



FM 3-09

FIELD ARTILLERY OPERATIONS AND FIRE SUPPORT

APRIL 2014

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Field Artillery Operations and Fire Support

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Preface

Field manual (FM) 3-09 provides tactics for field artillery operations and fire support in unified land operations. The principal audience for FM 3-09 is all commanders and staffs. Commanders and staffs of Army headquarters serving as joint task force or multinational headquarters should also refer to applicable joint or multinational doctrine concerning the range of military operations and relationships with joint or multinational forces. Trainers and educators throughout the Army will also use this manual.

Commanders, staffs, and subordinates ensure their decisions and actions comply with applicable United States (U.S.), international, and, in some cases, host-nation laws and regulations. Commanders at all levels ensure their Soldiers operate in accordance with the law of war and established rules of engagement. See FM 27-10.

FM 3-09 implements 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 marked with an asterisk (*) in the glossary and are boldfaced in the text. For other definitions shown in the text, the term is italicized and the number of the proponent publication follows the definition.

References to battalion and company organizations include units organized as squadrons and troops.

See Figure P-1 on page vi for an illustration of the FM 3-09 transition to Army training publications model.

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 United States Army Fires Center of Excellence. The preparing agency is the Directorate of Training and Doctrine, United States Army Fires Center of Excellence. Send comments and recommendations on a Department of the Army (DA) Form 2028 (<http://www.apd.army.mil/pub/eforms/pureedge/a2028.xfdl>) (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-inbox@mail.mil; or submit an electronic DA Form 2028.

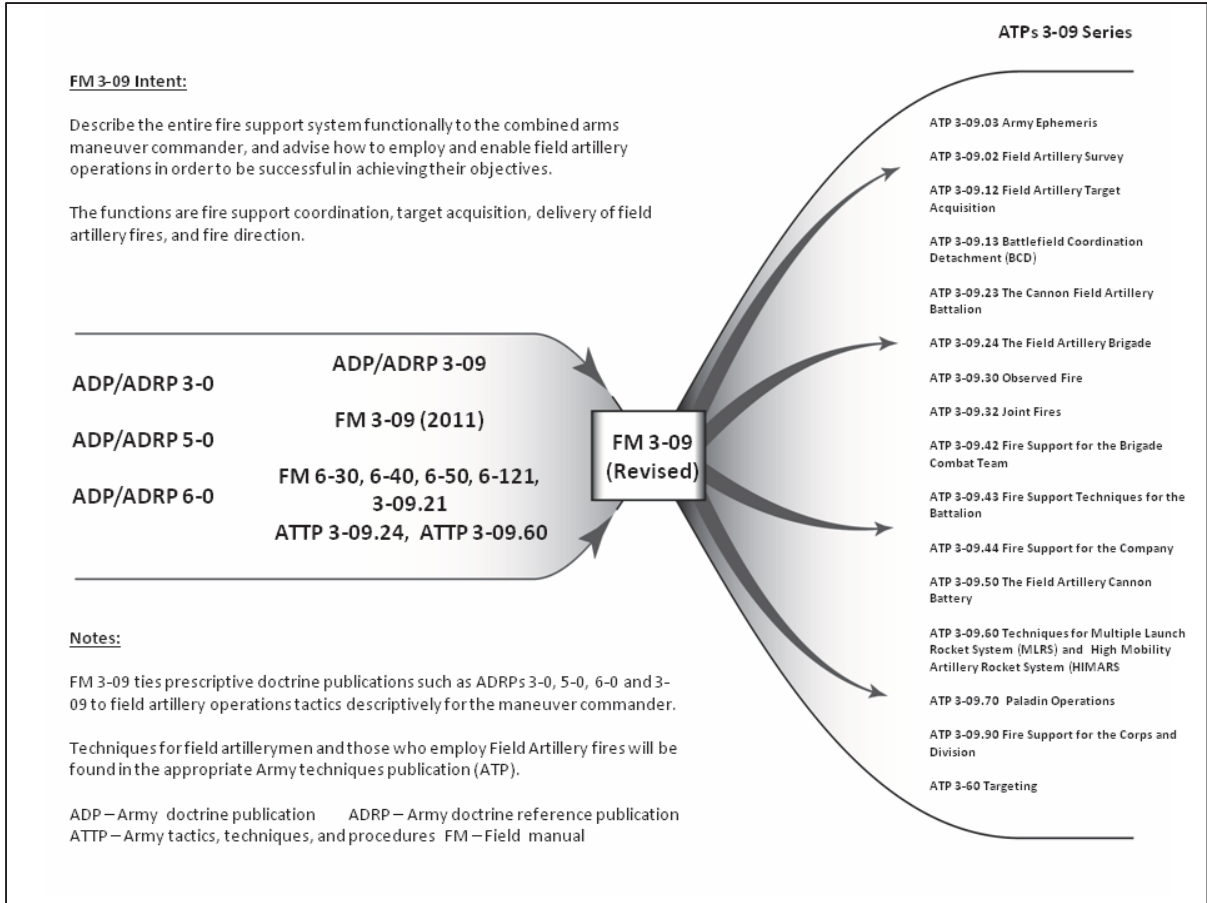


Figure P-1. FM 3-09 to ATP transition model

Introduction

Army forces are employed with other Services as part of a joint force. Consequently, this field manual (FM) is grounded in joint doctrine as found in joint publications (JP) 3-0, JP 3-09, and JP 3-60. FM 3-09 builds on the fires principles outlined in Army Doctrine Reference Publications (ADRP) 3-09 and nests with Army Doctrine Publications (ADPs)/ADRP 3-0, 5-0, and 6-0 in support of the maneuver commander.

This FM 3-09 is unlike any FM 6-20 or FM 3-09 you have seen before. It is revised to encompass the tactics for field artillery operations and fire support planning supporting maneuver force commanders in accomplishing their objectives. The tactics from several sources are described in the chapters of this FM. Field artillery techniques, to include fire support planning and execution, are found in current FMs until they are superseded by Army techniques publications (ATPs).

This publication is intended to provide guidance for brigade, division, and corps for the employment of field artillery, and for the planning, preparation, execution, and assessment of fire support. Higher echelon planners may use it to assist in establishing fire support requirements. The manual begins by describing the capabilities of the field artillery, how it is organized, and how field artillery supports the maneuver commander through the integration of all forms of fires. *Fires* are the use of weapon systems to create a specific lethal or nonlethal effect on a target (JP 3-09). This publication also provides a comprehensive discussion of fire support. This includes topics such as the role of fire support in Unified Land Operations, fire support coordination organizations and key personnel, target acquisition for fire support, and fire support attack resources. This publication also provides information on fire support in the operations process: fire support planning, preparation, execution, and assessment. This manual is a must read for combined arms leaders especially brigade and battalion commanders and staff, because it describes both field artillery and fire support as key components of successful maneuver operations.

Tactics is the employment and ordered arrangement of forces in relation to each other (Department of Defense (DOD) Dictionary of Military and Associated Terms, 15 October 2013). Tactics are concerned with the approach to combat, placement of troops, deployment and employment of weapons, and execution of movements. For further discussion see ADRP 3-90 and FMs 3-90-1/2.

There have been four major changes in the organization and contents of this publication. First, this publication is much broader in scope encompassing field artillery operations and fire support. Chapter 1, *Field Artillery Operations*, is new. Second, fires function and its relationship to other warfighting functions and fire support to the principles of joint operations, previously found in the context-setting Chapter 1 of this publication's predecessor, are now found in ADRP 3-09, *Fires*. Third, the content of Chapters 2 and 3 have been updated and titled as *Fire Support* and *Fire Support and the Operations Process*, respectively. Fourth, this publication has no appendices. The previous edition's Appendix A, *Maneuver Control and Fire Support Coordination Measures* has become Chapter 4. The discussion on command and support relationships, found in Appendix B of the previous edition, is now a section in Chapter 1.

This manual describes field artillery and fire support as key components of successful maneuver operations. It begins by describing the capabilities of the Field Artillery, how it is organized, and how field artillery supports the maneuver commander through the integration of all forms of fires. The discussion provides a comprehensive discussion of fire support coordination; target acquisition; fire support attack resources, and fire support planning, preparation, execution and assessment—fire support in the operations process.

FM 3-09 becomes the proponent manual for, or adds, modifies, or rescinds terms listed in introductory tables 1 through 3 on page viii.

Table I-1. Change in proponent manual

<i>Term</i>	<i>Remarks</i>
call for fire	Change proponent manual from FM 6-30 to FM 3-09
fire support planning	Change proponent manual from FM 6-20-30 to FM 3-09

Table I-2. New or revised army terms

<i>Term</i>	<i>Remarks</i>
artillery target intelligence zone	Modified the definition and changed the proponent manual from FM 3-09.12 to FM 3-09.
call for fire zone	Modified the definition and changed proponent manual from FM 3-09.12 to FM 3-09.
sensor zone	Modified the definition and changed proponent manual from FM 3-09.12 to FM 3-09.
clearance of fires	Modified the definition.
common grid	Modified the definition and changed proponent manual from FM 6-50 to FM 3-09.
common sensor boundary	Modified the definition and changed proponent manual from FM 3-09.12 to FM 3-09.
counterpreparation fire	New term and definition; formerly found in JP 1-02.
delay	New term and definition, formerly found in JP1-02
destruction	New term and definition.
field artillery brigade	New organization name, replaces fires brigade.
fire plan	New term and definition; formerly found in JP 1-02.
fire support plan	New term and definition.
high-payoff target list	New term and definition; formerly found in JP 1-02.
neutralization	New term and definition; formerly found in JP 1-02.
neutralization fire	New term and definition; formerly found in JP 1-02.
precision munition	New term and definition.
preparation fire	New term and definition; formerly found in JP 1-02.
priority target	Modified the definition and changed the proponent manual from FM 6-20-40 to FM 3-09.
scheme of fires	Modified the definition.
suppression	New term and definition; formerly found in JP 1-02.
suppressive fire	New term and definition; formerly found in JP 1-02.
target acquisition	Adopts the joint definition.

Table I-3. Rescinded army terms

<i>Term</i>	<i>Remarks</i>
desired effects	No longer formally defined as an Army unique term. Adopts common English language dictionary definition.
fires brigade	Renamed to field artillery brigade.

Chapter 1

Field Artillery Operations

This chapter provides a brief overview of the field artillery and its role and employment in Unified Land Operations. Field artillery operations are actually two distinct functions; field artillery, and fire support (ADRP 3-09). Section I begins the chapter by describing the mission and the role of the field artillery. Section II describes field artillery capabilities supporting tactical mission tasks. Sections III and IV describe field artillery organization for combat, command and support relationships, and field artillery organization. Section V concludes the chapter with a discussion of key considerations for field artillery employment.

SECTION I – THE MISSION AND THE ROLE OF FIELD ARTILLERY

The Mission of the Field Artillery

The mission of the Field Artillery is to destroy, defeat, or disrupt the enemy with integrated fires to enable maneuver commanders to dominate in unified land operations (ADRP 3-09).

1-1. Field artillery contributes to unified land operations by massing fires in space and time on single or multiple targets with precision, near-precision, and area fire capabilities. Field artillery can rapidly shift fires throughout the area of operations in support of the scheme of maneuver, and to counter unforeseen enemy reaction to achieve the maneuver commander's desired effects.

1-2. *Field artillery* consists of the equipment, supplies, ammunition, and personnel involved in the use of indirect fire cannon, rocket, or surface-to-surface missile launchers (ADRP 3-09). Field artillery cannons are classified according to caliber as:

- Light — 120-mm and less.
- Medium — 121 to 160-mm.
- Heavy — 161 to 210-mm.
- Very heavy — greater than 210-mm (JP 3-09).

1-3. Field artillery is the maneuver commander's principal means for providing continuous and responsive indirect fires in support of operations. *Indirect fire* is 1. Fire delivered at a target not visible to the firing unit. 2. Fire delivered to a target that is not itself used as a point of aim for the weapons or the director (FM 6-40).

1-4. Organic, assigned, attached, or placed under the operational control (OPCON) field artillery delivery assets include cannon, rocket, and missile systems. Field artillery provides continuously available fires under all weather conditions and in all types of terrain. Field artillery can shift and mass fires rapidly without having to displace.

1-5. Field artillery limitations include a firing signature that makes firing units vulnerable to detection by enemy target acquisition assets, limited self-defense capability against ground and air attacks, and limited ability to engage moving targets.

1-6. Field artillerymen, from company FIST teams and battalion through corps level fires cells, integrate all means of fire support — field artillery, mortars, electronic attack, and joint fires. Field artillery personnel integrate and synchronize fire support within the commander's scheme of maneuver. See chapter 2.

1-7. Field artillery supports ground and air operations by attacking the enemy force throughout the depth of its formations and provides specific target engagement such as suppression of enemy air defenses. Field artillery 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). Field artillery's ability to quickly attack enemy forces on key terrain, flanks, and in dead space, enables the maneuver commander to economize and concentrate to exploit advantages that arise.

1-8. Target acquisition is key to field artillery effectively providing timely and accurate fires. *Target acquisition* is the detection, identification, and location of a target in sufficient detail to permit the effective employment of weapons (JP 3-60). Field artillery target acquisition is accomplished by forward observers and weapons locating radars. In addition, maneuver commanders must integrate maneuver, unmanned aircraft systems, and other collection assets into the information collection plan.

THE EFFECTS OF FIRES

1-9. Successful maneuver requires close coordination and effective employment of available fires. Maneuver and field artillery fires functions are inseparable and complementary dynamics of unified land operations. These functions can create conditions that enhance the effective application of the other throughout the supported commander's area of operations. Depending on the tactical situation as defined by the mission variables of mission, enemy, terrain and weather, troops and support available, time available and civil considerations (METT-TC), the maneuver commander can employ supporting field artillery fires to deceive, defeat, delay, destroy, disrupt, divert, neutralize, and suppress enemy forces, combat functions and facilities. Fire support personnel and engineers work together to combine the effects of indirect fires and engineer obstacles to disrupt, turn, block or fix the enemy's ability to counter friendly actions thereby setting the stage for successful maneuver operations. Maneuver can also force enemy units into kill zones or concentrated formations where fires can achieve maximum effectiveness. Combining maneuver with fire support makes destroying larger enemy forces feasible and enhances the protection of friendly forces.

DECEIVE

1-10. *Military deception* is 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 (JP 3-13.4). Field artillery supports military deception by misleading the enemy decision makers' understanding. This greatly improves the chances the enemy will take risks that can expose him to the effects of friendly fires and maneuver. Field artillery fires contribute to the overall deception plan. 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.

DEFEAT

1-11. *Defeat* is a tactical mission task that occurs when an enemy force has temporarily or permanently lost the physical means or the will to fight. The defeated force's commander is unwilling or unable to pursue that individual's adopted course of action, thereby yielding to the friendly commander's will and can no longer interfere to a significant degree with the actions of friendly forces. Defeat can result from the use of force or the threat of its use (FM 3-90-1). 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 field artillery 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.

DELAY

1-12. **To delay is to slow the time of arrival of enemy forces or capabilities or alter the ability of the enemy or adversary to project forces or capabilities.** 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. Field artillery delivered minefields to delay the movement of an enemy may be an effective use of field artillery fires.

DESTROY

1-13. *Destroy* is a tactical mission task that physically renders an enemy force combat-ineffective until it is reconstituted. 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 (FM 3-90-1). Destruction results from the use of force to cause massive damage to equipment and material and significant personnel casualties. Field artillery fires are a major destructive element of combat power, and play a significant role in a unit's ability to eliminate the enemy's combat systems and affect his will to fight. ***Destruction 1. 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. 2. A type of adjustment for a given target.***

Note: Field artillery systems use the computed effects of field artillery fires as their baseline for tactical and technical fire direction computation purposes. Commanders may change the desired computed level of effects for the computations. Any change will have a corresponding impact on the number of rounds fired.

1-14. *Destruction fire* is 1. An element of the method of engagement portion of the call for fire requesting destruction fire. 2. Fire delivered for the sole purpose of destroying materiel (FM 6-40).

1-15. The amount of damage needed to render a unit combat-ineffective depends on the type of unit, leadership, training, discipline, and morale. Precision-guided munitions and, where appropriate, dual purpose improved conventional munitions provide the ability to effectively destroy armored, dug-in, or point targets. A *point target* is a target that is less than or equal to 200 meters in width and length. (ATP 3-09.30). The use of precision-guided munitions also limits collateral damage and permits effective engagement of point targets. For example, using precision munitions to destroy a high-payoff target during an attack on an urban objective (see chapter 2). *Collateral damage* is the 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). Such damage is not unlawful so long as it is not excessive in light of the overall military advantage anticipated from the attack.

DISRUPT

1-16. *Disrupt* is a tactical mission task in which a commander integrates direct and indirect fires, terrain, and obstacles to upset an enemy's formation or tempo, interrupt the enemy's timetable, or cause enemy forces to commit prematurely or attack in a piecemeal fashion (FM 3-90-1) 2. An obstacle effect that focuses fire planning and obstacle effort to cause the enemy force to break up its formation and tempo, interrupt its timetable, commit breaching assets prematurely, and attack in a piecemeal effort. (FM 90-7). This affects the enemy's ability to effectively coordinate actions, sustain and exploit success, and increases vulnerability to friendly maneuver and fires. For example, massed artillery fires on an enemy march formation disrupt his ability to deploy to an attack formation.

DIVERT

1-17. A *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 (JP 3-03). 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 field artillery employment in support of a commander's diversion is to use high explosive fires to encourage an enemy to adopt a different route.

NEUTRALIZE

1-18. *Neutralize* is a tactical mission task that results in rendering enemy personnel or materiel incapable of interfering with a particular operation (FM 3-90-1). **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.** The commander specifies the enemy force or materiel to neutralize and the duration, which is time or event driven. The neutralized target may become effective again when casualties are replaced, damage is repaired or the effect resulting in the neutralization is lifted. The assets required to neutralize a target vary according to the type and size of the target, and the weapon and munitions combination used. **Neutralization fire is fire delivered to render the target ineffective or unusable.** For example, firing a battery 1 on an enemy platoon in the open may result in 10-percent casualties.

SUPPRESS

1-19. *Suppress* is a tactical mission task that results in temporary degradation of the performance of a force or weapons system below the level needed to accomplish the mission (FM 3-90-1). Suppression occurs when a commander employs direct or indirect fires, such as artillery, electronic attack, or smoke on enemy personnel, weapons, and equipment to prevent or degrade enemy fires, sensors, and visual observation of friendly forces. **Suppressive fire is 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.** Unlike the neutralization task the original target regains its effectiveness without needing to reconstitute once the effects of the systems involved in the suppression effort lift or shift to another target. Suppression usually lasts only as long as the fires or their effects continue. **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 material damage.**

SECTION II – FIELD ARTILLERY CAPABILITIES SUPPORTING OFFENSIVE, DEFENSIVE, AND STABILITY TASKS

FIELD ARTILLERY IN SUPPORT OF OFFENSIVE TASKS

GENERAL CONSIDERATIONS

1-20. An *offensive task* is a task conducted to defeat and destroy enemy forces and seize terrain, resources, and population centers (ADRP 3-0). During the offensive, the fire support coordinator (FSCOORD), chief of fires, fire support officer, and fires cell integrate close-supporting field artillery, mortar fires, counterfire, strike, electronic attack; naval surface fire support; and the fires of close air support and air interdiction aircraft into the operations of the supported command. 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 joint air attack team and counterair operations within the supported command's area of operations —

- *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).
- A joint air attack team is typically supported by field artillery and other fire support assets. See chapter 2 for more information on joint air attack teams.
- *Offensive counterair* is offensive operations to destroy, disrupt, or neutralize enemy aircraft, missiles, launch platforms, and their supporting structures and systems both before and after launch, and as close to their source as possible (JP 3-01).

1-21. The field artillery commander emphasizes the development of clear, concise, and rapidly integrated fire support plans (see chapter 3). Planning ensures responsive fires are available when needed. **A fire plan is a tactical plan for using the weapons of a unit or formation so that their fire will be coordinated.** A fire plan typically includes the plan for direct fires and the fire support plan.

1-22. The field artillery commander positions field artillery assets forward within the attacking formation to facilitate continuous and effective fire support. In order to be within supporting range of maneuver forces, the field artillery commander must fully understand the supported commander's concept of the operation.

Successful massing of Army indirect and joint fires requires that the fire support planners (FSCoord, chief of fires, fire support officer, and fires cell) be proficient in the tracking of friendly indirect fire asset positions and movements. Additionally the field artillery commander must be aware of the enemy situation and likely reactions to friendly actions.

1-23. The fire support planners plan fires on known and likely enemy positions. 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). High-payoff targets are those high-value targets that must be acquired and successfully attacked for the success of the friendly commander's mission. A *high-value target* is a target the enemy commander requires for the successful completion of the mission (JP 3-60). The loss of high-value targets would be expected to seriously degrade important enemy functions throughout the friendly commander's area of interest. **A high-payoff target list is a prioritized list of high-payoff targets by phase of the operation.**

1-24. As the attacking force moves forward, preparation fire and counterfire destroy, neutralize, or suppress enemy positions and weapons systems. **Preparation fire is normally a high volume of fires delivered over a short period of time to maximize surprise and shock effect. Preparation fire can include electronic attack and should be synchronized with other electronic warfare activities.** *Electronic attack* is a division of electronic warfare involving the use of electromagnetic energy, directed energy, or anti-radiation weapons to attack personnel, facilities, or equipment with the intent of degrading, neutralizing, or destroying enemy combat capability and is considered a form of fires (JP 3-13.1).

1-25. In planning fires the maneuver commander and fire support planners must weigh the probable effects of preparation fire against the achievement of surprise and the creation of obstacles capable of impeding friendly forces movements. Preparation fire can continue while ground maneuver elements are moving. If the commander chooses to make the initial assault without preparation fire to achieve tactical surprise, fires are planned to support each subordinate unit's maneuver throughout the operation.

1-26. Disrupting one or more parts of the enemy's team weakens the entire enemy force. For example, disrupting the enemy's fire support system allows friendly forces to maneuver and mass against the enemy with a reduction in the effects of the enemy's indirect-fire weapons on friendly forces. Field artillery disrupts an enemy indirect fire target set's capability through the attack of enemy forward observers, fire direction centers, command posts, cannon and rocket artillery firing positions and ammunition stocks. The successful attack of each target set requires a different mix of resources to locate and engage individual targets within the set. For example, as the friendly force moves through the enemy's security area and closes into the enemy's main defensive positions, fires can be concentrated on neutralizing enemy command and fire control nodes, target acquisition, and intelligence-gathering systems. By doing so, the maneuver commander may prevent the enemy from determining the location and objective of the main attack.

OFFENSIVE TASK CONSIDERATIONS FOR FIELD ARTILLERY UNITS

1-27. Field artillery fires during offensive tasks facilitate maneuver by achieving desired effects on the enemy forces and positions. Considerations for field artillery units during the offense include—

- Continuously adjusting field artillery plans and responsibilities to meet the maneuver commander's intent.
- Establishing and maintaining effective communications with the supported unit.
- Identifying and planning the engagement of high-payoff targets with the appropriate mix of lethal and nonlethal effects.
- With the supported command's assistant chief of staff, operations (G-3)/battalion or brigade operations staff officer (S-3) and assistant chief of staff, intelligence (G-2)/battalion or brigade intelligence staff officer (S-2) identifying and coordinating the attack of high-payoff targets; integrating information collection sources to identify potential targets and integrating such targets into fire plans.
- Identifying and tasking primary and alternate observers and sensors to support the attack of targets; designating target/observer sensor-to-shooter communication links, and integrating radar placement and zones into fire planning.

- Coordinating target acquisition assets to locate targets, potentially in a 6400-mil/360-degree area of operations.
- Developing an observation plan.
- Ensuring accurate target locations by using the most accurate target acquisition asset available.
- Using permissive fire support coordination measures to facilitate the attack of targets.
- Integrating electronic attack into the attack guidance matrix.
- Positioning of firing units well forward to better exploit weapons ranges and preclude untimely displacement.
- Weighting the decisive operation with a preponderance of fires.
- Massing fires to gain maximum efficiency and effectiveness.
- Providing fires in support of close combat and fires in depth to support maneuver operations and to destroy and disrupt the enemy.
- Allocating responsive fire support for leading elements.
- Ensuring forward observers accompany leading elements of the assault force.
- Coordinating with available aviation assets for target identification and attack.
- Conducting counterfire.
- Interdicting and disrupting enemy sustainment efforts and troop movements.
- Planning fires to obscure enemy observation or screen friendly movements.
- Providing field artillery illumination to assist friendly force night operations, to mark locations or targets, to provide friendly direction orientation, or to degrade enemy night vision equipment.
- Planning targets to protect assaulting troops by destroying, neutralizing, or suppressing enemy direct fire weapons.
- Providing preparation fire, when required, to weaken the enemy's resistance; shifting fires just as the maneuver force moves toward the objective.
- Developing signals for lifting and shifting fires on the objective, primarily by networked communications and by visual signals as a backup means.
- Recommending fire support coordination measures, accounting for danger close and the echelonment of fires, to enable maneuver forces to get as close as possible to the objective before lifting fires.
- Planning fires against enemy reinforcements during the attack and to support friendly consolidations once the objective has been seized.
- Disrupting enemy counterattacks.
- Providing rapid delivery of field artillery scatterable mines minefields to support maneuver operations.
- Coordinating for meteorological and survey data.
- Providing precision, near-precision, and area fires.
- Coordinating air support to destroy targets on the objective and then shifting to reinforcing enemy units, artillery assets, and command nodes.
- Proactively suppressing enemy air defenses.
- Positioning prepackaged ammunition stocks capable of rapid delivery.
- Allocating fire support for the neutralization of bypassed enemy combat forces.

