- Recommended collaborative planning sessions.
- Proposed evaluation criteria.

3-61. During the mission analysis briefing or shortly thereafter, commanders approve the mission statement and commander's critical information requirements. They then develop and issue their initial commander's intent and planning guidance.

COMMANDER'S INTENT AND CONCEPT OF OPERATIONS

3-62. The *commander's intent* is a clear and concise expression of the purpose of the operation and the desired objectives and military end state (JP 3-0). FS personnel at all echelons must thoroughly understand the commander's intent and end state to design a FS and FA plan that best support the concept of operations and rapidly and effectively adjust to exploit advantages that arise. For an example of commander's intent (see table 3-5).

Table 3-5. Nested Commanders' intent examples at JFLCC and division levels

Joint Force Land Component Commander's Intent.
Purpose: Is to enable Atropian security and regional stability by defeating any ground forces Ariana employs to attack Atropia.
Key Tasks:
Project combat power into Atropia and rapidly maneuver 23rd Armored Division east of the Agshu River.
Deny enemy seizure of the Atropian capital and critical oil sites; and reinforce the Atropian defenses of their capital.
Defeat enemy forces by synchronizing Joint Fires against Arianan forces in depth and destroying the 17th and 18th DTGs, and the 21st Integrated Fires Command.
Protect long range fires platforms, WLRs, and attack aviation.
Endstate: Arianan aggression has been deterred or defeated and JFLCC forces restore the international border.
52nd Division Commander's Intent.
Purpose: The purpose of this operation is to enable partners, restore the sovereignty of Atropia, and defeat Arianan aggression.
Key Tasks:
Tempo: Anticipate transitions to synchronize fires, maneuver, and sustainment to rapidly cross the Agshu River, seize OBJ TEXAS, and destroy the 17th and 18th DTG.
Aggressive Reconnaissance: Employ heavy advanced guard to enable flexibility and mass combat power at the decisive point.
Fires: Maneuver to emplace fires forward and leverage information collection to detect and destroy division HPTs.
Protection: Disciplined and consistent use of tactical dispersion, camouflage, entrenchment, active patrolling and aggressive counter reconnaissance to protect the force.
Partnership: Partner with Atropian Security Forces to build the capacity for Atropia to exercise its authority within its boundaries.
Endstate:
Friendly.
52nd ID has seized OBJ DAKOTA, COLORADO, and TEXAS allowing the re-establishment of the International Border, creating a zone of separation.
52nd ID is partnered with Atropian forces securing major population centers and critical infrastructure.
Enemy.
17th and 18th DTGs destroyed and 19th DTG defeated. Remnants of OSC 2 have withdrawn from Atropia. 995th Commando BDE (SPF) is neutralized within Atropian borders.
Terrain. A zone of separation between Ariana and Atropia is established.
Civilian.
Conditions are set for the Government of Atropia to exercise its authority within its boundaries.
DTG – division tactical group, HPT – high-payoff target, ID – infantry division, JFLCC – joint force land component commander, OBJ – objective, OSC – operational strategic corps, SPF – special forces, WLR – weapons locating radar

3-63. The *concept of operations* is a statement that directs the manner in which subordinate units cooperate to accomplish the mission and establish the sequence of actions the force will use to achieve the end state (ADP 5-0). The scheme of fires (see table 3-6 on page 3-24) is an integral part of the concept of operations. It describes how to integrate and synchronize the use of FS lethal and nonlethal capabilities to create desired effects and achieve the commander' objectives.

Table 3-6. Description of scheme of fires

Annex D (Fires) Scheme of Fires. Describe how fires support the commander's intent and concept of operations to establish the priorities of fires to units for each phase of the operation. The scheme of fires must be concise but specific enough to clearly state what fires are to accomplish in the operation. The scheme of fires must answer the "who, what, when, where, and why" of the fires to be provided, but provide enough flexibility to allow subordinate commanders to determine the "how" to the maximum extent possible by ensuring necessary procedural and positive control. The scheme of fires may include a general narrative for the entire operation that should address the fire support task and purpose, allocation of assets, positioning guidance for fire support assets and observers, and attack guidance to include the entire scalable range of effects (lethal to nonlethal effects) to include restrictions. Add subparagraphs addressing fire support tasks for each phase of the operation use the following format: task, purpose, execution, and assessment in matrix form. Refer to the base plan or order and Annex C (Operations) as required. (FM 5-0)

Commander's Guidance for Fire Support

3-64. Commanders drive the operations process through understanding, visualizing, describing, directing, leading, and assessing operations (ADP 5-0). The supported commander must provide clear and concise guidance on effects expected from fires. Fire support personnel must thoroughly understand the commander's intent, scheme of maneuver, and guidance for fire support. Commanders must ensure fire support personnel understand the larger picture of the battle. It provides the staff and subordinate units with the general guidance and restrictions for the employment of fires, desired effects and the planning and execution of targeting functions. Commander's guidance for fire support must include the priority of fires. ***Priority of fires*** **is the commander's guidance to the staff, subordinate commanders, fires planners, and supporting agencies to employ fires in accordance with the relative importance of a unit's mission.** Mission orders for FA units should include the supported commander's intent, concept of operations, and priority of fires, EFSTs, and coordinating instructions.

3-65. The commander's guidance for FS describes the desired effects to be generated by FS attack/delivery systems, both lethal and non-lethal. An *effect* is 1. The physical or behavioral state of a system that results from an action, a set of actions, or another effect. 2. The result, outcome, or consequence of an action. 3. A change to a condition, behavior, or degree of freedom (JP 3-0). Capabilities associated with one desired effect may also contribute to other desired effects. For example, delay can result from disrupting, diverting, or destroying enemy capabilities or targets.

3-66. The most important part of providing guidance for FS is that the FSCOORD and the commander have a shared understanding of the commander's visualization and description of what FS must accomplish in support of the concept of operations. Some common terms that commanders may use to describe the desired effects when providing their guidance for FS are listed below and include:

- Deceive in military deception are actions executed to deliberately mislead adversary military, paramilitary, or violent extremist organization decision makers, thereby causing the adversary to take specific actions (or inactions) that will contribute to the accomplishment of the friendly mission. FS supports tactical deception by misleading the enemy decision makers' understanding of friendly intent. *Tactical deception* is a friendly activity that causes enemy commanders to take action or cause inaction detrimental to their objectives (FM 3-90). This greatly improves the chances the enemy will assume risks that can expose the enemy to the effects of friendly fires and maneuver. For example, preparation fire of a false landing zone may contribute to the belief a friendly attack is about to occur in one place when in fact it is about to occur in another. Deception fires are best employed to reinforce the pre-conceived notion of the enemy commander. Operations security is the foundation of deception. This includes the use of nets, camouflage, communications, and noise and light discipline.
- *Defeat* is to render a force incapable of achieving its objectives (ADP 3-0). Defeat manifests itself in some sort of physical action, such as mass surrenders, abandonment of positions, equipment and supplies, or retrograde operations. A commander can create different effects against an enemy to defeat that force. For example, a commander's employment of FA fires to attack an enemy force may result in the enemy no longer having sufficient personnel, weapons systems, equipment, or supplies to carry out its mission. Likewise, the delivery of massed, synchronized, and intense fires can cause enemy personnel to lose the will to continue to fight.

- Degrade is to reduce the effectiveness or efficiency of a threat. Strategic effect terms, the standard dictionary definition applies.
- *Delay* is when a force under pressure trades space for time by slowing down the enemy's momentum and inflicting maximum damage on enemy forces without becoming decisively engaged (ADP 3-90). When enemy forces are delayed, friendly forces gain time. For delay to have a major impact the enemy must face urgent movement requirements, or the delay must enhance the effect(s) of friendly operations. When delayed enemy forces mass behind a damaged route segment a more concentrated set of targets and a longer period of exposure to friendly fires results.
- *Deny* is task to hinder or prevent the enemy from using terrain, space, personnel, supplies, or facilities (ATP 3-21.20). An example of deny is to destroy the threats communications equipment as a means of denying his use of the EMS; however, the duration of denial will depend on the enemy's ability to reconstitute. *Denial operations* are actions to hinder or deny the enemy the use of terrain, supplies, or facilities (FM 3-90).
- *Destroy* is a tactical mission task that physically renders an enemy force combat-ineffective until reconstituted (FM 3-90). Alternatively, to destroy a combat system is to damage it so badly that it cannot perform any function or be restored to a usable condition without being entirely rebuilt.
- ***Destruction* in the context of the computed effects of field artillery fires, destruction renders a target out of action permanently, or ineffective for a long period of time, producing 30-percent casualties or materiel damage.**
- *Destruction fire* is an element of the method of engagement portion of the call for fire requesting destruction fire; delivered for the sole purpose of destroying materiel (TC 3-09.81).
- *Disrupt* 1. A tactical mission task in which a unit upsets an enemy's formation or tempo and causes the enemy force to attack prematurely or in a piecemeal fashion. 2. An obstacle effect that focuses fire planning and obstacle effort to cause the enemy to break up its formation and tempo, interrupt its timetable, commit breaching assets prematurely, and attack in a piecemeal effort (FM 3-90).
- ***Diversion* is the act of drawing the attention and forces of an enemy from the point of the principal operation; an attack, alarm, or feint that diverts attention**. Diversion causes enemy forces to consume resources or capabilities critical to enemy operations in a way that is advantageous to friendly operations. Diversions draw the attention of enemy forces away from critical friendly operations and prevent enemy forces and their support resources from being employed for their intended purpose. Diversions can also cause more circuitous routing along lines of communication, resulting in delays for enemy forces. An option for FA employment in support of a commander's diversion is to use high explosives (HE) fires to encourage an enemy to adopt a different route.
- *Interdiction* is an action to divert, disrupt, delay, or destroy the enemy's military surface capability before it can be used effectively against friendly forces or otherwise be used to achieve enemy objectives (JP 3-03).
- ***Interdiction fires* are employed to disrupt, delay, or destroy enemy forces.** Interdiction fires create windows for friendly unit movement and maneuver.
- *Isolate* is to separate a force from its sources of support in order to reduce its effectiveness and increase its vulnerability to defeat (ADP 3-0).
- ***Neutralization* in the context of the computed effects of field artillery fires renders a target ineffective for a short period of time, producing 10-percent casualties or materiel damage.**
- ***Neutralization fire* is fire delivered to render the target ineffective or unusable.**
- *Neutralize* is a tactical mission task in which a unit renders the enemy incapable of interfering with an operation (FM 3-90). A tactical mission task that results in rendering enemy personnel or materiel incapable of interfering with a particular operation (FM 3-90).
- ***Preparation fire* is a brief, intense bombardment on selected targets or a prolonged effort over time covering a large number of targets.** Commanders must be clear on what they hope to achieve by this sort of fire. The effectiveness of preparation fire varies with each situation; and its feasibility depends on such factors as surprise, deployment, ammunition supply, and type of weapons available. Preparation fire is planned by the commander planning the attack. Normally, fire begins before H-hour and may extend beyond it.

- ***Counterpreparation fire* is the intensive prearranged fire delivered when the imminence of the enemy attack is discovered.** It is designed to break up enemy formations; disorganize the enemy's system of command, communications, and observation; decrease effectiveness of artillery preparation; and impair the enemy's offensive spirit.
- *Suppress* is a tactical mission task in which a unit temporarily degrades a force or weapon system from accomplishing its mission (FM 3-90).
- ***Suppression* in the context of the computed effects of field artillery fires, renders a target ineffective for a short period of time producing at least 3-percent casualties or materiel damage.**
- ***Suppressive fire* are fires on or about a weapons system to degrade its performance below the level needed to fulfill its mission objectives during the conduct of the fires.**
- ***Counterbattery fire* is fire delivered for the purpose of destroying or neutralizing indirect fire weapon systems.**
- ***Harassing fire* an unpredictable and intermittent fire designated to disturb enemy troops not physically engaged in combat with the intent to curtail movement, readiness, ability to fight, and lower morale.**

3-67. The commander can also provide targeting restrictions as part of his guidance for FS support. Targeting restrictions fall into two categories-the no-strike list and the restricted target list:

- *No-Strike List* is a list of objects or entities characterized as protected from the effects of military operations under international law and/or rules of engagement (JP 3-60). The no-strike list is not a target list. Deliberately engaging or not taking sufficient precaution to avoid these objects or entities may violate the law of war.
- *Restricted target list* is a list of restricted targets nominated by elements of the joint force and approved by the joint force commander or directed by higher authorities (JP 3-60). A restricted target list is a list of valid military targets that could be on the joint integrated prioritized target list that have restrictions placed upon their engagement by the JFC or directed by higher authorities. (for more information see JP 3-60). Examples of possible restrictions are:
  - Limit collateral damage by a defined amount and do not strike during daytime.
  - Strike only with a certain weapon.

COURSE OF ACTION DEVELOPMENT

3-68. Simultaneously with the supported staff, fire support planners develop a fire support execution matrix in conjunction with the MDMP COA development, and HPT refinement (see table 3-7) for general considerations during COA Development). FS planners develop EFSTs based on identified HPTs and commanders' guidance. The HPTL, target selection standards, and AGM are developed to ensure each EFST is adequately addressed. Once EFSTs are completed a FS execution matrix is finalized to create the FS plan. FA planners develop a FA support plan as an annex to the FS plan.

Table 3-7. Fire support element during course of action development

MDMP STEP 3: COURSE OF ACTION DEVELOPMENT		
Staff Actions	***Key FSE Actions***	***FSE Output***
• Assess relative combat power. • Generate options. • Array forces. • Develop a broad concept. • Assign HQ. • Develop COA statements and sketches. • Conduct a COA briefing. • Select or modify courses of action for continued analysis.	• Assist G-2 and intelligence cell in conjunction with the G-3 in developing the information collection plan and its support for targeting. • Determine where to find and attack adversary or enemy fire support formations. • Identify high-payoff target in those formations. • Refine EFSTs. • Plan assessment for EFSTs, including measures of performance and measures of effectiveness. Quantify the execution for EFSTs. • Analyze relative fires combat power. • Ensure staff considers all fire support aspects of combat power. • Develop scheme of fires for each COA and assess risk, including fratricide. • Nominate high-payoff targets for each COA. • Integrate CEMA and other nonlethal input. • Array FS assets/resources needed to support each COA and propose generic FS organization for combat. Identify planned attack locations and sequence of attacks: • Allocate assets to acquire targets. • Allocate assets to attack targets. • Apportion force protection for FS assets. • Ensure FS is integrated with movement and maneuver and other warfighting functions. ▪ Integrate triggers with maneuver COA. ▪ Prepare scheme of fires for each COA and sketch for each COA. • Develop FSCMs.	• For each COA developed include− • Scheme of fires. • Initial FSCMs. • Draft high-payoff target list. • Target list worksheet. (digital or manual) • Draft FS execution matrix. • Target list/overlay. • Draft observer and TA plan. • Draft targeting synchronization matrix or modified (high-payoff target list, target selection. • Target selection standards and attack guidance matrix). • Draft FS input to the unit airspace plan. • Draft risk management plan. • FS-related portions of reconnaissance and surveillance plan. • Initial EFSTs and associated measures of performance and measures of effectiveness. • Refined asset locations. • Refined FSCMs. • Draft Annex D, Fires. ▪ Begin request of assets for reconnaissance and surveillance, CAS, nonlethal effects to include cyber electromagnetic activities. ▪ Determine radar positioning and sector search for all radars. ▪ Determine radar maintenance and cueing schedule.
CAS – close air support, CEMA – cyberspace electromagnetic activities, COA – course of action, EFST – essential fire support task, FS – fire support, FSCM – fire support coordination measure, FSE – fire support element, G-2 – assistant chief of staff, intelligence, G-3 – assistant chief of staff, operations, MDMP – military decision-making process, TA – target acquisition		

Developing Essential Fire Support Tasks

3-69. The purpose of the EFSTs are to ensure that the supported commander's guidance for fires is accomplished. The audience for EFSTs is the supported commander and staff. The EFSTs let the commander know that fires personnel understand and have specific tasks that accomplish the intent for fires. EFSTs drive the development of Annex D. The task describes what effects (for example, delay, disrupt, divert or destroy) fires must create on a target. The purpose describes why the task contributes to commander's objective. The

effect quantifies successful accomplishment of the task. Once EFSTs are determined the FSCOORD directs the development of EFATs. For more information on the development of EFSTs and EFATs see annex A.

Force Protection

3-70. The MDMP is the initial point to apportion force protection assets for FS assets. This will allow the entire staff to be involved in how it affects the mission. When possible, units should standardize force protection packages for planning purposes. Additionally, these attachments must be listed in coordinating instructions and specific tasks to subordinate units, not simply Annex D, for clarity and adherence to survivability standards. Table 3-8 is an example of force protection package minimums:

Table 3-8. Example of minimum force protection package for FA systems

Equipment	*Force Protection Requirement*
Weapons locating radar section	1 infantry squad or military police section (with transportation).
MLRS/HIMARS battalion	1 mechanized infantry platoon per battalion
Ammunition cache	1 infantry squad or military police section (with transportation).
HIMARS – High Mobility Artillery Rocket System, MLRS – multiple launch rocket system	

Determine Evaluation Criteria

3-71. Before beginning the war game, FS planners develop evaluation criteria to measure the effectiveness and efficiency of the FS contributions for each COA. They use these to compare courses of action during COA comparison. These criteria are listed in the FS running estimate and become the outline for the COA analysis subparagraphs. The FSCOORD and FSE planning personnel develop the criteria for evaluating the effects of fires by using fires-specific criteria that allow them to explain the FS related advantages and disadvantages of each COA. Evaluation criteria that may help discriminate among various courses of action may include:

- Lead time required for implementing EFSTs.
- The number of decision points that require FS.
- The cost of fires versus the expected benefits.
- The risk to friendly assets posed by enemy fires.

COURSE OF ACTION ANALYSIS

3-72. COA analysis or war gaming (see table 3-9) identifies which COA accomplishes the mission with minimum risk of casualties while positioning to retain the initiative. The war game provides detail and refinement, validates capabilities, and synchronizes the FS plan. During war gaming and COA comparison the FSCOORD and DFSCOORD must understand and be able to brief the commander on the strengths and weaknesses of each COA from a fire support perspective.

Table 3-9. Analysis of course of action (wargame)

MDMP STEP 4: COURSE OF ACTION ANALYSIS AND WARGAMING		
Staff Actions	***Key FSE Actions***	***FSE Output***
• Gather the tools. • List all friendly forces. • List assumptions. • List known critical events and decision points. • Select the wargaming method. • Select a technique to record and display results. • Wargame the operation and assess the results. • Conduct a war-game briefing (optional).	• Gather FS running estimate, FS portions of event templates, target value analysis results. See FM 3-60. • Confirm fire support assets for all courses of action. • Validate FS relevant facts and assumptions. • Validate/refine EFSTs and the FA contribution to EFSTs. • Validate/refine evaluation criteria to measure the effectiveness of the FS contributions for each COA. • Validate/refine fire support execution matrix for each COA. • Provide likely adversary FS actions to the G-2; determine where to find and attack enemy fire support capabilities. • Ensure FS is integrated into the commander's emerging concept of operations throughout the war game. • Formulate a list of advantages and disadvantages of each COA from fire support perspective. • Identify synchronization requirements including modifications to FS coordination and airspace coordinating measures. • Identify decision points, named areas of interest, decisive terrain and additional critical events and how these may influence positioning or posturing of FS assets. • Refine high-value targets, high-payoff targets, the FS portion of event templates, and develop a draft high-payoff target list, target selection standards and attack guidance matrix. • Integrate nonlethal effects to include CEMA into these targeting products. • Provide recommendations for the commander's attack guidance. • Actively participate in all phases of wargaming.	• Refined scheme of fires. • Refined draft Annex D (FIRES) and appendices. • Refined draft fire support execution matrix. • Refined draft target list worksheet (automated or manual) and target overlay. • Refined draft targeting synchronization matrix or modified targeting synchronization matrix (high-payoff target list, target selection standards, attack guidance matrix). • Refined draft FSCMs. • Refined draft NAI and TAIs.
CEMA – cyberspace electromagnetic activities, COA – course of action, EFST – essential fire support task, FA – field artillery, FS – fire support, FSCM – fire support coordination measure, FSE – fire support element, G-2 – assistant chief of staff, intelligence, MDMP – military decision-making process, NAI – named area of interest, TAI – target area of interest		

COURSE OF ACTION COMPARISON

3-73. During COA comparison (see table 3-10), the corps/division staff compares feasible courses of action to identify the one with the highest probability of success against the most likely enemy COA and the most dangerous enemy COA. The staff evaluates the advantages and disadvantages of each 12 and presents their findings. The staff outlines each COA in terms of the evaluation criteria established before war gaming and identifies the advantages and disadvantages of each with respect to the others. The FS staff records this analysis in paragraph three of the FS running estimate.

3-74. After the analysis, the G-3, G-2, and the FSCOORD compares strengths and weaknesses, highlights advantages and disadvantages from the perspective of the fires warfighting function and other warfighting functions. The staff assess risks and determine which COA promises to be most successful.

Table 3-10. Course of action comparison

MDMP STEP 5: COURSE OF ACTION COMPARISON		
Staff Actions	***Key FSE Actions***	***FSE Output***
• Conduct advantages and disadvantages analysis. • Compare courses of action. • Conduct a COA decision briefing.	• Participate with staff in comparing strengths, weaknesses, advantages, and disadvantages of FS for each COA. • Update FS and information-related capabilities estimates. • Brief results of FS analysis including best COA from FS perspective. • Refine fires paragraphs and annexes to include EFSTs, FSEM, target list and overlay, TSM or modified FS products (HPTL, TSS, AGM). • Integrate information collection capabilities and CEMA input into targeting products. • Provide inputs to the information collection plan. • Update FS running estimate. • FSCOORD briefs FS plan for each COA.	• Final drafts of the: • Scheme of fires. • Annex D (FIRES) and appendices. • FSEM • Target list worksheet. • Target overlay • Observer plan • TSM or modified (HPTL, TSS, and AGM). • FSEMs • NAIs and TAIs. • Airspace requirements and associated recommended ACMs.
ACM – airspace coordinating measure, AGM – attack guidance matrix, CEMA – cyberspace electromagnetic activities, COA – course of action, EFST – essential fire support task, FS – fire support, FSE – fire support element, FSCM – fire support coordination measure, FSCOORD – fire support coordinator, FSEM – fire support execution matrix, HPTL – high-payoff target list, MDMP – military decision-making process, NAI – named area of interest, TAI – target area of interest, TSM – target synchronization matrix, TSS – target selection standards		

COURSE OF ACTION APPROVAL

3-75. The inputs to COA approval and the following step, orders production, are the outputs of COA analysis and comparison. After completing the COA comparison, the corps/division staff identifies its preferred COA (see table 3-11) and recommends it to commander. The FSCOORD translates the recommended COA into a FS recommendation for approval by the commander. The commander approves a COA (as presented, or with any directed modifications). It is a summary of the concept of operations, the scheme of fires, and associated EFSTs including:

- Priority of fires.
- Allocation of FS resources.
- FA organization for combat.
- Command and support relationships.
- Final HPTL, target selection standards, AGM, or if used the target synchronization matrix.

Table 3-11. Course of action approval

MDMP STEP 6: COURSE OF ACTION APPROVAL		
Staff Actions	***Key FSE Actions***	***FSE Output***
• Recommends a COA, usually in a decision briefing. • The commander decides which COA to approve. • The commander issues final planning guidance. • Issues warning order to subordinate HQ.	• Assess implications and take actions as necessary to finalize selected scheme of fires including attendant HPTL, TSS, and AGM. • Integrated information collection capabilities and CEMA input into these targeting products. • Participates in COA approval briefing. • Include scheme of fires and EFSTs. • The FSCOORD assists the commander in the development of the refined commander's intent and planning guidance. • Prepare FS portions of warning order including changes to CCIR, risk guidance, time sensitive reconnaissance tasks and EFSTs requiring early initiation. • Prepare tentative FS portions of OPORD. • Participate in rehearsals.	• For the approved COA: • Refined scheme of fires. • Refined Annex D (FIRES) and appendices. • FSEM. • Target list worksheet. • Target overlay. • Observer plan. • TSM or modified (HPTL, TSS, and AGM). • FSEMs. • NAIs and TAIs. • Airspace requirements and associated recommended ACMs.
ACM – airspace coordinating measure, AGM – attack guidance matrix, CCIR – commander's critical information requirements, CEMA – cyberspace electromagnetic activities, COA – course of action, EFST – essential fire support task, FS – fire support, FSCM –fire support coordination measures, FSCOORD – fire support coordinator, FSE – fire support element, FSEMs – fire support execution matrix, HPTL – high-payoff target list, MDMP – military decision-making process, NAI – named area of interest, OPORD – operation order, TAI – target area of interest, TSM – target synchronization matrix, TSS – target selection standards		

3-76. During the staff's COA approval briefing to the corps/division commander, the FSCOORD briefs the scheme of fires as a part of each COA brief. The level of detail for this brief, including the portion briefed by the FSCOORD varies depending on the commander's level of participation in the war game and any specific briefing requirements that FSCOORD has issued. Normally, the FSCOORD covers the key details of the OPORD scheme of fires subparagraph 3e, emphasizing each EFST and any critical FS restrictions, limitations, or considerations pertinent to that COA. The FSE generally provide a sketch, map overlay, or terrain model to help convey details of the FS plan more clearly. If the FSCOORD perceives the need, they may request for additions or changes to the commander's intent or guidance for FS.

3-77. Once a COA is approved, the commander may refine the commander's intent and issue additional planning guidance. The FSCOORD and FSE prepare the FS portions of the order and participate in the required back-briefs and rehearsals. The warning order issued after COA approval contains information that executing units require to complete planning and preparation. Possible fires input to this warning order includes:

- FS contributions to the commander's intent or concept of operations.
- Changes to the commander's critical information requirements.
- Additional or modified risk guidance.
- Time-sensitive reconnaissance tasks and EFSTs requiring early initiation.

DEVELOP THE FIRE SUPPORT PLAN AND ORDERS PRODUCTION

3-78. A ***fire support plan*** **is a plan that addresses each means of fire support available and describes how Army indirect fires, joint fire support, and target acquisition are integrated into operations to facilitate success.** An effective fire support plan clearly defines FS requirements and focuses on accomplishing the commander's EFSTs. The fire support plan is an integral part of the OPLAN or OPORD (see table 3-12) and is normally comprised of the fires paragraph in the OPLAN or OPORD and Annex D, FIRES (if used), and its associated appendices, tabs, or enclosures. The FS Plan reflects a detailed understanding of the commander's intent. The FS Plan also requires the expertise necessary to assemble, to coordinate, and to direct appropriate information collection, TA, and attack/delivery systems toward a common objective. Preparation for and execution of the plan also includes the responsibility for both technical and tactical rehearsals. The fire support plan is refined at the lowest level utilizing top-down planning and bottom-up refinement.

Table 3-12. Orders production

MDMP STEP 7: ORDERS PRODUCTION		
Staff Actions	***Key FSE Actions***	***FSE Output***
• Refines approved course action into clear concise concept of operations and required supporting information. • Develops OPORD. • Implements risk controls by coordinating and integrating them into appropriate paragraphs and graphics of the order. • The commander reviews and approves order. • Commander briefs subordinate commanders and staffs and conducts confirmation briefings. • Implement hazard controls.	• Expand scheme of fires into full FS plan, reflecting current events, guidance and capabilities. • Confirm specific command and support relationships. • FA tactical mission assignments. • HPTL, TSS, AGM, and target synchronization matrix. • Integrate information related activities and CEMA input into the targeting products. • Information collection requirements. • Assessment requirements. • Assist subordinate staff/units with planning and coordination. • Present FS portions of OPLAN or OPORD briefing, including EFSTs.	• Warning order to subordinate and supporting FS assets. • Scheme of fires subparagraph 3e to OPORD. • Annex D (FIRES) to division OPORD. • FSEM. • EFSTs. • FS back brief. • Manage refinement. • Conduct FS rehearsal.
AGM – attack guidance matrix, CEMA – cyberspace electromagnetic activities, EFST – essential fire support task, FA – field artillery, FS – fire support, FSE – fire support element, FSEM – fire support execution matrix, HPTL – high-payoff target list, MDMP – military decision-making process, OPORD – operation order, TSS – target selection standards		

SECTION III – FIRE SUPPORT PREPARATION

3-79. Fire support preparation facilitates and sustains transitions, including those to branches and sequels. Preparation requires action by fire support personnel at every echelon. *Preparation* consists of those activities performed by units and Soldiers to improve their ability to execute an operation (ADP 5-0). Preparation creates conditions that improve friendly forces' opportunities for success. It requires commander, staff, unit, and Soldier actions to ensure the force is trained, equipped, and ready to execute operations. Preparation activities help commanders, staffs, and Soldiers understand a situation and their roles in upcoming operations. Mission success depends as much on fire support preparation as on fire support planning and coordination.

REHEARSALS

3-80. Rehearsals allow leaders and their Soldiers to practice key aspects of the concept of operations. These actions help Soldiers orient themselves to their environment and other units before executing the operation. Rehearsals help Soldiers build a lasting mental picture of the sequence of key actions within the operation.

A rehearsal is an effective organizational tool in gaining support, improving strategic and operational understanding, and fostering mutual trust within a commander's sphere of control. The commander and staff are able to visualize the terrain, and enemy and friendly units arranged by military action in time, space, and purpose. For more information on rehearsals see FM 6-0.

3-81. Each rehearsal type achieves a different result and has a specific place in the preparation timeline. Once a rehearsal is complete subordinate leaders must backbrief the commander. The four types of rehearsals are the:

- Combined arms rehearsal.
- Support rehearsal.
- Battle drill or SOP rehearsal.
- Conduct CP displacement rehearsals.

3-82. Fire support personnel are involved in every type of rehearsal. Multiple rehearsals ensure that maximum integration and synchronization in supporting the scheme of maneuver with fires. When time is limited, the number and scope of rehearsals are reduced. In these cases, rehearsals may focus on EFSTs or aspects of the supported commander's plan and the associated FS plan. The FS rehearsal, in coordination with the FA technical rehearsal, should be conducted prior to the combined arms rehearsal and if possible, include members of the operations and intelligence staff and other members of the targeting team.

3-83. Rehearsals are based on a completed OPORD. Units may rehearse a contingency plan to prepare for an anticipated deployment. The rehearsal is a coordination event, not an analysis. It does not replace war-gaming. Commanders avoid making major changes to OPORDs during rehearsals. They make only those changes essential to mission success and risk mitigation. *Risk management* is the process to identify, assess, and mitigate risks and make decisions that balance risk cost with mission benefits (JP 3-0). For more information on risk management see ATP 5-19.

BACKBRIEF

3-84. A *backbrief* is a briefing by subordinates to the commander to review how subordinates intend to accomplish their mission (FM 6-0). These briefs allow commanders to clarify the commander's intent early in subordinate planning. Commanders use the backbrief to identify any problems in the concept of operations and to increase understanding and synchronization through the passage of information. At a minimum the FSCOORD should cover the following items during the backbrief:

- Commander's guidance for fires.
- Initial scheme of fires.
- Priorities of fires by phase.
- HPTs.
- Initial FSCM recommendations.
- Command and support relationship recommendations.

3-85. Backbriefs should not be confused with confirmation briefs that commanders use immediately after issuing a plan to determine how well a subordinate commander understands the mission, task, and/or directive. It differs from a confirmation brief in that leaders are given time to complete their plan rather than briefing the commander immediately following receipt of an order. Typically, the confirmation brief occurs at the conclusion of the orders or OPLAN brief when all subordinate commanders are available. The commander adjourns the session only when they are confident their subordinates understand their mission, and assigned task and purpose, the commander's intent and the higher commander's intent, the concept of operation, scheme of maneuver, priorities, the time plan, and type and location of rehearsals.

COMBINED ARMS REHEARSAL

3-86. The combined arms rehearsals are conducted from corps to BN echelon. The fire support plan must be integrated into the combined arms rehearsal. Key fire support personnel representing or supporting the fire support system at the combined arms include the FSCOORD, DFSCOORD, DIVARTY or FAB FSE, JAGIC personnel, BCT FSOs (as available), air defense airspace management and brigade aviation element, ALO,

staff weather officer, subordinate and supporting unit FSE representatives, SOF representative, targeting officers, chief of staff, FAB and DIVARTY S-2s, S-3s, S-4s, S-6s. Assigned and attached combined arms units that comprise or support the command will participate when possible. Normally, the chief of staff directs the rehearsal using a synchronization matrix or execution checklist; the FSCOORD or DFSCOORD, should use the fire support execution matrix.

3-87. Usually, the combined arms rehearsal takes place after the Joint Targeting Cycle and Army Targeting Process have commenced. Much of the FS Plan for the operation will be refined based on the ongoing Targeting Cycle to include HPTs, TAIs, ISR plan and allocation, AI nominations, CAS allocations, Priorities of Fire, FSCMS ACMs, and overall scheme of fires.

3-88. For each phase or time period discussed at the combined arms rehearsal, the FSCOORD should ensure the following are integrated:

- EFSTs.
- HPTs and TAIs.
- Trigger points for each target and the target engagement criteria.
- Target Acquisition resources and allocation for each HPT/TAI.
- Communications plan for each TA resource.
- Attack guidance, such as unit(s) to fire, shell and fuze combination, and number of volleys, specified for each target.
- Alternate method of attack when GPS enabled weapons are primary and the area becomes denied, degraded, and disrupted.
- FSCMs and ACMs including triggers for moving FSCMs.
- Priorities of fire.
- Fire support attack/delivery systems (lethal and nonlethal) available and allocated for each HPT/TAI.
- Rear Area FS plan.
- CAS, AI, and SCAR apportionment, allocation, and request processes.

FIRE SUPPORT REHEARSAL

3-89. The FS rehearsal is a support rehearsal. It should occur before the combined arms rehearsal and ensure the integration and synchronization of the fire support effort with the information collection plan, unit airspace plan, and the supported commander’s plan. As with the combined arms rehearsal, the FS rehearsal likely occurs after the initiation of the targeting process. Fire support rehearsals are more detailed than the combined arms rehearsal and serve to refine the fire support plan and fire support execution matrix with the supported unit and prove the feasibility of executing EFSTs. If it is held before the combined arms rehearsal, changes from the combined arms rehearsal may require a second FS rehearsal. A fire support rehearsal may include all key supported and fire support personnel involved in planning and executing the fire support plan, to include the supporting FA unit CPs, the corps or division commander or his deputies, FSCOORD, DFSCOORD, JAGIC personnel, chief of staff, the G-3, the G-2, the G-4, the G-6, staff judge advocate (SJA), targeting officer, ALO, TACP representative, the FAIO, and liaison officers. There is also a requirement for SOF representation, FSOs, and unified action partners as necessary. For more information on FS rehearsals see FM 6-0, ATP 3-09.23, ATP 3-09.42, and ATP 3-09.90.

3-90. The FSCOORD ensures the following are discussed during the FS rehearsal:

- A clear understanding of the supported commander's intent and guidance for FS.
- Establishment of TAIs, NAIs, and HPTs that allow for targeting against specific enemy formations in accordance with the commander's targeting guidance (information collection plan).
- Airspace integration requirements such as ACMs affecting fires, ensuring FSCMs are added to the unit airspace plan, clearance of fires procedures above and below the coordinating altitude.
- Allocated primary and alternate TA and FS attack and delivery capabilities for each TA.
- A clear understanding of the scheme of fires.
- A clear understanding of the ROE and procedures for clearing fires.

- PACE plan.
- Alternate attack systems to be used in the engagement of specific targets.
- Positioning of munitions, observers, and weapon systems.
- Execution of EFSTs.
- Fire support execution matrix.
- Practicality and functionality of FSCMs.
- Purpose and triggers of FSCMs.
- Clear understanding of attack guidance matrix and target selection standards.
- Priority of fires.
- FS procedures in the rear area.

FIELD ARTILLERY TACTICAL REHEARSALS

3-91. FA tactical rehearsals are support rehearsals that ensure the FA unit OPLAN or OPORD properly plan and synchronize FA tactical fire control. An FA tactical rehearsal may include the FSCOORD/FA Commander, supporting and subordinate firing unit commanders (and staffs), FSOs, key firing unit staff to include the S-2, S-3, S-4, S-6, SJA, Fire Control and Fire Direction personnel, select observers, and the radar platoon leader. These personnel must be thoroughly familiar with clearance of fires procedures, restrictive and permissive FSCMs, FA target lists and schedules, trigger points and events, movement and displacement plans, combat service support provisions, and C2, and communications handover requirements. The FA Commander also ensures the following are discussed during the FA tactical rehearsal:

- Scheme of maneuver, friendly, and enemy actions that initiate each phase.
- Enemy situation.
- Concept of operations.
- Commander's guidance for fires.
- EFSTs.
- FA organization for combat and command and support relationships.
- Required supply rate and CSR implications.
- Tactical execution of FA essential tasks, the FA support matrix, schedules of fires, and schedules of targets - primary and backup methods.
- Tactical fire control and mission routing procedures.
- Clearance of fires requirements and procedures.
- Commander's attack criteria and priority of fires considerations.
- Effectiveness of FA movement and positioning plans, primary and alternate, for firing, control, and sustainment elements.
- Targeting, counterfire, and suppression enemy air defense (SEAD) operations.
- WLR positions and zones.
- Mutual support and continuity operations.
- Communications requirements - use and positioning of retransmission equipment, use of voice versus digital. Utilizing a PACE plan.
- Survey requirements.
- Timing and synchronization of FA efforts with maneuver, maritime, space, cyberspace, and airspace operations.
- Clear understanding of ROE and procedures for clearing fires.
- MET requirements.
- Resupply triggers, especially for low-density munitions.
- CBRN decontamination operations.
- Protection requirements for FA units (infantry, ADA, engineer, military police).
- Ensure protection battle drills are developed and rehearsed to account for reaction to enemy air, ground, CBRN, indirect fire, jamming, or CEMA attacks.

- Reconstitution procedures.

FIELD ARTILLERY TECHNICAL REHEARSALS

3-92. FA technical rehearsals are support rehearsals that ensure the supported higher HQ' fire support plan will be executed by the FSEs, fire control elements, the JAGIC, and subordinate FA unit's OPLAN or OPORD properly addresses FA technical fire direction and exercise the technical fire direction process. It is a network rehearsal technique. FA technical rehearsals focus include:

- Technical execution of FA essential tasks and the FA support matrix - digital links and primary and backup methods. Integration of voice and digital operations. Rehearsal of backups includes evaluation of reactions to catastrophic loss of digital or voice capability.
- Integration of tactical and technical fire control processes and computation of firing solutions, to include the communication and interaction among the FSEs, fire direction, and firing elements.
- Identification of technical fire direction issues - site to crest, high-angle fire, minimum safe distance, target, ammunition, range, FSCM and ACM conflicts.
- Digital database verification - setup, communications, positions, FSCMs, ACMs, target and attack guidance, mission routing and intervention points, target list, and scheduling data.
- Digital continuity of operations - actions for minor and catastrophic failure.
- Digital interface requirements -fire direction system, digital version differences, and any other digital systems, including Air Force, Navy, Marine, and multinational unified action partners.
- Technical rehearsal of the echelons above brigade TA capability sensor-to-shooter links.

3-93. Safeguards must be taken to prevent live rounds from being fired at technical rehearsal targets while maintaining the capability to react to real threats. Units must retain the ability to terminate or postpone rehearsals instantly when an actual fire mission needs to be processed.

FIRE SUPPORT BATTLE DRILL OR STANDARD OPERATING PROCEDURES REHEARSALS

3-94. FS related battle drills or SOPs should be rehearsed either independent from the above rehearsals or preferably, integrated as vignettes into the combined arms rehearsal and FS Rehearsal. Examples include:

- Clearance of fires (air and ground).
- Cross boundary fires.
- Unplanned SCAR procedures and coordinated attack see ATP 3-60.2.
- Counterfire.
- FSCM movement triggers.
- Reconstitution operations.

SECTION IV – FIRE SUPPORT EXECUTION

3-95. FS execution begins when the supported commander issues the execute order for the operation to commence and continues until the operation is terminated or the mission is accomplished. FSCOORDs and their staffs simultaneously support the supported commander's plan while continuing the planning process for subsequent operations.

PRINCIPLES OF FIRE SUPPORT EXECUTION

3-96. The FSCOORD uses the principles of FS execution to anticipate the dynamics of large-scale combat operations, maintain situational awareness of the OE, and leverage interoperable FS C2 systems and attack/delivery capabilities. FS planners utilize the memory aid AWIFM-N to remember the FS execution principles and communicate their status to the supported commander:

- Adequate Fire Support for the Committed Units. FS personnel use the allocation of CAS, attack aviation and nonlethal capabilities to ensure adequate FS for committed units. Adequate Fire Support for the Committed Units. FS personnel make use of available FA assets and the allocation of CAS, attack aviation, and nonlethal capabilities to ensure adequate FS for committed units. In

large-scale combat operations, the minimum adequate FA support for committed units is normally one FA BN for each committed brigade.

- Weight to the main effort. The *main effort* is a designated subordinate unit whose mission at a given point in time is most critical to overall mission success (ADP 3-0). The purpose for weighting the main effort is to concentrate the effects of combat power at the most advantageous place and time. The main effort can be weighted in a variety of ways. The main effort or the decisive operation can be weighted in a variety of ways with FS:
  - Allocation of additional lethal and nonlethal FS attack/delivery systems.
  - Command and support relationships designated to expedite execution of attack.
  - Ammunition allocation.
  - Focused TA assets.
  - Priorities of fires.
- Immediately available fire support for the commander to influence the operation. This can be accomplished through proper allocation of CAS, armed UAS, and attack aviation retained by the appropriate commander. Sufficient FS resources to include FA are normally retained under centralized control to concentrate fires at the decisive place and time. Establish FA support relationships of GS and GSR (discussed in Chapter 4) to enhance flexibility and facilitate the ability to provide immediately responsive fires. The supported commander lifts or shifts the priority of fires to exploit opportunities as they are presented. This is essential to ensure success in the face of unforeseen events.
- Facilitate future operations. To ensure smooth transition from one phase of an operation to another during execution and planning. This principle can be implemented through the assignment of command and support relationships, positioning of artillery, positioning of ammunition, and positioning of TA assets. The assignment of an on-order mission or command and support relationship allows a unit to anticipate FS attack/delivery system support need in a future situation. Applying limitations on ammunition expenditure in an earlier phase of an operation in order to support the future main effort is another way of facilitating future operations.
- Maximum feasible centralized control. The optimum degree of centralized control varies with each tactical situation. A higher degree of centralized control may be appropriate in a defensive situation, since the enemy has the initiative, and it is difficult to accurately predict where and when they will attack. The FSCOORD must anticipate and plan for the transition to offensive operations for a lesser degree of centralized control because the supported force has the initiative.
- Never leave artillery in reserve. In large-scale combat operations, commanders (advised by their FSCOORDs) ensure FA units (MLRS, HIMARS, and cannons) always remain in the fight. This is accomplished by continuously adapting command and support relationships and also by continuously repositioning fires capabilities to create desired effects. Refer to the principle of "facilitate future operations" when applying this execution principle.

INTEGRATION OF FIRE SUPPORT AND AIRSPACE CONTROL/MANAGEMENT DURING EXECUTION

3-97. *Airspace control* is the exercise of delegated authority over designated airspace and users through control procedures and coordination measures to maximize operational effectiveness (JP 3-52). Airspace control relies upon airspace management capabilities provided by airspace control elements. Plans and procedures that support airspace control and airspace management activities are addressed throughout the operations process and are approved by the JFC or the designated airspace control authority. An airspace control system that promotes decentralized execution by utilizing the capabilities of airspace control elements in assigned sectors improves responsiveness and flexibility to rapidly execute fire missions and coordinate airspace users' activities inside a manageable volume of airspace.

3-98. Clearance of fires during current operations are streamlined when ground force commanders properly plan for airspace use and implement the JAGIC TTP. The JAGIC is recognized by the joint force as an airspace control element of the airspace control system with delegated decentralized execution authority inside an assigned volume of airspace. The Army primarily uses procedural control to control forces and

airspace users. Procedural control relies on common published procedures, designated airspace, and promulgated instructions to activate ACMs and FSCMs to provide effective airspace management in specified areas. Procedural control of airspace requires disciplined airspace users to follow guidance and utilize planned and activated ACMs. The JAGIC TTP enables commanders to integrate surface fires with airspace users. The JAGIC combines Army and Air Force personnel and equipment to maintain situational awareness and communicate with affected airspace users and other airspace control elements within the OA. For more information on the JAGIC see ATP 3-91.1.

3-99. Army components of the theater air-ground system who collectively coordinate and integrate airspace use and are organic to Army brigades and higher are described in chapter 2 and include:

- Airspace Elements.
- JAGICs.
- FSEs.
- Air defense airspace management cells.
- Brigade aviation elements.
- Air and missile defense cells.
- BCDs.

3-100. Airspace elements do not routinely manage the flight path or trajectory of individual airspace users. Rather, airspace elements integrate the individual airspace user's planned airspace use for flight paths and trajectories in planning and execution to manage risk. When two or more airspace users conflict, the airspace elements direct changes in flight path of manned or UA, or coordinate with the FSE to alter the trajectory or timing of fires. In some cases, the re-routing of aircraft flight paths is appropriate to accommodate the delivery of surface-to-surface fires, while in other cases, alternative surface-to-surface fires options are used to accommodate the delivery of air-to-surface fires. These changes are based on the commanders' mission priorities and risk guidance. Pilots, UAS operators, and weapon system controllers (FSE, FDC) still maintain the responsibility to make the directed changes to their flight path or trajectory. Staffs need to identify risk during COA development and apply mitigation techniques to include the use of integrating ACMs and FSCMs from PAA to TAIs. This reduces risk to airspace users and communicates the agreed to level of risk in the supported commander's plan.

3-101. The FSE coordinates FSCMs with ACMs through close interface with airspace elements and the TACP. The airspace element works with the FSE to integrate FSCMs with the airspace plan. The airspace element and the FSE review the ACO to ensure integration between FSCMs and ACMs. FSCMs are normally sent to higher, lower, and adjacent HQ through fire support channels. In some cases, both the FSE and the airspace element send related control or coordination measures through their respective channels. The airspace element and the FSE ensure the SOPs and the airspace control appendix address the procedures for forwarding FSCMs and associated ACMs through appropriate coordination channels. The airspace element and the FSE review the ACO to see if there are any ACMs that have the potential to interfere with planned surface-to-surface fires. If a conflict exists between the fire support plan and the ACO, the airspace element coordinates with the higher airspace elements to either get approval to correct or modify the appropriate airspace coordinating measure, or the FSE will have to modify the surface-to-surface fires plan.

3-102. Army planners at the senior tactical and operational levels must actively assist in the development of the airspace control plan. This is critical if the divisions intend to request the authority to control division-assigned airspace using the JAGIC technique. Division-assigned airspace is a volume of airspace in which the airspace control authority has delegated the responsibility for control of that volume, in accordance with the airspace control plan and ACO, to the JAGIC. Division-assigned airspace is typically between the lateral boundaries of the division's AO, to include from the rear boundary to the FSCL, and upward to the coordinating altitude. A JAGIC enabled division is suitably manned and equipped to procedurally control the tactical airspace over the division AO up to the coordinating altitude. Using planning data from the fires and aviation planners Army airspace planners can integrate Army airspace requirements into the unit airspace plan. Integrated planning ensures that the location and altitude of key ACMs, that define division assigned airspace such as the coordinating altitude, balance both air component and Army force requirements for airspace. Fires planning data would include planned FA positions, max ordinate for artillery, mortar, rocket, and missile systems, planned target locations, primary counter fire weapon system and units, and GS artillery weapon systems. For more information on airspace control and management see FM 3-52 and JP 3-52.

SECTION V – FIRE SUPPORT ASSESSMENT

3-103. *Assessment* is a continuous process that measures the overall effectiveness of employing capabilities during military operations (JP 3-0). It is also used to determine progress toward accomplishing a task, creating a condition, or achieving an objective. Assessment involves continuously monitoring the situation and evaluating progress of an operation. Assessment precedes and guides the other activities of the operations process and concludes each operation or phase of an operation. However, the focus of assessment differs during planning, preparation, and execution. During planning, assessment focuses on gathering information to understand the current situation and developing an assessment plan. During preparation, assessment focuses on monitoring the progress of readiness to execute the operation and helps to refine the plan. Continuous assessment during execution is essential to adjusting operations based on changes in the situation. Assessment during execution involves a deliberate comparison of forecasted outcomes to actual events, using criterion to judge operational progress toward success.

3-104. Assessment is commander centric, and commanders maintain a personal sense of the progress of the operation, shaped by conversations with senior and subordinate commanders and battlefield circulation. Operation assessment complements the commander's awareness by methodically identifying changes in the OE, identifying, and analyzing risks and opportunities, and formally providing recommendations to improve progress toward mission accomplishment. Assessment should be integrated into the organization's planning and operations battle rhythm to best support the commander's decision cycle.

3-105. As an essential part of the overall operation assessment, the staff will assess FS. Staffs should assess how effectively the joint FS system supports forces in contact, supports the concept of operations, and associated FS plan, synchronizes FS, and sustains/protects the FS system. Positive indicators include a continuous flow of targeting information up and down the chain of command; availability of capabilities that can create both lethal and nonlethal effects; access to the requested type of FS; consistent use of the most effective FS; patterns of avoiding unnecessary duplication; civilian casualties and collateral damage; efficient use of airspace; and prompt fire support for troops in contact, along with rapid coordination methods. Negative indicators include insufficient creation of effects or achievement of objectives, patterns of friendly fire incidents, or unanticipated or unacceptable amounts of civilian casualties or collateral damage.

3-106. Assessment Indicators. The staff should identify the specific pieces of information needed to infer changes in the OE supporting them. These pieces of information are commonly referred to as indicators. Indicators are relevant, observable, or collectible, responsive, and resourced. Assessment plans should include both quantitative and qualitative indicators. An example of a fire support assessment indicator could be the speed with which important information is communicated to, and acknowledged by, elements of the FS system.

3-107. Operation assessments are an integral part of planning and execution of any operation, fulfilling the requirement to identify and analyze changes in the OE and to determine the progress of the operation. Assessments involve the entire staff and other sources such as higher and subordinate HQ, interagency and multinational unified action partners, and other stakeholders. They provide perspective, insight, and the opportunity to correct, adapt, and refine planning and execution to make military operations more effective. Operation assessment applies to all levels of warfare and during all military operations. Operation assessment applies during all military activities and operations, providing the opportunity for correction and adaptation. Assessment mechanisms and the assessment processes may differ at the tactical, operational, theater, global, and strategic levels, depending upon the commander’s pace of decision making and the OE analysis capabilities. An operation assessment is a continuous process that measures the overall effectiveness of employing capabilities during military operations in achieving stated objectives. For more information on assessments see JP 5-0.

3-108. Ultimately, operation assessment is a process that measures progress toward mission accomplishment. The commander may direct the formation of a cell, whose primary function is to develop and execute the assessment plan and to conduct assessments. The assessment cell is a cross-functional organization with representatives from all staff sections, the SJA, subordinate units, and multinational and interagency unified action partners. The assessment cell operates during both planning and execution phases of an operation. FS may have a subordinate assessment team or working group that feeds the command's assessment cell. For more information on developing and executing a FS assessment plan see JP 3-09.

3-109. Combat assessment is the fourth phase of the Army targeting process decide, detect, deliver, and assess, and the sixth phase of the joint targeting process. It is conducted at all levels of warfare. Combat assessment evaluates the results of weapons and target engagement and thus provides data for fires and the Army and joint targeting processes at all levels. *Combat assessment* is the determination of the overall effectiveness of force employment during military operations (JP 3-60). Combat assessment is composed of three major components: (a) BDA; (b) MEA; and (c) reattack recommendation.

3-110. BDA is an element of combat assessment and is the estimate of target damage or effect, which is based on physical damage assessment, change assessment, and functional damage assessment, as well as target system assessment, resulting from target engagement.

3-111. MEA is conducted concurrently and interactively with BDA and is the assessment of the military force applied in terms of the weapon system and munitions effectiveness to determine and recommend any required changes to the methodology, tactics, weapon system, munitions, fuzing, and/or weapon delivery parameters to increase force effectiveness. MEA is primarily an operations responsibility, with support from intelligence as documented in the MEA concept of the operation.

3-112. Reattack recommendation is an assessment derived from the results of BDA and MEA that provides the commander systematic advice on reattack of targets and further target selection to achieve objectives. The reattack recommendation is a combined operations and intelligence function. For more information on combat assessment see FM 3-60 and JP 3-60.

ASSESSMENT WORKING GROUP

3-113. The assessment working group is the battle rhythm event that allows staffs to formally assess changes in the OE and determine if effects are achieving operational objectives. After operations and target execution have begun, it is imperative the assessment working group meets before the targeting working group for the upcoming targeting cycle. This ensures the targeting team is armed with the most up to date assessment of the OE and understands the progress toward operational objectives. Assessment is a key step in Army and Joint targeting methodologies and thus makes the assessment working group and targeting meetings inextricably linked in the battle rhythm. Targeting team members must participate in the assessment working group as subject matter experts in the application and assessment of their respective effects on the OE. Targeting specific related inputs to the assessment working group can include the following:

- Current assessment of enemy composition and disposition.
- Assessment of information collection operations during the assessed targeting cycle.
- All portions of the combat assessment from the assessed targeting cycle.
- Relevant Intelligence Analysis of effects created during the assessed targeting cycle that may not have resulted in measurable BDA.
- All Warfighting functions must provide an assessment of their planned and executed effects for the assessed targeting cycle. At a minimum if time is constrained the assessment should include:
  - Fires.
  - Maneuver.
  - Intelligence.
  - Sustainment.

3-114. Supporting organizations must provide an assessment of their planned and executed effects for the assessed targeting cycle. Table 3-13. is an example assessment working group agenda as displayed in FM 6-0. The assessment working group is executed in accordance with the organizational battle rhythm. For more information of assessment working groups and their execution see FM 6-0 or ATP 5-0.3.

Table 3-13 Assessment working group agenda (example)

General Information	*Participants*
Title: Assessment working group. **Purpose:** Assess progress of operations toward the mid- to long-range planning horizons. **Frequency:** Weekly (IAW Organizational Battle Rhythm to match targeting cycle). **Duration:** Two hours. **Location:** Plans cell. **Medium:** Face-to-face, defense collaboration services.	**Staff lead:** G-5. **Chair:** Chief of staff. **Members:** Coordinating, special, and personal staff representatives; liaison officers; and others as required.
Inputs and Outputs	***Agenda (Responsibly Party)***
Inputs: • Assessment plan. • Higher echelon, subordinate, and unified action partner assessments. • Running estimates. **Outputs:** • Updated assessment products. • Recommended adjustments to the assessment and information collection plans. • Assessment reports to higher headquarters.	• Roll call (G-5). • Plan review (G-5). • Subordinate unit's assessments (G-5, LNOs). • Unified action partner assessments (G-5, LNOs). • Assessment discussions (staff leads). • Assessment summary (G-5). • Guidance (chief of staff).
G-5 – assistant chief of staff, plans, IAW -- in accordance with, LNO -- liaison officer	

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Chapter 4
Field Artillery Operations

This chapter provides a brief overview of the FA and its role and employment in large-scale combat operations. Section I describes the role of the FA. Section II covers FA organizations at echelons above brigade Section III covers FA capabilities in depth, Section IV covers FA organization for combat, Section V discusses key considerations for combat and Section VI covers fire direction.

SECTION I – THE ROLE OF THE FIELD ARTILLERY

4-1. The role of the FA is to destroy, neutralize, or suppress the enemy by cannon, rocket, and missile fire and to integrate and synchronize all FS assets into operations.

4-2. The FA, as an integral part of the FS system, is responsible for participating in the planning, preparation, and execution of lethal and nonlethal effects delivered by FA cannons, rockets, and missiles at the strategic, operational, and tactical levels. This often includes simultaneous FA fires in support of decisive, shaping, and sustaining operations, including counterfires. Deep fires, beyond the boundaries of tactical operations under joint force control, may involve the delivery of operational-level fires directly supporting the JFCs campaign plan. Such fires may have potential strategic effects.

4-3. FA contributes to operations by massing fires in space and time on single or multiple targets with precision, near-precision, and area fire capabilities. The synchronized use of massed or selectively applied FA fires in support of simultaneous decisive, shaping, and sustaining operations is intended to weaken the enemy at all echelons and deny them the opportunity to hide or rest – effectively contributing to efforts to impose multiple dilemmas on the enemy. FA can rapidly shift fires throughout the AO in support of the scheme of maneuver, and to counter unforeseen enemy reaction to create the supported commander's desired effects. FA cannons are classified according to caliber as mm:

- Light - 120-mm and less.
- Medium - 121 to 160-mm.
- Heavy - 161 to 210-mm.
- Very heavy - greater than 210-mm.
- Rockets - 298-mm.
- Missiles - 607-mm.

4-4. FA is the supported commander's principal means for providing continuous and responsive indirect fires in support of large-scale combat operations. It can achieve surprise with the instantaneous delivery of high volumes of fire without warning. As such, it is the most potent and responsive, 24-hour, all weather combat multiplier available to supported commanders.

4-5. Organic, assigned, attached, or OPCON FA delivery assets include cannon, rocket, missile, and hypersonic systems that range from tactical to strategic areas. FA provides continuously available fires under all weather conditions and in all types of terrain. FA can shift and mass fires rapidly without having to displace.

4-6. FA limitations include a firing signature that makes firing units vulnerable to an electromagnetic signature susceptible to enemy electronic warfare interference and detection by enemy TA assets, limited self-defense capability against ground and air attacks, and limited ability to engage moving targets.

4-7. FA personnel, from company FIST through fires commands, integrate all means of FS – FA, mortars, CEMA, and joint fires. FA personnel integrate and synchronize FS within the commander's scheme of maneuver.

4-8. FA supports ground and air operations by attacking the enemy force throughout the depth of its formations and provides specific target engagement such as SEAD. FA fires can provide simultaneous precision strikes of targets at long ranges that other means cannot attack without significant risk. *Strike* is an attack to damage or destroy an objective or a capability (JP 3-0). FA can quickly attack enemy forces on key terrain, flanks, and in dead space, and enables the supported commander to economize and concentrate to exploit advantages that arise.

4-9. As an element of the FS system TA is key to FA effectively providing timely and accurate artillery fires. FA specific TA is accomplished by FOs and WLRs. In addition, supported commanders must also integrate maneuver, UAS, other joint and national collection assets into the information collection plan.

SECTION II – FIELD ARTILLERY ORGANIZATIONS AT ECHELONS ABOVE BRIGADE

4-10. To meet the JFC's objectives, the joint force synchronizes diverse fires assets from US and multinational forces. Joint FS requires planning and detailed coordination to integrate and synchronize the supporting commander's joint FS into the supported commander's operation.

4-11. FA HQ and organizations provide the theater, corps, and division commanders with the C2 and synchronizing functions to integrate fires. These units at echelon are the TFC, theater fires element (TFE), multidomain task force, FAB, and the DIVARTY. For more information on the FAB and DIVARTY see ATP 3-09.24 and ATP 3-09.90.

THEATER FIRES COMMAND

4-12. A TFC will C2 organic assigned theater strategic fires capabilities and serve as the senior HQ assigned to a theater army to integrate theater fires assets and execute critical fires functions. *Theater strategic level of warfare* is the level of warfare at which combatant commanders synchronize with unified action partners and employ all elements of national power to fulfill policy aims within the assigned theater in support of the national strategy (FM 3-0). The TFC will develop, nominate, and integrate effects on joint targets across the theater. The TFC supports joint targeting by continuously setting the theater and setting the conditions to enable JFLCC/Field Army and corps operations in conflict. *Setting the theater* is the broad range of activities continuously conducted to establish conditions for the successful execution of operations in a theater (FM 3-0).

4-13. The TFC is assigned to an Army Service component command/Theater army to plan, coordinate, synchronize, and employ multidomain fires to support the Joint Force Land Component Command (JFLCC), theater army and the Joint Force Air Component Command (JFACC) throughout all periods of multi-domain operations. The TFC provides the JFLCC/theater army and JFACC with a FFA HQ to integrate multidomain fires against operational and strategic targets in armed conflict and provides strategic deterrence in competition and crisis. The primary functions of the TFC are:

- The TFC provides strategic deterrence through forward positioning of Army fires and other enablers in theater.
- Sets the theater for the rapid employment of multidomain fires and their effects through the development and implementation of theater-level FSCMs in support of the strategic framework.
- Responsible for an integrated fires network.
- Serves as the land component commander’s (referred to as LCC) coordinating HQ for theater joint targeting.
- Serve as a FFA HQ for the theater by assigning mission-specific HQs for counterfire, strike, or setting the conditions for future operations. Also recommends command and support relationships for all fires organizations in theater (including allies).

4-14. The TFC organizes, equips, and trains as a dedicated theater strategic level multidomain fires organization in support of the JFLCC/theater army. The formation serves in assigned theater to provide the Joint Force freedom of action during LSCO. The TFC provides strategic reach enabling the TFC to target and defeat threat capabilities, creating multiple dilemmas for the enemy to gain positions of advantage for Joint Force and ARFOR exploitation. The TFC roles include:

- Provide accurate and timely information to theater operations and intelligence processes.
- Provide early warning, reaction time, and maneuver space to the supported commander.
- Preserve combat power.
- Operate for extended duration at supporting distances.
- Facilitate movement and transitions for the supported theater commander.
- Facilitate echeloned C2 through situational understanding.
- Represent the theater army in the joint targeting process.
- Integrate coalition/multi-national fires.

THEATER FIRES ELEMENT

4-15. The TFE provides the JFLCC with the ability to accomplish joint force objectives, set the theater and support the development of an integrated multidomain joint force. The element plans, coordinates, synchronizes cross-domain fires in support of the JFLCC commander. They serve as the JFLCC's coordinating element for theater joint targeting providing an integrated theater strategic fires capability.

4-16. The TFE is organized under the G3 and the lead staff proponent for resourcing and coordinating actions for assigned fires HQs (multi-domain task force, BCD, FAB, Corps FSE). The TFE plans, coordinates, and synchronizes Army fires in support of the Theater Joint Force Land Component Commander and serves as the TFLCC's coordinating element for theater joint targeting in support of the Joint Force Commander (JFC). When designated as a Joint Task Force (JTF), the TFE serves as the nucleus for the Joint Fires Element (JFE) and is the integrating staff element that plans, coordinates, and synchronizes joint fires on behalf of the JTF commander. The TFE is structured and organized to:

- Plan, coordinate, and synchronize Army fires in support of the TJFLCC.
- Integrates Joint and Multinational Fires during Theater Joint Targeting.
- Develop targets of ground component interest and shepherd them through the targeting B2C2WG process (Target Discovery, BTD, ITD, ATD) for vetting and validation onto the joint target list (JTL) and restricted target list (RTL).
- Lead staff proponent (governance, resourcing, and coordination actions) assigned Fires HQ (multi-domain task force, BCD, FAB, Corps FSE) in the theater.
- Plan for set the theater activities in support of Campaign Plan and OPLAN.
- Lead integrators for Joint Fires Network (JFN), Fires COP, and AI/ML solutions into the digital kill chain.
- Maintains situations awareness on the operations floor providing the commander's estimate of blue and red fires.
- The TFE is not structured or organized to:
  - Serve as a FFA HQ.
  - Manage theater level counter fire fight.
  - Manage theater level fires ammunition.
  - No command authority to conduct mission command over assigned or attached fires formations.

Note. If searching for the manning authorizations for the theater fires element (TFE) in the Army's Force Management System, the TFE is not found. In its place, you will find the Multidomain Fires Element.

FIELD ARTILLERY BRIGADE

4-17. A FAB's primary tasks are conducting corps-level strike operations and augmenting division setting the conditions for future operations. The FAB provides the corps with the capability to mass effects during shaping operations in the conduct of large-scale combat operations. The FAB can be task organized with delivery and sensor systems to support mission requirements. A division, corps, JTF or other force may have a FAB or its units attached or placed under OPCON. The FABs BNs are fully capable of providing DS to joint, SOF and other joint units. When operating under the control of the JFC or another Service, the theater Army commander or Army Forces commander exercises administrative control over the FAB. The FAB, when designated by the JFC, corps, or division commander, can serve as a counterfire HQ, or be assigned a counterfire mission. For more information on the FAB see ATP 3-09.24.

DIVISION ARTILLERY

4-18. DIVARTY controls the divisions' organic and attached FA units and indirect FS operations, coordinating closely with the division FSE for continuous operations to the division main, tactical, and rear area CP. To win in large-scale combat operations quickly, decisively and with minimum friendly causalities, each division must be supported with the fires of additional FABs equipped with long range precision fires capability. The DIVARTY can provide the counterfire HQ for the division. If allocated the necessary firing units, the target processing section of the TA platoon, in conjunction with the DIVARTY CP, can be designated to coordinate the counterfire fight for the division. For more information on DIVARTY organization and operations see ATP 3-09.90.

4-19. The primary role of the DIVARTY is to facilitate shaping operations within the division AO. The DIVARTY serves as the FFA HQ for the division. Additionally, the DIVARTY commander, as the senior artilleryman in the division, is responsible for standardizing training for FA units that are assigned, attached, or placed under the OPCON of the division. The DIVARTY commander will mentor the commanders and leaders of these FA units and typically be assigned other key responsibilities on behalf of the division commander. Those responsibilities could include management of the assigned or attached 13-series career management field Soldiers, training oversight, and certification programs.

4-20. The DIVARTY is task organized with firing units based on mission requirements. Task organization may include a combination of MLRS, or HIMARS, or cannon BNs as well as other enablers. The DIVARTY, when allocated appropriate rocket and cannon units, brings a long range and precision FS capability to the division. In large-scale combat operations, the corps commander may attach a FAB’s units to a DIVARTY utilizing a support relationship. The division commander can task organize the division’s FA units to the DIVARTY as necessary to support accomplishment of EFSTs.

FIELD ARTILLERY BRIGADE AND DIVISION ARTILLERY ROLE IN COUNTERFIRE OPERATIONS

4-21. The corps or division commander can assign the role of counterfire HQ to a FAB, DIVARTY, or a separate FA BN. The counterfire HQ must be allocated the necessary assets to conduct the counterfire fight. The counterfire HQ will coordinate with the G-2 to integrate all available units into the counterfire fight in a proactive manner. The counterfire HQ will require sensor tasking authority from higher HQ, SJA, intelligence analysis augmentation, additional CAS, and attack helicopter allocation to include JTAC support. The counterfire HQ duties include:

- Plan and coordinate sensor management.
- Conduct pattern analysis of enemy indirect fire systems.
- Based off pattern analysis conduct zone management in support of the counterfire fight.
- Recommend positioning of counterfire delivery systems.
- Write the TA tab to Annex D.
- Recommend counterfire TTP to facilitate permissive fires.
- Participate in the targeting process.
- Establish counterfire mission procedures and communications architecture.

4-22. FAB contributions to the overall counterfire effort include the responsibility to:

- Serve as the counterfire HQ if designated.
- Task organize FAB assets as directed by the supported command and FFA HQ to support the counterfire fight.
- Plan and direct the counterfire fight for the supported command.
- Centralize the placement and control of detection assets and request additional sensor and attack assets from higher or other services.
- Position firing assets that are dedicated to the counterfire fight.
- Establish and maintain communications with all acquisition and delivery assets.
- Detect counterfire targets with FA organic assets, reinforced by collection assets allocated by the supported formation.
- Attack threat FS systems with MLRS/HIMARS, Army Aviation, air component sorties, and ground maneuver forces that may be available for target attack.

4-23. The DIVARTY can provide the counterfire HQ for the division. If allocated the necessary firing units, the target processing section of the TA platoon, in conjunction with the DIVARTY CP, can be designated and coordinate the counterfire fight for the division.

4-24. WLRs supporting the counterfire HQ send all acquisitions acquired by the radars to the counterfire cell of the counterfire HQ. Counterfire targets are usually generated from CFZs or CFFZs. Targets that meet target selection standards and are determined to be safe are immediately routed to the dedicated counterfire delivery unit for execution.

SECTION III – FIELD ARTILLERY CAPABILITIES IN DEPTH

4-25. Deep and simultaneous attacks, executed at increasingly longer range and with precision, are key elements for division, corps, and JFCs in setting the conditions on the battlefield and accelerating the enemy's defeat. In both offense and defense, deep operations are conducted to isolate, immobilize, and weaken the enemy in depth, using fire, maneuver, or a combination of the two. Deep FA fires may be used to limit the enemy's ability to shift forces to meet attacking friendly maneuver forces and to sustain the momentum of the attack. Deep fires limit, delay, or disrupt the enemy's attacking echelons and FS, C2, communications, and logistics. They are intended to reduce the enemy's rate of arrival in the close area to a level manageable by supported commanders.