FIELD ARTILLERY BRIGADE IN SUPPORT OF OFFENSIVE TASKS

General Considerations

1-28. Field artillery brigade (FAB) fires in support of offensive tasks are responsive, timely and assist the supported commander to achieve and sustain the initiative. Supporting fires must always be able to range the targets of advancing maneuver formations. General considerations for the FAB during the offensive include—

- Serving as the force field artillery headquarters, if designated by the maneuver commander.

- Providing fires in support of shaping operations.
- Establishing command or support relationships to provide responsive fires.
- Supporting brigade combat teams (BCTs) during the attack by providing close supporting fires.
- Providing radar support to BCT organic field artillery battalions unable to maintain radar coverage.
- Shifting fires to targets away from objectives when necessary to interdict enemy reinforcements.
- Structuring communications networks that ensure continuous responsive fire support to maneuvering forces.
- Providing continuous survey and meteorological coverage to the subordinate battalions and BCTs if required.

Movement to Contact

1-29. *Movement to contact* is an offensive task that is designed to develop the situation or regain contact (ADRP 3-90). It is conducted when the information related to enemy positions, situation and deployment is not clear. In a movement to contact the maneuver commander has lost contact with the enemy main body and attempts to reestablish it, using all available sources of intelligence to develop the situation. He may know the location of enemy reserve and follow-on forces. Since a movement to contact involves an unclear or uncertain situation, the FAB maintains centralized control over organic and assigned assets, enabling a coordinated response to a rapidly developing situation. See Figure 1-1 on page 1-8 for an example organization for combat for a movement to contact.

1-30. Centralized control also gives the FAB the flexibility to provide effective support to BCTs—allowing the organic field artillery battalions to continue movement with their BCTs in anticipation of contact with the enemy. Positioning of FAB units must facilitate responsive execution of fire support tasks. Additionally the FAB may provide the necessary meteorological, survey, and radar coverage required to support the operation; consequently the FAB may position units in the BCTs' areas of operations. The positioning and movement of FAB assets must be coordinated with the maneuver BCT S-3s. Given the uncertain enemy situation the assets should move as far forward as practical to allow maximum flexibility once the enemy contact is made. Specific FAB considerations include—

- Providing responsive cannon, rocket, and missile fires to the BCTs to enable their organic field artillery battalions to continue to move during the movement to contact.
- Integrating FAB radar, meteorological, and counterfire coverage in support of the BCTs to allow BCT organic field artillery battalions to continue to maneuver with the BCT; coordinating handover of support to BCTs once the situation is developed.
- Integrating FAB radar coverage in support of the BCTs to allow the radars in the BCT organic field artillery battalions to continue to maneuver with the BCT.
- Integrating field artillery, joint fires, and radar target acquisition to assist in securing the unprotected flanks of vulnerable division, corps, or other FAB supported command assets during advances.
- Transitioning FAB cannon field artillery battalions from general support (GS) or general support-reinforcing (GSR) to reinforcing (R) once the situation is developed and the BCTs begin to conduct follow-on offensive or defensive tasks.
- Coordinating positioning of multiple launch rocket system (MLRS)/high mobility artillery rocket system (HIMARS) battalions well forward to maximize range.
- Positioning field artillery to best support air and ground operations – deconflicting with airspace coordinating measures.
- Positioning the FAB command post forward.
- Planning for 6400-mil/360-degree fires and support to units in the division and/or corps support area.
- Attacking bridges and other mobility corridors with FAB strike and joint fires to limit enemy mobility options and facilitate shaping the meeting engagement for the BCTs.
- Executing strikes for the FAB-supported command's shaping operations against high-payoff targets.
- Using unmanned aircraft systems to conduct reconnaissance of routes and target areas of interest.
- Requesting joint fires to be employed rapidly against identified fires assets.

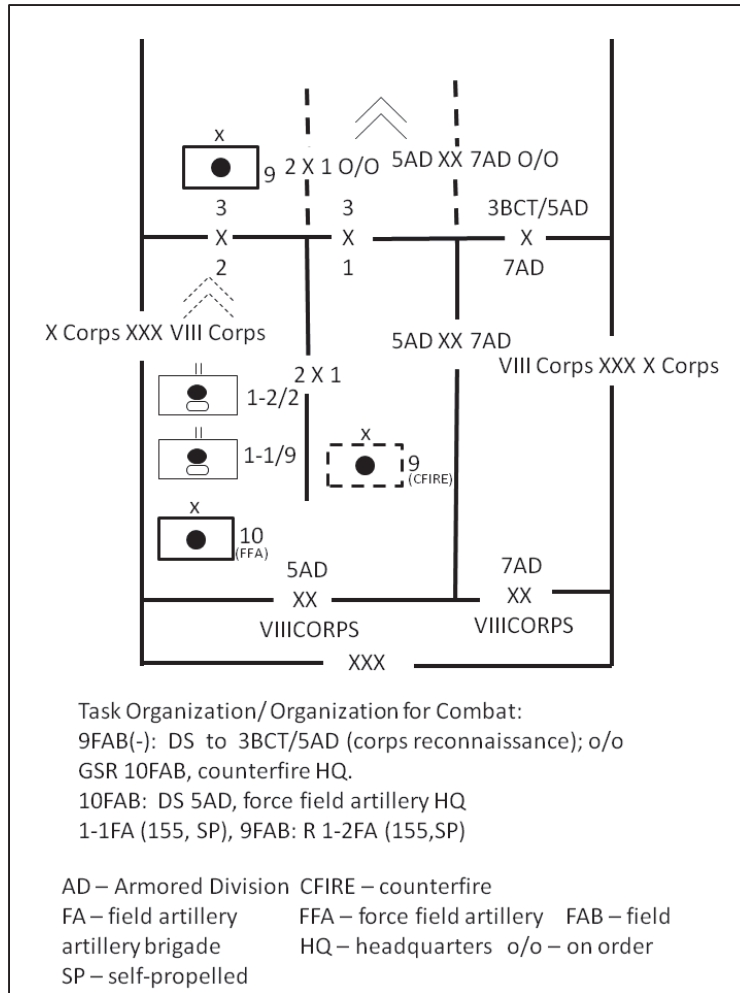


Figure 1-1. Organization for combat – movement to contact example

Attack

1-31. *Attack* is an offensive task that destroys or defeats enemy forces, seizes and secures terrain, or both (ADRP 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 shaping 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 (FM 3-90-1). During the attack, less centralized control of fires is used because the FAB-supported maneuver force will have the initiative. Allocation of field artillery fires for the FAB-supported command’s main effort helps control the tempo of offensive tasks. The *main effort* is a designated subordinate unit whose mission at a given point in time is most critical to overall mission success (ADRP 3-0). The main effort must be weighted by providing adequate field artillery fires. See Figure 1-2 on page 1-9 for an example organization for combat for a division attack.

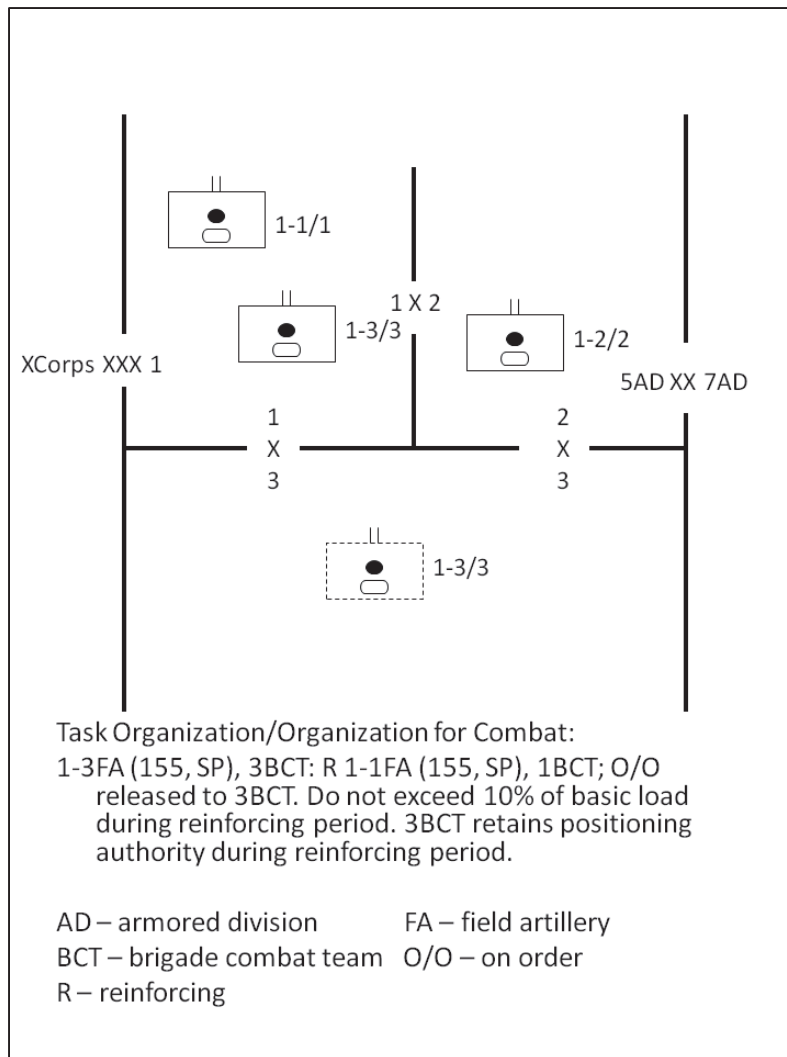


Figure 1-2. Organization for combat – division attack example

1-32. Timely displacements of field artillery units are essential for successful offensive tasks. Field artillery units move well forward prior to an attack, displacing by echelon to provide continuous fires to the supported force. If the FAB must maneuver in the area of operations of a BCT, the brigade S-3s must coordinate positioning. Units positioned by the FAB may be in danger of being left behind unless repositioning is frequent and synchronized to support the forward progress of BCTs. Displacements should maximize continuous delivery of fires and be completed as rapidly as possible. Specific FAB considerations to support an attack include—

- Attacking, in coordination with joint fires, enemy operational reserves and second echelon forces outside the BCT area of operations to isolate first echelon forces.
- Supporting combat aviation brigade attack operations by suppressing enemy air defense systems.
- Conducting FAB strikes to slow and disorganize repositioning and withdrawing enemy forces.
- Destroying enemy command and control facilities.
- Providing counterfire.
- Providing target acquisition.
- Providing fires for deception operations.
- Executing FAB strikes and supporting joint strikes in support of division, corps, joint task force, or other supported command shaping operations.

- Positioning field artillery units to best support ground and air operations – deconflicting airspace coordinating measures.
- Planning for 6400-mil/360-degree operations and to provide fires to division or corps sustainment areas.
- Considering positioning individual MLRS/HIMARS batteries to support battlefield surveillance brigade targeting for shaping operations.
- Providing radar/meteorological coverage for the BCTs to allow the uninterrupted movement of their assets forward during the attack.
- Providing preparation fires to shape the close fight.
- Providing massed fires to the BCTs to support the penetration of enemy positions.
- Responding to BCT requests for support against uncommitted and repositioning enemy forces in the BCT's area of operations.
- Recommending support relationships for a BCT's field artillery battalion when the BCT is held in reserve.
- Considering the requirements to support follow-on offensive tasks (pursuit/exploitation); ensuring routes have sufficient mobility to move rapidly to support the division, corps, joint task force, or other FAB supported command.
- Positioning FAB weapon locating radars to fill gaps in the BCTs' radar coverage.
- Integrating air support into counterfire operations.
- Establishing communications channels between surveillance, reconnaissance and target acquisition assets and FAB field artillery battalions for immediate execution of counterfire missions.

Exploitation and Pursuit

1-33. *Exploitation* is an offensive task that usually follows the conduct of a successful attack and is designed to disorganize the enemy in depth (ADRP 3-90). Exploitation is the primary means of translating tactical success into operational advantage. It exacerbates enemy force disorganization, confusion and disruption of the command and control 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 maneuver 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 when the opportunity to exploit success occurs. Exploitation demands a force with sufficient mobility to maintain pressure on the fleeing enemy force.

1-34. Field artillery units reposition to where they can support a renewed attack. Aviation assets can provide support while artillery systems reposition. The commander uses air reconnaissance to augment ground reconnaissance and can employ aerial sensors in advance of ground maneuver reconnaissance. This allows aerial observation of named and targeted areas of interest that facilitate the unit's movement and cue the attack of targets. A commander may need to request additional resources to include reconnaissance, surveillance, and target acquisition assets to help identify targets for attack. Once targets are identified, the commander can request long-range rocket and missile fires, precision-guided munitions, attack helicopters, and fixed wing aircraft.

1-35. *Pursuit* is an offensive task designed to catch or cut of a hostile force attempting to escape, with the aim of destroying it (ADRP 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 as a whole.

1-36. 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 3-90-1).

1-37. There is generally little time to establish and affect new task organizations or support relationships between an attack and exploitation and/or pursuit. These operations transition very quickly from one to another.

1-38. During exploitation and pursuit it is important to have decentralized execution authority and support relationships. For example a FAB MLRS/HIMARS battalion providing long-range rocket and missile fires to the direct pressure force may have a GSR support relationship, and FAB cannon field artillery battalions may have a reinforcing (R) support relationship to BCT field artillery battalions.

1-39. Specific FAB considerations for supporting a maneuver force during exploitation and pursuit include—

- Positioning forward to support the division, corps, joint task force, or other FAB supported command.
- Massing fires to support the exploitation and pursuit.
- Executing radar target acquisition, conducting counterfire, and strike operations in support of division, corps, joint task force.
- Conducting FAB strikes on repositioning and withdrawing enemy forces.
- Supporting combat aviation brigade attack operations by suppressing enemy air defense systems.
- Destruction of enemy command and control facilities
- Using available aviation assets and joint fires to facilitate continuous fires on fleeing enemy forces while FAB MLRS/HIMARS units are repositioning or moving with the exploiting/pursuing force.
- Positioning the majority (two-thirds or more) of the FAB assets with the direct pressure force.
- Placing field artillery assets with the pursuing/exploiting force.
- Planning 6400-mil/360-degree fires to support the flanks and rear of pursuing/exploiting forces.
- Providing massed FAB fires to the BCT to destroy enemy hasty defenses and allow the BCT to continue the pursuit of the enemy main body.
- Providing counterfire for the BCT to allow their organic and reinforcing field artillery battalions to mass fires on fleeing maneuver forces.
- Positioning FAB radars as far forward as possible to maximize range and provide maximum flexibility as the division, corps, joint task force, or other FAB supported command rapidly moves to destroy enemy formations.

MLRS/HIMARS BATTALION IN SUPPORT OF OFFENSIVE TASKS

General Considerations

1-40. Armed with a combination of long-range delivery systems, precision munitions, and a control system, the MLRS/HIMARS battalion provides the commander with the capability to interdict selected high-payoff targets or entire target sets at depths previously accessible only to aviation assets or special operations forces. Long-range MLRS/HIMARS battalion rocket and missile fires are employed to enable the supported commander to shape operations by taking advantage of the reach afforded by these systems to engage the enemy well before he is in contact with the main force. This long-range capability coupled with a synchronized array of fires assets including mortars, electronic attack, unmanned aircraft, and rotary- and fixed-wing manned aircraft, enable the ground force commander to set the condition for decisive operations. An MLRS/HIMARS unit functions to provide commanders conducting offensive operations the ability to greatly expand the depth of battle.

Movement to Contact

1-41. The MLRS/HIMARS can provide support during both movement to contact and attack operations. With its long range and tactical mobility, MLRS/HIMARS is suited to augment other artillery fires to protect the

force, ensure freedom of maneuver, and prevent enemy reinforcement. Considerations for an MLRS/HIMARS battalion supporting a maneuver unit during movement to contact include—

- Planning artillery movement to maintain force momentum and provide adequate immediately responsive support.
- Using unmanned aircraft systems searching forward of advancing MLRS and HIMARS batteries as an aid to reconnoiter routes and position areas—particularly to identify by-passed enemy forces.
- Destroying enemy reconnaissance, surveillance, and target acquisition.
- Anticipating/planning for hasty attack contingencies where enemy activity could significantly impact operations of the supported unit.
- Planning on-order fire support coordination measures throughout the supported unit area of operations.
- Planning and executing preparation fires.

Attack

1-42. Considerations for an MLRS/HIMARS battalion supporting a maneuver unit conducting an attack include—

- Planning for and providing preparation fires to facilitate attacks by the supported unit.
- Massing effects of fires against high-payoff targets to meet criteria established by the force commander to set conditions for crossing the line of departure.
- Providing fires to disorganize and disrupt enemy reinforcing or reserve formations.
- Massing fires against counterattacks.
- Reinforcing field artillery battalions of attacking BCTs.
- Providing fires to support raids and spoiling attacks.
- Planning and providing counterfire.

Exploitation and Pursuit

1-43. Exploitation and pursuit involves rapid movement forward. The extended range provided by guided MLRS and Army Tactical Missile System (ATACMS) munitions efficiently supports both offensive tasks. Ensure proper clearance of MLRS/HIMARS fires.

1-44. Considerations for an MLRS/HIMARS battalion supporting a maneuver unit during exploitation and pursuit include—

- Positioning MLRS/HIMARS unit close to the line of departure or forward line of own troops.
- Ensuring that MLRS/HIMARS units maintain supporting fires while advancing.
- Planning resupply operations.
- Continually requesting, monitoring, and updating fire support coordination measures throughout the supported unit area of operations.
- Synchronizing MLRS/HIMARS fires with the employment of obstacles in chokepoints to continue destruction of retreating enemy forces.
- Conducting counterfire.
- Providing MLRS/HIMARS fires to suppress enemy air defense systems.

CANNON FIELD ARTILLERY BATTALION IN SUPPORT OF OFFENSIVE TASKS

General Considerations

1-45. For cannon field artillery battalions, offensive tasks frequently involve forward, rearward, and lateral movement to better provide supporting fires to the attacking force. During periods of rapid advance, large areas of terrain may be available and position areas for artillery may be relatively easy to find. When advances stall,

or attacking forces are counterattacked, terrain may be restricted. General considerations for the cannon field artillery battalion during offensive tasks include—

- Positioning firing units to effectively support the maneuver commander's fire support requirements.
- Planning for rapid movement along multiple routes using all available resources.
- Positioning firing units to range beyond maneuver objectives.
- Identifying requirements for extended range munitions.
- Coordinating for external radar support.
- Designating and positioning combat configured loads of artillery ammunition.
- Ensuring ammunition plans address security, movement, and recovery of unused ammunition.
- Planning for unit defense in a 6400-mil/360-degree environment.
- Planning and executing radar zones.

Movement to Contact

1-46. Considerations for a cannon field artillery battalion supporting a maneuver force movement to contact include—

- Providing responsive fires for each phase of the operation.
- Planning and providing counterfire.
- Ensuring coordination requirements necessary to maintain synchronization of successive priority targets.
- Positioning fire support assets well forward to facilitate communications, allow for massing of fires, preclude untimely displacements, and exploit weapons ranges.
- Planning fires on key known, suspected, or potential enemy positions.
- Planning for obscuration or screening smoke.
- Planning fires to support blocking and fires to support future operations.
- Planning fires on critical points along the axis of advance, to include the flanks.
- Planning for suppression of enemy air defenses.
- Planning fires to support reconnaissance assets.
- Assigning priority of fires as designated by the BCT or supported commander.
- Refining all targeting data based on the reconnaissance effort and operational changes as the situation develops.
- Synchronizing the positioning and movement of cannon field artillery batteries and platoons with the tempo of the BCT or other supported unit and its fire support requirements.
- Ensuring that firing batteries are positioned to support the BCT at points of vulnerability such as obstacles, canalizing terrain, bridges, or gap crossings.
- Positioning a cannon field artillery battery or platoon to follow close behind the advance guard to provide responsive fires to lead elements.
- Considering fires to support deception efforts.
- Planning fires to support a possible transition to a hasty defense.

Attack

1-47. Considerations for a cannon field artillery battalion supporting an attacking maneuver force include—

- Positioning to engage high-payoff targets.
- Providing counterfire.
- Planning for obscuration or screening smoke.
- Positioning units to mass fires at decisive points.
- Planning for the use of scatterable mines.
- Planning for engaging enemy by-passed units.
- Planning for field artillery movement through the breach site.

- Positioning and sustaining field artillery assets to ensure continuous fire support.

Exploitation and Pursuit

1-48. Considerations for a cannon field artillery battalion supporting a maneuver unit during exploitation and pursuit include—

- Planning for continual displacement field artillery.
- Positioning firing units well forward in the supported unit formation.
- Suppressing bypassed enemy pockets of resistance.
- Planning for the delivery of scatterable mines.
- Planning for greater use of available radio retransmission capabilities.
- Planning for increased use of Class III and Class V supplies; air transportation of supplies may be required.

TARGET ACQUISITION IN SUPPORT OF OFFENSIVE TASKS

General Considerations

1-49. The effective assignment of target acquisition assets enables responsive fires during offensive tasks. Quick-fire nets allow the observers to communicate with specific field artillery or mortar fire units. These kinds of communication arrangements enhance responsiveness. Communication planning should also include communications nets for the clearing of targets for air assets.

1-50. During offensive tasks, target acquisition radars support the protection of friendly forces by locating enemy indirect fire systems. In offensive tasks, particular attention must be given to planning target acquisition that enables future operations. The target acquisition planners provide focus on the identification of enemy indirect fire assets. Detailed planning should provide for continuous coverage of the supported command's area of operations. The fire support planners must identify and coordinate the use of the terrain for the radar. Fire support planners also recommend radar zones to the commander.

1-51. Control and cueing for radars should be decentralized during offensive tasks. The field artillery controlling headquarters should designate cueing agents that can directly contact the radar through the radar deployment order. The radar deployment order identifies the cueing agents and their priorities to the radar section.

1-52. Requirements for radar positioning and movement are identified early in the operations process (see chapter 3) and tied to specific events. This allows continuous coverage by facilitating mutually supporting coverage between radars. The field artillery battalion commander monitors this process closely to ensure that the use of terrain, movements, and radar zones are properly coordinated. General considerations for target acquisition during all types of offensive tasks include—

- Executing target acquisition in support of the supported command's operations.
- Positioning observers and radars to support the observation and collection plans.
- Planning for frequent repositioning of target acquisition assets.
- Using call for fire zones to provide target acquisition coverage on suspected enemy firing positions.
- Coordinating radar employment across the supported command's area of operations to ensure there are no gaps in coverage.
- Positioning radars to maximize range and provide maximum flexibility.
- Positioning radars to cover critical point targets that are vulnerable to indirect fire.
- Planning for 6400-mil/360-degree coverage and flank security.

Movement to Contact

1-53. Target acquisition assets focus on locating enemy indirect fire systems throughout the movement to contact. Not only must the FAB support the BCTs with radar coverage to allow the BCTs' organic radars to

continue to maneuver with the BCT, but also coverage must be provided to protect vulnerable assets. As the situation develops surveillance, reconnaissance and target acquisition assets will transition to support shaping and counterfire missions. Considerations for target acquisition during movement to contact include—

- Positioning observers, including manned and unmanned aircraft forward and along the supported unit's flanks to detect enemy forces.
- Positioning radars as far forward as possible to maximize range and provide maximum flexibility.
- Positioning radars to cover critical friendly assets that are vulnerable to enemy indirect fire from bypassed regular or irregular forces.
- Ensuring coordination requirements necessary to maintain synchronization of successive priority targets.

Attack

1-54. During the attack, target acquisition assets focus on identifying enemy systems that can interdict the supported maneuver unit as it moves toward the objective. Radars and observers linked to fire support systems enable the supported unit's attack. Specific considerations for target acquisition during the attack include—

- Integrating primary and alternate observers to engage targets.
- Using unmanned aircraft systems to conduct reconnaissance of target areas of interest.
- Ensuring radars are in position in time to support the assault on the objective and subsequent consolidation.
- Coordinating radar employment across the supported command's area of operations to ensure there are no gaps in coverage.
- Planning call for fire zones on suspected and known enemy indirect fire systems.
- Planning for critical friendly zones over breaching sites and gap crossings.
- Positioning target acquisition to support higher echelon operations.
- Insuring adequate sensor-to-shooter linkage.
- Coordinating FAB radar coverage across the supported command's area of operations to ensure there are no gaps in coverage.
- Using echeloned movement to provide continuous radar coverage to the supported force.
- Providing FAB radar coverage for the BCTs or other supported units to allow movement of these subordinate unit assets forward during the attack.
- Coordinating surveillance, reconnaissance, and target acquisition requirements with the battlefield surveillance brigade and division, corps, joint task force, or other supported command G-2/S-2.
- Positioning radars as far forward as possible to maximize range and provide maximum flexibility.
- Positioning radars to cover critical friendly assets.

Exploitation and Pursuit

1-55. Considerations for target acquisition during exploitation and pursuit include—

- Using unmanned aircraft to help provide timely and accurate information about enemy locations and activities.
- Focusing target acquisition assets on acquiring enemy indirect fire systems.
- Positioning radars to cover critical friendly assets that are vulnerable to indirect fire from bypassed regular or irregular forces.
- Monitoring radar acquisitions for indications of scatterable mine emplacement by the enemy.
- Integrating reconnaissance, surveillance and targeting acquisition with FAB strikes.
- Positioning radars as far forward as possible to maximize range and provide maximum flexibility.