4-26. FA systems are fully capable of conducting deep precision strikes and massing fires under all weather conditions, day, or night. They provide joint and land component commanders the capability to engage HPTs when and where required. Precision strikes are also important factors in consolidation of gains and stability operations where the threat of collateral damage is often of primary concern. *Collateral damage* is a form of collateral effect that causes unintentional or incidental injury or damage to persons or objects that would not be lawful military targets in the circumstances ruling at the time (JP 3-60).

4-27. As part of deep operations, proactive TA, and FA counterfires can affect threat indirect fire systems before they have a major influence on the battle. Similarly, deep attack can interdict or attrit enemy maneuver forces, surface-to surface missile systems, and logistic units/facilities; alter combat power ratios; and limit an opponent's freedom of action while simultaneously enhancing friendly options and force protection. FA fires, either separately or as part of joint and combined arms missions, assist with SEAD and SCAR.

4-28. At corps and division levels, close operations during the offense or defense are undertaken to win the current battle or engagement. *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 (FM 3-0). FA fires, in the form of preparations, counterfires, and SEAD support friendly schemes of maneuver by assisting in denying the enemy favorable avenues of approach, helping maneuver forces control terrain, and defeating attacks. Counterfires engage enemy artillery and other indirect fire systems to preserve friendly fighting forces and combat capabilities. They give supported elements the freedom to maneuver, while obscuration smoke hides friendly movements and illumination exposes enemy formations at night. Close fires are normally the main concern of DS FA BNs whose fires in support of forces in contact may be augmented by fires from DIVARTY and FAB units. Commanders and planners must

ensure that supported forces receive an appropriate share of available FS to include security forces and reserves upon commitment.

4-29. Support area operations are conducted to ensure that friendly forces retain freedom of action to support combat forces engaged in deep and close operations. FA assets are seldom sufficient to dedicate firing units to consolidation and support area as their sole or primary mission. FA commanders, in the role as FSCOORD, may assign on-order support relationships to support corps or division rear area operations. They can also meet rear area FA support requirements by assigning GS and GSR support relationships to cannon units to range rear and support areas while continuing to perform their primary support relationships. A *support area* is the portion of the commander's area of operations that is designated to facilitate the positioning, employment, and protection of base sustainment assets required to sustain, enable, and control operations (ADP 3-0).

SECTION IV – FIELD ARTILLERY ORGANIZATION FOR COMBAT

4-30. Successful execution of large-scale combat operations requires careful planning of limited FA resources and the coordinated employment of TA and assessment means. FSCOORDs and FSEs on corps and division staffs ensure adequacy in support of operations by varying allocation and control of available FS resources to include FA formations.

4-31. The corps commander may allocate MLRS/HIMARS units to the divisions utilizing command and support relationships. The division FSCOORD recommends to the division commander the establishment of support relationships of FA units in large-scale combat operations. The division commander should consider assigning the BCT organic FA BNs as OPCON to the DIVARTY prior to execution of operations.

4-32. The FA commander recommends to the supported commander the command and support relationships of FA units supporting the operation, regardless if they are organic or assigned. This information is vital to planning fire support for tactical operations.

4-33. *Task-organizing* is the act of designing a force, support staff, or sustainment package of specific size and composition to meet a unique task or mission (ADP 3-0). Characteristics to examine when task-organizing the force include, but are not limited to, training, experience, equipment, sustainability, operating environment, enemy threat, and mobility. For Army forces, task-organizing includes allocating available assets to subordinate commanders and establishing their command and support relationships. The objective of FA-organization is to ensure that each FA unit has an established command relationship or support relationship that best supports the supported commander's concept of the operation. Dynamic task-organizing during operations is one way to ensure FA assets are never in reserve.

4-34. The FSCOORD, chief of fires and brigade FSO analyze the mission variables of METT-TC (I), evaluate the FA assets available and recommend a command or support relationship for each FA unit to the supported commander. The supported commander approves the FA task organization, which is subsequently reflected in the OPLAN/OPORD and FS plan. Commanders never place artillery in reserve.

4-35. Commanders consider mutual support when task-organizing FA. *Mutual support* is that support which units render each other throughout joint operations, because of their assigned tasks, their position relative to each other and to the enemy, or their inherent capabilities (JP 3-31). Mutual support exists when positions and units support each other by direct and/or indirect fire and/or nonlethal activities. Mutual support increases the strength of all defensive positions, prevents defeat in detail, and helps prevent infiltration between positions. *Supporting range* is the distance one unit may be geographically separated from a second unit yet remain within the maximum range of the second unit's weapons systems (ADP 3-0). Although a FA unit may be in supporting range of a supported unit, the communications capability must also be considered. If the unit needing support cannot communicate with the supporting unit, the range capability of a weapon system or its proximity to the supported force has no effect on the outcome of an operation. For more information on mutual support see ADP 3-90 and FM 3-90.

THE PRINCIPLES OF FIRE SUPPORT EXECUTION APPLIED TO FIELD ARTILLERY ORGANIZATION FOR COMBAT

4-36. Commanders and staffs must consider the principles of FS execution referred to as the memory aid AWIFM-N when planning the integration of fires into an operation. FS execution principles AWIFM-N considerations are:

ADEQUATE FIRE SUPPORT FOR THE COMMITTED UNITS

4-37. In large-scale combat operations the minimum adequate FA for committed units is normally one FA BN for each committed brigade. If a brigade is not committed, commanders must consider assigning a support relationship of the uncommitted brigade's artillery BN to a committed unit.

4-38. Commanders never place artillery in reserve. Commander's utilize command and support relationships to weight the main effort.

WEIGHT TO THE MAIN EFFORT

4-39. The main effort can be weighted by a variety of ways:

- R or GSR support relationships can be assigned to provide additional responsive fires to the supported forces in contact.
- FA units can be positioned and assigned directions of fire to concentrate their fires in the appropriate AO. In this manner, units in a GS support relationship can add weight to the main attack or strength to the most vulnerable area.
- FA ammunition may be allocated to provide for more support in a specific area.
- Priority of FA fires given to the main effort (decisive operation).

4-40. Support relationships from GS to DS provide increasing responsiveness to the main effort's commander. Minimal essential FS can be allocated to setting the conditions for future operations.

IMMEDIATELY AVAILABLE FIRE SUPPORT FOR THE COMMANDER TO INFLUENCE THE OPERATION

4-41. The force commander should establish command or support relationships for available artillery with which the commander can immediately influence the operation. The practice of establishing FA support relationships of GS and GSR enhances flexibility and facilitates ability to provide immediately responsive fires for the force.

4-42. The artillery commander maintains the capability to shift fires rapidly and add weight when enemy vulnerabilities are detected, or the force is threatened. As the engagement unfolds, the supported commander may shift the priority of fires to exploit opportunities as they are presented.

FACILITATE FUTURE OPERATIONS

4-43. Future operations can be facilitated by the assignment of a command or support relationship, the positioning of FA, and the allocation and positioning of ammunition (to include combat configured loads and ammunition issued for immediate consumption).

4-44. The assignment of GS and GSR support relationships, as well as on-order command or support relationships enables the transition to a future mission. Another way to facilitate future operations is to modify the current command or support relationship in accordance with anticipated requirements. Commanders can apply CSR to FA units to ensure planned future operations are adequately supported.

Maximum Feasible Centralized Control

4-45. The optimum degree of centralized control varies with each tactical situation. A high degree of centralized control is preferred in a defensive situation. Since the enemy has the initiative, it is difficult to accurately predict where and when the enemy will attack.

4-46. The commander cannot afford to dissipate fires capabilities on secondary priorities before determining the enemy's main effort. Less centralized control is essential in an offensive situation because the supported force has the initiative and unforeseen opportunities require responsive fires to exploit.

Never Place Artillery in Reserve

4-47. Commanders should not place artillery in reserve but may give a change to its support relationship ensuring artillery is not held in reserve and adequate support is provided to the main effort. These changes in support relationships can be identified by an on-order mission. An example of an on-order mission is "1-52 FA: GSR 1-50 FA; on-order R 1-50 FA."

4-48. In addition to never leaving FA in reserve and the FS execution principles of AWIFM-N, FA commanders and FS personnel also consider mission, ammunition, and positioning when planning for FA system employment. Considerations are:

- Mission. Appropriate FA unit command support relationships assigned based on the commander's intent and the overall situation.
- Ammunition. Allocate ammunition to provide more support for the main effort. Ensure adequate ammunition for future operations through positioning, ammunition restrictions, or CSR parameters during execution and planning.
- Positioning. Continually re-position FA units, ammunition, TA resources, CPs, and assets to best support the plan as it is being executed. Assign direction of fire to mass fires in the appropriate AO.

FIELD ARTILLERY INHERENT RESPONSIBILITIES IN ARMY COMMAND RELATIONSHIPS

4-49. FA cannon, rocket, and missile systems that are organic, assigned, attached to, or under the OPCON of FABs, DIVARTY, and BCTs provide commanders with continuously available, adjustable, and tailored fires under all weather conditions and in all types of terrain. These organizations can be task-organized with maneuver or supported unit to provide the right combination of indirect fires capabilities for a given situation.

4-50. Command relationships provide the basis for ensuring unity of command and unity of effort in operations. Command relationships are used in Army force generation, force tailoring, and task-organizing. Command relationships define superior and subordinate relationships between unit commanders. By specifying a chain of command, command relationships unify effort and enable commanders to use subordinate forces with maximum flexibility. Army command relationships identify the degree of control of the gaining commander. The type of command relationship often relates to the expected longevity of the relationship between the HQ involved and quickly identifies the degree of support that the gaining and losing Army commanders provide:

- *Organic* is assigned to and forming an essential part of a military organization as listed in its table of organization for the Army, Air Force, and Marine Corps, and are assigned to the operating forces for the Navy (JP 1, Vol 2).
- *Assign* is to place units or personnel in an organization where such placement is relatively permanent, and/or where such organization controls and administers the units or personnel for the primary function, or greater portion of the functions, of the unit or personnel (JP 3-0).
- *Attach* is the placement of units or personnel in an organization where such placement is relatively temporary (JP 3-0).
- *Operational control* is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission (JP 1, Vol 2).
- *Tactical control* is the authority over forces that is limited to the detailed direction and control of movements or maneuvers within the operational area necessary to accomplish missions or tasks assigned (JP 1, Vol 2).

FIELD ARTILLERY INHERENT RESPONSIBILITIES IN ARMY SUPPORT RELATIONSHIPS

4-51. In the past, DS, R, GSR, and GS were referred to as FA tactical missions. These tactical missions are now referred to as support relationships and are used by the rest of the Army to task-organize forces.

4-52. Army support relationships are not a command authority and are more specific than the joint support relationships. Commanders establish support relationships when subordination of one unit to another is inappropriate. Commanders assign support relationships when: the support is more effective if a commander with the requisite technical and tactical expertise controls the supporting unit rather than the supported commander; the echelon of the supporting unit is the same as or higher than that of the supported unit; or the supporting unit supports several units simultaneously (ADP 5-0). Organic FA BNs can be assigned a support relationship by the FFA HQ of the supported command.

4-53. Support relationships allow commanders to employ their units' capabilities to achieve the desired results required by supported commanders. Support relationships are graduated from an exclusive supported and supporting relationship between two units-as in DS-to a broad level of support extended to all units under the control of the higher HQ-as in GS. Support relationships do not normally alter administrative control. Support relationships are used to task-organize for a mission. FA units may be assigned a support relationship of DS, R, GSR, or GS.

4-54. The seven FA inherent responsibilities (see table 4-1 on page 4-11) supplement the inherent responsibilities of an Army support relationship. For more information on command and support relationships see FM 3-0.

DIRECT SUPPORT

4-55. Joint doctrine considers direct support a mission rather than a support relationship. For the Army, and FA, *direct support* is a support relationship requiring a force to support another specific force and authorizing it to answer directly to the supported force's request for assistance (FM 3-0). A FA unit in DS of a maneuver unit is concerned primarily with the fire support needs of only that unit. The FSE of the supported maneuver unit plans and coordinates fires to support the maneuver commander's intent.

4-56. The commander of a unit in DS recommends position areas and coordinates for movement clearances where his unit can best support the supported commander's concept of the operation. When FA units are able to habitually support the same supported force, coordination and training are enhanced. DS is the most decentralized support relationship.

REINFORCING

4-57. *Reinforcing* is a support relationship requiring a force to support another supporting unit (FM 3-0). Only like units (for example artillery to artillery) can be given an R support relationship. An R support relationship requires one FA unit to augment the fires of another FA unit.

4-58. When an organic or DS FA BN requires more fires to meet supported force requirements, another FA BN may be directed to reinforce it. An organic or DS FA BN may be supported by up to 2 R BNs. A FA unit assigned an R support relationship retains its command relationship with its parent unit but is positioned by the reinforced FA unit and has priorities of support established by the reinforced FA unit, then the parent unit.

GENERAL SUPPORT-REINFORCING

4-59. *General support-reinforcing* is a support relationship assigned to a unit to support the force as a whole and to reinforce another similar type unit (FM 3-0). The first priority of a FA unit assigned a GSR support relationship is to furnish artillery fires for the supported force as a whole; the second priority is to reinforce the fires of another FA unit.

4-60. A GSR unit remains under the control of the supported maneuver commander or his FFA HQ. The GSR support relationship offers the commander the flexibility to meet the requirements of a variety of tactical mission tasks.

GENERAL SUPPORT

4-61. *General support* is support which is given to the supported force as a whole and not to any particular subdivision thereof (JP 3-09.3). A FA unit assigned a support relationship of GS of a force has all its fires under the immediate control of the supported commander or his designated FFA HQ.

4-62. Among Army support relationships, GS provides the highest degree of centralized control of fires. This provides the commander flexibility to facilitate ongoing operations.

Table 4-1. The Seven Field Artillery inherent responsibilities in Army support relationships

Army support relationship	*Answers calls for fire in priority from:*	*Has as its zone of fire:*	*Furnishes (FIST):*	*Furnish liaison officer:*	*Establish COMM with:*	*Is Positioned by:*	*Has its fires planned by:*
Direct Support	1. Supported unit. 2. Own Observers.[1] 3. FA HQ[2]	AO of supported unit.	Provides temporary REP for casualty losses as required	No RQMNT	Supported HQ and FSO as required	Supported unit or FFA HQ	Supported unit or FFA HQ
Reinforcing	1. Reinforced FA 2. Own Observers.[1] 3. FA HQ[2]	Zone of fire of Reinforced FA.	No RQMNT	To reinforced FA unit HQ or as required.	Reinforced FA unit HQ or as required	Reinforced FA unit HQ.	Reinforced FA unit HQ
General Support Reinforcing	1. Supported unit. 2. FA HQ.[2] 3. Reinforced unit. 4. Own Observers.[1]	AO of supported unit to include zone of fire of reinforced FA unit.	No RQMNT	To reinforced FA unit HQ or as required.	Reinforced FA unit HQ or as required	1. Supported unit. 2. FFA HQ.[2]	1. Supported unit. 2. FFA HQ.[2]
General Support	1. Supported unit 2.FFA HQ [2] 3. Own Observers	AO of Supported unit.	No RQMNT	No RQMNT	FFA HQ or Supported Unit	1. Supported unit. 2. FFA HQ.[2]	1. Supported unit. 2. FFA HQ.[2]

Note: (1). Includes all target acquisition means not deployed with the supported unit. In NATO, the gaining unit may not task-organize.

Note: (2). If designated by the support commander.

AO – area of operation, COMM – communications, FA – field artillery, FFA – force field artillery, FIST – fire support team, FSO – fire support officer, HQ – headquarters, REP – replacement, RQMNT -- requirement

NONSTANDARD FIELD ARTILLERY SUPPORT RELATIONSHIPS

4-63. Commanders sometimes use a nonstandard support relationship. In many cases, this is simply a variation of a standard support relationship (DS, R, GSR, or GS) when there are not sufficient FA assets to cover all the contingencies, or if a FA unit is assigned more than one support relationship over a time period.

4-64. A nonstandard support relationship is also a means by which the commander can tailor his FA assets in anticipation of future operations. A nonstandard support relationship may involve limitations or guidance concerning ammunition, positioning, or other critical factors. Examples of nonstandard FA support relationships include:

- 110 FAB: GSR 7 FAB; do not exceed 25 percent of the CSR in support of 7 FAB.
- 1-89 FA (MLRS, M270A1): GS; provide liaison officer to the corps FSE.

SECTION V – KEY CONSIDERATIONS FOR FIELD ARTILLERY EMPLOYMENT

4-65. FA organizations employ indirect fire capabilities which are versatile and responsive, to create desired effects. In order to create effects, FA units employ and integrate joint fires, cannons, rockets, missiles, and TA assets. FA units are as mobile and deployable as the forces they support. Indirect fires include anything from a single precision munition, precision-guided munition, to a multiple BN mass mission.

4-66. A ***precision munition*** **is a munition that corrects for ballistic conditions using guidance and control up to the aimpoint or submunitions dispense with terminal accuracy less than the lethal radius of effects.** (Excalibur, GMLRS, ATACMS) A *precision-guided munition* is a guided weapon intended to destroy a point target and minimize collateral damage (JP 3-03). In order to deliver fires, FA units must:

- Meet the five requirements for accurate predicted fires.
- Be proactive and responsive to create the desired effects.
- Mass fires.

FIVE REQUIREMENTS FOR ACCURATE PREDICTED FIRES

4-67. The goal of any indirect firing unit is to achieve accurate first-round fire for effect (FFE) on a target. *Fire for effect* is a command to indicate that fire for effect is desired; fire that is intended to achieve the desired result on target (TC 3-09.81). In order to accomplish this goal an artillery unit must compensate for nonstandard conditions as completely as time and the tactical situation permit. There are five requirements for achieving accurate first-round FFE. These requirements are accurate target location and size, accurate firing unit location, accurate weapon and ammunition information, accurate MET information, and accurate computational procedures. If these requirements are met, the firing unit will be able to deliver accurate and timely fires in support of the ground-gaining arms. If the requirements for accurate fire cannot be met completely, the firing unit may be required to use adjust-fire missions to engage targets. Adjust-fire missions can result in reduced effect on the target, loss of surprise, increased ammunition expenditure, and greater possibility that the firing unit will be detected by hostile TA assets.

- **Accurate Target Location and Size.** Establishing the range from the weapons to the target requires accurate and timely detection, identification, and location of ground targets. Determining their size and disposition on the ground is also necessary so that accurate firing data can be computed. Determining the appropriate time and type of attack requires that the target size (radius or other dimensions) and the direction and speed of movement are considered. Target location is determined by using TA. *Target location error* is the difference between the coordinates generated for a target and the actual location of the target (JP 3-09.3). The following are the target location error categories expressed by circular error (CE) on ground expressed in feet (ft) and m:
  - CAT I : CE 0-20 ft/0-6 m
  - CAT II: CE 21-50 ft/7-15 m
  - CAT III: CE 51-100 ft/16-30 m
  - CAT IV: CE 101-300 ft/31-91 m
  - CAT V: CE 301-1000 ft/92-305 m
  - CAT VI: CE > 1000 ft/>305 m
- **Accurate Firing Unit Location**. Accurate range and deflection from the firing unit to the target requires accurate weapon location. Survey techniques and on-board navigation systems are used to determine the location of each weapon. See the following survey section and ATP 3-09.02.
- **Accurate Weapon and Ammunition Information.** The actual performance of the weapon is measured by the weapon muzzle velocity (velocity with which the projectile leaves the muzzle of the tube) for a projectile-propellant combination. The firing battery can measure the achieved muzzle velocity of a weapon and correct it for nonstandard projectile weight and propellant temperature; this is done through use of the muzzle velocity systems. The corrections that the muzzle velocity system makes are similar to those found in the muzzle velocity correction table. Calibration should be conducted continuously by using the muzzle velocity system. Firing tables and technical gunnery procedures allow the unit to consider specific ammunition information

(projectile square weight, fuze type, and propellant temperature); thus, accurate firing data are possible.

- **Accurate Meteorological Information.** The effects of weather on the projectile in flight must be considered, and firing data must compensate for those effects. Firing tables and technical gunnery procedures allow the unit to consider specific weather information (air temperature, air density/pressure, wind direction, and wind speed) in determining accurate firing data.
- **Accurate Computational Procedures.** The computation of firing data must be accurate. Manual and automated techniques are designed to achieve accurate and timely delivery of fire. The balance between accuracy, speed, and the other requirements discussed in this chapter should be included in the computational procedures.

Note. Nonstandard Conditions. If the five requirements for accurate predicted fire cannot be met, the FDC needs to take steps to improve firing data. For more information see TC 3-09.81.

SURVEY

4-68. FA survey is critical to the first two requirements for accurate predicted fire. FA survey must provide indirect fire assets and target locating assets with a common grid. The *common grid* refers to all firing and target-locating elements within a unified command located and oriented to prescribed accuracies with respect to a single three-dimensional datum (ATP 3-09.02). Common survey allows the supported commander to employ FS resources with a guarantee of accurate and timely FS. *Common control* is the horizontal and vertical map or chart location of points in the target and position area, tied in with the horizontal and vertical control in use by two or more units (ATP 3-09.02). Survey planning within the force is based on the following tactical considerations:

- The commander's target adjustment policy (that is, if the element of surprise is an important aspect of his tactical plan).
- The requirement for transfer of adjusted target locations to higher and lower echelons.
- The required attack of HPTs onto which fire cannot be adjusted (or if surprise is a factor).
- The planned positioning of indirect fire units during each phase of the operation.
- The planned tasking of TA sensors and the processing of targets to an attack system.

4-69. The supported HQ establishes survey timelines and accuracy requirements in the initial planning stages of an operation based on the commander's guidance. The supported commander gives the FA BN commander targeting priorities and the effects required on HPTs. This information translates into survey requirements for the TA sensors and the designated attack systems, which must be on a common grid by the time required. The effects on the target and inherent system inaccuracies determine the survey accuracy requirement (hasty, fourth-order, or fifth-order survey).

4-70. There is no longer a military occupational specialty dedicated solely to survey. This creates a need to train non-survey soldiers on how to operate the survey equipment. The commander designates the personnel to train and form the survey team. The survey team provides survey for the unit. The survey equipment is assigned to the FA BN. For more information on survey see ATP 3-09.02.

PROVIDE PROACTIVE AND RESPONSIVE FIRES THAT CREATE DESIRED EFFECTS

4-71. Effective gunnery, TA, weapons, munitions, C2 are essential for proactive and responsive FA fires to supported forces. Procedures must be streamlined to minimize the time between the proactive acquisition of a target, the call for fire, and the responsive delivery of fires. **A *call for fire* is a standardized request for fire containing data necessary for obtaining the required fire on a target.** Unnecessary delay can result in a failure to have desired effects on the target. Responsiveness can be achieved by:

- Training especially digital sustainment training.
- Streamlining the call for fire through use of digital systems.
- Planning FS requirements in advance.

- Establish a permissive battlefield design, to include airspace.
- Establish permissive FSCMs.
- Rehearsals, especially FA technical rehearsals.
- Time on target.
- Continually training observers in all aspects of FS.
- Limiting radio transmissions on fire nets to time-sensitive, mission-essential traffic only.

4-72. The effectiveness of fires on a target will depend, in part, on the method of fire and type of ammunition selected to attack the target. The desired effects are created through proper weaponeering, accurate initial fires, and massed fires. *Weaponeering* is the process of determining the specific means required to create a desired effect on a given target (JP 3-60).

4-73. The FA has the ability to deliver effects on a target from multiple formations to engage a target simultaneously. An essential capability to disrupting the enemy's A2/AD systems is our ability to mass fires.

MASSED FIRES

4-74. *Massed fire* is fire from a number of weapons directed at a single point or small area (JP 3-02). The FSCOORD needs to maximize the number of units massing across the fires formation to create the required effect in the specified EFAT. For more information on EFATs see appendix A. Massing fires within a firing unit distributes ammunition consumption and lessens the sustainment problem for the FA unit. Further, synchronized mass fires increase the lethality of the delivered munition by preventing the adversaries' ability to react to multiple volleys.

4-75. Massed fires maximize effectiveness of the initial volley on the intended target. Massing all available fires enables the supported commander to maximize the effect of fires on a target or targets. Fires can also be massed in time (striking multiple targets at the same time) to overwhelm the enemy's ability to react. The desired effect is created through fires delivered in an instant; since these fires limit the enemy's time to react and seek protection. Massed fires ensure maximum effect in attacking targets that can easily change their posture.

Operation Desert Storm.

In a 15 May 1991 letter to the Commandant of the FA School, Major General Raphael J. Hallada (1987–1991), about the US VII Corps' 24 February 1991 breaching operation, the Commanding General of the 1st Infantry Division, Major General Thomas G. Rhame, related: The performance of the FA in combat has caused all of us to remember what we had perhaps forgotten, namely its incredible destructive power and shock effect. The preparation fires I witnessed prior to our assault on the breachline were the most incredible sight I have seen in 27 years of service. On 24 February 1991 Commander of the US VII Corps Artillery, Brigadier General Creighton Abrams Jr., and the Commander of the 1st Infantry Division (Mechanized) Artillery, Colonel Michael L. Dodson assembled the FA force. In support of the US VII Corps assault, General Abrams allocated the 42d, 75th, and 142d FA Brigades, two division artilleries, and 10 Multiple Launch Rocket System batteries to create a Soviet-style attack at the breach area. General Abrams positioned approximately 22 artillery pieces for each kilometer of the attack zone. More than 350 FA pieces fired 11,000 rounds while M270 Multiple-Launch Rocket Launchers shot 414 rockets in a FA preparation of 30 minutes. Besides crushing Iraqi morale, this massed fires destroyed 50 tanks, 139 armored personnel carriers, and 152 FA pieces.

SECTION VI – FIRE DIRECTION

4-76. *Fire direction* is the tactical employment of firepower exercising the tactical command of one or more units in the selection of targets, the concentration and distribution of fire, and the allocation of ammunition

for each mission; the methods and techniques used to convert target information into the appropriate fire commands (TC 3-09.81). A *fire direction center* is that element of a command post, consisting of gunnery and communications personnel and equipment, by means of which the commander exercises fire direction and/or fire control (JP 3-09.3). The FDC receives target intelligence and requests for fire and translates them into appropriate fire direction.

4-77. The FDC provides timely and effective tactical and technical fire control in support of current operations. *Fire control* is all operations connected with the planning, preparation, and actual application of fire on a target (TC 3-09.81). The FDC is the control center for the gunnery team. The FDC personnel receive calls for fire through the AFATDS, or by voice. The FDC will then process that information by using tactical and technical fire direction procedures.

TACTICAL FIRE DIRECTION

4-78. Tactical fire direction is primarily performed at the FA BN FDC. Tactical fire direction includes processing calls for fire and determining appropriate method of fire, ammunition type and quantity, unit(s) to fire, and time of attack. The fire direction officer's decision on how to engage the target is concisely stated as a fire order.

4-79. A fire order is the fire direction officer's decision on what unit(s) will fire and how much and what type of ammunition will be fired. It is based on the fire direction officer's analysis of the target. The objectives of tactical fire direction include:

- Providing continuous, accurate, and responsive fires in all conditions.
- Maintaining the flexibility to engage various target types over wide frontages.
- Massing the fires of available units.
- Engaging a number and variety of targets simultaneously.

TECHNICAL FIRE DIRECTION

4-80. Technical fire direction is the process of converting weapon and ammunition characteristics (such as muzzle velocity, propellant temperature, and projectile weight), weapon and target locations, and MET information into firing data. Firing data is all data necessary for firing a weapon at a given target. FA firing data are determined by use of various firing tables and equipment. These tables contain the fire control information under standard conditions and data correcting for nonstandard conditions. Whether this process is done through an automated system or manually, the process is the same.

4-81. Firing data provided to both cannon and MLRS units includes the number and type of munitions/shell, fuze setting and aim point(s), allowing the platform to compute its own firing data (deflection and quadrant elevation). Deflection is the setting on the weapon sight to place the line of fire in the desired direction. The *azimuth of fire* is the direction, expressed in mils, that a firing unit is laid (oriented) on when it occupies a position (ATP 3-09.50). Cannon units are usually also provided the charge and type of fuze, although this too can be calculated at the firing platform. For firing units without an on-board technical computation capability, or operating in a degraded mode, the FDC transmits firing data to the firing unit as fire commands.

4-82. Fire commands are commands used by the FDC to give firing units all the information needed to conduct a fire mission. Initial fire commands include all elements needed for orienting, loading, and firing the weapon. Subsequent fire commands include only those elements that have changed from the previous commands, except quadrant elevation. Quadrant elevation is announced in every set of fire commands and allows the firing unit to fire in a weapons release status. For more information on fire commands see ATP 3-09.50. The surface-to-surface attack by FA depends on a number of factors including:

- Meeting the five requirements of accurate predicted fire.
- Identifying an appropriate target (TA process).
- Initiating a call for fire into the FS system (the fire request).
- Analyzing the fire mission to determine the proper method of attack.
- Conducting clearance of fires (which includes coordinating airspace).
- Transmitting the call for fire to the selected FDC(s) or firing element(s).

- Conducting technical fire direction.
- Giving fire orders to the firing element if necessary.
- Delivering the required ordnance on the target to create the desired effect on target (deliver fires).
- Determining and reporting effects on the engaged target.

4-83. A *fire mission* is the specific assignment given to a fire unit as part of a definite plan; an order used to alert the weapon/battery area and indicate that the message following is a call for fire (TC 3-09.81). FA BN functions directly associated with surface-to-surface attack are encompassed in the fire mission process. The FSE or any sensor can initiate a fire mission (for example, FOs, aerial observers, radars). Quick-fire channels can be established for any observer or sensor. Any brigade or BN FSE or FA CP that is normally in the fire mission flow, but is bypassed during quickfire operations, should receive a notification of each fire mission through message of interest processing. To expedite fires, the unit can coordinate the use of various quick-fire linkages, designed to facilitate rapid mission execution, while achieving desired control. For example, a quick-fire channel could be established from a FIST, through the BN FSE, and then directly to the FA BN FDC. For even faster response and more decentralized control, the FIST may send the mission directly to the FDC that will execute the mission. This is often used for priority targets and FPF.

4-84. A ***priority target*** **is a target, based on either time or importance, on which the delivery of fires takes precedence for the designated firing unit or element.** An artillery firing unit prepares to engage its priority target by laying its weapon(s) on the assigned target whenever the firing unit is not engaged in a fire mission in order to reduce the time required to fire the target. For example, a FPF is a priority target. The supported commander, after consultation with his FSO, designates priority targets. The supported commander also gives specific guidance as to when the targets will become priority, the munitions to use, the accuracy required, and the desired effects. The supported commander designates a priority target based on time requirements or target importance. When not engaged in fire missions, firing units lay on priority targets. The purpose of laying on a target is to direct or adjust the aim of a weapon, or setting of a weapon for a given range, deflection, or both.

4-85. FA BNs normally do not perform airspace deconfliction; instead, the air defense airspace management /brigade aviation element in coordination with the division JAGIC executes this process for the supported commander.

4-86. The FA BN primarily uses digital means to plan and execute fires. However, the BN may receive planned and immediate fire missions from a wide variety of sources, in both voice and digital formats. These requests may have been generated by lower or higher echelon FSE and by trained FA observers and untrained observers. UAS may send calls for fire directly to the brigade FSE as the aircraft may be considered a brigade asset.

DIGITAL FIRE REQUESTS

4-87. Digital fire missions may be received from FA and non-FA digital systems. Procedures and capabilities may vary depending on which digital systems are interfacing with one another. Training opportunities should be aggressively sought out. FA technical rehearsals should thoroughly address digital interface issues. Whenever possible, digital fire missions should be rehearsed along the entire data link, under the same digital conditions anticipated for the actual operation (for example, extended communications distances, surge digital traffic capacity, degraded operations, and alternate routes).

VOICE FIRE REQUESTS

4-88. Use of voice may be necessary for unplanned, immediate fire requests or during denied, disrupted, degraded operations. FDCs must anticipate the circumstances and the types of voice missions they may encounter. The tactical solution and effects on the target should be essentially the same regardless of whether the mission is processed voice or digital. However, missions from untrained observers must be rehearsed during training to establish proper unit techniques.

OBSERVED FIRE AND UNOBSERVED FIRE

4-89. Fires are either observed or unobserved. ***Observed fire*** **is the point of projectile impact or burst that can be seen by an observer, and can be adjusted on the basis of observation.**

4-90. ***Unobserved fire*** **are projectile points of impact or burst not observed.** The observer can attempt to adjust the round based on the sound of the impact.

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Chapter 5
Fire Support During Competition and Crisis

This chapter begins with a discussion on Army operations during competition. Section I discusses FS activities during competition. Section II discusses FS activities during crisis. This chapter ends with the transition to armed conflict.

SECTION I – FIRE SUPPORT DURING COMPETITION

5-1. Competition below armed conflict occurs when an adversary's national interests are incompatible with U.S. interests, and that adversary is willing to actively pursue them short of open armed conflict. While neither side desires, at least initially, to use military force as the primary method to achieve its goal, the adversary is willing to employ national instruments of power, including military force, below the threshold of actual armed conflict to achieve its aims. The resulting tension between the two sides creates potential for violent escalation when one side challenges the status quo. For more information on competition see FM 3-0.

5-2. FS and FA activities that contribute during competition consist of but are not limited to participating in activities such as security cooperation, regionally assigned and aligned forces, and setting the theater for operations. Operations during competition also include foundational training strategy such as training, maintaining operational readiness, and contingency planning conducted by the various elements of the FS system. The Army and joint targeting process are critical during competition.

SECURITY COOPERATION

5-3. Security Cooperation. Security cooperation activities include security assistance, security force assistance (SFA), and foreign internal defense (FID).

- *Foreign internal defense* is the participation by civilian and military forces of a government or international organizations in any of the programs and activities undertaken by a host nation government to free and protect its society from subversion, lawlessness, insurgency, terrorism, and other threats to its security (JP 3-22).
- Security assistance includes U.S. government programs that enable the provision of defense articles, military training, and other defense related services. Foreign military FS personnel attendance to FS specific initial entry and professional military education schools such as joint fires observer, the FA basic officer leader course, and the FA captain's career course are examples of FS and FA contributions to security assistance.
- *Security force assistance* is the Department of Defense activities that support the development of the capacity and capability of foreign security forces and their supporting institutions (JP 3-20). The focus of SFA is building the capacity and capability of foreign security forces (FSF) and their supporting institutions. *Foreign security forces* personnel are organized and/or employed for security, whether they are civil or military, federal, state or provincial, or local (JP 3-20). SFA encompasses various activities from tactical to ministerial level. FS and FA personnel will primarily train, advise, and assist foreign security forces at the tactical and operational levels. When determining goals for the FSF, it's important to fit them to the needs of the force. Success at SFA is determined by allowing the FSF to meet their own FS needs, not necessarily having them meet U.S. FS and FA standards. Potential areas that FA personnel can provide advice on include, but are not limited to, FS planning and integration; clearance of fires; and reconnaissance, selection, and occupation of a position. They may also advise the supported unit on training

management to move them further towards independent growth. For more information on SFA see ATP 3-96.1.

- The focus of all U.S. FID efforts is to support the host nation's internal defense and development program to build the capability and capacity of the host nation to achieve self-sufficiency. FID is an Army SOF core activity. While SFA and FID have much in common, FID activities directly support organizing, training, equipping, advising, and assisting FSF to combat internal threats, while SFA prepares FSF to defend against external threats an perform as a part of an international force. FS personnel, TA systems, and FS attack/delivery systems supporting SOF while engaged in FID activities are critical to force protection and to assisting FSF defend against internal threats.

5-4. Regionally assigned and aligned forces provide a CCDR with scalable, tailorable capabilities during competition. At the tactical level, units will primarily conduct military engagement through combined training and exercises. Combined training and exercises allow multi-national forces to validate shared procedures, terminology, graphics, and standards for FS and the delivery of FA fires. At all levels, units should maximize interoperable digital systems with multi-national unified action partners, when possible, to verify the FS communications plan. Regionally assigned and aligned forces can also shape the environment by identifying ports, runways, roads, potential operation areas, PAAs, and ammunition holding areas for follow on forces.

5-5. Foundational training activities contribute to operations during competition by providing a competent, credible, deployable force to leaders at the strategic level. Examples include FS and FA personnel participate regularly as members of the combined arms team in combat training centers, rotations, and warfighter exercises. Obtaining necessary skills through attendance at FS and FA functional courses such as joint fires observer, FA mechanic (additional skill identifier, U6), master gunner, special technical operations (referred to as STO), and the joint operational fires and effects course are critical to ensuring competent FS personnel at all levels.

SET THE THEATER

5-6. The theater Army serves as the Army Service component command of the combatant command. The *Army Service component command* is the command responsible for recommendations to the combatant commander on the allocation and employment of Army forces (JP 3-31). As an Army Service component command, the theater army executes several functions:

- Exercise C2 over Army forces in the theater.
- Execute CCDR's daily operational requirements.
- Provide administrative control of Army forces.
- Set and maintain the theater.
- Set and support OAs.
- Plan and coordinate for consolidation of gains in support of joint operations.
- Perform joint roles in limited scope, scale, and duration.

5-7. During competition, the theater army is the primary Army organization that plans, prepares, and oversees the execution of operations, activities, and investments conducted by Army forces and assesses the results of these activities. It supports and enables the commander’s pursuit and maintenance of operational access critical to achieving advantages throughout an AO while improving the security capabilities of partner nations. Gaining relative advantages during competition requires intelligence about the adversary’s capabilities and intent relative to friendly forces. While adversary intent is more difficult to ascertain, both factors are equally important since capability plus malign intent represent a larger immediate threat than either factor on its own. This understanding allows theater army commanders to develop their intent and recommend actions that impede adversary goals or convince adversaries to seek alternative courses of action more favorable to U.S. interests. For more information on setting the theater during competition see FM 3-0).

THEATER FIRE SUPPORT DURING COMPETITION

5-8. The TFC develops, nominates, and integrates effects on joint targets across the theater. This support to joint targeting enables setting the theater during competition for the JFLCC, field Army, and corps. The TFC ensures the Army's contribution to the joint targeting process is effectively planned and executed during the competition phase and can seamlessly transition to execution in a conflict phase. This also provides greater deterrence options for the theater during crisis.

5-9. The TFE operates in theater as the Army fires synchronization, coordination and targeting development organization to support theater operations. They integrate into the JFLCC mission command and theater intelligence enterprise networks, establishing reporting protocols and staff relationships. The TFE participates in OPLAN development and assesses fires force requirements. They operate from within the force's HQ, conducting and managing targeting through the joint targeting process to integrate all available capabilities.

Pacific Pathways

Soldiers of the 25th Infantry Division said their final farewells before heading to Thailand to participate in Pacific Pathways. Pacific Pathways is an operation conducted by U.S. Army Pacific that deploys personnel and material to support security cooperation exercises with ally and partner militaries. Thailand is one of the United States' oldest partners in Asia and the broad cooperation between the two nations continues on issues that benefit both countries, the region and beyond. "The division's area of responsibility is Southeast Asia and the Pacific Region so this gives us an opportunity to deploy off of the island of Oahu, train, and build holistic readiness with our Thai counterparts," the Executive Officer of 3rd Squadron, 4th Cavalry Regiment, 3rd Infantry Brigade Combat Team, 25th Infantry Division. In addition to multinational training, Pacific Pathways meets the requirement to provide a force able to rapidly adapt to emerging challenges across multiple domains. "We trained alongside of them at JRTC (Joint Readiness Training Center, Fort Polk, Louisiana)," the Executive Officer said.

"We were very impressed with their professionalism and how they seamlessly integrated into the team and we're looking forward to training with them over the course of several months," he added. The ability of both nations' military forces to work together is beneficial, and was most recently highlighted by the U.S. participation in the Thai-led effort to rescue the Wild Boar soccer team from a cave in northern Thailand. "We're hoping to build on the already established relationship with them (Royal Thai Army) in order to further drive our influence within the Southeast Asian area of operations," said the Officer in Charge, assigned to 3rd Squadron, 4th Cavalry Regiment, 3rd Infantry Brigade Combat Team, 25th Infantry Division.

This Pacific Pathways mission has captured the world's attention, and the United States are very proud to have been asked by Thailand to assist.

SECTION II – FIRE SUPPORT DURING CRISIS

"Enemy leaders must be made to understand clearly that, if they choose to move militarily, no longer will there be a status quo ante-bellum...something to be restored. Rather, the situation they themselves have created is one which will be resolved on new terms"

GEN Donn A. Starry

5-10. Army operations during crisis include all activities to deter undesirable actions by an adversary. While these activities are normally focused on preventing a shift from competition to military conflict, they may also occur during conflict to prevent further escalation. These operations are typically in response to indications and warnings that an adversary intends to take military action counter to U.S. interests, or in response to adversary activities that are ongoing. Activities during crisis are intended to change an adversary's

risk calculus. Regardless of the methods used to raise the potential cost of an adversary, the primary deterrent is the demonstrated ability of a properly manned, equipped, and trained joint force to prevail in large-scale combat operations.

5-11. FS and FA activities that contribute to operations during crisis consist of, but are not limited to, the participation in activities such as flexible deterrent operations, flexible response operations, setting the theater, and force tailoring. Elements of the FS system will also have an important role in initial deployment into a theater of operations including echeloning CPs and integration with the initial employment of information collection assets.

5-12. A *flexible deterrent option* is a planning construct intended to facilitate early decision making by developing a wide range of interrelated responses that begin with deterrent-oriented actions carefully tailored to create a desired effect (JP 5-0). An example of a flexible deterrent option for a FA unit be the movement of a FA BN into a position where it can range potential HPTs. Other examples include, standing up an FFA HQ, deploying long range fires assets that could provide joint SEAD or strike HPTs, or establishing a counterfire HQ and deploying the appropriate firing units. Flexible deterrent options are preplanned actions designed to deescalate the situation that must be carefully weighed by theater-level leaders against the potential that they may unintentionally elevate tensions.

Flexible Deterrent.

An example of a flexible deterrent is the Regionally Aligned Forces mission assigned to the multiple launch rocket system rotational battalion in the Korean Theater of Operations. Each of the firing batteries, with enablers from headquarters and headquarters battery and forward support company, deploy to a combat outpost for a total of four and a half months of an eight-month deployment. The battalion's mission is to work closely with Republic of Korea forces as a deterrent option to North Korean aggression.

5-13. Unit's assigned missions during crisis generally have branch plans that describe how they can respond should a situation escalate. Those plans describe conditions that are created or maintained to reduce the risk to the overall mission of the force. The sequencing of forces into theater and their subsequent AO considers risks to the mission.

5-14. Successful operations during crisis ensure that tensions and conditions do not escalate further. The very nature of these operations implies that the forces assigned to this task have the capacity to conclude the situation with force. While this is a powerful message to an adversary, there is always the potential for misinterpretation of friendly actions and those misinterpretations leading to large-scale combat operations. To reduce the risk of escalation, the theater army considers the initial ROE, force positioning and posture, weapon control status, and operating parameters for example communication with all echelons of command for shared understanding, underwriting risk.

5-15. A *flexible response* is the capability of military forces for effective reaction to any enemy threat or attack with actions appropriate and adaptable to the circumstances existing (JP 5-0). Flexible response systems are generally punitive in nature, responding to an offensive action by the enemy, and may mark the transition from competition to conflict. Often, the ability to provide a credible flexible response system can act as a flexible deterrent option to deter an adversary's planned offensive action. An example of a flexible response activity involving FS would be executing strikes with air-to-surface or surface-to-surface fires against designated HPTs.

Flexible Response

In Operation Inherent Resolve in 2017, armed Syrian Army units aligned with hostile paramilitary forces demonstrated threatening actions against US forces and its partners. After significant and appropriate warnings to cease the threatening actions, US forces conducted lethal air to surface strikes as a response resulting in multiple destroyed Syrian ADA and artillery organizations. The remainder of the Syrian Army units withdrew, and the threatening action ceased.

5-16. Depending on the adversary's indirect fire capabilities, counterfire may also be required as part of a flexible response option. FS leaders must develop an integrated counterfire plan as part of operations to prevent and to be fully prepared for what may be a rapid transition from competition to conflict. This should include the designation of a counterfire HQ and the delineation of counterfire responsibilities among subordinate units as well as clearly defined ROE to prevent unintentional escalation. For more on counterfire operations see ATP 3-09.12.

5-17. The CCDR is responsible for setting the theater to establish favorable conditions for the rapid execution of military operations and the support requirements for a specific OPLAN during crisis or conflict. In operations to prevent military conflict, the CCDR will establish a JTF HQ. Transitioning from competition to crisis, targets will be continuously developed, validated, and added to the restricted target list, and the joint integrated target list. Army HQ in the roles of JTF or land component commander (referred to as LCC) must ensure personnel within their formation are properly trained and certified to integrate into targeting work centers capable of basic, intermediate, and advanced target development to the joint standards outlined in CJSI 3370.01D and CJSI 3505.01E.

5-18. *Force tailoring* is the process of determining the right mix of forces and the sequence of their deployment in support of a joint force commander (ADP 3-0). Artillery leaders in the TFC and TFE advise the Army Service component command on what types of FA units and FS assets will best meet the needs of the CCDR as well as the suggested sequencing for those units into the AO. Regionally aligned forces will likely be among the first forces designated for employment by the CCDR. FS personnel at theater level should begin coordinating with FA units as soon as they are aligned to the region to begin integrating them into potential theater security cooperation or contingency plans.

5-19. *Force projection* is the ability to project the military instrument of national power from the United States or another theater, in response to requirements for military operations (JP 3-0). As a theater escalates towards military conflict, force projection can become a race between friendly forces and the potential enemy force to have operational capabilities in theater first. Upon arrival in theater, units will conduct reception, staging, onward movement, and integration.

5-20. The Secretary of Defense established the immediate response force in 2008 to enhance the nation's ability to respond quickly to a wide range of contingencies. Immediate response forces are critical to operations to shape and prevent. The immediate response force is the Army's designated unit for ensuring joint operational access through the concept of joint forcible entry. The immediate response force can respond to a hybrid threat in any environment and can execute a wide variety of missions required by CCDRs. *Hybrid threat* is the diverse and dynamic combination of regular forces, irregular forces, terrorists forces, or criminal elements unified to achieve mutually benefitting effects (ADP 3-0). These mission profiles include:

- Joint task force mission command.
- Joint forcible entry.
- Conduct raid and direct action.
- Non-combatant evacuation.
- Fixed site security and defense.
- Joint targeting.
- Implementation of an exclusion zone.
- Foreign humanitarian assistance.
- Stability operations.

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Chapter 6

Fire Support in Depth During Large-Scale Combat Operations

This chapter is divided into five sections and describes FS considerations for large-scale combat operations. Section I describes the Army's strategic role to prevail in large-scale combat operations. Section II briefly describes FS considerations in the deep area during large-scale combat operations, to include forcible entry, airborne, and air assault operations. Section III addresses FS in the defense. Section IV covers FS considerations for the offense. Section V discusses FS considerations for enabling, stability and reconstitution operations.

SECTION I – PREVAIL IN LARGE-SCALE COMBAT OPERATIONS

Large-scale combat operations are extensive joint combat operations in terms of scope and size of forces committed, conducted as campaigns aimed at achieving operational and strategic objectives through the application of force. Large-scale combat on land occurs within the framework of a larger joint campaign, usually with an Army headquarters forming the base of a joint force headquarters. These operations typically entail high tempo, high resource consumption, and high casualty rates. Large-scale combat introduces levels of complexity, lethality, ambiguity, and speed to military activities not common in other operations. (FM 3-0)

6-1. During large-scale combat operations, Army forces focus on the defeat and destruction of enemy ground forces as part of the joint team. Army forces close with and destroy enemy forces in any terrain, exploit success, and break the opponent's will to resist. Army forces attack, defend, perform stability operations, and consolidate gains to accomplish national objectives. The ability to prevail in ground combat is a decisive factor in breaking an enemy's capability and will to continue a conflict. "Conflict resolution requires the Army to conduct sustained operations with unified action partners as long as necessary to accomplish national objectives" (ADP 3-0). Echelon above brigade formations and their respective FS staffs are central to the conduct of large-scale combat operations. They must fight with fires and maneuver in the deep areas, and support brigade and below operations in the close and rear areas. See figure 6-1 on page 6-2, for context.

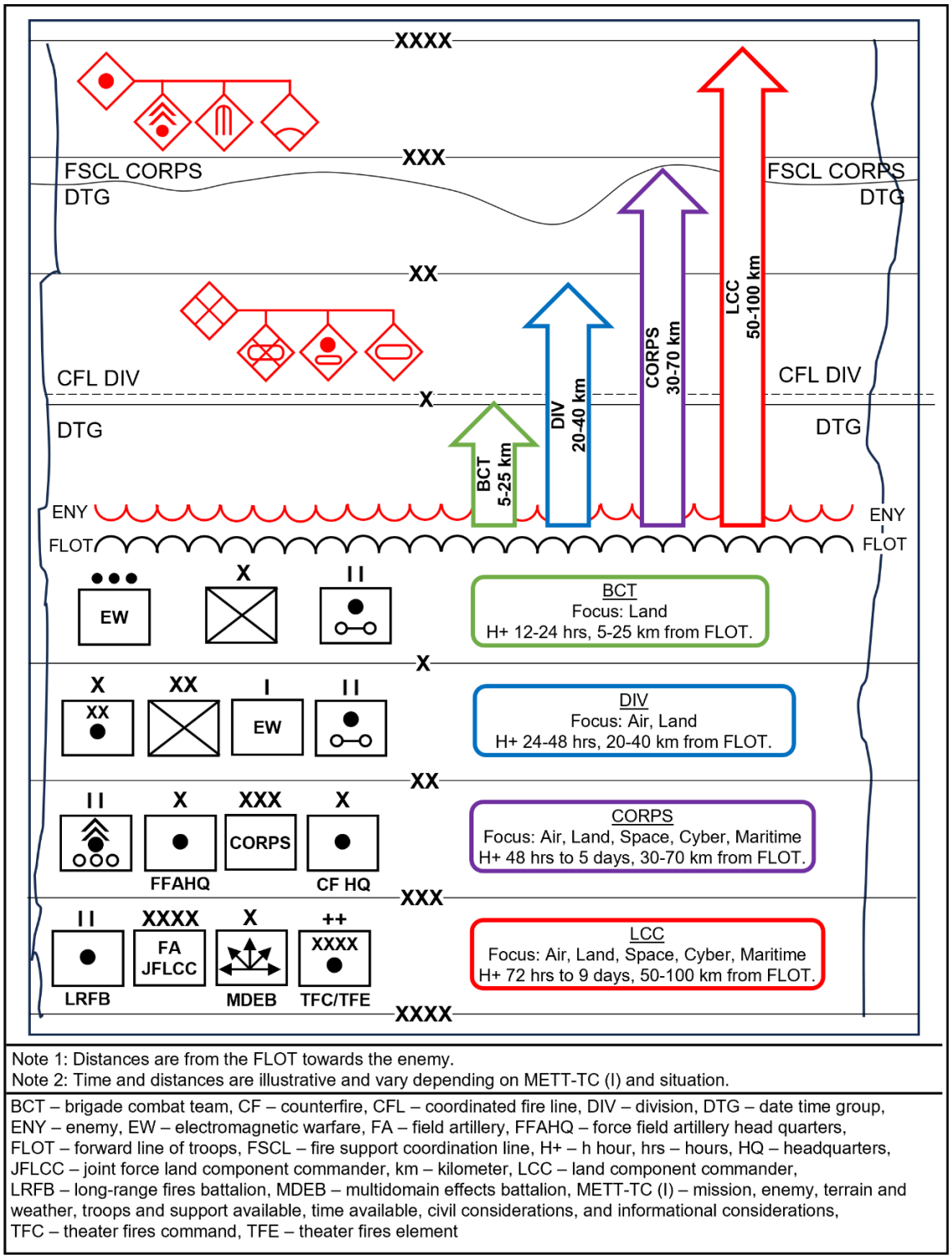


Figure 6-1. Large-scale combat battlefield framework

6-2. Joint FS contributes extensively to the Army's ability to defeat and destroy enemy ground forces by supporting offensive and defensive operations in large-scale combat operations. Simultaneously attacking HPTs with fires in depth presents an enemy force with multiple dilemmas across all domains, forcing them to react continually. Retaining the initiative requires employment of sustained, relentless lethal and nonlethal

fires on enemy forces. Commanders maintain this pressure by accomplishing the four basic FS functions previously discussed.

6-3. FA and FS lethality is enabled by formations maneuvering into positions of relative advantage where they can mass effects to place enemy forces at risk. *Lethality* is the capability and capacity to destroy (FM 3-0). FS formations support the maneuver or supported commanders' efforts to impose multiple dilemmas on the enemy by enabling convergence when and where critically needed.

SECTION II – FIRE SUPPORT IN DEEP OPERATIONS

6-4. Deep condition setting with integrated fires executed at increasingly longer ranges with precision in conjunction with fires in the close area are key elements for JFCs, corps, and divisions setting the conditions in the OE and accelerating the enemy's defeat in large-scale combat operations. A *shaping operation* is an operation at any echelon that creates and preserves conditions for success of the decisive operation through effects on the enemy, other actors, and the terrain (ADP 3-0). Deep operations and their corresponding fires are not just tools of the defense. They are, if anything, even more critical in the offense. *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 (FM 3-0). In both offense and defense, operations in the deep area involve efforts to interdict uncommitted maneuver forces using fire, maneuver, or a combination of the two to create opportunities to seize and retain the initiative. The *deep area* is where the commander sets conditions for future success in close combat (ADP 3-0). *Close combat* is warfare carried out on land in a direct-fire fight, supported by direct and indirect fires, and other assets (ADP 3-0). A commander's deep area generally extends beyond subordinate unit boundaries out to the limits of the commander's designated AO. For more information on deep operations see ATP 3-94.2.

6-5. Enemy forces in the deep area are not out of contact in a multidomain environment since space, cyberspace, and the information dimension have few range constraints. Deep operations disrupt the enemy's movement in depth, destroy HPTs, and disrupt enemy C2 at critical times. They can deny the enemy the initiative early and limit enemy commander options.

6-6. Joint and Army FS attack and delivery platforms are the most responsive assets an operational-level commander has to shape enemy forces and before they can employ lethal or non-lethal means against friendly forces. FS in the deep area might disrupt the movement of operational reserves, for example, or prevent an enemy from employing long-range cannon, rocket, or missile fires. Planning for operations in the deep area includes considerations for information collection, airspace control, joint fires, obstacles emplacement, maneuver (air and ground), and special operations. FS in the deep area is not a luxury; it is an absolute necessity to winning. FS in the deep area must be tightly coordinated over time with fires in the close area. Without this coordination, limited resources may be wasted on targets whose destruction in the deep area actually has little payoff in the close area.

6-7. Corps HQ and their FSEs play a significant role in physical and temporal deep area operations. Temporally, corps planners must project into the future and decide what conditions can be created and exploited to defeat the enemy and accomplish the corps mission. Corps deep operations are those activities which are directed against enemy forces not currently engaged in the close operation, but capable of engaging or inflicting damage in future close operations. Many of the FS and TA capabilities the corps requires for deep operations are not organic to the corps. As such, the corps HQ coordinates for these joint and unified action partner capabilities through planning and the targeting process.

6-8. Division deep operations, reinforced by corps and higher joint capabilities, focus on information collection, interdiction fires, and maneuver on enemy organizations and capabilities beyond the range of the BCTs engaged in close operations. They identify opportunities for BCTs to exploit, disrupt enemy C2, and mass effects against key enemy capabilities, such as long-range fires, to enable rapid movement. Interdiction fires create windows for friendly unit offensive maneuver.

6-9. In general, corps deep operations occur beyond the area division can effectively employ its combat power. The extent to which a division conducts deep operations is limited in two ways: using control measures and by the ranges of the capabilities it controls. Corps deep fires should facilitate division freedom

of action in the close and deep areas, both in execution of fires under corps C2 and allocation of capabilities to the division through task organization and command and support relationships.

6-10. It is important to clearly delineate corps and division FS responsibilities and focus in terms of time, space, and domains. Failure to do so leads to inefficient application of friendly TA and FS capabilities. Commanders use control measures, such as boundaries, FSCMs, and airspace coordinating measures, to assign deep operations and FS responsibilities to the appropriate echelons.

6-11. In the offense or defense, the commander attacks or defends in depth. Information collection adopts this principle by using a phased, echeloned approach to collecting information to satisfy requirements. Each echelon conducting information collection plays a critical role in the success of any military operation. In the offense and defense, units should use an intelligence handover line to utilize the echeloned approach. The intelligence handover line is a control measure that establishes areas within which each echelon is responsible for collecting information. Intelligence handover lines are developed to deconflict collection efforts between echelons and reduce the likelihood of duplication occurring. For more information on intelligence handover lines see ATP 2-01. Factors to consider when assigning intelligence handover lines:

- The unit's organic intelligence collection capability.
- Availability of processing, exploitation, and dissemination capabilities.
- Facilitate coordination between a unit and its subordinates.
- Direct units to detect and track threat units and HPTs in their areas.
- Transfer collection responsibility for portions of the AO from one echelon to another.

6-12. FS for deep operations may consist of maneuver and FS or of fires alone. Commanders may employ subordinate maneuver units to conduct deep air or ground maneuver operations (such as forcible entry operations, and airborne and air assault operations) to exploit the opportunities created by large-scale deep fires, when the desired effects outweigh the inherent risks.

6-13. Other FS considerations for the deep area:

- The submission of air support requests for AI missions is critical.
- Joint targeting coordination board (referred to as JTCB) and Army targeting boards must be nested at all levels between division and JTF.
- Ensure close coordination between the CAB commander and the FSCOORD (with staffs).
- Establish proper authorities for the FSCOORD to act on behalf of the commander and G-3 while fighting in the deep area. (Such as target engagement authority, ISR re-tasking, CAS/AI re-allocation and prioritization).
- Ensure a common understanding of ISR resources dedicated to target development vs. TA between FSCOORD/G-2/G-3.
- Ensure continual battle tracking of all friendly and neutral positions (unified action partners, nongovernmental organizations, SOF, partner forces, other actors on the battlefield) beyond CFL and FSCL.
- Ensure the ground force commander priorities are adequately communicated/represented in the Joint Targeting process as operations in the deep area will likely involve numerous joint and unified action partners with different goals.
- Leverage the federated intelligence enterprise for direct and/or complimentary support for TA.
- Ensure continual communication and common understanding between echelons of command regarding setting the conditions for future operation expectations and assessments.
- Position FA assets to maximize range and ensure proper security of these assets.
- Ensure adequate TA and attack/delivery platforms to meet the commander's intent in the deep area are balanced with the natural tension of supporting the ongoing chaos of the close fight.
- Consider close support to SOF and other unified action partners and multinational forces operating in the deep area.
- Seek opportunities for target handover between SOF and conventional force TA and FS attack/delivery platforms.

- Establish clear delineation of responsibilities and authorities between joint unified action partners operating in the deep area (especially between Army and USAF).
- Ensure adequate JTAC and SJA representation at all FS nodes with target engagement authority.
- Establish and rehearse a robust communications plan since operations in the deep area will likely require coordination with unified action partners around the world (processing, exploitation, and dissemination nodes, the combined air operations center, proper CEMA authorities).

FORCIBLE ENTRY

6-14. *Forcible entry* is the seizing and holding of a military lodgment in the face of armed opposition or forcing access into a denied area to allow movement and maneuver to accomplish the mission (JP 3-18). A *lodgment* is a designated area in a hostile or potentially hostile operational area that, when seized and held, makes the continuous landing of troops and materiel possible and provides maneuver space for subsequent operations (JP 3-18). A forcible entry operation is conducted to gain entry into the territory of an enemy by seizing a lodgment as rapidly as possible to enable the conduct of follow-on large-scale combat operations after the enemy's A2/AD capabilities are neutralized. Like FS itself, forcible entry operations are joint in nature. The requirements for continuous resources of varying, complex capabilities such as C2, fires, transportation, and sustainment necessitate coordination from all elements of Department of Defense, other unified action, and often multinational unified action partners. For more information on forcible entry see JP 3-18.

6-15. To set favorable conditions for success, there are fourteen principles that apply to forcible entry operations. While FS is inherent in all these principles, it is critical in the six principles below:

- Achieve surprise. Planners should strive to achieve surprise regarding exact objectives, times, methods, and forces employed in forcible entry operations. The degree of surprise required depends on the nature of the operation to be conducted. FS considerations include the timing of pre assault fires.
- Visualize the OA. Utilizing joint intelligence preparation of the OE provides the JFC the composite of the conditions, circumstances, and influences that affect the employment of capabilities that bear on the decisions of the commander. FS considerations include the integration into the joint targeting process for joint integrated prioritized target list nominations, and coordination with intelligence to understand enemy in the lodgment or that can affect the lodgment such as reinforcements and counter-attack forces.
- Isolate the lodgment. FS Considerations include the attack/neutralization of enemy capabilities including ground, sea, and air assets that can react to the assault. HPTs that support isolation of the lodgment include enemy long-range fires that can range the lodgment area, fixed bridges, and enemy TA and C2 capabilities.
- Gain and maintain access. FS Considerations include identifying and neutralizing an enemy's AD capabilities to include their long-range precision fires, ADA radars, ADA delivery platforms, airfields, and NL capabilities.
- Neutralize enemy forces within the lodgment. The joint force must neutralize enemy forces within the lodgment to facilitate the establishment of airheads and beach heads and to provide for the immediate protection of the force. HPTs include enemy security forces, enemy short range air defense, and C2 nodes. Consider limiting damage to infrastructure (such as an airfield or communications facility) that may be of value for future use of the friendly force.
- Expand the lodgment. FS Considerations include pushing ISR further into the OA, moving FA with maneuver forces off the lodgment to increase range, and begin flowing in additional artillery to reduce initial dependency on CAS, attack aviation, and Naval Gunfire Support.

6-16. Forcible entry capabilities include a combination of amphibious, airborne assault, air assault, and ground assault operations. Airborne, air assault, and SOF FS considerations are discussed below. For more information on forcible entry capabilities see JP 3-18 and FM 3-99.

6-17. Airborne forcible entry FS considerations include:

- Availability of surface-to-surface FS assets may be initially limited. Initial dependency on CAS, rotary wing aviation, and naval gunfire until artillery and mortars are available. Ensure proper ALO, JTAC, and air-naval ground liaison company representation in the assault force.
- Ensure adequate FA systems are introduced early in the airborne operation and following air land operations to create flexibility by reducing the dependency on CAS, attack aviation, and naval gunfire.
- SEAD to support transport aircraft (to include enemy ADA as well as enemy aircraft bases and enemy helicopter army and refueling points).
- Pre-assault fires of the airhead and other critical targets including interdiction fires.
- Deception fires at false landing zones.
- CEMA to disrupt forces in vicinity of the airhead.
- Inclusion of long-range precision fires.
- Establish liaison with all joint and unified action partners supporting the operation.
- Common understanding and visualization of all SOF and unified action partners already operating in the area.

6-18. Air assault forcible entry FS consideration include:

- Deception. False preparations can be fired into areas other than the objective or landing zone area to deceive enemy forces.
- Duration of preparation fires. A preparation of long duration may reduce the possibility of surprise. The preparation fires should begin as the first aircraft of the first lift crosses the release point and end just before the first aircraft lands.
- Availability of FS assets. When an air assault is executed across extended distances, preparation fires by CAS or attack helicopters may be the only viable alternative to organic FA.

6-19. Special operations FS considerations include:

- Allocating priorities for CAS.
- Allocating LRPF capabilities as soon as possible; establishing a DS support relationship between HIMARS or MLRS to SOF forces as appropriate.
- Ensure SOF positions as well as the multinational unified action partners they are supporting are known and tracked throughout the operation, especially during any pre-assault fires.
- Define and expedite clearance of fires responsibilities between SOF and conventional forces by establishing a ground force commander and redundant communications.

FORCIBLE ENTRY PLANNING CONSIDERATIONS

6-20. Forcible entry operations are conducted in five phases. The five phases of forcible entry are preparation and deployment, assault, stabilization of the lodgment, introduction of follow-on forces, and termination or transition of operations. Each phase with FS considerations is discussed below.

6-21. Preparation and deployment, FS considerations include:

- Establishing a PACE plan for enroute communications.
- The availability of joint TA and joint FS attack/delivery platforms including the integration with SOF forces already in the vicinity of the lodgment.
- Input to the joint integrated prioritized target list and ATO.
- Targeting the enemy's A2/AD capabilities utilizing AI to engage targets in the vicinity of the lodgment area.
- Integrate CEMA and other information-related capabilities into the operation early as authorities for use require longer timelines.
- Recommend FS considerations into the GO-NO GO criteria for the operation. Consider ISR allocation for BDA for answering these criteria.

- Develop pre assault fire plan and any deception fires with joint and unified action partners and ensure all elements executing SEAD also understand the ground force commander's maneuver plan and HPTs.
- Understand and communicate the JFC SEAD plan that will support the operation to the supported commander.
- Make recommendations for priority of echeloning FS platforms into the lodgment over time.
- Provide FS to the joint force operating in the land or maritime domain well beyond the established lodgement.
- Ensure ISR assets are allocated.

6-22. During the assault phase, the FS considerations include:

- Understand the ground tactical plan.
- Establish communications with SOF on the ground for ISR/target handover capabilities.
- Account for the dense airspace utilizing airspace C2 and coordinating measures.
- Strike enemy targets in the lodgment area simultaneously with enemy units that can reinforce or counterattack.
- Position FA and mortars to support expansion of the lodgment and deconflict with potential ongoing air landings.
- Decentralized execution of fires.

6-23. During the third phase, stabilization of the lodgment FS considerations include:

- Balance CAS, attack aviation, and AI capabilities as additional indirect FS systems arrive.
- Deconfliction of the saturated airspace.
- Begin moving FA and mortars with supported forces as lodgment expands.

6-24. During the fourth phase, introduction of follow-on forces FS considerations include:

- Utilize FS planning and execution principles to support ground offensives as additional maneuver forces arrive.
- Be prepared to shift priority of fire.
- Be prepared to shift boundaries and respective FSCMs.

6-25. During the fifth phase termination or transition of operations FS considerations include:

- Increase in nonlethal and information related capability options.
- Redeployment of FA balanced with CAS and AI and attack aviation.

6-26. Deep operations do not occur separately. They are conducted simultaneously with operations in the close and rear areas. These operations are conducted to protect forces, provide freedom of maneuver, and facilitate operations in the close area. The following sections will describe the defense and offense in the close area and FS considerations of each.

SECTION III – THE DEFENSE

6-27. While the offense is more decisive, the defense is usually stronger. The conduct of the defense alone normally cannot determine the outcome of battles. The purpose of the defense is to create conditions for the offense that allows Army forces to regain the initiative.

6-28. A *defensive operation* is an operation to defeat an enemy attack, gain time, economize forces, and develop conditions favorable for offensive or stability operations (ADP 3-0). The defense is what provides time for a commander to build combat power and establish conditions to transition to the offense. The defense is ideally a shield behind which a commander maintains or regains the initiative. Initially, a defending commander is likely to be at a relative disadvantage against an attacking enemy since and enemy can choose when and where to strike.

6-29. A defending force does not wait to be attacked, it aggressively seeks ways to attrit and weaken enemy forces before combat begins. A defending force attacks enemy forces at every opportunity and seeks every opportunity to transition to the offense. FS is a primary means for the maneuver commander to continually

attack the enemy, even as his forces are preparing for and executing the defense. As discussed in Chapter 1, a characteristic of the FA is to always operate in the spirit of the offense, even when maneuver forces are in the defense.

THE ENEMY ATTACK

6-30. During offensive operations, enemy forces typically attempt to mask the location of their main effort with multiple fixing attacks on the ground while using fires to disrupt critical friendly CPs, radars, and FDCs. Generally, enemy forces seek to reinforce success, massing capabilities at a vulnerable point to achieve large force ratio advantages to enable a rapid penetration of friendly defenses. The enemy uses mobile forces to exploit the penetration rapidly to the maximum possible depth in order to make the overall friendly defensive posture untenable.

6-31. Threat forces can have advantages in both volume and range of fires, so they can simultaneously mass fires on the point of penetration to enable rapid closure and breakthrough, fix other friendly elements along the FLOT, and target key friendly C2 and logistics nodes along the depth of the defense. Threat forces prefer to use fires to move around fixed positions when possible and through destroyed units when necessary. Threat forces seek to maneuver tactically to a depth that achieves operational objectives in support of his overall strategic purpose.

6-32. Threat forces may employ ISR, EW, information warfare, SOF, CBRN and other capabilities. For more information on enemy attack see FM 3-0.

COMMON DEFENSIVE CONTROL MEASURES

6-33. Commanders control a defense by using control measures that provide flexibility needed to allow defending commanders to concentrate combat power and the decisive point. Below are defensive control measures that every FS leader should understand in order to best support the commander. For more information on defensive control measures see ADP 3-90.

6-34. The *security area* is that area occupied by a unit's security elements and includes the areas of influence of those security elements (ADP 3-90). It may be located as necessary to the front, flanks, or rear of a protected unit, facility, or location. FS in the security area engages enemy reconnaissance elements early in order to delay, disrupt, or limit the enemy's advance. FS is planned to assist the supported commander in moving and disengaging as well as integrating FS and obstacle plans to ensure obstacles are covered by direct observation. FS considerations for defensive operations in the security area will be discussed in subsequent under reconnaissance and security operations. See figure 6-2.

6-35. The *main battle area* is the area where the commander intends to deploy the bulk of their unit to defeat an attacking enemy (FM 3-90). Normally, most of the defending force is deployed in the main battle area (MBA) to defeat the enemy's main attack. The mission of the MBA forces at corps level covers the entire spectrum of operations. Thus, while the corps as a whole may be engaged in defensive operations, units within the corps AO (divisions, BCTs, TFs) may be conducting any type of defensive or offensive operation in the MBA. FS for the MBA is allocated with the priority to the most vulnerable area which usually coincides with the enemy's most likely avenues of approach and main attack. These areas must be weighed more heavily with immediately responsive fires such as CAS and DS or (R) FA. Detailed FS considerations for defensive operations and offensive operations in the MBA are discussed later in this chapter. See figure 6-2.

6-36. The *forward edge of the battle area* is the foremost limits of a series of areas in which ground combat units are deployed to coordinate fire support, the positioning of forces, or the maneuver of units, excluding areas in which covering or screening forces are operating (JP 3-09.3) See figure 6-2. FS short of the forward edge of the battle area consists of close support tasks such as supporting friendly units in contact, supporting strongpoints, supporting obstacles, suppressing, and obscuring enemy overwatch positions, supporting counterattacks, and coordinating CAS and attack aviation to engage enemy armored formations. See figure 6-2.

6-37. The *forward line of own troops* is a line that indicates the most forward positions of friendly forces in any kind of military operation at a specific time (FM 3-90). In the defense, it may be beyond, at, or short of the forward edge of the battle area. FS beyond the FLOT acquires and engages enemy reconnaissance

elements early to delay, disrupt, or limit the enemy's advance into the security area. The CFL should be kept as close as possible to the FLOT in both offensive and defensive operations. FS personnel must maintain continual awareness of SOF, multinational and unified action partners operating beyond the FLOT to expedite clearance of fires and reduce chances of fratricide. See figure 6-2.

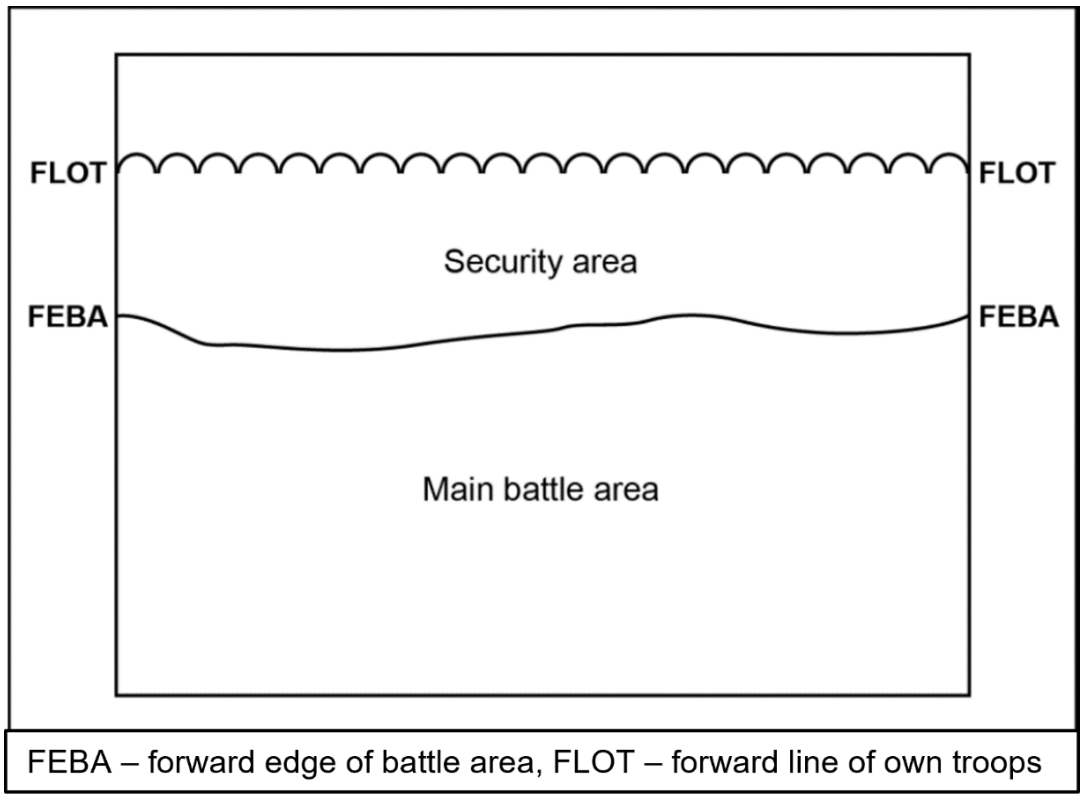


Figure 6-2. Defensive arrangement

FIRE SUPPORT CONSIDERATIONS AND THE CHARACTERISTICS OF THE DEFENSE

6-38. Successful defenses are aggressive and strive to regain the initiative from attacking enemy forces. FS plays a critical role in facilitating the following characteristics of the defense. The characteristics of the defense are disruption, flexibility, maneuver, mass and concentration, operations in depth, preparation, and security.

DISRUPTION

6-39. Disruption actions include deceiving or destroying enemy reconnaissance forces, breaking up combat formations, separating echelons, and impeding an enemy force's ability to synchronize its combined arms. FS plays a key role in disrupting an attacker's tempo and synchronization. Considerations include:

- Employ fires to neutralize and destroy enemy artillery and mortar, TA, C2 nodes, and logistics systems.
- Disrupt enemy sustainment efforts and troop movements (consider destroying bridges).
- Ensure integration of fires in support of obstacles.
- Assist in defeating enemy reconnaissance forces, separating enemy forces, isolating enemy units, and attacking or disrupting enemy systems.

FLEXIBILITY

6-40. *Flexibility* is the employment of a versatile mix of capabilities, formations, and equipment for conducting operations (ADP 3-0). Defensive operations require flexible plans that anticipate enemy actions and allocate resources accordingly. FS must address the need for flexibility and the need to:

- Allocate initial priority of FA fires to forward security forces.
- Quickly shift fires to critical points throughout the AO.
- Execute successive or concurrent programs or fire plans.
- Rapidly shift fires from support of the defense to support the counterattack and offense.
- Coordinate and synchronize air support on known, suspected, and likely enemy locations.

MANEUVER

6-41. Maneuver allows a defending force to achieve and exploit a position of relative advantage. Even in the defense, there are elements of the offense. FS assists defending forces create opportunities to maneuver against the attacking force by:

- Delaying the movement of enemy reserves.
- Coordinating all means of available FS to delay, destroy, or limit the enemy's advance, and to weight the attack(s) of the striking force in a mobile defense.
- Supporting the obstacle plan by placing fires in front of, on top of, to the side of, and behind obstacles to maximize their effect.
- Providing fires to support the disengagement of maneuver elements and their repositioning to subsequent battle positions.
- Channelizing enemy movement into EAs.

MASS AND CONCENTRATION

6-42. Defending forces seek to mass and concentrate fires against enemy forces. This produces overwhelming combat power at specific locations to support decisive operations. Concentrating forces increases risk of large-scale losses from enemy fires. This risk can be mitigated by using deception and employment of FS capabilities. FS considerations for this characteristic of the defense include:

- Support the rapid destruction of an enemy force when it is most vulnerable or when it is on the verge of gaining a significant advantage.
- Allow a commander to accept prudent risk by using minimal maneuver forces in one area in order concentrate forces in another area.
- Mass fires to create an important demoralizing psychological effect that is not achieved from smaller-scale fires.
- Use fires, TA, and CFZs to protect concentrating friendly forces.

OPERATIONS IN DEPTH

6-43. *Operations in depth* is the simultaneous application of combat power throughout an area of operations (ADP 3-90). The HQ FSE plans the employment of available Army and joint fires to achieve depth and simultaneity and secure advantages for future operations. This includes disrupting the enemy's approach to and movement within the MBA, destroying HPTs, denying, or interrupting vital components of enemy operating systems, and using obscurants to conceal friendly movement. They create conditions favorable to friendly forces by disrupting enemy long-range fires, sustainment, and enemy C2. The defending commander directs the delivery of effects in multiple domains to establish positions of relative advantage necessary for a successful counterattack. Operations in depth prevent enemy forces from maintaining their tempo. FS assets rapidly and continuously engage enemy forces throughout the operational framework to:

- Disrupt, delay, and attrit the enemy in the deep area.
- Destroy enemy long-range fires, ADA sites, and sustainment efforts.
- Destroy and neutralize enemy sustainment and C2 nodes.
- Allocate responsive fires to support the decisive operation.

- Disrupt the enemy's tempo in the close area by attacking enemy forces preparing to attack.
- Plan observation and fires to defeat or disrupt enemy attempts to breach friendly obstacles.
- Plan obscurant fires to deny enemy observation or screen friendly movements between defensive positions.
- Neutralize enemy threats in the rear areas.

PREPARATION

6-44. *Preparation* consists of those activities performed by units and Soldiers to improve their ability to execute an operation (ADP 5-0). Preparation creates condition that improve friendly forces' opportunities for success. Defending units prepare their AO before attacking enemy forces arrive, or they establish the defense behind a force performing a security operation. FS preparation consideration:

- Actively participate in the joint and Army targeting processes.
- Plan indirect fires in support of the barrier and obstacle plan.
- Plan fires in support of patrols, convoys, or quick reaction forces.
- Plan targets, observer positions (primary and alternate), triggers, and fires in support of all EAs for all phases of the defensive operation.
- Recommend FSCMs to support each phase of the defensive operation.
- Plan targets on avenues of approach to disrupt enemy attacks by striking the enemy on the approach and during their assault.
- Ensure that forward positioned observers are resourced with adequate security, mobility, and situational understanding.
- Prepare and harden artillery and TA positions.
- Conduct rehearsals on the actual terrain.

SECURITY

6-45. Commanders secure their forces through the performance of security, protection, information collection, and cyberspace and EW operations. Security operations prevent enemy ISR assets from determining friendly locations, strengths, and weaknesses. FS must complement and support all security operations and unit protection plans by providing:

- Support to security forces and actions in the consolidation and support areas.
- Execution of deception fires and support to deception operations.
- Disruption to enemy attacks.
- Counterfire throughout the depth of the AO.
- Suppress and obscure enemy overwatch positions.
- Support friendly strong points.

TYPES OF DEFENSIVE OPERATIONS

6-46. There are three basic defensive operations- area defense, mobile defense, and retrograde. These apply to both the tactical and operational levels of war, although the mobile defense is more often associated with the operational level. The three operations are significantly different concepts and pose significantly different challenges in FS and FA planning and execution. Although the names of these defensive operations convey the overall aim of a selected defense, each typically contains static and mobile elements.

AREA DEFENSE

6-47. The *area defense* is a type of defensive operation that concentrates on denying enemy forces access to designated terrain for a specific time rather than destroying the enemy outright (ADP 3-90). The focus of the area defense is on retaining terrain where the bulk of the defending force positions itself in mutually supporting prepared positions.

6-48. Usually, there is some warning of an enemy attack. The enemy must be brought under the maximum mass of counter preparation fire as early as possible. ***Counterpreparation fire*** **is the intensive prearranged fire delivered when the imminence of the enemy attack is discovered.** Counterpreparation fire disrupts the enemy's preparations for an attack or a counterattack. It does this by striking him in his assembly areas; breaking up his attack formations; disorganizing his command, control, and communications; impairing his TA capabilities; and reducing his morale. Counterpreparations are usually scheduled as on call. The counterpreparation may be phased, although this is not required.

- Phase 1 includes: enemy forward elements, indirect fire systems, observation posts.
- Phase 2 includes enemy CPs, communication and reserves while attacking of indirect fire systems continues.

6-49. During an area defense, FS assists in shaping operations that constrain the enemy into a specific COA or fix them in a given location. These actions limit the enemy's options. The supported commander covers obstacles with fires that turn, or block to limit the options available to the enemy. The main effort focuses fires into EAs, possibly supplemented by a counterattack. The supported commander directs reconnaissance, surveillance, and TA WLR assets to determine the locations, strengths and probable intentions of the attacking enemy force. Specific FS considerations include:

- Providing long-range shaping fires to delay, disrupt, and attrit enemy forces.
- Provide fires for spoiling and counter attacks.
- Positioning firing units forward to support a covering force to include SOF operating in zone.
- Ensure FSCMs, CFZs and CFFZs are established.
- Engaging enemy long-range indirect fire systems prior to the enemy executing preparation fires.
- Massing fires to break the momentum of an enemy attack.
- Providing counterfire support to divisions and BCTs as the enemy enters the EAs allowing the BCT's organic FA BNs to execute close support fires for maneuver.
- Providing fires to disrupt follow-on echelons.
- Ensuring FS for the battle handover and withdrawal of the security forces.

MOBILE DEFENSE

6-50. The *mobile defense* is a defensive operation that concentrates on the destruction or defeat of the enemy through a decisive attack by a striking force (ADP 3-90). In a mobile defense, commanders take advantage of terrain in depth, military deception, obstacles and mines while employing fires and maneuver to seize initiative from the attacking enemy force. The commander weights the striking force, with the allocation of FA and other FS resources available.

6-51. The defending force's planned maneuver must incorporate the movement of FS assets to locations where they can provide continuous support. FS assets enhance the supported force combat capabilities and enable the quick defeat of the enemy force.

6-52. The defending commander takes precautions to prevent fratricide by establishing a restrictive fire line (RFL) and other FSCMs. The commander positions FS assets to support screen and guard forces and allocates additional artillery to support a covering force. If the security force is assigned a large OA, the commander may have to position FS assets to provide effective coverage of only the most likely enemy avenues of approach. This is particularly important for a screen because often the screen force relies on indirect fire to delay or disrupt the enemy. Providing adequate indirect FS to the security force may require the main body to position its artillery well forward in its formation. Other FS considerations for a mobile defense include:

- Weight the striking force with the most flexible FS attack/delivery platforms available such as CAS and attack aviation.
- Positioning two-thirds of the available firing units with the striking force during a mobile defense and one- third with the fixing force.
- Planning for frequent survivability moves of TA WLR assets based on movement of the FLOT.
- Planning for the use of obscuration or screening smoke to support both the fixing and striking force.
- Positioning ammunition stocks for each phase of the operation.

- Positioning observers forward and along the flanks of both the fixing and striking force to observe and execute priority targets.
- Employing UA forward of advancing units to detect and identify enemy elements at the earliest possible time and to locate targets in designated TAIs.
- Monitor WLR acquisitions for indications of mine emplacement by the enemy.
- Integrate reconnaissance, surveillance and targeting acquisition with the fixing force to slow and disorganize repositioning and withdrawing enemy forces.
- Coordinate and synchronize joint FS with SOF and the air component.

RETROGRADE

6-53. The *retrograde* is a type of defensive operation that involves organized movement away from the enemy (ADP 3-90). An enemy may force these operations, or a commander may execute them voluntarily. In either case, the higher echelon commander of a force executing a retrograde must approve the retrograde operation before its initiation. A retrograde is a transitional operation. It is not conducted in isolation. It is part of a larger scheme of maneuver designed to regain the initiative and defeat the enemy.

6-54. The three forms of the retrograde are delay, withdrawal, and retirement. In delays, units yield ground to gain time while retaining flexibility and freedom of action to inflict the maximum damage on an enemy. Withdrawing units, whether all or part of a committed force, voluntarily disengage from an enemy to preserve the force or release it for a new mission. A *withdraw* is to disengage from an enemy force and move in a direction away from the enemy (ADP 3-90). A withdrawal is the riskiest of all operations. Deception operations can reduce this operational risk. A *retirement* is when a force out of contact moves away from the enemy (ADP 3-90). In each form of the retrograde, a force not engaged with an enemy moves to another location, normally by a tactical road march. In all retrograde operations, firm control of friendly maneuver elements is a prerequisite for success.

Fire Support Planning and Tasks for the Delay

6-55. Initially, position FS assets well forward to exploit range. Prepare a plan of interdiction fires covering main hostile avenues of approach. Later position assets in depth to provide maximum continuous fires. EFSTs for a delay are as follows:

- Place fires on barriers and natural obstacles.
- Emplace obstacles with scatterable mines.
- Utilize fires to support strongpoints.
- Provide fires to cover and screen withdrawals. Use smoke extensively.
- Provide fires in support of hasty counterattacks.
- Engage enemy forces congested behind obstacles or minefields and to slow breaching attempts.
- Use fires to attack enemy forces that have breached the obstacles.
- Provide fires to assist maneuver in disengagement.
- Provide maximum continuous fire for maneuver forces as they displace to the rear.
- Provide mass fires to slow the enemy as they deploy to concentrate for attack of friendly delay positions.

6-56. The FS planning aspects of a withdrawal are very similar to those of a delay, as the FSCOORD must plan for a withdrawal under pressure. The enemy must be forced to slow down as they concentrate their forces. Because enemy maneuver units are moving while this occurs, the use of joint precision effects against HPTs is essential. Deep fires are used in relieving pressure on units in contact with the enemy.

6-57. A retirement is a retrograde operation in which a force that is not engaged with the enemy conducts a tactical movement to the rear. FA units are integrated with the maneuver units. They are given a GS support relationship with on-order missions of DS to their organic units. EFSTs in a withdrawal are as follows:

- Mask the movement of friendly forces with smoke.
- Use fires to slow the enemy.
- Cover obstacles with fire and observation.

- Jam enemy command nets to slow the enemy's reaction to a withdrawal once it is under way.
- Use deep fires to relieve pressure on units in contact.
- Provide FPF when necessary.
- Be prepared to support a delay.

Planning for Retrograde Operations

6-58. A defensive situation may require the HQ staff to plan for retrograde operations in combination, sequentially, or subsequent to the defensive mission. Planning and rehearsing a rearward passage of lines of security forces forward of the MBA is critical to ensuring proper execution while under enemy pressure. The complexity and fluidity of retrograde operations and the need to synchronize the entire operation dictate the need for detailed, centralized planning and coordination with decentralized execution. A retrograde may be forced or voluntary. In either event, a higher echelon commander must approve it.

Fire Support Considerations For Sustainment In Defensive Operations

6-59. Sustained combat in defensive operations will normally generate the largest requirement for supplies and services, stress resupply capabilities for fuel and ammunition, and require rapid evacuation of wounded and equipment repair as far forward as possible. Sustainment for artillery units in a defensive role requires prepositioning of ammunition and other essential supplies. During a delay operation, supplies should be prepositioned at subsequent delay lines or positions. Petroleum, oil, lubricants, and ammunition stocks must also be adequate to support decisive defensive actions.

6-60. As operations shift towards the defense, FS sustainment elements should begin to minimize the amount of support forward in the defense. Sustainment staffs will be primarily concerned with providing needed support to firing units engaged in corps-level operations and to divisions in whose area the main enemy effort is expected.

6-61. FS and sustainment planners in the defense should consider ammunition and fuel availability while maximizing organic haul capability and minimizing requirements for resupply. They should preposition additional ammunition and fuel in planned and coordinated cache sites in convenient locations along anticipated routes of withdrawal while making plans to destroy these stocks, if necessary.

The Reserve In Defensive Operations

6-62. The defense plan retains a reserve regardless of the defensive operation assigned. The *reserve* is that portion of a body of troops that is withheld from action at the beginning of an engagement to be available for a decisive movement (ADP 3-90). The reserve is more difficult to resource in the mobile defense because so much of the available combat power is allocated to the striking force.

6-63. EFSTs for the reserve are as follows:

- Plan fires to support the commitment of the reserve during movement.
- Plan fires to strike at objectives in depth as enemy dispositions are revealed. This is to support the committed reserves and to break up the enemy's coordination of the attack in the area defense.
- Plan fires on the enemy's flanks and rear where counterattacking forces are committed in the mobile defense.
- Plan fires to deceive the enemy into thinking the reserve is committed elsewhere.
- Plan for FSCMs such as an RFL in case of converging forces in the mobile defense or a RFA to safeguard strongpoints in the area defense.
- Plan to rearm, refit, and refuel organic and supporting FS before assuming on-order missions.

6-64. As in the offense, a support relationship of GS or GSR is best for artillery units designated to support reserves once committed. Once the reserve is committed, organic FA is augmented by other lethal and nonlethal attack/delivery platforms. Unnecessary changes in organization and time-consuming movements should be avoided to ensure adequate support for the committed reserve.

TRANSITION TO THE OFFENSE

6-65. A defending commander seeks a window of opportunity to transition to offensive operations by anticipating when and where an enemy force will reach its culminating point or require an operational pause before it can continue. During these windows, the combat power ratios mostly favor a defending force. An enemy force will do everything it can to keep a friendly force from knowing when it is overextended. FSCOORDs anticipate the transition to the offense and support their commanders by providing input to the overall operation assessment process, and by applying the principles of FS planning and coordination and FS execution.

SECTION IV – THE OFFENSE

6-66. The main purpose of the offense is to defeat enemy forces, destroy enemy forces, and gain control of terrain, resources, and population centers. The offense supports friendly operations in the land, air, maritime, space, and cyberspace domains, and in the information environment. The *cyberspace domain* is the interdependent networks of information technology infrastructures and resident data, including the Internet, telecommunication networks, computer systems, embedded processors and controllers, and relevant portions of the electromagnetic spectrum (FM 3-0). *Dislocate* is to employ forces to obtain significant positional advantage in one or more domains, rendering the enemy's dispositions less valuable, perhaps even irrelevant (FM 3-0). These operations destroy, dislocate, disintegrate, or isolate an enemy force.

6-67. An *offensive operation* is an operation to defeat or destroy enemy forces and gain control of terrain, resources, and population centers (ADP 3-0). The offense is the decisive form of war. The offense is the ultimate means commanders have of imposing their will on enemy forces. Executing offensive operations to defeat and destroy enemy forces as well as gain control of terrain, resources, and population centers. Offensive operations can also be conducted to deceive or divert an enemy force, develop intelligence, or hold an enemy force in position. Commanders seize, retain, and exploit the initiative when conducting the offense. Taking the initiative from an enemy force requires the conduct of the offense, even in the defense.

6-68. The performance of effective offensive operations capitalizes on timely, relevant, accurate, and predictive intelligence and other relevant information regarding enemy forces, weather, and terrain. Commanders maneuver forces to positions of relative advantage before contact. Contact with enemy forces before the main effort is deliberate and designed to shape the optimum situation for the decisive operation. Without hesitation, commanders violently execute both movement and fires-within the higher commander's intent-to break the enemy's will or destroy the enemy**.**

THE ENEMY DEFENSE

6-69. During offensive operations, the enemy typically attempts to slow and disrupt friendly forces with a combination of obstacles, prepared positions, and favorable terrain so that they can be destroyed with massed fires. The enemy is likely to defend in depth, and when provided time, will continuously improve positions in ways that better protect enemy defending units, make attacks against them more costly, and allow the enemy to commit the minimum amount of ground combat power forward. Forward positioned enemy forces are heavily focused on providing observed fires for long range systems and slowing friendly forces long enough to be engaged effectively by those systems. The enemy is likely to conduct a mobile defense whenever capable, using a series of subsequent battle positions to achieve depth.

6-70. The enemy commander seeks to use fires and obstacles to prevent decisive engagement of the defending ground forces as they reposition, while causing friendly forces to move methodically under continuous fire without fixing the enemy's own forces. The enemy can employ significant EW, ISR, and information-related capabilities as part of this defensive effort. Several potential enemies can employ CBRN weapons to include tactical nuclear weapons. The enemy main defense zone is organized in a succession of integrated kill zones, obstacles, and battle positions.

ECHELONMENT OF FIRES

6-71. Echelonment of fires is a technique for integrating and synchronizing maneuver and fires. Echelonment of fires is the execution of a schedule of fires fired from the highest caliber to the lowest caliber weapon,

based on risk estimate distances (see ATP 3-09.32) and weapons system range capabilities, as the supported force moves toward an objective. Echelonment of fires helps to ensure that ground forces are able to move to an objective without losing momentum, helps set the conditions for the direct fire fight, and reduces the risk of friendly casualties. Echelonment of fires is accomplished when the supported commander wishes to conduct preparation fires on an objective.

6-72. Echeloning a preparation is a 9-step process. The process is described in greater detail in ATP 3-09.42 the 9-steps are:

- Determine what assets, to include ammunition, are required and what assets are currently available or allocated.
- Verify risk estimate distances and attack criteria with the commander.
- Plan targets.
- Develop a communications plan.
- Determine what the rate of movement will be.
- Develop the schedule of fires and decide how the preparation schedule will be initiated.
- Brief the plan and confirm the method with the commander.
- Complete the target scheduling worksheet.
- Rehearse and refine the plan.

COMMON OFFENSIVE CONTROL MEASURES

6-73. Orders for the offense include the minimum control measures required to coordinate the operation. Control measures describe and illustrate the plan, maintain separation of forces, concentrate the effort, provide subordinates freedom of action, assist the commander in the mission command of forces, and add flexibility to the maneuver plan. At a minimum, control measures prescribe a line of departure (LOD), a time of attack, and the objective. In addition, commanders could assign AO and an axis of advance, routes, phase lines, checkpoints, and FSCMs. They optimally allow subordinates the maximum freedom of action consistent with necessary synchronization. Below are offensive control measures that every FS leader should understand in order to best support the supported commander. For more information on offensive control measures see ADP 3-90.

6-74. *Axis of advance* is the general area through which the bulk of a unit's combat power must move (ADP 3-90). A commander uses an axis of advance:

- First, to direct the bypass of locations that could delay the progress of an advancing force, such as known contaminated areas. Plan fires along the route to engage enemy observation posts and direct fire systems.
- Second, to indicate that a force is not required to clear the AO as it advances. The force will need to clear the axis in accordance with specified bypass criteria.
- Third, to indicate to a unit involved in offensive encirclement, exploitation, or pursuit operations the need to move rapidly toward an objective.

6-75. *Battle handover line* is a designated phase line where responsibility transitions from the stationary force to the moving force and vice versa (ADP 3-90). The common higher echelon commander of two forces establishes a battle handover line after consulting both commanders. The stationary commander determines the location of the line. The battle handover line is forward of the forward edge of the battle area in the defense or the FLOT in the offense. The commander draws it to keep the passing unit in the supporting range of the forward combat elements of the stationary unit until the passage of lines is complete. The area between the battle handover line and the stationary force belongs to the stationary force commander. The stationary force commander may employ security forces, obstacles, and fires in the area. Other FS considerations include changes to priority of fire and FSCM changes as units cross the battle handover line.

6-76. *Direction of attack* is a specific direction or assigned route a force uses and does not deviate from when attacking (ADP 3-90). It is a restrictive control measure. A commander's use of a direction of attack maximizes control over a subordinate unit's movement, and it is often used during night attacks, infiltrations, and when attacking through obscurants. Unit commanders establish a direction of attack through a variety of

means, such as target reference points and checkpoints. When using a direction of attack, unit commanders designate a point of departure.

6-77. *Final coordination line* is a phase line close to the enemy position used to coordinate the lifting or shifting of supporting fires with the final deployment of maneuver elements (ADP 3-90). Before crossing this line, units make final adjustments to supporting fires to reflect the actual situation versus the anticipated situation. The location should be easily recognizable on the ground. The final coordination line is not an FSCM.

6-78. The FLOT normally identifies the forward location of covering or screening forces. It does not apply to small, long-range reconnaissance assets and similar stay-behind forces. Friendly forces forward of the FLOT should have a restrictive FSCM, such as an NFA, placed around them to prevent friendly fire incidents. The CFL should be planned as close as possible to the FLOT without restricting the maneuver operations.

6-79. *Limit of advance* is a phase line used to control forward progress of the attack (ADP 3-90). The attacking unit does not advance any of its elements or assets beyond the limit of advance, but the attacking unit can push its security forces to that limit. Commanders usually select a feature that is easily identifiable, perpendicular to the direction of attack, and on the far side of the objective as the limit of advance. The use of a limit of advance prevents an attacking force from overextending and reduces fratricide possibilities and friendly fire incidents by fires supporting the attack. FSCOORDs plan and execute fires beyond the limit of advance.

6-80. The *line of contact* is a general trace delineating the locations where friendly and enemy forces are engaged (ADP 3-90). Commanders designate the enemy side of the line of contact by the abbreviation "ENY." In the defense, a line of contact is often synonymous with the FLOT. A line of contact may be combined with an LOD in the offense.

6-81. A *line of departure* in land warfare, a line designated to coordinate the departure of attack elements (JP 3-31). The purpose of an LOD is to coordinate the advance of the attacking force, so that its elements strike enemy forces in the order and at the time desired. An LOD also marks where a unit transitions from movement to maneuver. Commanders also use it to facilitate the coordination of fires. Generally, it should be perpendicular to the direction the attacking force takes on its way to the objective. Units crossing the LOD trigger fire plans and FSCM changes.

6-82. An *objective* is a location used to orient operations, phase operations, facilitate changes of direction, and provide for unity of effort (ADP 3-90). An objective can be terrain or force oriented. Terrain-oriented objectives should be easy to recognize. A higher echelon commander uses terrain-oriented objectives to focus the operations of subordinates, focus phase operations, facilitate changes of direction, and provide for unity of effort. Commanders determine force-oriented objectives based on known enemy positions. FSCOORDs plan fires on, beyond, and to the flanks of objectives IAW the scheme of maneuver and the commander's intent. FS attack/delivery systems should be able to range well beyond the objective. A rule of thumb for FA assets is that two-thirds of their maximum range should be beyond the objective.

FIRE SUPPORT CONSIDERATIONS AND CHARACTERISTICS OF THE OFFENSE

6-83. Audacity, concentration, surprise, and tempo characterize the offense. Commanders maneuver forces to advantageous positions before the start of an operation. To shape their main effort, they initiate selective contact with enemy forces. The main effort determines the outcome of the major operation, battle, or engagement. The main effort will capitalize on the successful application of the characteristics of the offense.

Audacity

6-84. Audacity is a willingness to take bold risks. By executing a bold, aggressive plan, a commander can seize and retain the initiative, but the risk decisions must be balanced against expected gains. Commanders can use FS to demonstrate audacity by:

- Aggressively applying firepower by massing in an accurate and timely manner.
- Proactively target and strike critical enemy C2, indirect fire, and sustainment nodes.
- Placing FS assets forward of supported units maximize range. The commander must ensure proper security of FS assets.

- Using FA raids to strike HPTs or gain range for setting the conditions for future operation. For more information on artillery raid operations see ATP 3-09.23.

Concentration

6-85. Concentration is massing the effects of combat power in time and space at the decisive point to achieve a single purpose. It is imperative to have concentrated ISR assets to support this effort. Commanders can use FS to achieve concentration by:

- Allocating FS assets to support the decisive operation.
- Focusing information collection and TA assets.
- Focus fires in support of one aspect of supported unit decisive or shaping operations for brief periods.
- Massing fires on choke points and key terrain to canalize, slow, and block the enemy's movements.

Surprise

6-86. Commanders surprise enemy forces by attacking at a time or place or in a manner enemy forces did not prepare for or expect. They achieve this by showing enemy forces what they expect to see while actually doing something different. FS enables the commander to achieve surprise with the instantaneous delivery of a high volume of fire on the enemy without warning. Commanders can use FS to achieve surprise by:

- Meet the five requirements for accurate predicted fire, for first round FFE.
- Rapidly shifting FS assets and massing effects.
- Using short duration, intense fires against key enemy functions at critical times.
- Foregoing a preparation to achieve surprise in initiating an attack.

Tempo

6-87. *Tempo* is the relative speed and rhythm of military operations over time with respect to the enemy (ADP 3-0). Commanders can use FS to enhance or maintain the tempo of the offense by:

- Using a decentralized organization for combat and decentralized FS planning and fire control methods (especially in the offense) to facilitate rapid, flexible execution of fires and immediately available dedicated fires to a designated ground force.
- Providing fires to slow the enemy's retreat during the pursuit.
- Using on-order missions to facilitate transition to subsequent phases, branches, and sequels.
- Providing fires in support of shaping operations that complement the main effort and set the stage for rapid transition.
- Developing a thorough sustainment plan that properly anticipates potential culminating points.
- Ensuring FSCMs are planned to facilitate a permissive environment.
- Providing fires to stop reinforcements; use smoke to delay and disrupt the enemy retreat.

TYPES OF OFFENSIVE OPERATIONS

6-88. Offensive operations are movement to contact, attack, exploitation, and pursuit. During the offense, the FSCOORD and FSE integrate close-supporting FA, mortars, counterfire, strike, electronic attack; naval surface FS, CAS and AI aircraft into the operations of the AO owning commander. Such fires may be time or event driven. The planning also involves the use of surface-to-surface fires necessary to suppress enemy air defenses to facilitate air component operations within the supported command's AO.

MOVEMENT TO CONTACT

6-89. *Movement to contact* is a type of offensive operation designed to establish or regain contact to develop the situation (FM 3-90). It is conducted when the information related to enemy positions, situation and deployment is not clear. In a movement to contact the supported commander has lost contact with the enemy main body and attempts to reestablish it, using all available sources of intelligence to develop the situation. The commander may know the location of enemy reserve and follow-on forces see figure 6-3 on page 6-20.

6-90. Since a movement to contact involves an unclear or uncertain situation, the positioning of FA units must facilitate responsive execution of EFSTs. The positioning and movement of FA assets must be coordinated with maneuver. Position FA assets as far forward as practical to allow maximum flexibility once enemy contact is made. TA assets focus on locating enemy indirect fire systems throughout the movement to contact. As the situation develops TA assets will transition to support setting the conditions for future operation and counterfire missions. Specific FS and FA considerations include:

- Allocate preponderance of CAS and attack aviation to cover and guard forces.
- Be prepared to rapidly change priorities of fire and establish FSCMs.
- Integrate DIVARTY and FAB WLRs, survey, MET, and counterfire coverage in support of the BCTs to allow BCT organic FA BNs to continue to maneuver with the BCT; coordinating handover of support to BCTs once the situation is developed.
- Integrate FA, joint fires, and TA WLR assets to assist in securing the unprotected flanks of vulnerable division, corps, or other supported command assets during advances.
- Attack bridges and other mobility corridors to limit enemy mobility options and facilitate setting the conditions for a meeting engagement.
- Position FS assets well forward to facilitate responsiveness and the ability to mass fires.
- Position the CP forward to facilitate control of FS operations.
- Provide responsive cannon, rocket, and missile fires to the BCTs to enable their organic FA BNs to continue to move during the movement to contact.
- Plan artillery movement to maintain force momentum and provide adequate immediately responsive support.
- Use UAS searching forward of advancing MLRS and HIMARS batteries as an aid to reconnoiter routes and position areas-particularly to identify by-passed enemy forces.
- Plan on-order targets on likely enemy defensive locations, EAs, observation posts, and obstacles. They are placed into effect and cancelled as the lead element can confirm or deny enemy presence.
- Transition FA units from GS or GSR to R once the situation is developed and the BCTs begin to conduct follow-on offensive or defensive operations.
- Position a FA unit to follow close behind the advance guard to provide responsive fires to lead elements.
- Position WLRs, observers, and UAS to detect enemy forces forward and along the supported unit's flanks.
- Position WLRs to cover critical friendly assets that are vulnerable to enemy indirect fire from bypassed regular or irregular forces.
- Plan for alternate position areas and survivability moves.
- Plan for obscuration or screening smoke.
- Synchronize the positioning and movement of FA with the tempo of the supported unit.

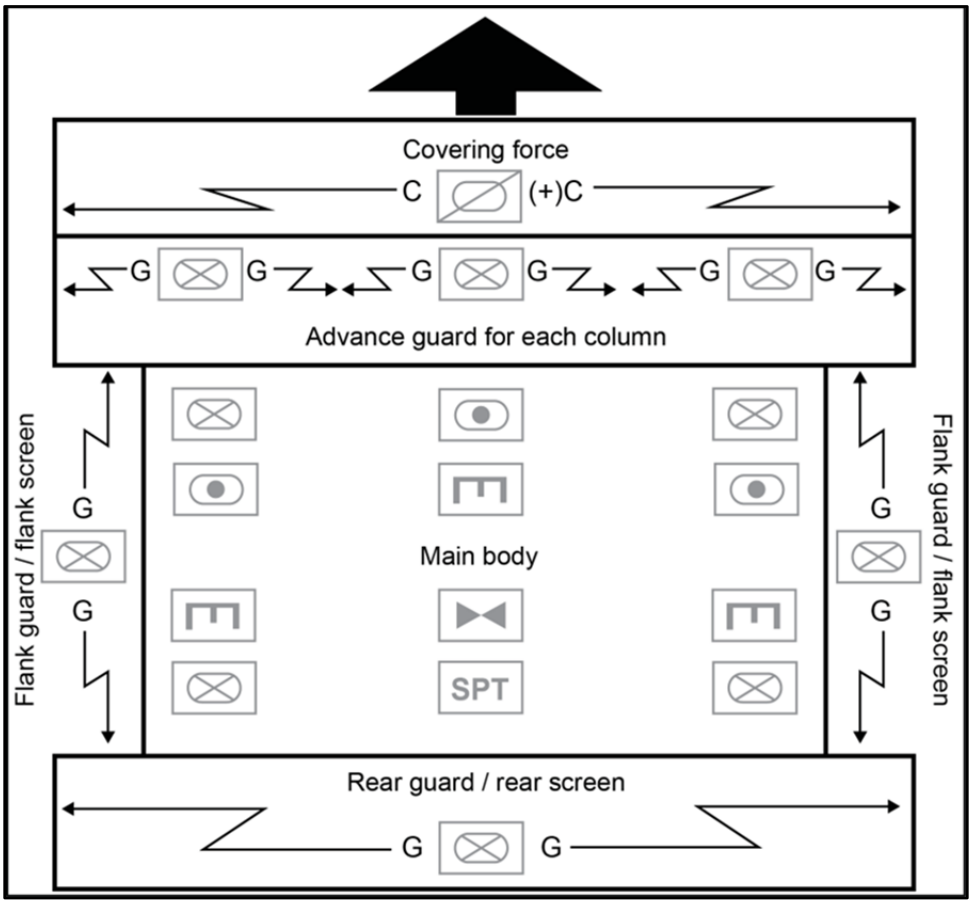


Figure 6-3. Task organized for a movement to contact

ATTACK

6-91. *Attack* is a type of offensive operation that destroys or defeats enemy forces, seizes and secures terrain, or both (FM 3-90). Attacks are violent engagements incorporating movement supported by fires against an enemy position with a force whose disposition is known and reasonably understood. However, based on mission variable analysis the commander may decide to conduct an attack using only fires. Attacks may be either a decisive or setting the conditions for future operation and, depending on the time available for planning, are characterized as either hasty or deliberate. An attack differs from a movement to contact because, in an attack, the commander knows part of the enemy's disposition. This knowledge enables the commander to better synchronize the attack and employ combat power more effectively in an attack than in a movement to contact. For more information on attack see FM 3-90.

6-92. During the attack, less centralized control of fires is used because the supported force will have the initiative. Allocation of FA fires for the supported command's main effort helps control the tempo of offensive operations. The main effort must be weighted by providing adequate FA fires.

6-93. As the attacking force moves forward, preparation fire destroys, neutralizes, or suppresses enemy positions and weapons systems. As defined in chapter 3, preparation fire is a brief, intense bombardment on selected targets or a prolonged effort over time covering a large number of targets. In planning fires, the supported commander and FSCOORD must weigh the probable effects of preparation fire against the achievement of surprise and the creation of obstacles capable of impeding friendly force movements. Preparation fire can continue while ground maneuver elements are moving. Preparation fire is planned by the commander planning the attack. The preparation fire may be phased as follows:

- Phase 1: Attack of enemy FS capabilities and observation capabilities, including artillery HQ and CPs.
- Phase 2: Attack of enemy main CPs, communication facilities, assembly areas, and reserves.
- Phase 3: Attack of enemy defensive areas in the forward portions of the enemy's AO, and targets that pose an immediate threat to attacking forces.

6-94. Timely displacements of FA units are essential for successful offensive operations. FA units move well forward prior to an attack, sometimes beyond the FLOT, displacing by echelon to provide continuous fires to the supported force. Units may be in danger of being left behind unless repositioning is frequent and synchronized to support the forward progress of the maneuver force. Displacements should maximize continuous delivery of fires and be completed as rapidly as possible. During the attack, TA WLR assets focus on identifying enemy systems that can interdict the supported unit as it moves toward the objective. Radars and observers linked to FS systems enable the supported unit's attack see figure 6-4 on page 6-22. Specific considerations to support an attack include:

- Attack enemy operational reserves and second echelon forces outside the AO to isolate first echelon forces.
- Support air operations with SEAD.
- Conduct strikes to slow and disorganize repositioning and withdrawing enemy forces.
- Destroy enemy C2 facilities to prevent coordination of their defense.
- Execute strikes in support of division, corps, JTF, or other supported command setting the conditions for future operations.
- Provide fires to support the penetration of enemy positions.
- Recommend support relationships for a BCT's FA BN when the BCT is held in reserve.
- Plan FS for follow-on offensive operations (pursuit, exploitation); ensuring routes have sufficient mobility to move rapidly.
- Plan for and provide preparation fires to facilitate attacks by the supported unit.
- Mass effects of fires against HPTs to meet criteria established by the force commander to set conditions for crossing the LOD.
- Provide fires to disorganize and disrupt enemy R or reserve formations.
- Mass fires against counterattacks.
- Provide fires to support raids and spoiling attacks.
- Plan for obscuration or screening smoke.
- Ensure radars are in position in time to support the assault on the objective and subsequent consolidation.
- Use echeloned movement to provide continuous radar coverage to the supported force.

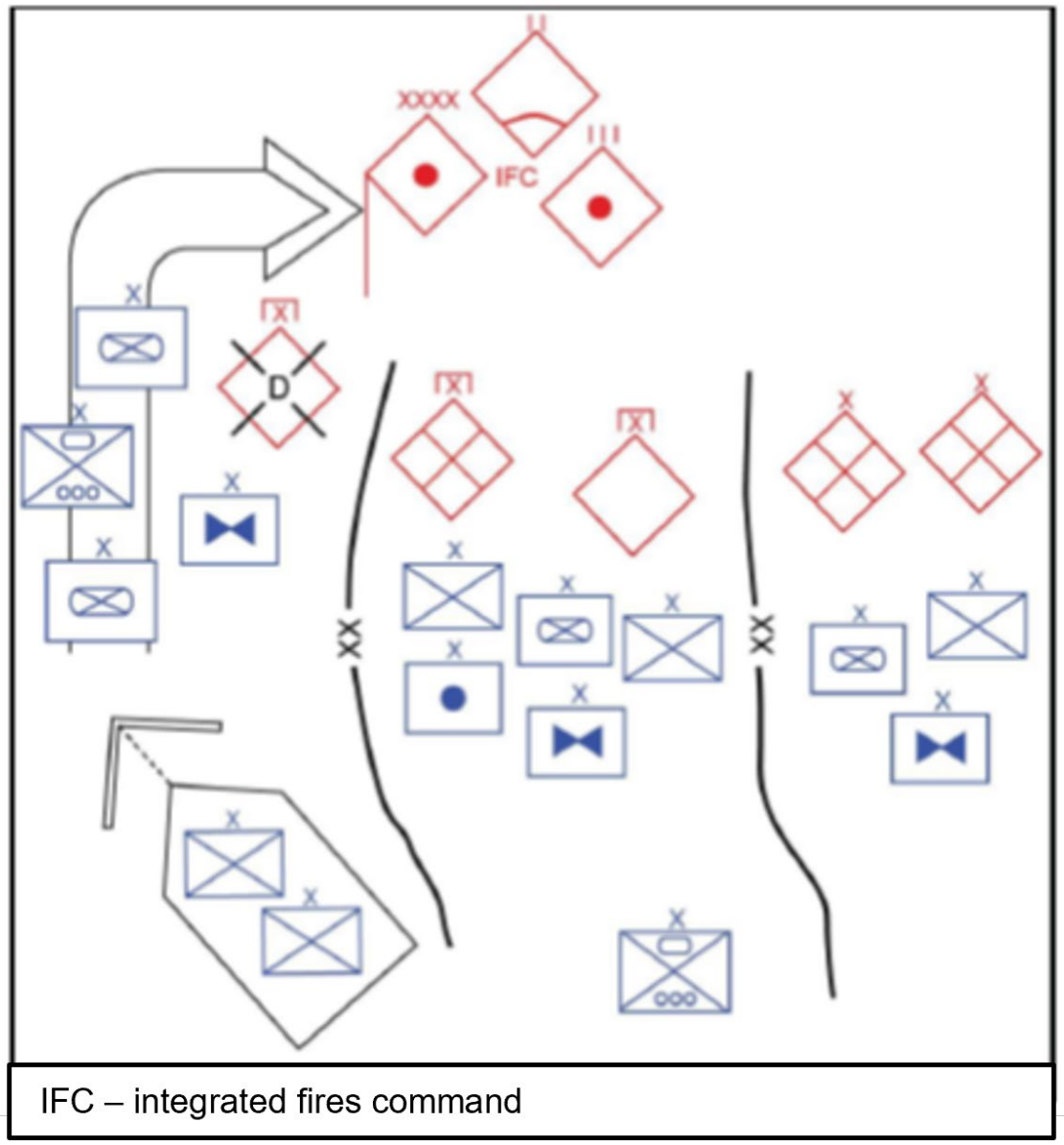


Figure 6-4. Example of Corps attack

EXPLOITATION AND PURSUIT

6-95. *Exploitation* is a type of offensive operation following a successful attack to disorganize the enemy in depth (FM 3-90). Exploitation is the primary means of translating tactical success into operational advantage. It exacerbates enemy force disorganization, confusion, and disruption of the C2 system caused by tactical defeat. Exploitation takes advantage of tactical opportunities to degrade enemy forces to the point where they have no alternative but surrender, be destroyed, or take flight. Typically, the supported commander does not assign a subordinate unit the mission of exploitation before starting a movement to contact or attack but reorganizes internally to reflect the existing mission variables of METT-TC (I) when the opportunity to exploit success occurs. Exploitation demands a force with sufficient mobility to maintain pressure on the fleeing enemy force. Joint fires, to include CAS, are the most flexible assets in an exploitation and pursuit.

6-96. FA units reposition to where they can support a renewed attack. Aviation assets can provide support while artillery systems reposition. A commander may need to request additional resources to include reconnaissance, surveillance, and TA WLR assets to help identify targets for attack.

6-97. *Pursuit* is a type of offensive operation designed to catch or cut off a disorganized hostile force attempting to escape, with the aim of destroying it (FM 3-90). A pursuit normally follows a successful exploitation. Unlike an exploitation, which may focus on seizing key or decisive terrain instead of the enemy force, the pursuit always focuses on completing the destruction of fleeing enemy forces by destroying their ability and will to resist. The commander in a pursuit tries to combine direct pressure against the retreating forces with an enveloping or encircling maneuver that fixes the enemy in positions where the enemy force can be defeated in detail. Fires can restrict movement of the enemy force and delay and disrupt its ability to quickly execute the maneuvers vital to protecting itself see figure 6-5.

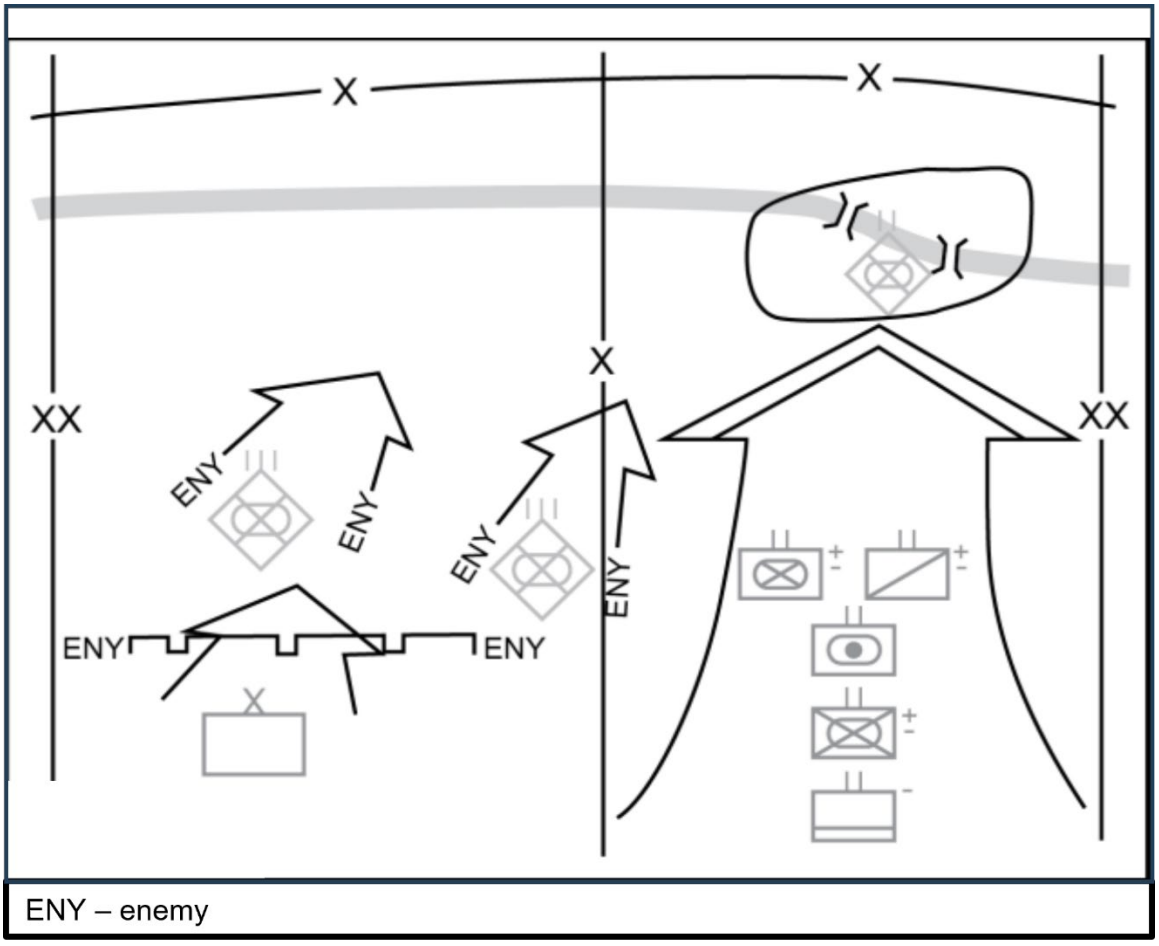


Figure 6-5. Exploitation and pursuit

6-98. An aggressively executed pursuit keeps the moving enemy unprepared, and unable to defend, ultimately faced with the options of surrendering or complete destruction. Pursuits require swift maneuver and attacks by forces to strike the enemy's most vulnerable areas. There are two options in conducting a pursuit; each involves assigning a subordinate the mission of maintaining direct pressure on the rearward moving enemy force. The first is a frontal pursuit that employs only direct pressure. The second is a combination that uses a subordinate element to maintain direct-pressure and one or more other subordinate forces to encircle the enemy. In the pursuit, the most decisive effects result from combining a direct pressure force and an encircling force (FM 3- 90).

6-99. There is generally little time to establish and affect new task organizations or support relationships between an attack and exploitation or pursuit. These operations transition very quickly from one to another.

During exploitation and pursuit, it is important to have decentralized execution authority and support relationships. Considerations for supporting a unit during exploitation and pursuit include:

- Conduct strikes on repositioning and withdrawing enemy forces to disrupt or slow the enemy's retreat.
- Exploiting forces should be allocated as much CAS and attack aviation as possible.
- Support CAB attack operations with SEAD.
- Destroy enemy C2 facilities to disrupt the enemy's ability to consolidate and reorganize.
- Use available aviation assets and joint fires to facilitate continuous fires on fleeing enemy forces while units are repositioned or moved with the exploiting or pursuing force.
- Plan fires to support the flanks and rear of pursuing or exploiting forces.
- Provide fires to destroy enemy hasty defenses and allow the continued pursuit of the enemy main body.
- Request, monitor, and update FSCMs as the exploitation and pursuit continues.
- Provide fires on obstacles and chokepoints to continue destruction of retreating enemy forces.
- Plan for greater use of retransmission capabilities.
- Plan for increased use of Class III (petroleum, oil, and lubricants) and Class V (ammunition of all types) supplies.
- Position WLRs to cover critical friendly assets that are vulnerable to indirect fire from bypassed regular or irregular forces.
- Monitor WLR acquisitions for indications of scatterable mine emplacement by the enemy.

THE RESERVE IN OFFENSIVE OPERATIONS

6-100. In the offense, a sizable reserve force exists. At the corps, the reserve may be a division, while at the division the fixed figure for a reserve force should not be estimated. The commander establishes its planning priorities for likely contingencies. A reserve reinforces or maintains the attack's momentum by-

- Exploiting success when the opportunity arises.
- Countering tactical reverses, such as an enemy counterattack against committed units.
- Sustaining the attack of a committed unit.
- Countering threats to the corps or division rear areas that exceed the capabilities of local forces to defeat.

6-101. In organizing the artillery for combat and in allocating other FS assets, the following must be considered:

- A plan for the use of FS organic assets to the reserve force until it is committed.
- Provision of adequate support to the force at the time of commitment.

6-102. Support relationships of GS to the corps, GSR to DIVARTY of a committed division and DS to a brigade are ideal missions for artillery of a reserve force. Positioning and ammunition expenditures can be controlled by the FFA HQ that has overall responsibility for FS. This helps the units make an easy transition to their on-order support relationship once their force is committed.

6-103. Plan fires to support the commitment of the reserve during movement. Fires are planned:

- On the flanks to protect the force.
- On the way to the objective.
- On the objective to destroy, neutralize, or suppress targets.
- Mass fires at the breakthrough point or at the point of assault to create a hole in the enemy defenses.
- Beyond the objective to prevent counterattacks, to help consolidate the objective, and to prevent reinforcement of the objective area.
- On enemy elements that have been bypassed.
- FSCMs such as CFLs must be well forward to ensure the force will not outrun them.

SUSTAINMENT FOR FIRE SUPPORT IN OFFENSIVE OPERATIONS

6-104. As units move forward and offensive combat operations are initiated, lines of communication extend, and detailed planning is required to accommodate increased rates of consumption. FS operations must be sustainable with fuel, ammunition, maintenance, and medical support by aerial and ground means. FS and sustainment planners must arrange for fuel to be pushed forward to allow artillery units to refuel with minimum disruption to operations. Planning should consider access to prepositioned forward corps and division assets to include refuel-on-the-move options and equipment recovery support. Refueling on the move is the preferred option for operations in the offense. During movement to contact, units should anticipate a disruption of resupply. They should carry sufficient supplies to support them through the movement to contact and ensuing battle.

6-105. Prior to crossing the LOD in support of offensive operations, firing units should use prepositioned ammunition stocks to fire preparations or other programs requiring extensive expenditure of ammunition. This will conserve up-loaded ammunition and permit advance into enemy territory with a maximum amount of accompanying ammunition stocks.

6-106. Sustainment operations during deliberate attacks should focus on weighting the main effort and the resupply of critical items such as fuel and ammunition and the provision of medical and maintenance support. Follow-on operations must be considered to ensure a swift transition into exploitation or pursuit operations.

TRANSITION TO THE DEFENSE

6-107. Commanders retain greater flexibility for defensive operations if they begin preparations before the force culminates. This may allow commanders to dictate where they conduct defensive operations. Commanders can plan future activities to aid defensive operations, minimize vulnerability to attack, and facilitate renewal of offensive operations as a force transitions to branches or sequels of an ongoing operation. For example, some of a commander's subordinate units may move into battle positions before the entire unit terminates the offense. Commanders can echelon sustainment assets forward to establish a new echelon support area.

6-108. If a force achieves its objectives, and the situation makes focusing on defensive operations inappropriate, then commanders transition to a security and stability focus. The commander's intent and concept of operations drives the design and planning for security and stability. Generally, commanders focus on meeting the minimum-essential stability tasks by providing security and ensuring the provision of essential food, water, shelter, sanitation, and medical services to the local inhabitants in their AO. This occurs in coordination with indigenous population and institutions and unified action partners before addressing the other stability concerns.

SECTION V – ENABLING, STABILITY AND RECONSTITUTION OPERATIONS

6-109. Commanders direct tactical enabling operations to support the performance of all offensive, defensive, and stability operations. Enabling operations are usually conducted by commanders as part of shaping operations and supporting efforts. A *supporting effort* is a designated subordinate unit with a mission that supports the success of the main effort (ADP 3-0). Enabling operations apply to all elements of decisive action. See For more information on enabling, stability, and reconstitution operations see ADP 3-90 and ATP 3-90.4.

ENABLING OPERATIONS

6-110. The tactical enabling operations are reconnaissance, security, troop movement, relief in place, passage of lines, mobility operations, and countermobility operations. They will be discussed in the following paragraphs.

RECONNAISSANCE

6-111. *Reconnaissance* is mission undertaken to obtain information about the activities and resources of an enemy or adversary, or to secure data concerning the meteorological, hydrographic, geographic, or other

characteristics of a particular area, by visual observation or other detection methods (JP 2-0). Reconnaissance accomplished by small units primarily relies on the human dynamic rather than technical means. Commanders orient their reconnaissance assets by identifying a reconnaissance objective within an AO. Reconnaissance is a focused collection effort. The *reconnaissance objective* is the most important result desired from that specific reconnaissance effort (FM 3-90). Although all units conduct reconnaissance, ground cavalry, aviation attack reconnaissance units, scouts, and Special Forces are specifically trained to conduct reconnaissance operations. The five types of reconnaissance operations are:

- Area reconnaissance.
- Reconnaissance in force.
- Route reconnaissance.
- Special reconnaissance.
- Zone reconnaissance.

6-112. FS considerations during reconnaissance operations are as follows:

- Orient fires on the reconnaissance objective.
- Use fires to help the reconnaissance force retain freedom of maneuver.
- Provide deception fires.
- Consider attaching FA assets to the supported reconnaissance force.
- FA units must have the mobility equal to that of the supported force.
- Main body FA units should be positioned forward to support reconnaissance elements.
- FS plans should only be executed if surprise is lost. While a fundamental of the reconnaissance is to gain and maintain enemy contact, it is not normally the intent of the reconnaissance elements to become engaged with the enemy.
- Report all information quickly and accurately.

SECURITY OPERATIONS

6-113. The main difference between conducting security operations and reconnaissance is that security operations orient on the force or facility being protected while reconnaissance orients on the enemy and terrain. The ultimate goal of security operations is to protect the force from surprise and reduce the unknowns in any situation. A commander may conduct security operations to the front, flanks, or rear of the friendly force. Setting the conditions for operation, economy of force is often a consideration when planning security operations. The four types of security operations are area, cover, guard, and screen. For more information on types of security operations see ADP 3-90.

6-114. FS considerations during security operations are as follows:

- Provide responsive fires for all security forces due to the typically limited number of maneuver units operating over a large area.
- Provide deceptive fires for covering forces and security forces in the offense, and fires to deceive the enemy in the defense. For example, by delivering effects in an area away from the friendly defensive positions. Forcing the enemy to deploy out of a traveling formation believing that they had made contact with the MBA forces.
- Provide proper FS allocations for covering and security forces which operate on a wide front, in a large area, and at great distances from the main body causing an imbalance of relative combat power. This includes additional CAS and attack helicopter allocations. For FA units, this could mean extreme decentralization of assets. The allocation of one FA BN in a DS relationship for each BN sized maneuver element in a covering force is appropriate.
- Plan fires for hasty attack and/or hasty defense.
- Plan fires for forward passage of lines for MBA forces in the offense, and rearward passage of lines of security forces in the defense. The control of indirect fires passes to MBA forces as covering forces hand over the battle. Detailed coordination between passing and stationary force commanders and FSCOORDs is essential.
- FA unit displacements in the offense and defense will be frequent, plan for routes and PAAs well in advance.

- Fire plans should be simple, most fires will be against targets of opportunity.
- Main body FA units should be positioned forward to support covering and other security forces.
- In the offense, FSCMs should be permissive and on-order, well in front of the rapidly moving covering force.
- On order CFLs should be established in conjunction with phase lines, as close as possible to friendly troops.
- FA units must have the mobility equal to that of the supported forces.
- Execute fires to assist maneuver in moving and disengaging.
- Suppress and obscure enemy overwatch positions.

TROOP MOVEMENT

6-115. *Troop movement* is the movement of Soldiers and units from one place to another by any available means (FM 3-90). Troop movements are made by different methods, such as dismounted and mounted marches using organic combat and tactical vehicles; motor transport; and air, rail, and water means in various combinations. FS considerations for troop movement are similar to the FS considerations for security operations listed above and by applying the FS functions.

RELIEF IN PLACE

6-116. A *relief in place* is an operation in which, by the direction of higher authority, all or part of a unit is replaced in an area by the incoming unit and the responsibilities of the replaced elements for the mission and the assigned zone of operations are transferred to the incoming unit (JP 3-07.3). There are three techniques for conducting a relief: sequentially, simultaneously, or staggered. Simultaneous relief takes the least time to execute but is more easily detected by the enemy. Sequential or staggered reliefs can occur over a significant amount of time. These three relief techniques can occur regardless of the operational theme in which the unit is participating see figure 6-6 on page 6-28.

6-117. A relief does not normally require artillery units to relieve weapon system for weapon system, unless the terrain limits the number of firing positions available. Generally, the relieved unit's artillery and other FS assets remain in place until all other relieved elements displace and are available to reinforce the fires of the relieving unit in case the enemy tries to interfere. If the purpose of the relief is to continue the attack, the FS attack/delivery systems of both forces generally remain in place to support the subsequent operation. FS considerations during a relief in place include:

- The relieving unit adopts the FS plan of the unit being relieved.
- The FS assets of both units support the relief. This maintains FS if the enemy detects the relief and tries to exploit the situation.
- Plan fires to deceive the enemy and expedite the relief.
- FS attack/delivery systems maintain normal activity patterns. For example, a unit continues to expend the same average number of artillery rounds per day during the relief that it expended before the initiation of the relief.
- The commander does not relieve FA units at the same time as the units they support. Relieving FA units do not occupy previously used firing positions. Instead, relieving firing units establish firing positions near those firing positions of the relieved unit and carefully integrate their fire with that of the relieved unit.
- Occupying firing positions at night or during periods of poor visibility enhances operations security.

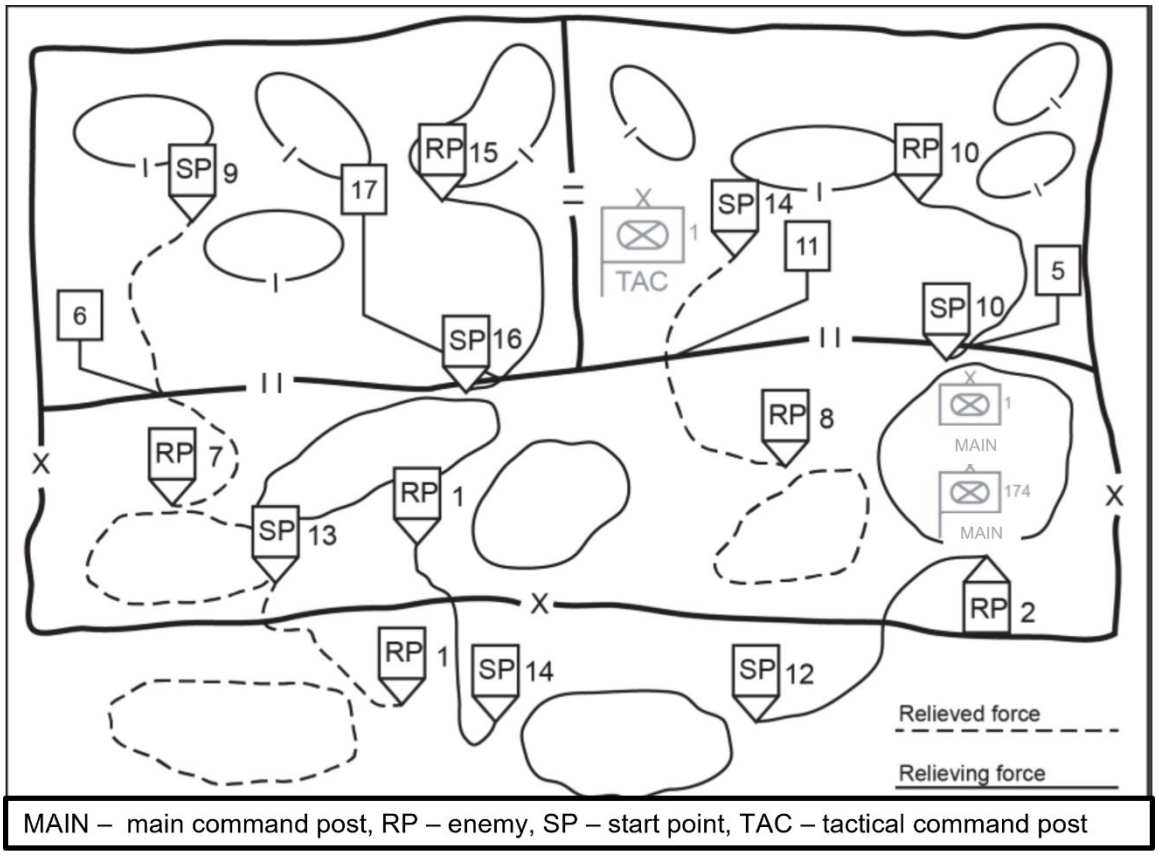


Figure 6-6. Relief in place

PASSAGE OF LINES

6-118. *Passage of lines* is an operation in which a force moves forward or rearward through another force's combat positions with the intention of moving into or out of contact with the enemy (JP 3-18). A passage may be designated as a forward or rearward passage of lines. A commander conducts a passage of lines to continue an attack or conduct a counterattack, retrograde, or security operation when one unit cannot bypass another unit's position. The conduct of a passage of lines potentially involves close combat. It involves transferring the responsibility for an AO between two commanders.

6-119. Commanders must recognize that the transfer of control has impacts on FS. For example, the FS support attack/delivery system may have an on-order support relationship. Responsibility for FS coordination passes from the FSCOORD of one force to the FSCOORD of the other force at the time the force commanders change C2.

6-120. Close coordination of plans between the commanders and staffs of the involved forces is mandatory. Once the passage of lines is ordered, the FSCOORD of the passing force in a forward passage of lines should send a liaison section to the FSCOORD of the force in contact. In a rearward passage, the FSCOORD of the stationary force should send a liaison section to the FSCOORD of the passing force. FSCOORDs define and assign mutually agreed upon FS responsibilities to facilitate the passing force. Information that the two FSCOORDs should share and areas that should be coordinated are shown below. The important point to remember is that each unit will be in the AO of another unit for a period of time and that detailed coordination is vital to ensure that each of the two units understands how the other operates. The units must do the following:

- Exchange unit SOPS.
- Exchange existing targets and fire plans.

- Provide status of unit TA assets.
- Exchange attack guidance and casualty criteria.
- Exchange control measures in effect; for example, FSCMs, passage points, passage lanes, and contact points.
- Coordinate recognition signals.
- Provide information on obstacles and barriers.
- Coordinate position areas.
- Exchange intelligence.
- Coordinate clearance of fire procedures.

6-121. During forward passage the FA assets of the passing force should be infiltrated early from the rear assembly area to the designated primary positions to support the operation. These positions should be near the passage lanes but not so close that they interfere with the supported force movement. On a forward passage, position priority goes to the passing force. During the passage of lines, the passing force FSE and CP collocate with the stationary force FSE and CP. Position areas forward of the passage points are selected based on anticipated rate of movement of the supported forces and terrain availability. Also, they are selected away from passage points.

6-122. During rearward passage the FA assets of the stationary force should be positioned well forward to provide deep fires to support the withdrawal of the passing force. Again, these positions should be away from passage lanes. In the rearward passage, the stationary force has positioning priority. As the passing force FA assets moves through, it should position behind the stationary FA assets and move laterally away from the passage lanes.