FIELD ARTILLERY IN SUPPORT OF DEFENSIVE TASKS

GENERAL CONSIDERATIONS

1-56. A *defensive task* is a task conducted to defeat an attacking enemy force, retain key terrain, gain time, economize forces, and develop conditions favorable for offensive or stability tasks. (ADRP 3-0) During defensive tasks, FSCoord, the chief of fires, fire support officer, fires cell integrate fires into the supported unit's scheme of maneuver by planning fires previously described for offensive tasks (depending on mission variables of METT-TC) as well as those specific to defensive tasks. These fires may also be time or event-driven.

1-57. As the commander develops defensive plans, he must visualize how to synchronize, coordinate, and distribute the effects of indirect and direct fire at the decisive time and place. **Counterpreparation fire is intensive prearranged fire delivered when the imminence of the enemy attack is discovered.** Counterpreparation fire is designed to break up enemy formations; delay movement of reinforcements or reserves; disorganize the enemy's system of command, communications, and observation; decrease the effectiveness of artillery preparation; and impair the enemy's offensive spirit. The fire support planners continuously review and adjust primary and alternate task responsibilities. The FAB/artillery battalion S-3 must maintain close coordination with the supported maneuver commander's G-3/S-3 and fire support planners to monitor changes in tasks and trigger responsibilities. The supported maneuver command's brigade support battalion (BSB), sustainment officer and forward support company commander may need to deliver or redistribute ammunition, to include emergency expeditionary support packages.

1-58. Indirect fires have the greatest impact when they are planned in depth, and synchronized with direct fires, the use of obstacles, and strong defensive positions. As the enemy attack stalls, fires are a key element during the execution of counterattacks. The maneuver commander integrates the indirect fire to enhance the effectiveness of obstacles and to counter enemy attempts to breach or bypass these obstacles.

1-59. Typically a commander (depending upon METT-TC) will begin engaging advancing enemy forces at the maximum range of field artillery fires. The focus being to destroy high-payoff targets as they appear, identify the enemy's main attack, cause early deployment of the attacking force, and channel the enemy into the engagement area. Once an enemy attack begins, mortar and artillery fires break up the enemy formations to suppress and neutralize supporting weapons and to destroy as much of their force as possible. Targets in relation to friendly defensive positions are planned —

- In front of the position on all confirmed and suspected enemy locations, on likely avenues of approach, and on prominent terrain features that can be used by enemy overwatch elements.
- In front of friendly barriers and obstacles, these fires are often critical to the defense. Any obstacle not covered by both direct and indirect fires can be obscured and breached.
- On the position, so that if an enemy penetrates friendly defenses, effective fire can be delivered on them immediately.
- Behind friendly positions to provide flexibility to the defense if an enemy surprises the defender by attacking from an unexpected direction. This also aids the defender in blunting enemy penetration, making the counterattack decisive.
- On enemy avenues of approach into the flanks of a units position.

1-60. Commanders coordinate the attack of enemy high-payoff targets with field artillery fires as the enemy concentrates at obstacles and near other movement-restricting points. Proper distribution of fires ensures effective maneuver/fires coordination and the massing of overwhelming combat power at critical times and places. The defending force employs its available combat power to defeat the enemy and regain the initiative. The maneuver commander uses economy of force measures in areas where he does not anticipate decisive operations. In all cases the maneuver commander's most responsive resource, one able to add mass to units in position, are the fires that are available to him.

1-61. In defensive tasks, the supported commander normally directs more centralized control of all artillery assets, to ensure they are immediately responsive to the supported headquarters.

1-62. The commander employs fires to support the security force, using precision and other munitions to destroy enemy reconnaissance and identified high-payoff targets. This also helps to deceive the enemy about the location of the main battle area. The FSCOORD supports the security force by planning the delivery of fires at appropriate times and places throughout the area of operations to slow and canalize the enemy force as it approaches the security area. This allows the security force to engage the enemy on more favorable terms without becoming decisively engaged. To prevent fratricide, the commander designates no-fire areas over security force elements. Finally, the commander uses fires to support the withdrawal of the security force once the shaping mission is complete and the defending unit is prepared to conduct main battle area operations.

1-63. In addition to long range cannon, rocket and missile fires, commanders use air interdiction to disrupt an enemy advance. The commander also incorporates artillery fires with electronic attack and joint systems to suppress enemy air defenses while close air support attacks a target. Air interdiction can delay, destroy, or neutralize enemy attackers and follow-on forces before they can be brought to bear effectively against friendly forces, thereby providing the commander with additional time to defeat the enemy in detail and prepare defensive positions for subsequent attacks.

1-64. Field artillery assets target enemy combat units to force them to deploy, inflict casualties, disrupt the cohesion of the enemy's attack, and impede the enemy's ability to mass combat power or reinforce successes. Field artillery assets continue to extend the battle to attack enemy follow-on forces before they can be committed to the main battle area. Field artillery systems attack command facilities and logistics sites in depth to disrupt and deplete the attacking enemy.

1-65. Field artillery systems are deployed to cover obstacles, barriers, and lightly defended areas. The defending commander takes advantage of the range and flexibility of field artillery weapons to quickly shift and mass fires to engage targets at critical times and points in the battle. The defending commander assigns tasks to field artillery systems that include closing obstacle gaps, or reseeding mines in previously breached obstacles.

1-66. In response to shallow enemy penetrations of the defense, artillery commanders normally reposition their systems laterally, away from the point(s) of enemy penetration. This allows the defender's artillery systems to provide fire support throughout the area of penetration.

1-67. *Final protective fire* is an immediately available prearranged barrier of fire designed to impede enemy movement across defensive lines or areas (JP 1-02). Final protective fires are the highest type of priority targets and take precedence over all other fire requests. Final protective fires differ from standard priority targets in that they are fired at the maximum rate of fire until ordered to stop or until all ammunition is expended. They are designed to create a final barrier of steel. The risk estimate distance for a given delivery system is a factor in how close the final protective fires can be placed in front of friendly front lines. Closer final protective fires are easier to integrate into direct fire final protective lines. *Danger close* in close air support, artillery, mortar, and naval gunfire support fires, is the term included in the method of engagement segment of a call for fire which indicates that friendly forces are within close proximity of the target. The close proximity distance is determined by the weapon and munition fired (JP 3-09.3).

1-68. Artillery final protective fires are allocated to companies in the most critical defensive positions. Mortar final protective fires may be allocated to cover less critical avenues of approach. Once allocated to a company, that commander designates the precise final protective fire location where they can best augment the direct fire weapons.

DEFENSIVE TASK CONSIDERATIONS FOR ALL FIELD ARTILLERY UNITS

1-69. Field artillery fires during defense tasks support maneuver by achieving desired effects on the attacking enemy forces. Defensive task considerations for all field artillery units include—

- Providing counterfire, counterpreparation fire and suppression of enemy air defenses.
- Providing fires in support of the unit's security operations.
- Providing field artillery fires in support of close combat and in depth to support maneuver operations.
- Neutralizing enemy forces that have penetrated the defensive area.
- Relocating field artillery units after identifying the enemy's main effort.
- Providing rapid delivery of scatterable mines to support maneuver operations.

- Planning for obscuration or screening smoke.
- Coordinating for meteorological and survey data.
- Providing precision munitions.
- Designating firing units for final protective fires.
- Delivering field artillery fires at maximum range.

FIELD ARTILLERY BRIGADE IN SUPPORT OF DEFENSIVE TASKS

General Considerations

1-70. As during offensive tasks, FAB fires during defensive tasks are fundamental to the success of the supported unit. Fires throughout the enemy’s depth destroy enemy artillery, separate enemy echelons, and defeat enemy maneuver elements as they move forward. Fires can be critical to offsetting a lack of maneuver assets for defense of large areas. See Figure 1-3 for an example organization for combat for a FAB designated as the counterfire HQ with control of all field artillery radars.

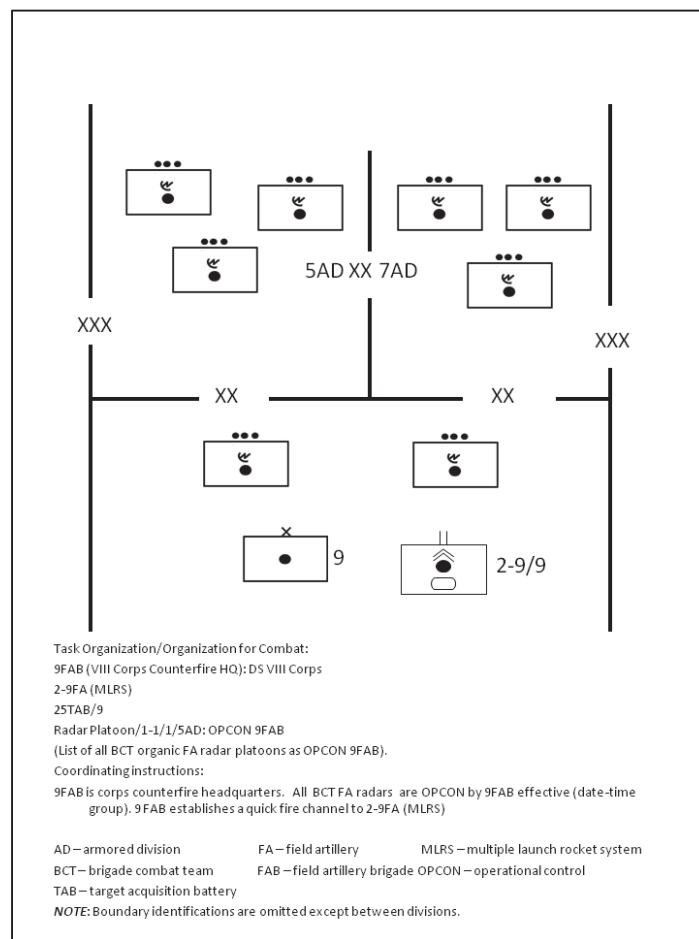


Figure 1-3. Organization for combat – FAB as counterfire headquarters example

1-71. In the defense, the FAB generally retains more centralized control of field artillery assets. This allows the FAB commander maximum flexibility in supporting all BCTs. FAB movement during defensive tasks is normally limited to: withdrawal from the covering force area; lateral repositioning for survivability; and maneuver to support the striking force in a mobile defense. The FAB could be positioned in a BCT area of operations during the defense. Close coordination between the FAB and the BCT S-3 is vital to ensure the FAB

is positioned to execute its missions but will not interfere with BCT movement or repositioning. The FAB may be given its own assignment for positioning and some security assets to respond to localized threats.

1-72. The general tasks of the FAB in the defense are—

- Coordinating joint fires against the enemy to separate echelons.
- Executing fires at maximum range.
- Providing long-range missile fires on enemy high-payoff targets.
- Providing adequate support to the division covering force. A large portion of the FAB may occupy the covering force operational area and it is possible that the FAB will serve as the force field artillery headquarters for the BCT executing the covering force mission.
- Coordinating joint air assets against enemy indirect fire systems.
- Supporting joint air and combat aviation brigade attacks by suppressing enemy air defenses.
- Providing massed fires to assist BCTs in breaking the momentum of attacking enemy maneuver forces.
- Executing counterfire to destroy enemy artillery systems.
- Providing meteorological support to subordinate units.
- Positioning radars to augment the BCT assets in the covering force.

Area Defense

1-73. The *area defense* is a defensive task that concentrates on denying enemy forces access to designated terrain for a specific time rather than destroying the enemy outright (ADRP 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. During an area defense, FAB fires assist in shaping operations that constrain the enemy into a specific course of action or fix him in a given location. These actions limit the enemy's options. Fires may be used to attrit enemy follow-on and reserve forces to keep them from entering the main battle area. The commander covers obstacles with fires that turn, block, or disrupt to limit the options available to the enemy. The decisive operation focuses fires into engagement areas, possibly supplemented by a counterattack. Additional considerations for the FAB in supporting an area defense include—

- Executing fires at maximum range.
- Engaging enemy long-range indirect fire systems prior to the enemy executing preparation fires.
- Coordinating joint air assets against enemy indirect fires systems.
- Coordinating joint fires against the enemy high-payoff targets.
- Massing fires to break the momentum of an enemy attack.
- Providing counterfire support to BCTs as the enemy enters the engagement areas allowing the BCT's organic field artillery battalions to execute close support fires for maneuver.
- Providing fires to disrupt follow-on echelons.
- Executing target acquisition and strike in support of shaping operations.
- Planning for 6400-mil/360-degree fires and support to sustainment area operations and units.

Mobile Defense

1-74. The *mobile defense* is a defensive task that concentrates on the destruction or defeat of the enemy through a decisive attack by a striking force (ADRP 3-90). During a mobile defense the defender withholds a large portion of available forces for use as a striking force in a counterattack. Effective mobile defense requires retaining the ability to maneuver freely and quickly to strike and defeat the enemy. Defending forces combine offensive, defensive, and delaying actions to lure the attacking enemy into positions where they are vulnerable to counterattack. 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. Planning of all fires and identifying and defeating targets to delay, disrupt and disorganize the enemy attack is a critical enabling factor of the mobile defense. The defending force positions itself to conduct decisive engagements that destroy the enemy maneuver forces. The operations require continuous and concentrated fire

support. The commander weights the striking force, through the allocation of field artillery and other fire support resources available.

1-75. The defending force's planned maneuver must incorporate the movement of fire support assets to locations where they can provide continuous support. Fire support assets, especially when employing precision-guided munitions, can enhance the combat capability of committed maneuver forces and enable the quick defeat of the enemy force.

1-76. The defending commander takes precautions to prevent fratricide by establishing restrictive fire lines and other fire support coordination measures. He positions fire support assets to support screen and guard forces and allocates additional artillery to support a covering force. If the security force is assigned a large operational area, the commander may have to position fire support 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 fire support to the security force may require the main body to position its artillery well forward in its formation.

1-77. Additional considerations for FAB fires in support of a mobile defense include—

- Positioning two-thirds of the FAB firing units with the fixing force during a mobile defense and one-third with the striking force.
- Moving one-third of the FAB firing units with the striking force during a mobile defense.
- Supporting combat aviation brigade attack operations.
- Suppressing enemy air defenses.
- Positioning FAB radars as far forward as possible to maximize range and acquire enemy indirect fire systems.

Retrograde

1-78. The *retrograde* is a defensive task that involves organized movement away from the enemy (ADRP 3-90). This includes delays, withdrawals and retirements. Retrograde operations are conducted to gain time, preserve forces, place the enemy in unfavorable positions or avoid combat under undesirable conditions. Movement of FAB units during retrograde operations is closely tied to the movement of the ground maneuver forces. The FAB must balance the requirement to execute strike missions with the need to maneuver with the force away from the enemy. Close coordination between the FAB and the terrain managers is necessary to ensure the FAB positioning and movement is synchronized with the retrograde of the BCTs.

1-79. The considerations for establishing command and support relationships for retrograde operations are similar to those for the mobile and area defenses. The ground forces in contact with the enemy need responsive fires to support breaking contact with the enemy. For a withdrawal not under pressure, there is no enemy contact, however the supported force and the FAB move tactically and retain the readiness to respond should the enemy attack. The FAB continues to centrally control fires to support the force as a whole. Additionally, the FAB must retain the flexibility to mass fires in support of individual BCTs to facilitate disengagement and repositioning.

1-80. Additional considerations for the FAB in support of a retrograde include—

- Providing FAB strike to delay, disrupt, and attrit attacking enemy forces.
- Echeloning FAB units to keep two-thirds of FAB assets in position.
- Task-organizing FAB field artillery battalions.
- Providing support to the supported command rear guard.
- Designation as the force field artillery headquarters for the BCT executing the covering force mission.
- Positioning sufficient assets forward to support a covering force if one is employed.
- Establishing liaison with the covering force headquarters.
- Providing fires to disrupt out of contact enemy echelons within the BCT area of operations.
- Positioning units to facilitate follow-on operations such as establishment of a hasty defense.
- Positioning FAB radars to provide coverage while BCT radars are displacing.

- Providing mass fires to the BCT to permit disengagement by the BCTs.
- Providing counterfire support to the BCTs.
- Providing recommendations to the supported commander concerning the placement, coordination, and movement of target acquisition assets.
- Planning for the possibility that civilian evacuation during operations may interfere with tactical movement.
- Planning for the suppression of enemy air defenses.

MLRS/HIMARS BATTALION SUPPORT OF DEFENSIVE TASKS

General Considerations

- 1-81. General consideration for the MLRS/HIMARS battalion supporting defensive tasks include—
- Providing long-range fires with precision-guided and area munitions.
 - Providing rocket and missile fires on enemy targets arrayed in depth and high-payoff targets.
 - Providing long-range rocket and missile fires to suppress enemy air defenses in support of air operations.

Area Defense

- 1-82. Specific considerations for the MLRS/HIMARS battalion supporting an area defense include—
- Positioning sufficient MLRS/HIMARS firing units forward to support a covering force.
 - Providing long-range rocket and missile fires to delay, disrupt, and attrit attacking enemy forces.
 - Providing rocket and missile fires to break the momentum of an enemy attack.
 - Providing rocket and missile fires to destroy enemy indirect fire and target acquisition systems.
 - Providing rocket and missile fires to disrupt the arrival of enemy follow-on echelons.

Mobile Defense

- 1-83. Specific considerations for the MLRS/HIMARS battalion supporting a mobile defense include—
- Planning positions that allow two-thirds of the MLRS/HIMARS firing units to be ready to fire at any one time.
 - Positioning MLRS/HIMARS firing units with both the fixing and striking forces.
 - Moving MLRS/HIMARS firing units with the striking force.

Retrograde

- 1-84. Specific considerations for the MLRS/HIMARS battalion supporting a retrograde include—
- Conducting strikes to delay, disrupt, and attrit attacking enemy forces.
 - Echeloning MLRS/HIMARS units to keep two-thirds of firing units in position ready to fire to enable the supported command retrograde.
 - Positioning MLRS/HIMARS firing units with the covering force.
 - Moving to positions that facilitate follow-on operations.

CANNON FIELD ARTILLERY BATTALION IN SUPPORT OF DEFENSIVE TASKS

General Considerations

1-85. Repositioning to alternate or supplemental positions may often be reactive during early stages of the defense. The cannon field artillery battalion may experience increased lateral and rearward movement until the friendly maneuver force can regain the initiative, slow the advance and/or better anticipate enemy actions.

1-86. During defensive tasks, the cannon field artillery battalion should coordinate for engineer support and Class IV materials to harden positions and reduce the effectiveness of enemy fires. Plan for the use of direct fire in support of battery/platoon defenses. Critical friendly zones may be used to increase protection of key friendly units. Anticipate the need for survivability moves after firing units have provided extended and/or intense fires (planned or unplanned). Review emergency destruction procedures.

1-87. Additional considerations for cannon battalions during defensive tasks include—

- Planning alternate and supplementary positions for each location.
- Unmanned aircraft systems can be used to recon routes and field artillery position areas.
- Conducting ground reconnaissance, selection, and occupation of alternate and supplementary positions.
- Requesting engineer assets to prepare field artillery position areas.
- Engaging approaching enemy formations at maximum range with field artillery fires.
- Providing counterfire.
- Coordinating with the supported command's fires cell to ensure that the obstacle plan integrates cannon fires to reinforce obstacles.
- Planning for the use of scatterable mines.
- Developing the fire support plan to include priorities of fires, targets on point obstacles, obstacle belts and groups.
- Coordinating with the supported command's fires cell for close air support and Army aviation close combat attacks.
- Coordinating with the supported command's fire support officer and fires cell to plan for and mass all available fires to support disengagements.
- Providing field artillery illumination to assist friendly force night operations, to mark locations or targets, to provide friendly direction orientation, or to degrade enemy night vision equipment.

Area Defense

1-88. Specific considerations for the cannon field artillery battalion supporting an area defense include—

- Ensuring adequate cannon field artillery fires are available for the battle handover and withdrawal of the security forces.
- Planning to forward position cannon field artillery firing units in support of security area operations.
- Coordinating the movement of field artillery batteries to support fire support tasks; ensuring movements are coordinated with the scheme of maneuver to avoid confusion and possible interference with planned maneuver actions.

Mobile Defense

1-89. Specific considerations for a cannon field artillery battalion supporting a mobile defense include—

- Providing timely cannon field artillery fires to suppress enemy air defenses.
- Planning for the use of obscuration or screening smoke to support both the fixing and striking force.
- Synchronizing the positioning and movement of the cannon field artillery battalion subordinate firing units and radars with the scheme of maneuver.
- Providing counterfire.
- Positioning ammunition stocks for each phase of the operation.

Retrograde

1-90. Considerations for a cannon field artillery battalion supporting a retrograde are the same as those for a mobile defense.

TARGET ACQUISITION IN SUPPORT OF DEFENSIVE TASKS

General Considerations

1-91. The primary role of target acquisition radar in the defense is to provide target intelligence and information to allow for counterfire mission processing. Target acquisition planners must also consider transitions to offensive tasks such as counterattacks. Positioning, task organization, and on-order missions should facilitate transitions. General consideration for target acquisition during defensive tasks include—

- Employing target acquisition assets to provide coverage of named areas of interest, target areas of interest, and critical assets.
- Integrating radar placement and acquisition data into fire planning.
- Coordinating target acquisition assets to locate targets in a 6400-mil/360-degree area of operations.
- Assisting the supported command's fires cell in the development of an observation plan that:
 - Ensures obstacles are under continuous observation.
 - Ensures that responsibility for related fire support tasks are identified and coordinated.
 - Includes priority intelligence requirements.
 - Addresses both military and civilian activity.
 - Is objective oriented.
 - And focuses on monitoring critical areas.
- Rehearsing the observation plan to ensure that all targets are adequately observed, that triggers are effectively coordinated, and that backup plans are adequate.
- Employing radar in support of higher echelon shaping operations.
- Linking unmanned aircraft systems with MLRS/HIMARS units to rapidly respond to acquired enemy indirect fires units.
- Positioning observers to see both targets and trigger lines.
- Ensuring adequate sensor-to-shooter linkage.
- Using echeloned movement to provide continuous radar coverage to the supported force.
- Coordinating surveillance, reconnaissance, and target acquisition requirements with the supported command G-2/S-2.
- Integrating air assets into counterfire operations.
- Coordinating radar employment across the supported command's area of operations to ensure there are no gaps in coverage.

Area Defense

1-92. During area defense the commander directs reconnaissance, surveillance and target acquisition assets to determine the locations, strengths and probable intentions of the attacking enemy force before and throughout the defense; placing a high priority on early identification of the enemy's main effort. Target acquisition assets are focused on locating enemy identified high-payoff targets that may include enemy fire support systems. Specific considerations for target acquisition systems area defense include—

- Integrating primary and alternate observers to engage high-priority targets.
- Positioning radars to maximize range and acquire enemy indirect fire systems.
- Positioning radars to cover infantry defiles and strong points.
- Employing allocated unmanned aircraft systems to conduct reconnaissance, detect enemy indirect fire systems, and other enemy forces.
- Planning for radar critical friendly zones.

Mobile Defense

1-93. Specific considerations for target acquisition supporting a mobile defense include—

- Planning for frequent repositioning of target acquisition assets based on movement of the forward line of own troops.
- Positioning observers forward and along the flanks of both the fixing and striking force to observe and execute priority targets.
- Positioning radars as far forward as possible in the fixing force to maximize range and provide maximum flexibility as the striking force maneuvers to destroy enemy formations.
- Positioning radars to cover critical point targets.
- Employing unmanned aircraft systems forward of advancing maneuver units to detect enemy forces.
- Using unmanned aircraft systems to conduct reconnaissance of target areas of interest that include enemy indirect fires assets.
- Continually reviewing timelines and coordination requirements necessary to maintain synchronization of observers/triggers, shooters, and decision makers for successive priority targets during for both fixing and striking forces.
- Monitoring radar acquisitions for indications of scatterable mine emplacement by the enemy.
- Integrating reconnaissance, surveillance and targeting acquisition with the fixing force to slow and disorganize repositioning and withdrawing enemy forces.

Retrograde

- 1-94. During a retrograde, target acquisition-specific considerations may include—
- Positioning long-range radars rearward to provide extended coverage for the supported command during the retrograde.
 - Planning call for fire zones on probable enemy field artillery locations.

FIELD ARTILLERY IN SUPPORT OF TACTICAL ENABLING TASKS AND OTHER SPECIAL CONSIDERATIONS

SECURITY OPERATIONS

1-95. *Security operations* are those operations undertaken by a commander to provide early and accurate warning of enemy operations, to provide the force being protected with time and maneuver space within which to react to the enemy, and to develop the situation to allow the commander to effectively use the protected force (ADRP 3-90). The ultimate goal of security operations is to protect the force from surprise, clarify the enemy's tactical intent, and reduce the situational unknowns. A commander may conduct security operations to the front, flanks, or rear of the friendly force.

1-96. All maneuver forces are capable of conducting security operations (ADRP 3-90). A reinforcing FAB cannon field artillery battalion or BCT organic field artillery battalion may be part of a larger covering force operation where a FAB functions as the force field artillery headquarters. The BCT field artillery battalion will provide fire support to its parent BCT, but may also be assigned an R, GSR, or GS relationship by the division commander or the force field artillery headquarters. A BCT organic field artillery battalion may also serve as force field artillery headquarters of the covering force.

ARTILLERY RAID

1-97. An artillery raid is a type of attack that uses field artillery as its primary attack mechanism. An artillery raid is frequently conducted by a platoon or battery sized field artillery unit. Artillery raid missions are conducted to achieve tactical or operational objectives and involve the rapid movement of artillery assets by air or ground into a position to attack a high-payoff target with artillery fires. They entail sending firing elements forward—generally beyond the security area—to engage enemy targets beyond the maximum range of positioned field artillery weapons. Normally the raid is extremely short and should not involve sustained operations. Detailed planning, surprise, and speed in execution are the key factors in the successful conduct of an artillery raid. Because the target is likely to be perishable, the raid is planned and executed in a compressed

timeline. For more information on raids in which specific types of field artillery units participate, see the Army techniques publication (ATP) specific to that type of unit.

ENCIRCLEMENT OPERATIONS

1-98. *Encirclement operations* are operations 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 (ADRP 3-90). Encirclement operations occur because combat operations involving modernized forces are likely to be chaotic, intense, and highly destructive, extending across large areas containing relatively few units as each side maneuvers against the other to obtain positional advantage (ADRP 3-90).

1-99. If there is an encircled enemy force, and the friendly commander decides to destroy it, that enemy force is reduced as rapidly as possible to free resources for use elsewhere. The reduction of an encircled enemy force continues without interruption, using the maximum concentration of forces and fires, until the encircled enemy force is destroyed or surrenders. A commander may destroy encircled enemy forces by fires alone or by a combination of fire and movement.

BREAKOUT OPERATIONS

1-100. A *breakout* is an operation conducted by an encircled force to regain freedom of movement or contact with friendly units. It differs from other attacks only in that a simultaneous defense in other areas of the perimeter must be maintained (ADRP 3-90). The field artillery may support the breakout of friendly encircled forces as part of the encircled force or from outside the encirclement. Considerations for field artillery as part of the encircled force may include—

- Reorganizing and consolidating, as necessary, field artillery units within the encirclement.
- Ensuring centralized control where possible and establishing a force field artillery headquarters, as required.
- Ensuring 6400-mil/360-degree coverage.
- Retaining the capability to mass fires, as required.
- Planning for aerial resupply of ammunition and critical items.
- Reallocating ammunition to support the firing unit(s) supporting the breakout.
- Coordinating with field artillery units outside the encirclement that can provide supporting fires.
- Prioritizing communications to prevent network overload.
- Implementing appropriate fire support coordination measures.
- Planning for firing restrictions based on ammunition shortages.

1-101. The field artillery battalion should be neither the first nor the last unit out of the perimeter during breakout from an enemy encirclement. If more than one firing element is within the perimeter, withdrawal should be phased to maximize the time field artillery fires are available. Consider external field artillery support if available. Maintain unit integrity at platoon or battery level if at all possible. The field artillery battalion commander must keep in contact with both the lead element commander and the forces remaining in the perimeter. Moving units must anticipate emergency occupations.

PASSAGE OF LINES

1-102. A *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 commander conducts a passage of lines to continue an attack or conduct a counterattack, retrograde security or main battle forces, and any time one unit cannot bypass another unit's position (ADRP 3-90).

Forward Passage of Lines

1-103. A *forward passage of lines* occurs when a unit passes through another unit's positions while moving toward the enemy. During a forward passage of lines, responsibility for field artillery fires passes from the stationary force to the passing force at the same time control is passed to the maneuver units. The stationary

field artillery force may be attached to the passing field artillery force or it may be ordered to reinforce the passing field artillery force from its present positions, until the passing force has moved out of range. During a forward passage of lines, the field artillery commander considers —

- Establishing liaison and communications with the stationary force field artillery headquarters.
- Obtaining and reviewing the passage plans of the supported force.
- Determining security requirements.
- Obtaining available target lists and fire plans from the stationary force.
- Planning and reviewing position areas and routes.
- Reviewing possible enemy observation capabilities in the area.
- Reviewing fire support coordination measures.
- Considering future resupply operations.
- Exchanging survey data with the stationary force field artillery headquarters.
- Exchanging data for radar zones; particularly call for fire zones and artillery target intelligence zones.
- Reviewing the observation plan, and coordinating forward positions.
- Planning for follow-on tasks.

Rearward Passage of Lines

1-104. Withdrawal actions in the defense often involve a rearward passage of lines. A *rearward passage of lines* occurs when a unit passes through another unit's positions while moving away from the enemy (ADRP 3-90). This often occurs when a security force withdraws behind the forward edge of the battle area. Field artillery units with each force exchange liaison and critical information as early as possible. They coordinate fire plans to synchronize and maximize their combined firepower. This includes the transfer of field artillery support responsibilities within the maneuver unit's sector. This transfer usually coincides with the passing of maneuver control. During the rearward passage the withdrawing field artillery commander considers—

- Exchanging field artillery fire plans and target lists.
- Establishing communications requirements.
- Coordinating clearance of position areas and routes, as required.
- Coordinating resupply, if appropriate.
- Exchanging survey data with the stationary force field artillery headquarters.
- Confirming recognition signals with the stationary force.

RELIEF IN PLACE

1-105. A commander conducts a relief in place as part of a larger operation, primarily to maintain the combat effectiveness of committed units. A *relief in place* is 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). The incoming unit continues the operation as ordered.

1-106. The higher headquarters directs when and where to conduct the relief and establishes the appropriate control measures. Normally, during the conduct of major combat operations, the unit relieved is defending. However, a relief may set the stage for resuming offensive operations (ADRP 3-90). During a relief in place, the field artillery battalion commander should consider—

- Establishing liaison and communications between field artillery units.
- Providing existing fire plans to the incoming field artillery unit and exchange liaison officers.
- Establishing procedures for the relief.
- Provide existing survey data to incoming unit

1-107. Normally, field artillery units will not be relieved at the same time as the maneuver forces. The exchange of field artillery responsibilities is a condition that must be met and acknowledged by the supported commander. The outgoing force passes fire plans to the incoming force as a key component of those conditions.

MOBILITY OPERATIONS

1-108. *Mobility* is a quality or capability of military forces, which permits them to move from place to place while retaining the ability to fulfill their primary mission (JP 3-17). Field artillery must be positioned to provide continuous fires for the supported force.

1-109. *Mobility operations* are those combined arms activities that mitigate the effects of natural and man-made obstacles to enable freedom of movement and maneuver (Army tactics, techniques and procedures [ATTP] 3-90.4). When attacking, the commander concentrates the effects of combat power at selected locations. This may require the unit to improve or construct combat trails through areas where routes do not exist. The surprise achieved by attacking through an area believed to be impassable may justify the effort and time expended in constructing these trails. The force bypasses existing obstacles and minefields before starting the offensive task instead of breaching them whenever possible. Units mark bypassed minefields whenever the mission variables of METT-TC allow (FM 3-90-1).

Breaching Operations

1-110. *Breach* is a tactical mission task in which the unit employs all available means to break through or establish a passage through an enemy defense, obstacle, minefield or fortification (FM 3-90-1). Breaching is a synchronized combined-arms operation conducted under the control of a maneuver commander. Breaching operations begin when friendly forces encounter an obstacle and begin to pass around or through it, and they end when the obstacle has been penetrated. At this point battle handover may occur with a follow-on force assuming the lead role. The primary task for the supporting field artillery elements is to protect the breaching force from direct and indirect enemy fires positioned to reinforce the obstacle. Unplanned breaching operations may require that the field artillery battalion S-3 quickly review ammunition status for impact on other tasks.

1-111. Considerations for field artillery during breaching operations, may include—

- Organizing, positioning, and synchronizing indirect suppressive fires. Anticipate high volumes of suppressive fires to include high explosive/variable time and smoke ammunition.
- Developing combat configured ammunition loads to support breaching tasks.
- Creating backup plans which are especially critical to maintaining suppressive and obscuration fires while the breaching team is exposed.
- Providing screening or obscuration smoke.
- Anticipating suppression of enemy air defenses fires if air assets participate in the operation.
- Planning for critical friendly zones over the breach site.
- Considering the use of infrared illumination during night breaches.
- Positioning artillery forward, but clear of avenues of approach.
- Preparing to quickly move firing units through the breach.

Gap Crossing Operations

1-112. *Gap crossing* is the projection of combat power across a linear obstacle (wet or dry gap) (ATTP 3-90.4). Rivers and other gaps remain major obstacles despite advances in high-mobility weapon systems and extensive aviation support (ADRP 3-90). Field artillery units displace to far bank positions, to extend the depth of the battle area on the far side as soon as maneuver units seize first-phase objectives and secure field artillery positions are available. Other field artillery units cross the gap to expand the pocket and ensure continuous coverage of their supported maneuver units. Field artillery crossings require detailed coordination to ensure integration into the breaching force's movement plan.

1-113. Considerations for field artillery fires in support of a gap crossing (deliberate, hasty, or covert), may include—

- Establishing quick fire channels to aerial observers to provide surveillance beyond the gap.
- Planning for critical friendly zones, on the gap-crossing site, associated assembly areas, and air defenses.
- Firing series and groups of targets to neutralize the bridgehead area.

- Firing in depth to prevent or delay reinforcements.
- Planning for high ammunition expenditures, especially smoke and illuminating projectiles during a deliberate crossing.
- Planning fires to the flanks on enemy crossing sites and infiltrating forces involved in enemy flanking efforts.
- Planning call for fire zone placement on probable locations of enemy field artillery that may attempt to interdict friendly routes of withdrawal, reinforcement, and resupply based on threat templates.
- Planning final protective fires, smoke, scatterable mines, and massed fire missions to assist disengagement and withdrawal of the last maneuver elements across the gap.
- Positioning field artillery units across the gap as soon as possible, while maintaining continuous fire support.
- Considering engineer support to harden the field artillery and forward observer/fire support team positions, if the maneuver force plans to establish defensive positions across the gap, and stabilize the forward line of own troops.
- Planning for the possibility that field artillery units may occupy vacated hardened positions. However, consider the risks that the previous fires may have compromised the positions.

URBAN OPERATIONS

1-114. *Urban operations* are operations across the range of military operations planned and conducted on, or against objectives on a topographical complex and its adjacent natural terrain, where man-made construction or the density of population are the dominant features (FM 3-06). Commanders conducting major urban operations use their ability to visualize how doctrine and military capabilities are applied within the context of the urban environment (ADRP 3-90). For example during urban operations the supported command's G-3/S-3, G-2/S-2, chief of fires, fire support officer and FSCOORD should identify size and location of dead space where indirect fires cannot reach. Indirect fire dead space is that area along either the observer-target line or the gun-target line beyond an object such as a crest or building where the rounds either cannot be observed or cannot impact. Dead space is generally five times the height of buildings for low-angle fire and one-half the height of buildings for high-angle fire for area munitions. Because of its steep angle of descent, high-angle fire can achieve greater effects and is usually the preferred method in urban operations. *High-angle fire* is fire delivered at elevations greater than the elevation of maximum range of the gun and ammunition concerned. Range decreases as the angle of elevation increases (FM 6-40). High-angle fire is achieved by a weapon system firing at an elevation (angle) greater than is required for its maximum range.

1-115. Fires in urban areas must be closely coordinated and planned in detail to include considerations of munitions effects, psychological effects on the populace, and potential collateral damage. During urban operations expect more detailed and restrictive rules of engagement and a greater number of protected or restricted sites with associated restrictive fire support coordination measures. Effective airspace coordinating measures can ensure that other missions (for example air reconnaissance, strike) can transit or operate in the airspace above and around the urban area. For air-delivered munitions, terminal control and guidance can help ensure the delivering platform has acquired the correct target, thus reducing the risk of fratricide.

1-116. Target coordinates and associated target location error need to be of sufficient accuracy to enable desired effects on the target. For more on target location error and its significance, see the discussion in chapter 2, FM 3-09.12, ATP 3-09.32, and JP 3-09.3.

FIELD ARTILLERY IN SUPPORT OF STABILITY TASKS

1-117. *Stability tasks* are tasks conducted as part of operations outside the United States in coordination with other instruments of national power to maintain or reestablish a safe and secure environment, and provide essential governmental services, emergency infrastructure reconstruction, and humanitarian relief (ADP 3-07). Stability tasks focus on identifying, targeting, and mitigating the root causes of instability to set the conditions for long-term development by building the capacity of local institutions. Any integrated approach to operations characterized by stability tasks requires a framework that applies across the range of military operations (ADRP 3-07).

1-118. Field artillery tasks conducted in support of stability are essentially the same as those for offensive and defensive tasks. Restraint is vital in the employment of fires during stability tasks. Such restraint typically concerns the munitions employed and the targets engaged to obtain desired effects. Having the ability to employ a weapon does not mean it should be employed. In addition to collateral damage considerations, the employment of fires could have second and third order negative effects. Collateral damage could adversely affect efforts to gain or maintain legitimacy and impede the attainment of both short- and long-term goals. The use of nonlethal capabilities should be considered to fill the gap between verbal warnings and deadly force to avoid unnecessarily raising the level of conflict. Excessive force antagonizes those friendly and neutral parties involved. Restraint increases the legitimacy of the organization that uses it while potentially damaging the legitimacy of an opponent.

1-119. The actions of field artillery personnel and units are framed by the disciplined application of force including specific rules of engagement. Successful employment of field artillery weapons and munitions requires a common understanding by commanders and their field artillery personnel. Commanders must limit collateral damage and apply force precisely to accomplish the mission without causing unnecessary loss of life, suffering, or damage to infrastructure. Field artillery units must be properly trained in the rules of engagement and quickly informed of any changes. Rules of engagement may vary, but should always be consistent with the inherent right of self-defense. Given timely and accurate intelligence to determine targets and their locations, precision munitions may achieve the desired effects while mitigating adverse effects. Key considerations for employment of field artillery fires during stability operations include—

- Stability operations are often conducted in noncontiguous areas of operation. This can complicate the use of fire support coordination measures, the ability to mass and shift fires, and clearance of fires procedures.
- What constitutes key terrain may be based more on political, cultural and/or social considerations than physical features of the landscape; fires may be used more frequently to defend key sites than to seize them.
- Rules of engagement are often more restrictive than in major combat operations; commander guidance for fires requires careful consideration during development and wide dissemination to all levels.
- Planning for the use of precision-guided munitions and/or employment of nonlethal capabilities may be necessary to limit collateral damage.
- Planning the use of field artillery fires to demonstrate capabilities, show of force or area denial.

1-120. As during offensive and defensive tasks, fire support coordination measures are established for stability tasks to facilitate the attack of high-payoff targets throughout the area of operations. Restrictive fire support coordination measures are those that provide safeguards for friendly forces and noncombatants, facilities, or terrain. For example, no-fire areas and restrictive fire areas may be used not only to protect forces, but also to protect populations, critical infrastructure, and sites of religious or cultural significance.

FIELD ARTILLERY IN DEFENSE SUPPORT OF CIVIL AUTHORITIES

1-121. Field artillery units usually contribute in nontraditional ways during tasks involving defense support of civil authorities. The equipment and organizations available to the units can not only provide effective mission command but observation posts, convoy operations, local security, sustainment operations, and liaison to assist inform activities as well.

1-122. For discussion of Defense Support of Civil Authorities, see ADRP 3-09, ADP/ADRP 3-28, and ATP 3-28.1.

SECTION III – ORGANIZATION FOR COMBAT AND COMMAND OR SUPPORT RELATIONSHIPS

ORGANIZATION FOR COMBAT

1-123. *Task-organizing* is the act of designing an operating force, support staff, or sustainment package of specific size and composition to meet a unique task or mission (ADRP 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 field artillery task-organization is to ensure that each field artillery unit has an established command relationship or support relationship.

1-124. Commanders should not place artillery in reserve. When the tactical situation dictates, field artillery units can be given a different command or support relationship.

1-125. The FSCoord, chief of fires and brigade fire support officer analyze the mission variables of METT-TC, evaluate the field artillery assets available and recommend a command or support relationship for each field artillery unit to the supported commander. The supported commander approves the field artillery task-organization, which is subsequently reflected in the operation plan (OPLAN)/operation order (OPORD) and fire support plan.

1-126. Commanders consider mutual support when task-organizing field artillery. *Mutual support* is that support which units render each other against an enemy, because of their assigned tasks, their position relative to each other and to the enemy, and 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 (ADRP 3-0). Although a field artillery 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 on mutual support see ADRP 3-90 and FM 3-90-1.

FIELD ARTILLERY EMPLOYMENT

1-127. When planning the integration of fires into an operation, commanders and staffs should consider the memory aid AWIFM.

Adequate Fire Support for the Committed Units

1-128. The minimum adequate fire support for committed units is considered to be 1 field artillery battalion for each committed brigade.

Weight to the Main Effort

1-129. The main effort can be weighted by a variety of ways:

- Reinforcing or general support-reinforcing support relationships can be assigned to provide additional responsive fires to the maneuver forces in contact.
- Field artillery units can be positioned and assigned directions of fire to concentrate their fires in the appropriate operational area. In this manner, units in GS can add weight to the main attack or strength to the most vulnerable area.
- Ammunition may be allocated to provide for more support in the affected area.
- Priority of fires may be given to the main effort (decisive operation).

1-130. Support relationships from GS to direct support (DS) provide increasing responsiveness to the main effort's commander. Minimal essential fire support can be allocated to shaping operations. Consider weighting the main effort with close air support sortie distribution. Consider suppression of enemy air defenses to enable friendly close air support and attack helicopter operations supporting the main effort.

Immediately Responsive Fires

1-131. The force commander should establish command or support relationships for available artillery with which he can immediately influence the operation. The practice of establishing field artillery support relationships of GS and GSR enhances flexibility and facilitates ability to provide immediately responsive fires for the force as a whole. 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 maneuver commander may shift the priority of fires to exploit opportunities as they are presented.

Facilitate Future Operations

1-132. Future operations can be facilitated by the assignment of a command or support relationship, the positioning of field artillery, and the allocation of ammunition. 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.

Maximum Feasible Centralized Control

1-133. The optimum degree of centralized control varies with each tactical situation. A high degree of centralized control is desired in a defensive situation. Since the enemy has the initiative, it is difficult to accurately predict where and when he will attack. A lesser degree of centralized control is required in an offensive situation, because the supported force has the initiative.

FIELD ARTILLERY INHERENT RESPONSIBILITIES IN ARMY COMMAND RELATIONSHIPS

1-134. 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.

1-135. 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 headquarters involved and quickly identifies the degree of support that the gaining and losing Army commanders provide (ATTP 5-0.1).

1-136. *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).

1-137. *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).

1-138. *Attach* is the placement of units or personnel in an organization where such placement is relatively temporary (JP 3-0).

1-139. *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).

1-140. *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).

1-141. Field artillery cannon, rocket, and missile systems that are organic, assigned, attached to, or under the OPCON of FABs 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 to provide the right combination of indirect fires capabilities for a given situation. *Task-organizing* is the act of designing an operating force, support staff, or sustainment package of specific size and composition to meet a unique task or mission (ADRP 3-0).

1-142. The 4 Army field artillery inherent responsibilities (see table 1-1) supplement the inherent responsibilities of an Army command relationship.

Table 1-1. Field artillery inherent responsibilities in army command relationships

<i>If Army Command Relationship is-</i>		<i>Then Field Artillery Inherent Responsibilities are-</i>			
		<i>Answers Calls for Fire in Priority From:</i>	<i>Has as Its Zone of Fire:</i>	<i>Is Positioned By:</i>	<i>Has Its Fires Planned By:</i>
Army Command Relationship	Organic	1. Parent unit. 2. Own observers. ¹ 3. Force field artillery headquarters ²	Area of operations of parent unit.	Organic headquarters	Parent unit.
	Assigned	1. Parent unit. 2. Own observers. ¹ 3. Force field artillery headquarters. ²	Area of operations of parent unit.	Assigned headquarters	Parent unit.
	Attached	1. Gaining unit. 2. Own observers. ¹ 3. Force field artillery headquarters. ²	Area of operations of gaining unit.	Gaining unit	Gaining unit.
	OPCON	1. Gaining unit. 2. Own observers. ¹ 3. Force field artillery headquarters. ²	Area of operations of supported unit.	1. Supported unit 2. Force field artillery headquarters ²	1. Supported unit 2. Force field artillery headquarters ²
	TACON	1. Gaining unit. 2. Own observers. ¹ 3. Force field artillery headquarters. ²	Area of operations of supported unit.	1. Supported unit 2. Force field artillery headquarters ²	1. Supported unit 2. Force field artillery headquarters ²
<p>Note: (1) Includes all target acquisition means not deployed with the supported unit (such as radars or unmanned aircraft systems), vehicles, air observers, survey parties. In the NATO, the gaining unit may not task-organize a multinational unit (see TACON).</p> <p>Note: (2) If designated by the supported commander.</p>					
<p>OPCON – operational control NATO – North Atlantic Treaty Organization TACON – tactical control</p>					

FIELD ARTILLERY INHERENT RESPONSIBILITIES IN ARMY SUPPORT RELATIONSHIPS

1-143. In the past, DS, R, GSR, and GS were referred to as field artillery 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.

1-144. 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 (ATTP 5-0.1). Organic field artillery battalions can be assigned a support relationship by the force field artillery headquarters of the supported command.

1-145. 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 headquarters—as in GS. Support relationships do not normally alter administrative

control. Support relationships are used to task-organize for a mission. Field artillery units may be assigned a support relationship of DS, R, GSR, or GS.

1-146. The 4 Army field artillery inherent responsibilities (see table 1-2 on page 1-34) supplement the inherent responsibilities of an Army support relationship.

Direct Support

1-147. *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 (ADRP 5-0). A field artillery unit in DS of a maneuver unit is concerned primarily with the fire support needs of only that unit. The fires cell of the supported maneuver unit plans and coordinates fires to support the maneuver commander's intent. The commander of a unit in DS recommends position areas and coordinates for movement clearances where his unit can best support the maneuver commander's concept of the operation. When field artillery units are able to habitually support the same maneuver force, coordination and training are enhanced. DS is the most decentralized support relationship.

Reinforcing

1-148. *Reinforcing* is a support relationship requiring a force to support another supporting unit (ADRP 5-0). Only like units (for example artillery to artillery) can be given a reinforcing mission. An R support relationship requires one field artillery unit to augment the fires of another field artillery unit. When an organic or DS field artillery battalion requires more fires to meet maneuver force requirements, another field artillery battalion may be directed to reinforce it. An organic or DS field artillery battalion may be supported by up to 2 reinforcing battalions. A field artillery unit assigned an R support relationship retains its command relationship with its parent unit, but is positioned by the reinforced field artillery unit and has priorities of support established by the reinforced field artillery unit, then the parent unit.

General Support-Reinforcing

1-149. *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 (ADRP 5-0). The first priority of a field artillery unit assigned a GSR support relationship is to furnish artillery fires for the maneuver force as a whole; the second priority is to reinforce the fires of another field artillery unit. A GSR unit remains under the control of the supported maneuver commander or his force field artillery headquarters. The GSR support relationship offers the commander the flexibility to meet the requirements of a variety of tactical tasks.

General Support

1-150. *General support* is that support which is given to the supported force as a whole and not to any particular subdivision thereof (JP 3-09.3). A field artillery unit assigned in GS of a force has all of its fires under the immediate control of the supported commander or his designated force field artillery headquarters. Among Army support relationships, GS provides the highest degree of centralized control of fires.

Table 1-2. Field artillery inherent responsibilities in army support relationships

If Army Support Relationship is –		Then Field Artillery Inherent Responsibilities Are –			
		Answers Calls for Fire in Priority From:	Has as Its Zone of Fire:	Is Positioned By:	Has Its Fires Planned By:
Army Support Relationship	Direct Support	1. Supported unit. 2. Own observers. ¹ 3. Force field artillery headquarters. ²	Area of operations of supported unit.	Supported unit.	Supported unit.
	Reinforcing	1. Reinforced field artillery. 2. Own observers. ¹ 3. Force field artillery headquarters. ²	Zone of fire of reinforced field artillery unit.	Reinforced field artillery unit HQ.	Reinforced field artillery unit HQ.
	General Support-Reinforcing	1. Supported unit. 2. Force field artillery headquarters. ² 3. Reinforced unit. 4. Own observers. ¹	Area of operations of supported unit to include zone of fire of reinforced field artillery unit.	1. Supported unit. 2. Force field artillery headquarters. ²	1. Supported unit. 2. Force field artillery headquarters. ²
	General Support	1. Supported unit. 2. Force field artillery headquarters. ² 3. Own observers. ¹	Area of operations of supported unit.	1. Supported unit. 2. Force field artillery headquarters. ²	1. Supported unit. 2. Force field artillery headquarters. ²
<p>Note: (1). Includes all target acquisition means not deployed with the supported unit (radar, unmanned aircraft systems), vehicles, air observers, survey parties. In the NATO, the gaining unit may not task-organize.</p> <p>Note: (2). If designated by the supported commander.</p>					
NATO – North Atlantic Treaty Organization					

Note: When working with United States (U.S.) Marine Corps and North Atlantic Treaty Organization (NATO) units see Marine Corps warfighting publication (MCWP) 3-16/STANAG 2484 for inherent responsibilities for artillery tactical tasks.

NONSTANDARD FIELD ARTILLERY SUPPORT RELATIONSHIPS

1-151. 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 field artillery assets to cover all the contingencies, or if a field artillery unit is assigned more than one support relationship over a time period. A nonstandard support relationship is also a means by which the commander can tailor his field artillery 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 field artillery support relationships include—

- 110 FAB: GSR 7 FAB; do not exceed 25 percent of the controlled supply rate in support of 7 FAB.
- 1-89 Field Artillery (MLRS, M270A1): GS; provide liaison officer to the corps fires cell.

1-152. 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 Field Artillery; on-order R 1-50 Field Artillery.”