6-123. FS planning considerations for a forward passage of lines are as follows:

- Ensure the stationary force supports the close operation while the passing force indirect fire assets complete the passage.
- Ensure counterfire is planned and controlled by the stationary force.
- Obscure the enemy's forward observation of the passage.
- Plan fire on HPTs; for example, enemy direct-fire systems, C2, enemy FS assets, and air defense targets.
- Plan fires to support the deception plan.
- Plan smoke to screen friendly movement through passage points.
- Plan fires to interdict enemy counterattacks and reinforcements in the area of passage.
- Plan appropriate FSCMs as follows:
  - Plan on-order CFL.
  - Consider restrictive fire areas (RFAs or NFAs) on passage points.
- Ensure passing force plans fires to support operations after the passage of lines.
- Plan CFZs on passage points and assembly areas.
- Continually update the CFL. FSCOORDS and FSOs must know the lead element's position continuously.
- Assign priority of fire to the passing force.

6-124. FS planning considerations for a rearward passage are as follows:

- Plan obscurants to conceal movement through passage points.
- Plan massed fires to disengage forces.
- Plan fires to support obstacle and or barrier plans.
- Plan fires to support the deception plan.
- Plan FSCMs as follows:
  - RFAs or NFAs at passage points.
  - On-call CFLs.
- Plan CFZs on passage points and assembly areas.

- Ensure the stationary force supports the close operation while the passing force indirect-fire assets complete the passage.
- Ensure counterfire is planned and controlled by the stationary force.
- Plan fires on passage points to be fired after friendly units have passed through. Consider use of scatterable mines to close passage lanes.
- Ensure the stationary force plans fires to support operations after the passage of lines.
- The FSE of the stationary force sends liaison to the FSE of the passing force.

MOBILITY OPERATIONS

6-125. Freedom to move and maneuver within an OA is essential to the application of combat power and achieving results across the range of military operations. An OE will present numerous challenges to movement and maneuver. These are typically overcome through the integration of combined arms mobility and countermobility in support of mission requirements.

BREACHING OPERATIONS

6-126. The plan must synchronize combat multipliers to isolate the point of penetration. *Breach* is a tactical mission task in which a unit breaks through or establishes a passage through an enemy obstacle. (FM 3-90). The breaching force employs all available means to break through or establish a passage through an enemy defense, obstacle, minefield, or fortification. As a general rule, obstacles are covered by fire; a primary role for the FA is to suppress the weapons systems that can engage the rupture force. The staff integrates maneuver, CAS, artillery, mortars, Army aviation, electronic attack, the employment of scatterable mines, air defense, obscuration, and deception to create the conditions for the success of the breaching operation. Additionally, the maneuver force must continue to fight well beyond the breach area to stop the enemy from counterattacking or repositioning to reinforce the enemy unit targeted for penetration. Detecting and engaging the enemy's reserve is a primary concern. The FS planners must carefully balance resource requirements (such as Army indirect fires and CAS) for isolating the point of penetration with the requirements of the element conducting the breach. The breaching fundamentals are suppress, obscure, secure, reduce, and assault. They can be remembered with the memory aid SOSRA.

6-127. Suppress:

- Suppress enemy's direct fire systems near the breach site.
- Suppression must also be effective against the enemy's indirect fires that can range the breach site.
- The FSCOORD should designate the breach site as a CFZ for WLRs.
- Suppress the enemy to allow the follow-and-support force to get into the support by fire position.

6-128. Obscure:

- Reduce effectiveness of direct fire weapons against the breach and assault elements.
- Screen the follow-and-support force movement to the support by fire position, if necessary.
- Smoke should be used with fog or darkness to maximize effectiveness.
- The commander must decide on the priority for the munition types.
- Smoke may attract enemy attention or degrade friendly TA or control.

6-129. Secure:

- Mortars and FA continue suppression and obscuration as necessary while maneuver forces secure the breach site.
- Support stay-behind forces.

6-130. Reduce:

- As maneuver forces with engineer support reduce the obstacle and creates lanes the FA and mortars should continue suppression fires and be prepared to lift or shift fires.
- CAS and attack helicopters should disrupt enemy counterattack forces.
- Upon reduction of the obstacle and after a foothold is established on the far side of the obstacle, obscuring smoke should be lifted.

6-131. Assault:

- As the maneuver force assaults through breach to destroy the enemy, FA and mortars should continue suppression fires and be prepared to lift or shift fires as the force approaches the enemy battle positions.

6-132. Key EFSTs in support of a breaching operation include:

- Mortars - provide suppression and obscuration or screening fires.
- FA - isolate the breach area and suppress the enemy; provide obscuration/screening fires, and in coordination with the S-3, establish/manage radar CFZs.
- CAS - isolate and suppress the enemy; disrupt the enemy counterattack.
- Attack helicopters - isolate and suppress the enemy; disrupt the enemy counterattack.
- Intelligence - locate and identify HPTs among enemy units in the vicinity of the breach area.
- Electronic attack - identify, locate, and jam the enemy communications associated with units in the vicinity of the breach area.
- Obscuration (projected and generated) - isolate the breach area.
- Scatterable mines - prevent repositioning of enemy forces without hindering friendly actions on the objective; disrupt the enemy counterattack.

6-133. FSE work closely with the G-2 during IPOE and information collection. Scouts and other observers can often provide accurate targeting. The FSCOORD and FSE planners may designate the reduction area (or points of breach) and support-by-fire positions providing cover as WLRs CFZs so that they are treated as priority targets for counterfire support. The key is getting targeting information into the FS system and executing fires at the critical time. Scouts and other observers can also be effective in setting and controlling fires for obscuration within the breach area by adjusting fires and correcting for the actual conditions of wind speed and direction.

6-134. In accordance with the scheme of fires, tasks to be executed by FS (to include mortars) in support of the breach may include:

- Provide fires for obscuration and suppression.
- Destroy or suppress enemy artillery and mortars.
- Destroy or suppress enemy antitank weapon systems.
- Destroy or suppress enemy dismounted infantry positions.
- Delay, disrupt, and neutralize enemy repositioning forces.
- Destroy, suppress, or obscure enemy observation posts.

6-135. The commander designates and assigns priority targets to make indirect fires more responsive to the supported unit execution. Observers must be employed to effectively engage such targets during a maneuver force breaching operation. The FSCOORD, FSE and fire control personnel monitor the command network and lift and shift fires at the critical time, should the primary executor be unable to execute.

6-136. Attack/delivery systems cross the obstacle with the forces they support to extend the breach and ensure continuous support of follow-on operations. Positioning is critical at the breach area. FS assets should be positioned to support the breaching operation, but not interfere with the approach, the breach, or assault forces. Breaching operations consume a significant amount of ammunition. Planners must consider pre-positioning stocks of smoke, HE, and precision munitions.

6-137. In coordination with the G-3, the FSCOORD and FSE consider the requirements for protection at the breach area. They also plan for WLRs zones and consider the enemy phases of fire for defensive operations. The FSCOORD and FSE consider CFZs and FSCMs between the enemy and the breach area, and the support and breach force positions. They also consider establishing NFAs or RFAs around scouts or other observers, and RFLs for forces converging on the objective.

6-138. The commander may give the priority of indirect fires to the unit most likely to encounter an obstacle. The FSE maintains a focus on the critical tasks and continuously adjusts the plan as required to accomplish the mission. FS planning guidelines for breaching operations include:

- Use IPOE techniques to designate enemy high-value targets and identify HPTs for attack.

- Plan EA assets to defeat explosive device threats, disrupt enemy information collection, reconnaissance, and surveillance efforts, and detect enemy use of the EMS for targeting purposes.
- Use scouts or other observers to identify and monitor target around the breach area prior to arrival of main body.
- Refine targets based on intelligence and the knowledge of the actual breach area.
- Plan target handoff with observers or scouts.
- Position primary and alternate observers focused on identification of HPTs.
- Plan priority of fires to the rupture force and then to the follow-and-assume force.
- Plan and firing smoke to cover movement of the follow-and-assume force into the support-by-fire position. Fires for obscuration or screening should start before the follow-and-assume force enters the direct fire range of enemy systems.
- Determine the placement (wind condition), density, and timing of obscuration smoke on enemy positions and screening smoke between the enemy and the reduction area.
- Plan triggers to lift or shift fires from obscuration to suppression when necessary.
- Plan FSCMs such as RFAs and RFLs and WLR CFZs at the breach area, support-by-fire position(s), and the objective once it has been secured by the rupture force.
- Recommend that the units focus on antitank weapon systems and dismounted infantry and suggest additional smoke, if required.
- Rehearse and communicate when the conditions have been met to commit the breach force.

6-139. Once the follow-and-assume force is deployed, it must rapidly develop and disseminate a fire plan designating sectors of fire and observation to ensure all possible enemy positions are covered. Observation is particularly critical. Observers with the follow-and-support force initially bring indirect fires on enemy positions to fix them in place. The observers should also cue the organic FA and its R artillery to prepare immediate counterfire. The follow-and-assume force then adjusts obscuration. The follow-and-assume force is responsible for controlling fires for suppression and obscuration and for setting the conditions for the breach.

6-140. Effective suppression must be applied against the enemy's fires since the rupture force will be exposed for a lengthy period. Air support and electronic attack is planned for and employed, if available. FA and mortars provide smoke for obscuration. Attack/delivery assets should be positioned to fire the mission. Obscuration fires can be fired simultaneously with suppressive fires so that the smoke builds before the friendly forces move forward. Smoke is targeted and adjusted to obscure or screen the breach from direct fire. It is difficult to use smoke to obscure enemy fires on the obstacle during the breach because of the close proximity to friendly troops. Using a combination of HE and smoke as the last rounds fired during a preparation on the assault objective provides some obscuration to conceal the breach area. Additional smoke and HE munitions may be required to keep the breach force obscured and seeking cover depending on the gap to be breached, the proficiency of the breach force, weather, and other factors.

6-141. Fire control measures are essential, as both the follow-and-assume and the rupture forces are firing on the enemy when the operation begins. Suppression of enemy observer positions continues, and other enemy forces remain fixed by fires until the breach has been achieved and the enemy is destroyed or dislodged. The rupture force should assume control for direct fire on the assault objective as follow-and-assume force fires are lifted or shifted.

6-142. The FSCOORD integrates all types of FS attack/delivery capabilities to create the conditions for the success of the breaching operations. FS plays a role in every fundamental of breaching, but especially during suppress and obscure. Below are some example FS considerations during breaching operations:

- Synchronize with supported units to isolate the point of penetration.
- Suppress enemy weapons systems that can engage the rupture force.
- Obscure all likely enemy observation locations or screen friendly movement; use obscurants for deception in order to protect the breach site.
- Establish CFZs on breaching sites.

- Ensure TA resources adequately set conditions at breach site prior to the arrival of the main body. Correctly identifying where to penetrate, suppress and obscure, and communicating that information quickly, is imperative.
- Predict likely enemy locations, and plan on-call fires accordingly.
- Plan for the shifting of priority of fires to the support force, then to the assault force. Establish the triggers.

GAP CROSSING

6-143. Corps and divisions can be expected to conduct gap crossings as part of offensive and defensive operations. Like the passage of lines, gap crossings are usually implied tasks rather than primary missions. Gap crossings involving corps and divisions present several challenges to be overcome, particularly in the area of FS. The six phases of a gap crossing are discussed below.

- Set the Conditions (Phase I). This phase consists of all planning and continued fires targeting operations in the deep, close, and support areas designed to defeat deep and close enemy forces to synchronize one or more gap-crossing operations with all warfighting function capabilities across all domains.
- Advance to the gap (Phase II). The second phase is the attack to seize objectives that secure the nearside terrain, which offers favorable crossing sites and road networks and provides enough area to stage crossing forces while preventing congestion and an undesirable massing of assets.
- Assault across the gap (Phase III). The third phase involves units assaulting across the gap to seize the far side objective, eliminating direct fire into the crossing sites.
- Advance from the far side (Phase IV). The fourth phase is the attack to secure the exit bank and intermediate objectives that eliminates direct and observed indirect fires into the crossing area.
- Secure the bridgehead line (Phase V). The fifth phase includes the tasks necessary to secure bridgehead objectives, defeating any enemy counterattacks. This gains the necessary time and space for the buildup of forces for the attack out of the bridgehead.
- Continue the attack (Phase VI). The sixth phase is the attack out of the bridgehead to defeat the enemy at a subsequent or final objective. It is considered as a phase of the gap crossing because the timing and initiation of this phase are typically dependent on the success of the other five phases of the gap crossing.

6-144. Commanders must plan to quickly cross whatever rivers or streams are in the path of advance. A wet-gap crossing requires special planning and support. The size of the obstacle and the enemy situation will dictate how to make the crossing. Attackers should strive to cross rivers without loss of momentum regardless of how they get across. The planning requirements for each type of gap crossing are similar. However, the required degree of detail and necessary conditions for a high degree of success will vary based on the type and the unique features associated with a crossing mission. For more information on gap crossing see, ATP 3-90.4. The gap crossing types:

- *Deliberate crossing* is the crossing of an inland water obstacle or other gap that requires extensive planning and detailed preparations (ATP 3-90.4). It requires the use of rafting (nonbridging) and bridging assets. The use of assault craft, rafting, or ferries and the emplacement of bridging assets may occur sequentially or concurrently. The objective in deliberate wet-gap crossings is to project combat power to the exit bank of a river or other type of significant water obstacle at a faster rate than the enemy can concentrate forces for a counterattack. Typically, wet-gap crossings are one of the most difficult types. They generally require significant augmentation of mobility support assets.
- *Hasty crossing* is the crossing of an inland water obstacle or other gap using the crossing means on hand or those readily available, and made without pausing for elaborate preparations (ATP 3-90.4). Hasty gap crossings are usually focused on a combined arms activity to project combat power across a terrain feature (wet or dry) that can be overcome by self-bridging assets within the BCT. These assets may be organic, provided to the BCT as augmentation, or found as expedient crossing materials within the AO. Typically, a hasty gap crossing is a gap that is 65 ft or less in width. They are normally accomplished with tactical bridging. A hasty gap crossing may also include support bridging and the use of expedient bridging or gap crossing by other means.

- *Covert crossing* is a planned crossing of an inland water obstacle or other gap in which the crossing is intended to be undetected (ATP 3-90.4). The primary purpose of the covert crossing is to facilitate undetected infiltration of the far side of a gap. A covert crossing is normally conducted by BN and smaller forces. It is used when surprise is essential to infiltrate over a gap and when limited visibility and terrain present the opportunity to reduce or defeat the enemy obstacle (gap) without being seen. Through surprise, the commander conceals capabilities and intentions and creates the opportunity to position support and assault forces to strike the enemy unaware or unprepared.

6-145. Commanders use the same organic C2 nodes for gap crossings as they do for other missions. These nodes, however, take on additional functions in deliberate gap crossings. This may require some temporary collocation of HQ cells and an increase in communication means. Commanders conducting a deliberate gap crossing organize their units into assault, assured mobility, bridgehead, and breakout forces discussed below:

- Assault force seizes the far side objective to eliminate direct fire on the crossing sites.
- Assured mobility forces such as combat engineer companies, mobility augmentation companies and mobility assault companies, bridge companies, military police, and CBRN units that provide crossing means, and traffic control.
- Bridgehead force assaults across a gap to secure the enemy side (the bridgehead) to allow the buildup and passage of a breakout force during gap crossing.
- Breakout force attacks to seize objectives beyond the bridgehead as a continuation of the offense.

6-146. A successful gap crossing is characterized by applying gap-crossing fundamentals. These fundamentals are applied when a gap is encountered in the OA. These fundamentals are as follows:

- Surprise.
- Extensive preparation (less for hasty crossing).
- Flexible planning.
- Traffic management.
- Organization.
- Speed.

6-147. FS Considerations for gap crossings are below:

- Plan fires at depth to isolate the bridgehead area from enemy reinforcement.
- Plan fires to soften enemy defense and crossing sites and to seal- off exit bank positions.
- Establish CFZs on crossing sites and staging areas.
- Make fires immediately available to crossing forces. If necessary, have GS artillery fire while DS artillery is crossing.
- Assign priority of fires to assault forces.
- Assign nonstandard missions to GS units. Change the priority of calls for fire, fire planning, and other inherent responsibilities as necessary.
- Plan smoke and suppression fires in greater than normal amounts if necessary.
- Use smoke to screen both actual and dummy crossing sites.
- Use smoke to obscure enemy direct-fire positions in the bridgehead area until the crossing forces can engage them.
- Suppress enemy forces in the bridgehead area until the assault force can provide its own suppressive fires.
- Use all available TA assets to identify targets in the bridgehead area.
- Have indirect-fire weapons cross the river with the forces they support.
- Use CAS and attack aviation to expand the bridgehead.

COUNTERMOBILITY

6-148. *Countermobility* a set of combined arms activities that use or enhance the effects of natural and man-made obstacles to prevent the enemy freedom of movement and maneuver (ATP 3-90.8). The primary purposes of countermobility operations are to shape enemy movement and maneuver and to prevent the

enemy from gaining a position of advantage. Countermobility operations are conducted to support forces that are operating along the range of military operations. Countermobility operations directly support offensive and defensive operations. For more information on countermobility operations see ATP 3-90.8.

6-149. Commanders must ensure that obstacles are integrated with observation and fires to defeat or disrupt enemy attempts to breach friendly obstacles. These fires must be fully synchronized with the concept of operations to avoid hindering any friendly-force mobility. Consider the use of scatterable mines to prevent repositioning of enemy forces without hindering friendly actions, and to disrupt the enemy counterattack.

ENCIRCLEMENT

6-150. Encirclement is no longer an enabling operation but is still a desired outcome. There are special planning considerations required to create, maintain, reduce, and when encircled, break out of an encirclement. Encirclements are an outcome that can result from offensive operations to isolate and destroy enemy forces or result from a friendly force being isolated by enemy forces. *Encirclement* is where one force loses its freedom of maneuver because an opposing force is able to isolate it by controlling all ground lines of communications and reinforcement (FM 3-90). A unit can conduct offensive encirclement operations designed to isolate an enemy force or they could become encircled resulting from the unit's isolation by the actions of an enemy force see figure 6-7 on page 6-36.

6-151. Defending forces can become encircled at any time during large-scale combat operations. This is especially true during noncontiguous operations. An encircled force can continue to defend encircled, conduct a breakout, exfiltrate toward other friendly forces, or attack deeper into enemy-controlled territory. A commander's form of maneuver once becoming encircled depends on the senior commander's intent and the mission variables METT-TC (I). It is important for the encircled force to continue its mission, establish communication with higher HQ, and act on its own initiative within the intent of the higher commander. The most likely COA facing the encircled force is to try a breakout toward friendly forces and prepare for linkup operations.

6-152. The following must be considered in a breakout toward friendly troops:

- Plan fires to support the immediate defense and the breakout.
- Reorganize available FS assets, and coordinate with FS elements outside the encircled force for additional FS.
- Establish FSCMs.
- RFAs around encircled forces and RFLs between converging breakout and linkup forces should be considered. Airspace coordination areas in the vicinity of the breakout point are necessary if CAS is used.
- Concentrate massed and continuous fires at the breakout point to open a gap for the rupture force.
- Plan for WLR sectors of search, use CFFZs over known and suspected enemy locations and place CFZs over the encircled force.
- Plan for linkup operations by establishing FSCMs to facilitate FS operations between friendly forces.
- Make use of all lethal and nonlethal capabilities to deceive the enemy as to the location of the breakout.

6-153. Offensive encirclement operations are conducted by corps and division to isolate targeted enemy forces. Typically, encirclements result from penetrations and envelopments, or are extensions of exploitation and pursuit operations. As such, they are not a separate form of the offense but an extension of an ongoing operation. They may be planned sequels or result from exploiting an unforeseen opportunity.

6-154. Once a decision is made to reduce an encirclement, the commander normally uses one of two possible methods of reduction-fire alone or fire and maneuver. Reduction by fire alone implies that the encircling friendly commander will use FS as the primary or sole means of reducing the encirclement. This includes employing artillery, direct fires, CAS, CEMA, attack helicopters and armed UAS against the enemy perimeter. Reduction by fire alone reduces the number of casualties suffered by the friendly encircling force. For more information on offensive and defensive encirclement see FM 3-90.

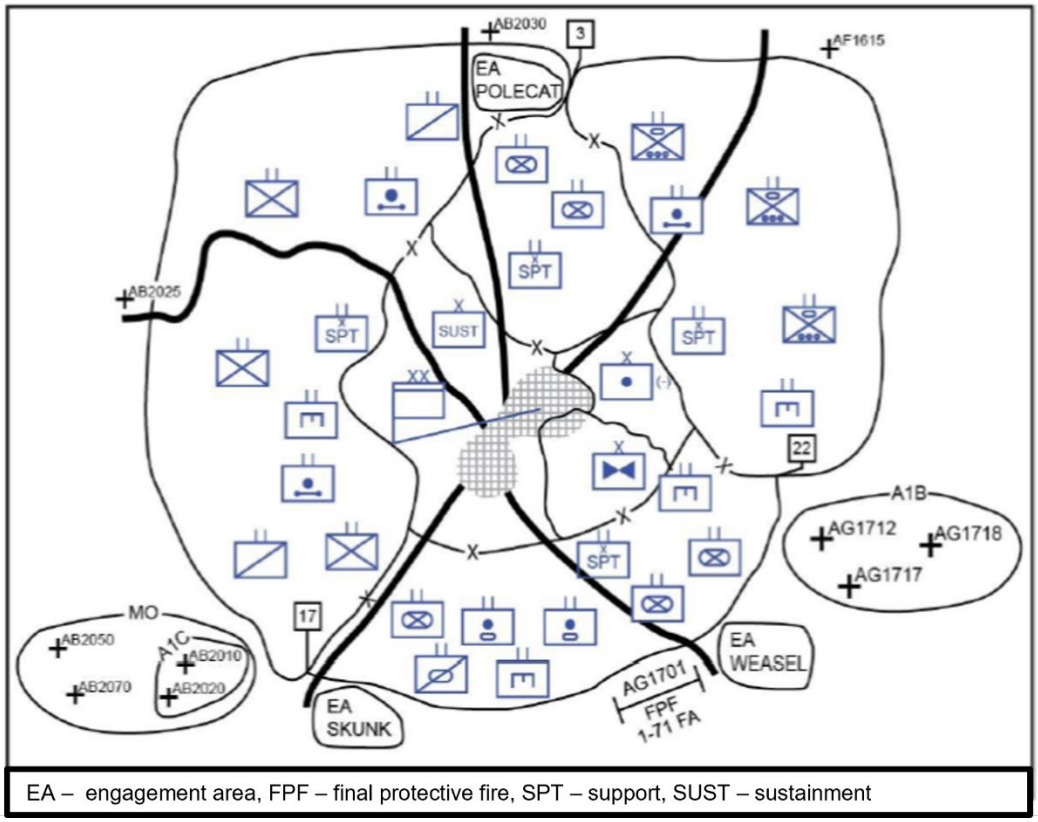


Figure 6-7. Encirclement example

STABILITY OPERATIONS AND REAR AREA FIRE SUPPORT

6-155. Large-scale combat operations involve the combination of offense, defense, and stability operations. A *stability operation* is an operation conducted outside the United States in coordination with other instruments of national power to establish or maintain a secure environment and provide essential governmental services, emergency infrastructure reconstruction, and humanitarian relief (ADP 3-0). The priorities and effort given to stability operations vary within subordinate unit AO. Corps and division commanders analyze the situations they face to determine the minimum-essential stability operations and the priority associated with each operation. This analysis includes a planned transition to consolidation of gains in OAs once large-scale combat operations culminate.

6-156. *Consolidate gains* are activities to make enduring any temporary operational success and to set the conditions for a sustainable security environment, allowing for a transition of control to other legitimate authorities (ADP 3-0). Consolidation of gains is an integral and continuous part of armed conflict, and it is necessary for achieving success across the range of military operations. Operations to consolidate gains will be conducted simultaneously with all other strategic roles, to include large-scale combat operations. Army forces deliberately plan to consolidate gains during all phases of an operation. While Army forces consolidate gains throughout an operation, consolidating gains becomes the focus of Army forces after large-scale combat operations have concluded. Operations to consolidate gains require combined arms capabilities and the ability to employ fires and manage airspace, but at a smaller scale than large-scale combat operations.

6-157. The four FS functions, planning principles, and principles of FS execution during stability operations are the same as during offensive and defensive operations. The actions of FS personnel are framed by the disciplined application of force while adhering to the ROE. Considerations for FS during stability operations include:

- Stability operations are often conducted in noncontiguous areas of operation. This can complicate the use of FSCMs, the ability to mass and shift fires, and clearance of fires procedures.
- Fires may be used more frequently to defend key sites than to seize them.
- Additional planning for the use of precision and near precision munitions and employment of additional nonlethal capabilities may be necessary to limit collateral damage.
- Planning FS to demonstrate capabilities, provide a show of force, or to provide AD fires.
- An increase in the amount and types of restrictive FSCMs may be appropriate.

REAR AND SUPPORT AREA OPERATIONS

6-158. *Rear operations* are tactical actions behind major subordinate maneuver forces that facilitate movement, extend operational reach, and maintain desired tempo (FM 3-0). *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 (FM 3-0). In large-scale combat operations, a maneuver enhancement brigade is assigned to the rear and support area, and it provides support to forces in contact with the enemy.

Threats In The Support and Rear Area

6-159. Threats in the support and rear areas are categorized by the three levels of defense required to counter them. Any or all threat levels may exist simultaneously. Emphasis on base defense and security measures may depend on the anticipated threat level described below:

- A *level I threat* is a small enemy force that can be defeated by those units normally operating in the echelon support area or by the perimeter defenses established by friendly bases and base clusters (ATP 3-91). A level I threat for a typical base consists of a squad-sized unit or smaller groups of enemy soldiers, agents, or terrorists.
- A *level II threat* is an enemy force or activities that can be defeated by a base or base cluster's defensive capabilities when augmented by a response force (ATP 3-91). A typical response force is an MP platoon (with appropriate supporting fires); however, it can be a combined arms maneuver element. Level II threats consist of enemy special operations teams, long-range reconnaissance units, mounted or dismounted combat reconnaissance teams, and partially attrited small combat units.
- A *level III threat* is an enemy force or activities beyond the defensive capability of both the base and base cluster and any local reserve or response force (ATP 3-91). It consists of mobile enemy combat forces. Possible objectives for a level III threat include seizing key terrain, interfering with the movement and commitment of reserves and artillery, and destroying friendly combat forces. The division response to a level III threat is a tactical combat force (TCF). A *tactical combat force* is a rapidly deployable, air-ground, mobile combat unit with appropriate combat support and combat service support assets assigned to and capable of, defeating Level III threats, including combined arms (JP 3-10). The TCF requires tactical mobility and enough combined arms capability to deal with the threats it is likely to face. It should include or be supported by fires, aviation, and engineer assets. (FM 3-0). Should the TCF with its supporting artillery be committed, the FSO will coordinate with the FSE for additional FS attack/delivery systems as needed to assist base, base cluster, or other response forces countering level II or III threats. The TCF will retain priority of fires.

FIRE SUPPORT CONSIDERATIONS

6-160. 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 base or base cluster units or by the response force. These threats are usually individual or small-unit operations, are of limited scope and duration, and provide too fleeting a target for successful engagement by indirect-fire assets. Considerations that affect the application of FS in the rear area include:

- The reduction of FS capabilities to the MBA.
- The responsiveness of the available weapons systems.
- The precision and collateral damage effects of the weapon systems.

- The availability of observers to identify and adjust targets.

6-161. Rear area operations are conducted to ensure friendly forces retain freedom of action to support combat forces engaged in deep and close area operations. The focus is on protecting the most critical capabilities and attacking bypassed enemy forces. There are not enough FA assets to dedicate firing units to rear area support as their sole or primary mission. Additionally, surface fires may not be the most responsive asset available for FS in the rear area, given range and clearance requirements. The FSCOORD assigns support relationships to corps or division rear area operations. They meet these requirements by assigning GS and GSR relationships to FA units able to range the rear area while continuing to perform their primary missions in support of deep and close operations.

6-162. Fires must be planned in support of maneuver forces conducting reconnaissance and establishing security while eliminating pockets of resistance in the rear area. Fires are planned to support forces conducting a hasty defense to block possible enemy counter attacks. FS and fire planning must be tailored to the more restrictive ROE and the potential congestion of the rear area. The most responsive FS assets in the rear area are Army armed attack aviation, CAS, armed UAS and mortars.

6-163. All maneuver forces assigned to the rear area must have adequate FS assets to execute fires in support of area security, base and base cluster security, and defense. FS assets will destroy enemy remnants, enemy SOF, and protect forces transiting through the rear area. FS attack/delivery systems located in the rear area do not constitute FS in reserve. For example, FA units supporting the TCF or other units in the rear areas are committed FA. Other considerations for FS in the rear areas are:

- Army aviation or CAS aircraft may be the most responsive FS asset for use in the rear areas. Attack helicopters provide one of the most rapidly available assets to engage rear area incursions. Army aviation also may be used to rapidly displace towed artillery to critical firing positions. Commanders should consider allocating dedicated CAS missions to the rear area.
- Terrain management, airspace management, and clearance of fires present unique challenges to FS in the rear area. The rear area CP must be augmented with FS personnel to address these challenges (to include JTACs).
- Since the TCF is considered a committed force, the functions for FS coordination apply. This coordination includes a DS BN supporting a brigade size TCF. A BN size TCF is supported by a cannon battery.
- The allocation of some of the artillery committed to the TCF for support of the overall rear area may be appropriate since one BN split into battery fire bases could cover a considerable area of the rear area until the TCF is committed to ensure 6400 mil coverage. Also, consider the use of FA units undergoing reconstitution operations as partially available to provide a level of FS for the rear area.
- FSCMs must be more restrictive to protect friendly units. Permissive FSCMs must be approved by the division or corps FSE.
- Consider leveraging multinational FS attack/delivery platforms that are not permitted to conduct offensive operations by national caveats but are permitted to conduct defensive operations.

Airspace Control In The Rear Area

6-164. Divisions require the capability to control airspace while corps participate in airspace control through the commander's guidance and subordinate divisions. The commander's priorities, timing, and effects as well as the airspace control appendix of the operations order (Appendix 10 to Annex C) provide guidance on the use of airspace. Airspace control in the consolidation and support areas may be accomplished by a variety of methods. For example, the JFC designated airspace coordination area may delegate airspace control to a division responsible for the rear area which enables the corps to coordinate airspace for fires and other airspace users.

6-165. If the corps is primarily conducting rear operations to consolidate gains, then it may choose to temporarily locate a division JAGIC at the corps CP to maintain situational awareness of the entire rear area. The nature of corps sustainment operations and long-range fires requires a responsive airspace control system. To account for anticipated surface fires, the corps should include specific coordination measures (to include position areas for artillery and missile flight paths) as part of their unit airspace plan.

CLEARANCE OF FIRES

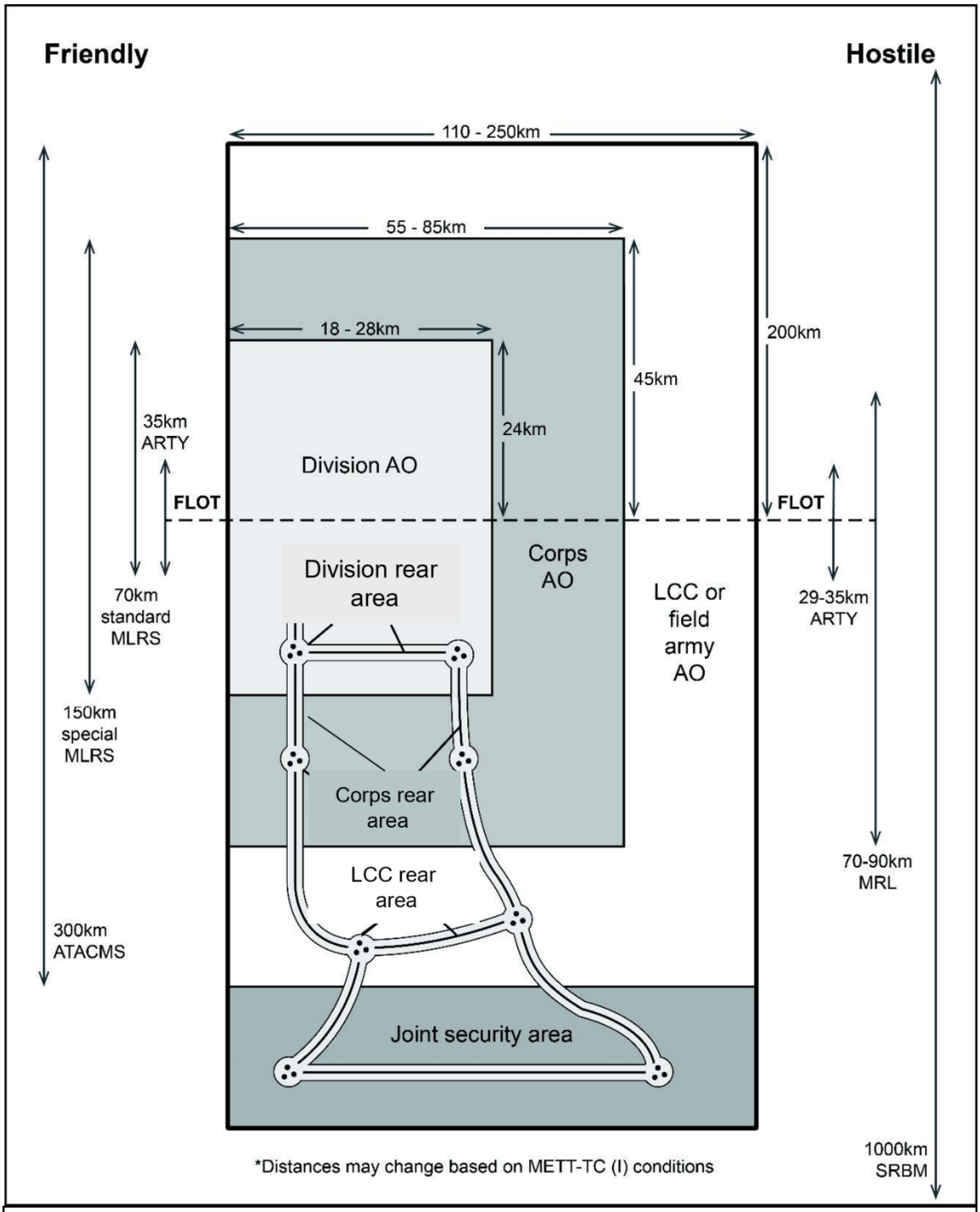
6-166. The rear area CP must be staffed with the necessary intelligence, FS, and airspace control personnel to plan, answer calls-for-fire, and coordinate additional enablers for support area security forces and units transiting through the rear area. The commander must decide how to deconflict fires in the rear area. Liaison personnel can facilitate the deconfliction of fires in support of units moving in the rear area.

6-167. The BCTs air defense airspace management cell must be tied into the division JAGIC to clear airspace for the rear area. In this instance the BCT commander must clear fires for the rear area. Targeting working groups and target coordination boards must be aligned with close, deep, and rear operations to compete for resources.

6-168. FSCOORD and FS personnel must be aware of their left and right boundaries and the FS assets of adjacent units. They must have FSCMs in place and be aware of clearance procedures for cross boundary fires. CAB assets should be task organized to respond to threats in the rear area. The FSCOORD and FS personnel must integrate base cluster defenses into rear area support plans.

6-169. Conditions and triggers must be established for shifting the FSCMs. In addition, triggers must be established for moving the division and BCT rear boundaries forward as the rear area conditions change. There must also be procedures in place for the battle hand over NAIs, TAIs and any significant activities logs.

6-170. Figure 6-8 on page 6-40, shows the complexity of FS in the rear area. In addition to coordinating FS for the BCT in a division's rear area, the rear area CP or rear area FSCOORD must also consider airspace and terrain deconfliction for division- and corps-level GS and GSR shooters supporting the close and deep area operations. Additionally, movement along critical lines of communication (main supply routes and alternate supply routes) may be contested and may require FS within the rear area to facilitate movement to and from supported units in the close area. The HQ elements, support nodes, and base clusters likely in and around the support area will present large target signatures and increased ground and air traffic, requiring additional assets and coordination through the rear area CP. The fight in the rear area is complex and will require detailed planning and rehearsal to adequately support operations in the close and deep areas.



AO – area of operations, ARTY – artillery, ATACMS – Army Tactical Missile System, FLOT – forward line of troops, KM – kilometers, LCC – land component command, METT- TC(I) – mission, enemy, terrain and weather, troops and support available, time available, civil considerations, information considerations, MLRS – multiple launch rocket system, MRL – multiple rocket launcher,
SRBM – short-range ballistic missile
– base clusters, ═══ – main and alternate supply routes

Figure 6-8. Division Rear Area

RECONSTITUTION OPERATIONS

6-171. The scale, complexity, and increased destructive power of large-scale combat operations assumes an all-encompassing fight, potentially resulting in the greater loss of personnel, weapon platforms, supplies, and equipment of our warfighting formations. Under exceptional conditions, with severely degraded units, constrained time, and limited or no personnel replacements, commanders may make the decision to execute reconstitution. Reconstitution must be planned and resourced from the beginning of any operation. The commander directing the reconstitution mission uses assets under their control, along with those provided by higher echelons.

6-172. Reconstitution of organizations will likely occur in the rear area. The maneuver unit assigned responsibility for the rear area is primarily concerned with defeating bypassed forces but must be prepared to facilitate reconstitution operations. This includes training replacement personnel, receiving equipment, and integrating with civil authority operations.

6-173. Reconstitution consists of two major elements-reorganization and regeneration. Reorganization is the expedient cross-leveling of internal resources within an attrited unit in place to restore necessary combat effectiveness as directed by the unit commander. Regeneration is the intentional restoration of a unit's combat power that requires time and resource intensive operations which includes equipment repairs or replacements, supply replenishment, mission essential training, and personnel replacements in accordance with theater commander guidance. Reorganization may include such measures as:

- Cross-leveling equipment and personnel.
- Matching operational weapons systems with crews.
- Forming composite units (joining two or more degraded units to form a single mission-capable unit).

6-174. Immediate reorganization is the rapid and usually temporary restoration of attrited units to minimum levels of effectiveness. Normally, the commander implements immediate reorganization in the combat position or as close to that site as possible to meet near-term needs. Immediate reorganization consists of cross-leveling personnel and equipment, matching weapon systems to crews, or forming composite units (joining two or more attrited units to form a single mission capable unit) (for more information see FM 4-0).

6-175. Deliberate reorganization is conducted when more time and resources are available. It usually occurs farther away from hostile activity than immediate reorganization. Procedures are similar to those for immediate reorganization; however, some replacement resources may be available. Also, equipment repair is more intensive and more extensive cross-leveling is possible (for more information see FM 4-0).

6-176. Regeneration is the intentional restoration of a unit's combat power and is considerably more resource-intensive than reorganization. Regeneration is also time-intensive and normally requires days to weeks to execute. It requires large-scale replacement of personnel, equipment, and supplies. Regeneration involves reestablishing or replacing the chain of command and conducting mission-essential training to get the regenerated unit to a required readiness standard. Because of the intensive nature of regeneration, it occurs at a designated regeneration site after the unit disengages from combat operations. The regeneration site is normally situated in a relatively secure location away from the battlefield, but still most conducive to regenerate combat power under the constraints of time and geography (for more information see FM 4-0).

6-177. Regeneration is a deliberate operation to rebuild the unit. It is directed by a higher commander that has the resources to accomplish the mission, often two or more echelons above the attrited element. Unit leadership and cohesion will be preserved when it is possible. The regeneration operation will always include a training program to focus on essential collective tasks to obtain a specific level of combat effectiveness for the upcoming mission.

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Appendix A

Development of Essential Fire Support and Essential Field Artillery Tasks

This appendix includes an overview of development of EFSTs and EFATs. An EFST is an essential element of the FS plan. An EFAT is a task given to a FA unit or organization that supports the commander's scheme of maneuver. An EFST is a critical element of the FS plan that must be accomplished for mission success. The task must be clear, concise, and include the elements of task, purpose, method, and effect. EFATs must accomplish a well-defined result in execution of the EFST.

SECTION I – ESSENTIAL FIRE SUPPORT TASK

A-1. The EFST states the supported maneuver task and the type(s) of effects the fires delivery unit (Army or joint) must provide for that phase of the operation. The task describes what FS must accomplish to support the operation. It consists of the objective, formation, and function. The purpose defines the friendly maneuver goal and states the supported commander's purpose and desired end state for the targeted enemy formation, function, or capability. The purpose describes the why of the EFST. The method is how we will engage the target using priority, allocation, and restrictions. The effect identifies the desired result or outcome the delivered fires and effects are to create. As the FSCOORD and FS planner's war-game a EFST during planning, they identify assets to accomplish the task, and describe the desired effect to be created.

A-2. The fire support tasks that must be accomplished to achieve the supported commander's mission are designated as EFSTs. Failure to achieve an EFST may require the commander to alter the tactical or operational plan. Fully developed EFSTs consist of a task, purpose, method, and effect. The FA BN uses EFSTs that have a method of "FA" as the start point for defining EFATs. The task is described as the effect that fires must have on an enemy formation's function or capability. The task is enemy oriented. The purpose is described in terms of the benefit that accomplishment of the EFST gives to the supported commander. This is described as being friendly oriented. The effect is the quantified, observable result of successful accomplishment of the task. The effect is stated as relative condition of the friendly force in relationship to the enemy. For an example of an EFST checklist, (see table A-1).

Table A-1. Essential Fire Support Task Development Checklist

Purpose of fires – From the commander's intent for fires
Phase
Task:
Objective.
Disrupt.
Degrade.
Delay.
Destroy.
Neutralize.
Suppress.
Formation – Number and type of enemy vehicles
Function – "The enemy's ability to… Prevent the enemy from doing "
Purpose: "To enable, to allow… (friendly maneuver goal)

Table A-1. Fire Support Task Development Checklist (continued)

Method :
Priority.
FA priority of fire.
Mortar priority of fire.
Close air support – priority to destroy_____.
Special munitions – priority to engage_____.
Allocation.
Shooter.
Target number.
Description.
Munitions.
Trigger.
Alternate shooter.
** return to a) until all targets in essential fire support tasks are addressed.
Targets and final protective fire delegated – tied to a trigger.
Mortar position.
Azimuth of fire.
Position area.
Targets.
Close air support target.
Suppression of enemy air defenses targets?
Marking round?
Any other special instructions.
Restrictions.
a) Ammunition restrictions.
b) Fire support coordination measures.
1) Fire support coordination line.
2) Coordinated fire line.
3) Airspace coordinating area.
4) Restricted fire area.
5) No fire area.
c) Rules of engagement.
D. Effects.
1. Maneuver task oriented, complete fire support tasks.
a) “Unable to identify battle positions”
b) “Vehicles screened, no direct fire”
2. Quantify number of vehicles.
a) Separate by fire type.
b) Effect for each target.

A-3. As the staff, FSCOORD, and FS planners build the COA, they determine how best to create the commander's desired effects. FS planning serves as a basis for identifying EFSTs and for preparing the subsequent FS plan. The staff and FS planners determine where to find and attack enemy formations to create desired effects.

A-4. EFSTs are synchronized and executed with other combined arms tasks. The FSCOORD considers the enemy COA and the IPOE, of where the enemy formations, functions or capabilities can be found and attacked. The staff graphically portrays these locations using target areas of interest or EAs. Certain sub-elements, capabilities, or equipment sets within the formations may be more vulnerable to attack or provide the highest payoff if attacked. These are further identified or refined as HPTs. See table A-2 for an example of an EFST.

Table A-2. Essential fire support task example

Essential Fire Support Task 1
Task: Degrade enemy indirect fire system's ability to place effective fires on the wet gap crossing.
Purpose: Allow unimpeded crossing.
Method: **Priority of fires:** BN mortars to AN/TPQ-Q-50 radar; FA to A Company on-order B Company; CAS to C Company. **Allocations:** A Company 1x FA platoon priority target. **Positioning guidance:** BN mortars occupy mortar firing position 1 not later than H-6. **Restrictions/ FSCMs:** ROZ 22 in effect 0600-0900; critical friendly zone 1 in effect; ROZ FALCON in effect 1145-1430Z.
Effect: Enemy indirect fire systems are not able to interfere with wet gap crossing.
BN – battalion, CAS – close air support, FA – field artillery, FSCM – fire support coordination measure, H – hour, ROZ – restricted operations zone

DEVELOPING THE FIRES PARAGRAPH

A-5. To prescribe the procedures for formulating and formatting the fires paragraph of a OPORD or OPLAN. As a subparagraph to the concept of operations, the fires paragraph describes the scheme of fires that, along with the scheme of maneuver communicates how the force as a whole will achieve the commander's intent. The primary audience for the fires paragraph is the subordinate commanders and their staffs and must clearly describe the logical sequence of EFSTs and how they contribute to the concept of operations.

A-6. The overall paragraph organization should mirror that of the scheme of maneuver paragraph. If the maneuver paragraph is phased or otherwise organized, the fires paragraph will take on the same organization.

A-7. The internal format for the fires paragraph uses four subcategories: task, purpose, method, effects. Within each phase of an operation, each EFST will be described in the sequence of planned execution using task, purpose, method, effects. The fires paragraph must be concise but specific enough to clearly state what fires are to accomplish in the operation.

ESSENTIAL FIRE SUPPORT TASK DEVELOPMENT

A-8. Based on the FS planning guidance, the EFSTs are refined from the commander's intent and scheme of fires. The following paragraphs describe the process of developing an EFST using task, purpose, method, effects.

TASK

A-9. Task describes the targeting objective fires must create against a specific enemy formation's function or capability. These formations are HPTs or contain one or more HPT. The task is developed by considering the objective, formation, and function.

A-10. The objective outlines several terms to describe the targeting objective. The most common terms used are degrade, disrupt, delay, destroy, neutralize, and suppress. Examples and definitions of the common terms are found in chapter 3.

A-11. A formation can be a specific element or sub-element of the enemy. It can be specified by a specific vehicle type or target category as long as the element or sub-element is clear.

A-12. The enemy's function is a capability of the formation that is needed for it to achieve its primary task and purpose. For example, what is the formation doing that is unacceptable? What do we want the formation to do or not to do? The following is an example of a developed task sentence: Disrupt the ability of (objective) the enemy maneuver force at the point of penetration (formation) to place effective direct fire against friendly breach force (function).

PURPOSE

A-13. The purpose describes the maneuver or operational purpose for the task. When describing purpose use the maneuver purpose from the OPORD. Identify the maneuver formation that will leverage the targeting effect and describe in space and time what the effect will accomplish. An example of the purpose, "To allow the maneuver element to occupy far side positions while conducting wet gap crossing operations without becoming decisively engaged by enemy forces."

METHOD

A-14. The method describes how the task and purpose will be achieved. It ties the detect function with the deliver function in time and space and describes how to achieve the task. Method is developed using priority, allocation, restriction. It includes:

- Priority of fire.
- FPF.
- Observers (primary and alternate).
- Positioning.
- Command and support relationship.
- Naval gun fire.
- AI.
- FSCMs.
- Execution triggers.
- Special munitions restrictions.
- Target allocation.
- Priority targets.
- CAS.
- Attack aviation.
- Other specific instructions.

A-15. Priority assigns priority of fires to execute the task outlined. FA, other observers, or acquisition means. When an acquisition asset focuses exclusively on a task, that information can be communicated here. An example of CAS using priority would be, "CAS is to destroy the tanks in the enemy reserve." This part of the method can also provide focus by using NAIs, TAIs, targets, or EAs to describe where the attacks will occur.

A-16. *Allocation* is the distribution of limited forces and resources for employment among competing requirements (JP 5-0). For the shooter, it describes the distribution of attack/delivery assets to accomplish the EFSTs. Attack/delivery assets may include FA fires to destroy, neutralize, suppress, obscure, or screen, CAS, and attack helicopters. In method, the FA and other attack/delivery assets can identify their part of accomplishing the EFST. It is from the method of a FS task that the FA and other FS and TA assets develop their tasks.

A-17. Restriction which is the method can also outline any limitations or restrictions on accomplishing the tasks. Ammunition such as no improved conventional munitions on the objective, FSCMs, ACMs, or other restrictions that may affect the accomplishment of the FS task.

A-18. FS planners use the memory aids of target, trigger, location, observers, delivery, attack guidance, communications (refers as TTLODAC) and purpose, location observer, trigger, communications, and resources (ref as PLOT-CR). TTLODAC lends itself best to organizing FS planning and publishing information in annex D (fires) and use during technical rehearsals within the fires warfighting function. PLOT-CR is a better method for briefing specific targets during tactical rehearsals with the supported force. For instructions and examples see tables A-3 through A-6, page A-5 through A-8.

EFFECTS

A-19. The effects quantify the successful accomplishment of the task. Effects provide the observer or TA asset with a measure of completion of the task. If multiple delivery assets are involved it helps delineate what

each effect must accomplish. Effects provides a measure of when the task is accomplished. It also provides the basis for the assess function in targeting and determines if there is a need to reengage the target.

Table A-3. Sample matrix for each fire support task

Phase: State the phase of the operation or descriptor if required.							
Task (what): State the supported or maneuver commander task and the type(s) of effects the fires unit must provide for that phase of the operation (suppress, neutralize, interdict, divert, exploit, deny, delay, deceive, disrupt, degrade, destroy, obscuration, or screening)							
Purpose (why): State the supported or maneuver commander purpose and the desired end state for the targeted enemy formation, function, capability. (There may be more than one task or purpose per phase).							
Priority of fire: State the priority of fire to subordinate units for all fires assets under the unit's command or control.							
Allocations: List any additional assets assigned to subordinates for planning. Examples are priority targets, radar zones, attack aviation.							
Positioning guidance: Provide positioning guidance to assets such as mortars or observers required for execution.							
Restrictions: List all restrictions for the phase.							
FS Task	**(T)** Target	**(T)** Trigger	**(L)** Location	**(O)** Observers	**(D)** Delivery System(s)	**(A)** Attack Guidance	**(C)** Communications
List the task number the target supports.	List the target number or type of target.	State the trigger tactical or technical for the target.	Give the location of the target.	State the observer of the target (primary and alternate).	State the delivery system for the target (primary and alternate).	State the attack guidance or method of engagement for the target.	State the frequency and communication network the target will be called in on (primary, alternate, contingency, or emergency).
Notes: This is an alternate location that may include allocation of resources, positioning guidance, restrictions, and coordination information. List information deemed necessary. Describe the scheme of cannon, rocket, and missile fires in support of operations. Include specific tasks to subordinate FA headquarters. Address any potential requirements for massing fires that may affect organic, direct support, or reinforcing fires units. Identify the timing and duration of specific identified fire plans, such as counterfire, preparations, suppression of enemy air defenses, or joint suppression of enemy air defenses. Refer to Appendix 4 (FA Support) to Annex D (Fires) as required.							

Table A-4. A completed matrix example for essential fire support tasks (memory aid TTLODAC)

Phase: II Decrease effectiveness of indirect fire on wet gap crossing							
Task (what): Essential Fire Support Task (EFST) 1: Provide counterfire to disrupt the enemy's ability to place accurate indirect fire on wet gap crossing.							
Purpose (why): EFST 1 Purpose 1: Allow the unimpeded crossing of the wet gap.							
Priority of fire: BN mortars to AN/TPQ-Q-50 radar; FA to A Company on-order B Company; CAS to C Company.							
Allocations: A Company 1x FA PLT priority target.							
Positioning guidance: BN mortars occupy mortar firing position 1 not later than H-6.							
Restrictions/FSCMs: ROZ 22 in effect 0600-0900; critical friendly zone 1 in effect; ROZ FALCON in effect 1145-1430Z							
FS Task	**(T)** Target	**(T)** Trigger	**(L)** Location	**(O)** Observer(s)	**(D)** Delivery System(s)	**(A)** Attack Guidance	**(C)** Communications
EFST 1	1x 82-mm mortar section; 3 personnel & white or gray pickup truck	0600–0900Z	Vicinity of EV 12344567 (TAI 156)	Primary: FIST 1 (with joint terminal attack controller) Alternate: CAS (F-16) call sign Maverick; Q-53	Primary: 1xPLT 105-mm Alternate: CAS (F-16 x 2);	105-mm 3 x volleys high explosive/ variable time; CAS 1 x joint direct attack munition	Primary - AFATDS FH300; Alternate - BCT ALO, FH 570.
EFST 1	KE2000	1200–1400Z as acquired	NAI 20	Primary: A Company Alternate: B Company	Primary: 120-mm mortar Alternate: 105-mm	5 rounds high explosive	Primary - BN Mortar Net FH570 Alternate- Fires Net FH350
EFST 1	KE2005	1200–1400Z as acquired	NAI 21	Primary: A Company Alternate: B Company	120-mm mortar	5 rounds high explosive	Primary - BN mortar net FH570; Alternate - Fires net FH350
Notes: none							
AFATDS – Advance Field Artillery Tactical Data System, ALO – air liaison officer, AN/TPQ – Army/Navy (Marine) transportable radar special purpose (multipurpose), BCT – brigade combat team, BN – battalion, CAS – close air support, EFST – essential fire support task, FH – frequency hopping, FIST – fire support team, mm – millimeter, NAI – named area of interest, net – network, PLT – platoon, ROZ – restricted operations zone, TAI – target area of interest, Z -- zulu							

Table A-5. Sample matrix for fire support tasks (memory aid PLOT-CR)

Phase: State the phase of the operation or descriptor if required.							
Task (what): State the supported or maneuver commander task and the type(s) of effects the fires unit must provide for that phase of the operation (suppress, neutralize, interdict, divert, exploit, deny, delay, deceive, disrupt, degrade, destroy, obscuration, or screening)							
Purpose (why): State the supported or maneuver commander purpose and the desired end state for the targeted enemy formation, function, capability. (There may be more than one task or purpose per phase).							
Priority of fire: State the priority of fire to subordinate units for all fires assets under the unit's command or control.							
Allocations: List any additional assets assigned to subordinates for planning. Examples are priority targets, radar zones, attack aviation.							
Positioning guidance: Provide positioning guidance to assets such as mortars or observers required for execution.							
Restrictions: List all restrictions for the phase.							
FS Task	**(T)** Target	**(P)** Purpose	**(L)** Location	**(O)** Observer(s)	**(T)** Trigger	**(C)** Communications	**(R)** Resources
List the task number the target supports	List the Target number or type of target.	Purpose of the planned fires and the desired end state.	Give the location of the target.	State the observer of the target (primary and alternate).	State the trigger (tactical or technical) for the target.	State the frequency and communications network the target will be called in on (primary, alternate, contingency, or emergency).	State the delivery system for the target (primary and alternate).
Notes: This is an alternate location that may include allocation of resources, positioning guidance, restrictions, and coordination information. List information deemed necessary. Describe the scheme of cannon, rocket, and missile fires in support of operations. Include specific tasks to subordinate FA headquarters. Address any potential requirements for massing fires that may affect organic, direct support, or reinforcing fires units. Identify the timing and duration of specific identified fire plans, such as counterfire, preparations, suppression of enemy air defenses, or joint suppression of enemy air defenses. Refer to Appendix 4 (FA Support) to Annex D (Fires) as required.							

Table A-6. A completed matrix example for essential fire support tasks (memory aid PLOT-CR)

Phase: II Assault on Objective Bears							
Task (what): Essential Fire Support Task (EFST) 1: Provide obscuration fires to disrupt the enemy's ability to observe breaching operations. EFST 2: Provide suppressive fires to disrupt the enemy mechanized infantry platoons' ability to place effective direct fire on the breach site.							
Purpose (why): EFST 1 Purpose 1: Enable the successful breaching operation. EFST 2 Purpose 2: To enable the successful breaching operation.							
Priority of fire: Field Artillery: A Company; Mortars: B Company.							
Allocations: A Company 1x Critical Friendly Zone; C Company 1x FA Priority Target.							
Positioning guidance: Mortars move along Route REDLEG and occupy mortar firing position 1 (azimuth of fire 1600); in place ready to fire not later than H+ 30 minutes.							
Restrictions/FSCMs: Coordinated fire line is Phase Line RED; No-Fire Areas 1 & 2 in effect.							
FS Task	Target	**(P)** Purpose	**(L)** Location	**(O)** Observer(s)	**(T)** Trigger	**(C)** Communications	**(R)** Resources
EFST 1	AB1000	Disrupt enemy's ability to observe breaching operations.	NG1234 4567	Primary: A Company Alternate: C Company	A Company lead element crosses Phase Line Blue.	Primary: BN mortar net FH800 Alternate: FA fire direction net FH700	Primary: BN mortars. Alternate: FA 20 minutes x 200 meters smoke
EFST 2	AB1005	Disrupt the enemy's mechanized infantry platoons' ability to place effective direct fire on the breach site.	NG4567 1234	Primary: B Company FIST HQ Alternate: 1/B FO	When support by fire position 1 is set.	Primary: FA fire direction net FH700 Alternate: BN fire support net FH600	Primary: FA BN, 6 rounds high explosive/ variable time; Alternate: Attack aviation
Notes: none							
BN – battalion, EFST – essential fire support task, FA – field artillery, FH – frequency hopping, FIST – fire support team, FO – forward observer, FS – fire support, FSCM – fire support coordination measure, HQ – headquarters							

ESSTENTIAL FIELD ARTILLERY TASK DEVELOPMENT

A-20. A task for the FA that must be accomplished to achieve an EFST. A fully developed EFAT has a task, purpose, method, and effects. The task describes the effects of fires against a specific enemy formation. The effects of fires include destroy, neutralize, suppress, screen, or obscure. The purpose is a summary of the task and purpose from the EFST. The method describes how the task will be accomplished by assigning responsibilities to the FA firing unit. The method is described by covering three categories priority, allocation, and restrictions. Priority provides the firing unit with priority of fires and priority of survey. Allocations include movement triggers, routes, PAA, azimuth of fire, priority targets, FPF, and radar zones. Restrictions cover FSCMs, ACMs and survivability movement criteria. Effects is a quantification of the EFAT and positioning of FA units. For an example of an EFAT check list, (see table A-7 and table A-8 on page A-10).

Table A-7. Example of an essential field artillery task

Phase: II (Attack)
TASK: Destroy/Neutralize/Suppress/Degrade/Disrupt/Delay (QUANTIFY #/%) on FORMATION IVO LOCATION AT TRIGGER/TIME IN SUPPORT OF MANEUVER/SUPPORTED COMMANDERS TASK. • EFAT 1: Destroy 30% of 19th FAB/ 11th IN BDE Medium Artillery (6/18 x 2S19 and 2/6 x 2A36/ 2A65) and counter BTRY radars (2/4 x IL 220s) IVO TAI XX NLT H-4hrs IN SUPPORT OF 1-1 BN seizure of OBJ Bronze. • EFAT 2: Suppress 2/2 ZSU IVO Hill 509 from H-4min to H+4min ISO 2-2BN air assault on OBJ Silver
PURPOSE: State the supported/ maneuver commander quantifiable task and desired end state for the targeted enemy formation/function/capability. Priority 1: Enable 1-1 BNs attack to seize OBJ Bronze with 80% or greater combat power; 11th BTG unable to defend OBJ Bronze. Priority 2: ZSUs unable to effectively engage RW assets; min force 7/9 RW chalks successfully arrive LZ
METHOD: Primary CF BTRY is Bravo BTRY, BTRY 9 HE or BTRY 3 DPICM. B BTRY remains in PAA 3 during this phase to ensure 2/3rds range at 5H beyond OBJ Bronze; Alternate PAA is PAA 2. Alternate CF BTRY is Charlie BTRY from PAA 4; Alternate PAA is PAA 5. Primary BTRY for targets for dynamic engagement is Alpha BTRY, BTRY 9 HE or BTRY 3 DPICM for PLT sized elements and larger. Alpha moves from PAA 2 to PAA 5 as 1-1 BN crosses PL Ironwood in order to maintain a minimum of 2 launchers available to range on OBJ Bronze. Suppression missions are BTRY 3 HE or BTRY 1 DPICM or duration as required. The Alternate dynamic target BTRY is Charlie BTRY in position at PAA 4 during this phase; Alternate is PAA 7.
EFFECTS: MOP: A measure of performance is used to measure a friendly action that is tied to measuring task accomplishment (JP 3-0). “Are we accomplishing tasks to standard?”-(Adjudication Tables) • MOP 1: Enemy ARTY engaged within 8 mins of a counter-battery radar accusation and shoot back criteria met from TSS. Enemy ARTY engaged upon positive identification of stationary ARTY / MRL PLT or higher • MOP2: 8 Min sustained rate of fire 155MM HE/VT during air assault. PLT survivability as required in PAA. • MOE: A measure of effectiveness is used to measure changes in system behavior, capability, or operational environment that is tied to measuring the attainment of an end state, achievement of an objective, or creation of an effect (JP 3-0) “Are we creating the effect(s) or conditions in the OE that we desire?” • MOE 1: BDA: 4/19 x 2S19 fire power kill, 2/6 2A36 fire power kill, 1/4 1 launcher 220 NMC 1/4 1 launcher 220 immobile, radar still FMC: Repeat criteria met. • MOE2: 1X ZSU conducted survivability move and unable to engage, 1X UH-60 engaged conducted emergency landing on LZ.
ARTY – artillery, BDA – battle damage assessment, BN – battalion, BTG – battalion tactical group, BTRY – battery, BDE – brigade, CF – counterfire, DPICM – dual purpose improved conventional munition, EFAT – essential field artillery task, FMC – fully mission capable, H – hour, HE – high explosive, IN – infantry, IVO – in vicinity of, LZ – landing zone, MIN – minutes, MOE – measure of effectiveness, MOP – measure of performance, MRL – multiple rocket launcher, NLT – no later than, NMC – non-mission capable, OBJ – objective, OE – operational environment, PAA – position area for artillery, PL – phase line, PLT – platoon, RW – rotary wing, TAI – target area of interest, TSS – target selection standards, UH – utility helicopter, VT – variable time, ZSU -- Zenitnaya Samokhodnava Ustanovha (Soviet self-propelled, radar guided anti-aircraft weapon system)

Table A-8. Essential Field Artillery Task Example

Essential Field Artillery Task

Task: must include the desired_____ (effect) on the enemy formation. (Degrade, disrupt, delay, destroy, neutralize, suppress, and obscure) (formation size – platoon, company, battalion, or number of systems)

*** Special munitions (precision, smoke) (derived from the method of essential fire support task)

Purpose: Task and purpose from essential fire support task. (Task can be written verbatim or summarized)

Method: Tell the story.

Priority: Field artillery priority of fire and field artillery priority of survey. (Survey can be technical, manual, or it can include other units and delivery assets.)

Allocation: Command post (support relationship), battery (support relationship), weapons locating radar, survey, field artillery task.

*Movement: routes, triggers, order of march, release points, start points, check points. In-place ready to observe, in-place ready to fire, time of movement (no earlier than, not later than) position area for artillery, azimuth of fire.

*Targets: Special munitions, priority and alternate shooters, attitudes and width, type of ammunition, target number and location, triggers, final protective fires, priority targets. Other: radar zones, survey control points.

Restrictions: Fire support coordination measures, survivability movement criteria, ammunition constraints. Other considerations, such as target dwell times, special munition approval authority.

Effects: Quantification of field artillery task (number of enemy systems destroyed), and positioning of field artillery units at the end of phase.

A-21. An EFAT is defined as a task that the FA must accomplish in order to achieve an EFST in the supported commander's OPORD. Those EFSTs that do not have "FA" as the method are not EFATs. A fully developed EFAT has a task, purpose, method, and effects. The task describes the effects of the fires against a specific enemy formation in terms of degrade, disrupt, delay, destroy, neutralize, and suppress it can also include obscure or fire SEAD. The purpose must clearly tie the EFAT to the EFST it supports. It is a statement of the EFST task and purpose. The method is a concise statement of how the EFAT will be accomplished. Tell the "story" of what must be done to complete the EFAT. This entails describing priorities of fire and survey; position areas and routes to them; azimuths of fire; target numbers, priority targets and FPFs; radar zones; triggers for movement and survivability move criteria; FSCMs. These are referred to as Priorities, Allocations and Restrictions. The effect is a description of what success will look like: As much as possible, quantify the effect as an observable result. Describe the location of the firing elements to include will the firing unit move after executing the task.

A-22. After being assigned the EFST, the commander would give the staff planning guidance to include planning guidance for fires: "FSCOORD use fires to delay from 2100Z18Augxx until 0500Z19Augxx the enemy movement along route RED to prevent enemy forces from interfering with the wet gap crossing". The FSCOORD and FSE planners using the OPORD then develop tasks to subordinate FA units. See table A-7 on page A-9, for an example of an EFAT.

A-23. The commander determines the desired effect for each target. Effects can be created by selection of the appropriate weapon system, number and type of munitions fired and the method used to engage a target. Commanders analyze mission variables of METT-TC (I) to create effects using a range of capabilities to destroy, disrupt, neutralize, interdict, and suppress enemy forces.

A-24. In planning for EFATs, the FSCOORD considers the elements of the task - the task description itself, its purpose, and the desired effect. Task describes the objectives that fires must achieve against a specific enemy capability. The task has three parts: targeting objective, enemy formation, and function. Disrupt, delay, and destroy are all examples of objectives. Formation is the size of the threat, and function is the capability of this threat to achieve its task and purpose.

A-25. The purpose describes how the task will contribute to achieving the commander's intent. As with a FS task, this should identify the decisive point that will leverage the targeting effect. It is constructed very similarly, if not identical to a FS Task.

A-26. To develop the method the FSCOORD, plans and details the priorities, allocations, and restrictions of the EFAT. The planning addresses movement functions and priorities, critical tasks to subordinate firing units during execution of the EFAT and other required tasks. The FSCOORD prescribes priority of fires, primary and alternate position areas, triggers for movement, priority of survey support, concept of movement, and the scheme of fires to achieve the EFAT.

A-27. The desired effect quantifies the successful accomplishment of the task. An example of a desired effect is two BMPs destroyed, the desired effect is assessment-oriented and assists in the decision to reattack or not.

A-28. To assess the required effects, sensors include observers, TA assets, infantry, Army aviation, and scouts. Effects are more than destroying the enemy equipment; they are quantifiable and observable. Accurate assessment and confirmation that the system has been destroyed or the desired effect has been created is the end result of the task. Disseminate the developed EFAT in the FA BN OPLAN or OPORD or in subparagraph 3e of the higher HQ OPORD as the FA support plan.

A-29. For completed examples of a EFAT using the memory aid target, trigger, location, observers, delivery, attack guidance, communications (refers as TTLODAC) see table A-9 page A-12 and table A-10 on page A-13.