SECTION IV – FIELD ARTILLERY ORGANIZATION

FIELD ARTILLERY BRIGADE

1-153. Organic FAB assets include a BSB, a signal network support company, a target acquisition battery, and a headquarters and headquarters battery—

- The FAB BSB is organized to provide sustainment support (supply, maintenance, field services, and transportation) to the organic units of the FAB.
- The signal network support company deploys, installs, operates and maintains the mission command information systems networks that support FAB operations and integrate with the division or corps networks.
- The target acquisition battery is organized with meteorological, survey, and target acquisition capabilities including the Army/Navy (Marine) transportable radar special purpose (multipurpose) (AN/TPQ)-37 (being replaced by the AN/TPQ-53) and AN/TPQ-50-series radars.

1-154. The FAB headquarters and headquarters battery and its assigned staff provide expertise across a broad range of functional areas. The FAB and each of the subordinate elements can be task-organized as required. This may include a combination of one to five rocket/missile (MLRS or HIMARS) and/or cannon field artillery battalions, as well as other enablers. See figure 1-4. For example, executing strike may require placing surveillance, reconnaissance and electronic attack assets under the OPCON or TACON of the FAB commander.

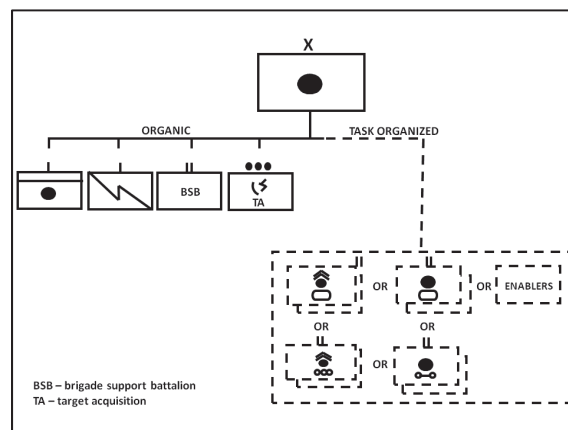


Figure 1-4. Field artillery brigade organization example

1-155. The FAB is the only Army field artillery organization that typically serves at echelons above the BCT and can be directed to execute tasks for any joint, Service, or functional headquarters. The FAB is not organic to any Army organization or echelon. A division, corps, joint force land component command, or joint task force may have a FAB attached or placed under its OPCON. However, the FAB is normally attached to a division. When operating under the control of the joint force commander or another Service, the senior Army headquarters exercises administrative control over the FAB.

1-156. A FAB gives the supported maneuver commander a headquarters that plans, prepares, executes, and assesses fires in support of operations, and provides the capability to execute strike and counterfire throughout the area of operations. Depending on the size of the supported commander’s area of operations, the FAB may not have the resources to provide fire support in all areas simultaneously such as during forced entry or airborne/air assault operations. The FAB focuses its assets in the supported command’s area of operations based on the fire support requirements and priorities established by the supported commander.

1-157. FABs are task-organized to accomplish assigned tasks. Strike is an optimal task for the FAB. The FAB's supported maneuver commander assigns the FAB its mission and provides guidance for coordinating the FAB's actions with BCTs and other supporting brigades. The supported commander also provides supporting units to the FAB as necessary. Subordinate units may include augmenting surveillance, reconnaissance, target acquisition, and/or other fire support assets. The FAB's supporting assets also may include ground reconnaissance and surveillance, manned aviation, and unmanned aircraft assets from division or higher echelons. These assets augment the FAB based on the higher headquarters or supported commander's mission analysis task organization and the requirements of a particular mission. The BCT, battlefield surveillance brigade, maneuver enhancement brigade, combat aviation brigade, and sustainment brigade can all support FAB operations. The FAB might be required to detach some of its subordinate elements to BCTs or other supporting brigades of the command.

1-158. Training and readiness authority is the authority for matters affecting the training and readiness of specified units. This authority is inherent in command authority and may be delegated in whole or in part to subordinate commanders. Unless specified otherwise by the senior commander, it includes authority to give direction to an assigned or attached unit concerning unit readiness and organizational training. For example, when a FAB is attached to a division, the FAB participates in the training events, readiness exercises, and the deployments of the division. The division commander may also direct the FAB commander to assist BCT commanders training and preparing their organic field artillery battalions. These functions, in conjunction with the BCT commander, may include—

- Providing guidance and oversight for training standardization and certification including development of the mission training brief.
- Assessing the state of training and provide training direction for the 13-series military occupational specialty, including advising on the management and leader development of career military field 13 personnel and management of artillery/fire support equipment, including the cross-leveling between attached units on the same installation.
- Assisting the division commander in planning, preparing and executing cannon field artillery battalion external evaluations and major training exercises.

Note: Units organic to the FAB may control other augmenting units based on task organization for a specific contingency or operation.

1-159. A *force field artillery headquarters*, if designated by the supported commander, is normally the senior field artillery headquarters organic, assigned, attached, or placed under the operational control of that command. The supported commander specifies the commensurate responsibilities of the force field artillery headquarters and the duration of those responsibilities (ADRP 3-09). When designated as the force field artillery headquarters by a supported division, corps joint task force, or Joint Force Land Component Command commander, the FAB commander is the FSCoord for the supported command. The division, corps or joint task force chief of fires serves as the deputy FSCoord and takes direction and guidance from the FSCoord. If the FAB is designated as force field artillery headquarters, the FAB's fires cell may require augmentation.

1-160. The FAB staff performs mission planning, determines what assets can best fulfill the supported commander's fire support requirements, and tasks its subordinate units. The FAB staff can plan for and employ those fire support assets it receives as assigned, attached, or which are placed under its OPCON or tactical control (TACON). It may provide these units a mission, tasks, and establish support relationships as part of field artillery organization for combat and provides tasks to subordinate units in FAB plans and orders.

MLRS/HIMARS BATTALION

1-161. The MLRS/HIMARS battalion (see figure 1-5 on page 1-37) is composed of a headquarters and headquarters battery, and 2 or 3 MLRS/HIMARS firing batteries with 8 or 6 launchers each. A forward support company from the BSB is typically given an augmenting command or support relationship—

- The headquarters and headquarters battery is organic to the MLRS/HIMARS battalion and is organized and equipped to coordinate administrative, logistical, maintenance and communications support for the battalion headquarters and the firing batteries.

- The MLRS/HIMARS firing battery consists of a battery headquarters, a battery operations center, a support platoon, and 2 firing platoons. The battery headquarters has personnel and equipment to perform administration and limited sustainment for the firing platoons.

1-162. MLRS/HIMARS units are employed to provide field artillery medium-range rocket and long-range missile fires in support of the BCT, division, corps, joint or multinational forces. The battalion can operate as a single unit or it can detach batteries or platoons to operate for limited periods.

1-163. For more on the MLRS/HIMARS field artillery battalion see ATP 3-09.60.

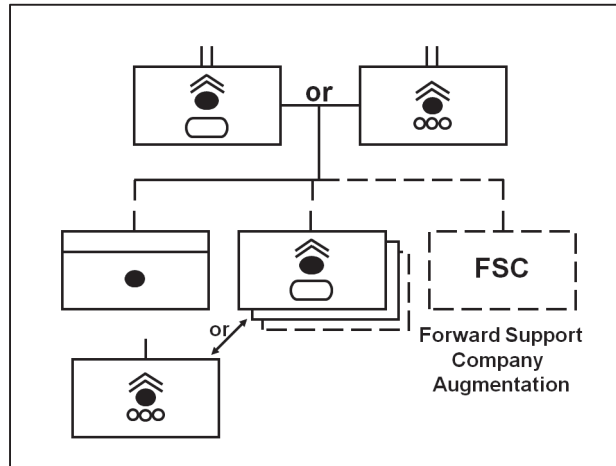


Figure 1-5. MLRS/HIMARS battalion organization example

CANNON FIELD ARTILLERY BATTALION

1-164. The armored brigade combat team field artillery battalion is 3 batteries of 6 M109A6 Paladin self-propelled 155-mm howitzers. The batteries are manned and equipped to operate as 2 separate firing platoons of either 4 or 3 guns. See figure 1-6.

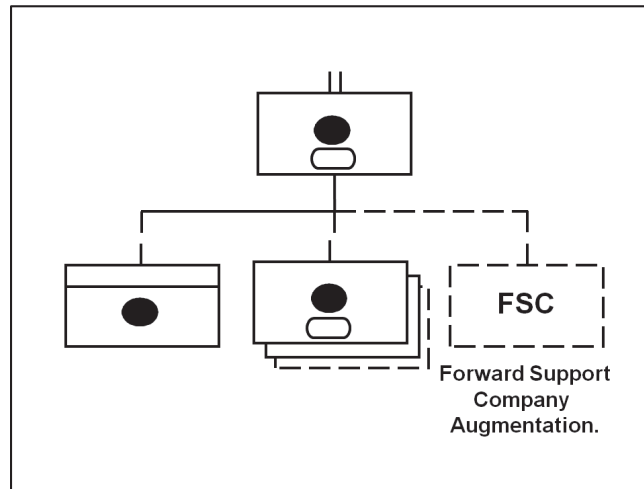


Figure 1-6. ABCT cannon battalion example

1-165. The Stryker brigade combat team field artillery battalion has 3 6-gun lightweight M777-series 155-mm towed howitzer batteries; this permits each battery to be organized with 2 firing platoons of 3 guns each. See figure 1-7 on page 1-38. The Stryker BSB task-organizes its field maintenance company to provide combat repair team support to the battalion.

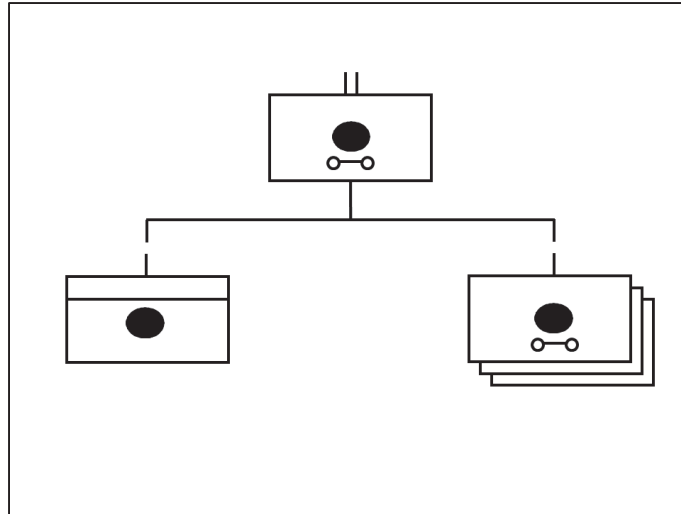


Figure 1-7. SBCT cannon battalion example

1-166. The infantry brigade combat team field artillery battalion is 2 platoons of 4 guns each to a composite battalion of 1 or 2 6-gun M119-series 105-mm towed howitzer batteries, and 1 6-gun M777-series 155-mm towed howitzer battery. The 6-gun firing batteries in a battalion are organized into 2 3-gun firing platoons. See figure 1-8.

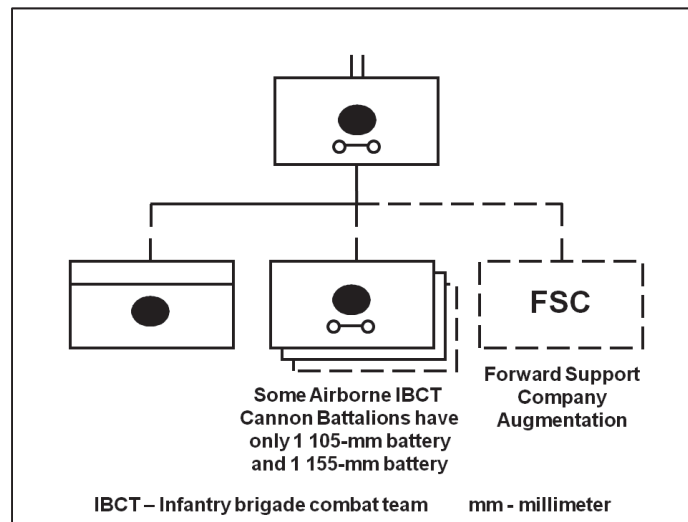


Figure 1-8. IBCT cannon battalion example

1-167. The FAB cannon field artillery battalion may be either self-propelled or towed—

- The self-propelled cannon field artillery battalion is 3 batteries of 4 howitzers each. See figure 1-9 on page 1-39.

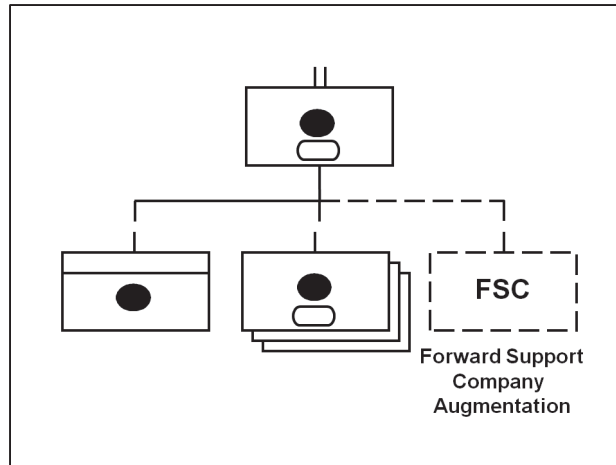


Figure 1-9. FAB self-propelled cannon battalion example

- The towed cannon field artillery battalion has 3 batteries composed of 4 M777-series 155-mm towed howitzer each. See figure 1-10.

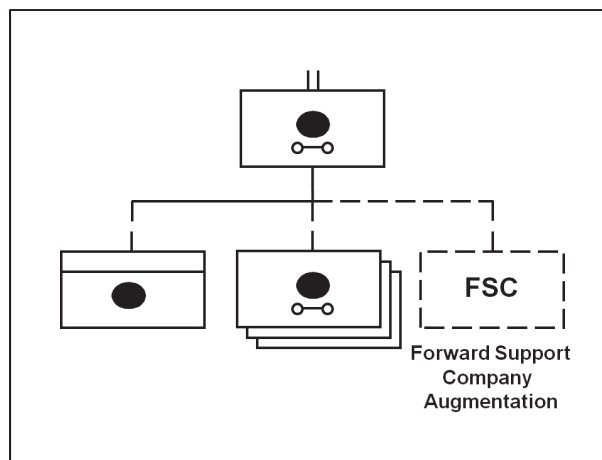


Figure 1-10. FAB towed cannon battalion example

1-168. Cannon field artillery battalions are organized with a headquarters and headquarters battery and 2 or 3 firing batteries; a forward support company from the BSB augments the BCT organic field artillery battalion.

- The BCT field artillery battalion typically includes a target acquisition platoon headquarters team, weapons locating radar sections (radar types and numbers vary), a meteorological team, 2 survey teams, a counterfire operations section, 1 or more fire support platoons, and a lightweight counter mortar radar section. The number and composition of fire support platoons and fires cells vary based upon the type of unit supported.
- The FAB field artillery battalion has the same basic organization as the BCT field artillery battalion less the target acquisition platoons and the fire support platoons. Target acquisition support for the FAB field artillery typically comes from the FAB target acquisition battery.
- The headquarters and headquarters battery typically consists of a battery headquarters, battalion command section, S-1 personnel, S-2 intelligence, S-3 operations, S-4 supply, S-6 communications, a medical platoon and unit ministry team.
- The cannon field artillery batteries typically consist of a battery headquarters, supply section, 2 fire platoon headquarters with fire direction center, 6 firing sections, and 2 ammunition sections (1 per platoon) —

- The firing platoon is the basic firing unit of the cannon field artillery battery and has personnel and equipment to determine firing data and conduct fire missions. Each fire platoon consists of a platoon headquarters, a fire direction center, 3 howitzer sections, and an ammunition section.
- The battery headquarters has personnel and equipment to perform administration, sustainment, and limited chemical, biological, radiological, and nuclear functions—the supply section provides limited sustainment support; each ammunition section has personnel and equipment to provide limited ammunition support.
- The forward support company is organized to provide subsistence, field maintenance, subsistence, and supply distribution for the battalion; the company consists of a company headquarters, a field feeding section, a distribution platoon, and a field maintenance platoon.

1-169. The cannon field artillery battalion provides responsive and accurate field artillery fires to the supported command and its subordinate units according to the commander's priority of fires. Cannon field artillery battalions typically have a command or support relationship with a BCT or a FAB. The BCT's field artillery battalion has an organic command relationship, but the BCT commander may assign a support relationship directly to subordinate units of the BCT. A FAB, U.S. Marine Corps, or multinational artillery units may reinforce a BCT field artillery battalion. A cannon field artillery battalion assigned or attached to a FAB is typically given a command or support relationship to support the whole force or to augment the fires of a specified field artillery unit.

1-170. The BCT's field artillery battalion coordinates with fires cells at BCT and battalion level; and fire support teams and forward observers at company level. This cannon field artillery battalion is also able to operate over a widely dispersed area due to its communications capability, organic radars, and support from the BCT's sustainment and surveillance and reconnaissance capabilities. The cannon field artillery battery's fire direction center controls the battery's firing and is required to maintain the current tactical situation and respond to the supported unit and higher headquarters. Each firing platoon has personnel and equipment to determine firing data and conduct fire missions. A *fire mission* is 1. The specific assignment given to a fire unit as part of a definite plan. 2. An order used to alert the weapon/battery area and indicate that the message following is a call for fire (FM 6-40). The primary control facility for the cannon field artillery battery is the fire direction center.

1-171. Platoon operations are normally 2 firing platoons operating independently in separate platoon locations with a fire direction center controlling the howitzers. The platoon fire direction centers are equipped with the Advanced Field Artillery Tactical Data System (AFATDS) computer as the primary digital interface between the battalion command post and the howitzers. In a platoon-based unit, the platoon leader and platoon operations center execute mission command. The functions of the platoon operations center include technical and tactical fire direction. The platoon operations center is a fire direction center with added responsibilities. The platoon operations center is not a separate element and does not require a separate vehicle. Additional functions of the platoon operations center are executing orders from higher headquarters, coordinating logistics, and all the other operational functions normally performed by a headquarters based on guidance from the battery commander/platoon leader. The numbers of howitzers in each platoon and employment method may vary based on the tactical situation or mission requirements. Howitzers normally position individually and work together under the lead of the senior section chief. If the platoon divides into pairs or groups, a designated senior section chief acts as team leader.

1-172. Section operations are the least preferred method because the section is isolated and must provide for its own defense. This method requires the highest degree of crew training and does not provide for mutual support against air or ground threats.

SECTION V – KEY CONSIDERATIONS FOR FIELD ARTILLERY EMPLOYMENT

FIVE REQUIREMENTS FOR ACCURATE FIRE

1-173. To employ fires is to use available weapons and other systems to create a specific lethal or nonlethal effect on a target. To be effective, fires must be planned, coordinated, accurate and timely. *Predicted fire* is the delivery technique of applying accurately computed corrections (not determined by firing) to standard firing data for all nonstandard conditions (weather, weapon, ammunition, rotation of the earth) to deliver accurate

surprise, nuclear, or nonnuclear fire on any known target in any direction from any weapon limited only by the characteristics of the weapon and ammunition used (FM 6-40).

1-174. Providing responsive fires in support of maneuver is dependent on the ability to achieve accurate first-round fire for effect on targets. *Fire for effect* is 1. A command to indicate that fire for effect is desired. 2. Fire that is intended to achieve the desired result on target (FM 6-40). To achieve responsive fires, field artillery and other units providing indirect fires must conduct thorough and effective fire planning, and maximize the capabilities and the versatility of automated systems used for tactical and technical fire control. To achieve accurate first-round fire for effect on a target, an artillery unit or other unit providing indirect fires must compensate for nonstandard conditions as completely as time and the tactical situation permit. If these requirements are met, the firing unit will be able to deliver accurate and timely fires. 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, because the target is alerted by rounds that miss, can result in less effect on the target, increased ammunition expenditure, increased possibility the firing unit will be detected by hostile target acquisition assets, and collateral damage. There are 5 requirements for accurate fire—

- Accurate target location and size.
- Accurate firing unit location
- Accurate weapons and munitions information.
- Accurate meteorological information.
- Accurate computational procedures.

ACCURATE TARGET LOCATION AND SIZE

1-175. Accurate target location is the first of the five requirements for predicted fire's accuracy. Errors in self-location, direction and range combine to determine target location error as measured on X (deviation), Y (vertical) or Z (range) axes (self-location error includes all three axes). Target coordinates and target location error need to be of sufficient accuracy to enable the desired effects to be created on the target. Determining the size and disposition of the target 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.

1-176. The observer must locate targets using the most accurate means available. Precision munitions offer both an increased probability of achieving first-round effects on a target and a reduced probability of collateral damage. Because precision munitions are more accurate, target location error must be minimized to achieve effects on a target. The method of target location is normally a grid location, as both polar and shift from known point imply a large target location error. Grid locations are transmitted using the military grid reference system with the 100,000 meter grid square designators and a 10-digit or better grid using a target mensuration system, if available, or an 8-digit grid, if using a less accurate means of target location. Target elevation should be in meters in relation to mean sea level or the ellipsoid using the most current datum available. The observer must specify the datum used, so that the fire direction center can make any necessary conversions.

1-177. Point mensuration has always been an important part of targeting, since the points measured represent the desired points of impact for the munitions employed. As the accuracy of weapons delivery has improved, the importance of mensuration has grown in proportion and is a vital part of targeting—

- *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* is the process of measurement of a feature or location on Earth to determine an absolute latitude, longitude, and height. For targeting applications, the errors inherent in both the source for measurement and the measurement processes must be understood and reported. Mensuration tools can employ a variety of techniques to derive coordinates. These may include, but are not limited to, direct read from DPPDB [Digital Point Positioning Database] stereo-pairs in stereo or dual mono mode, multi-image geopositioning, or indirect imagery correlation to DPPDB. (Chairman of the Joint Chiefs of Staff instruction 3505.01B)

1-178. Target acquisition assets provide the means to successfully detect, locate, identify, track, and classify targets. Field artillery target acquisition assets include field artillery observers, radar, and target processing

sections. Field artillery observers are assigned to the field artillery battalion in infantry, armor, and Stryker BCTs. These fire support personnel have a habitual relationship with the supported maneuver unit. Field artillery radars and target processing sections are found in both the target acquisition battery of the FAB and the target acquisition platoon of the BCT's organic field artillery battalion. Other potential target acquisition assets include—

- Information collection assets.
- Other ground sources (maneuver units, support brigades, civil affairs units).
- Air sources (manned and unmanned).
- Special operations forces.
- Military space systems.
- National systems.
- Multinational forces' assets

1-179. With an accurate target location, field artillery and other fire support personnel are able to match required assets to a target, and increase the effectiveness of all fire support resources available to the maneuver commander. The ability to quickly shift highly effective fires throughout the area of operations and beyond enables field artillery and other fire support personnel to add weight at the time and place needed to support decisive operations.

ACCURATE FIRING UNIT LOCATION

1-180. The field artillery 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. Accuracy standards of 7.0 meters horizontal circular error probable (CEP), 3.0 meters vertical probable error and no more than 0.6 mil azimuth probable error are considered the minimums for firing and target acquisition assets to achieve accurate unit location. The improved position and azimuth determining system – global positioning system and on-board navigation systems are the primary means to achieve these levels of accuracy. The fire direction center 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. The field artillery commander and his S-3, advised by the survey section chief, identify survey requirements and develop the survey plan using available assets and techniques to best meet the guidance given by the commander which may include—

- Priorities for survey to include survey methods.
- Accuracies required if other than tactical standard operating procedures. Modified survey techniques may be needed as the result of the mission variables of METT-TC.
- Times that critical tasks in the survey plan must be completed.
- Position requirements to include primary, alternate and supplementary.
- Future plans.
- Initialization and confidence checks for digitized platforms.

1-181. **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.** Common grid is the extension of survey control (direction, location, and altitude) from a base datum to all fire support assets requiring orientation and positioning data within a command. Common grid enables accurate locations for targets and the friendly firing platforms used to attack them. Without a common grid, the fire support assets cannot provide desired effects on targets. Common grid is required for the massing of fires; to achieve first round fire for effect; and transmission of target data from one unit to another in order to aggressively attack enemy targets. Common grid is often referred to as common survey.

1-182. Common grid is provided by field artillery survey sections (found in the target acquisition batteries of field artillery brigades and target acquisition platoons of the BCT's organic cannon field artillery battalion) using the Improved Position and Azimuth Determining System, or in the case of the U.S. Marine Corps, the Improved Position and Azimuth Determining System; Survey System, Navigation, or survey equipment from the Marine Artillery Survey Set. Survey operations must be started as soon as the requirement for survey has been identified. The goal is to establish survey control before occupation by the firing or acquisition elements.

1-183. When survey control is not immediately available, efforts should be directed toward establishing common directional control in the position area. When using an azimuth, the point from which the azimuth originates is the center of an imaginary circle.

1-184. In order for two locations to be considered on common grid they must be referenced to the same datum (for example the World Geodetic System of 1984) ellipsoid (there are more than five ellipsoids used around the world), and grid system (for example, the military grid reference system), and must meet the prescribed survey accuracies or be converted to them. Common grid facilitates all fire support assets being oriented the same with respect to azimuth, position, and elevation to a prescribed accuracy. Common grid/map datum is essential for accurate navigation, target acquisition, target engagement, and for the prevention of fratricide.

1-185. Establishment of the map datum to be used and common grid is a critical command responsibility. Common grid for a field artillery-supported command is provided by the FAB's target acquisition battery and/or the target acquisition platoon found in the BCT's organic cannon field artillery battalion using the improved position and azimuth determining system or improved position and azimuth determining system-global positioning system. Survey planning begins with understanding the field artillery-supported commander's intent and concept of the operation and the FSCOORD/chief of fires/brigade fire support officer's guidance for survey. During planning, full consideration must be given to the field artillery-supported commander's concept of the operation, priorities, tactical situation, survey control available, desired accuracy, and mission variables of METT-TC. This information can be translated into survey requirements for the target acquisition sensors and the designated attack systems, which must be on a common grid by the time required. Aggressive survey planning is essential to ensure mission success.

ACCURATE WEAPONS AND MUNITIONS INFORMATION

1-186. Accurate weapons and munitions information is developed and provided by firing units, fire direction centers, and sustainment cells. Firing tables and technical gunnery procedures allow the unit to consider specific ammunition information (weight, fuze type, muzzle velocity variations, and propellant temperature); and firing unit specifics (for example individual howitzer muzzle velocity); thus, accurate firing data are possible. The exact procedures to apply weapons information to obtain accurate technical solution can be found in the applicable technical manuals and tabular firing tables.

ACCURATE METEOROLOGICAL INFORMATION

1-187. With today's emphasis on first round fire for effect and trends toward longer distances, accurate meteorological corrections for artillery fires are crucial. Atmospheric conditions that include wind, 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. For example, tests in Southwest Asia have shown that firing artillery at maximum ranges in extreme heat and low air density resulted in meteorology corrections up to 4,700 meters. Accurate meteorological data is one of the prerequisites for accurate fire.

1-188. Meteorological conditions at the target location affect the accuracy of precision-guided munitions and submunitions that are subject to the same effects of wind, temperature, and humidity as area munitions. These effects are moderated by the ability of precision-guided munitions to make in-flight corrections using various guidance methods. The greatest effect of meteorology conditions on precision-guided munitions is their ability to acquire targets. Precision-guided munitions that acquire targets by reflected laser energy or visual means can have difficulty locating targets when the target area is obscured by clouds, blowing sand, or other adverse conditions. Newer precision munitions are less affected by these low-visibility conditions. The 155-mm Excalibur projectile, the guided-MLRS rocket, or the Accelerated Precision Mortar Initiative 120-mm mortar round are global positioning system-aided and/or rely on inertial measurement units to home in on the target coordinates.

1-189. Profiler is a system that provides U.S. Army and U.S. Marine Corps field artillery units with critical meteorological information to increase first round hits, conserve ammunition, achieve surprise and reduce the chances for fratricide and collateral damage. Two versions of the Profiler currently exist; the Meteorological Measuring Set – Profiler in use by Army units and the Computer, Meteorological Data – Profiler in use by both Army and Marine Corps. Both systems rely on the Meteorological Model Fifth Generation to provide gridded

meteorological data that in turn are used to generate meteorological messages for the field artillery. Profiler measures and transmits meteorological conditions to indirect fire direction centers, such as wind direction, temperature, pressure and humidity, rate of precipitation, visibility, cloud height and cloud ceiling. Profiler uses this information to create a 4-dimensional meteorological model (height, width, depth, and time) that includes terrain effects. The Air Force Weather Agency transmits large scale global or regional model output to both versions via the Global Broadcast System, which is used to initialize the on board Meteorological Model Fifth Generation. Those systems were designed to use the Navy Operational Global Atmospheric Prediction System for initialization, which was relayed to the field via the Air Force Weather Agency.

ACCURATE COMPUTATIONAL PROCEDURES

1-190. 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 fire direction centers. 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.

1-191. FM 6-40 and ATTP 3-21.90 provide a comprehensive discussion of firing data computational procedures for cannon field artillery and mortars.

FIRE DIRECTION

GENERAL CONSIDERATIONS

1-192. *Fire direction* is 1. 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. 2. The methods and techniques used to convert target information into the appropriate fire commands (FM 6-40).

1-193. 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. The fire direction center receives target intelligence and requests for fire, and translates them into appropriate fire direction. The fire direction center provides timely and effective tactical and technical fire control in support of current operations (JP 3-09.3). *Fire control* is all operations connected with the planning, preparation, and actual application of fire on a target (FM 6-40). The fire direction center is the control center for the gunnery team. The fire direction center personnel receive calls for fire through the AFATDS, or by voice. The fire direction center will then process that information by using tactical and technical fire direction procedures.

Tactical Fire Direction

1-194. Tactical fire direction is primarily performed at the field artillery battalion fire direction center. 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. 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

1-195. 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 meteorological information into firing data. Firing data is all data necessary for firing a weapon at a given

target. Field artillery 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.

1-196. 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 fire unit is laid (oriented) on when it occupies a position (FM 6-50). 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 fire direction center transmits firing data to the firing unit as fire commands.

1-197. Fire commands are commands used by the fire direction center 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. FM 6-40 provides details on fire commands.

1-198. The surface-to-surface attack by field artillery depends on a number of factors including—

- Meeting the five requirements of accurate fire.
- Identifying an appropriate target (target acquisition process).
- Initiating a call for fire into the fire support system (the fire request).
- Analyzing the fire mission to determine the proper method of attack.
- Conducting clearance of fires.
- Coordinating airspace.
- Transmitting the call for fire to the selected fire direction center(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.

1-199. Whether this process is done through an automated system or manually, the process is the same.

1-200. A *fire mission* is 1. A specific assignment given to a fire unit as part of a definite plan. 2. An order used to alert the weapon/battery area and indicate that the message following is a call for fire (FM 6-40). A ***call for fire is a request for fire containing data necessary for obtaining the required fire on a target.*** Field artillery battalion functions directly associated with surface-to-surface attack are encompassed in the *fire mission* process. The fires cell or any sensor can initiate a fire mission (for example, forward observers, aerial observers, radars). Quick-fire channels can be established for any observer or sensor. Any brigade or battalion fires cell or field artillery command post that is normally in the fire mission flow, but is bypassed during quick-fire 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 fire support team, through the battalion fires cell, and then directly to the field artillery battalion fire direction center. For even faster response and more decentralized control, the fire support team may send the mission directly to the fire direction center that will execute the mission. This is often used for priority targets and final protective fires.

1-201. A ***priority target is 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.*** 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 final protective fire is a priority target. The maneuver commander, after consultation with his fire support officer, designates priority targets. He 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 maneuver commander designates a priority target based on time requirements or target importance. When not engaged in fire missions, firing units lay on

priority targets. *Lay* is 1. To direct or adjust the aim of a weapon. 2. The setting of a weapon for a given range, deflection, or both (FM 6-40).

1-202. Field artillery battalions normally do not perform airspace deconfliction; instead, the brigade fires cell with its air defense airspace management element (ADAM) in coordination with the brigade aviation element (BAE) executes this process for the maneuver commander. Airspace control is a mission command function.

1-203. The field artillery battalion primarily uses digital means to plan and execute fires. However, the battalion 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 maneuver fires cells and by trained field artillery observers and untrained observers. Unmanned aircraft systems may send calls for fire directly to the brigade fires cell as the aircraft may be considered a brigade asset.

DIGITAL FIRE REQUESTS

1-204. Digital fire missions may be received from field artillery and non-field artillery digital systems. Procedures and capabilities may vary depending on which digital systems are interfacing with one another. Training opportunities should be aggressively sought out. Field artillery 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

1-205. Use of voice may be necessary for unplanned, immediate fire requests or during adverse communications conditions. Fire direction centers 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.

COUNTERFIRE

GENERAL CONSIDERATIONS

1-206. *Counterfire* is fire intended to destroy or neutralize enemy weapons. Includes counterbattery and countermortar fire (JP 3-09). The counterfire battle is not a separate battle, 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. Counterfire gains freedom of maneuver for all friendly forces. Counterfire is inseparably tied to current and future operations and is part of the overall combined arms fight to achieve fire superiority. Counterfire is both proactive and reactive.

Proactive Counterfire

1-207. Proactive counterfire is the specific targeting of enemy indirect fire systems including their command and control, sensors, platforms, and logistics before they engage friendly forces. The proactive measures consists of zone management, site analysis, and position survivability considerations. Proactive counterfire process begins with targeting during the military decision making process and continues throughout the operation. The brigade combat team intelligence officer and the targeting officer develop named areas of interest and target areas of interest where the enemy indirect fire assets are expected. The objective of proactive counterfire is to identify, locate, and attack to eliminate the enemy's strike capability before it can impact friendly operations. The FAB normally performs the bulk of proactive counterfire in support of division operations, using organic target acquisition and fires as well as allocated division, corps, joint 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, fire direction centers, counterfire radars, forward observers, fixed or rotary wing airfields and fire support

communication infrastructure. Intelligence assets must be synchronized and integrated to accurately locate targets; and attack assets (such as artillery, mortars, close air support, attack helicopters, naval surface fire support, and electronic attack) must be dedicated against the threat total fire support system. Considerations for conducting proactive counterfire include—

- All available artillery units participate.
- Requires augmentation by Army and joint intelligence 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 unmanned aircraft systems are critical.
- Establishing digital interface between the MLRS/HIMARS and cannon field artillery battalion S-2s and the S-2/liaisons is critical.
- Making maximum use of permissive fire support coordination measures to facilitate the clearance of fires; for example, in defense the coordinated fire line may be positioned close to friendly troops to facilitate quick engagements.
- Managing no-fire areas that protect special operations forces, long-range surveillance detachments, reconnaissance troops, and scouts is critical.
- Use of AFATDS to clear fires should be maximized.
- Establishing radar call for fire zones.

Reactive Counterfire

1-208. Reactive counterfire provides immediate indirect fires to neutralize, destroy, and suppress enemy indirect fire weapons once acquired. The fire support systems respond 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. The FAB or the BCT organic field artillery battalion serve as the counterfire headquarters for the supported maneuver command: planning, coordinating, and delivering fires in reaction to enemy indirect fire activity. FAB MLRS/HIMARS and cannon field artillery battalions and BCT organic cannon field artillery battalions employ a variety of counterfire acquisition assets to accurately locate enemy indirect fire assets as they are engaging friendly forces and establish necessary sensor-to-shooter links to rapidly attack the enemy systems. Ensure that the mission fired report and artillery target intelligence is sent to the analysis and control element. Other key considerations for conducting reactive counterfire include airspace clearance, the use of both permissive fire support coordination measures that facilitate quick engagements and restrictive measures such as no-fire areas to protect critical assets, establishing quick-fire channels with sensor-to-shooter links, and designating radar zone managers.

INTEGRATING COUNTERFIRE WITH THE SCHEME OF MANEUVER

1-209. The combination of the AFATDS, MLRS/HIMARS, and cannon weapons systems and an array of sensors that include highly responsive radars enable proactive and reactive counterfire. Sensors, including radars and unmanned aircraft systems, provide accurate near real-time targeting information. The AFATDS at all levels can interface directly with weapons locating radars. This link gives the commander an extremely fast, responsive, and effective counterfire capability. Sensor-to-shooter pairings can orient on the force commander's priorities while still providing counterfire to the force as a whole. Use of zone management and common sensor boundaries, based on specific commander's guidance, is essential for providing targeting, zone, and report criteria for the radar section and engagement and effects criteria for the firing unit.

1-210. As part of the combined arms battle, counterfire must be effectively planned and integrated into the supported maneuver commander's scheme of maneuver. The commander receives input and recommendations from his FSCoord, chief of fires, fire support officer, G-3/S-3 and G-2/S-2 and other staff officers involved in counterfire operations. He issues decisions and guidance as necessary to direct counterfire efforts, to ensure effective coordination occurs, and to ensure that counterfire is synchronized with all other aspects of field artillery supported-unit operations. Field artillery units receive counterfire guidance through the force field artillery headquarters (if designated) or the chain of command. Counterfire responsibilities for the supported maneuver unit staff and fire support planners include—

- Supporting the maneuver commander's critical assets.
- Developing, disseminating, and managing intelligence and order of battle information on the enemy's indirect fire system.
- Advising the maneuver commander in the establishment of attack guidance for counterfire targets.
- Coordinating counterfire operations with higher echelon counterfire operations.
- Integrating counterfire into the operation plan in a complementary manner to enable maneuver operations.
- Achieving indirect fire superiority within the supported maneuver commander's area of operations.

PLANNING FOR COUNTERFIRE AND POSITIONING RADARS

1-211. Planning for counterfire begins with supported maneuver commander's guidance, intelligence preparation of the battlefield and identification of high-payoff targets early in the military decision making process (MDMP). Planning for counterfire continues throughout the operation. Products of the MDMP may include Annex D (FIRES) to the supported commander's OPORD, the supporting FAB/field artillery battalion OPORD, and its supporting target acquisition tab/annex that identify the requirements for the counterfire radars. The field artillery battalion S-2 and targeting officer, with S-3 guidance, develop the radar deployment order for the commander's approval. The radar deployment order details positioning, coverage, and zones for the radars. The radar deployment order is normally part of the target acquisition tab/annex to the field artillery battalion OPORD.

1-212. If the enemy indirect fire threat is significant, the supported maneuver commander may direct his air, ground, and electronic information collection and target acquisition assets to find and target the threat. The supported commander's G-2/S-2 and fires cell planners and targeting officers develop named areas of interest and target areas of interests where the enemy indirect fire assets are expected. The supported unit commander's G-3/S-3 assigns units to detect enemy activities in the selected named areas of interest. Tasks that are given to the reconnaissance squadron, the military intelligence company, and maneuver units form the basis of the brigade's information collection plan. Information on the enemy indirect fire system includes all systems in the supported commander's area of operations, as well as any outside the area of operations that can impact the supported commander's mission including—

- Indirect fire weapon systems—mortars, cannons, rocket, and missile launchers.
- Target acquisition assets—observers, radars, sound/flash systems, and electronic intelligence.
- Command and control elements relevant to counterfire operations.
- Enemy indirect fire tactics.
- Enemy counterfire tactics—to include use of lethal and nonlethal ground and air assets against friendly field artillery.

1-213. Information feeds from the Joint Surveillance and Target Attack Radar System, unmanned aircraft systems, and electronic, communications, and human intelligence sources populate the Distributed Common Ground System-Army database in the supported maneuver commander's intelligence cell. The Distributed Common Ground System-Army generates target nominations that are digitally transmitted to the AFATDS in the fires cell for mission processing. Sensors providing information on targets not meeting the target selection standards are used to cue other sensors to validate the target.

1-214. The flexibility of unmanned aircraft systems makes them a key resource to be cross-cued to locate enemy indirect fire targets. Once located, field artillery, close air support, or maneuver assets may engage the targets. Unmanned aircraft systems may provide near real time battle damage assessment.

1-215. The fire support planners must coordinate the use of the terrain for the radar and recommend radar zones. Radar positioning is coordinated between the FAB's operations and counterfire officers and the supported unit's S-3. Likewise, the BCT field artillery battalion S-3 coordinates positioning of the battalion target acquisition platoon's radars with both its higher headquarters or other supported fires cell, S-3, and the FAB (if one has been designated as force field artillery headquarters). The targeting officer or radar section leader recommends radar positioning based on the mission variables of METT-TC and the radar's accumulated cueing times. When possible, the FAB target acquisition battery's target acquisition platoon leader and/or radar

section leader should reconnoiter the sites. If the radar moves or becomes inoperable, the radar coverage area should be tasked to another target acquisition asset. The radar section chief selects the final radar site based on the Radar Position Analysis System and visual sighting. Often, radars require a position that permits 6400-mil/360-degree coverage.

1-216. The supported unit commander should indicate the assets that are deemed essential to ensure mission accomplishment. If the commander does not identify these assets, the targeting officer must query the commander for the necessary guidance. Once the guidance is obtained, the information is passed to the fires cell for designation as radar critical friendly zones.

1-217. Radar zones are a means of prioritizing 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 on a tactical graphic around an area that designates the area as more, or less, important. Four types of zones can be entered into radars: critical friendly, call for fire, artillery target intelligence and censor zones. A common sensor boundary is useful in reducing duplication of acquired targets among radars. Activities essential for successful radar zone management planning include—

- Prioritizing operational sector and scheme of maneuver events for zone planning based on the commander's intent/guidance.
- Developing zones during the course of action development and the wargaming process.
- Approving and allocating zones to subordinate fires cells that support the scheme of maneuver and facilitate the engagement of high-payoff targets.
- Developing and assigning triggers for the execution of planned zones.
- Incorporating triggers for planned zones and radar movement into the appropriate decision support template, synchronization/execution matrices, and information collection plan.
- Rehearsing planned zones during combined arms, field artillery technical, and fire support rehearsals.
- Refining zones during execution as the intelligence preparation of the battlefield develops or the scheme of maneuver changes.
- Developing positioning guidance for the radar that optimizes the probability of acquisition and supports the coverage of planned zones.

FAB/FIELD ARTILLERY BATTALION ROLE IN COUNTERFIRE OPERATIONS

1-218. The FAB or the BCT's cannon battalion normally has primary responsibility for the reactive component of the maneuver commander's counterfire operations.

1-219. In the FAB, the key counterfire personnel are the FSCOORD/FAB commander, S-3, S-2, target acquisition battery commander, counterfire officer, assistant counterfire officer, targeting officer, and the radar section leader. The FAB S-3, based on the supported maneuver commander's guidance, considers counterfire in all phases of the operation. The FAB commander directs measures to decrease the FAB's vulnerability to detection and minimize exposure to enemy fires. Counterfire attempts to locate and destroy enemy indirect fire systems that pose the greatest threat before they can attack.

1-220. In the BCT field artillery battalions, the key counterfire personnel are the FSCOORD/field artillery battalion commander, S-3, fire direction officer, S-2, targeting officer, target acquisition platoon leader, and the radar section leader. The field artillery battalion S-3, based on the supported maneuver commander's guidance, considers counterfire in all phases of operations. The FSCOORD directs measures to decrease the field artillery battalion's vulnerability to detection and minimize exposure to enemy fires.

1-221. Counterfire radars organic to the target acquisition battery of the FAB and target acquisition platoon of the BCT's cannon field artillery battalion normally send fire missions generated acquired by the radar to the fire direction center at the designated field artillery battalion tactical operations center. Counterfire targets are usually generated from critical friendly zones or call for fire zones. If the situation warrants, a quick-fire channel can be established from a radar directly to a firing battery or platoon. Quick-fire channels, when directed, are established for a specified period to achieve specific mission requirements. Pre-clearance of such targets needs to be defined in precise terms that identify the conditions under which the target is pre-cleared for engagement.

1-222. Acquired counterfire targets may be fired by the designated field artillery battalion or forwarded through field artillery and fire support channels for attack by other assets. When a field artillery battalion is assigned a reinforcing support relationship, the supported field artillery battalion commander has additional options for executing counterfire operations—

- The supported maneuver commander's fires cell passes all counterfire missions to the reinforcing field artillery battalion; this allows the BCT's field artillery battalion to concentrate on providing close fires.
- The radars send all acquisitions directly to the reinforcing field artillery battalion; this normally lowers mission-processing time.

SPECIAL CONSIDERATIONS FOR THE CONTROL OF WEAPONS LOCATING RADARS

1-223. The FSCoord, chief of fires, brigade fire support officer, and fires cell planners recommend an organization for combat for the radar assets to best meet the supported commanders' requirements and the mission. The FAB or the BCT field artillery battalion coordinates radar management with supported G-2/S-2s, G-3/S-3s and fires cells. Control options for weapons locating radars include centralized control at the FAB, decentralized control, and a combination of centralized and decentralized control.

Centralized Control

1-224. When directed by the supported maneuver commander, the FAB may assume control of all weapons locating radars in the supported force. Centralized control optimizes coverage to support the commander's intent. The FAB's S-2, S-3, counterfire, target processing, and fire control elements work with both FAB-subordinate and BCT organic field artillery battalion counterfire personnel by—

- Designating a general position area, sector of search, and zones for each of the radars.
- Designating cueing agents
- Establishing cueing guidance.
- Establishing sensor-to-shooter linkages
- Controlling radar movement.

1-225. Deconfliction of coverage in autonomous operations is simple since the fires cell controls all weapons locating radars. Even so, a common sensor boundary might be established to segregate coverage areas according to capabilities of individual radar. If established, the common sensor boundary should be placed in conjunction with the brigade's coordinated fire line when possible. This eliminates the need to deconflict acquisitions before engaging targets. The call for fire zone may be cleared to engage targets immediately based on intelligence preparation of the battlefield and commander's intent.

1-226. BCT organic target acquisition assets may be held either under the centralized control of the BCT fires cell or the BCT's field artillery battalion. Centralized control optimizes coverage to both support the scheme of maneuver and to provide radar coverage for call for fire and critical friendly zones. Under centralized control, the BCT S-2, brigade fire support officer, and fires cell planners work with the organic field artillery battalion S-2 and targeting officer and organic field artillery battalion personnel to accomplish the same tasks as do their FAB counterparts.

Decentralized Control

1-227. Decentralized control can be accomplished by establishing a command or support relationship for the radar. Under decentralized control, target acquisition assets are provided to subordinate units for their direct control and employment. To facilitate autonomous operations, radar sections may be attached to battalions or even batteries. Units with attached radars plan the employment of attached radars. The battalion S-3 controls the radar, based on recommendations from the battalion S-2 and targeting officer, to meet the commander's guidance. Weapons locating radar sections are responsible for covering the supported maneuver battalion or reconnaissance squadron zone of responsibility or area of operations. The FSCoord, brigade fire support officer and fires cell direct requirements and priorities based on the BCT commander's guidance and tactical situation. The field artillery battalion S-3 directs radar employment to execute those requirements. Weapons

locating radars may be placed under the control of a FAB MLRS/HIMARS battalion or other field artillery unit from the division or corps based on METT-TC.

A Combination of Centralized and Decentralized Control

1-228. Any combination of centralized and decentralized control of radars may be used according to the situation. For example, one of the weapons locating radars and a howitzer battery may be in DS of a BCT subordinate maneuver battalion, while the remaining weapons locating radar is kept under control of the BCT field artillery battalion.

Considerations for Supporting Augmenting Field Artillery Units

1-229. Augmenting units may or may not require both target acquisition assets and additional processing capability to effectively perform counterfire. In either case, the BCT organic field artillery battalion must ensure the augmenting unit is capable of accomplishing any assigned fire mission. Closely linked to BCT maneuver through the fires cell, the fire support coordinator, brigade fire support officer, and BCT organic field artillery battalion S-3 must provide and coordinate the following for the R unit—

- Commander's guidance for counterfire, to include required search azimuth, zones, and cueing guidance.
- Provide intelligence support.
- Coordinate terrain, to include position areas for augmenting field artillery and acquisition assets.
- Traffic and movement priorities for units and ammunition.
- Ammunition forecast and other sustainment requirements.
- Survey and meteorological support, if needed.

1-230. An automated (digital) capability must be provided to non-automated multinational field artillery units to maximize communications. The supported FA battalion may have to provide liaison with multinational units.

TACTICAL MOVEMENT AND POSITIONING

1-231. Artillery units should not be positioned on major avenues of approach. Enemy breakthroughs may jeopardize the unit or force it to displace prematurely. Supported commanders typically give artillery units a position area for artillery where individual artillery systems can maneuver to increase their survivability. A position area for artillery is not an area of operations for the artillery unit occupying it. Coordinating positions for field artillery is a collaborative effort among the maneuver headquarters, fires cells, and field artillery headquarters to ensure continuously available field artillery (indirect fires, radar, survey and meteorology) support to the force. Early in the operations process the personnel identify the possible field artillery units involved, the general position areas required and their suitability in the supported unit areas of operation, the general times when these locations will be required, and the possible routes needed for movement. Reconnaissance, selection, and occupation of position is the rapid, orderly movement to and occupation of an artillery firing position.

1-232. This information is used by the supported command and supporting fires cell and field artillery battalion staffs to begin the detailed planning and information gathering necessary to identify specific issues or requirements, the feasibility of the general positioning and movement plan, and the detailed coordination requirements necessary for terrain management. As the scheme of maneuver develops, field artillery positioning and movement plans and information become more detailed, and the maneuver headquarters G-3/S-3, fires cells and FAB/field artillery battalion S-3s conduct lateral coordination. The supported command's chief of fires/fire support officer can assist supporting FABs/field artillery battalions with terrain management issues. Level III threats (requires commitment of tactical combat force) may cause significant traffic as sustainment units and civilians move away from the threat. In such cases field artillery units may need to request priority for movement. Aerial reconnaissance may facilitate movement planning, helicopters can quickly emplace advance party teams and unmanned aircraft systems can be used to scout ahead of moving field artillery units.

1-233. The positioning of field artillery in the security area to maximize range is appropriate and must be carefully considered and planned. Positioning considerations include security risks, communications requirements and logistical support.

1-234. During an area defense, field artillery units may have to move more often than maneuver forces, particularly where there is significant enemy counterfire. Field artillery should position well forward in the supported command's defensive formation; coordination for subsequent positions is essential. Terrain analysis includes its effects on not only weapons systems but also for ammunition carriers and towed-artillery prime movers as well. During airborne or air assault tasks, conduct initial reconnaissance by map or air. Plan for air or ground displacement.

1-235. When in urban areas, identify position areas with dirt surfaces that will support emplacement of spades and firing platforms. Anticipate the possibility that street rubble may hamper movement. Anticipate increased movements to overcome obstruction/dead space. Ensure howitzer positions allow for high-angle firing. Position fire units on the edge of the urban area, if possible. Provide multiple exits from the position. Consider the need for multiple survey control points. Anticipate survey difficulties due to obstructions, collateral damage, and electro-magnetic interference, for example, metal, power lines, and transformers.

1-236. FAB/field artillery battalion sustainment organizations should be located so that support can be maintained, but does not interfere with the tactical movement of FAB/field artillery battalion units, or with units that must pass through the area. The size of the area dedicated to sustainment activity varies with terrain; that for a FAB may be up to 4 to 7 kilometers in diameter with that for a field artillery battalion proportionately smaller. Usually the FAB/field artillery battalion sustainment organizations are on a main supply route located in the brigade, division, corps, joint task force, or other supported command's sustainment area. Ideally the areas are out of the range of the enemy's medium artillery.