Table A-9. A completed example of essential field artillery task (referred as TTLODAC)

Phase: IIa Buildup of combat power in PAA BLUE							
Task (what): Essential Field Artillery Task (EFAT) 1: Provide suppressive fires on 841st armored formations (support brigade EFST 1)							
Purpose (why): Allow Army attack aviation and CAS to destroy enemy motorized formations crossing international border, along PL Betty.							
Priority of fire: FA POF 1-71, 1-87, 2-22							
Allocations: C BTRY POF to 1-71, B BTRY POF to 2-22, A BTRY POF to 1-87							
Positioning guidance: C BTRY PAA BLUE 18T VP 40897612 AOF 1000; A BTRY PAA BLUE 18T VP 40897612 AOF 1300 on order PAA RED 18T VP 47558085 AOF 2200; B BTRY 18T VP 40897612 AOF 1600 on order PAA PURPLE 18T VP 44508200 AOF 0800							
Restrictions/FSCMs: FSCL along PL Betty; CFL along PL Archie; NFA and CFZ over all friendly unit locations; RFA over villages of Razish, Guba, Barasu, and Nabran							
FA Task	**(T)** Target	**(T)** Trigger	**(L)** Location	**(O)** Observers	**(D)** Delivery System(s)	**(A)** Attack Guidance	**(C)** Communications
EFAT 1	KC0001	Identification of 30% of 841st motorized elements crossing PL Betty	18T VP 506 856	P: 1-71 A: Army attack aviation	P: C BTRY A: A BTRY C: B BTRY	P: BTRY 2 rd HE/PD (155mm) A:BTRY 4 rd HE/PD (105mm)	P: FD1 A: FD2
EFAT 1	KC0005	Identification of 30% of 841st motorized elements crossing PL Betty	18T VP 521 824	P: 1-71 A: Army attack aviation	P: C BTRY A: A BTRY C: B BTRY	P: BTRY 2 rd HE/PD (155mm) A:BTRY 4 rd HE/PD (105mm)	P: FD1 A: FD2
EFAT 1	KC0010	Identification of 30% of 841st motorized elements crossing PL Betty	18T VP 526 805	P: 1-71 A: Army attack aviation	P: C BTRY A: A BTRY C: B BTRY	P: BTRY 2 rd HE/PD (155mm) A: BTRY 4 rd HE/PD (105mm)	P: FD1 A: FD2
Effects: MOE1: 30% of 841st motorized BN tactical group vehicles mobility or firepower kills. MOP: Suppression of 841st motorized vehicles achieved in less than 10 minutes.							
A – alternate, AOF – azimuth of fire, BTRY – battery, CFL – coordinated fire line, CFZ – critical friendly zone, CAS – close air support, EFAT – essential field artillery task, EFST – essential fire support task, FA – field artillery, FD1 – fire direction network 1 (Digital), FD2 – fire direction network 2 (Voice), FSCL – fire support coordination line, HE – high explosive, mm – millimeter, MOE – method of effectiveness, MOP – method of performance, NFA – no fire area, P – primary, PAA – position area for artillery, PD – point detonating, PL – phase line, POF – priority of fire, rd – round, RFA – restrictive fire area							

Table A-10. An example of a completed essential field artillery task (memory aid TTLODAC)

Phase: IIa Buildup of combat power in PAA BLUE							
Task (what): Essential Field Artillery Task (EFAT) 2: Provide counter-fire on enemy fire support assets in AO WARRIOR.							
Purpose (why): Deny 841st motorized battalion group fire support assets the ability to mass indirect fires on 1BCT.							
Priority of fire: FA POF 1-71, 1-87, 2-22							
Allocations: C BTRY POF to 1-71, B BTRY POF to 2-22, A BTRY POF to 1-87							
Positioning guidance: C BTRY PAA BLUE 18T VP 40897612 AOF 1000; A BTRY PAA BLUE 18T VP 40897612 AOF 1300 on order PAA RED 18T VP 47558085 AOF 2200; B BTRY 18T VP 40897612 AOF 1600 on order PAA PURPLE 18T VP 44508200 AOF 0800							
Restrictions/FSCMs: FSCL along PL Betty; CFL along PL Archie; NFA and CFZ over all friendly unit locations; RFA over villages of Razish, Guba, Barasu, and Nabran							
FA Task	**(T)** Target	**(T)** Trigger	**(L)** Location	**(O)** Observer(s)	**(D)** Delivery System(s)	**(A)** Attack Guidance	**(C)** Communications
EFAT 2	KC0020	Identification of 841st MRL units	18T VP 578 858	P: Q53 A: UAS	P: C BTRY A: A BTRY C: B BTRY	P: BTRY 3 rd HE/PD (155mm) A: BTRY 3 rd HE/PD (105mm)	P: FD1 A: FD2
EFAT 2	KC0025	Identification of 841st 155mm SP units	18T VP 588 871	P: Q53 A: UAS	P: C BTRY A: A BTRY C: B BTRY	P: BTRY 3 rd HE/P (155mm) A: BTRY 3 rd HE/PD (105mm)	P: FD1 A: FD2
EFAT 2	KC0030	Identification of 841st MRL units	18T VP 505 910	P: Q53 A: UAS	P: C BTRY A: A BTRY C: B BTRY	P: BTRY 3 rd HE/PD (155mm) A: BTRY 3 rd HE/PD (105mm)	P: FD1 A: FD2
EFAT 2	KC0040	Identification of 841st 155mm SP units	18T VP 515 915	P: Q53 A: UAS	P: C BTRY A: A BTRY C: B BTRY	P: BTRY 3 rd HE/PD (155mm) A: BTRY 3 rd HE/PD (105mm)	P: FD1 A: FD2
Effects: MOE1: 30% of 841st motorized battalion tactical group vehicles mobility or firepower kills. MOP: Suppression of 841st motorized vehicles achieved in less than 10 minutes.							

A – alternate, AOF – azimuth of fire, BCT – brigade combat team, BTRY – battery, CFL – coordinated fire line, CFZ – critical friendly zone, EFAT – essential field artillery task, FA – field artillery, FD1 – fire direction network 1 (Digital), FD2 – fire direction network 2 (Voice), FSCL – fire support coordination line, FSCMs – fire support coordination measures HE – high explosive, mm – millimeter, MOE – method of effectiveness, MOP – method of performance, MRL – multiple rocket launcher, NFA – no fire area, P – primary, PAA – position area for artillery, PD – point detonating, PL – phase line, POF – priority of fire, Q53 – weapons locating radar, rd – round, RFA – restrictive fire area, SCAR – strike coordination and reconnaissance, SP – self-propelled, UAS – unmanned aircraft system

SECTION II – ATTACK GUIDANCE MATRIX

A-30. **The *attack guidance matrix* is a targeting product approved by the commander, which addresses the how and when targets are engaged and the desired effects.** The AGM sample in table A-11 provides guidance on what HPT should be attacked and when and how they should be attacked. Units may develop their own AGM format. The AGM includes the following elements:

- High-payoff target. The HPT column is a prioritized list of HPTs by phase of the operation.
- WHEN. The WHEN column indicates the time the target should be engaged. (See the table A-11)
- HOW. This column indicates the weapon system that will engage the target.
- EFFECT. The desired effects on the target or target system are stated in this column.
- REMARKS. Remarks concerning whether or not BDA is required, whether coordination must take place, and any restrictions are indicated in this column.

Table A-11. Attack guidance matrix (example)

High-payoff target	*When*	*How*	*Effect*	*Remarks*
Artillery	A	FA	Neutralize	Coordinate and ensure CFFZs, CFZs are emplaced and active
ADA and EW Radars	A	FA, CEMA	Destroy	Ensure FSCMs and ACMs are coordinated and in place for immediate engagement of targets
Command posts	P	CEMA	Neutralize	Jam communications at H-1
Ammunition caches	I	Maneuver	Destroy	Destroy in place or secure
Engineer assets	A	Maneuver, UAS	Neutralize	Capture or destroy
ACM – airspace coordinating measure, ADA – air defense artillery, CEMA – cyberspace electromagnetic activities, CFFZ – call for fire zone, CFZ – critical friendly zone, EW – electronic warfare, FA – field artillery, FSCM – fire support coordination measure, UAS – unmanned aircraft system				

Appendix B

Fire Support Coordination Measures

FSCMs enable the employment of fires and effects. Locations and implementing instructions for FSCMs are disseminated electronically by message, database updates, or overlays through command and FS channels, to higher, lower, and adjacent maneuver and supporting units. The establishment or change of a FSCM is typically initiated through the operations cell and ultimately approved by the establishing commander. FSCMs enhance the expeditious engagement of targets; protect forces, populations, critical infrastructure, and sites of religious or cultural significance; and set the stage for future operations. The commander positions and adjusts FSCMs consistent with the operational situation and in consultation with superior, subordinate, supporting, and affected commanders. The operations cell informs coordination elements of the change and effective times. Conditions that dictate the change of FSCMs are also coordinated with the other agencies and components as appropriate. As conditions are met, the new FSCM effective time can be projected and announced. Following direction to execute the change, the current operations integration cell should confirm with all liaison elements that the FSCM changes have been disseminated.

Note. The airspace coordinating and FSCM graphics depicted in this chapter are examples for illustrative purposes only. The authority for constructing such graphics is FM 1-02.2, JP 3-09, JP 3-52, and Military Standard (MILSTD 2525).

SECTION I – PERMISSIVE FIRE SUPPORT COORDINATION MEASURES

B-1. Permissive FSCMs facilitate the attack of targets. Fires must be cleared with both terrain owners and other airspace users. FSCMs will change frequently during large-scale combat operations. The commander adjusts FSCMs as required to keep pace with operations.

COORDINATED FIRE LINE

B-2. A *coordinated fire line* is a line beyond which conventional surface-to-surface direct fire and indirect fire support means may fire at any time within the boundaries of the establishing headquarters without additional coordination but does not eliminate the responsibility to coordinate the airspace required to conduct the mission (JP 3-09). The purpose of the CFL is to expedite the surface-to-surface attack of targets beyond the CFL without coordination with the ground commander in whose area the targets are located. A brigade commander or equivalent, usually establishes the CFL, but it can be established by a BN with higher HQ approval. For example, in amphibious operations a maneuver BN could establish the CFL. The division or corps commander may reserve the right to establish or consolidate CFLs. Locate the CFL as close to the establishing unit as possible without interfering with the supported forces. The CFL does not eliminate the requirement or responsibility to coordinate the airspace required to conduct the mission. Such fires must still comply with ROE and law-of-war targeting constraints; designation of a CFL is not authorization to fire indiscriminately into the area. The CFL should be placed on identifiable terrain, however, additional considerations include the limits of ground observation, the location of the initial objectives in the offense, and the requirement for maximum flexibility in both maneuver and the delivery of supporting fires.

B-3. A dashed black line, with "CFL" followed by the establishing HQ above the line and the effective date-time group below the line provides graphic portrayal of the CFL (see figure B-1). Locations for CFLs are disseminated by message or overlay through maneuver and FS channels to higher, lower, adjacent maneuver, and supporting units.

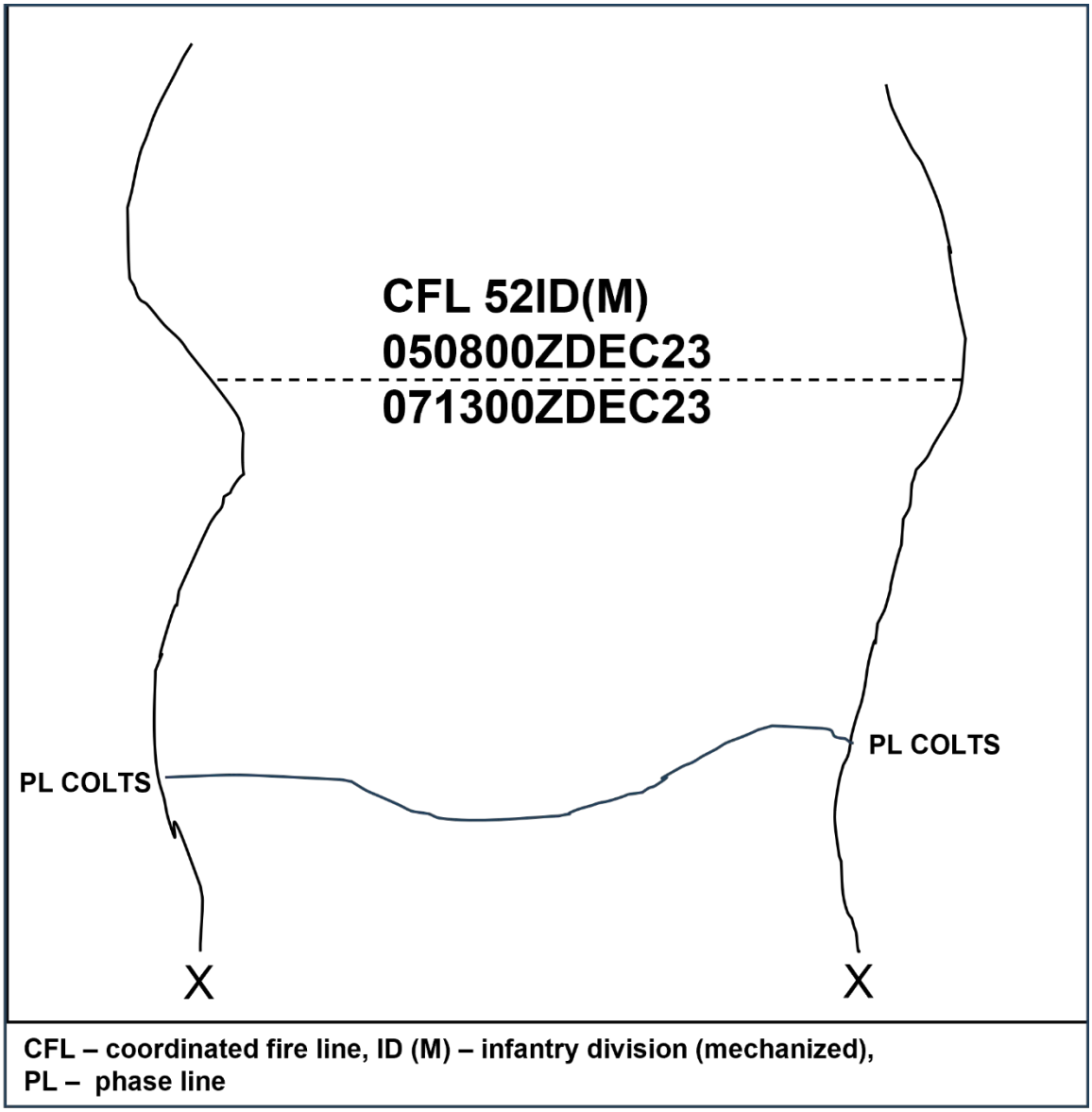


Figure B-1. Coordinated fire line example

FIRE SUPPORT COORDINATION LINE

B-4. A *fire support coordination line* is a fire support coordination measure established by the land or amphibious force commander to support common objectives within an area of operation, beyond which all fires must be coordinated with affected commanders prior to engagement and, short of the line, all fires must be coordinated with the establishing commander prior to engagement (JP 3-09). The optimum placement of the FSCL varies with specific AO circumstances, but considerations include the ground force positions and anticipated scheme of maneuver during the effective time period of the FSCL and their indirect FS systems' range limits, where typically the preponderance of lethal effects on the AO shifts from the ground component to the air component. For more information see JP 3-09.

B-5. FSCLs facilitate the expeditious attack of surface targets of opportunity beyond the coordinating measure. The FSCL is not a boundary-the synchronization of operations on either side of the FSCL is the responsibility of the establishing commander, out to the limits of the land or amphibious force boundary. The FSCL applies to all fires of air, land, and sea-based weapon systems using any type of ammunition. The JFLCC and JFMCC cannot employ fires long of the FSCL without coordination with affected commanders, and the JFACC cannot employ fires short of the FSCL without coordination with the JFLCC or JFMCC. Supporting elements attacking targets beyond the FSCL must ensure that the attack will not produce adverse effects on, or to the rear of, the line. The appropriate land or amphibious force commander controls all air-to- ground and surface-to-surface attack operations short of a FSCL. The FSCL should follow well-defined terrain features to assist identification from the air. Coordination of attacks beyond the FSCL is especially critical to commanders of air, land, and SOF. For more information on coordination of attacks beyond the FSCL see JP 3-09.

B-6. Establishing a FSCL close-in, yet at sufficient depth to not limit the tempo of maneuver forces, eases target engagement coordination requirements within their areas of operations by forces that may not be under their direct control. The commander adjusts the location of the FSCL as required to keep pace with operations. In large-scale combat operations, the FSCL will change frequently. The JFC should establish a time standard and guidance for shifting an FSCL.

B-7. The FSCL is a term oriented to land and airspace operations and is normally located only on land. In certain situations, such as littoral areas, the FSCL may affect both land and sea areas. If possible, the FSCL should follow well-defined terrain features to assist identification from the air. The commander of the landing force normally establishes the FSCL for amphibious operations. Changes to the FSCL require notification of all affected forces within the AO and must allow sufficient time for these forces to incorporate the FSCL change. When friendly forces are operating beyond the FSCL restrictive FSCMs such as RFAs and NFAs should be employed to protect those forces.

B-8. A solid black line extending across the assigned areas of the establishing HQ provides the graphic portrayal of the FSCL (see figure B-2 on page B-4). The letters "FSCL" followed by the establishing HQ are annotated above the line, and the effective date-time-group below the line. FSCLs do not have to follow traditional straight-line paths. Positioning the FSCL on terrain identifiable from the air is a technique that may further assist in fratricide prevention. Curved or enclosed FSCL have applications in joint operations conducted in non-contiguous areas of operation.

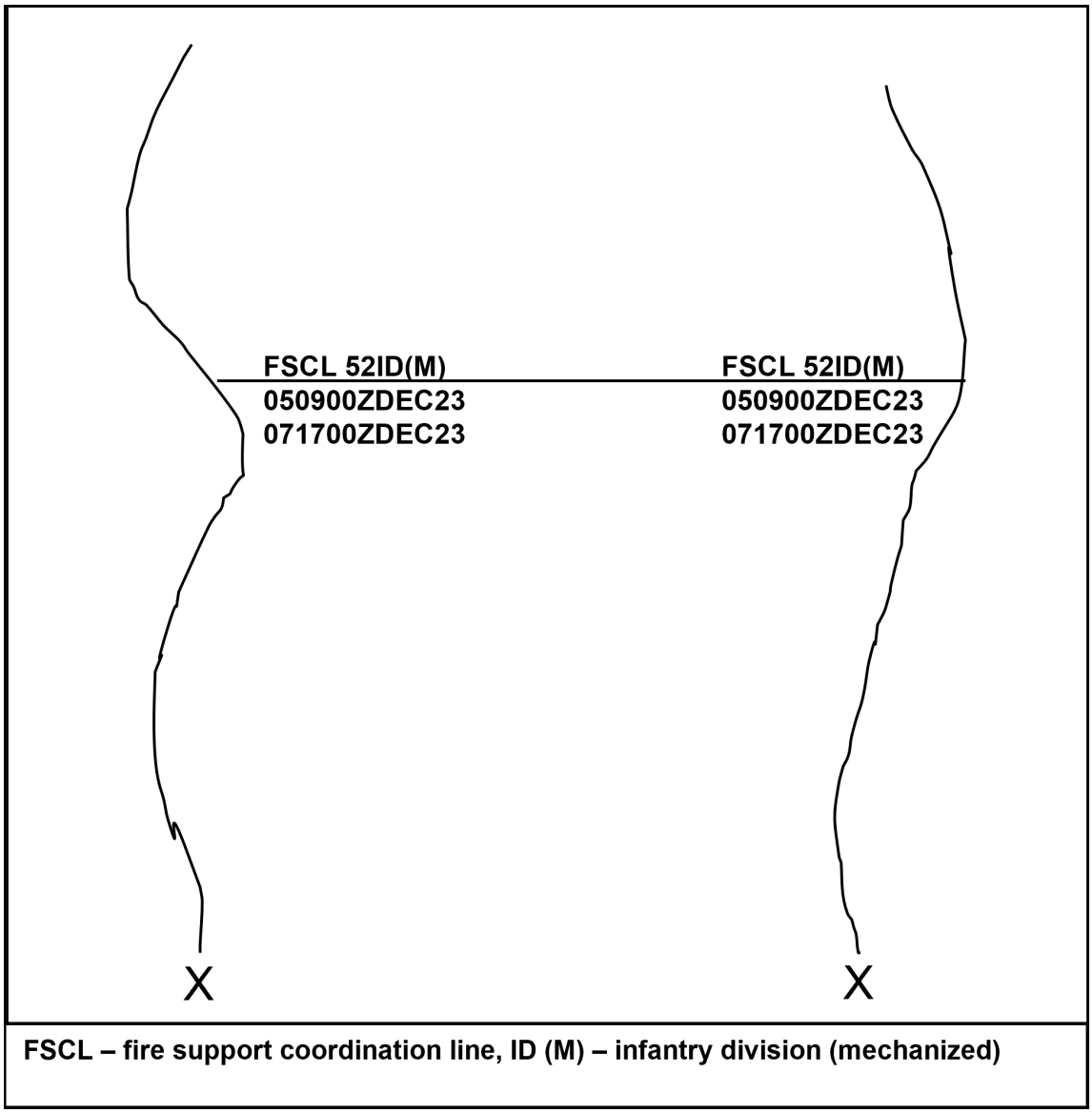


Figure B-2. Fire support coordination line example

B-9. The decision on where to place or even whether to use a FSCL requires careful consideration. If used, its location is based on estimates of the situation and concept of operations. The establishment of a FSCL does not create a FFA beyond the FSCL. Engagements beyond the FSCL must be consistent with the establishing commander's priorities, timing, and desired effects. Location of enemy forces, anticipated rates of movement, concept and tempo of the operation, organic weapon capabilities such as wide-area munitions, or those with delayed effects, and other factors are all considered by the commander. The FSCL is normally positioned closer to the FLOT in the defense than in the offense; however, the exact positioning depends on the situation. Placing the FSCL at greater depths will typically require support from higher HQ and other supporting commanders. Also, when the FSCL is positioned at greater depth, there is greater requirement for detailed coordination with the establishing commander and can slow the expeditious clearance of fires short of the FSCL.

B-10. Attacks on surface targets short of the FSCL, during the conduct of joint interdiction operations, must be controlled by, and/or coordinated with, the appropriate land or amphibious force commander.

B-11. The establishing commander adjusts the location of the FSCL as required to keep pace with operations. A series of disseminated "on-order" FSCLs will help accelerate the coordination required. The establishing commander quickly transmits the change to higher, lower, adjacent, and supporting HQ to ensure that appropriate controlling agencies coordinate engagement operations. Changes to the FSCL require notification of all affected forces within the AO and must allow sufficient time for these forces and/or components to incorporate the FSCL change. Current technology and collaboration tools between the elements of the joint force determine the times required for changing the FSCL.

B-12. Varying capabilities for acquisition and engagement may exist among adjacent commanders in a multinational operation. Normally, commanders at senior tactical echelons establish an FSCL to support their operations. Layered FSCLs and multiple, separate, noncontiguous corps and/or MAGTF FSCLs positioned at varying depths, create a coordination and execution challenge for supporting commanders (e.g., tracking effective times, lateral boundaries, and multiple command guidance). In cases such as these, when the components share a mutual boundary, the JFC or a designated component commander may consolidate the operational requirements of subordinates to establish a single FSCL. When possible, a single FSCL best facilitates air ground operations synchronization.

FREE-FIRE AREA

B-13. A *free-fire area* is a specific region into which any weapon system may fire without additional coordination with the establishing headquarters (JP 3-09). Where indirect fires and aircraft share an FFA, consider establishing an airspace coordination area to assist in deconfliction. Only the military commander with jurisdiction over the area (usually, a division or higher commander) may establish an FFA. Preferably, the FFA should be located on identifiable terrain; however, grid coordinates or the Global Area Reference System may be used to designate the FFA.

B-14. The FFA is graphically portrayed (see figure B-3 on page B-6) by a solid black line defining the area and the letters "FFA" within, followed by the establishing HQ and the effective date-time-group. For more information on establishment of a free-fire area see FM 1-02.2.

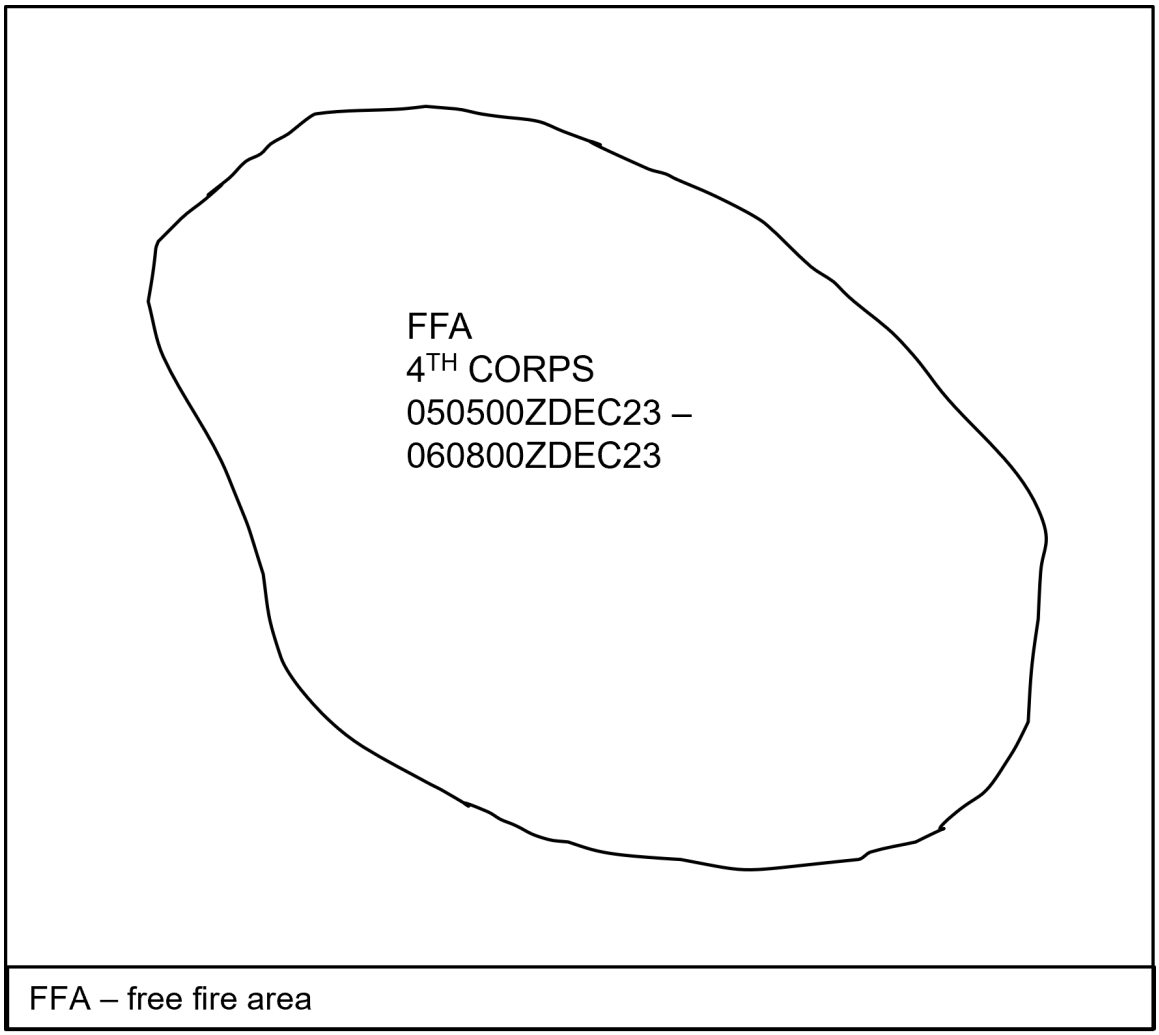


Figure B-3. Free-fire area example

GRIDDED REFERENCE GRAPHIC

B-15. A gridded reference graphic (GRG) (see figure B-4 for an example) are detailed gridded maps or imagery that have a military grid reference system grid and may contain information including building numbers, FSCMs, phase lines, helicopter landing zones, and named areas of interest. It is the responsibility of the ground unit that owns a particular OA to produce GRGs for that area, ensure dissemination to subordinate, adjacent, and higher echelons, and maintain version control on the products as they are updated or revised. The developing unit should consider selecting grid sectors based on what the aircrew or aircraft sensors can most easily see such as rivers, road junctions, buildings, and bridges. For more information on the GRG see JP 3-09.3 Below are recommendations for GRG creation:

- Ensure the collection manager provides the clearest and most recent image of the area.
- Imagery should contain a north arrow and the picture should be oriented north-up whenever possible.
- Easting and northing lines should be labeled at the top and left side of the GRG, respectively.
- Buildings may be numbered from northwest to southeast for large area GRGs, or from the objective building clockwise for smaller scale single-objective GRGs.

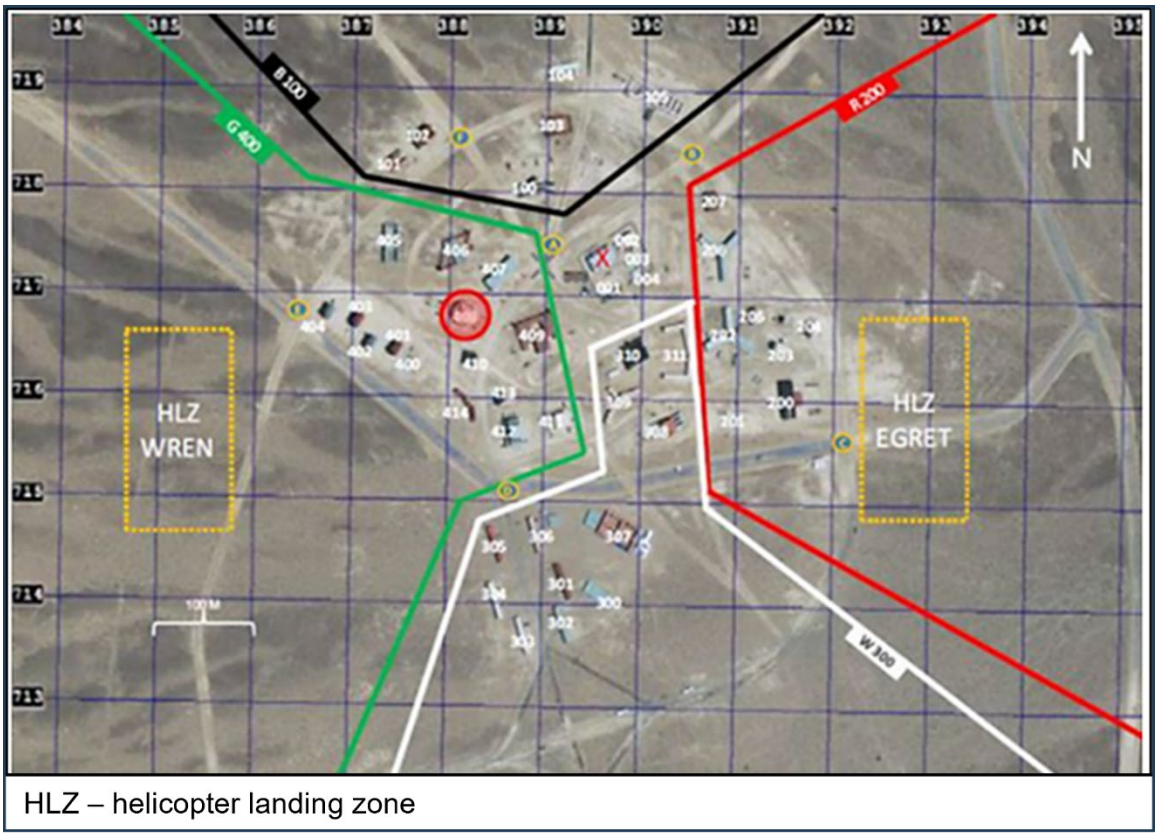


Figure B-4. Gridded reference graphic example

KILL BOX

B-16. Description. A *kill box* is a three-dimensional permissive fire support coordination measure with an associated airspace coordinating measure used to facilitate the integration of fires (JP 3-09). A kill box is a coordination measure, not a mission.

B-17. Purpose. The kill box reduces execution coordination because all requirements for target engagement in the target area (to include, guidance, clearance of fires, timing, and deconfliction from other assets) are accomplished while planning and coordinating the kill box in support of approved targets on a component's target nomination list or joint integrated prioritized target list.

- Kill boxes are established to support interdiction efforts as an outcome of the JFC's joint targeting process.
- Kill boxes allow attacks against surface targets without further coordination with the AO commander, and without the requirement for terminal attack control.
- When use of air-to-surface, subsurface, and surface-to-surface indirect fires are desired, the kill box will have ACMs that provide airspace in which participating aircraft are deconflicted from friendly surface fires. These ACMs also prevent nonparticipating aircraft and maneuver forces from entering kill boxes. The goal of excluding nonparticipating forces is to reduce the coordination required to engage targets while preventing friendly fire.

B-18. Missions. Specific missions applicable to this publication are AI.

Note. All users must understand that kill boxes are not part of a reference system but are specialized CMs consisting of FSCMs with an associated ACM. The Global Area Reference System (GARS) naming and numbering conventions are used to facilitate joint fires integration.

B-19. Kill Box Types. The following kill box color definitions are specific to munition delivery methods (to include air-to-surface only or air-to-surface and surface-to-surface).

- Blue Kill Box. The primary purpose of a blue kill box is to facilitate the attack of surface targets with air-to-surface munitions without further coordination with the AO commander see figure B-5. The blue kill box extends from the surface to a ceiling altitude. ***Altitude*** **is the vertical distance of a level, a point or an object considered as a point, measured from mean sea level or heigh above ellipsoid**. Indirect fire munitions impacting within or passing through an active blue kill box must be coordinated with the designated airspace control element, kill box coordinator, or the aircrew on station in the blue kill box.
- Purple Kill Box. The purple kill box enables joint fires in the kill box to maximize potential for engaging targets. The primary purpose of a purple kill box is to facilitate the attack of surface targets with subsurface-to-surface, surface-to-surface, and air-to-surface munitions without further coordination with the AO commander. The purple kill box contains an altitude floor below which aircraft will not fly, that enables subsurface-to-surface and surface-to-surface fires. Indirect fires that remain beneath the ACM floor do not require further coordination; however, airspace coordination along the munition flight path outside the kill box must still occur.

B-20. Kill Box Operating Status Terminology.

- Established. A status that identifies the kill box is published on the ACO.
- Effective Time. The scheduled date and time of the kill box on the ACO.
  - Active. There is activity in the kill box. A descriptor identifying an established kill box has a fires and airspace status affecting aircraft and fires operating in the kill box.
  - Inactive. There is no activity in the kill box. A descriptor identifying an established kill box is without a fires and airspace status affecting fires or aircraft operating in the kill box. Additional coordination is required to activate an inactive kill box.
- Cancelled. The kill box is no longer established and is deleted from the ACO.

B-21. Kill Box Fires Status and Airspace Status Terminology. An active kill box status is described in two parts: fires and airspace. The fires status addresses effects in the kill box's target area. The airspace status addresses the availability of and restrictions for using the airspace above the target area.

B-22. Fires Status. An active kill box's fires status is either HOT or COLD.

- HOT. A status that describes a kill box or portion of a kill box where fires are permitted without further coordination.
- COLD. A status that describes a kill box or portion of a kill box where fires are not permitted without further coordination.

B-23. Airspace Status. An active kill box's airspace status is either OPEN or CLOSED.

- OPEN. A status that describes a kill box or portions of a kill box where aircraft may be approved to operate inside the kill box ACM or designated segments.
- CLOSED. A status that describes a kill box or portion of a kill box that restricts aircraft from operating within the confines of the kill box or designated segments. Indirect subsurface-to-surface and surface-to-surface fires trajectories may transit through them.

B-24. Airspace Control Element. The airspace control element is the assigned tactical C2 echelon assigned to control a given kill box on the ACO. All airspace users should contact the assigned airspace control element prior to entry into a kill box. When the kill box is inactive, or active without a kill box coordinator, the assigned airspace control element is responsible for coordination regarding the kill box.

B-25. A kill box facilitates the expeditious air-to-surface lethal attack of targets (such attacks can be augmented with surface-to-surface indirect fires). A "blue" kill box permits air-to-surface fires within its boundaries and typically extends from the surface to a ceiling altitude; a "purple" kill box within its boundary.

B-26. Kill Box Lateral Dimensions and Subdivision. The lateral dimensions of a kill box should be defined using GARS. Using GARS cells, quadrants, and keypads to define kill boxes facilitates airspace and fires joint integration and deconfliction by the assigned airspace control elements. For more information on kill box employment see JP 3-09 and ATP 3-09.34.

- Cell. GARS cells divide the surface of the earth into 30-minute by 30-minute cells (approximately 55-kilometers (km) by 55 km).
- Quadrant. Each 30-minute cell is divided into four 15-minute by 15-minute quadrants (approximately 28 km by 28 km).
- Keypad. Each 15-minute quadrant is divided into nine 5-minute by 5-minute areas (approximately 9 km by 9 km).
- As GARS cells move away from the equator GARS cells get smaller.

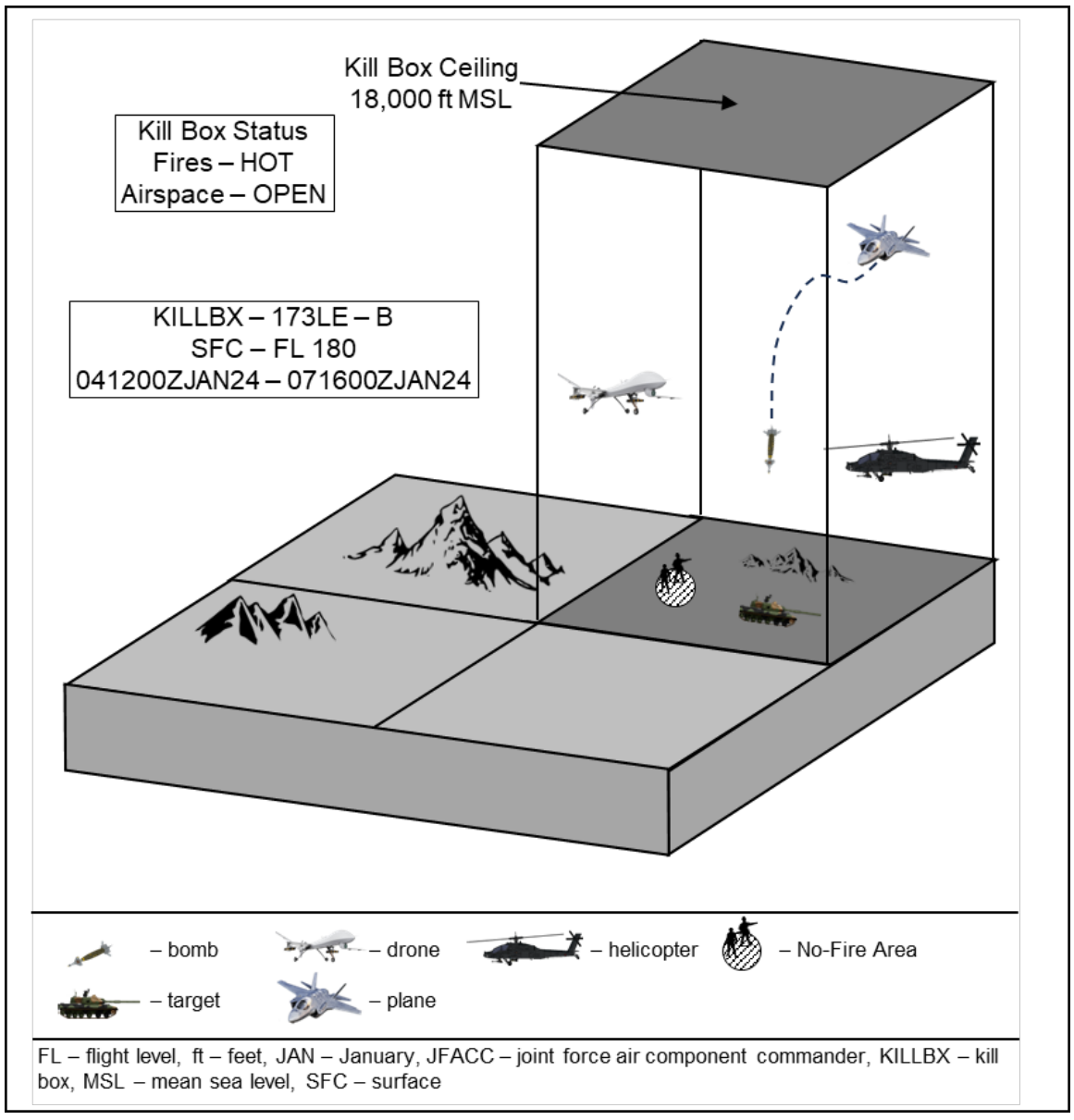


Figure B-5. Kill box graphic example

AIRSPACE COORDINATION AREA

B-27. *Airspace coordination area* is a three-dimensional block of airspace in a target area, established by the appropriate commander, in which friendly aircraft are reasonably safe from friendly surface fires. (JP 3-09.3).

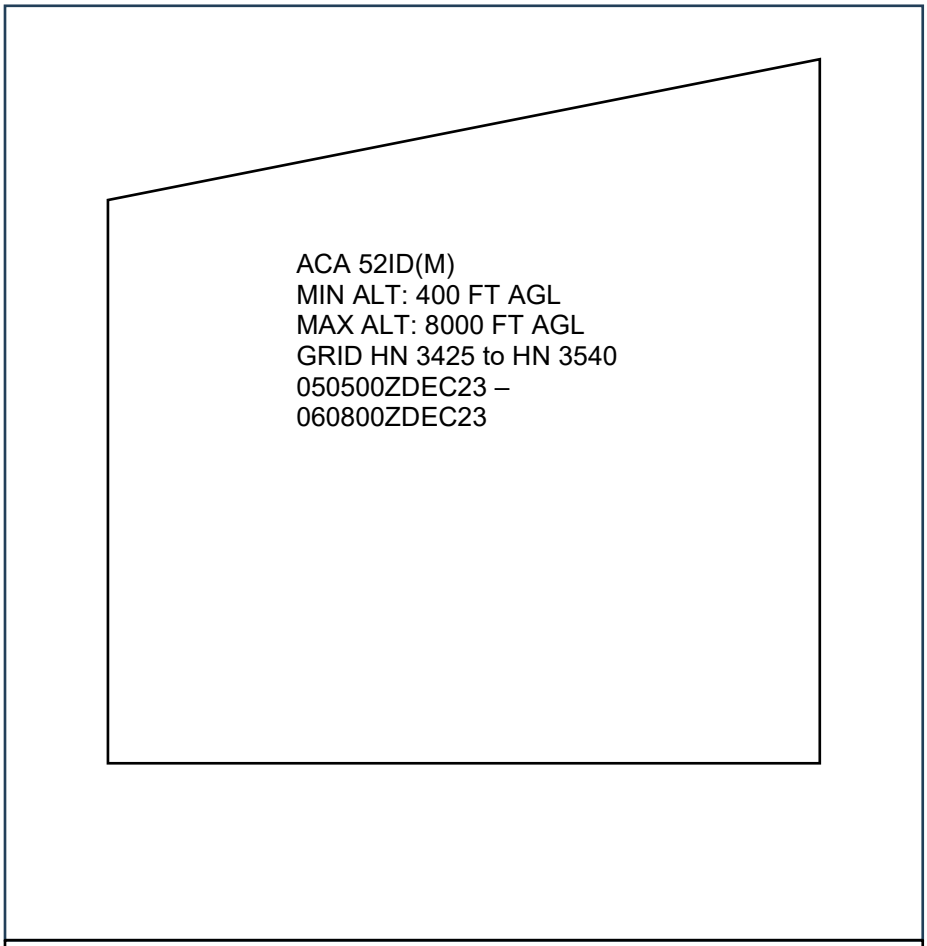
B-28. A formal airspace coordination area requires detailed planning. Vital information defining the formal airspace coordination area includes minimum and maximum altitudes, a baseline designated by grid coordinates at each end, the width (on either side of the baseline), and the effective times. When time for coordination is limited, an informal airspace coordination area is used. In an informal airspace coordination area, aircraft and surface joint fires may be separated by time or distance (lateral, altitude, or a combination of the two). The supported commander requesting CAS or employing helicopters can request an informal airspace coordination area; the informal airspace coordination area is approved at BN or higher level. Both types of airspace coordination areas are constructed with the assistance of the ALO to ensure they meet the technical requirements of the aircraft and weapon systems.

B-29. Army aviation, ADA, military intelligence, maneuver, UAS, EW assets, FS, and joint and multinational air and ground forces all use airspace. Commanders of BCTs and lower exercise airspace management as part of a division's airspace control within division assigned airspace because they are not organized, trained, and equipped to conduct airspace control. Airspace control maximizes the simultaneous use of airspace. At decisive moments, commanders can exploit all available combat power synchronized in time, space, and purpose.

B-30. Fires are airspace users. Clearance of fires maximizes damage to enemy capabilities while minimizing the risk of damage to friendly forces and non-combatants. Clearance of fires may be accomplished through a staff process, control measures, embedded in automation systems, active or passive recognition systems, or a combination thereof.

B-31. A formal airspace coordination area is graphically shown (see figure B-6) as an area enclosed by a solid black line. Depicted inside the enclosed area are airspace coordination are (known as "ACA,") the establishing HQ, the minimum and maximum altitudes, the grid coordinates for each end of the baseline and the width of the airspace coordination area, the grid coordinates for each point of an irregularly shaped airspace coordination area, and the effective date-time group or the words "on-order." Informal airspace coordination areas are not normally displayed on maps, charts, or overlays.

Note. In NATO FA tactical doctrine the airspace coordination area is a FSCM and is defined as "a restricted area or route of travel specified for use by friendly aircraft and established for the purpose of preventing friendly aircraft from being fired on by friendly forces" (Allied Artillery Publication-5).



ACA – airspace coordination area,
AGL – altitude above ground level, ALT – altitude,
ID(M) – infantry division (mechanized),
MAX – maximum, MIN – minimum

Figure B-6. Airspace coordination area example

Note. The depiction of airspace coordination area on a two-dimensional surface such as on a map does not display the possibly irregularly shaped airspace coordination area dimensions (such as Army Tactical Missile System (ATACMS) missile or Excalibur flight paths) that may be constructed within automation systems, which can provide information for airspace clearance.

SECTION II – RESTRICTIVE FIRE SUPPORT COORDINATION MEASURES

B-32. Restrictive FSCMs are those that provide safeguards for friendly forces and noncombatants, facilities, or terrain.

NO-FIRE AREA

B-33. A *no-fire area* is an area designated by the appropriate commander into which fires or their effects are prohibited (JP 3-09.3). There are two exceptions.

- When the establishing HQ approves joint fires within the NFA on a mission-by- mission basis.

- When an enemy force within the NFA engages a friendly force and the engaged commander determines there is a requirement for immediate protection and responds with the minimal force needed to defend the force.

B-34. Any size unit may establish NFAs. If possible, the NFA is established on identifiable terrain. It may also be located by a series of grids or by a radius from a center point.

B-35. The NFA is graphically portrayed (see figure B-7) as an area outlined with a solid black line with black diagonal lines inside. The letters "NFA" are within, followed by the establishing HQ and the effective date-time group.

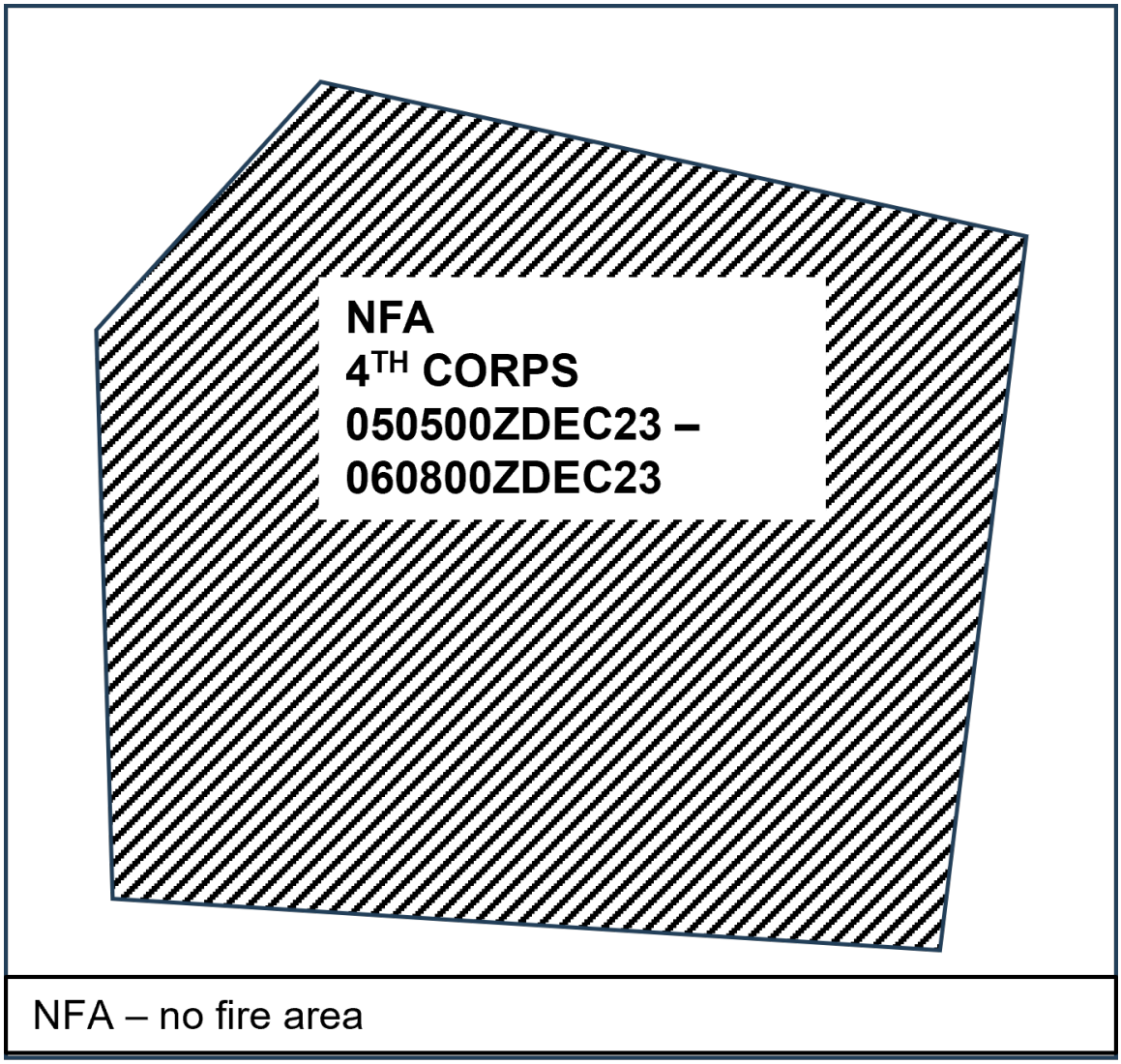


Figure B-7. No fire area example

RESTRICTIVE FIRE AREA

B-36. A *restrictive fire area* is a location in which specific restrictions are imposed and into which fires that exceed those restrictions will not be delivered without coordination with the establishing headquarters (JP 3-09).

B-37. A maneuver BN or higher echelon normally establishes a RFA. Usually, the RFA is located on identifiable terrain, by grid, or by a radius from a center point. To facilitate rapidly changing operations, on-call RFAs may be used. The dimensions, locations, and restrictions of the on-call RFAs are prearranged.

B-38. A RFA is graphically portrayed with solid black line defining the area and the letters "RFA" within, followed by the establishing HQ and the effective date-time group provides graphic portrayal of the RFA. (See figure B-8). The restrictions may be included within the graphic if space allows, or reference may be made to a specific OPORD or OPLAN (FM 1-02.2). For example, a commander may identify a particular type of ammunition to preclude its firing within the RFA.

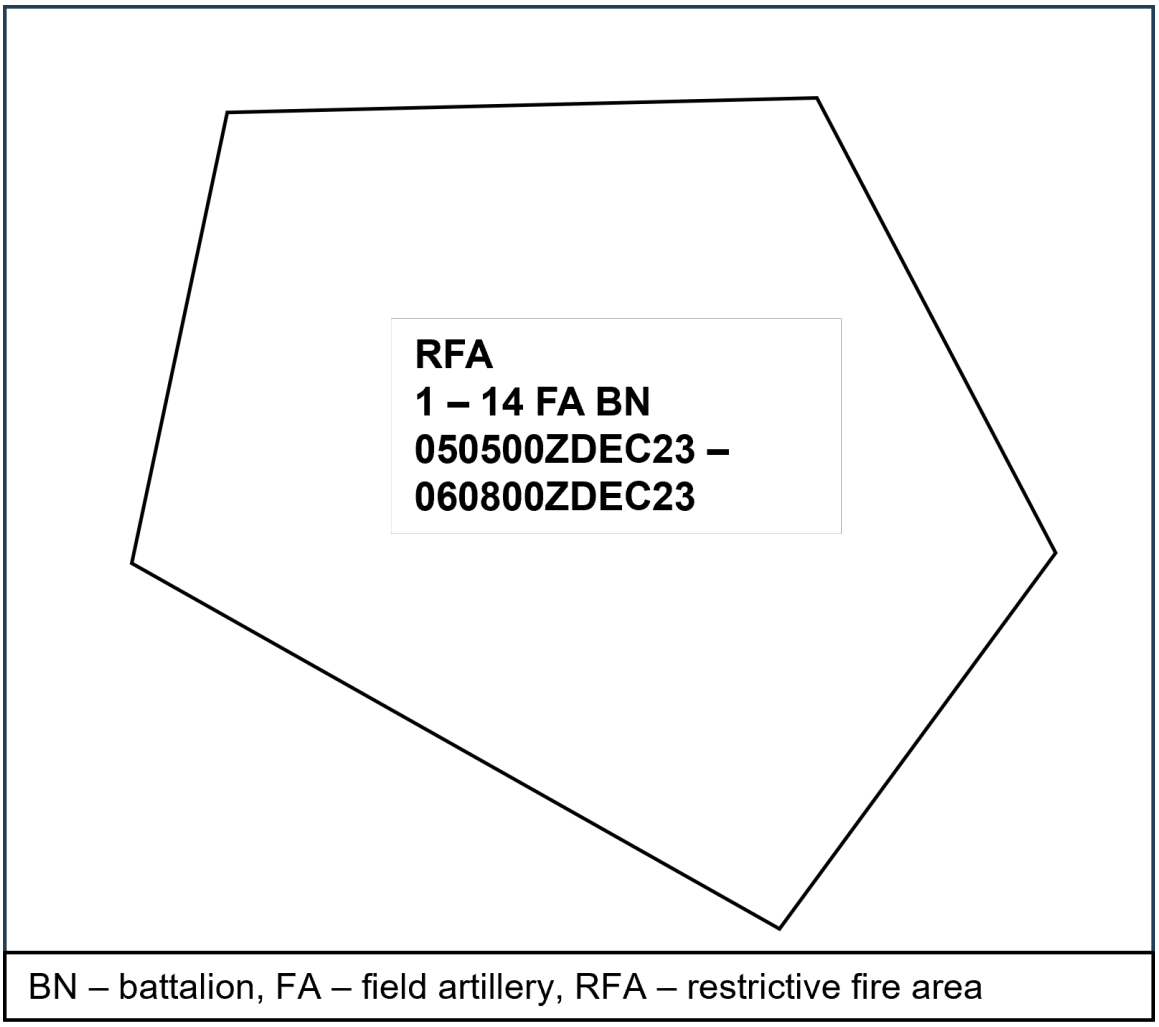


Figure B-8. Restrictive fire area example

RESTRICTIVE FIRE LINE

B-39. A *restrictive fire line* is a specific boundary established between converging, friendly surface forces that prohibits fires or their effects from crossing. (JP 3-09). The purpose of the RFL is to prevent fratricide and duplication of engagements by converging friendly forces.

B-40. A RFL (see figure B-9 on page B-14) is graphically portrayed by a solid black line, with "RFL" followed by the establishing HQ above the line and the effective date-time group below the line. The commander common to the converging forces establishes the RFL. It is located on identifiable terrain when possible. In link-up operations, it is usually closer to the stationary force to allow maximum freedom of action for the maneuver and FS of the linkup force.

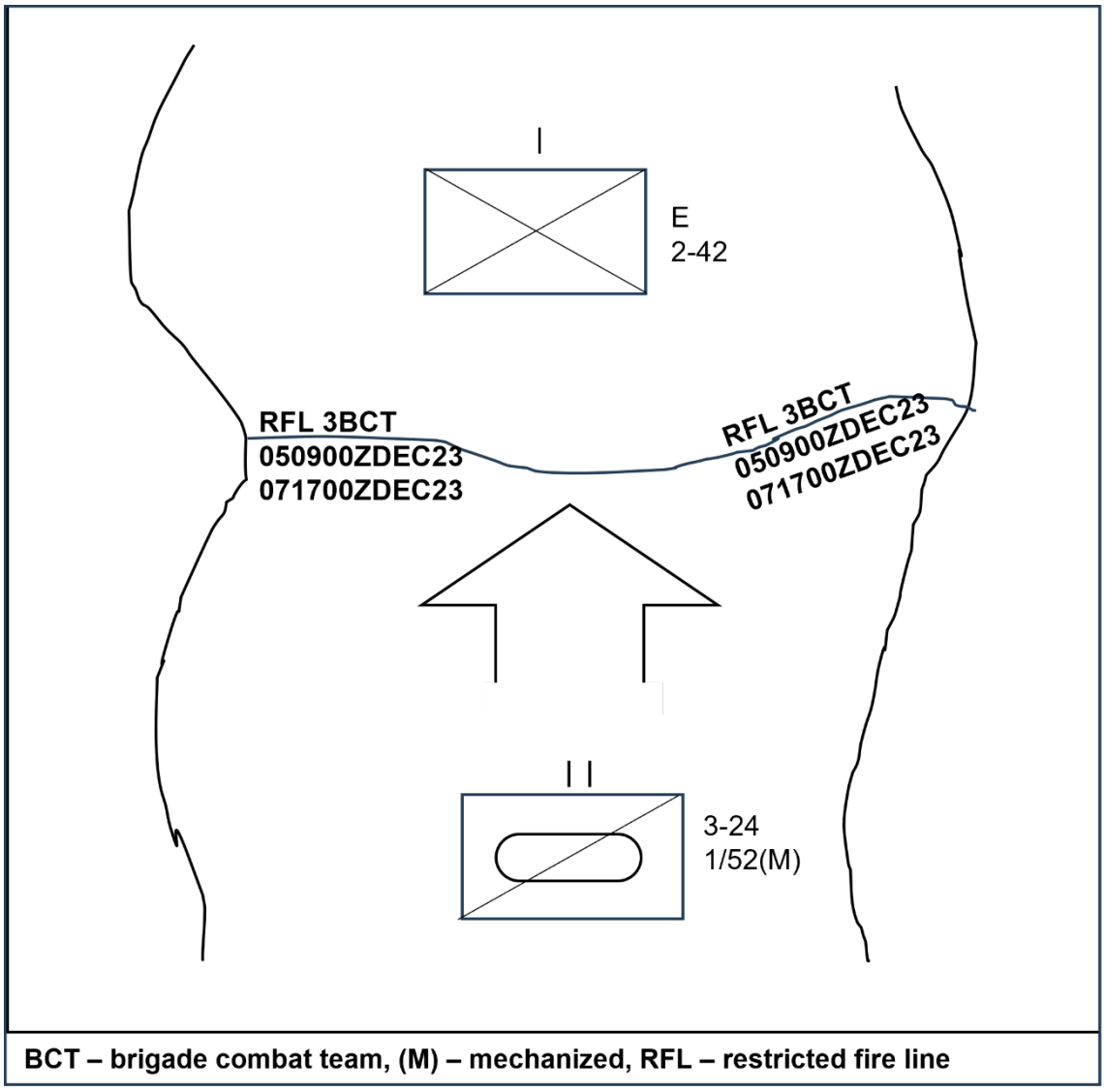


Figure B-9. Restrictive fire line example

SECTION III – ADDITIONAL GRAPHIC CONTROL MEASURES

B-41. Additional graphic control measures can be permissive or restrictive. A *graphic control measure* is a symbol used on maps and displays to regulate forces and warfighting functions (ADP 6-0). These control measures include boundaries, phase lines, trigger lines and PAA.

FIRE SUPPORT AREA AND A FIRE SUPPORT STATION

B-42. In amphibious operations when engagement groups are formed and separate landing areas are designated, the commander, amphibious task force may assign each engagement group commander the responsibility for control of naval gunfire support within the area. The officer in tactical command, typically the commander, amphibious task force, establishes FS areas and FS stations. A *fire support area* is an appropriate maneuver area assigned to fire support ships by the naval force commander from which they can deliver gunfire support to an amphibious operation (JP 3-09). A FS area is normally associated with amphibious operations but can be used whenever it is desirable to have a FS ship occupy a certain geographic

position. The FS station designation is used to station ships within boat lanes of the assaulting force, or in areas where maneuvering room is restricted by other considerations. A *fire support station* is an exact location at sea within a fire support area from which a fire support ship delivers fire (JP 3-02).

B-43. FS areas are designed with Roman numerals (for example "FSA I, II, or III") and are graphically portrayed on the naval surface FS operations overlay. FS stations are designated by numbers (for example "FSS 1, 2, or 3") and are shown on the naval surface FS operations overlay as an "X" indicating the exact position of the ship. Figure B-10 provides an example of a graphic representation of the FS area and FS station.

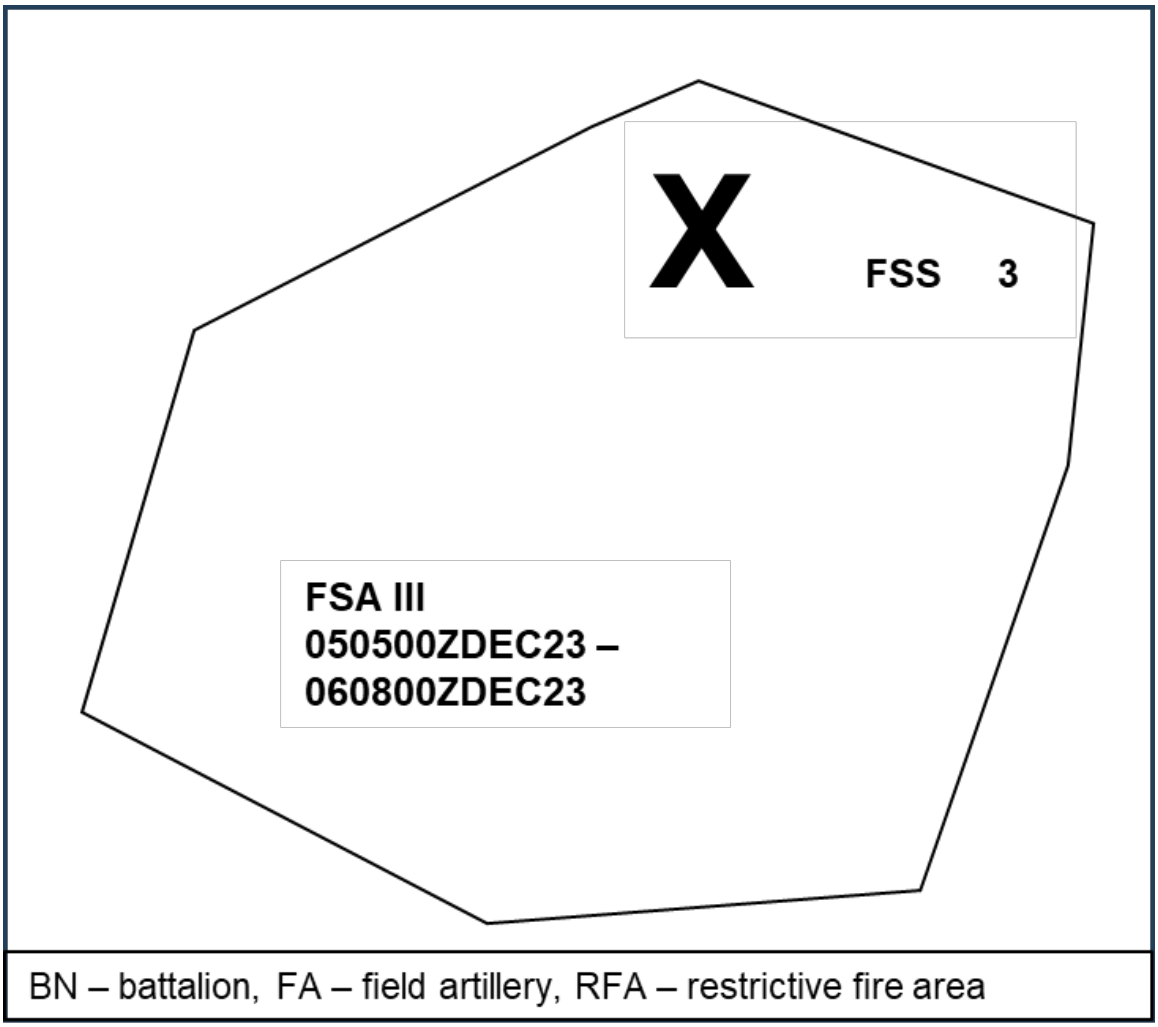
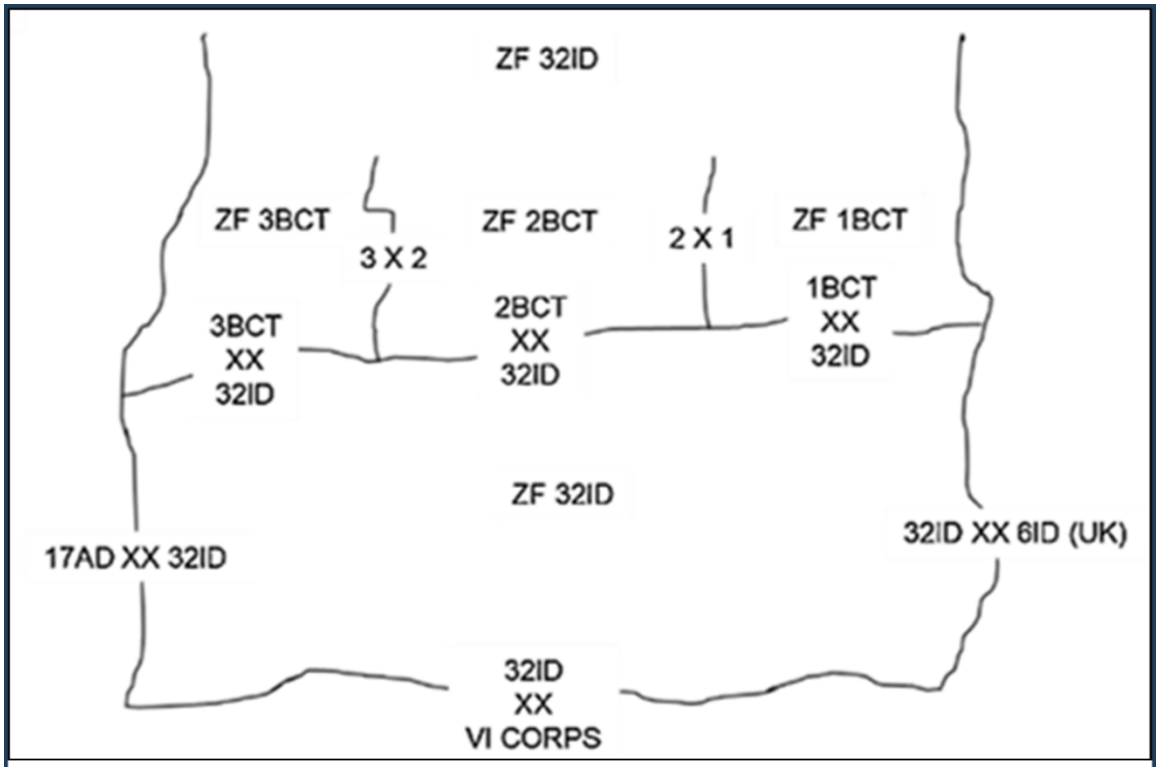


Figure B-10. Fire support area and a fire support station

ZONE OF FIRE

B-44. A *zone of fire* is an area within which a designated ground unit or fire support ship delivers, or is prepared to deliver, fire support (JP 3-09). Fire may or may not be observed. Gunfire support ships and units are assigned land divided into zones of fire to coordinate their efforts with each other and with the scheme of maneuver of the supported ground unit. Units and ships assigned zones of fire are responsible for engaging known targets and targets of opportunity according to their mission and the guidance of the supported commander.

B-45. Graphically portray a ZF (see figure B-11) using broken lines (solid lines if unit boundaries are used as depicted), with designating Arabic numerals, for example "ZF3" For more information on zone of fire establishment see JP 3-09.



AD – armored division, BCT – brigade combat team, ID – infantry division, UK – United Kingdom, VI – 6TH corps, ZF – zone of fire

Figure B-11. Zone of fire example

Note. JP 3-09 directs the use of only Arabic numerals to identify a ZF. The AFATDS software uses the zone of responsibility graphic to implement a ZF. The zone of responsibility line or area name field allows the use of uppercase alphabetic characters (A-Z), numeric characters (0-9), and blank spaces to identify that graphic.

B-46. The commander of the maritime force providing naval surface fire support establishes and assigns zones of fire for the forces. The ZF for an artillery BN or a ship assigned the support relationship or mission of DS normally corresponds to the AO of the supported unit. The ZF for an artillery BN or a ship assigned the support relationship or mission of GS should be within the boundaries of the supported unit. When used in conjunction with naval gunfire, the size and shape of a ZF will depend on the following:

- Boundaries. To permit ready identification by the spotter and the individual FS ship, the boundaries of the zones of fire should be recognizable both on the terrain and on a map. It may be necessary to divide a large ZF into two or more smaller zones due to considerations discussed in subsequent paragraphs. The boundaries of zones of fire of DS ships should correspond to the zones of action of the landing force units supported.
- Size. The size of each ZF should be such that the FS ships, or ships assigned to observe and destroy targets, will be able to accomplish the mission in the time allocated. When zones of fire are delineated, known or suspected targets scheduled for destruction in each zone are plotted, and then the number and type of targets are compared to the capability of the ship.

- Visibility. Observation from seaward is a desirable feature for zones of fire since it permits a ship to deliver more accurate and rapid fire.
- Accessibility to Fire. The zones of fire must be accessible to the trajectory of the FS ship(s) assigned to the zone.