SURVIVABILITY AND SECURITY

1-237. Field artillery units and their elements are often high-value targets for the enemy, can be detected by multiple means, and are vulnerable to enemy air attack, ground forces, and electronic warfare. Many field artillery units have very limited self-protection capability. Elements that need to be secured include headquarters elements, command posts and mobile command groups, isolated elements, and field artillery firing platoons. Survivability of these units is critical to the success of the field artillery-supported command.

1-238. The ability to disperse, hide, fire, and then displace quickly helps negate the vulnerability of firing units to detection based on their firing signature. Keep in mind that this firing signature may also endanger any nearby units. The battery commander will issue movement criteria to the platoon leader for displacement and survivability moves. Base movement criteria on mission variables of METT-TC and tactical standard operating procedures. Some triggers for movement may include the number of rounds fired in current location, duration of firing, and time in position.

1-239. Radar systems are susceptible to enemy ground attack, air attack, indirect fires, and electronic warfare. When possible, radar section equipment should be placed in a hardened position to protect the antenna and crew. Even so, the antenna cannot be completely covered. Placing the radar in a hardened position also helps dissipate noise from the antenna transceiver group and equipment trailer, lowers susceptibility to direct observation, and reduces the radar's thermal and infrared signatures.

1-240. Field artillery units must always plan for self-defense. The key to survival for less mobile elements of field artillery units such as command posts and fire direction centers is to avoid detection; concealment using natural and manmade camouflage, noise and light discipline, and positioning these unit elements within natural terrain features to reduce the risk of detection from the ground or air greatly enhance survivability. Other considerations include—

- Positioning units to protect them from potential enemy indirect and direct fire:
 - Positioning on reverse slopes.
 - Positioning away from high speed avenues of approach.
 - Establishing a track plan within the position area.
 - Using terrain-gun positioning.

- Using natural and man-made camouflage.
- Positioning units to enable mutually supporting fires.
- Coordinating support from maneuver units, military police, nearby units, and host nation civil/military elements to assist in defending field artillery battalion assets from attack and in repelling attacks.
- Using supplementary positions for lengthy planned missions, especially when the counterfire threat is high.
- Making maximum use of mask to shield fires and communication from enemy acquisition.
- Hardening positions whenever possible.
- Covering likely avenues of approach with machine guns, antitank weapons, and grenade launchers.
- Planning for howitzer direct fire.
- Positioning listening posts and observation posts to provide sufficient early warning to the battery.
- Using roving patrols throughout the position area.
- Training Soldiers on improvised explosive devices and mine identification, likely locations, and marking procedures.
- Ensuring an advanced party detects or clears the position of any enemy forces, civilians; chemical, biological, radiological, and nuclear threats, improvised explosive devices, and mines prior to the main body arriving.
- Initially clearing lanes for critical vehicles to move into position, for example, fire direction center and howitzers; clear noncritical areas as time permits.
- Establishing a secure perimeter to guard against ground attacks, displaced civilians entering the perimeter, and thieves.
- Ensuring vehicles never travel alone.

1-241. Planning and requesting fire support, situational understanding, appropriate positioning, and movement all contribute to self-defense. The key to acquiring external protection is to work with the force commander to reach an agreement that matches the threat level of the operational environment. Procedures for using such a package should be included in all battalion and battery tactical standard operating procedures. The supported commander may consider including forces to provide security and protection for field artillery elements as specified tasks in OPLANs/OPORDs. FAB/field artillery battalion sustainment elements must organize and prepare to defend themselves against ground or air attacks. Often, they occupy areas that have been secured by maneuver units. The security of the trains at each echelon is the responsibility of the individual in charge of the trains.

SUSTAINMENT

THE ROLE OF ECHELONS ABOVE BRIGADE SUSTAINMENT ORGANIZATIONS

1-242. Sustainment brigades are subordinate commands of the theater sustainment command which consolidate selected functions. The theater sustainment command uses sustainment brigades to provide support to the joint task force, corps, divisions' BCTs and other support brigades (for example FAB, battlefield surveillance brigade, maneuver enhancement brigade). The sustainment brigades are assigned multifunctional and/or single function battalions, and companies tailored and task organized to the specific mission. All sustainment brigades provide area support, although the specific tasks they are assigned may differ.

THE ROLE OF BCT AND FAB BRIGADE SUPPORT BATTALIONS

1-243. The BSB organic to BCTs and FABs perform selected consolidated functions. The BSBs in the BCTs generally have an organic distribution, maintenance, and medical company and a number of forward support companies. The forward support companies are assigned to the BSB and can be in direct support DS, or under OPCON or TACON of supported maneuver or field artillery battalions of the brigade.

1-244. The FAB's BSB have distribution and maintenance platoons but does not have an organic medical company. A medical treatment team and an ambulance team are organic to the FAB headquarters and

headquarters battery to provide health service support Role 1 medical care. The area support medical company from the multifunctional medical battalion provides Role 2 health service support and force health protection support for the FAB. The BSB provides a material carrying capability that enables the brigades to conduct sustained operations for a finite period of time. For example the BCT and the FAB are organized with self-sustainment capability for up to 48 hours of combat. Beyond 48 hours, echelons above brigade sustainment organizations, such as the sustainment brigade, are required to conduct replenishment of BCT and FAB combat loads.

SUSTAINMENT WITHIN FIELD ARTILLERY ORGANIZATIONS

Field Artillery Brigade

1-245. The BSB is the core sustainment organization for the FAB. The BSB is organic to the FAB and consists of functional support platoons and functional and multifunctional forward support companies that provide support to the FAB HHB/separate companies and to the FAB's organic and assigned battalions. The BSB plans, coordinates, synchronizes, and executes sustainment operations in support of brigade operations. It maintains visibility of the theater distribution system, synchronizing the flow of throughput into the brigade's operational area. The BSB also operates an ammunition transfer holding point in the brigade support area. Additional sustainment support beyond that which can be provided by the BSB is provided by a sustainment brigade on an area basis. External support is requested by the BSB support operations officer in coordination with the corps, division or other supported command G-4 to which the FAB has a command or support relationship.

1-246. The FAB BSB has forward support companies that are given a command or habitual support relationship to individual FAB battalions to provide logistical support. There is one forward support company for each field artillery battalion in the FAB. Each forward support company has a distribution and a maintenance platoon that provide—

- Food and water (Class I).
- Fuel (Class III).
- Ammunition (Class V).
- Repair parts (Class IX).

1-247. The forward support company provides dedicated sustainment assets organized specifically to meet each FAB subordinate battalion commander's requirements. The forward support company commander receives technical sustainment oversight from the BSB commander.

BCT Field Artillery Battalion

1-248. BCTs have a significant organic capability to sustain their own operations, which serves to ensure freedom of action, extend operational reach, and prolong endurance. Although BSB capabilities and structure differ somewhat depending upon the type of BCT (armored, infantry, or Stryker), core capabilities include maintenance, medical, supply, and distribution. Direct throughput of supplies to the field artillery battalion is the rule rather than the exception. The BSB commander, as the senior logistics commander and single logistics operator for the BCT, plans, coordinates, synchronizes, and executes sustainment operations in support of brigade operations. The forward support company commander in the armored BCT and infantry BCT field artillery battalion is the key sustainment operator at the battalion level and provides maintenance, supply, and distribution support. The Stryker BCT BSB task-organizes support to the Stryker BCT's field artillery battalion given the battalion does not an assigned forward support company.

1-249. The principal sources of support to the field artillery battalion are the forward support company and the BSB, which provides responsive logistical support to the BCT by positioning forward support companies with maneuver and field artillery battalions. Additional sustainment support beyond that which can be provided by the BSB must be requested by the BSB support operations officer responsible for communicating sustainment requirements to the sustainment brigade assigned to support the BCT. The support operations staff officer determines requirements in coordination with the brigade manpower and personnel staff officer, the brigade logistics staff officer, and the BSB S-2/3.

1-250. The firing platoon can provide fires without its parent battery or battalion. Logistical support of the detached platoon can be a significant challenge. Split operations must be carefully planned and specific resources identified and allocated to support the platoon during mission execution. The extensive requirement for artillery ammunition resupply may require supplemental transport to be provided by the supported commander. Support considerations may include—

- Stockpiling ammunition.
- Throughput deliveries.
- Aerial resupply.
- Supply point distribution.

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Chapter 2

Fire Support

Field artillery operations are actually two distinct functions; field artillery, and fire support (Army doctrine reference publication [ADRP] 3-09). *Fire support* is fires that directly support land, maritime, amphibious and special operations forces to engage enemy forces, combat formations, and facilities in support of tactical and operational objectives (joint publication [JP] 3-09). Section I begins this chapter by describing the role of fire support in unified land operations Section II describes fire support coordination organizations and key personnel. Section III describes information collection and target acquisition for fire support. Section IV concludes the chapter with a discussion of fire support attack resources.

SECTION I – FIRE SUPPORT IN UNIFIED LAND OPERATIONS

GENERAL CONSIDERATIONS FOR FIRE SUPPORT

2-1. The *fires warfighting function* is the related tasks and systems that provide collective and coordinated use of Army indirect fires, air and missile defense, and joint fires through the targeting process (Army doctrine publication [ADP] 3-0). Fires contribute to the overall effect of maneuver, but commanders may also use fires separately for decisive and shaping operations. The fires warfighting function includes tasks associated with integrating and synchronizing the effects of Army indirect fires, air and missile defense, and joint fires with the effects of other warfighting functions. It includes planning for targeting; providing fire support; countering air, ballistic missile, cruise missile, rocket, artillery, mortars, and unmanned aircraft systems threats; and integrating joint and multinational fires (ADP 3-09).

2-2. Fire support planning is normally developed by the higher headquarters and further refined by subordinate headquarters. This is sometimes referred to as “top down planning, bottom up refinement”. For example, there is usually not enough time during preparation for combat for the brigade FSO to wait for platoon forward observers and company/battalion FSOs to identify, consolidate, and forward targets for inclusion into the brigade fire support plan. Fire support plans developed by the brigade FSO include the commander’s intent and can be refined by the subordinate battalion and company FSOs.

2-3. Fire support agencies should disseminate the fire support plan to subordinate levels using a digital formatted message (as opposed to plain text message) to reduce the probability of errors in transmission. FOs and FSOs at lower levels must verify and refine the plan, their assigned targets, and positioning to ensure they can execute fires needed to support the commander’s intent.

2-4. Commanders integrate fire support into the concept of operations during planning. Field artillery commanders, assisted by fire support personnel and organizations at all echelons integrate Army, joint, interagency and multinational fires capabilities during the operations process. These leaders will perform the fires integration function (including electronic attack) for the commanders of both maneuver and special operations forces; providing access to Army, joint, interagency, and multinational fires capabilities. *Joint fire support* is defined as joint fires that assist air, land, maritime, and special operations forces to move, maneuver, and control territory, populations, airspace, and key waters (JP 3-0). *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).

EMPLOY VERSATILE ARMY INDIRECT FIRES CAPABILITIES

2-5. The fires community is a versatile force that operates across the range of military operations and does so with competence and professionalism. Our foundation is our leaders and Soldiers. Through training, education, leader development programs, and operational experience we give our leaders and Soldiers the skills necessary to perform a broad range of missions and tasks. By combining this foundation and collective training, fires organizations will be able to employ indirect fire capabilities which are versatile and responsive, and achieve desired precision, as well as, area effects. In order to attain these effects on the battlefield we will use cannons, rockets, missiles, mortars, and target acquisition assets. Fire support personnel understand how to access and integrate joint, Army, and multinational fires in a timely and responsive manner. Fires forces are as mobile and deployable as the maneuver forces they support. Indirect fires may include anything from a single precision munition round to a multiple battalion mass mission.

PROVIDE RESPONSIVE FIRES THAT ACHIEVE DESIRED EFFECTS

2-6. Effective gunnery, target acquisition, weapons, munitions, and mission command are essential for field artillery fires to be responsive to maneuver forces. Procedures must be streamlined to minimize the time lag between the acquisition of a target and the delivery of fires. Unnecessary delay can result in a failure to have desired effects on the target. Responsiveness can be achieved by—

- Streamlining the call for fire through use of digital systems.
- Training.
- Rehearsals.
- Planning fire support requirements in advance.
- Limiting radio transmissions on fire nets to time-sensitive, mission-essential traffic only.
- Continually training observers in all aspects of fire support.

2-7. 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 effect can be achieved through proper weaponeering, accurate initial fires, and massed fires. *Weaponeering* is the process of determining the quantity of a specific type of lethal or nonlethal weapons required to achieve a specific level of damage to a given target considering target vulnerability, weapons characteristics and effects, and delivery parameters. (JP 3-60)

Accurate Initial Fires

2-8. The goal of the Field Artillery is to achieve first-round fire for effect. This enables greater effectiveness and a reduced logistical footprint. First-round fire for effect requires that all five of the requirements for accurate fire are consistently being met.

Massed Fires

2-9. *Massed fire* is 1. The fire of the batteries of two or more ships directed against a single target. 2. Fire from a number of weapons directed at a single point or small area (JP 3-02). Massed fires seek to maximize effectiveness of the initial volley on the intended target. For example massed fires can be anything from a battalion 1 high explosive on the target to a platoon firing precision munitions on separate aim points. Massing all available fires enables the maneuver commander to maximize the effects 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 achieved 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; for example, a soft target (personnel in the open) can easily become a hard target (personnel with overhead cover).

IDENTIFY, LOCATE, TARGET, AND ENGAGE THREATS WITH INCREASED DISCRIMINATION

2-10. Success on the battlefield requires precision and the use of force. The Army must be able to provide the means for Soldiers to rapidly discriminate friend from foe on the battlefield and provide units with the multi-

echelon common operational picture. Due to the urbanization of the combat zones our enemies operate in, this requirement is unlikely to change any time soon.

2-11. Army fires combine with joint and multinational assets via an integrated fire control capability to recommend the best weapon to counter evolving threats from land, sea, air and space. Advanced target location tools assist in reducing target location error. A range of capabilities in our munitions and task-organized composite units assist to achieve the desired effects.

2-12. Electronic attack capabilities provide discrete effects to minimize collateral damage and prevent disruption of friendly force operations. Electronic attack provides commanders with another option to engage targets in environments with the high potential for fratricide and/or collateral damage.

INTEGRATE JOINT, ARMY, AND MULTINATIONAL CAPABILITIES

2-13. Fires capabilities must be integrated with the capabilities of the other Army warfighting functions, special operation forces, joint services, interagency, and multinational partners. Although this will create some redundancy, overall it will create an optimal environment because it will mitigate restrictions and resource shortfalls. Indirect fires – artillery, mortar, and naval surface fire support – provide an all-weather, 24/7 fires capability for the warfighter. Interoperability will also be key, as well as the ability to attack targets and threats identified and located by organic and nonorganic sensors. This interoperability includes the ability to successfully hand targets off to other organizations throughout the area of operations.

DISTRIBUTE FIRES CAPABILITIES FOR DECENTRALIZED CONTROL OF OPERATIONS

2-14. The goal of distributed fires is to ensure joint, Army, and multinational forces always have timely and responsive fires for decisive action. To increase operations for commanders at all echelons, the fires command network must enable centralized as well as decentralized control of operations. Fires capabilities, from precision fires to the ability to mass the effects of multiple systems against single or multiple targets, will be distributed throughout the area of operations.

SECTION II - FIRE SUPPORT COORDINATION ORGANIZATIONS AND KEY PERSONNEL

COMMAND POST CELLS AND LIAISON

2-15. A fires cell is the command post cell responsible for integrating and coordinating Army indirect fires, air and missile defense, and joint fires through the targeting process. There are fires cells within the command post of every Army echelon from corps through brigade as well within those of the maneuver battalions, reconnaissance squadrons and the brigade special troops battalion of the brigade combat team (BCT). The theater army commander plans and requests tailored Army force packages. The theater army determines the composition of the force (how many and what types of units); its optimum deployment sequence given combatant commander priorities and available lift; and the initial command and support relationships. The capability to use the theater army as a field army commanding multiple army corps disappeared when the Army deleted the operational command post module built into the design. The role of the small theater fires cell at theater army level is beyond the scope of this manual. See FM 3-93 for additional information on theater army operations. The FSCOORD, chief of fires, or fire support officer leads the fires cell. Coordination among fires cells at each echelon facilitates the effective support of the maneuver unit and the use of fire support coordination measures to ensure effective massing of fires and the prevention of fratricide.

JOINT FORCE LAND COMPONENT/JOINT TASK FORCE

Fires Cell

2-16. When designated by the joint force commander, a corps or division commander serves as the commander of the joint force land component or a joint task force. The corresponding fires cell functions at the designated headquarters include—

- Advising on the application of fires to achieve the desired effects.
- Identifying requirements for the supported commander's desired effects from fires provided by other components (air interdiction/naval surface fires).
- Reviewing the joint force air component commander's apportionment recommendation.
- Recommending joint force land component commander assets for joint force commander allocation.
- Advising on fires asset distribution (priority) to land forces.
- Recommending joint force land component commander priorities, timing, and effects for air interdiction within the joint force land component commander area of operations.
- Recommending joint force land component commander targeting guidance and priorities to include information from space-based assets that will aid in targeting.
- Recommending joint force land component commander's target lists and fire support coordination measures.
- Leading the joint targeting coordination working group; participating in the Joint Targeting Coordination Board.

Battlefield Coordination Detachment

2-17. The battlefield coordination detachment is an Army coordination organization that provides selected operational functions between the Army and the air component commander. Its mission is to provide Army forces liaison at the joint air operations center. The battlefield coordination detachment provides the critical and continuous coordination between the air and land commanders. The battlefield coordination detachment staff clearly articulates the Army forces or land component commander's requests for air operations support for the ground operations to complement the joint forces commander's end state. The BCD performs its mission by—

- Exchanging operational and intelligence data between the joint forces air component commander and Army forces.
- Relaying and clarifying the actions of the land battle for the air component commander.
- Managing information to render a comprehensive common operational picture.
- Processing the Army forces prioritized air support requests.
- Submitting the commander's air interdiction targets and advocating for their support.
- Coordinating requirements for airspace coordinating measures, fire support coordination measures, and theater airlift.

2-18. For additional information on the battlefield coordination detachment see ATTP 3-09.13.

Ground Liaison Officer

2-19. The ground liaison officer advises Air Force commanders on Army organization, operations, tactics and equipment and assists them by coordinating Army units during joint operations. He supports Air Force tactical fighter, tactical air control and airlift units. The ground liaison officer's functions include—

- Serving as an information conduit between the Army and supporting Air Force Wing.
- Providing Air Force Wing flight crews with scheme of ground component maneuver, ground fires integration considerations, special munitions instructions and ground component desired effects.
- Providing situational understanding and battle damage assessment to the battlefield coordination detachment ensuring information flow between the battlefield coordination detachment and the Air Force Wing.

ARMY ECHELONS ABOVE BRIGADE

Corps and Division Fires Cells

2-20. The corps and division fires cells develop, recommend, and brief the scheme of fires, including both lethal fires and nonlethal actions, recommend targeting guidance to the commander, develop high-payoff targets,

select targets for attack, and coordinate, integrate and assign allocated joint, interagency and multinational fires to specific targets/target systems.

2-21. Corps and division fires cells synchronize all fire support for the command to include Army, joint and unified action partners. Through targeting, cyber electromagnetic activities are integrated and synchronized by the electronic warfare officer. Corps and division fires cells also participate in assessment (battle damage, munitions effectiveness, re-attack recommendations); develop planning guidance; provide target intelligence for planning and execution and coordinate with the battlefield coordination detachment collocated with the respective air support operations center.

2-22. At the division level, air support operations centers are aligned with the division headquarters. Integrating air support operations centers and tactical air control parties with division fires cell personnel, Army airspace personnel give the division a powerful joint collaborative team maximizing the use of fires with airspace. This team comes together within the division current operations integrating cell referred to as the Joint Air-Ground Integration Center (JAGIC). Although the JAGIC takes direction from the G-3 or chief of current operations, the division chief of fires maintains executive oversight of the JAGIC. The assistant FSCOORD serves as the senior Army representative in the JAGIC and works closely with the senior air director for the air support operations center.

2-23. Fires cell general functions at this level include—

- Planning, integrating, coordinating, and synchronizing Army indirect fires, air and missile defense, and joint fires.
- Providing access to joint fires for interagency and multinational forces.
- Interfacing with the battlefield coordination detachment, joint air operations centers, and lower and adjacent fires cells.
- Providing input to the air tasking order, airspace control plan, and airspace control order which includes fire support coordination measures and airspace coordinating measures.
- Reviewing target nominations for inclusion into the joint integrated prioritized target list.
- Providing input to the joint force air component commander's apportionment recommendation.
- Conducting target management including recommendations, receipt, and distribution to subordinate fires units for rules of engagement, high-priority target list/time sensitive targets, and restricted target/no-strike lists.
- Leading the targeting working group and participating in the targeting board.
- Conducting airspace coordination.
- Providing input to the information collection plan to synchronize surveillance and reconnaissance assets with named areas of interest and designated targets in coordination with the analysis and control element.
- Requesting and coordinating close air support and air interdiction.
- Coordinating position areas for fires units under corps control with maneuver and airspace control agencies.

2-24. The fires cell works closely with the force field artillery headquarters if one is established. The fire cell's responsibilities are based on the situation and may include coordination and technical oversight. The force field artillery headquarters may provide the corps or division fires cell with operational control of all corps or division fires.

2-25. When the corps serves as the headquarters for a joint task force or joint land component commander, the fires cell performs additional functions (see JP 3-09 and JP 3-31). To further facilitate fires when the corps is serving as the senior Army tactical headquarters, the air support operations center collocates with the fires cell. The fires cell provides representatives to the current operations integration cell.

United States Air Force Elements at Corps and Division

2-26. Air Force support to the corps headquarters consists of a corps tactical air control party (TACP), a staff weather officer, and the air mobility liaison officer. These Air Force elements function as a single entity in

planning, coordinating, deconflicting, and integrating the air support elements with ground elements. Air mobility liaison officers advise ground commanders and staffs on the capabilities and limitations of air mobility assets.

2-27. The air support operations center is the principal air control agency of the theater air control system responsible for the direction and control of air operations directly supporting the ground forces. It processes and coordinates requests for immediate air support and coordinates air, space, and cyberspace missions requiring integration with other supporting arms and ground forces. The air support operations center normally collocates with the Army senior tactical headquarters, normally at corps or division level. When employed, the air support operations center and tactical air control party merge to form one combat organization, under the command of a single leader, but they remain equipped and manned to perform distinct functions in support of brigade combat teams (BCTs).

BRIGADE FIRES CELL

2-28. The brigade fires cell plans, coordinates, integrates, synchronizes and deconflicts the employment and assessment of fires for both current and future operations. The brigade fires cell is generally organized with a fire support officer and assistants, an air defense airspace management element (ADAM), an electronic warfare element, a targeting element, and digital systems operators. The brigade aviation element typically collocates with the ADAM. The fires cell plans, prepares, coordinates and integrates the execution and assessment of fires including artillery, mortar, radar, electronic attack, air support, naval surface fire support, and other joint assets.

2-29. The fires cell is the centerpiece of the brigade targeting architecture. The cell plans, synchronizes, coordinates, and integrates fires matched to a wide range of targets/target systems. Along with the brigade S-3 and S-2 the fires cell plans, coordinates and synchronizes the use of fires with the scheme of maneuver. The fires cell recommends targeting guidance to the commander, develops high-payoff targets, and selects targets for attack. The brigade's targeting working group brings together representatives of all staff sections concerned with targeting. The brigade legal section can assist the fires cell by providing legal review of plans, targeting and orders. The fires cell coordinates target acquisition, target dissemination and target engagement functions for the commander. Primary functions of brigade fires cell include—

- Planning, integrating, coordinating, and synchronizing fire support for brigade operations.
- Providing input to the information collection plan.
- Coordinating the tasking of sensors during development of the information collection plan with the BCT S-2, the military intelligence company commander, and the reconnaissance squadron to acquire targets.
- Leading the brigade targeting process.
- Interfacing with all boards/cells.
- Managing and tracking target nominations.
- Producing and executing the fire support plan.
- Briefing the brigade commander on the fire support plan.
- Disseminating the approved fire support plan to subordinate and supporting fire support organizations.
- Preparing the fires portion to include annex D of the brigade operation plan (OPLAN)/operation order (OPORD).
- Working with the S-7, S-9, public affairs officer, electronic warfare officer, ADAM officer, air liaison officer, and brigade judge advocate to integrate fires and appropriate aspects of inform and influence activities into the brigade targeting process.
- Coordinating airspace requirements.
- Recommending and managing fire support and airspace coordination measures.
- Coordinating position areas for fires units with maneuver and airspace control agencies.
- Requesting and coordinating close air support and air interdiction.
- Conducting fires assessment and recommending re-attack.
- Coordinating clearance for attacks against targets (clearance of fires).
- Coordinating requests for additional fire support to include joint fires.

Battalion Fires Cells

2-30. Battalion fires cells provide a fire support coordination capability within the unit headquarters and assist the maneuver battalions and the reconnaissance squadron in executing their respective portions of the BCT's scheme of fires. The fires cells also assist the maneuver battalions, reconnaissance squadron and brigade special troops battalion in executing their own scheme of fires. Battalion fires cells also provide fire support teams with digital linkage to their battalion mortars as well as to fire support assets available at the BCT or higher levels.