B-47. A FA unit's higher HQ may also assign a FA unit a ZF. The ZF for artillery units assigned to a maneuver unit or assigned the DS support relationship corresponds to the AO of the parent or supported unit. The ZF for an artillery unit assigned the R support relationship corresponds to the ZF of the reinforced artillery unit. The ZF for an artillery unit assigned the GSR support relationship corresponds to the AO of the supported unit including the zones of fire of the reinforced artillery unit. The ZF for an artillery unit assigned the GS relationship corresponds to the AO of the supported unit. For more information on amphibious operations see JP 3-02.

FINAL PROTECTIVE FIRE

B-48. *Final protective fire* is an immediately available, prearranged barrier of fire designed to impede enemy movement across defensive line or areas (JP 3-09.3). An FPF provides continuous fires on a planned target. FPFs should be integrated with maneuver crew served weapons final protective lines. When the adversary initiates the final assault into a defensive position, the defending unit initiates its FPFs to kill adversary forces and suppress armored vehicles.

B-49. The FPF consists of a single black line. Two anchor points, one at each end of the line, determine the line's length and orientation. The target number followed by the firing unit responsible and the caliber of that unit's weapons below the line. Figure B-12 portrays the assigned FPFs of Alpha Battery, 1st BN 16th FA (155-mm), a priority target for that unit.

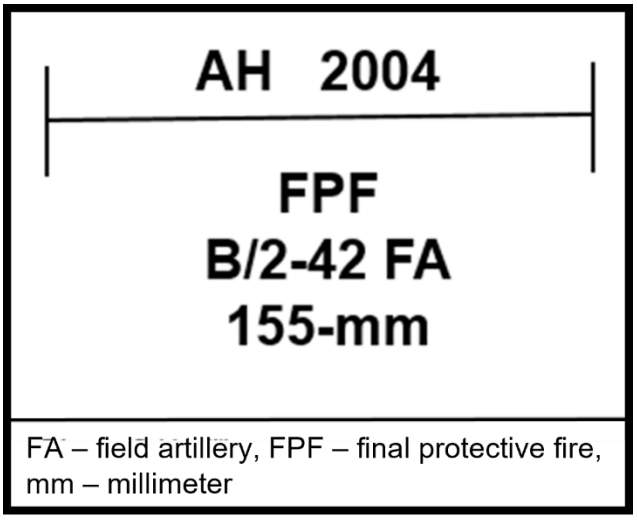


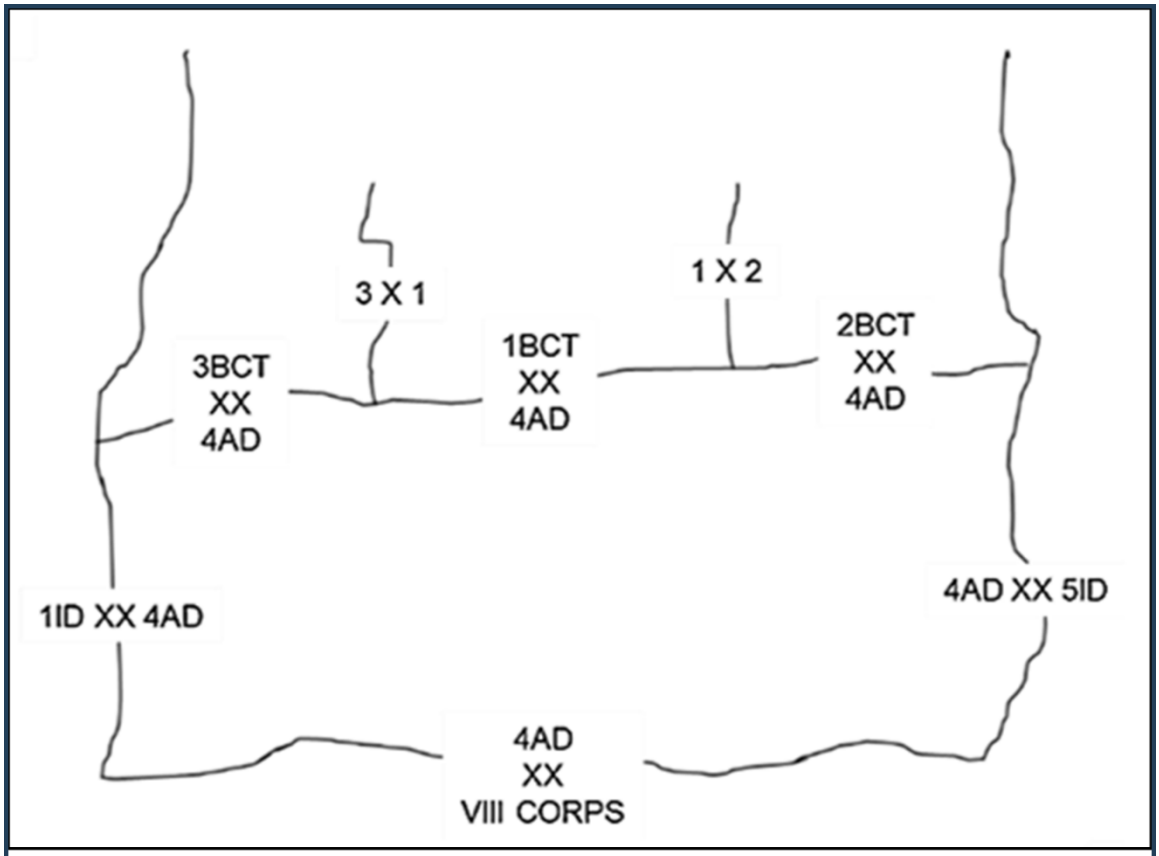
Figure B-12. Final protective fire example

BOUNDARIES

B-50. A *boundary* is a line that delineates surface areas for the purpose of facilitating coordination and deconfliction of operations between adjacent units, formations, or areas (JP 3-0). Boundaries divide up areas of operation and define responsibility for clearance of fires. Boundaries are both permissive and restrictive in nature (see figure B-13 on page B-18).

B-51. They are permissive in that a maneuver commander, unless otherwise restricted, enjoys designation of priority, effects, and timing of fire and maneuver within their own boundaries. Thus, units may execute joint fires without close coordination with neighboring units unless otherwise restricted. They are restrictive in that normally units do not fire across adjacent or forward boundaries unless the fires are coordinated with the

affected unit or the fires are allowed by a permissive FSCM, such as a CFL. These restrictions apply to conventional and special munitions and their effects. For more information on boundaries, see ADP 3-90.



AD – armored division, BCT – brigade combat team, ID – infantry division, VIII – 8th Corps

Figure B-13. Boundaries example

PHASE LINE AND TRIGGER LINE

B-52. A *phase line* is an easily identified feature in the operational area utilized for control and coordination of military operations (JP 3-09). Phase lines (see figure B-14) are usually easily identifiable from a ground or air vantage point and may include features such as ridgelines, tree lines, hilltops, roads, and rivers. Phase lines can be used to identify limits of advance and to coordinate fires.

B-53. A *trigger line* is a phase line located on identifiable terrain used to initiate and mass fires into an engagement area at a predetermined range (FM 3-90). The commander designates a phase line as the trigger line for FS attack assets. The trigger line's location is based on such variables as the time of flight for artillery shells, positioning of the guns, and the existence of quick-fire links. A trigger line's location varies from situation to situation. Its position reflects the distance that the enemy force is likely to traverse in the time it takes from when fires are requested to when artillery rounds impact (see figure B-14). This gives time for the FS delivery systems to respond to the initial call for fire. Fires unit commanders must determine the appropriate planning response time for their unit based on their weapon system and training proficiency to recommend the placement of a trigger line.

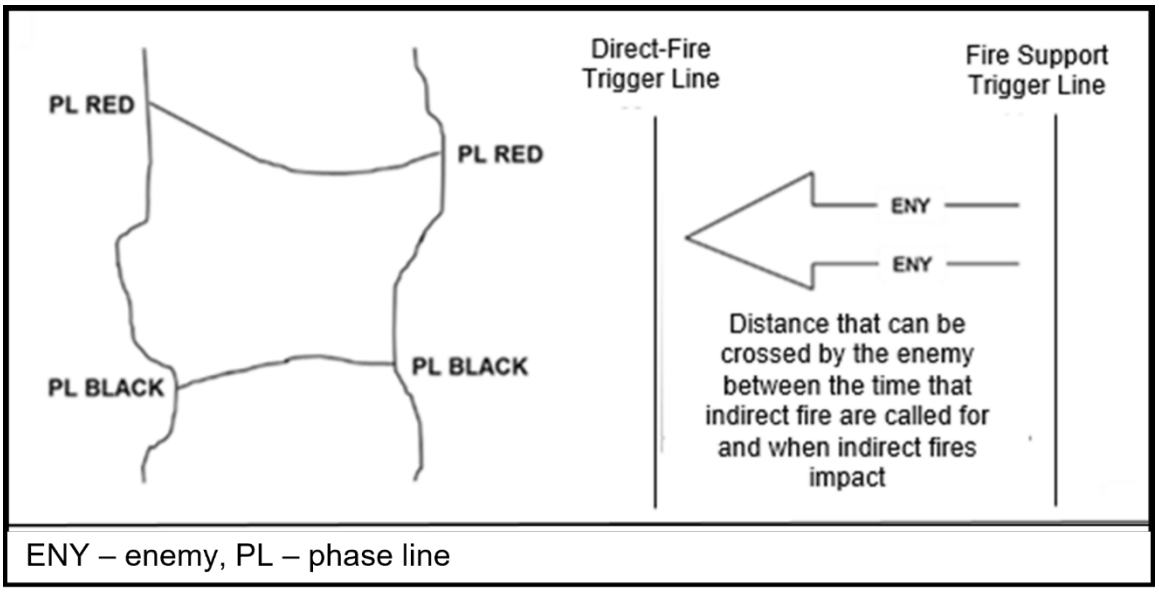


Figure B-14. Phase line and trigger line example

B-54. The commander can establish another trigger line for the most accurate long-range weapon system in the vicinity of the area where the FS impacts to capitalize on the asymmetric attack. However, dust and debris resulting from the artillery fire may prevent the direct fire systems from engaging the enemy. The commander establishes other trigger lines for shorter-range systems. The commander may give guidance to extremely proficient crews to engage the enemy at longer than normal ranges or give them different engagement priorities than the rest of the force, such as giving priority to engaging air defense or engineer-breaching systems. This could result in losing the effect that the sudden application of massed fires has on an enemy.

B-55. When the enemy reaches these closer trigger lines, the commander establishes a decision point to help determine should longer-range systems continue to fire in depth or to concentrate fires on a single point. Many factors impact the decision, most of which concern the enemy and how they maneuver and the effects of the defending force's fires.

B-56. The purpose of each phase line and any actions required by forces affected by the phase line will be specified on the OPORD of the establishing HQ. Any commander given an AO can establish a phase line. For more information on phase lines see ADP 3-90.

POSITION AREA FOR ARTILLERY

B-57. A *position area for artillery* is an area assigned to an artillery unit to deliver surface to surface fires (FM 3-90) see figure B-15 on page B-20. The supported commander assigns PAA as a terrain management technique. A PAA potentially attracts enemy counterfire so other units should stay away from that area to avoid enemy artillery attacks. The exact size of a PAA depends on the mission variables of METT-TC (I). A Paladin platoon normally requires a PAA encompassing over four square kilometers, and a MLRS platoon requires twelve square kilometers. Units equipped with M119A3 or M777A2 requires one square kilometer PAA.

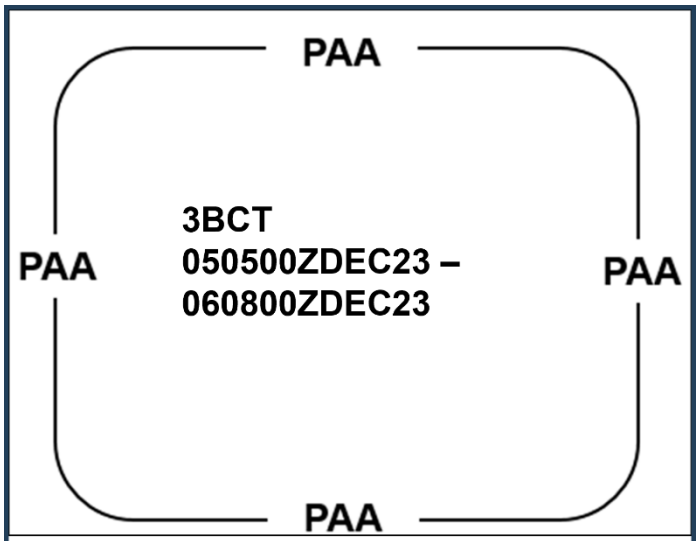


Figure B-15. Position area for artillery example

B-58. The PAA is graphically portrayed by a solid black line defining the area and the letters "PAA" within, followed by the establishing HQ and the effective date-time-group (FM 1-02.2). Based on the commander's guidance and FSCOORD input, the maneuver echelon operations officer (G-3 or S-3) establishes PAAs within the unit AO.

B-59. The artillery unit occupies but does not control the PAA and has neither the authority nor responsibilities that are associated with a unit assigned an AO. For example, other units can move through a PAA without clearing that movement with the occupying artillery unit. The artillery unit occupying a PAA establishes liaison with the unit with authority for the AO where the PAA is located. The echelon FSO is usually responsible for liaison in accordance with standard command and support relationships.

B-60. The decision to establish a PAA affects airspace control and coordination for rotary-, fixed-wing, and tilt-rotor aircraft integration. A PAA is a base upon which to establish future gun-target lines for lateral deconfliction and areas for rotary-, fixed-wing, and tilt rotor aircraft to avoid, depending on high- or low-angle artillery fires. For more information on PAAs see ADP 3-90.

SECTION IV – TARGET ACQUISITION

B-61. The designation of radar zones provides a means of prioritizing TA radar sectors of search into areas of greater or lesser importance. Zones focus radar coverage on the combined arms commander's battlefield priorities. A radar zone is a geometric figure placed around an area that designates the area as more, or less, important. There are four different types of zones used with the radar:

- Critical friendly zone.
- Call for fire zone.
- Artillery target intelligence zone.
- Censor zone.

CRITICAL FRIENDLY ZONE

B-62. A ***critical friendly zone*** **a commander designated friendly area of coverage critical to the protection of an asset whose loss would seriously jeopardize the mission that is employed by weapons locating radar.** A CFZ is graphically portrayed (see figure B-16) by a solid black line defining the area and the letters "CF ZONE," followed by the identifying name within, plus the effective date-time-group.

B-63. The CFZ requires a minimum of 3 and a maximum of six anchor points to define the boundary of the area. The size and shape of the CFZ is determined by the anchor points and may be circular, rectangular, or irregular. When possible, the effective date-time-group (moveable and scalable) should be placed within the graphic boundary, but it may be placed outside the graphic or within a computer drop box if necessary.

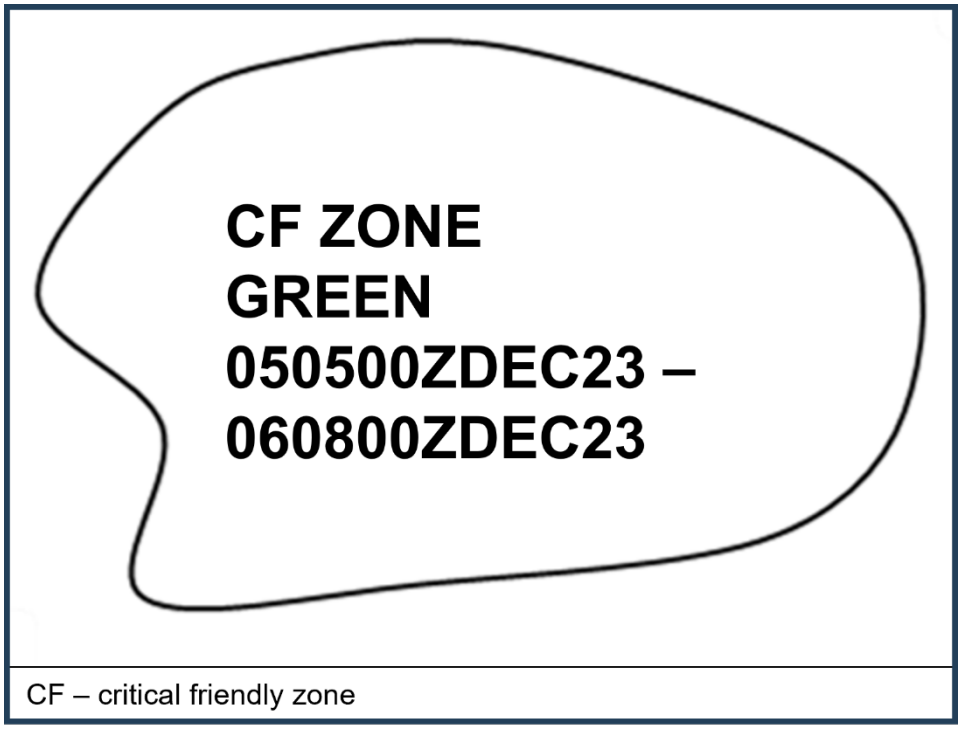


Figure B-16. Critical friendly zone example

B-64. CFZs may be phased along the maneuver axis of advance and activated when entered by friendly forces. This is particularly important in those areas where friendly forces are most vulnerable (for example, river-crossing sites and areas open to easy visual observation). Typical CFZs include maneuver assembly areas, CPs, forward arming and refueling points, friendly breaching sites and other troop concentrations. The supported 072508 commander may also designate critical civilian infrastructure as a CFZ.

B-65. Designation of a CFZ requires WLR coverage of the designated area and attack/delivery assets to provide counterfire. The supporting FA unit's automated FS system places any WLR acquired enemy indirect fire into a CFZ in priority ahead of all other counterfire targets with an immediate call for fire.

CALL FOR FIRE ZONE

B-66. **A *call for fire zone* is a weapon locating radar search area from which the commander wants to attack hostile firing systems.** A CFFZ would be placed around an enemy FS position identified as a HPT. The CFFZ provides the second most responsive priority for fires from the radars.

B-67. On the basis of IPOE and other target indicators, CFFZs are used to monitor suspect areas from which threat indirect fires may jeopardize the mission. Establishing a CFFZ will facilitate immediate counterfire of enemy artillery disrupting the friendly scheme of maneuver.

B-68. A CFFZ is graphically portrayed (see figure B-17 on page B-22) by a solid black line defining the area and the letters "CFF ZONE," followed by the establishing HQ within, plus the effective date-time-group. The CFFZ requires a minimum of three and a maximum of six anchor points to define the boundary of the area. The size and shape of the CFFZ is determined by the anchor points and may be circular, rectangular, or irregular. When possible, the effective date-time-group (moveable and scalable) should be placed within the graphic boundary, but it may be placed outside the graphic if necessary.

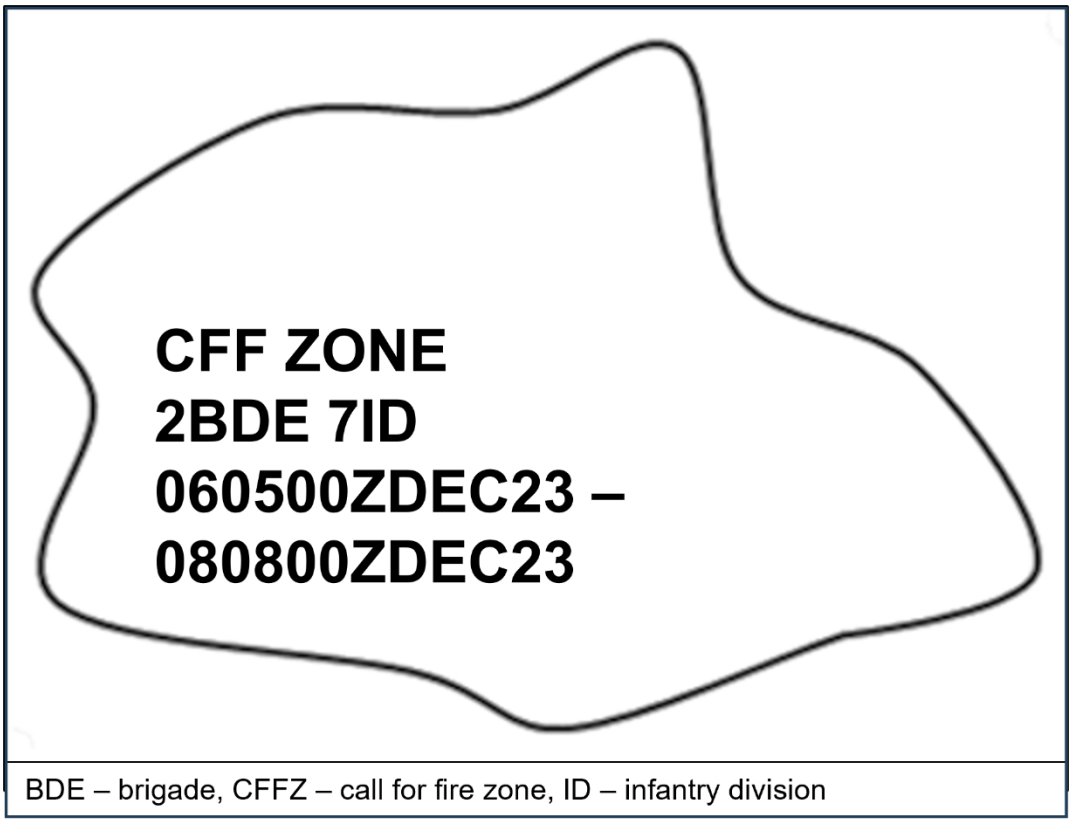


Figure B-17. Call for fire zone example

ARTILLERY TARGET INTELLIGENCE ZONE

B-69. **An *artillery target intelligence zone* is a weapons locating radar search area in enemy territory that the commander monitors closely to detect and report any weapon ahead of all acquisitions other than those from critical friendly zones or call for fire zones.**

B-70. Artillery target intelligence zones may be established in areas where we are not sure about threat indirect fires and need to develop the situation. They can also be used in areas of suspect threat indirect fires that the commander wishes to monitor closely but are out of friendly indirect fire range. When possible, the effective date-time-group (moveable and scalable) should be placed within the graphic boundary, but it may be placed outside the graphic if necessary.

B-71. An artillery target intelligence zone is graphically portrayed (see figure B-18) by a solid black line defining the area and the letters "ATI," followed by the establishing HQ within plus the effective date-time-group. The artillery target intelligence zone requires a minimum of three and a maximum of six anchor points to define the boundary of the area. The size and shape of the CFFZ is determined by the anchor points and may be circular, rectangular, or irregular.

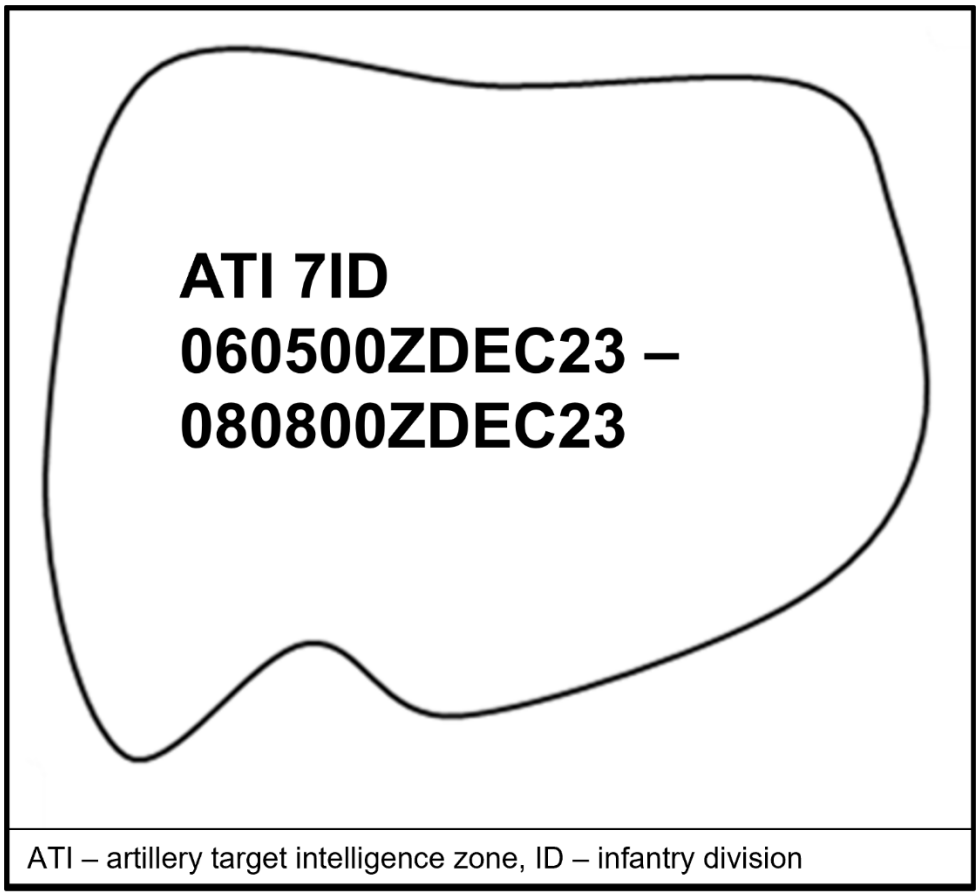


Figure B-18. Artillery target intelligence zone

CENSOR ZONE

B-72. **A *censor zone* is an area from which the weapons locating radar is prohibited from reporting acquisitions.** Normally placed around friendly weapon systems to prevent them from being acquired by friendly radars. The censor zone can be used to prevent WLRs from reporting acquisitions from other sensitive areas as well.

B-73. A censor zone is graphically portrayed (see figure B-19 on page B-24) by a solid black line defining the area and the words "CENSOR ZONE," followed by the defining characteristic within, plus the effective date-time-group. The censor zone requires a minimum of three and a maximum of six anchor points to define the boundary of the area. The size and shape of the CFFZ is determined by the anchor points and may be circular, rectangular, or irregular. When possible, the effective date-time-group (moveable and scalable) should be placed within the graphic boundary, but it may be placed outside the graphic if necessary.

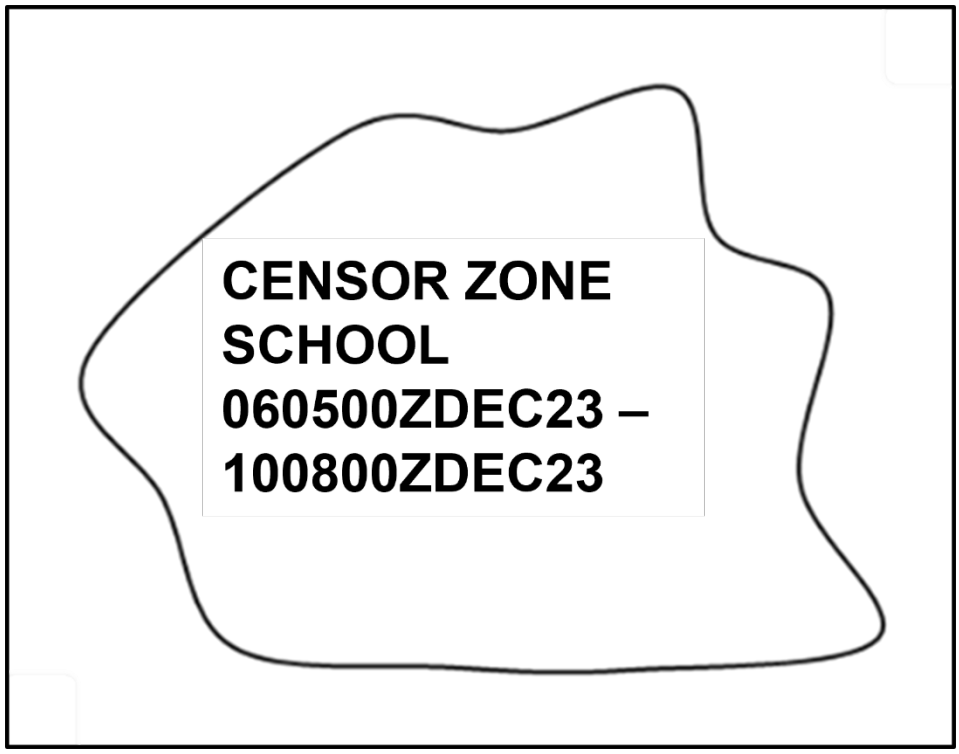


Figure B-19. Censor zone example

COMMON SENSOR BOUNDARY

B-74. Target duplication between radars is likely during combat operations. In addition, the sheer volume of targets being passed from the radars will overwhelm the targeting element, especially if the radars are under centralized control.

B-75. An effective method of reducing the duplication of these targets for attack is to establish a common sensor boundary (see figure B-20). **A *common sensor boundary* is a line depicted by a series of grid coordinates, grid line, phase line, or major terrain feature that divides target acquisition search areas into radar acquisition management areas.**

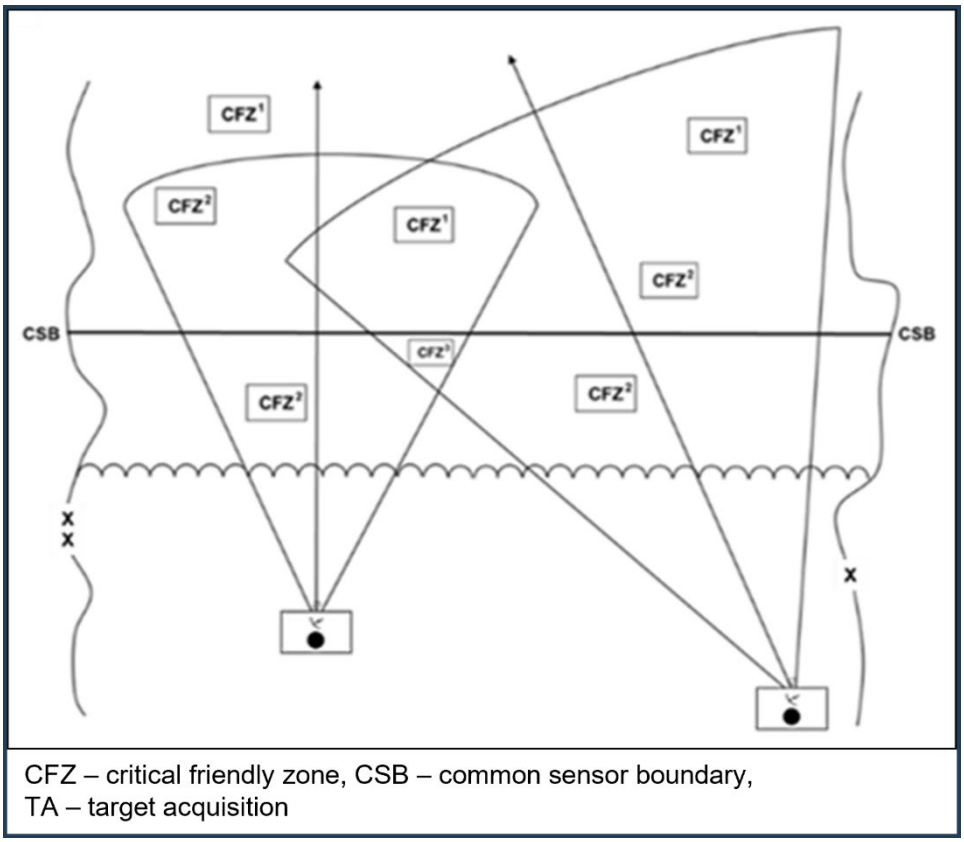


Figure B-20. Common sensor boundary example

SECTION V – AIRSPACE CONTROL

B-76. Airspace control increases operational effectiveness by promoting the safe, efficient, and flexible use of airspace while minimizing restraints on airspace users. Airspace control includes coordinating, integrating, and regulating airspace to increase operational effectiveness.

B-77. Airspace control is essential to overall military effectiveness and in achieving JFC objectives. Given the speed, range, and physical characteristics of air operations, ACMs are integrated into operations to deconflict airspace users and decrease the potential for unintended engagements against friendly, civil, and neutral aircraft. For more information on airspace control see JP 3-52.

AIRSPACE COORDINATING MEASURES

B-78. A key to effectively coordinating joint fires is to constantly view the OA as a three-dimensional area. ACMs are nominated from subordinate HQ through component command HQ and forwarded to the airspace control authority in accordance with the airspace control plan. *Airspace coordinating measures* are measures employed to facilitate the efficient use of airspace to accomplish missions and simultaneously provide safeguards for friendly forces (JP 3-52).

B-79. Most ACMs affect direct and indirect joint fires trajectories and UAS because of their airspace use. The establishment of ACMs in coordination with FSCMs results in the most efficient use of airspace for all friendly airspace users. Some ACMs may be established to permit surface joint fires or UAS operations. The component commanders ensure that ACMs nominations support and do not conflict with joint operations prior to forwarding the nominations to the joint AOC. The airspace control authority approves formal ACM nominations and includes them in the ACO. The *airspace control authority* is the commander designated for overall responsibility for airspace control (JP 3- 52).

B-80. The airspace control authority consolidates, coordinates, and deconflicts the airspace requirements of the components and publishes the ACMs in the ACO. The ACO is normally published at least daily.

B-81. An *airspace control order* is an order implementing the airspace control plan that provides the details of the approved requests for airspace coordinating measures (JP 3-52). It is published either as part of the ATO, or as a separate document.

B-82. An ATO is a method used to task and disseminate to components, subordinate units, and C2 agencies projected sorties, capabilities, or forces to targets and specific missions. The ATO normally provides specific instructions to include call signs, targets, controlling agencies, as well as general instructions. For more information on conduct and control of air operations see JP 3-52 and JP 3-30.

Note. Altitude typically refers to the height above sea level of a given point. Personnel must ensure the altitude is correctly displayed in accordance with their system requirements. Some systems may require altitude to be expressed as height above ellipsoid while others may require expression in relation to mean sea level. Some systems may require conversion from ft to m to permit system entry. FS personnel must also be aware that altitude is sometimes expressed as measured from ground level rather than mean sea level.

B-83. Army commanders use ACMs to facilitate the efficient use of airspace and simultaneously provide safeguards for friendly forces. Procedural control ACMs are used to delineate an airspace boundary or define airspace dimensions for enabling other systems (such as FS systems) to discriminate friendly coordination joint engagement measures from enemy, employ fires across boundaries, and coordinate joint attack of targets for a particular operation. The ACMs that frequently affect FS include the airspace coordination area, the coordinating altitude, and the restricted operations zone (ROZ). Those are discussed here. For more information on additional ACMs see FM 3-52 and JP 3-52.

B-84. An *airspace coordination area* is a three-dimensional block of airspace in a target area, established by the appropriate commander, in which friendly aircraft are reasonably safe from friendly surface fires. (JP 3-09.3).

B-85. A formal airspace coordination area requires detailed planning. Vital information defining the formal airspace coordination area includes minimum and maximum altitudes, a baseline designated by grid coordinates at each end, the width (on either side of the baseline), and the effective times. When time for coordination is limited, an informal airspace coordination area is used. In an informal airspace coordination area, aircraft and surface joint fires may be separated by time or distance (lateral, altitude, or a combination of the two). The supported commander requesting CAS or employing helicopters can request an informal airspace coordination area; the informal airspace coordination area is approved at BN or higher level. Both types of airspace coordination areas are constructed with the assistance of the ALO to ensure they meet the technical requirements of the aircraft and weapon systems.

B-86. Army aviation, ADA, military intelligence, maneuver, UAS, EW assets, FS, and joint and multinational air and ground forces all use airspace. Because they are not organized, trained, and equipped to conduct airspace control, BCT and lower commander's exercise airspace management as part of a division's airspace control within division assigned airspace. Airspace control maximizes the simultaneous use of airspace. At decisive moments, commanders can exploit all available combat power synchronized in time, space, and purpose.

B-87. Fires are airspace users. Clearance of fires maximizes damage to enemy capabilities while minimizing the risk of damage to friendly forces and non-combatants. Clearance of fires may be accomplished through a staff process, control measures, embedded in automation systems, active or passive recognition systems, or a combination thereof.

B-88. A formal airspace coordination area is graphically shown (see figure B-6 on page B-25) as an area enclosed by a solid black line. Depicted inside the enclosed area are airspace coordination area (known as "ACA,") the establishing HQ, the minimum and maximum altitudes, the grid coordinates for each end of the baseline and the width of the airspace coordination area, the grid coordinates for each point of an irregularly

shaped airspace coordination area, and the effective date-time group or the words "on-order." Informal airspace coordination areas are not normally displayed on maps, charts, or overlays.

COORDINATING ALTITUDE

B-89. The *coordinating altitude* is an airspace coordinating measure that uses altitude to separate users and as the transition between different airspace control elements (JP 3-52). Examples of Army airspace control elements include ADA and Army corps, division airspace elements. Army echelons incorporate airspace control plan guidance and integrate the ACO, area air defense plan, special instructions, and the ATO via OPORDs. All airspace users should coordinate with the appropriate airspace control elements when transitioning through or firing through the coordinating altitude.

B-90. The requirement to integrate airspace use in support of ground fire missions requires the determination of the firing locations, the impact location, and the airspace that will be transited by the projectile during flight. Those projectile parameters are integrated with other airspace users. Service liaisons and airspace control agencies work closely to ensure that appropriate ACMs and FSCMs integrate surface operations and airspace operations.

COORDINATION LEVEL

B-91. *Coordination level* is an airspace coordinating measure below which fixed-wing aircraft normally will not fly (JP 3-52). To prevent friendly fire incidents and manage operational risk, all airspace users should coordinate with the appropriate airspace control elements when flying or firing through a coordination level.

RESTRICTED OPERATIONS ZONE

B-92. The *restricted operations zone* is airspace reserved for specific activities in which the operations of one or more airspace users is restricted (JP 3-52). Some typical uses are to restrict air operations over artillery launch and target areas, UAS launch, and recovery areas and areas identified by the area air defense commander as "weapon free" zones.

B-93. A ROZ is graphically shown as an area enclosed by a solid black line. Depicted inside the enclosed area are "ROZ," the establishing HQ, the minimum and maximum altitudes, the grid coordinates for each end of the baseline, figure outline grid coordinates, or the center point grid coordinate and radius in m, and the effective date-time group or the words "on-order."

B-94. For more information on the airspace coordination area, coordinating altitude, ROZ, and other ACMs, see FM 3-52, ATP 3-52.1, JP 3-09.3, and JP 3-52.

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Appendix C

Denied, Degraded and Disrupted Operations

To effectively operate in denied, degraded, and disrupted environments Commanders must drive training conditions based on the expected conditions in the OE. This chapter is an example on how to plan for and train to maintain firing capabilities when all capabilities are not fully functional. Section I describes the types of degraded conditions. Section II describes the five requirements for accurate predicted fire during degraded, disrupted or denied operations.

SECTION I – TYPES OF DENIED, DEGRADED, AND DISRUPTED CONDITIONS

C-1. The TTP required to conduct denied, degraded, and disrupted operations are perishable skills. It is imperative that unit leaders institute training programs to conduct operations under all conditions in order to maintain proficiency and sustain the FS systems ability to continuously support operations.

C-2. As we become more reliant on technology to perform operational tasks, we also become more susceptible to single points of failures within our system of systems. To counter this we must be prepared to fight without technology. To ensure organizations can maintain full mission capability in degraded operations, proper planning and rehearsals at all organizational levels are essential to ensure FS for maneuver forces within the OE. *Denied, degraded, or disrupted space operational environment* is a composite of those conditions and influences in which space-enabled capabilities have been impaired by hostile threats or non-hostile means (FM 3-14).

THE THREAT TO COMMUNICATIONS

C-3. Enemies and adversaries may seek to contest the use of the information environment as a means of denying operational access and diminishing the capability of the US and multinational forces. The ability to perform C2 and communicate with globally deployed forces is a key enabler for protection of US national interests and, as such, is also a key target for adversaries.

C-4. Enemies and adversaries may deliberately attempt to deny friendly use of the EMS, space, cyberspace, and terrestrial systems. Due to our heavy joint reliance on advanced communications systems, such an attack may be a central element of any enemy or adversary A2 and AD strategy, requiring a higher degree of protection for friendly C2 systems and planning for operations in a denied or degraded environment (JP 6-0).

C-5. Peer and near-peer adversaries have demonstrated hybrid threat capabilities that threaten the Army's dominance in cyberspace and the EMS. Communications are a key enabler; therefore, communication and information networks present a high-value target for enemies and adversaries. Our peer threats understand the extent of U.S. forces' reliance on satellite communication systems. Enemies and adversaries will contest the information environment to deny operational access and diminish the effectiveness of our forces.

C-6. Space weather can adversely impact communications systems, to include satellite communications, GPS, missile warning, and space surveillance and reconnaissance. Knowledge of space weather effects enables forces to mitigate operational impacts during forecast periods of reduced communications availability.

MAINTENANCE OR SYSTEM FAULT

C-7. Another possible reason to operate degraded is because a piece of automated fire control system temporarily goes down for a maintenance related issue. Unit level TTP, battle drills, and SOPs can allow the units to reciprocally lay a howitzer, transfer the howitzer or launchers to another FDC, or switch to a backup piece of fire control equipment. All in order to maintain fires and TA capability.

C-8. Unit TTP and SOPs for maintenance related work arounds vary by the type of equipment and the nature of the fault. Self-locating howitzers are able to reciprocally lay with another howitzer in order to maintain firing capability, while a radar system may have to rely on another system to fill its mission while the fault is being repaired.

THE THREAT TO GLOBAL POSITIONING SYSTEMS

C-9. One of the greatest threats is a persistent disruption of the GPS affecting positioning, navigation, and timing in operations. Timing, especially for secure communications, can be controlled by the net control station and pushed to subordinate radios. Units must ensure they load the proper communications security (referred to as COMSEC) into their GPS systems to help prevent degradations in the signal quality and provide the most accurate data possible.

C-10. Pre-combat checks and pre-combat inspections should be performed to ensure GPS receivers are keyed. A DAGR is keyed through the J1 connector for loading the crypto variable key. DAGRs utilize over-the-air distribution for updates once they have been physically keyed. DAGRs should be powered on at least once a month to ensure the updated keys are downloaded. Leaders should verify these checks are being performed.

C-11. There are multiple technologies and techniques that can be utilized to improve GPS operations when jamming occurs. The best solution is to use anti jamming equipment if available. If anti jamming equipment is unavailable, block the signal by placing a barrier (for example, your body) between the device and the suspected source of jamming. If using your body, slowly pivot 90 degrees every two minutes until the signal is regained. The EMI emitter is then behind you. Alternatively, the receiver can be placed in a hole six inches deep. A vehicle hatch may be used as a hole. Allow two minutes for the device to acquire the signal. If neither of these techniques resolve the issue; move. The emitter is too close for mitigating techniques to have any effect.

C-12. FA systems can operate in a GPS denied environment. Units must be prepared and trained to execute their mission using INS, maps, aiming circles and compass when necessary.

THE THREAT TO NETWORK CONNECTIVITY

C-13. Enemy CEMA can disrupt the network affecting key means of communications. Units must ensure they have an adequate PACE plan. Ensure it is known and rehearsed at all organizational levels in order to maintain communications and firing capability as long as possible.

C-14. Digital communications are the primary means for transmitting fire commands. If digital communication is lost or degraded it must be reestablished as soon as possible. Degraded digital communication uses the AFATDS purely as a technical fire direction computer and the FDC personnel would transmit the fire command by voice. If one howitzer in the battery or platoon loses digital communications, the FDC will issue voice commands to that howitzer or the howitzer can fire data from an adjacent section. If two or more howitzers or launchers lose digital communications, the FDC may direct all howitzers or launchers to use degraded mode. The howitzers or launchers can then take fire commands by voice only. To facilitate voice commands, the FDC provides the fire command standards to the section chief after occupation of the position.

C-15. If digital communication is denied or degraded with the supported element, fire missions, fire plans, FSCMs, and any other data can be transmitted by voice. If voice communications are not possible courier or liaison personnel can be utilized.

TRAINING FOR DENIED, DEGRADED, AND DISRUPTED OPERATIONS

C-16. Realistic training combined with increased repetitions will improve our leaders and Soldiers ability to manage operational contingencies and maintain firing capability. Being able to continue to fight while under D3SOE conditions is an extremely perishable skill and should be trained as a regular part of a unit's annual cyclic training and certifications. Units must train under D3SOE conditions to include:

- CBRN.
- D3SOE networks.
- D3SOE positioning.
- Navigation and timing.
- D3SOE fire control and fire direction systems.
- D3SOE precision fires.

SECTION II – THE FIVE REQUIREMENTS FOR ACCURATE PREDICTED FIRE DURING DENIED, DEGRADED, AND DISRUPTED OPERATIONS

C-17. If the requirements for accurate predicted fire cannot be met completely, the firing unit may be required to use adjust-fire missions to engage targets. Adjust-fire missions can result in reduced effect on the target, increased ammunition expenditure, and greater possibility that the firing unit will be detected by hostile TA assets.

C-18. Registrations can be conducted to compute data that will compensate for nonstandard conditions (see table C-1 on page C-4). There are two types of registrations: precision registration and high-burst or mean-point-of-impact registration. Applying these corrections to other fire missions will allow the unit to determine accurate predicted firing data. The purpose of a registration is to determine firing data corrections that will correct for the cumulative effects of all nonstandard conditions. All registrations yield total corrections. With these corrections applied to firing data, a unit can rapidly and successfully engage any accurately located target, subject to range transfer limits and the registration point, and have a first round FFE capability. For information on registrations see TC 3-09.81.

Table C-1. The five requirements for accurate predicted fire in fully operational and degraded operations

Requirements	*Full operational capability*	*Degraded methods*	*Potential effects of degradation*
Accurate target location and size	Laser designator /rangefinder GPS/INS, PF-D / PF-M	Map, compass, binoculars	Reduction from CAT I – IV TLE to CAT V – VI TLE1 Decreased first round accuracy
Accurate firing unit location	GPS/INS survey	Aiming circle (direction, distance, vertical angle from known point) Map and compass, hasty survey techniques, registration, observer adjusts fire	Increased occupation times, increased counterfire threat Decreased first round accuracy
Accurate weapons and munitions information	Calibration chronograph	Predictive muzzle velocity technique, registration, observer adjusts fire	Increased counterfire threat, decreased first round accuracy
Accurate meteorological information	GPS/profiler computer distributed	Registration observer adjusts fire	Potential increased fire mission processing time
Accurate computational procedures	AFATDS, centaur, AFCS	Manual fire direction	Potential increased fire mission processing time2
Notes: 1 – Training of observers on degraded methods can improve TLE back to CAT III/IV. 2 – Training of FDC personnel on manual methods can mitigate increase processing time.			
ADA – air defense artillery, AFATDS – Advanced Field Artillery Tactical Data System, AFCS – advanced fire control system, CAT – category, FDC – fire direction center, GPS – global positioning system, INS – inertial navigation system, PF-D – precision fires-dismounted, PF-M – precision fires-mounted, TLE – target location error			

SECTION III – ACCURATE TARGET LOCATION AND SIZE

ACCURATE TARGET LOCATION AND SIZE

C-19. Accurate target location is critical to achieving effects on targets. The use of position locating systems, mensuration tools, and laser rangefinders designators operating from known locations are critical to precisely locating targets. *Mensuration* is the process of measurement of a feature or location on the Earth to determine an absolute latitude, longitude, and elevation (JP 3-60). *Target coordinate mensuration program* is combination of the following distinct separate critical components and their ability to operate as a whole to accurately produce mensurated target coordinates: use of one or more National Geospatial-Intelligence Agency (NGA)-validated mensuration tool, a mensuration process, a training syllabus, proficiency development and maintenance procedures, work center/work environment procedures, access to imagery, program governance documentation, and certified analysts and/or operators (CJSI 3505.01E).

C-20. When these capabilities are not available and the observer is operating in a degraded mode, the observer must rely on thorough terrain map study to accurately locate targets. Frequently in these degraded situations or in emergency situations demanding quick action, the observer may be unable to accurately locate targets and must correct errors in target location by adjusting fires onto a target, thereby forfeiting surprise and effects on target. Observers must train and be proficient on using a compass, map, protractor, and observed fire fans to develop a terrain sketch. They will improve accuracy and improve speed at which a target can be located. Constant improvement of terrain sketches is a vital skill set that must be trained and reinforced.

C-21. The observer can obtain an initial location by map-spot and compass, however, should refine the observation post location and the orientation of the laser rangefinder with more accurate means as soon as possible. If possible, observer location should be determined by survey. Lacking survey control, however, the observer has a variety of techniques available to self-locate. An observer should always use the most accurate means of self-location available that the situation permits in a D3SOE.

C-22. To consistently determine an accurate target location, an observer:

- Must be prepared to observe with a map and compass.
- Must be able to determine an accurate target location through mensuration using current target location tools.
- Must be able to use terrain association and map analysis for self-locating procedures.
- Must be able to self-locate to within 10 m (100 m if degraded by lack of position locating systems or other navigational aids).
- Uses prominent terrain features to relate potential target areas to grid locations on a map.
- Makes a thorough study of terrain by drawing a terrain sketch (in a static location) and visibility diagram.
- Associates the direction in which the observer is looking with a direction line on the map.
- Ensures that a planned target is always a recognizable point on the ground (except "cannot observe" missions). This ensures that the observer can consistently find the target location.

C-23. Observers sometimes use a FS vehicle equipped with the Fire Support Surveillance Sensor (referred to as an FS3) to assist them in locating the target. Binoculars used in conjunction with the M2 magnetic compass are excellent devices to assist the observer in locating the target. In a GPS denied or degraded operation the FS vehicles are equipped with an inertial location and navigation system that allow for accurate position and direction information even after movements over large amounts of terrain.

C-24. The observer can also self-locate by using map spot, resection, or a one burst artillery round. The preferred method of self-location uses the most current digital forward entry device. For more information accurate target location and the observer see ATP 3-09.30.

ACCURATE FIRING UNIT LOCATION

C-25. The FA commander is responsible for accurate firing unit location for all indirect fire weapon systems. The components of accurate firing unit location are position, direction, and altitude. The most accurate available survey equipment and on-board navigation systems are the primary means to achieve the accuracy standards listed above. The FDC can also determine the grid location of each piece by using the reported direction, distance, and vertical angle for each piece from the aiming circle used to lay the battery. For more information on the accurate firing unit location standards see ATP 3-09.02.

SURVEY

C-26. Survey provides indirect fire platforms as well as target locating assets with a common position and direction (common grid). With the proliferation of GPS technology in conjunction with onboard navigation systems, desired location accuracy is easily attained. However, while the proliferation of these systems facilitates self-location, it places on the FA commander the additional responsibility to ensure that enough survey control points exist throughout the AO to maintain common grid.

C-27. There is no longer a military occupational specialty dedicated solely to survey. This creates a need to train non-survey soldiers on how to operate the survey equipment. The commander designates the personnel to train and form the survey team. The survey team provides survey for the unit. The survey equipment is assigned to the FA BN.

C-28. The field notes of any survey are the only original record of the survey that the survey party has once it leaves the field. Therefore, the field notebook must contain a complete record of all measurements made or determined during the progress of the survey. It should include complete sketches, descriptions, and remarks, when necessary, to clarify the notes. The best survey fieldwork is of no value to the using unit if the notes are not accurate, legible, and complete in every detail.

HASTY SURVEY

C-29. Determining location when survey or GPS equipment are not available, the desired location may be determined through a graphic resection or graphic traverse. For more information on procedures for determining location, see ATP 3-09.50.

DIRECTION

C-30. Direction is the most important element of survey control. The mil relation formula states that one mil of error in direction at 1,000 m will result in a one-meter lateral deviation from the target. As the range increases, so does the deviation.

C-31. FA personnel will use the M2A2 aiming circle to perform directional control in a GPS degraded, disrupted, or denied environment. Soldiers can perform directional observations using the sun and stars. Soldiers can also provide directional control using a declinated lensatic or M2 compass.

Note. Units equipped with the gun laying and positioning system have an organic capability to establish an orienting station and end of the orienting line for the unit.

ARTILLERY ASTRONOMIC OBSERVATION USING THE SUN

C-32. Using the aiming circle in the artillery astronomic method of determining azimuth; two sides of the Pole-Zenith Star triangle, the polar distance and colatitude, and one angle are used to solve for the azimuth angle. This computation is based on the time of the observation. The problem of determining azimuth consists of taking a horizontal reading at the observer's station between the mark and sun, the azimuth of which can be computed. The simple operation of subtracting this horizontal angle from the computed azimuth of the sun gives the desired azimuth to the mark. For more information on this procedure see ATP 3-09.02.

CAUTION

The sun must never be viewed through the telescope without a sun filter. The filter should be inspected before use to ensure that the coated surface is free from scratches or other defects.

Serious eye damage will result if proper precautions are not taken. If the sun filter has been damaged or lost, a solar observation may be completed by use of the card method. The image of the sun is projected onto a card held 3 to 6 inches behind the eyepiece and the telescope is focused so that the cross hairs are clearly defined.

ARTILLERY ASTRONOMIC OBSERVATION USING A STAR

C-33. The artillery astronomic method can be used with observations on Polaris or on east-west stars. Used with Polaris, this method yields the most accurate azimuths. When the artillery astronomic method is used with east-west stars, the requirement for accurate time is a disadvantage, but the method can be used when no stars meet the position requirements for the altitude method. Computation of artillery astronomic star is the same as the computations for artillery astronomic sun. For more information on artillery astronomic observation see ATP 3-09.02.

MEASURING AN AZIMUTH WITH THE M2 COMPASS

C-34. To read the azimuth scale by reflection, hold the compass in both hands at eye level with arms braced against body and with the rear sight nearest your eyes. Place the cover at an angle of approximately 45° to the face of the compass so that the scale reflection can be viewed in the mirror. Level the instrument by viewing the circular level in the mirror. Sight on the desired object and read the azimuth indicated on the reflected azimuth scale by the south-seeking (black) end of the compass needle. For more information on measuring an azimuth with the M2 compass see ATP 3-09.50

C-35. The M2 compass is an alternate instrument for orienting or laying howitzers. The unmounted magnetic compass is a multipurpose instrument used to obtain angle of site and azimuth readings.

C-36. This method of lay is used during a deliberate occupation when an aiming circle is not available. The M2 compass is used to lay one howitzer. Once laid for direction, that howitzer is used to reciprocally lay the remaining howitzers.

C-37. The steps for laying with the M2 compass are as follows:

- Place the M2 compass on a stable object (such as a collimator cover, and aiming circle tripod, or a mattock handle) away from magnetic attractions.
- Measure the azimuth to the pantel of the howitzer to be laid.
- Determine the deflection to the howitzer by subtracting the azimuth of fire from the measured azimuth.

C-38. This method of lay has advantages and disadvantages that must be considered before it is used.

- The main advantage to using this method is that all howitzers will be oriented parallel.
- Disadvantages are the compass is graduated every 20 mils and can be read to an accuracy of 10 mils. The accuracy depends a great deal on the ability of the instrument operator.

Note. A *mil* is a unit of measure for angles that is based on the angle subtended by l/6400 of the circumference of a circle (TC 3-09.81). The mil is used because of its accuracy and the mil relation formula, which assumes that an angle of one mil will subtend an arc of one meter at a distance of 1,000 m. The graphic representation of a mil is a lower-case letter "m" with a virgule (/) through it.

MEASURING AN AZIMUTH USING AIMING POINT-DEFLECTION METHOD

C-39. The aiming point-deflection method of lay is used during an emergency fire mission when the need to expedite the mission is more critical than the need for first-round accuracy. A distant aiming point is required and must be at least 1,500 m from the position. All howitzers must be able to pick up a line of sight to the distant aiming point. A compass, or a map and protractor are the only equipment needed. For more information on measuring an azimuth using an aiming point-deflection method see ATP 3-09.50.

MEASURING AN AZIMUTH USING COLLIMATOR AND AIMING POSTS

C-40. The collimator is the primary aiming point for the howitzer. The emplacement distance for the collimator will vary because of terrain encountered but is normally between 4 and 15 m from the howitzer. Displacement is corrected by matching the numbers in the panoramic telescope with the corresponding numbers in the collimator. If the collimator is not emplaced within the distances stated above, the graduations visible in the collimator will not align properly and the sight picture will be out of focus. Therefore, it will be impossible to correct for displacement.

C-41. The aiming posts are a secondary aiming point for the howitzer. The aiming posts are emplaced approximately 50 and 100 m from the gun for the M119-series and M109-series howitzer, or 75 and 150 m for the M777-series howitzer. The increased spacing of the M777-series howitzer's aiming posts is due to the pivot point of that weapon system. When firing out of traverse missions, the gunner can lose sight of the aiming posts at the shorter distances. Increasing the distance of the aiming posts addresses the problem. For more information on measuring an azimuth using the collimator and aiming posts see ATP 3-09.50.

MEASURING AN AZIMUTH USING THE RECIPROCAL LAYING METHOD

C-42. Reciprocal laying is a procedure by which the 0-3200 line of one instrument and the 0-3200 line of another weapons on the azimuth of fire. The aiming circle is used to measure horizontal clockwise angles from the line of fire instrument are laid parallel.

C-43. The aiming circle is the primary means by which the cannon battery orients weapons on the azimuth of fire. The *azimuth of fire* is the direction, expressed in mils, that a fire unit is laid (oriented) on when it occupies a position (ATP 3-09.50). The aiming circle is used to measure horizontal clockwise angles from

the line of fire to the line of sight to a given aiming point. In reciprocal laying, the aiming point for the aiming circle is the howitzer panoramic telescope.

C-44. Survey may not be available. To establish directional control and lay units by the orienting angle method, the orienting line must be established. Without survey, the orienting line can be established by hasty survey techniques. Once the orienting line is established, the steps shown above apply. The OS grid location and altitude may be obtained by GPS, map spot or by hasty traverse. If survey data is not available and hasty survey is not possible, then the next best method is laying by grid azimuth.

C-45. In reciprocal laying, the 0-3200 line of one instrument and the 0-3200 line of another instrument are laid parallel.

ACCURATE WEAPON AND AMMUNITION INFORMATION

C-46. Accurate weapons and munitions information is developed and provided by firing units, FDCs, and sustainment cells. The weapon information is normally applied automatically using the AFATDS. If the AFATDS is not functioning the procedures to apply weapons information manually is found in the applicable technical manuals and tabular firing tables. Firing tables and technical gunnery procedures allow the unit to consider specific ammunition information as follows:

- Weight of the projectile.
- Type of fuze used.
- Muzzle velocity variations.
- Propellant temperature.

C-47. Weight of the projectile affects how far or short the round will travel. If the round is heavier than standard it will have a decreased range, the opposite is also true if the round is lighter than standard it will have an increased range. Compensation for projectile weight is found in the appropriate tabular firing table that is being used.

C-48. The type of fuze will determine the information that is set for the fuze. For a point detonating fuze no information is set on the fuze and the round will function as it hits a solid target. Variable time fuze can set function at 7 m above the ground by setting the fuze for the appropriate range to be used. Time fuzes can be set at various heights above the ground to have better effects against soft targets, such as dismounted infantry, radars, C2 systems, or fuel points. All these fuzes require different settings based on their type, function, and ranges to be used.

C-49. Muzzle velocity variation is the difference from a standard speed the round departs the barrel with. If the round is traveling faster than the standard speed it will have an increased range, the inverse is also true if the round is traveling slower when it leaves the barrel it will have a decreased range from standard. We measure this with the M90 chronograph or the M94 muzzle velocity system using the appropriate technical manual. While it is not practical to predict (within ±0.1 m a second) the velocity of every round, it is possible to approximate velocities to within ±1 or ±2 m a second with current available information. This may be useful when calibration is not possible, when updating calibration data, or when trying to increase the accuracy of inferred muzzle velocity techniques. When calibration is not possible, the shooting strength of the howitzer can be used as the muzzle velocity variation. While this may be enough when no other data are available, it is important to understand that a muzzle velocity variation consists of more than just shooting strength. An equation can be created for determining a muzzle velocity variation by using its basic parts. In the event the muzzle velocity system becomes inoperable the unit can register or extract powder efficiency data from another system to apply to the inoperable muzzle velocity system weapon's shooting strength data.

C-50. Propellant temperature affects the range a round will travel. Propellant has a standard temperature based on 70 degrees Fahrenheit. If the propellant is colder than standard the round will have a decreased range, if the propellant is warmer than standard the round will have an increased range to the target. A *propellant* is a low-order explosive that burns rather than detonates (TC 3-09.81). In artillery weapons using separate-loading ammunition, the propellant burns within a chamber formed by the obturator spindle assembly, powder chamber, rotating band, and base of the projectile. For cannons using semi-fixed ammunition, the chamber is formed by the shell casing and the base of the projectile. When the propellant is ignited by the primer, the burning propellant generates gases. When these gases develop enough pressure to

overcome initial bore resistance, the projectile begins its forward motion. Table E in the tabular firing tables lists the magnitude of change in muzzle velocity resulting from a propellant temperature that is greater or less than standard. Appropriate corrections can be extracted from that table. Propellant temperature should be determined from ready ammunition on a periodic basis, particularly if there has been a change in the air temperature. For more information on accurate weapon and ammunition data see TC 3-09.81.

ACCURATE METEOROLOGICAL INFORMATION

C-51. With today's emphasis on FFE and trends toward longer distances, accurate MET corrections for artillery fires are crucial. Atmospheric conditions that include wind direction, wind speed, air temperature and air density along the trajectory of a projectile or rocket directly affect its accuracy and may cause the projectile or rocket to miss the desired point of impact.

C-52. The Computer Meteorological Data-Profiler (CMD-P) (AN/GMK-2) is a weather measurement system developed to provide MET data to support artillery and TA units. CMD-P interfaces with the AFATDS via local area network connection and is operated by the AFATDS operator. The BN AFATDS transmits MET data to the subordinate FA units. Every effort must be made to obtain the most accurate met corrections available. The website that provides the information to the Profiler is:

- https://www.kc.army.mil/armywx/

C-53. Meeting the MET requirement in D3SOE conditions can be resolved by a number of techniques if CMD-P is unavailable:

- MET can be received from other units not affected by the D3SOE.
- MET message via voice.
- Conduct a registration if conditions are permissive.

VERIFYING MET MESSAGES

C-54. When the FDC receives a met message, it should be checked to ensure that it is valid. Any peculiarities in the message should be noted. If the timeliness or validity of a met message is doubted, that should be questioned and referred to the BN FDC. While most messages are transmitted digitally, verbal transmission of met messages may cause copying errors, particularly if the message is copied down on something other than the standard (computer) met form. FDC personnel should use the procedures outlined in TC 3-09.81 to verify MET messages.

C-55. Check the computer met message heading as follows:

- Check message type, octant, and location entries for correctness, ensuring validity for the AO. The location of the met message should be the midpoint between the gun and target areas.
- Check date-time entries to ensure they are current (date-time entries are expressed in Greenwich Mean Time).
- Check for possible line to line errors in the computer met message as follows:
- Question drastic wind direction changes (1,000 mils or greater) or sudden reverses of wind direction from line to line, particularly if wind speeds are more than 10 knots. Direction changes greater than 1,000 mils are common when wind speeds are 10 knots or less.
- Question severe increases or decreases (10 knots or greater) in wind speed from line to line.
- Temperature accuracy is hard to evaluate because of natural erratic changes. Question a severe increase or decrease (over 20°K) in temperature from line to line.
- Check for increases in pressure. Pressure should decrease smoothly from line to line. Pressure will never increase with height.

C-56. Computer met messages that do not reflect the correct location or current date-time are invalid and do not accurately represent the current weather conditions for the AO. Invalid met messages should be brought to the attention of the BN FDC for the processing of a new, valid met message.

C-57. The line-to-line checks reflect basic weather behavior patterns. Regional and topographical characteristics can often produce unusual variances in wind direction and speed. The CMD-P numerical model does not necessarily produce a 100% accurate forecast, but it does not produce non-physical results.

The deviations noted do not invalidate the met message but should be referred to the BN FDC for clarification, especially in cases where the message was transmitted verbally.

C-58. In cases where the met message's validity is called into question, the fire direction officer has a few available options.

- If this is the first met message and it cannot be checked against previous met data, a precision registration should be conducted in order to account for all nonstandard conditions. If a registration is not feasible and line to line errors are in question, the met may be applied and a check round fired to verify accuracy.
- If the met in question is not the first produced by the CMD-P and the FDC has maintained accuracy during fire mission processing with the current met, a dry-fire verification may be conducted in order to compare firing solutions. With the current met, compute and record firing data (deflection, quadrant elevation, and time fuze setting) for a known point. Next, make the new met current and compute firing data for the same known point, comparing the two firing solutions. As a general rule, apply the standard tolerances for deflection (±3 mils), quadrant elevation (±3 mils), and time fuze setting (±0.1 seconds).

Note. Additional analysis may be needed when firing at maximum ranges, where each mil causes a greater deviation on the ground. Use the appropriate TFT to compare the differences in firing data at the known point target range.

C-59. The fire direction officer also maintains the option to discard the new met and continue firing with the current met while maintaining accuracy. While made feasible by the ability of the CMD-P to provide a new met every 30 minutes, the FDC should strive to improve accuracy with every chance afforded.

C-60. The passage of time may decrease the accuracy of a MET message because of the changing nature of weather. With existent equipment and technology, the BN FDC has the ability to provide met messages every 30 minutes. A met message at this frequency has been shown to dramatically increase the accuracy and lethality of munitions. This however may be impractical and could slow the responsiveness of the firing unit. A firing unit should request a new met message every 2 to 4 hours, depending on the tactical situation.

C-61. It is critical for a firing unit to request and receive a met message when:

- Upon entering the initial firing position.
- Any movements more than 4 kilometers, but the target area remains the same.
- Anytime direction of fire is more than 800 mils from the original target location.
- Anytime there is a significant change in weather; that is, a front comes through, or the temperature increases or decreases.
- During transition periods.

MANUAL COMPUTATION OF MET

C-62. For manual MET procedures use DA Form 4200 (*Met Data Correction Sheet*) as outlined in TC 3-09.81.

ACCURATE COMPUTATIONAL PROCEDURES

C-63. The computation of firing data similarly affects all indirect fire systems, to include mortars, and must be accurate. Accurate computational procedures are provided by all FDCs. Automated and manual techniques are designed to achieve accurate and timely delivery of fire. The balance between accuracy, speed, and the other requirements for accurate fire should be included in the computational procedures.

C-64. In order to reduce firing incidents is to recognize that individuals make errors, and the best safeguard against those errors is an independent double check of all operations in which human error could cause a firing incident (sometimes referred to as the two-man rule). A fundamental aspect of safety is that no one person performs a critical live fire task then checks that task alone. For every critical task required for firing

artillery safely, there is a person or persons designated to verify the task. Verification of data includes independent checks including:

C-65. Independent checks are performed on each howitzer by the section chief to verify lay of the howitzer, emplaced retaining pins, prefire checks, charges, fuze settings, and set deflection and quadrant, as well as ensuring the announced firing data is applied as announced.

C-66. Independent checks are also performed in the FDC where the database must be verified, either as the information is input or as a total review once the entire database has been constructed. The checks are continuous since the FDC must verify any additions, changes, or deletions to the database as they occur.

C-67. A means to assist rapid transmission of commands to the howitzers are terrain gun position corrections. *Terrain gun position corrections* are individual howitzer corrections applied to the gunner's aid on the panoramic telescope (pantel), the correction counter on the range quadrant, and the fuze setting of each howitzer (TC 3-09.81). The digital link between the AFATDS and the howitzer will at some point fail to function. The problem may be in the AFATDS, one or more of the Gun Display Unit Replacement (referred to as a GDU-R), section chief display, or the communications link. When the failure occurs, voice fire commands must be transmitted to one or more of the howitzers. If the failure is at the AFATDS, voice commands must be transmitted to each of the howitzers. It is important that terrain gun position corrections be computed. These corrections, as a minimum, should be computed for the primary, left, and right sectors.

C-68. During some types of degraded howitzer operations, the battery or platoon FDC may assume direct control of technical fire direction and send firing data to the howitzer. For example, if the digital control system of an individual howitzer section is degraded or inoperative, the FDC may compute technical firing data for that section. The preferred method requires an operational howitzer to locate next to the degraded howitzer and the degraded howitzer uses the operational howitzer's firing data. For more information see the appropriate technical manual for the specific cannon system and ATP 3-09.50.

C-69. Manual backup should be established as a form of "position improvement" and should not impede setup or processing with automated means. The manual backup also serves as a basis of a rapid independent check to the automated solution. One of the elements to the solution of the gunnery problem is the determination of chart data. Chart data consists of chart range, chart deflection, and angle T. The determination of chart data requires the construction and operation of a firing chart.

SECTION IV – FIRING CHARTS

C-70. A *firing chart* is a graphic representation of a portion of the earth's surface used for determining distance (or range) and direction (azimuth or deflection) (TC 3-09.81). The chart may be constructed by using a map, a photomap, a grid sheet, or other material on which the relative locations of batteries, known points, targets, and observers can be plotted. Additional positions, FS coordinating measures, and other data needed for the safe and accurate conduct of fire may also be recorded.

C-71. A *surveyed firing chart* is a chart on which the location of all required points (battery or platoon positions, known points, and observation points) are plotted (TC 3-09.81). These locations can be based on survey or map inspection. All plotted points are in correct relation to one another and reflect actual map coordinates.

C-72. Chart data consist of chart range and chart deflection from the firing unit to the target and angle T. In a manual FDC, two firing charts will be constructed and used to check each other.

C-73. One chart may differ slightly from another because of small differences in construction caused by human limitations in reading the graphical equipment. Because of these differences, the following tolerances between charts are permissible:

- Range or distance ±30 m.
- Azimuth or deflection ±3 mils.
- Angle T ±30 mils.

C-74. When survey control and maps are not available, delivery of indirect fires is possible by using observed firing charts. An *observed firing chart* is a firing chart on which all units and targets are plotted relative to each other from data determined by firing a registration (TC 3-09.81). Observed firing charts are an expedient

method that should only be use under emergency conditions and every attempt should be made to construct a surveyed firing chart as soon as possible. Since all locations are based upon firing data, observed firing charts contain errors because of nonstandard conditions. Manual gunnery methods are described in TC 3-09.81.

Appendix D

Environmental and Terrain Considerations for Fire Support

The sections of this appendix are designed to be a quick-reference resource of information on aspects of environmental and terrain considerations that affect FS. Section I begins with FS considerations in urban terrain. Section II covers FS considerations in a maritime environment. Section III covers FS considerations in mountainous terrain. Section IV is devoted to operations in the jungle. Section V covers FS considerations in desert operations. Section VI covers night operations. Section VII discusses continuous operations. While section VIII covers cold weather operations.

SECTION I – FIRE SUPPORT CONSIDERATIONS FOR URBAN OPERATIONS

D-1. Urban operations are typically planned and conducted on or against objectives on terrain where man-made construction or the density of population are the dominant features. The FS planners recommend EFSTs to support the division and corps scheme of maneuver. Often, the role of FS in an urban environment is to enable subordinate and supporting units to get into or around the urban area with minimal casualties. This enables the respective unit commander to have maximum combat power with which to close with the enemy and finish the fight. Appropriate FSCMs are essential because fighting in urban areas results in opposing forces engaged in close combat.

PLANNING

D-2. Planning considerations for fires in support of urban operations include:

- Exchange FS and observer plans with adjacent units.
- Conduct target mensuration for precision munitions.
- Coordinate for collateral damage estimates as necessary.
- Develop an observer plan to include observation posts in buildings, location of laser designators, and overwatch of trigger points and gun-target lines.
- Plan EW assets to defeat explosive threats, disrupt enemy information collection, reconnaissance, and surveillance efforts, and detect enemy use of the EMS for targeting purposes.
- Identify location of hazardous sites; both above and below ground such as fuel and industrial storage tanks, gas distribution lines, CBRN sites and any other area where incendiary effects of detonating artillery and mortar rounds will start fires, or release CBRN or other hazards.
- Identify the general construction or composition of the buildings and road surfaces (may impact the type of munitions used).
- Where does building masking, overhead power lines, or towers degrade GPS and compass functioning?
- Will the use of obscurants and illumination favor friendly units or the threat?
- Will buildings or structures require FS personnel to carry or use equipment not normally carried such as field expedient antennas, climbing rope, wire gloves, axes, or sledgehammers?
- Plan for radar coverage.

D-3. The FSCOORD and fires cell planners often find their major challenges to be in providing FS to numerous smaller engagements that, while separate, are part of coordinated, larger unit operations. Prioritizing FS, sustaining FS, and positioning and repositioning FS assets take on greater significance in urban operations.

CHARACTERISTICS OF URBAN TARGETS

D-4. The enemy has many covered and concealed positions and movement lanes and may be on rooftops, in buildings, and in sewer and subway systems. Aerial observers are extremely valuable for targeting because they can see farther to detect movements, positions on rooftops, and fortifications. Engagements on rooftops are planned for to clear away enemy FOs, snipers, communications, and radar equipment. Engagement areas are planned on major roads, at road intersections, and on known or likely enemy positions. Also, restrictive FSCMs, such as RFAs and NFAs, are needed to protect civilians and identified restricted areas.

D-5. Identifying and anticipating kill zones or EAs is critical to ensuring that indirect fire assets are in position to provide supporting fires. Practically, the ability and the utility of massed fires is affected in an urban environment. The natural restrictions in place due to the obstructive nature of urban terrain and the small-unit operations prevalent in urban combat require an innovative and limited approach to the delivery of fires. However, major road networks that offer high-speed avenues of approach into and through an area are suitable for targeting to restrict the flow of enemy forces and supplies into the combat area.

D-6. IPOE leads to the identification of time-sensitive HPTs and is an important consideration for the FSCOORD and the FSE. The commander or higher HQ normally provides specific targeting guidance and prioritization for time-sensitive targets within the AO.

FRATRICIDE PREVENTION MEASURES

D-7. Fratricide prevention is a matter of concern in all operations. The risk of fratricide is much greater when visual identification and precise navigation are inhibited, by either distance or reduced visibility. In urban operations, the very nature of the physical terrain creates a situation of reduced visibility, resulting in unique and significant challenges to combat identification and fratricide prevention. The challenge is the need to minimize fratricide without unreasonably restricting the ability to accomplish its mission.

D-8. There are two basic causes of urban fratricide-procedural and technical. Procedural causes are typically failures of FS coordination. Technical failures may include failures of controlling equipment or mechanical malfunctions.

WEAPONS EFFECTS

D-9. Because the conduct and coordination of indirect fires in urban areas is difficult, fires in support of the maneuvering elements are closely coordinated and planned in detail. Planning and coordination include considerations of force protection, weapons effects, psychological effects on the populace, and the potential for collateral damage. For air-delivered munitions, terminal control and positive guidance are required to ensure the delivering platform has acquired the correct target. Effective ACMs can ensure other missions (for example, SCAR) can transit or operate in the airspace above and around the urban area.

D-10. The effects of lethal munitions can be significantly different in urban environments. The characteristics of the urban terrain and the small unit house-to-house nature of urban combat affect both the results and employment of weapons. Specific weapons effects considerations for urban operations include the risk estimate distance and quantity of the munitions, the construction of the buildings, and the ability to engage the target.

D-11. Calculated risk estimate distances are often not valid in urban operations. Buildings provide cover that can reduce blast and shell fragment effects risk distances to a few m. Inaccurate or stray fires may occur due to projectiles deflecting off buildings, wires, or other objects. Bomblets, scatterable mines, illumination, and other ordnance payloads may also be diverted by objects or may have irregular patterns due to swirling upper- or lower-level winds around large or tall structures.

TARGET ACQUISITION AND OBSERVATION CONSIDERATIONS

D-12. Urban military operations are involved with physical terrain, noncombatants, and infrastructure. Urban combat almost always will affect all three in greater or lesser degree, and the lethal and collateral effects of fires have the potential for great destruction and loss of life. In order to maximize desired effects of fires on

the threat while at the same time minimizing undesired adverse effects on the built-up area and its inhabitants, these fires must often be as precise as technology and planning will allow.

TARGET ACQUISITION

D-13. Target acquisition in an urban environment faces several challenges. Sensors and reconnaissance have difficulty penetrating the urban environment's increased cover and concealment limiting both TA and battle damage assessment. Moving personnel or vehicular targets are normally the easiest to acquire. However, the cover and concealment provided by urban terrain gives moving targets short exposure times, requiring firing systems to act rapidly on targeting data. In specific circumstances, weapon locating radar TA may be more effective in locating hostile firing weapons because of the increased use of high-angle indirect fires.

D-14. Targeting challenges are met by innovatively integrating reconnaissance capabilities. Air Force reconnaissance and surveillance systems contribute significantly to assessing the urban area. These information collection systems include manned and UAS. These information systems are vulnerable to weather and staff weather officers should be leveraged to provide weather effects assessments for both the platforms and sensors based on current and forecast weather conditions. Air Force reconnaissance and surveillance systems can provide vital data to help assess threat intentions, threat dispositions, and an understanding of the civilian population. These systems also can downlink raw information in real-time to Army intelligence processing and display systems, such as the common ground station or division tactical exploitation system.

OBSERVATION

D-15. Ground observation may be limited. Consider placing observers on overlooking terrain outside the city and using external routes for observer movement.

D-16. Allow additional time for observer relocations when rubble, downed electrical wires, snipers, and other obstacles and impediments to movement may exist. Observers may need to take routes around obstacles. Elevators typically should not be used to avoid becoming trapped in the event of power failure. This can require time-consuming stairway climbs to gain an adequate vantage point. Fatigue may become a problem.

D-17. FOs should be positioned where they can get the maximum observation so that TA and adjustments in fire can best be accomplished. This is not necessarily on the tops of buildings. FOs may be placed on upper floors of buildings to improve visibility. The observers on rooftops are vulnerable to both enemy aircraft direct fire and artillery or mortar airbursts.

D-18. Ground observation is limited in urban areas. Adjusting fires is difficult since buildings may block the view of adjusting rounds; therefore, the lateral method of adjustment may be most useful in urban operations. The impact of initial rounds may be adjusted laterally, until a round impacts on the street perpendicular to the forward edge of the battle area. When rounds impact on the perpendicular street, they are adjusted for range. When the range is correct, a lateral shift is made onto the target, and the guns FFE. Adjustments may be made by sound although this can be deceptive due to echoes off of buildings. Using airburst rounds is another technique for adjustment.

D-19. Consider the use of aerial observers. Aerial observers are effective for seeing behind buildings immediately to the front of friendly forces. These observers are extremely helpful when using adjusted fire because the observer may see the adjusting rounds impact behind buildings. Aerial observers can also relay calls for fire when communications are degraded due to power lines or masking by buildings. Illumination rounds fired to burn on the target can mark targets (both visual and infrared) in the daylight amid the smoke and dust of urban combat.

D-20. FOs must be able to determine where and how large are the dead spaces. Dead space is the area in which indirect fires cannot reach the street level because of buildings. This area is an enemy haven that is protected from indirect fires. For mortars and high-angle artillery fires, the dead space is about one-half the height of the building. For low-angle artillery fires, the dead space is about five times the height of the building behind which the target sits.

LETHAL FIRE SUPPORT IN URBAN AREAS

D-21. The physical aspects of the urban environment, such as the height and concentration of buildings, cause significant masking and dead space. Buildings that stand three or more stories tall hinder close indirect fires. Tall buildings can potentially mask several blocks of area along the gun-target line of artillery firing at low angles of elevation. The urban environment also affects the type and number of indirect fire weapon systems employed. Commanders may prefer high-angle fire because of its ability to fire in close proximity to friendly occupied buildings. More artillery systems may need to be used to ensure the responsiveness (rather than the weight) of fires. Careful positioning of artillery and mortar systems reduces the amount of dead space and permits units to establish more direct sensor-to-shooter links.

D-22. Commanders may consider R units, to include mortar platoons, from units in reserve. This will increase the number of systems available to support units. MLRS dual purpose improved conventional munitions rockets may be of limited use in urban areas due to their dud rate. GMLRS unitary rockets are well suited for this environment due to their precision munition capabilities and low collateral damage. Requirements for high-angle fire necessitated by confined urban terrain and an increase in point targets make the vertical attack capability option afforded by Excalibur and GMLRS unitary rockets especially useful.

D-23. Structures affect Army aviation attacks where the enemy is in contact with friendly ground forces. Vertical structures interrupt line of sight and create corridors of visibility along street axes. The result is shortened acquisition and arming ranges for supporting fires from attack helicopters that affect engagement techniques and delivery options. Pilots maintain line of sight long enough to acquire targets, achieve weapons delivery solutions, and fly to those parameters. Tube-launched, optically tracked, wire-guided heavy antitank missile systems require 65 m to arm. The Hellfire missile requires at least 500 m to reliably arm and stabilize on the intended target. Thus, attack helicopters firing from longer ranges improve the probability of a hit. Heavy smoke and dust rising from urban fires and explosions may hinder target identification, laser designation, and guidance for rotary- and fixed-winged aircraft. The close proximity of friendly units and noncombatants requires units to agree on, disseminate, and thoroughly rehearse clear techniques and procedures for marking target and friendly locations.

AMMUNITION AND SUSTAINMENT

D-24. In the absence of attack helicopters, CAS, and related FS assets, ammunition expenditure is likely to be high. Moving large convoys through rubbled urban terrain and along narrow city streets can affect the sustainment effort. The FA may need to rely on several smaller sustainment convoys. Increased time is allowed for in the planning of logistics activities. Pre-stocked supplies, locally available supplies, and infrastructure services for power and transportation should be used as much as possible. Use local water supplies once they have been certified. Security and the risks of sabotage must be considered in the use of all locally procured items.

D-25. Precision fire provided by Army aviation attack or appropriate joint fires may be employed to engage observable targets and minimize collateral damage. Remote designators need to be close enough to accurately designate, but far enough away not to be acquired by the laser-guided munition during its flight path. Consider using precision-guided munitions to defeat enemy forces in buildings or in fortified positions and to target small enemy positions, such as snipers or crew-served weapons.

D-26. Considerations for the use of laser designators in urban terrain include:

- Correct positioning of aerial attack-by-fire positions and observation posts that meet any applicable angle-T requirements.
- Focus on key buildings, avenues of approach, complexes, or terrain where use of precision-guided munitions is anticipated.
- Intervening tall structures may degrade the effectiveness of the laser designator.
- Maintaining a continuous laser track on moving targets is difficult.
- The presence of large expanses of polished, flat, highly reflective surfaces such as windows may reflect laser energy and pose a hazard to friendly troops.
- The presence of highly absorptive surfaces such as open windows or tunnels may degrade designator effectiveness.

- Because of a fluid FLOT, designators may have to reposition more often.
- Weather effects on the employment of laser designators and range finders.

D-27. The mix of munitions used by indirect fire systems will change somewhat in urban areas. Supporting unit commanders rely on their FSCOORDs to understand ammunition effects and to correctly estimate the number of volleys needed for the specific target coverage. Increased use of certain munitions (for example Excalibur and other HE or smoke rounds, and precision guidance kit, delay, and concrete-piercing fuzes) should be anticipated.

D-28. Special considerations apply to shell and fuze combinations when buildings limit effects of munitions:

- Indirect fires may create unwanted rubble and collateral damage. Precision and precision-guided munitions can be used to minimize rubbling.
- The close proximity of enemy and friendly troops requires careful coordination of fires.
- Swirling winds may degrade smoke operations.
- White phosphorus may create unwanted fires and smoke.
- Fuze delay should be used to penetrate fortifications or tops of buildings.
- Point detonating fuzes on delay typically penetrate only the first wall or roof of a structure. The MK 399 concrete piercing fuze is used when added penetration is necessary.
- Use of visible illumination may favor the defender who lacks night vision devices.
- Illumination rounds can be effective; however, friendly positions should remain in shadows, and enemy positions should be highlighted.
- Tall buildings may mask the effects of illumination rounds. Illumination rounds fired to burn on the ground or on a building can also be used to mark targets for aerial support.
- Airbursts (variable time or time fuze) and improved conventional munitions are effective for clearing those antennas and enemy observers located on rooftops and for suppressing enemy fires.
- Variable time fuzes may detonate prematurely due to the proximity of other structures.
- Observer-adjusted time fuzes may be better to use among buildings with varying heights.
- If the area will be crossed by friendly or civilian personnel, units may choose not to use improved conventional munitions. Such circumstances include residual hazards created by unexploded ordnance form improved conventional munitions which fail to function or if the enemy is in a building with several floors which offer overhead protection.
- Scatterable mine effectiveness is reduced when delivered on a hard surface.

DIRECT FIRE

D-29. Artillery may be used in the direct fire mode. Commanders, in consultation with their FSCOORD and FSEs, determine the parameters under which FA assets can be used as direct fire platforms. Normally, FA is employed in direct fire only where tanks, Bradley fighting vehicles, and other direct fire systems are not available to engage the target. In this case, subordinate and supporting unit commanders, in coordination with their respective FSCOORD and fires cell planners, direct the employment of individual howitzer sections to support the unit in contact. Commanders should identify their most proficient direct fire sections.

D-30. Self-propelled systems can take advantage of the systems' mobility to support multiple elements. FA used for direct fire will likely require shuttling between indirect fire and direct fire positions. One or more sections may need to follow a supported force closely if sustained direct FS is needed. Self-propelled howitzers are effective in neutralizing or destroying bunkers, heavy fortifications, or enemy positions in reinforced concrete buildings. Concrete-piercing 155-mm rounds can penetrate 36 inches of concrete at ranges up to 2,200 m. If care is taken, self-propelled artillery can be used to clear or create avenues of approach. Due to the self-propelled howitzer's limited armor protection, infantry will be required to provide security from enemy snipers and antitank teams.

D-31. Although towed artillery can be used in a direct fire role, it is not preferred because it does not have any ballistic crew protection. This lack of protection should not preclude the use of towed artillery if the situation calls for it and the commander is willing to accept increased risk of crew casualties. For some direct fire situations, the light 105-mm howitzer may be more adaptable especially for fires against dismounted

infantry on streets or in open areas. Other direct fire considerations include adequate communications, protection, and positions. A dedicated radio frequency for the supported HQ communicating directly to the howitzer section is necessary to control fires and prevent fratricide.

D-32. A Bradley fighting vehicle and a squad of dismounted mechanized infantry, or a squad of light infantry with anti-armor weapons should protect each howitzer, regardless of weapon type. The infantry must provide local security and prevent enemy ground assault, sniper fire, and antitank fire (for example, rocket-propelled grenades).

D-33. The infantry must reconnoiter and occupy positions where the howitzer can provide FS. These positions must be free from enemy direct fire, but still allow direct fire by the howitzer on the target. Although self-propelled artillery systems seem formidable, they provide less crew protection than the Bradley fighting vehicle, and they contain large amounts of onboard ammunition and propellant. Self-propelled howitzers are susceptible to catastrophic destruction by heavy automatic weapons, light cannon FA, and antitank fire. The howitzer should provide the necessary support and then move to an alternate position to avoid being identified by the enemy. Overwatching infantry should always move ahead of and with the howitzer to prevent enemy ambushes.

POSITIONING AND MOVEMENT

D-34. The urban area may affect the positioning of artillery. Sufficient space may not exist to place battery or platoon positions with the proper unmasked gun line. This may mandate moving and positioning artillery in sections while still massing fires on specific targets. Commanders protect artillery systems, particularly when task organized into small sections. Threats to artillery include raids and snipers. Therefore, firing units will have to place increased emphasis on securing their positions.

D-35. Use of observation posts and listening posts is more important, as terrain allows the enemy to infiltrate and get closer to artillery positions. Personnel in the open or in vehicles moving through restricted areas are particularly exposed to fires from snipers in tall buildings.

D-36. FA should be positioned outside of town on the edge of the urban area, if possible. Existing structures should be used to harden positions. Barns and other large buildings can be occupied for concealment of weapons and equipment. Units should also be aware of the dangers presented by overhead and underground power lines, gas and water pipelines, and similar hazards, especially when combined with the danger of enemy counterfire.

D-37. When placement in the urban area is necessary, howitzer positions among buildings should, at a minimum, allow for high-angle firing. Masking should be minimized. Positioning of indirect fire assets is difficult because of the predominance of concrete surfaces. Spades can be emplaced against a curb or base plates can be sandbagged if ground is not suitable for normal emplacement.

D-38. Airports, parks, athletic fields, and such may offer good firing positions. Cultivated fields may be too soft and muddy for use.

D-39. Reconnaissance is more difficult. Armed reconnaissance parties may need to clear an area physically before occupation is possible. Maneuver or military police assistance may be required.

D-40. Range requirements must be considered. Counterfire targets outside the urban area may be difficult to range from positions in the city needed for high-angle, close-supporting fires. Firing positions outside the urban area that allow excellent low-angle fires may be too distant to range counterfire targets on the far side of the city. Supplementary positions may be needed for counterfire and other missions.

D-41. FA weapons may be placed in buildings or damaged structures for protection. However, building collapse and fire are possibilities. Overpressure can significantly increase the noise hazard for crews. A 105-mm howitzer battery may have better mobility than larger self-propelled howitzers in confined areas and may be quickly moved by helicopter, unhindered by ground obstacles.

SURVEY AND MAPS

D-42. Map spotting may be difficult in large cities. The maps and diagrams used in urban operations are often a mix of available documents that do not use common datum. Existing survey datum and markers, especially

in developing countries, may be inaccurate or altered. City zoning maps, tourist maps, and sketches from reconnaissance teams may be used with military maps. Street signs may be non-existent or may have been altered by the enemy. Higher units should acquire and disseminate high resolution imagery to subordinate units.

D-43. Forces may use unit building numbering systems and sketches for clearing areas. The staff, FSCOORD and FSEs must understand all of these problems and work with survey teams and FA FDCs to translate target locations and friendly force locations accurately into grid locations on the common datum. Firing units will have the same problems pin-pointing their firing locations. The GPS may be greatly degraded due to satellite-to-receiver line of sight masking from buildings. Many more targets will be point targets, requiring increased target location accuracy. Thus, firing unit, observer, TA, and target area survey requirements will increase. Hasty survey techniques may frequently be necessary.

D-44. Hasty survey is hampered by decreased line of sight. Magnetic interference from buildings and power lines may interfere with the establishment of directional control. Establishment of multiple survey control points should be anticipated. Placement of survey control points should be well thought out to ensure that rubbling or traffic does not destroy the points. Additional survey assets may be required, and additional time may need to be allotted for survey operations.

WEATHER

D-45. Weather conditions, especially winds, can vary considerably from outside the city to inside the city. Tall skyscrapers, suburban homes, athletic fields, rivers, and other settings all have different atmospheric conditions (especially light and low-level winds). Low-level winds may vary greatly from upper-level winds, and may fluctuate considerably and unpredictably. The FSCOORD and planning cell should engage with the staff weather officer to obtain weather effects assessments based on current and forecast conditions within the urban environment. The FSCOORD should coordinate the placement of any weather capability (such as weather sensors and weather observers including MET teams) with the staff weather officer to obtain representative weather conditions.

COMMUNICATIONS

D-46. Structures and urban infrastructure reduce radio ranges. Use of wire, messenger, and visual signals should be increased. Antennas should be set up on upper floors to increase their range. They are vulnerable if positioned on rooftops. Existing civilian telephone systems should be used for unsecured communication. Wire and local area network cables should be routed through sewers and buildings for protection. Generators should be placed near existing walls outside occupied buildings. Units will have an increased dependence on satellite-based communication platforms.

COMMANDER'S INTENT

D-47. The commander's intent imparts the vision as to how the operation should progress. Clear understanding of this intent by the FSCOORD and FSEs ensures effective and timely application of FS to the operation and immediate and the tailored fires needed to deal with situations as they arise. The FSCOORD and FSE use the commander's targeting guidance to develop ammunition requirements and restrictions.

COUNTERFIRE

D-48. Counterfire is difficult in urban environments. Masking can degrade the performance of radars. It will be more difficult for air and ground observers to locate enemy artillery by visual, sound, and flash methods. Radar sites must be carefully selected. If radars are sited too close behind tall buildings, they will be masked and lose some effectiveness. High terrain outside the urban area should be considered, when possible. Counterfire ammunition requirements may increase if the enemy effectively uses buildings and available materials to harden and camouflage those positions. However, counterfire may be limited by the ROE and fear of collateral damage.

AIR AND ARMY AVIATION SUPPORT

D-49. Air and Army aviation support is an important aspect of urban operations. Although air-delivered fires from manned and unmanned fixed- and rotary-wing aircraft can positively and directly affect the conduct of unit actions in the urban area, the ability of aircraft to provide fires may be limited by the structural makeup of the urban location. FSEs should consider the use of supporting aircraft to observe, call for, and adjust indirect fires, and report battle damage assessment.

D-50. Air interdiction (AI) can be a vital component of shaping operations in urban terrain. Often, AI of the avenues of approach into the urban area isolates the threat by diverting, disrupting, delaying, or destroying threat forces before they can be used effectively against friendly units. AI is especially effective in major theater war circumstances where restrictions on airpower are limited, and the threat is likely to be a conventionally equipped enemy. In addition to setting the conditions for future operations and dominating the urban operation through firepower, the commander can use aviation support capabilities to improve and augment the urban transportation and distribution infrastructure. For more on aviation support to urban operations see ATP 3-06.

NONLETHAL ACTIVITIES

D-51. Aspects of CEMA (such as electromagnetic attack) and nonlethal effects (such as artillery- or air-delivered military information support operations leaflets) are not designed specifically to minimize fatalities, but they may be used with the same intent. Nonlethal activities can help the commander maintain the desired balance between protection, mission accomplishment, and the safety of noncombatants by expanding the number of options available when the use of deadly force poses problems. In determining nonlethal capabilities use and employment, the commander should consider risk, threat perspective, legal, ethical, and environmental concerns, and public opinion:

- Planning EW assets to defeat explosive threats, disrupt enemy information collection (see the discussion in chapter 4 and FM 3-55), reconnaissance and surveillance efforts, and detect the enemy's use of the EMS for targeting purposes.
- A threat may interpret the use of nonlethal activities as our reluctance to use force. This may embolden the enemy to adopt courses of action otherwise not considered.
- Some nonlethal activities may have unintended adverse effects on the local population. This may arouse adverse public opinion.
- The targeting working group and targeting board must synchronize the use of nonlethal activities.

LEGAL CONSIDERATIONS FOR FIRE SUPPORT IN URBAN OPERATIONS

D-52. The large numbers of noncombatants potentially affected by urban operations are a major legal concern and increase the requirement for knowledgeable and active legal support. Whether noncombatants suffer the negative effects of urban combat or benefit from foreign humanitarian assistance, there are legal requirements and ramifications to every aspect of the operation. Further, the impact military operations have on the local infrastructure must be carefully monitored. Some infrastructure provides service to noncombatants that, if destroyed or significantly curtailed, could result in their displacement, or increase the level of human suffering. The laws of armed conflict restrict the targeting of certain infrastructure.

D-53. The law of war consists of several general principles that must be considered by the commander in evaluating all uses of force. Four of the most important ones are discrimination, military necessity, unnecessary suffering, and proportionality:

- Discrimination - Distinguish between combatants, who may be attacked, and noncombatants who may not be attacked.
- Military necessity - Use only those measures that are necessary for securing the military objective as soon as possible, unless forbidden by international or domestic law.
- Unnecessary suffering - The prohibition of using weapons, projectiles, or other materials, which, by their nature or manner of use, are calculated to cause superfluous injury or unnecessary suffering.

- Proportionality - The injury to persons and damage to property incidental to military action must not be excessive in relation to the direct military advantage anticipated.

RULES OF ENGAGEMENT

D-54. Legal factors are but one element of the ROE; national policy and political objectives also play an essential role in the drafting of ROE. Often the ROE will include some restrictions on weapons and targets and provide the commander with guidelines to ensure the greatest possible protection of noncombatants consistent with military necessity.

TARGETING CONSIDERATIONS

D-55. One of the major areas of consideration in the law of war is that of targeting. There are few absolutes in targeting, but the application of the general principles applies. Commanders must confirm that targets support military objectives. The following may be in that category:

- Members of the armed forces having the status of combatants.
- Non-combatants who lose protected status by taking a direct part in hostilities.
- Objects that by their nature, location, purpose, or use, are either military property, or contributing to the enemy's war effort. Their destruction provides a military advantage.

D-56. Although civilians, noncombatants, and civilian property may not be specifically targeted, incidental injury and collateral damage are not unlawful if caused incident to an attack on a lawful target, and the incidental injury and collateral damage are not excessive in proportion to the anticipated military advantage gained from the attack. Targeting issues are important not only in urban combat operations, but also in irregular situations where an enemy, in violation of the law of war, may use civilians to mask attacks or as unlawful combatants.

SECTION II – FIRE SUPPORT IN MARITIME OPERATIONS

D-57. The *maritime domain* is the oceans, seas, bays, estuaries, islands, coastal areas, and the airspace above these, including the littorals (JP 3-32). Maritime environments include littoral regions, divided into two segments: seaward and landward. Seaward segments include the area from open ocean to the shore, which must be controlled to support operations ashore. Landward segments are those areas inland from the shore that can be supported and defended directly from the sea. Maritime littoral regions are divided into five categories:

- Enclosed and semi-enclosed seas-bodies of water surrounded by a landmass.
- Islands-single land masses surrounded by a body of water.
- Archipelagoes-groups of islands.
- Open seas-unenclosed bodies of water, typically outside of territorial boundaries.
- Marginal seas-portions of open seas or oceans that bound land masses such as peninsulas, islands, and archipelagos.

D-58. The maritime environment is generally a noncontiguous OE that requires joint execution. Army forces will likely be the supporting command and rarely the supported command. Targeting in a maritime environment is extremely complex due to the adversary's non-cooperative nature, mobility, and integrated defensive capabilities.

D-59. Maritime targets will normally fall under the target system naval forces and ports. Although, targeting and creating effects on military supply and storage, command, control, communications, computers, intelligence, petroleum, oil and lubricants, and power generation could have an indirect effect on the adversary's maritime operations. Maritime targets are usually deliberate, planned, scheduled or on-call. Army integration with maritime forces includes but is not limited to the following:

- Contribute ISR deep sensing in support of find, fix, and track.
- Contribute to target development.
- Contribute lethal and nonlethal capabilities in support of maritime strike.
- Contribute to joint coordination measures, planning, and execution.

- Provide FS to the JTF.
- Provide FS to maritime component.
- Provide liaison officers to maritime operations center.
- Provide FS to air component.
- Provide theater strategic and operational FS system liaison officers to the air operations center – master air attack plan cell.
- Posture Army capabilities to support maritime operations.
- Integrate Army digital fires systems within the joint force.
- Participate in joint digital fires rehearsals.
- Conduct FS technical rehearsals.
- Ensure protection planning of theater strategic and operational FS systems.
- Army fires assets may also be designated in a support role to other component commands, providing SEAD for aerial attack of island-based enemy forces or surface-to-surface fires to defeat enemy naval forces.
- Establish clearance of fires procedures on landing areas.
- Provide deep fires for forceable entry operations, to defeat enemy A2/AD capabilities.

D-60. The Joint force conducts maritime strikes and target actions to gain and exploit command of the sea, sea control, sea denial, and to project power from the sea. The Army supports maritime strikes by integrating Army capabilities with other service component capabilities. The joint force facilitates integration amongst all services to enable friendly freedom of action. This necessitates integrated operational and tactical C2, sensors, weapons, nonlethal effects, and support capabilities (see figure D-1). Army FS organizations must incorporate their FS systems with other applicable joint elements. Additionally, tactical level technical FS rehearsals should be conducted, when appropriate, to facilitate fire mission processing and execution. Army organizations and capabilities could be directed to execute FS and effects in support of the JFC or other joint elements while also potentially being supported by joint fires and effects. For more information on joint FSCMs and maritime operations see JP 3-02, JP 3-09, and FM 3-0.

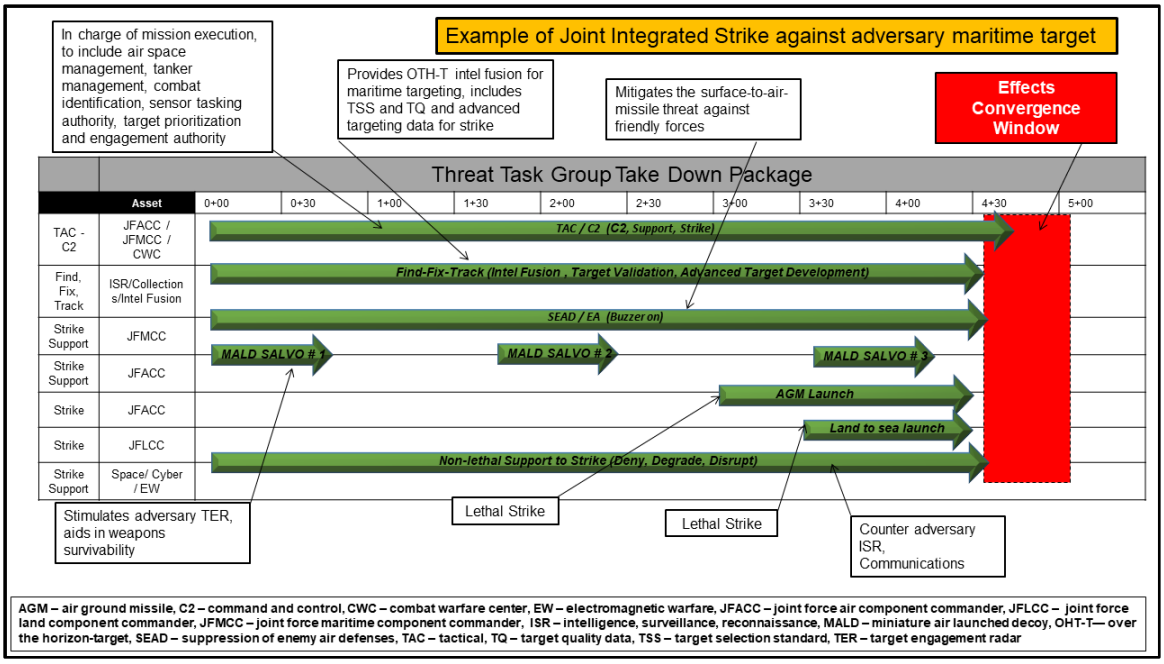


Figure D-1. Maritime strike coordination planning product

D-61. Maritime strike force package is a preplanned on-call package specifically designed to support maritime targeting and strikes. Maritime strike package is executed by a mission commander and consists of three elements:

- Tactical C2.
- Support element.
- Strike.

D-62. Critical components of an adversary ship are radars, missile launchers, guns, ammunition magazines, control rooms, engine rooms and hull. Upon assignment of the force package, rehearsal of concepts and battle drills should be executed to ensure roles, responsibilities, timing, and effects are sufficiently understood by all participants. When targeting adversary's maritime forces, the most considered effects are:

- Fire power kill (F-Kill).
- Gun kill (G-Kill).
- Mission kill (M-Kill).
- Sink/seaworthiness kill.
- Mission control kill.

D-63. Target engagement authority in a maritime environment, should be delegated to a C2 node that has the highest situational awareness and the ability to expedite an integrated joint strike. For more information on joint FSCMs and maritime operations see JP 3-02, JP 3-09, and FM 3-0.

SECTION III – MOUNTAIN OPERATIONS

D-64. In combat operations, mountains generally are characterized by rugged, compartmented terrain; steep slopes; and few natural or man-made lines of communication. The weather spans the entire spectrum from extreme cold, with ice and snow, to extreme heat in some areas. Vegetation can vary from dense jungle to barren waste. Variability of weather over short periods of time and of vegetation from area to area significantly influences both maneuver and FS operations.

MUNITIONS

D-65. Munitions effects are affected by the environment and terrain. IPOE helps determine where and what munitions are most effective. Below are munitions considerations for mountainous terrain.

- In snow:
  - FA delivered mines may settle into the snow off vertical. At temperatures lower than -15° C, very little settling occurs.
  - Variable time and time fuzes are most effective in most cases.
  - HE - point detonating, HE-delay, and improved conventional munitions are ineffective because at least 40 percent of the effects are muted by the snow.
  - The phosphorus in white phosphorus (referred to as WP) can burn undetected in snow for up to four days.
- In rocky terrain:
- HE-point detonating is very effective because it produces extra fragmentation from splintering rocks.
  - Variable time and time fuzes are very effective because the burst covers a larger area than HE-point detonating on reverse slopes.
  - FA mines are effective to deny the enemy the use of narrow defiles, valleys, roads, and usable terrain.
- When smoke and illumination are used:
  - Swirling winds make smoke employment very difficult to adjust and maintain.
  - Close coordination is required with adjacent elements to ensure they are not obscured or that they are not highlighted.

- Mortars are ideal for targets on reverse slopes and over intermediate crests because of their high-angle fires.
- Airbursts on reverse slopes are extremely effective.

TARGET ACQUISITION AND OBSERVATION

D-66. The following are considerations when FOs are involved in mountain operations:

- The observers should be positioned on high ground and spread out to overcome terrain masks and compartments.
- The observers may need mountaineering equipment to get to the best positions, or they may be airlifted.
- Terrain sketches and visibility diagrams are useful to deliver fast, accurate fires and to identify blind spots.
- Heavy fogs or low clouds may obscure observation.
- Observers (without laser rangefinders) who are looking up tend to underestimate range, whereas observers looking down tend to overestimate range.

D-67. Air observers:

- Are very effective to observe beyond terrain masks, in deep defilade, and on reverse slopes.
- Complement the FIST observers.
- Can be used to detect deep targets.
- May be confined to valleys and lower elevations because thin air at high elevations makes flying difficult.

D-68. Radar considerations in mountain operations include:

- Radars should concentrate on terrain that can be occupied by artillery and mortars (as determined by IPOE).
- Terrain masks can degrade the effective range of the radar.
- Additional use of ground surveillance radars and remote sensors may be required.
- More extensive use of shelling reports may be required.

TARGETING

D-69. The intelligence officer's IPOE should identify the following:

- Routes that can be used by the enemy to attack, withdraw, and resupply.
- Likely position areas for enemy indirect fire assets, C2, support assets, and observation posts.
- Terrain that is subject to snows slides, rockslides, or avalanches. These may deny the enemy use of roads and trails and may destroy elements in defilade.

POSITIONING

D-70. Usually, position areas for mortars and artillery are limited and access thereto may be restricted. Because of the need to fire high angle, it is important that the mortars and artillery be positioned in defilade to increase their survivability. Positioning considerations include:

- Helicopters should be used to airlift artillery into position areas. These air assets also may be required to provide ammunition resupply.
- Helicopters may be useful in performing survey by use of Doppler radar.
- Positioning along dry riverbeds is hazardous because of the danger of flash flooding.
- Towns and cities usually have flat areas (school yards, parks, stadiums, and so forth) that can accommodate firing batteries. However, these towns and cities are often enemy objectives and may be targeted.
- Most mountainous flat land is farmland and is difficult for towed artillery to negotiate from spring to fall. However, in winter, if the ground is frozen, farmland provides good firing positions for mortars and artillery.

CLOSE AIR SUPPORT

D-71. Because the terrain forces the enemy to concentrate his forces along roads, valleys, reverse slopes, and deep defilades, CAS is very effective. However, the terrain also restricts the attack direction of the CAS strikes. The enemy also conducts IPOE to determine the likely direction of the CAS strikes and will weight his air defenses along those routes. The FSCOORD must aggressively identify the enemy air defense systems and target them to enhance the survivability of the CAS assets.

COMMUNICATIONS

D-72. Communications considerations in mountain operations include:

- Place antennas on sides of hills or mountains.
- Make maximum use of directional antennas.
- Plan to use retransmission capabilities.

SECTION IV – JUNGLE OPERATIONS

D-73. Jungle operations are usually carried out by infantry forces. FS may be limited to indirect fires and air support. Because small-unit operations are commonplace, greater challenges accrue to the FS personnel at company and BN levels.

MUNITIONS

D-74. In jungle terrain, most contact with the enemy is at extremely close range. If the friendly force has a substantial advantage in FS, the enemy will most likely try to come in as close as possible and maintain that close contact. Thus, the friendly force commander cannot use his FS advantage without inflicting casualties on his own troops. Therefore, a knowledge of the type of munitions best suited for the terrain and how to employ them is vital. For example, in triple-canopy jungle:

- HE-delay penetrates the treetops and splinters the trees, creating additional fragmentation (splintering effect).
- Smoke has limited effectiveness.
- White phosphorous is effective as a marking round and in initial adjustments.

TARGET ACQUISITION AND OBSERVATION

D-75. The triple-canopy jungle makes observation beyond 25 to 50 m very difficult. The jungle also makes map reading, self-location, target location, and friendly unit location very difficult.

D-76. Experience from World War II (WWII) and Vietnam showed that FOs must be able to adjust mortar and FA fire by sound, because often they cannot see the rounds to adjust them. This sound adjustment is very difficult and requires experience. Greater accuracy can result from the recommended adjustments of two or more FOs. The battery FDC can help by announcing “splash” to let the FOs know when the round should impact. The observer then counts the seconds until they hear the rounds detonate. By multiplying the seconds by the speed of sound, the observer can estimate the range to impact. The speed of sound is approximately 350 m per second. The speed of sound varies according to temperature, wind speed and direction, relative humidity, and air density; but 350 m per second should be used as a start point.

D-77. The FO must determine the observer location and ensure that the battery FDC has it plotted. The FO then determines the direction to the target and selects a target grid 1,000 m along the direction to the target. Using that direction and target grid, the FO sends a call for fire to the FDC. Add 1,000 m to the FO's position for safety.

D-78. When the initial adjusting round impacts, the FO uses that impact as a known point. The FO determines the direction to the round, measures the difference between the direction to the target and the impact of the initial round, computes the lateral correction, and makes a range correction, if necessary. Using the shift from a known point call for fire, the FO sends the data to the FDC, reporting the new direction.

D-79. If the FO's position location is poor, the initial round location will be poor too. The FO can use the initial round to re-determine his location. For example, the FO's call for fire told the FDC to fire grid 123456, direction 0200. The round impact is nowhere near the target. The FO then determines the direction and range to the burst. The FO plots a back-azimuth from the burst and estimates range along that direction to replot the FO's position. Then, using the new position location, FO reinitiates the mission.

D-80. Vietnam and WWII also showed that the first round in adjustment should be white phosphorous. Because both the FO's location and the location of other friendly elements may have been doubtful, white phosphorous was usually fired first to avoid inflicting casualties on friendly personnel. (Using a 200-meter height of burst can help the FO see the first round.)

D-81. The creeping method of adjustment is used exclusively during danger close missions. The observer makes range changes by using corrections of 100 m or less and creeping the rounds to the target. The observer must know where all friendly troops are to avoid endangering them. All weapons that will FFE are used in adjustment. For BN missions, batteries should be adjusted individually.

D-82. Marking rounds can be fired to help the FO determine his own location. The use of marking rounds also helps ensure that the FDC knows in what area the friendly unit is, which ensures more responsive fires. A marking round is usually white phosphorous fired 300 to 400 m forward of friendly units at 200 m height of burst. The FDC plots a target, fires a white phosphorous round, and sends the grid of the white phosphorous impact to the FO. The FO then has a known position on which to orient.

D-83. Because of the close combat, laser range finders may not be of great use; however, night vision devices are extremely critical.

D-84. Air observers. Air observers can be important in jungle warfare. They can detect enemy movements that ground forces have no way of seeing. They can act in concert with ground observers to deliver accurate fires on enemy elements in close contact with friendly forces. Also, the air observers can relay calls for fire from ground elements to the FDC.

D-85. Air observers can help direct CAS assets against enemy targets. Because ground observers cannot see the whole battlefield, the air observer marks targets for the CAS sortie (by use of flares, white phosphorous, or smoke). Caution must be taken, and positive identification of the target must be made.

D-86. WLRs are extremely effective in the jungle, since most indirect fires are high-angle fires. In stability operations, many targets detected by the radars are fleeting in nature (shoot and move) and the radar must be tied in with an indirect FS asset to ensure quick counterfire.

D-87. Also, most enemy indirect fires will be directed against friendly unit positions. Therefore, the radars should be oriented to locate those enemy fires.

TARGETING

D-88. Targeting is very difficult because of the triple canopy and the fluid nature of the conflict. Experience with the particular enemy will provide some targets indicated by the enemy's past performance and techniques.

D-89. Plan targets:

- To support the scheme of maneuver.
- Along roads and trails.
- At likely ambush sites.
- Around clearings.
- At river or stream crossings.
- Around built-up areas.

D-90. Also, isolated units will prepare 360-degree defenses. Plan FPFs to support that defensive posture. Consider recommending to the supporting FA BN commander a munition specific required supply rate to support the operation.

POSITIONING

D-91. Often, firing positions for FA and mortars are very limited; and some positions may be inaccessible by roads. While mortars may be dismounted and airlifted into position, artillery will be severely limited in its movement and ability to position. Platoons may have to be widely separated, increasing the difficulty of mutual defense and resupply. Each position must have 6,400-mil firing capability, regardless of weapon types. Remember that a position occupied too long is subject to ground attack. Also, the enemy will quickly determine the range of weapons in that position and stay out of their range. If GPS are not available, consider using a helicopter-mounted position azimuth determining system or Doppler radar to survey air-inserted mortar positions inaccessible by road.

CLOSE AIR SUPPORT

D-92. CAS can be effective in the jungle but hard to control because of the inability of the pilot to see the friendly ground elements. Also, because the combat is usually of such close nature, the delivery of the munitions must be closely controlled to avoid injuring friendly personnel.

D-93. Pyrotechnics should be used to mark friendly forces and the target area. A joint fires observer or JTAC, should monitor the air strike, but only a JTAC or FAC(A) can clear an attacking aircraft. It is extremely important that the method used for this marking not be duplicated by the enemy. Strict security is required.

D-94. Heavy bombs (2,000 to 3,000 pounds) with fuze extenders can clear away the jungle canopy. Many cluster munitions are designed to penetrate jungle canopy. Depending on the type and quantity delivered, bomblets are effective against area targets consisting of personnel, light materiel, and armor.

COMMUNICATIONS

D-95. Communications considerations for jungle operations include:

- Remember that communications in a triple-canopy jungle are severely degraded.
- Elevate antennas above the canopy, when possible.
- Use air observers or airborne command platforms as relay stations.
- Consider using directional antennas.
- Plan to use retransmission assets.

SECTION V – DESERT OPERATIONS

D-96. The three types of desert terrain are mountainous, rocky plateau, and sandy or dune-type desert. FS planning and considerations vary significantly between operations in each type of desert terrain. Often, those considerations resemble those for other environments, such as arctic and mountain. The type of terrain in the AO must be analyzed before effective FS planning can be performed. Tactics, techniques, and employment of munitions are greatly affected by the different terrain characteristics. Restricted desert terrain can offer significant disadvantages for movement and emplacement of indirect fire systems, depending on the trafficability of the surrounding valley areas.

MUNITIONS

D-97. Mountain deserts, munitions effectiveness is the same as in any mountainous region except that the considerations involving snow usually do not apply. The following are added considerations:

- HE-point detonating is very effective because of the extra fragmentation created by splintering rocks.
- FA mines are very effective and should be used to deny the enemy the use of roads, valleys, narrow defiles, and level terrain.
- Smoke and illumination may be degraded by swirling winds. They must be closely coordinated with adjacent units to ensure that the vision of adjacent troops is not obscured, or troops are not highlighted. Both smoke and illuminating shells can be used to silhouette the enemy.
- Airbursts on reverse slopes are extremely effective.

D-98. Rocky plateau deserts, the following are munitions considerations in rocky plateau desert operations:

- HE-point detonating is extremely effective. It creates extra fragments by splintering rocks.
- Variable time and time fuzes are effective.
- Improved conventional munitions are very effective.
- FA delivered mines are very effective and should be employed with the natural terrain to force the enemy into unnavigable terrain.
- Smoke and illumination may be degraded by high winds but may be used to silhouette the enemy.

D-99. Sandy or dune deserts, the following are munitions considerations:

- HE with point detonating or delay fuze is smothered by deep sand, which makes it ineffective.
- VT and time fuzes are very effective.
- FASCAM are smothered by deep sand, which makes them ineffective.
- Smoke and illumination are effective and can be used to silhouette the enemy.

TARGET ACQUISITION AND OBSERVATION

D-100. Determining location is often very difficult in rocky plateau and sandy or dune deserts. Maps are often inaccurate, dunes shift, and heat waves hamper distance estimations. Where GPS equipment is not available, pace count, odometer readings, and resection from available key terrain features may be the best of a few options for self-location essential for day and night navigation.

D-101. FOs can detect targets by observing dust clouds created by moving enemy forces. Dust clouds created by impacting rounds sometimes make subsequent adjustments difficult. Usually, adjustment of fires by a FO is enhanced when the initial round impacts beyond the target. Laser range finders must be used, especially when heat waves degrade distance estimating by other conventional means.

D-102. The FO should consider using smoke behind the enemy to silhouette him. At night, illumination burning on the ground behind the enemy has the same effect.

D-103. The sameness of colors in the desert makes specific targets hard to spot. Laser range finders may need to be adjusted several times a day because of temperature changes.

D-104. Most open desert terrain allows a faster or an unimpeded approach and more maneuver space for mechanized forces. Use of trigger points and long-range observation capabilities is critical for effective engagement with available FS systems. Fast-moving formations are best engaged with fixed-wing assets and attack helicopters.

D-105. Increased equipment failure can be expected as a result of heat, sand, and dust. Especially susceptible are radios, automation systems, and other electronic equipment.

D-106. Air Observers can be used for TA, coordination of FS, and adjustment of fires in flat terrain or in a desert of rolling sand dunes. The difficulty of aerial navigation in flat desert terrain is a disadvantage that must be planned for. The absence of terrain features in an open desert makes aircraft more vulnerable to enemy air defense.

D-107. Because of the ability to see great distances and the featureless terrain of an open desert, positive identification of friendly troops requires special measures. More than usual coordination may be required, with prearranged signals and procedures established for friendly force locations. Maintaining continuous communications on FS and mission command nets with aviation elements operating in sector is even more critical.

D-108. Radars are highly effective in the desert. However, they may have to be repositioned more often because the flat terrain does not provide adequate screening crests.

TARGETING

D-109. A thorough IPOE must be conducted to:

- Identify passable terrain for wheeled and tracked vehicles.
- Identify likely mortar and artillery positions.

- Assess the impact of wadis, gulches, and other significant terrain on friendly and enemy mobility.
- Identify likely enemy forward observation positions.
- Identify antitank guided missile systems and air defense systems as priority targets.

D-110. Plan the correct munitions for targets:

- Improved conventional munitions and FA mines for roads in restricted terrain.
- FA mines to deny the enemy navigable terrain and to try to force him into wadis and gulches.
- Variable time on reverse slopes.
- Variable time and time fuzes on targets in deep, sandy deserts.
- Smoke during the day and ground-burning illumination at night to silhouette the enemy.
- Smoke and white phosphorous against likely enemy observation posts.
- HE with point detonating fuzes on targets in rocky terrain.

POSITIONING

D-111. Common grid, the limited number of available attack/delivery systems requires the use of a common grid based on the best available survey data. Terrain association techniques (map spots) may be inadequate for positioning indirect fire systems.

D-112. Concealment, FA, and mortars should move under cover of darkness, because enemy observers can detect the movement or at least the dust from the movement of vehicles. Resupply should also be conducted at night, preferably enroute between positions. Appropriate color of equipment and camouflage systems is essential for effective concealment of firing positions.

D-113. Emplacement in wadis and gulches offers the best concealment. However, it entails some degree of risk as the result of unexpected flash flooding (size of wadis is relative to degree of risk).

D-114. Movement, trafficability through the dunes may be severely degraded. The absence of roads in the direction of our movement will further slow moves.

D-115. Position area selection, positioning on rocky soil away from roads reduces the dust hazard during air assault operations. Sandy deserts may be a problem for some towed artillery and mortars. Solid ground to secure some firing systems' platforms or baseplates and spades may be rare in certain areas.

CLOSE AIR SUPPORT

D-116. Air support aircraft may be more vulnerable because of the lack of covered approaches. Suppression of enemy air defenses is very important. However, the greater visibility common in most deserts allows target engagement from better standoff ranges.

D-117. Detailed planning for CAS is important because of wide dispersion of units. Marker panels or other visual or electronic signatures are required to help the pilot differentiate between friend and foe.

SECTION VI – NIGHT OPERATIONS

D-118. Some specific reasons for night combat include:

- To achieve surprise and to avoid heavy losses that might be incurred in daylight operations over the same terrain.
- To compensate for advantages held by an enemy with superior forces or air superiority.
- To counter the enemy night operations.
- To retain the initiative or freedom of action.
- To exploit the technological advantage of our forces at night over a less sophisticated enemy.

D-119. Movement and land navigation are more difficult at night. This is largely because of problems with terrain recognition. If navigation aids such as GPS equipment is not available, maintaining direction while moving is extremely difficult at night.

D-120. Target acquisition and engagement ranges are limited to the capabilities of night vision devices. Controlling the direct fires is critical at night. Control requires effective communications to ensure engagement of the correct targets.

FIRE SUPPORT

D-121. The main consideration in supporting night combat with FA, mortars, tactical aircraft, and naval gunfire is the ability to detect the target and coordinate the attack. Illumination and smoke assets probably will be in short supply. If their use is critical to the success of an operation, the FSCOORD must know the specific area in which the commander desires to use smoke and illumination and for what purpose. Plan smoke at night to degrade enemy night vision capabilities. If too little ammunition is available, take action to alleviate the shortfall well in advance.

D-122. At night, the adjustment of fires without the aid of radars, artificial illumination, or sound ranging is virtually impossible. If adjustment of fires on critical targets is required, do it during daylight if possible. If not possible to adjust the target during daylight, allocate TA assets for adjustment of fires.

D-123. The FSCOORD plays a critical role if CAS, UAS, or attack helicopters are used in night operations. These weapon platforms may not be equipped with adequate night vision equipment. Their effectiveness will depend on the ability of the force to illuminate targets. Additional coordination between the FSCOORD, G-3, G-3 air, and ALO is needed to integrate sorties and plan illumination for their use.

NIGHT OFFENSIVE OPERATIONS

D-124. In planning a night attack, the commander must decide what type of attack to conduct. Their decision is based on the required FS.

D-125. Illuminated and non-illuminated attacks. An illuminated attack is used when the possibility of achieving surprise is remote, when the enemy has night vision devices, and where control of units overrides the need for stealth.

D-126. Commanders often use non-illuminated attacks when the enemy lacks night vision devices, but devices are available to friendly forces. Another reason is when friendly forces plan to use stealth to achieve surprise and close on a position before the enemy discovers the attack. Even though the commander wishes to conduct a non-illuminated attack, always plan for illumination. It is executed only on the commander's authority.

D-127. Execution of planned fires using stealth and surprise may be more important to the attack objectives than the effects expected by preparation fires. Use of preparation fires alerts the enemy to the objectives of the attack and may compromise any night advantages. However, always plan for these fires. The non-illuminated attack with on-call fires offers a better opportunity for surprise.

D-128. Night offensive FS considerations include prearranged visual signals such as hand-held flares that can be used for initiating or canceling fires of air support and schedules of fire such as groups or series.

D-129. When fires are shifted, they should be moved beyond the friendly unit limit of advance. Illuminating fires may not be fired but should be planned. Time illumination over the objective to burn out approximately 300 m above the ground. Illumination beyond the objective should be allowed to burn on the ground to silhouette the defenders on the objective and to provide a heading reference for friendly forces. Also, illumination can be placed on several locations over a wide area to confuse the enemy as to the exact place of the attack. Once used, illumination should probably be continuous, because friendly troops will have temporarily lost their night vision.

D-130. Smoke can be used to degrade enemy night vision devices. It should be placed in front of the enemy; Smoke also can be used when key terrain is to be bypassed. However, smoke on the objective during the final assault conceals enemy locations. Only thermal devices can see through some types of smoke.

D-131. Place FSCMs on identifiable terrain. Place permissive measures well in front of friendly forces. Restrictive measures should be used minimally and must provide the safety required yet not complicate clearing fires at night. These measures must be disseminated and understood by all friendly elements. Plan

suppressive fires for the final assault to the objective and beyond the limit of advance to stop enemy force retreat or reinforcement.

NIGHT DEFENSIVE OPERATIONS

D-132. The effective employment of FS is critical to the successful night defense. As with the offense, daylight planning and coordination considerations are used in addition to considerations for night defense, which include:

- Use on-call fires to engage enemy forces as they attack or probe the defense.
- Plan illumination fires although the appropriate supported commander is the approving authority for defensive illumination fires. This is to preclude accidental illumination of friendly activity such as patrols and engineer activities. When used, drop visible illumination above and behind attacking forces to silhouette them.
- Adjust fires, especially FPFs, during daylight, if possible.
- Use smoke to slow, confuse, and disorient attacking forces.
- Plan FA delivered mines in coordination with the engineer to separate forces, disrupt formations, and plug gaps in the defense.
- Plan permissive FS measures as close to friendly troops as possible; however, measures should be placed on positively identifiable terrain.
- Plan restrictive measures, if required, on easily identifiable terrain to provide safety to friendly elements.

SECTION VII – CONTINUOUS OPERATIONS

D-133. Physiological aspects of continuous operations include those factors that degrade the Soldier's physical ability to function. Sleep loss and fatigue induced by night operations magnify stress. After 48 hours of sustained activity, loss of sleep becomes the most significant degrader of Soldier performance on the battlefield. As sleep loss begins to accumulate, both physical and mental effects are observed in varying degrees. Most of the following effects can occur after 24 hours without sleep:

- Tasks may be omitted as a result of a momentary lapse into sleep (falling asleep with eyes open).
- Vigilance decreases rapidly, resulting in missed critical signals.
- Ability to focus on a task for more than a brief period decreases noticeably.
- Memory becomes faulty, particularly short-term memory. This makes it difficult to learn new information, follow instructions, or remember recent decisions.
- Response to events or instructions slows. One seems to be operating in a daze.
- The ability to formulate and make sense from information becomes severely degraded. It takes longer to perform simple tasks such as plotting grid coordinates. Accuracy suffers.
- The ability to reason logically is degraded, which may result in snap judgments.
- Problems with communication arise. One has difficulty understanding or articulating even simple messages.
- A wide range of mood changes, characterized by depression, anger, lack of patience, and euphoria, can occur.

D-134. Sleep loss is cumulative over time. The number of hours needed to recover is directly related to the number of hours sleep was deprived. As a rule of thumb, a minimum of 6 hours rest is required for every 24 hours without sleep. Fatigue is the result of excessive work and sleep loss. The latent effects of fatigue may linger for about 3 days following sleep deprivation of 48 hours or more.

SECTION VIII – COLD WEATHER OPERATIONS

D-135. Fire planning for cold weather operations is no different than that required for more temperate regions. However, the FS planner must consider that artillery weapon systems may have limited mobility in snow and ice that will also affect ammunition supply and increase to time to accomplish tasks.

MUNITIONS

D-136. The following are considerations in the employment of various munitions in cold weather operations:

- Make maximum use of airburst munitions.
- HE-point detonating, HE-delay, improved conventional munitions, and FA delivered mines are ineffective in deep snow and unfrozen bogs. At least 40 percent of the blast from these munitions is smothered by the snow.
- Hexachloroethane smoke is not effective because canisters are smothered in the deep snow.
- White phosphorous is effective; however, phosphorus may burn undetected in the snow for up to four days and may be a hazard to friendly troops subsequently moving through the area.
- Overall, variable time or multi-option artillery fuzes are good fuzes for cold weather operations. However, snow and ice may cause them to detonate prematurely. Also, extreme cold may cause a higher dud rate.
- Extreme cold weather will affect the range of weapons.
- Low temperature may cause illuminating rounds to malfunction as the result of freezing the parachute and its components.

TARGET ACQUISITION AND OBSERVATION

D-137. Considerations for employing FOs in cold weather operations include:

- Equip FOs with snowshoes or skis to allow them to move quickly.
- Relieve observers in static positions frequently.
- Update visibility diagrams regularly because drifting snow changes visibility.
- Use amber filters on binoculars and observation devices to reduce the incidence of snow blindness.
- Avoid using ground bursts that may be difficult to observe in deep snow.

D-138. Observers in aircraft are valuable because they can see deep and are not as prone to disorientation as are ground observers. However, weather conditions may reduce the availability of aircraft.

D-139. WLRs considerations when radars are used in cold weather:

- Extremely cold weather may degrade their operations.
- Remote sensors are rarely effective when used in deep snow.

TARGETING

D-140. Because of terrain and weather phenomena, target detection is difficult. However, ice fogs and snow clouds created by moving enemy formations will reveal targets. Also, tracks in the snow may indicate enemy positions.

CLOSE AIR SUPPORT

D-141. The following are considerations in the use of CAS in cold weather operations:

- Frequent poor weather reduces the availability of CAS.
- The sameness of the terrain makes the marking of targets critical.
- Panels or pyrotechnics must be used to indicate friendly locations.

COMMUNICATIONS

D-142. Effective communications are hampered by:

- Electronic interference.
- Weakened batteries. Conventional dry-cell batteries are 40 percent effective below 0° F, 20 percent effective below -10° F, and 8 percent effective below -30° F. A similar problem exists for nickel-cadmium and lithium batteries.
- Frost from human respiration forms in the radio mouthpiece. Cover it with cloth or a sock.

SURVEY

D-143. Extreme cold in arctic and subarctic regions adversely affects survey equipment operability. Accuracies may be degraded and impact on transfer data, massed fire, and unobserved fire.

FIELD ARTILLERY MOVEMENT

D-144. Considerations affecting planning for FA cold weather movement include:

- Consider route reconnaissance in FA ground and air.
- Determine ice thickness and load-bearing capacity before the FA crosses frozen lakes and rivers.
- Consider that a vehicle may be required to position towed artillery weapons used in air assault operations conducted into snowy areas.
- Plan for maximum use of aerial resupply.

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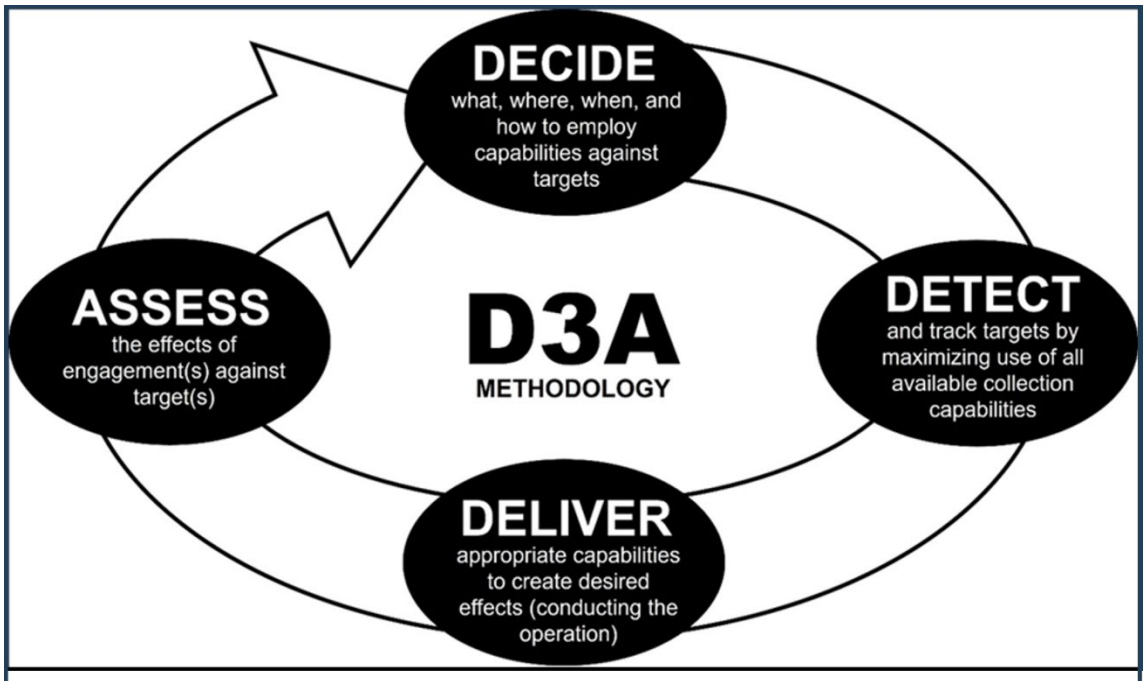
Appendix E

Targeting and Army Air Support Requests

Joint airpower is an extension of fires and should be leveraged to the greatest extent possible. Identifying air support requirements, submitting air support requests (AIRSUPREQs), and synchronizing the effects of surface-to-surface fires with air-to-surface fires increases our effectiveness on the battlefield while simultaneously safeguarding friendly forces. This appendix provides an overview on the relationship between targeting and AIRSUPREQs and information necessary to plan, generate, submit, and track preplanned AIRSUPREQs.

SECTION I – AIR SUPPORT REQUEST

E-1. To leverage joint air assets, Army echelons identify joint air support requirements during the planning steps of the operations process and the decide function of the Army targeting process (see figure E-1). Joint airpower can create effects that achieve objectives in support of the ground commander's concept of operations. When tactical Army echelons identify targets that require effects exceeding their organic capabilities or when other requirements for joint airpower are identified during the planning process, FSEs at echelon create AIRSUPREQs for submission to the supporting joint force air component.



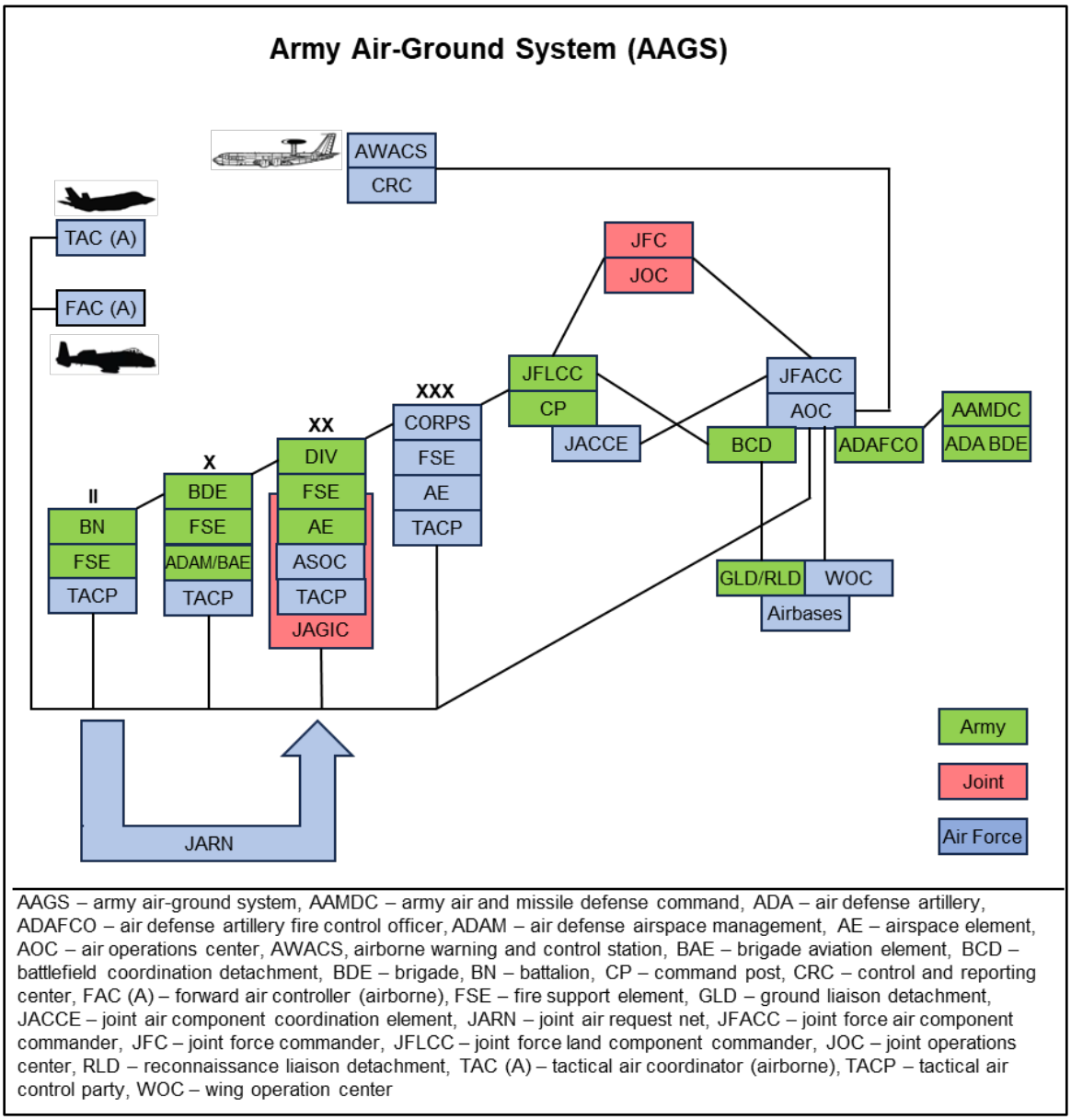
D3A – decide, detect, deliver, assess

Figure E-1. Army Targeting Methodology

E-2. FSEs utilize the Army air-ground system (see figure E-2 on page E-2) to submit AIRSUPREQs. FSEs at each echelon send AIRSUPREQs to their next higher HQ for approval. Every Army echelon that receives AIRSUPREQs from a subordinate unit is responsible for approving or denying the request, verifying

prioritization of each request, re-prioritizing when necessary, merging the requests into a single air support list, and forwarding the air support list to their next higher HQ. The senior Army HQ or JFLCC HQ adjudicates AIRSUPREQs received and may generate additional AIRSUPREQs in sufficient time to be included in the JFC's joint targeting cycle and the JFACC's joint air tasking cycle. For more information on the Army air-ground system see ATP 3-52.2.

E-3. AIRSUPREQs that support the JFC's objectives and are submitted in sufficient time to meet the suspense set by the JFC's battle rhythm are called preplanned AIRSUPREQs. Preplanned AIRSUPREQs may result in scheduled and on-call air missions on the ATO. Air missions planned and listed on the ATO in response to Army AIRSUPREQs are dedicated to support the Army unit specified in the AIRSUPREQ. AIRSUPREQs submitted after the ATO has been published are called immediate AIRSUPREQs. Immediate AIRSUPREQs are supported with on-call air missions or by redirecting scheduled air missions that are already on the ATO. The procedures for tracking preplanned AIRSUPREQs and their associated air missions are explained in Section II of this appendix. For more information on immediate AIRSUPREQs see JP 3-09.3.



AAGS – army air-ground system, AAMDC – army air and missile defense command, ADA – air defense artillery, ADAFCO – air defense artillery fire control officer, ADAM – air defense airspace management, AE – airspace element, AOC – air operations center, AWACS, airborne warning and control station, BAE – brigade aviation element, BCD – battlefield coordination detachment, BDE – brigade, BN – battalion, CP – command post, CRC – control and reporting center, FAC (A) – forward air controller (airborne), FSE – fire support element, GLD – ground liaison detachment, JACCE – joint air component coordination element, JARN – joint air request net, JFACC – joint force air component commander, JFC – joint force commander, JFLCC – joint force land component commander, JOC – joint operations center, RLD – reconnaissance liaison detachment, TAC (A) – tactical air coordinator (airborne), TACP – tactical air control party, WOC – wing operation center

Figure E-2. Army Air Ground System

PLANNED TARGETS AND AIR MISSIONS

E-4. Targeting seeks to create specific desired effects through lethal and nonlethal actions. There are two targeting categories: deliberate targeting and dynamic targeting. Deliberate targeting generally provides more planning time and a larger pool of resources to leverage against a target, while dynamic targeting is generally restricted by time, resources available, and command priorities (see table E-1). Deliberate targeting prosecutes planned targets. These targets are known to exist in the AO and have actions scheduled against them. Both scheduled and on-call targets are outputs of deliberate targeting. Scheduled targets exist in the AO and are located in sufficient time so that fires or other actions upon them occur at a specific, planned time. On-call targets have actions planned, but not for a specific delivery time. The commander expects to locate these targets in sufficient time to execute planned actions. Scheduled air missions are planned to execute scheduled targets, while on-call air missions are planned for the execution of on-call targets. Both scheduled and on-call air missions are requested via the AIRSUPREQ process. For more information on targets and targeting see FM 3-60.

Table E-1. Planned targets and air missions

<table>
<tr><td colspan="3">Deliberate Targeting</td></tr>
<tr><td colspan="3">Planned Targets
Targets known to exist in the operational environment with engagement actions planed against them.</td></tr>
<tr><td>Originate from: JTL/RTL</td><td>Scheduled Targets
Targets prosecuted at a specific time and location.</td><td>On-Call Targets
Targets with actions planned, but not for a specific delivery time or coordinate, which are most likely located in time to execute planned actions.</td></tr>
<tr><td>Planning</td><td>X</td><td>X</td></tr>
<tr><td rowspan="2">Execution</td><td>Deliberate</td><td>Deliberate</td></tr>
<tr><td>Deliberate</td><td>Dynamic</td></tr>
<tr><td rowspan="4"></td><td colspan="2">Deliberate Targeting</td></tr>
<tr><td>Scheduled Air Missions</td><td>On-Call Air Missions</td></tr>
<tr><td>AI, CAS, and EW</td><td>Airborne Alert or Ground Alert, AI, CAS, and EW</td></tr>
<tr><td colspan="2">AIRSUPREQ (USMTF D670)
A means of digitally submitting requests for joint air support when tactical Army echelons identify targets that require effects exceeding their organic capabilities or when other requirements for joint air power are identified during the planning process. Scheduled air missions are tasked to prosecute JFC approved JIPTL targets. On-call missions are tasked to prosecute non JIPTL targets withing the Army AO.</td></tr>
<tr><td colspan="3">AI – air interdiction, AO – area of operations, CAS – close air support, EW – electronic warfare,
JFC – joint force commander, JIPTL – joint integrated prioritized target list, JTL – joint target list,
RTL – restricted target list, USMTF D670 – United States message text format D670</td></tr>
</table>

E-5. Scheduled targets are prosecuted with scheduled air missions. Scheduled targets are derived from the JFC approved joint target list (JTL) and restricted target list (RTL). When scheduled targets are approved for execution by the JFC, they will be included on the joint integrated prioritized list and sourced on the ATO for execution at a specific time. Scheduled air missions tasked to execute scheduled targets in support of the ground force have weapon loadouts tailored to achieve specific effects on targets. Scheduled air missions provide the greatest effects on targets but have the least flexibility for re-tasking and relatively short on-station times.

E-6. On-call targets can be prosecuted with on-call air missions. On-call air missions will be listed on the ATO for a specific block of time as either airborne-alert or ground-alert. The block of time is determined based on the anticipated target type, disposition, composition, target location or target area, and

friendly/enemy actions in or near the target area. Aircraft response times will also be listed on the ATO and must be accounted for in planning. Response times vary depending on the distance from the airbase to the mission/target area and, for ground-alert type aircraft, the alert status time. Aircraft tasked to execute on-call air missions require planned airspace within which they can safely operate and communication with the supported ground force. On-call air missions provide a high level of flexibility in execution, longer planned on-station times, and weapon loadouts designed to be effective against multiple target types.

E-7. Unscheduled and unanticipated targets, also referred to as targets of opportunity, are prosecuted via dynamic targeting. Scheduled air missions listed on the ATO can support dynamic targeting efforts only when those aircraft have been made available for re-tasking. Normally, every available on-call air mission should be utilized for dynamic targeting efforts prior to re-tasking scheduled air missions. A scheduled target has been planned, approved by the JFC, and given priority over other targets. When re-tasking scheduled air missions, the original scheduled target will not get executed as intended. Re-tasking scheduled air missions may negatively affect the success of future operations. For more information on dynamic targeting see ATP 3-60.1.

NOMINATING TARGETS FOR EXECUTION VIA AIR SUPPORT REQUESTS

E-8. Tactical Army echelons can nominate targets for execution via preplanned AIRSUPREQs. AIRSUPREQs should be populated with target data from the JFC approved JTL and/or RTL. Army tactical echelons submit an air support list containing preplanned AIRSUPREQs to their next HQ for approval or denial. The air support list is transmitted via the USMTF D670 AIRSUPREQ message. The preferred method of transmitting the air support list is electronically, utilizing the Army's digital FS command and control information system. Currently, this is the AFATDS. The senior Army HQ submits the Army air support list to the BCD for processing. For more information on air support request forms and transmission methods see JP 3-09.3.

E-9. The BCD is the Army liaison co-located at the supporting joint force air component HQ, normally the JAOC. BCD responsibilities include submitting Army AIRSUPREQs to, and coordinating air support requirements with, the supporting joint force air component during planning stages of the joint air tasking cycle. For more information on the BCD see JP 3-09 and ATP 3-09.13.

E-10. The rationale and desired effects sections of each AIRSUPREQ should clearly identify how the requested effects conform to the JFC's targeting guidance by referencing the specific operational and tactical objectives or tactical tasks they support. The table of prioritized tactical tasks and associated task codes is normally found in the air operations directive. The air operations directive is produced during Stage 1 (objectives, effects, and guidance) of the joint air tasking cycle and is normally distributed to the Army by the BCD.

E-11. Targets nominated for execution via AIRSUPREQs and resourced by joint force assets or joint air missions must meet validation criteria. Targets are validated and prioritized according to the weight of effort assigned by the JFC to those specific objectives and tasks as outlined in the JFC's plans and orders. Identifying within each AIRSUPREQ the appropriate supported objectives or tasks enables the JFC's designated targeting oversight authority to validate and prioritize each target for inclusion on the JFC approved joint integrated prioritized target list. For more information on joint targeting and the joint air tasking cycle see JP 3-30 and JP 3-60.

E-12. Army corps or divisions operating as tactical HQ are the most appropriate echelons at which to update the rationale and desired effects sections of AIRSUPREQs. The rationale and desired effects fields of the USMTF D670 should clearly state which prioritized tactical task the AIRSUPREQ supports by referencing the prioritized tactical task codes listed in the air operations directive. Each Army echelon is responsible for verifying that all required information is clearly stated in the AIRSUPREQ. Listing the prioritized tactical task codes in AIRSUPREQs assists with correct prioritization of Army targets nominated for execution.

PREPLANNED AIR SUPPORT REQUESTS FOR SCHEDULED TARGETS (SCHEDULED AIR MISSIONS)

E-13. The normal suspense for nominating targets for execution via AIRSUPREQs is prior to Stage 2 (Target Development) of the joint air tasking cycle. Air support list submission prior to Stage 2 is required to provide the targeting and effects team at the JAOC time to verify collateral damage estimates and generate weapon aimpoints. Aimpoints are described as desired point of impact, joint desired point of impact, desired mean point of impact, and nonlethal reference points.

- AIRSUPREQs for scheduled air missions should be populated with target data (critical elements) from the JFC approved JTL and/or RTL.
- Army target nominations submitted prior to Stage 2 (target development) may be resourced by the following scheduled air missions:
  - CAS.
  - AI.

PREPLANNED AIR SUPPORT REQUESTS FOR ON-CALL TARGETS (ON-CALL AIR MISSIONS)

E-14. The normal suspense for submitting AIRSUPREQs for on-call air missions is prior to Stage 3 (weaponeering and allocation) of the joint air tasking cycle. Air support list submission prior to Stage 3 is required to provide the master air attack plan team at the JAOC the time necessary to conduct weaponeering. The master air attack plan team also works with joint airspace planners to ensure airspace is planned for each air mission. When requesting on-call air missions, Army units should clearly identify which tactical objective and tactical task the air mission will support. It is highly recommended to add any additional target information to the remarks section of the USMTF D670 AIRSUPREQ message (to include target type, size, composition, disposition, and target area). AIRSUPREQs for on-call air missions must be within the tolerance of the JFC's air apportionment decision and the JFACC's air allocation guidance for the planned ATO period. See JP 3-30 for more information on the joint air tasking cycle.

- AIRSUPREQs for on-call air missions are not processed during the joint targeting cycle and are not required to contain data from the modernized integrated data base, JTL, or RTL.
- AIRSUPREQs for on-call air missions are submitted to the joint force as part of the Army air support list.
- AIRSUPREQs for on-call air missions submitted prior to Stage 3 (weaponeering and allocation) may be resourced by the following on-call air missions:
  - XCAS/XINT (airborne-alert CAS/AI).
  - GCAS/GINT (ground-alert CAS/AI).
  - EW.

TARGETING, AIR SUPPORT REQUESTS, AND AIR-GROUND OPERATIONS

E-15. The targeting and preplanned AIRSUPREQ processes are crucial to the success of air-ground operations. Commanders conduct air-ground operations to make use of available combat power from the land and air domains to accomplish missions and defeat enemy forces. The goal of air-ground operations is to safely integrate surface-to-surface fires and air-to-surface fires while delivering effects on targets that achieve commanders' objectives. Identifying requirements for joint airpower during the targeting process, clearly stating what effects the commander wants to achieve, how the requested effects support the JFC's objectives, and submitting the associated AIRSUPREQs to the supporting air component are critical tasks that must be accomplished at the appropriate Army echelon.

E-16. Identifying requirements for air support during targeting and conducting effective air-ground operations provides commanders the ability to create and exploit advantages against enemy forces. The use of joint airpower supports air-ground operations and provides certain benefits when compared to traditional surface-to-surface fires. Ordinance delivered by fixed wing aircraft are predominantly precision guided and

have low probability of error resulting in less chance of fratricide and collateral damage while achieving lethal effects on targets. Aircraft are more effective against mobile, armored targets and can engage targets of opportunity immediately upon discovery during a mission. Pilots can provide BDA and additional intelligence via inflight reports during or shortly after target engagements, enabling commanders to make well informed decisions. Traditional surface-to-surface fires also support air-ground operations by providing specific target engagements to suppress enemy air defense systems. Surface-to-surface fires can provide simultaneous precision strikes of targets at long ranges that aircraft cannot attack without significant risk.

SECTION II – AIR SUPPORT REQUEST NUMBERING PROCESS

E-17. Each AIRSUPREQ requires a unique number for tracking, processing, and pairing with the tasked air mission(s). The Army air support list can't be processed digitally at the JAOC unless each AIRSUPREQ in the list is correctly numbered; AIRSUPREQ numbers are a required field in the USMTF D670 AIRSUPREQ message. AIRSUPREQ numbers are also a recognized field by which C2 information systems can sort the ATO, allowing requesting units to quickly locate information about which aircraft have been tasked to support them. Army echelons that don't use AIRSUPREQs to nominate targets for execution should assign AIRSUPREQ numbers to each target nominated for execution. This will aid in identifying on the ATO which air missions are servicing Army-nominated targets.

E-18. The senior Army HQ is responsible for establishing AIRSUPREQ numbers for use by Army units. Units are assigned a series of AIRSUPREQ numbers via the operations order (OPORD), Annex D (Fires), Appendix 5 (Air Support). While AIRSUPREQ numbers do not originate in the special instructions, they may be published in special instructions to ensure joint force visibility. The AIRSUPREQ number is comprised of 2 letters which identify the ATO day, three letters that identify the requesting unit, and a three-digit sequence number. See figure E-3.

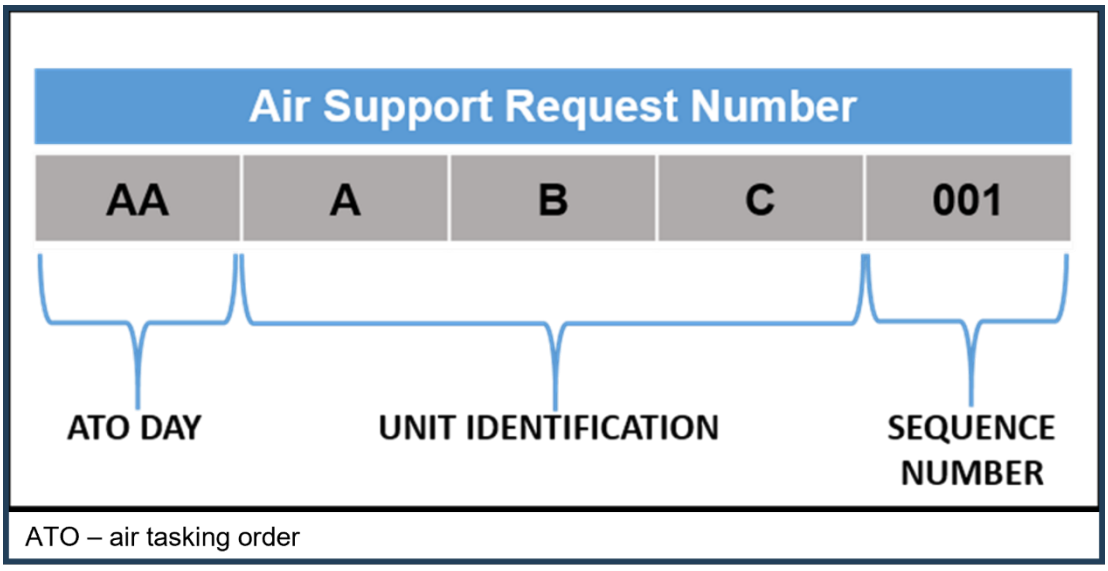


Figure E-3. Air Support Request Number

E-19. AIRSUPREQs are planned for specific ATO days. The AIRSUPREQ number uses its first two characters to identify which ATO day joint airpower and effects are requested for. The next three letters identify the specific Army unit that is submitting the AIRSUPREQ. The first letter identifies the senior Army HQ (for example Theater Army, JFLCC). The second letter identifies the upper echelon tactical HQ (Corps or Division). The third letter identifies the lower echelon tactical HQ (DIV or BDE). (See figure E-4).

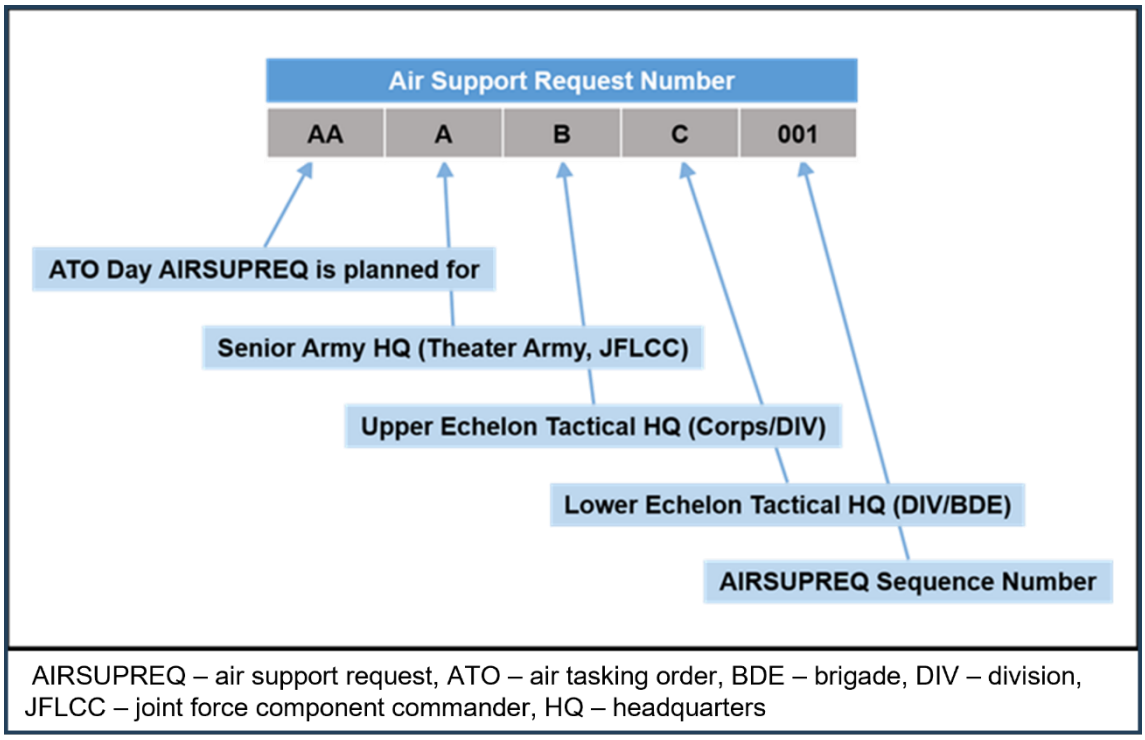


Figure E-4. Air Support Request Numbering

E-20. The two-letter ATO day designation is created by assigning the number of the month and day to their corresponding letters in the alphabet. Since January is the first month of the year and "A" is the first letter of the alphabet, January would be designated as "A", February "B", March "C", etc. The first day of the month would also use the letter "A", resulting on January 1st being annotated as ATO day "AA" and January 26th being annotated as ATO day AZ. When the date of the month exceeds the number 26, the second letter starts over at "A". See table E-2.

Table E-2. Example air tasking order day calendar

Air Tasking Order for March 2023						
SUN	**MON**	**TUE**	**WED**	**THU**	**FRI**	**SAT**
26 BZ	27 BA	28 BB	1 CA	2 CB	3 CC	4 CD
5 CE	6 CF	7 CG	8 CH	9 CI	10 CJ	11 CK
12 CL	13 CM	14 CN	15 CO	16 CP	17 CQ	18 CR
19 CS	20 CT	21 CU	22 CV	23 CW	24 CX	25 CY
26 CZ	27 CA	28 CB	29 CC	30 CD	31 CE	1 DA
FRI – Friday, MON – Monday, SAT – Saturday, SUN – Sunday, THU – Thursday, TUE – Tuesday, WED – Wednesday						

E-21. The three-letter unit identification portion of the AIRSUPREQ number is used to identify the requesting unit. The first letter signifies the senior Army HQ. The senior Army HQ is the highest Army echelon of command, for example theater Army or JFLCC. Each unit is assigned a letter that represents their HQ. Table E-3 on page E-8, is a notional example of the first letter of the unit identification portion of an AIRSUPREQ number.

Table E-3. Assignment of first letter (example)

Senior Army Headquarters	*Letter*
USARCENT	C
USAREUR-AF	E
USASOC	F
ARNORTH	N
USARPAC	P
ARSOUTH	S
ARNORTH – U.S. Army North, ARSOUTH – U. S. Army South, USARCENT – U.S. Army Central, USAREUR-AF – U.S. Army Europe and Africa, USARPAC – U.S. Army Pacific, USASOC – U.S. Army Special Operations Command	

E-22. The second letter in the unit identification of the AIRSUPREQ number indicates the upper echelon tactical HQ. If an Army corps is operating in a tactical role, this letter should identify the Army corps where the request originated. If the corps is not operating as a tactical HQ, then an Army division should be the upper echelon tactical HQ. Table E-4 is a notional example of letter assignment for upper echelon tactical HQ.

Table E-4. Assignment of second letter (example)

Upper Echelon Tactical Headquarters	*Letter*
I Corps	A
III Corps	B
V Corps	C
XVIII Airborne Corps	D

E-23. The third letter in the unit identification of the AIRSUPREQ number indicates the lower echelon tactical HQ. When operating beneath a tactical corps HQ, the third letter should identify the tactical division HQ where the request originated. In the absence of a tactical corps HQ, the third letter should identify the brigade within the division that submitted the AIRSUPREQ. When Army divisions operating as upper echelon tactical HQ submit AIRSUPREQs in support of a maneuver brigade's operations, the third letter may be used to identify the brigade being supported. Table E-5 is a notional example of letter assignment for lower echelon tactical HQ.

Table E-5. Assignment of the third letter (example)

Lower Echelon Tactical Headquarters	*Letter*
3rd Infantry Division	A
10th Mountain Division	B
82nd Airborne Division	C
101st Airborne Division	D
7th Infantry Division	E
25th Infantry Division	F
11th Airborne Division	G
1st Infantry Division	H
1st Cavalry Division	I
1st Armored Division	J
4th Infantry Division	K
3rd Armored Cavalry Regiment	L

E-24. The last three characters in the AIRSUPREQ number are used as sequence numbers, identifying the number of the request submitted by the unit. The numbers do not represent the type of air mission. Using the data in Tables E-2 through E-5, an AIRSUPREQ submitted by 82nd Airborne Division for March 1st, 2023, with XVIII Airborne Corps as their HHQ, operating in the CENTCOM AOR, would have the following AIRSUPREQ number assigned:

- CACDC001.

- CA is the ATO day the AIRSUPREQ is planned for - March 1st, 2023.
- CDC identifies the requesting unit - ARCENT, XVIII Airborne Corps, 82nd Airborne Division.
- 001 identifies the AIRSUPREQ as the first request submitted by 82nd Airborne Division.

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Source Notes

This division lists sources by page number. Where material appears in a paragraph, it lists the page number followed by the paragraph number.

1-14 “Get the job done, tidy up the battlefield later.” Gen. Jack N. Merritt (Field Artillery). Available at https://www.armyupress.army.mil/Portals/7/combat-studies-institute/csi-books/FtLeavenworth_Philosophy.pdf.

1-14 “If you make war,’ he would say to General d’Hédouville in December 1799, ‘wage it with energy and severity; it is the only means of making it shorter and consequently less deplorable for mankind.’79”, — Andrew Roberts, *Napoleon: A Life*, ASIN : 0143127853, Publisher : Penguin Books; Reprint edition (October 20, 2015), Page 51.

1-15 “There is still a tendency in each separate unit… to be a one-handed puncher. By that I mean that the rifleman wants to shoot, the tanker wants to charge, the artilleryman to fire…That is not the way to win battles. If the band played a piece first with the piccolo, then with the brass horn, then with the clarinet, and then with the trumpet, there would be a hell of a lot of noise but no music.” GEN George S. Patton’s speech to the Third Army, June 5th, 1944. Available at https://usacac.army.mil/sites/default/files/publications/90-6Book_PAOCleared.pdf.

3-1 “The Artillery was my strongest tool… repeatedly said that it was more a matter of the infantry supporting the artillery than the artillery supporting the infantry. This was an overstatement, but not too much of one… I wish I knew the countless times that positions were taken or held due solely to TOT’s. I also wish I knew the innumerable times… when counterattacks we smeared by the artillery.” General R. O. Barton, commanding the 4th Division. Page 254–255, Frank E. Comparato, *Age of Great Guns: Cannon Kings and Cannoneers Who Forged the Firepower of Artillery*, Harrisburg, PA. Stackpole, 1965.

4-14 “In a 15 May 1991 letter to the Commandant of the FA School, Major General Raphael J. Hallada (1987–1991), about the US VII Corps’ 24 February 1991 breaching operation, the Commanding General of the 1st Infantry Division, Major General Thomas G. Rhame, related: The performance of the FA in combat has caused all of us to remember what we had perhaps forgotten, namely its incredible destructive power and shock effect. The preparation fires I witnessed prior to our assault on the breachline were the most incredible sight I have seen in 27 years of service. On 24 February 1991 Commander of the US VII Corps Artillery, Brigadier General Creighton Abrams Jr., and the Commander of the 1st Infantry Division (Mechanized) Artillery, Colonel Michael L. Dodson assembled the FA force. In support of the US VII Corps assault, General Abrams allocated the 42d, 75th, and 142d FA Brigades, two division artilleries, and 10 Multiple Launch Rocket System batteries to create a Soviet-style attack at the breach area. General Abrams positioned approximately 22 artillery pieces for each kilometer of the attack zone. More than 350 FA pieces fired 11,000 rounds while M270 Multiple-Launch Rocket Launchers shot 414 rockets in a FA preparation of 30 minutes. Besides crushing Iraqi morale, this massed fires destroyed 50 tanks, 139 armored personnel carriers, and 152 FA pieces. ” page 6. Boyd L. Dastrup, "*Artillery Strong: Modernizing the Field Artillery for the 21st Century*” (2018). https://www.govinfo.gov/content/pkg/GOVPUB-D110-PURL-gpo90442/pdf/GOVPUB-D110-PURL-gpo90442.pdf.

5-3 “Soldiers of the 25th Infantry Division said their final farewells before heading to Thailand to participate in Pacific Pathways. Pacific Pathways is an operation conducted by U.S. Army Pacific that deploys personnel and material to support security cooperation exercises with ally and partner militaries. Thailand is one of the United States' oldest partners in Asia and the broad cooperation between the two nations continues on issues that benefit both countries, the region and beyond. "The division's area of responsibility is Southeast Asia and the Pacific Region so this gives us an opportunity to deploy off of the island of Oahu, train, and build

holistic readiness with our Thai counterparts," the Executive Officer of 3rd Squadron, 4th Cavalry Regiment, 3rd Infantry Brigade Combat Team, 25th Infantry Division. In addition to multinational training, Pacific Pathways meets the requirement to provide a force able to rapidly adapt to emerging challenges across multiple domains. "We trained alongside of them at JRTC (Joint Readiness Training Center, Fort Polk, Louisiana)," the Executive Officer said. "We were very impressed with their professionalism and how they seamlessly integrated into the team and we're looking forward to training with them over the course of several months," he added. The ability of both nations' military forces to work together is beneficial, and was most recently highlighted by the U.S. participation in the Thai-led effort to rescue the Wild Boar soccer team from a cave in northern Thailand. "We're hoping to build on the already established relationship with them (Royal Thai Army) in order to further drive our influence within the Southeast Asian area of operations," said the Officer in Charge, assigned to 3rd Squadron, 4th Cavalry Regiment, 3rd Infantry Brigade Combat Team, 25th Infantry Division. This Pacific Pathways mission has captured the world's attention, and the United States are very proud to have been asked by Thailand to assist. HI, United States (dvids) 02.19.2020, Story by Sgt. Ryan Jenkins, 25th Infantry Division, SCHOFIELD BARRACKS, Hawaii. Available at https://www.dvidshub.net/news/363680/leaving-pacific-pathways.

5-3 “Enemy leaders must be made to understand clearly that, if they choose to move militarily, no longer will there be a status quo ante-bellum...something to be restored. Rather, the situation they themselves have created is one which will be resolved on new terms" *Extending the Battlefield, Military Review*, March 1981, pages 32-58, GEN Donn A. Starry. Available at https://www.armyupress.army.mil/Portals/7/online-publications/documents/1981-mr-donn-starry-extending-the-battlefield.pdf.

5-4 “U.S. Army Europe has led the Department of Defense’s Atlantic Resolve land efforts by bringing units based in the U.S. to Europe for nine months at a time. Atlantic Resolve provides these rotational units with the ability to build readiness, increase interoperability and enhances the bond between ally and partner militaries through multinational training events. There are three types of Atlantic Resolve rotations – armored, aviation and sustainment task forces. These rotations are overseen by a US Army Division (Forward), a regionally aligned headquarters based in Poznan, Poland. These deployments of ready, combat-credible U.S. forces to Europe in support of Atlantic Resolve is evidence of the strong and unremitting U.S. commitment to NATO and Europe.” Available at https://www.dvidshub.net/feature/AtlanticResolve.

5-4 “An example of a flexible deterrent is the Regionally Aligned Forces mission assigned to the multiple launch rocket system rotational battalion in the Korean Theater of Operations. Each of the firing batteries, with enablers from headquarters and headquarters battery and forward support company, deploy to a combat outpost for a total of four and a half months of an eight-month deployment. The battalion’s mission is to work closely with Republic of Korea forces as a deterrent option to North Korean aggression.” Pages 68-69, 2018 Fires Red Book, January-February 2019. Available at https://tradocfcoeccafcoepfwprod.blob.core.usgovcloudapi.net/fires-bulletin-archive/2019/jan-feb/jan-feb.pdf..

5-4 “In Operation Inherent Resolve in 2017, armed Syrian Army units aligned with hostile paramilitary forces demonstrated threatening actions against US forces and its partners. After significant and appropriate warnings to cease the threatening actions, US forces conducted lethal air to surface strikes as a response resulting in multiple destroyed Syrian ADA and artillery organizations. The remainder of the Syrian Army units withdrew and the threatening action ceased" As stated by a U.S. representative. *HIMARS deploys to Syria for first time*, UPI, Defense News 14 Jun 2017. Available at https://www.upi.com/Defense-News/2017/06/14/HIMARS-deploys-to-Syria-for-first-time/8771497458424/.

Glossary

SECTION I – ACRONYMS AND ABBREVIATIONS

A2	antiaccess
ACM	airspace coordinating measure
ACO	airspace control order
AD	area denial
ADA	air defense artillery
AFATDS	Advanced Field Artillery Tactical Data System
AGM	attack guidance matrix
AI	air interdiction
AIRSUPREQ	air support request
ALO	air liaison officer
AO	area of operations
AOC	air operations center
ASOC	air support operations center
ATACMS	Army Tactical Missile System
ATO	air tasking order
BCD	battlefield coordination detachment
BCT	brigade combat team
BDA	battle damage assessment
BN	battalion
C2	command and control
CAB	combat aviation brigade
CAS	close air support
CBRN	chemical, biological, radiological, and nuclear
CCDR	combatant commander
CE	circular error
CEMA	cyberspace electromagnetic activities
CFFZ	call for fire zone
CFL	coordinated fire line
CFZ	critical friendly zone
CMD-P	Computer Meteorological Data-Profiler
COA	course of action
CP	command post
CSR	controlled supply rate
D3SOE	denied, degraded, or disrupted space operational environment
DA	Department of the Army

DFSCOORD	deputy fire support coordinator
DIVARTY	division artillery
DS	direct support
EA	engagement area
EFAT	essential field artillery task
EFST	essential fire support task
EMS	electromagnetic spectrum
EW	electronic warfare
FA	field artillery
FAB	field artillery brigade
FAC(A)	forward air controller (airborne)
FAIO	field artillery intelligence officer
FDC	fire direction center
FFA	force field artillery
FFE	fire for effect
FID	foreign internal defense
FIST	fire support team
FLOT	forward line of own troops
FM	field manual
FO	forward observer
FPF	final protective fire
FS	fire support
FSCL	fire support coordination line
FSCM	fire support coordination measure
FSCOORD	fire support coordinator
FSE	fire support element
FSO	fire support officer
ft	feet
G-2	assistant chief of staff, intelligence
G-3	assistant chief of staff, operations
GARS	Global Area Reference System
GMLRS	Global Positioning System Multiple Launch Rocket System
GPS	Global Positioning System
GRG	gridded reference graphic
GS	general support
GSR	general support-reinforcing
HE	high explosives
HIMARS	High Mobility Artillery Rocket System
HPT	high-payoff target
HPTL	high-payoff target list
HQ	headquarters

IADS	integrated air defense system
INS	inertial navigation system
IPOE	intelligence preparation of the operational environment
ISR	intelligence, surveillance, and reconnaissance
JACCE	joint air component coordination element
JADOCS	Joint Automated Deep Operations Coordination System
JAGIC	joint air-ground integration center
JAOC	joint air operations center
JFACC	joint force air component commander
JFC	joint force commander
JFE	joint fires element
JFLCC	joint force land component commander
JFMCC	joint force maritime component commander
JP	joint publication
JTAC	joint terminal attack controller
JTF	joint task force
JTL	joint target list
LOD	line of departure
m	meters
MAGTF	Marine air-ground task force
MBA	main battle area
MDMP	military decision-making process
MEA	munitions effectiveness assessment
MET	meteorological
METT-TC (I)	mission, enemy, terrain and weather, troops and support available, time available, and civil considerations, and informational considerations
mm	millimeter
MLRS	multiple launch rocket system
MOC	maritime operations center
NAI	named area of interest
NATO	North Atlantic Treaty Organization
NFA	no-fire area
NSFS	naval surface fire support
OA	operational area
OE	operational environment
OPCON	operational control
OPLAN	operation plan
OPORD	operation order
PAA	position area for artillery
PACE	primary, alternate, contingency and emergency
R	reinforcing

RFA	restrictive fire area
RFL	restrictive fire line
ROE	rules of engagement
ROZ	restricted operations zone
RTL	restricted target list
S-2	battalion or brigade intelligence staff officer
S-3	battalion or brigade operations staff officer
SCAR	strike coordination and reconnaissance
SEAD	suppression of enemy air defenses
SFA	security force assistance
SJA	staff judge advocate
SOF	special operations forces
SOP	standard operating procedure
SOTF	special operations task force
TA	target acquisition
TACP	tactical air control party
TAI	target area of interest
TC	training circular
TCF	tactical combat force
TFC	theater fires command
TFE	theater fires element
TTP	tactics, techniques, and procedures
UA	unmanned aircraft
UAS	unmanned aircraft system
U.S.	United States
USAF	United States Air Force
USMC	United State Marine Corps
USMTF	United States message text format
WLR	weapons locating radar
ZF	zone of fire

SECTION II – TERMS

air interdiction

Air operations to perform interdiction conducted at such distances from friendly forces that detailed integration of each air mission with the fire and movement of friendly forces is not required. (JP 3-03)

air liaison officer

The senior tactical air control party member attached to a ground unit who functions as the primary advisor to the ground commander on air power. (JP 3-09.3)

airspace control

The exercise of delegated authority over designated airspace and users through control procedures and coordination measures to maximize operational effectiveness. (JP 3-52)

airspace control authority

The commander designated for overall responsibility for airspace control. (JP 3-52)

airspace control order

An order implementing the airspace control plan that provides the details of the approved requests for airspace coordinating measures. (JP 3-52)

airspace coordinating measures

Measures employed to facilitate the efficient use of airspace to accomplish missions and simultaneously provide safeguards for friendly forces. (JP 3-52)

airspace coordination area

A three-dimensional block of airspace in a target area, established by the appropriate commander, in which friendly aircraft are reasonably safe from friendly surface fires. (JP 3-09.3)

allocation

Distribution of limited forces and resources for employment among competing requirements. (JP 5-0)

***altitude**

The vertical distance of a level, a point or an object considered as a point, measured from mean sea level or height above ellipsoid.

area defense

A type of defensive operation that concentrates on denying enemy forces access to designated terrain for a specific time rather than destroying the enemy outright. (ADP 3-90)

Army Service component command

Command responsible for recommendations to the combatant commander on the allocation and employment of Army forces. (JP 3-31)

artillery target intelligence zone

A weapons locating radar search area in enemy territory that the commander monitor closely to detect and report any weapon ahead of all acquisitions other than those from critical friendly zones or call for fire zones.

assessment

A continuous process that measures the overall effectiveness of employing capabilities during military operations. (JP 3-0)

assign

To place units or personnel in an organization where such placement is relatively permanent, and/or where such organization controls and administers the units or personnel for the primary function, or greater portion of the functions, of the unit or personnel. (JP 3-0)

attach

The placement of units or personnel in an organization where such placement is relatively temporary. (JP 3-0)

attack

A type of offensive operation that destroys or defeats enemy forces, seizes and secures terrain, or both. (ADP 3-90)

***attack guidance matrix**

A targeting product approved by the commander, which addresses the how and when targets are engaged and the desired effects.

axis of advance

The general area through which the bulk of a unit’s combat power must move.

azimuth of fire

The direction, expressed in mils, that a firing unit is laid (oriented) on when it occupies a position. (ATP 3-09.50)

backbrief

A briefing by subordinates to the commander to review how subordinates intend to accomplish their mission. (FM 6-0)

battle handover line

A designated phase line where responsibility transitions from the stationary force to the moving force and vice versa. (ADP 3-90)

boundary

A line that delineates surface areas for the purpose of facilitating coordination and deconfliction of operations between adjacent units, formations, or areas. (JP 3-0)

breach

A tactical mission task in which a unit breaks through or establishes a passage through an enemy obstacle. (FM 3-90)

***call for fire**

A standardized request for fire containing data necessary for obtaining the required fire on a target.

***call for fire zone**

A weapons locating radar search area from which the commander wants to attack hostile firing systems.

***censor zone**

An area from which the weapons locating radar is prohibited from reporting acquisitions.

chief of fires

The senior fires staff officer at echelons above corps who advises the commander on the best use of available fires resources, and provides input to necessary orders. (ADP 3-19)

***clearance of fires**

The process by which the supported commander ensures that fires or their effects will have no unintended consequences on friendly units or the scheme of maneuver.

close air support

Air action by aircraft against hostile targets that are in close proximity to friendly forces and that require detailed integration of each air mission with the fire and movement of those forces. (JP 3-09.3)

close combat

Warfare carried out on land in a direct-fire fight, supported by direct and indirect fires, and other assets. (ADP 3-0)

close operations

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. (FM 3-0)

close support

Action of the supporting force against targets or objectives that are sufficiently near the supported force as to require detailed integration or coordination of the supporting action with fire, movement, or other actions of the supported force. (JP 3-31)

collateral damage

A form of collateral effect that causes unintentional or incidental injury or damage to persons or objects that would not be lawful military targets in the circumstances ruling at the time. (JP 3-60)

combat assessment

The determination of the overall effectiveness of force employment during military operations. (JP 3-60)

combat power

The total means of destructive and disruptive force that a military unit/formation can apply against an opponent at a given time. (JP 3-0)

command and control

The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. (JP 1, Volume 2)

command and control system

The arrangement of people, processes, networks, and command posts that enable commanders to conduct operations. (ADP 6-0)

commander's intent

A clear and concise expression of the purpose of the operation and the desired objectives and military end state. (JP 3-0)

common control

The horizontal and vertical map or chart location of points in the target and position area, tied in with the horizontal and vertical control in use by two or more units. (ATP 3-09.02)

common grid

Refers to all firing and target-locating elements within a unified command located and oriented to prescribed accuracies with respect to a single three-dimensional datum. (ATP 3-09.02)

***common sensor boundary**

A line depicted by a series of grid coordinates, grid line, phase line or major terrain feature that divides target acquisition search areas into radar acquisition management areas. Also called CSB.

concept of operations

A statement that directs the manner in which subordinate units cooperate to accomplish the mission and establishes the sequence of actions the force will use to achieve the end state. (ADP 5-0)

consolidate gains

Activities to make enduring any temporary operational success and to set the conditions for a sustainable security environment, allowing for a transition of control to other legitimate authorities. (ADP 3-0)

controlled supply rate

The rate of ammunition consumption that can be supported, considering availability, facilities, and transportation. It is expressed in rounds per unit, individual, or vehicle per day. (ATP 3-09.23)

convergence

An outcome created by the concerted employment of capabilities from multiple domains and echelons against combinations of decisive points in any domain to create effects against a system, formation, decision maker, or in a specific geographic area. (FM 3-0)

coordinated fire line

A line beyond which conventional surface-to-surface direct fire and indirect fire support means may fire at any time within the boundaries of the establishing headquarters without additional coordination but does not eliminate the responsibility to coordinate the airspace required to conduct the mission. (JP 3-09)

coordinating altitude

An airspace coordinating measure that uses altitude to separate users and as the transition between different airspace control elements. (JP 3-52)

coordination level

An airspace coordinating measure below which fixed-wing aircraft normally will not fly. (JP 3-52)

core competency

An essential and enduring capability that a branch or an organization provides to Army operations. (ADP 1-01)

counterair

A mission at the theater level that integrates offensive and defensive operations to attain and maintain a desired degree of control of the air and protection by neutralizing or destroying enemy aircraft and missiles, both before and after launch. (JP 3-01)

***counterbattery fire**

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

counterfire

Fire intended to destroy or neutralize enemy weapons. (JP 3-09)

countermobility

A set of combined arms activities that use or enhance the effects of natural and man-made obstacles to prevent the enemy freedom of movement and maneuver. (ATP 3-90.8)

***counterpreparation fire**

The intensive prearranged fire delivered when the imminence of the enemy attack is discovered.

covert crossing

A planned crossing of an inland water obstacle or other gap in which the crossing is intended to be undetected. (ATP 3-90.4)

***critical friendly zone**

A commander designated friendly area of coverage critical to the protection of an asset whose loss would seriously jeopardize the mission that is employed by weapons location radar.

cyberspace attack

Actions taken in and through cyberspace that create denial (i.e., degradation, disruption, or destruction) or manipulation effects in cyberspace and are considered a form of fires. (JP 3-12)

cyberspace domain

The interdependent networks of information technology infrastructures and resident data, including the Internet, telecommunication networks, computer systems, embedded processors and controllers, and relevant portions of the electromagnetic spectrum. (FM 3-0)

cyberspace operations

The employment of cyberspace capabilities where the primary purpose is to achieve objectives in or through cyberspace. (JP 3-0)

***danger close**

For air-to-surface and surface-to-surface missions is a mandatory call alerting of an elevated risk to the closest friendly troops from the intended point of a weapon’s impact requiring specific procedures for risk mitigation.

decisive operation

The operation that directly accomplishes the mission. (ADP 3-0)

deep area

Where the commander sets conditions for future success in close combat. (ADP 3-0)

deep operations

Tactical actions against enemy forces, typically out of direct contact with friendly forces, intended to shape future close operations and protect rear operations. (FM 3-0)

defeat

To render a force incapable of achieving its objectives. (ADP 3-0)

defeat in detail

Concentrating overwhelming combat power against separate parts of a force rather than defeating the entire force at once. (ADP 3-90)

defensive operation

An operation to defeat an enemy attack, gain time, economize forces, and develop conditions favorable for offensive or stability operations. (ADP 3-0)

delay

When a force under pressure trades space for time by slowing down the enemy's momentum and inflicting maximum damage on enemy forces without becoming decisively engaged. (ADP 3-90)

deliberate crossing

The crossing of an inland water obstacle or other gap that requires extensive planning and detailed preparations. (ATP 3-90.4)

denial operations

Actions to hinder or deny the enemy the use of terrain, supplies, or facilities. (FM 3-90)

denied, degraded, and disrupted space operational environment

A composite of those conditions and influences in which space-enabled capabilities have been impaired by hostile threats or non-hostile means. (FM 3-14)

deny

A task to hinder or prevent the enemy from using terrain, space, personnel, supplies, or facilities. (ATP 3-21.20)

destroy

A tactical mission task that physically renders an enemy force combat-ineffective until reconstituted. (FM 3-90)

***destruction**

In the context of the computed effects of field artillery fires, destruction renders a target out of action permanently, or ineffective for a long period of time, producing at least 30-percent casualties or materiel damage.

direction of attack

A specific direction or assigned route a force uses and does not deviate from when attacking. (ADP 3-90)

direct support

A support relationship requiring a force to support another specific force and authorizing it to answer directly to the supported force's request for assistance. (FM 3-0)

disintegrate

To disrupt the enemy's command and control, degrading synchronization and cohesion of its operations. (FM 3-0)

disrupt

1. A tactical mission task in which a unit upsets an enemy's formation or tempo and causes the enemy force to attack prematurely or in a piecemeal fashion. 2. An obstacle effect that focuses fire planning and obstacle effort to cause the enemy to break up its formation and tempo, interrupt its timetable, commit breaching assets prematurely, and attack in a piecemeal effort. (FM 3-90)

dislocate

To employ forces to obtain significant positional advantage in one or more domains, rendering the enemy's dispositions less valuable, perhaps even irrelevant. (FM 3-0)

***diversion**

The act of drawing the attention and forces of an enemy from the point of the principal operation; an attack, alarm, or feint that diverts attention.

domain

A physically defined portion of an operational environment requiring a unique set of warfighting capabilities and skills. (FM 3-0)

effect

1. The physical or behavioral state of a system that results from an action, a set of actions, or another effect. 2. The result, outcome, or consequence of an action. 3. A change to a condition, behavior, or degree of freedom. (JP 3-0)

encirclement

Where one force loses its freedom of maneuver because an opposing force is able to isolate it by controlling all ground lines of communications and reinforcement. (FM 3-90)

engagement authority

An authority vested with a joint force commander that may be delegated to a subordinate commander, that permits an engagement decision. (JP 3-01)

execution

The act of putting a plan into action by applying combat power to accomplish the mission and adjusting operations based on changes in the situation. (ADP 5-0)

exploitation

A type of offensive operation following a successful attack to disorganize the enemy in depth. (FM 3-90)

***field artillery**

Equipment, supplies, ammunition, and personnel involved in the use of cannon, rocket, or surface-to-surface missile launchers.

final coordination line

A phase line close to the enemy position used to coordinate the lifting or shifting of supporting fires with the final deployment of maneuver elements. (ADP 3-90)

final protective fire

An immediately available, prearranged barrier of fire designed to impede enemy movement across defensive lines or areas. (JP 3-09.3)

fire direction center

That element of a command post, consisting of gunnery and communications personnel and equipment, by means of which the commander exercises fire direction and/or fire control. (JP 3-09.3)

***fire plan**

A tactical plan for using the weapons of a unit or formation so that their fire will be coordinated.

***fire support**

A rapid and continuous integration of surface-to-surface indirect fires, target acquisition, armed aircraft, and other lethal and nonlethal attack/delivery systems that converge against targets across all domains in support of the supported commander’s concept of operations.

fire support area

An appropriate maneuver area assigned to fire support ships by the naval force commander from which they can deliver gunfire support to an amphibious operation. (JP 3-09)

fire support coordination

The planning and executing of fire so targets are adequately covered by a suitable weapon or group of weapons. (JP 3-09)

fire support coordination line

A fire support coordination measure established by the land or amphibious force commander to support common objectives within an area of operation, beyond which all fires must be coordinated with affected commanders prior to engagement and, short of the line, all fires must be coordinated with the establishing commander prior to engagement. (JP 3-09)

fire support coordination measure

A measure employed by commanders to facilitate the rapid engagement of targets and simultaneously provide safeguards for friendly forces. (JP 3-0)

***fire support coordinator**

The senior field artillery commander for the theater, corps, division, or brigade combat team who is the supported commander's primary advisor to plan, coordinate, integrate fires, field artillery, and fire support in the execution of assigned tasks.

***fire support officer**

Is the operational to tactical level field artillery officer responsible for advising the supported commander or assisting the fire support coordinator on fires functions and fire support.

***fire support plan**

A plan that addresses each means of fire support available and describes how Army indirect fires, joint fire support, and target acquisition are integrated into operations to facilitate success.

***fire support planning**

The continuous process of analyzing, allocating, integrating, synchronizing, and scheduling fires to describe how the effects of fires facilitate supported force actions.

fire support station

An exact location at sea within a fire support area from which a fire support ship delivers fire. (JP 3-02)

fire support team

A field artillery team provided for each maneuver company/troop and selected units to plan and coordinate all supporting fires available to the unit, including mortars, field artillery, naval surface fire support, and close air support integration. (JP 3-09.3)

fires

The use of weapon systems or other actions to create specific lethal or nonlethal effects on a target. (JP 3-09)

flexibility

The employment of a versatile mix of capabilities, formations, and equipment for conducting operations. (ADP 3-0)

flexible deterrent option

A planning construct intended to facilitate early decision-making by developing a wide range of interrelated responses that begin with deterrent-oriented actions carefully tailored to create a desired effect. (JP 5-0)

flexible response

The capability of military forces for effective reaction to any enemy threat or attack with actions appropriate and adaptable to the circumstances existing. (JP 5-0)

***force field artillery headquarters**

A battalion size or higher unit designated by the supported commander who specifies its duration, duties, and responsibilities.

force projection

The ability to project the military instrument of national power from the United States or another theater, in response to requirements for military operations. (JP 3-0)

force tailoring

The process of determining the right mix of forces and the sequence of their deployment in support of a joint force commander. (ADP 3-0)

forcible entry

Seizing and holding of a military lodgment in the face of armed opposition or forcing access into a denied area to allow movement and maneuver to accomplish the mission. (JP 3-18)

foreign internal defense

Participation by civilian and military forces of a government or international organizations in any of the programs and activities undertaken by a host nation government to free and protect its society from subversion, lawlessness, insurgency, terrorism, and other threats to its security. (JP 3-22)

foreign security forces

Personnel organized and/or employed for security, whether they are civil or military, federal, state or provincial, or local. (JP 3-20)

forward air controller (airborne)

A specifically trained and qualified aviation officer, normally an airborne extension of the tactical air control party, who exercises control from the air of aircraft engaged in close air support of ground troops. (JP 3-09.3)

forward edge of the battle area

The foremost limits of a series of areas in which ground combat units are deployed to coordinate fire support, the positioning of forces, or the maneuver of units, excluding areas in which covering or screening forces are operating. (JP 3-09.3)

forward line of own troops

A line that indicates the most forward positions of friendly forces in any kind of military operation at a specific time. (FM 3-90)

forward observer

An individual operating with front line troops trained to adjust ground or naval gunfire and pass battlefield information. (JP 3-09)

fratricide

The unintentional killing or wounding of friendly or neutral personnel by friendly firepower. (ADP 3-37)

free-fire area

A specific region into which any weapon system may fire without additional coordination with the establishing headquarters. (JP 3-09)

function

The broad, general, and enduring role for which an organization is designed, equipped, and trained. (JP 1, Volume 1)

general support

Support which is given to the supported force as a whole and not to any particular subdivision thereof. (JP 3-09.3)

general support-reinforcing

A support relationship assigned to a unit to support the force as a whole and to reinforce another similar type unit. (FM 3-0)

graphic control measure

A symbol used on maps and displays to regulate forces and warfighting functions. (ADP 6-0)

***harassing fire**

Unpredictable and intermittent fire designated to disturb enemy troops not physically engaged in combat with the intent to curtail movement, readiness, ability to fight, and lower morale.

hasty crossing

The crossing of an inland water obstacle or other gap using the crossing means on hand or those readily available, and made without pausing for elaborate preparations. (ATP 3-90.4)

high-payoff target

A target whose loss to the enemy will significantly contribute to the success of the friendly course of action. (JP 3-60)

high-value target

A target the enemy commander requires for the successful completion of the mission. (JP 3-60)

hybrid threat

The diverse and dynamic combination of regular forces, irregular forces, terrorists forces, or criminal elements unified to achieve mutually benefitting effects. (ADP 3-0)

information activity

A collection of tasks linked by purpose to affect how humans and automated systems derive meaning from, use, and act upon, or are influenced by, information. (ADP 3-13)

***indirect fire**

Fire delivered at a target not visible to the firing unit.

interdiction

An action to divert, disrupt, delay, or destroy the enemy's military surface capability before it can be used effectively against friendly forces or otherwise be used to achieve enemy objectives. (JP 3-03)

***interdiction fires**

Employed to disrupt, delay, or destroy enemy forces.

isolate

To separate a force from its sources of support in order to reduce its effectiveness and increase its vulnerability to defeat. (ADP 3-0)

joint fires

Fires delivered during the employment of forces from two or more components in coordinated action to produce desired effects in support of a common objective. (JP 3-0)

joint fires observer

A certified and qualified Service member who requests, controls, and adjusts surface-to-surface fires; provides targeting information in support of close air support; and performs terminal guidance operations. (JP 3-09.3)

joint fire support

Joint fires that assist the joint force in creating effects and achieving objectives. (JP 3-0)

joint force commander

A general term applied to a combatant commander, subordinate unified commander, or joint task force commander. (JP 1, Volume 1)

joint force land component commander

The commander within a unified command, subordinate unified command, or joint task force responsible to the establishing commander for recommending the proper employment of assigned, attached, and made available for tasking land forces; planning and coordinating land operations; or accomplishing such operational missions as may be assigned. (JP 3-0)

joint targeting coordination board

A group formed by the joint force commander to accomplish broad targeting oversight functions that may include, but are not limited to, coordinating targeting information; providing targeting guidance, synchronization, and priorities; and approving the joint integrated prioritized target list. (JP 3-60)

joint terminal attack controller

A qualified (certified) Service member who, from a forward position, directs the action of combat aircraft engaged in close air support and other offensive air operations. (JP 3-09.3)

kill box

A three-dimensional permissive fire support coordination measure with an associated airspace coordinating measure used to facilitate the integration of fires. (JP 3-09)

large-scale combat operations

Extensive joint combat operations in terms of scope and size of forces committed, conducted as a campaign aimed at achieving operational and strategic objectives. (ADP 3-0)

law of war

That part of international law that regulates the conduct of armed hostilities. (JP 3-84)

lethality

The capability and capacity to destroy. (FM 3-0)

Level I threat

A small enemy force that can be defeated by those units normally operating in the echelon support area or by the perimeter defenses established by friendly bases and base clusters. (ATP 3-91)

Level II threat

An enemy force or activities that can be defeated by a base or base cluster's defensive capabilities when augmented by a response force. (ATP 3-91)

Level III threat

An enemy force or activities beyond the defensive capability of both the base and base cluster and any local reserve or response force. (ATP 3-91)

limit of advance

A phase line used to control forward progress of the attack. (ADP 3-90)

line of contact

A general trace delineating the locations where friendly and enemy forces are engaged. (ADP 3-90)

line of departure

In land warfare, a line designated to coordinate the departure of attack elements. (JP 3-31)

lodgment

A designated area in a hostile or potentially hostile operational area that, when seized and held, makes the continuous landing of troops and material possible and provides the maneuver space for subsequent operations. (JP 3-18)

main battle area

The area where the commander intends to deploy the bulk of their unit to defeat an attacking enemy. (FM 3-90)

main effort

A designated subordinate unit whose mission at a given point in time is most critical to overall mission success. (ADP 3-0)

maritime domain

The oceans, seas, bays, estuaries, islands, coastal areas, and the airspace above these, including the littorals. (JP 3-32)

massed fire

Fire from a number of weapons directed at a single point or small area. (JP 3-02)

mensuration

The process of measurement of a feature or location on the Earth to determine an absolute latitude, longitude, and elevation. (JP 3-60)

mobile defense

A type of defensive operation that concentrates on the destruction or defeat of the enemy through a decisive attack by a striking force. (ADP 3-90)

movement to contact

A type of offensive operation designed to establish or regain contact to develop the situation. (FM 3-90)

multidomain operations

The combined arms employment of joint and Army capabilities to create and exploit relative advantages to achieve objectives, defeat enemy forces, and consolidate gains on behalf of joint force commanders. (FM 3-0)

multinational operations

A collective term to describe military actions conducted by forces of two or more nations, usually undertaken within the structure of a coalition or alliance. (JP 3-16)

mutual support

That support which units render each other throughout joint operations, because of their assigned tasks, their position relative to each other and to the enemy, or their inherent capabilities. (JP 3-31)

named area of interest

The geospatial area or systems node or link against which information that will satisfy a specific information requirement can be collected, usually to capture indications of enemy and adversary courses of action. (JP 2-0)

naval surface fire support

Fire provided by Navy surface gun and missile systems in support of a unit or units. (JP 3-09.3)

***neutralization**

In the context of the computed effects of field artillery fires renders a target ineffective for a short period of time, producing at least 10-percent casualties or materiel damage.

***neutralization fire**

Fire delivered to render the target ineffective or unusable.

neutralize

A tactical mission task in which a unit renders the enemy incapable of interfering with an operation. (FM 3-90)

no-fire area

An area designated by the appropriate commander into which fires or their effects are prohibited. (JP 3-09.3)

nonlethal weapon

A weapon, device, or munition that is explicitly designed and primarily employed to incapacitate personnel or materiel immediately, while minimizing fatalities, permanent injury to personnel, and undesired damage to property in the target area or environment. (JP 3-09)

no-strike list

A list of objects or entities characterized as protected from the effects of military operations under international law and/or rules of engagement. (JP 3-60)

objective

(Army) A location used to orient operations, phase operations, facilitate changes of direction, and provide for unity of effort. (ADP 3-90)

***observed fire**

The point of projectile impact or burst that can be seen by an observer, and can be adjusted on the basis of observation.

offensive operation

An operation to defeat or destroy enemy forces and gain control of terrain, resources, and population centers. (ADP 3-0)

on-scene commander

An individual in the immediate vicinity of an isolating event who temporarily assumes command of the incident. (JP 3-50)

operational approach

A broad description of the mission, operational concepts, tasks, and actions required to accomplish the mission. (JP 5-0)

operational area

An overarching term encompassing more descriptive terms (such as area of responsibility and joint operations area) of locations for the conduct of military operations. (JP 3-0)

operational control

The authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. (JP 1 Volume 2)

operational environment

The aggregate of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander. (JP 3-0)

operations in depth

The simultaneous application of combat power throughout an area of operations. (ADP 3-90)

organic

Assigned to and forming an essential part of a military organization as listed in its table of organization for the Army, Air Force, and Marine Corps, and are assigned to the operating forces for the Navy. (JP 1 Volume 2)

passage of lines

An operation in which a force moves forward or rearward through another force's combat positions with the intention of moving into or out of contact with the enemy. (JP 3-18)

phase line

An easily identified feature in the operational area utilized for control and coordination of military operations. (JP 3-09)

position area for artillery

An area assigned to an artillery unit to deliver surface to surface fires. (FM 3-90)

precision-guided munition

A guided weapon intended to destroy a point target and minimize collateral damage. (JP 3-03)

***precision munition**

A munition that corrects for ballistic conditions using guidance and control up to the aimpoint or submunitions dispense with terminal accuracy less than the lethal radius of effects.

preparation

Those activities performed by units and Soldiers to improve their ability to execute an operation. (ADP 5-0)

***preparation fire**

A brief, intense bombardment on selected targets or a prolonged effort over time covering a large number of targets.

principle

A comprehensive and fundamental rule or an assumption of central importance that guides how an organization approaches and thinks about the conduct of operations. (ADP 1-01)

***priority of fires**

The commander's guidance to the staff, subordinate commanders, fires planners, and supporting agencies to employ fires in accordance with the relative importance of a unit's mission.

***priority target**

A target, based on either time or importance, on which the delivery of fires takes precedence over all the fires for the designated firing unit or element.

protection

Preservation of the effectiveness and survivability of mission-related military and nonmilitary personnel, equipment, facilities, information, and infrastructure deployed or located within or outside the boundaries of a given operational area. (JP 3-0)

pursuit

A type of offensive operation to catch or cut off a disorganized hostile force attempting to escape, with the aim of destroying it. (FM 3-90)

rear operations

Tactical actions behind major subordinate maneuver forces that facilitate movement, extend operational reach, and maintain desired tempo. (FM 3-0)

reconnaissance

A mission undertaken to obtain information about the activities and resources of an enemy or adversary, or to secure data concerning the meteorological, hydrographic, geographic, or other characteristics of a particular area, by visual observation or other detection methods. (JP 2-0)

reconnaissance objective

The most important result desired from that specific reconnaissance effort. (FM 3-90)

reinforcing

A support relationship requiring a force to support another supporting unit. (FM 3-0)

relative advantage

A location or condition, in any domain, relative to an adversary or enemy that provides an opportunity to progress towards or achieve an objective. (FM 3-0)

relief in place

An operation in which, by direction of higher authority, all or part of a unit is replaced in an area by the incoming unit and the responsibilities of the replaced elements for the mission and the assigned zone of operations are transferred to the incoming unit. (JP 3-07.3)

required supply rate

The amount of ammunition expressed in terms of rounds per weapon per day for ammunition items fired by weapons, in terms of other units of measure per day for bulk allotment, and other items estimated to be required to sustain operations of any designated force without restriction for a specified period. (ATP 3-09.23)

reserve

That portion of a body of troops that is withheld from action at the beginning of an engagement to be available for a decisive movement. (ADP 3-90)

restricted operations zone

Airspace reserved for specific activities in which the operations of one or more airspace users is restricted. (JP 3-52)

restricted target list

A list of restricted targets nominated by elements of the joint force and approved by the joint force commander or directed by higher authorities. (JP 3-60)

restrictive fire area

A location in which specific restrictions are imposed and into which fires that exceed those restrictions will not be delivered without coordination with the establishing headquarters. (JP 3-09)

restrictive fire line

A specific boundary established between converging, friendly surface forces that prohibits fires or their effects from crossing. (JP 3-09)

retirement

When a force out of contact moves away from the enemy. (ADP 3-90)

retrograde

A type of defensive operation that involves organized movement away from the enemy. (ADP 3-90)

risk management

The process to identify, assess, and mitigate risks and make decisions that balance risk cost with mission benefits. (JP 3-0)

role

The broad and enduring purpose for which the organization or branch is established. (ADP 1-01)

rules of engagement

Directives issued by competent military authority that delineate the circumstances and limitations under which United States forces will initiate and/or continue combat engagement with other forces encountered. (JP 3-84)

running estimate

The continuous assessment of the current situation used to determine if the current operation is proceeding according to the commander's intent and if planned future operations are supportable. (ADP 5-0)

scheme of fires

The detailed, logical sequence of targets and fire support events to find and engage targets to support the commander's objective. (JP 3-09)

sector

An operational area assigned to a unit in the defense that has rear and lateral boundaries and interlocking fires. (FM 3-0)

security area

That area occupied by a unit's security elements and includes the areas of influence of those security elements. (ADP 3-90)

security force assistance

The Department of Defense activities that support the development of the capacity and capability of foreign security forces and their supporting institutions. (JP 3-20)

setting the theater

The broad range of activities continuously conducted to establish conditions for the successful execution of operations in a theater. (FM 3-0)

shaping operation

An operation at any echelon that creates and preserves conditions for success of the decisive operation through effects on the enemy, other actors, and the terrain. (ADP 3-0)

space domain

The area above the altitude where atmospheric effects on airborne objects become negligible. (JP 3-14)

stability operation

An operation conducted outside the United States in coordination with other instruments of national power to establish or maintain a secure environment and provide essential governmental services, emergency infrastructure reconstruction, and humanitarian relief. (ADP 3-0)

strike

An attack to damage or destroy an objective or a capability. (JP 3-0)

strike coordination and reconnaissance

An air mission to detect targets and coordinate or perform attack or reconnaissance on those targets. (JP 3-03)

support area

The portion of the commander's area of operations that is designated to facilitate the positioning, employment, and protection of base sustainment assets required to sustain, enable, and control operations. (ADP 3-0)

support area operations

The tactical actions securing lines of communications, bases, and base clusters that enable an echelon's sustainment and command and control. (FM 3-0)

supporting effort

A designated subordinate unit with a mission that supports the success of the main effort. (ADP 3-0)

supporting range

The distance one unit may be geographically separated from a second unit yet remain within the maximum range of the second unit's weapons systems. (ADP 3-0)

suppress

A tactical mission task in which a unit temporarily degrades a force or weapon system from accomplishing its mission. (FM 3-90)

***suppression**

In the context of the computed effects of field artillery fires, renders a target ineffective for a short period of time producing suppression of enemy air defenses at least 3-percent casualties or materiel damage.

suppression of enemy air defenses

Activity that neutralizes, destroys, or temporarily degrades surface-based enemy air defenses by destructive and/or disruptive means. (JP 3-01)

***suppressive fire**

Fires on or about a weapons system to degrade its performance below the level needed to fulfill its mission objectives during the conduct of the fires.

sustainment

The provision of logistics, financial management, personnel services, and health service support necessary to maintain operations until successful mission completion. (ADP 4-0)

synchronization

The arrangement of military actions in time, space, and purpose to produce maximum relative combat power at a decisive place and time. (JP 2-0)

tactical combat force

A rapidly deployable, air-ground, mobile combat unit with appropriate combat support and combat service support assets assigned to, and capable of, defeating Level III threats including combined arms. (JP 3-10)

tactical control

The authority over forces that is limited to the detailed direction and control of movements or maneuvers within the operational area necessary to accomplish missions or tasks assigned. (JP 1, Volume 2)

tactical deception

A friendly activity that causes enemy commanders to take action or cause inaction detrimental to their objectives. (FM 3-90)

target

An entity or object that performs a function for the threat considered for possible engagement or other action. (JP 3-60)

target acquisition

The detection, identification, and location of a target in sufficient detail to permit the effective employment of capabilities that create the required effects. (JP 3-60)

target area of interest

The geographical area where high-value targets can be acquired and engaged by friendly forces. (JP 2-0)

target coordinate mensuration program

The combination of the following distinct separate critical components and their ability to operate as a whole to accurately produce mensurated target coordinates: use of one or more National Geospatial-Intelligence Agency (NGA)-validated mensuration tool, a mensuration process, a training syllabus, proficiency development and maintenance procedures, work center/work environment procedures, access to imagery, program governance documentation, and certified analysts and/or operators. (CJSI 3505.01E)

targeting

The process of selecting and prioritizing targets and matching the appropriate response to them, considering operational requirements and capabilities. (JP 3-0)

target location error

The difference between the coordinates generated for a target and the actual location of the target. (JP 3-09.3)

task-organizing

The act of designing a force, support staff, or sustainment package of specific size and composition to meet a unique task or mission. (ADP 3-0)

tempo

The relative speed and rhythm of military operations over time with respect to the enemy. (ADP 3-0)

terminal attack control

The authority to control the maneuver of and grant weapons release clearance to attacking aircraft. (JP 3-09.3)

terminal guidance operations

Actions using electronic, mechanical, voice, or visual communications that provide approaching aircraft and/or weapons additional information regarding a specific target location. (JP 3-09)

theater strategic level of warfare

The level of warfare at which combatant commanders synchronize with unified action partners and employ all elements of national power to fulfill policy aims within the assigned theater in support of the national strategy. (FM 3-0)

threat

Any combination of actors, entities, or forces that have the capability and intent to harm United States forces, United States national interests, or the homeland. (ADP 3-0)

trigger line

A phase line located on identifiable terrain used to initiate and mass fires into an engagement area at a predetermined range. (FM 3-90)

troop movement

The movement of Soldiers and units from one place to another by any available means. (FM 3-90)

unified action partners

Those military forces, governmental and nongovernmental organizations, and elements of the private sector with whom Army forces plan, coordinate, synchronize, and integrate during the conduct of operations. (ADP 3-0)

***unobserved fire**

Projectile points of impact or burst not observed.

***weapons locating radar**

A continuous target acquisition counterbattery system that detects in-flight projectiles, and communicates point of origin and point of impact locations.

weaponeering

The process of determining the specific means required to create a desired effect on a given target. (JP 3-60)

withdraw

To disengage from an enemy force and move in a direction away from the enemy. (ADP 3-90)

zone

An operational area assigned to a unit in the offense that only has rear and lateral boundaries. (FM 3-0)

zone of fire

An area into which a designated ground unit or fire support ship delivers, or is prepared to deliver, fire support. (JP 3-09)

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