2-31. The battalion fires cell is organized with a fire support officer, fire support noncommissioned officer, an electronic warfare noncommissioned officer, and digital systems operators. The battalion fires cell tracks organic fire support assets (such as mortars), as well as supporting fire support assets. It monitors priority of fire for indirect and electronic attack systems, and recommends priority of search for radars. The battalion fire support officer plans fires in support of all battalion tasks and advises the commander concerning the capabilities, limitations and effective use of available fire support resources.

Fires Cell Augmentation and Liaison

2-32. Augmentation to the fires cell normally includes an Air Force tactical air control party and, depending upon the mission variables, may include a naval surface fire support liaison officer, a Marine Corps liaison officer, and an Army space support team.

United States Air Force Tactical Air Control Party

2-33. A *tactical air control party* is a subordinate operational component of a tactical air control system designed to provide air liaison to land forces and for the control of aircraft (JP 3-09.3). An Air Force tactical air control party provides the BCT commanders' with an air liaison officer who leads the tactical air control party and is principal advisor on air support. The tactical air control party is typically collocated with the fires cell at the Army BCT main command post. The air liaison officer leverages the expertise of the tactical air control party and linkages to higher echelon tactical air control parties to plan, prepare, coordinate, execute, and assess the effectiveness of air support for brigade operations. The air liaison officer also maintains situational understanding of the total air support picture. The brigade's aligned tactical air control party is resourced to support brigade operations from that unit's tactical command post as well as the main command post. Joint fires observers may assist tactical air control party joint terminal attack controllers in the conduct of type 2 or 3 close air support.

Naval Surface Fire Support Liaison Officer/Air and Naval Gunfire Liaison Company

2-34. The naval surface fire support liaison officer supervises a naval surface fire support team that may be collocated with the fires cell to advise the commander and staff on the planning, preparation, execution, and assessment of naval surface fires.

2-35. Members of the Navy air and naval gunfire liaison company are specially trained in conducting naval gunfire. However, the procedures are simplified and standardized so that any trained observer (for example a fire support team or forward observer) can effectively adjust the fire of a ship.

2-36. Air and naval gunfire liaison company personnel are available to advise unit commanders from company through brigade levels on how to best use the naval air and gunfire support available to them. Liaison personnel can give unit commanders and their fire support personnel information on weapon ranges, ammunition effects, and all-weather bombing capabilities. For maximum effectiveness, air and naval gunfire liaison company support should begin during the planning phase of an operation. Air and naval gunfire liaison company task-organized teams should be attached to the units they will support as soon as possible. Air and naval gunfire liaison company personnel at all levels, company through BCT, are trained as naval gunfire spotters and/or forward air controllers and can request and control missions for the units they support.

Marine Corps Liaison Officer

2-37. A United States (U.S.) Marine Corps liaison officer or a liaison team may augment the fires cell to coordinate U.S. Navy and/or U.S. Marine Corps air support to the BCT. The fires cell processes requests for U.S. Navy/U.S. Marine Corps air support through this liaison officer and/or team. A firepower control team may be attached to the maneuver battalions and/or reconnaissance squadron to perform terminal control of U.S.

Navy/U.S. Marine Corps air support. In the absence of an observer from the firepower control team, U.S. Navy and/or U.S. Marine Corps aircraft may be controlled in the same manner as U.S. Air Force aircraft (typically by a joint terminal attack controller or the company fire support team's joint fires observer).

Army Space Support Team

2-38. Army space operations personnel provide space-related tactical planning and support, expertise, advice, and liaison regarding available space capabilities. Space operations personnel are available to—

- Determine space support requirements and request, plan, and integrate space capabilities into operations (See JP 3-14).
- Coordinate space support with national, service, joint, and theater resources.
- Prepare the space support plan.
- Provide space products to support planning.
- Provide estimates on the status, capabilities, and limitations of space-based intelligence, surveillance, and reconnaissance, weather, navigation and timing, and communication satellites for friendly, threat, and commercial systems

Electronic Warfare Element and Working Group

2-39. *Electronic warfare* is military action involving the use of electromagnetic and directed energy to control the electromagnetic spectrum or to attack the enemy (JP 3-13.1). An electronic warfare element is an organic organization in brigade, division, and corps army command staffs. The element is responsible to the G-3/S-3 and is primarily involved with planning and monitoring electronic operations and activities, however it plays an important role in requesting and integrating joint air and ground electronic warfare assets and manages electronic warfare from within the mission command cell.

2-40. The electronic warfare working group includes representation from across the staff and helps to facilitate Army and joint integration, synchronization, and deconfliction of electronic warfare actions with the other warfighting functions. The senior electronic warfare officer heads this working group and is accountable to the G-3/S-3 for integrating electronic warfare requirements. Working within the mission command cell the electronic warfare officer coordinates directly with the FSCOORD, chief of fires/fire support officer, fires cell, and targeting working group to integrate electronic warfare into targeting.

INTEGRATION OF FIRE SUPPORT AND AIRSPACE CONTROL

2-41. Airspace is a component of an operational environment critical to successful Army operations. Army forces use airspace over an area of operations to collect information, conduct air operations, deliver direct and indirect fires, conduct air and missile defense and conduct sustainment. Fires must be cleared with other airspace users.

2-42. Army components of the theater air-ground system (see field manual [FM] 3-52.2) include airspace elements, fires cells including the ADAMs, BAEs, Army air and missile defense command elements, battlefield coordination detachments, ground and reconnaissance liaison detachments, and air defense artillery fire control officers who collectively coordinate and integrate airspace use and are organic to Army brigades and higher. Corps and division airspace elements are structured the same and both contain an airspace element in their main and tactical command posts. BCTs and support brigades (except sustainment) contain an ADAM or ADAM/BAE responsible for integrating brigade airspace to include air and missile defense and aviation functions. Each of these elements coordinates with higher, subordinate and adjacent elements to maximize the efficiency of airspace coordination and the lethality of weapon systems occupying or transiting the airspace. For information on ADAM/BAE functions, see ATP 3-01.50 and Training Circular 1-400.

2-43. Airspace elements do not routinely manage the flight path or trajectory of individual airspace users. Rather, airspace elements integrate 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 unmanned aircraft, or coordinate with the fires cell to alter the trajectory or timing of fires. In some cases the re-routing of aircraft flight paths is necessary to accommodate the delivery of fires. These changes are

based on the commanders' mission priorities and risk guidance. Pilots, unmanned aircraft system operators, and weapon system controllers (fires cell, fire direction center) still maintain the responsibility to make the directed changes to their flight path or trajectory. See FM 3-52.

2-44. The fires cell coordinates and deconflicts fire support coordination measures with airspace coordinating measures through close interface with airspace elements and the tactical air control party. The airspace element works with the fires cell to integrate fire support coordination measures with the airspace plan. The airspace element reviews and integrates the fire support overlay with other airspace requirements for inclusion into the airspace control plan. Fire support coordination measures are normally sent to higher, lower, and adjacent headquarters through fire support channels. In some cases, both the fires cell and the airspace element send related control or coordination measures through their respective channels. The airspace element and the fires cell ensure the standard operating procedures and the airspace control annexes address the procedures for forwarding fire support coordination measures and associated airspace coordinating measures through appropriate coordination channels. The airspace element and the fires cell review the airspace control orders to ensure that airspace coordinating measures avoid unnecessarily interfering with fires. If a conflict exists between the fire support plan and the airspace control order, the airspace element coordinates with the higher airspace elements to correct or modify the appropriate airspace coordinating measure.

CORPS AND DIVISION AIR DEFENSE AIRSPACE MANAGEMENT ELEMENT

2-45. When deployed, the corps headquarters has an ADAM element within the fires cell. The ADAM is fielded with the air missile defense planning and control system components. ADAM element functions include—

- Conducting air and missile defense augmentation planning and coordination.
- Conducting aviation augmentation planning and coordination.
- Conducting risk management to minimize the potential for fratricide (air/ground positive/procedural identification).
- Providing early warning of enemy aerial attack.
- Developing, displaying, and disseminating the common operational picture/single integrated air picture to provide and facilitate situational understanding.
- Contributing to airspace control planning and execution.
- Contributing to joint/local airspace deconfliction including clearance of fires.
- Advising and updating the commander on defended assets, adjacent air and missile defense unit locations, plans and intent.
- Continuously assessing air and missile defense augmentation requirements.
- Requesting, maintaining, and disseminating airspace coordinating measures or restrictions.

BRIGADE COMBAT TEAM AIR DEFENSE AIRSPACE MANAGEMENT/BRIGADE AVIATION ELEMENT

2-46. BCTs and support brigades contain a version of an ADAM from the fires cell and a BAE responsible for integrating brigade airspace, to include air and missile defense and aviation functions. During combat operations, the BAE works in conjunction with the fires cell and TACP to integrate functions for airspace deconfliction, clearance of fires, dynamic targeting, dynamic re-tasking of aviation and fires assets, for command and control of airspace users operating in the BCT area of operations. The ADAM/BAE is the executive agent responsible for integrating the use of airspace for the BCT commander under the direction of the S-3.

2-47. See FM 3-52, FM 3-52.1, FM 3-52.2, ATP 3-01.50 and JP 3-52 for more on the integration of fires and airspace control.

DUTIES AND RESPONSIBILITIES OF FIRE SUPPORT PERSONNEL

COMMANDERS OVERVIEW

2-48. Maneuver commanders at all levels are responsible for ensuring the synchronization and integration of fires throughout the operation. The field artillery provides the nucleus for effective fire support planning and coordination through staff personnel, fire support agencies, and attack resources. The FSCoord, chief of fires, and brigade fire support officer advise the commander on the allocation and use of available fires resources. The FSCoord, chief of fires, fire support officer, and fires cell integrate fire support and synchronize it with the supported commander's concept of operations. The fires cell plans, prepares, executes, and assesses fire support in support of current and future operations.

FIRE SUPPORT COORDINATOR

2-49. The *fire support coordinator* is the brigade combat team's organic field artillery battalion commander; if a FAB is designated as the division force field artillery headquarters, the FAB commander is the division's fire support coordinator and is assisted by the chief of fires who then serves as the deputy fire support coordinator during the period the force field artillery headquarters is in effect (ADRP 3-09). The fire support coordinator is the unit commander's primary advisor for the planning, coordination, and integration of field artillery and fire support in the execution of assigned tasks. As a commander, his inherent duties include the consolidated and focused fire support specific training, certification, readiness and oversight. The responsibilities and authority given to the fire support coordinator should be fully delineated by the supported commander. He may be given authority by the commander to—

- Facilitate establishing standard operating procedures across the brigade (to save time and ensure a single standard).
- Ensure efficiently resourced training packages (limit requirements for unit tasking(s) and reduce coordination requirements between units).
- Oversee the professional development of the 13-series career management field Soldiers.

2-50. The fire support coordinator is assisted in these duties by the brigade fire support officer and the other fire support personnel organic to the BCT. The fire support coordinator is responsible for the training and certification of all fire support personnel in the BCT.

CHIEF OF FIRES

2-51. The *chief of fires* is the senior fires officer at division and higher headquarters level who is responsible for advising the commander on the best use of available fire support resources, providing input to necessary orders, developing and implementing the fire support plan (ADRP 3-09). The duties and responsibilities of the chief of fires should be fully delineated by the commander. The chief of fires may be given authority by the commander to—

- Provide for consolidated and focused fire support-specific training, readiness, and oversight (personnel management, equipment issue, and training).
- Facilitate establishing standard operating procedures across the force (to save time and ensure a single standard).
- Ensure efficiently resourced training packages (limit requirements for force taskings and reduce coordination requirements between units).
- Plan for the allocation of fires assets.

2-52. The chief of fires plans and coordinates the fires warfighting function. He works closely with the Chief of Staff and G-3 to ensure mutual understanding of all aspects of planning, preparation, execution and assessment of fire support for operations. His responsibilities include, but are not limited to —

- Developing a scheme of fires to support the operation with the commander and G-3.
- Planning and coordinating fire support tasks.
- Developing a proposed high-payoff target list, target selection standards, and an attack guidance matrix.

- Coordinating positioning of fire support assets.
- Providing information on the status of fire support attack assets, target acquisition assets, and field artillery ammunition.
- Coordinating and synchronizing joint fire support.
- Recommending fire support coordination measures to support current and future operations.
- Recommending to the commander the establishment, responsibilities, authorities, and duties of a force field artillery headquarters.
- Planning, preparing, executing, and assessing all aspects of fire support for operations.
- Conducting the tasks associated with integrating and synchronizing Army indirect fires, joint fires, and multinational fires with the other warfighting functions.
- Directing and supervising the fires cell in planning, preparing, executing, and assessing all fire support for operations and the development of respective products to support the OPLAN/OPORD development.
- Advising the commander and staff of available fire support capabilities and limitations.
- Leading the targeting working group.
- Working with the Chief of Staff and G-3 to integrate all types of fire support into the commander's concept of operation.
- Serving as the JAGIC chief.

FIRE SUPPORT OFFICER

2-53. A *fire support officer* is the field artillery officer from the operational to tactical level responsible for advising the supported commander and assisting the senior fires officer of the organization on fires functions and fire support (ADRP 3-09).

BRIGADE/BATTALION FIRE SUPPORT OFFICER

2-54. The brigade/battalion fire support officer is the senior field artillery staff officer responsible for all fires planning and execution. His duties and responsibilities are similar to those of the chief of fires. The duties and responsibilities of the fire support officer include but are not limited to—

- Planning, preparing, executing, and assessing all aspects of fire support and addressing them in rehearsals.
- Developing a scheme of fires to support the operation with the commander and S-3.
- Planning and coordinating fire support tasks in close coordination with the brigade/battalion S-3 to support timely development of the field artillery operation order or field artillery support plan.
- Developing a proposed high-payoff target list, target selection standards, and an attack guidance matrix.
- Coordinating the positioning of fire support assets.
- Providing information on the status of fire support attack assets, target acquisition assets, and field artillery ammunition.
- Recommending fire support coordination measures to support current and future operations and addressing them in rehearsals.
- Recommending and implementing the commander's counterfire (including radar zones) and other target engagement priorities.
- Recommending to the commander the establishment, responsibilities, authorities, and duties of a force field artillery headquarters as necessary.
- Integrating and synchronizing Army indirect fires, joint fires, and multinational fires with the other warfighting functions.
- Directing and supervising the fires cell in planning, preparing, executing, and assessing all fire support for operations and the development of respective products to support the OPLAN/OPORD development.
- Advising the commander and staff of available fire support capabilities and limitations.
- Leading the targeting working group.

- Working with the chief of staff/executive officer, and S-3 to integrate all types of fire support into the commander's concept of operations.

TARGETING OFFICER

2-55. Fires cells from corps to battalion may have one or more targeting officers who collect analyze and process information for required target attack guidance and instructions. The targeting officer assists in providing targeting and counterfire guidance, including radar deployment instructions. They use the information provided by information collection systems and target acquisition radars, as well as those assets available to locate high-payoff targets for attack. The targeting officer provides recommendations and advice to the G-3/S-3, plans battle captain and the targeting working group/board (see FM 3-60) during the MDMP. They contribute to the development of targeting and assessment guidance to be entered into the AFATDS as well as to be distributed within mission orders. The targeting officer with the G-2/S-2, G-3/S-3 develops the high-payoff target list, attack guidance matrix, target selection standards and the targeting synchronization matrix. *Target selection standards* are criteria applied to enemy activity (acquisitions and battlefield information) used in deciding whether the activity is a target (FM 3-60).

2-56. During operations, the targeting officers provide recommendations to the targeting working group on updating targeting priorities. The targeting officers prepare products for the targeting working group. They direct updating and purging of targeting files. The targeting officers ensure that interoperability is maintained with information collection assets. Targeting officers provide information to the G-2/S-2 and develop the guidance to be entered into the AFATDS so that the fires cell receives targeting information from intelligence automations systems. Targeting officer duties and responsibilities include—

- Coordinating with the G-2/S-2 to identify and refine high-payoff targets.
- Assisting the information collection planner to ensure that the information collection plan is synchronized with the fires warfighting function.
- Managing changes to the radar azimuth of search and to radar zones.
- Developing and managing the high-payoff target list, target selection standards, attack guidance matrix, and targeting synchronization matrix.
- Coordinating radar cueing schedules to ensure they are deconflicted with the pattern analysis of enemy indirect fires.
- Advising and assisting the fires cell and electronic warfare officer in coordinating and integrating indirect and joint fires including electronic attacks and facilitating electronic warfare support operations.
- Coordinating the positioning and status of target acquisition assets.
- Recommending and implementing with the counterfire officer the commander's counterfire guidance (including radar zones) and other target engagement priorities.

COMPANY FIRE SUPPORT OFFICER

2-57. The primary duty of the company fire support officer is to be a full-time fire support advisor, coordinator, and planner to the maneuver company commander. The company fire support officer advises the commander on the capabilities, limitations, and employment of all fire support assets available to support his operation. These assets may include vehicles, precision target location equipment, digital fire support systems, and fire support weapon systems. The company fire support officer bases his actions on the needs of the supported force as directed by the maneuver commander's guidance. Additional responsibilities of the company fire support officer include but are not limited to—

- Integrating the fire support plan with the company operation order/operation plan and addressing fire support tasks during rehearsals.
- Planning, directing, and managing the employment of observer platforms and laser equipment where they will best support the commander's concept of operations.
- Employing all means of fire support.
- Integrating fire support assets into the company commander's scheme of maneuver.

- Controlling the actions of the forward observers.
- Employing fire support vehicles and/or precision targeting equipment to maximize their capabilities.

FIRE SUPPORT SERGEANT

2-58. The fire support sergeant is the fire support officer's assistant. Therefore, he must be able to perform all of the duties of the fire support officer and act in his absence. The duties of the fire support sergeant include but are not limited to the following—

- Employing all means of fire support.
- Acting as the senior enlisted supervisor for the fires cell/fire support team.
- Supervising the maintenance of fires cell/team equipment.
- Supervising the establishment and operation of team equipment in the fires cell/fire support team headquarters.
- Conducting and evaluating fires cell/fire support team training.
- Supervising the establishment of fires cell/fire support team digital and voice communications.

FIRE SUPPORT SPECIALIST

2-59. The duty of the fire support specialist is to help the fire support sergeant in the performance of his duties. His duties include but are not limited to the following—

- Employing all means of indirect fire support.
- Performing all duties of a forward observer.
- Assisting in the setup, operation, and maintenance of all equipment assigned to the fire support team headquarters.

2-60. For a complete list of fire support team personnel duties, see ATP 3-09.30.

AIR FORCE FIRE SUPPORT COORDINATION ORGANIZATIONS

2-61. The Air Force coordinates support through the theater air control system described in FM 3-52.2. These paragraphs describe those Air Force organizations that have a role in fire support coordination.

AIR OPERATIONS CENTER

2-62. The air operations center is the senior U.S. Air Force element of the theater air control system. It is the operations command center of the Air Force forces. During joint operations, the air operations center is identified as the joint air operations center.

AIR SUPPORT OPERATIONS CENTER

2-63. The air support operations center is an operational component of the theater air control system subordinate to the air operations center, and is usually collocated with or close to the fires cell and the airspace element at the corps or division main command post. The air operations center provides primary control of air support to the Army and processes requests for immediate close air support for the supported ground forces. The air operations center uses the air support operations centers, forward air controllers, tactical air control parties, and air liaison officers, to extend its coordination effort to the other components.

UNITED STATES AIR FORCE ELEMENTS AT CORPS AND DIVISION

2-64. The corps air liaison officer, when designated the Expeditionary Air Support Operations Group Commander, commands all Air Force personnel within the corps and is the air component commander's direct liaison to the corps commander. The corps main command post tactical air control party, Air Force weather, and the air mobility liaison officers locate in or adjacent to the current operations, future operations, plans, fires and intelligence cells. Air Force personnel at the corps command posts provide planning expertise to integrate and use

air, space, and cyberspace. This is in addition to the space integration support provided by Army space forces assigned and attached to the corps.

2-65. The air support operations center is the principal air control agency of the theater air control system responsible for the direction and control of air operations directly supporting the ground forces. It processes and coordinates requests for immediate air support and coordinates air, space, and cyberspace missions requiring integration with other supporting arms and ground forces. The air support operations center normally collocates with the Army senior tactical headquarters, normally at corps or division level. When employed, the air support operations center and tactical air control party merge to form one combat organization, under the command of a single leader, but they remain equipped and manned to perform distinct functions in support of ground operations.

NAVY AND MARINE CORPS FIRE SUPPORT COORDINATION ORGANIZATIONS

NAVY

2-66. Army forces are most likely to rely on Navy fire support coordination during an amphibious operation. An amphibious operation requires detailed planning, precise timing in air, naval surface fire support, field artillery support, and effective command or support relationships. Close coordination between supporting and supported arms is always critical.

2-67. Fire support coordination activities in amphibious operations are accomplished by the following agencies—

- Supporting arms coordination center (SACC). The SACC functions as a fires cell for the naval forces, and is supervised by the supporting arms coordinator. The designated (supported) commander may choose either the amphibious task force's supporting arms coordinator or the landing force's force fires coordinator to supervise the SACC. The force fires coordinator is responsible to the Marine air-ground task force (MAGTF) commander for planning, coordination, and conduct of fire support operations in the MAGTF and for coordinating major subordinate command fire support operations. During amphibious operations, the SACC works from the ship and is the primary agency which coordinates and controls all supporting fires for the commander, amphibious task force in order to establish the landing force ashore. If designated as the force fires coordinator, the Army landing force chief of fires/fire support coordinator advises the supporting arms coordinator to ensure effective integration of the fire support plan that supports naval operations and the landing force scheme of maneuver. Fire support personnel from the landing force may augment the SACC while embarked on amphibious shipping.
- Navy tactical air control center (TACC). The Navy TACC controls all air operations within the amphibious operating area or the amphibious objective area until control of these operations is phased to the landing force's Marine Corps TACC. The TACC, although usually in close physical proximity to the SACC, is a distinct entity. Once a land-based air control agency can control landing force air operations, the Navy TACC becomes a supporting tactical air direction center. The TACC and SACC personnel work closely together in planning, controlling, and coordinating offensive air support and assault support.

MARINE AIR-GROUND TASK FORCE FIRE SUPPORT COORDINATION AGENCIES

Force Fires Coordination Center

2-68. The MAGTF command element exercises control of fires through the force fires coordination center (FFCC). An FFCC is established in every size MAGTF. The FFCC serves as the MAGTF commander's principal staff section responsible for the overall planning, coordinating, and execution of fires throughout the MAGTF area of operations but emphasizes the control of fires rather than the detailed coordination of fires. Some of the primary functions of the FFCC are targeting for the unassigned area of the command's area of operations, interfacing with external agencies on fire support coordination measures, deconfliction of airspace, and the allocation of fire support assets.

Fire Support Coordination Centers

2-69. At the Marine division, infantry regiment, and infantry battalion levels the fire support coordination center (FSCC) is the agency that coordinates fire support. The FSCC is a single location in which centralized communications facilities and personnel enable the coordination of all forms of fire support. Supporting arms units provide representatives and equipment necessary for conducting coordination, targeting, and communications functions for their respective arms. The Marine fire support coordinator is the officer in charge of the FSCC and is responsible for planning and coordination of all available fire support.

MARINE AIR-GROUND TASK FORCE AVIATION

2-70. The primary mission of the Marine air-ground task force air combat element is to support the MAGTF. There are 6 functions of Marine aviation: offensive air support, anti-air warfare, assault support, air reconnaissance, electronic warfare, and control of aircraft and missiles.

2-71. The air combat element provides a Marine air command and control system (MACCS) to enhance unity of effort, integrate elements of the command and control system, and helps maintain the commander's situational awareness. The MACCS facilitates these objectives by providing the command and control architecture to integrate and execute aviation operations. Army forces may operate jointly with Marine forces in an amphibious operations area while elements of the Marine air command and control system provide and control air support to Army forces. Principal Marine air command and control system agencies are the —

- Tactical air command center. The Marine tactical air command center is the senior Marine air command and control system agency. The tactical air command center's primary external interfaces are with the U.S. Army's main command post, the U.S. Navy's TACC, and the U.S. Air Force's air operations center. The tactical air command center integrates aviation operations with the MAGTF command element through linkage with the MAGTF FFCC and combat operations center. Note: both the Navy TACC and the Marine tactical air command center use the same acronym to identify themselves.
- Direct air support center (DASC). The DASC is the principal MACCS air control agency responsible for the direction of air operations directly supporting ground forces. It processes and coordinates requests for immediate air support and coordinates air missions requiring integration with ground forces and other supporting arms. The DASC is the first principal MACCS agency ashore. It functions in a decentralized mode, but is subordinate to and directly supervised by the tactical air command center. The DASC will normally be collocated or electronically linked with the senior FSCC within the ground combat element.
- Marine Corps tactical air control party (TACP). The Marine Corps TACP establishes and maintains facilities for liaison and communications between supported units and appropriate control agencies. The tactical air control party is also a terminal control agency. The air officer, who informs and advises the supported ground unit commander on the employment of supporting aircraft and requests and coordinates air support missions, leads the tactical air control party. TACPs are organic to Marine divisions, infantry regiments, and infantry battalions. The TACP is one of the many air control organizations through which the DASC operates.

2-72. For more information on Marine Corps force fires coordination within the MAGTF command element see Marine Corps Warfighting Publication (MCWP) 3-43.3. For more information on fire support coordination at the ground combat element, see MCWP 3-16. For more information on Marine Corps aviation see MCWP 3-2.

SECTION III – INFORMATION COLLECTION AND TARGET ACQUISITION FOR FIRE SUPPORT

INFORMATION COLLECTION

GENERAL CONSIDERATIONS

2-73. The G-2/S-2, G-3/S-3 and chief of fires/brigade fire support officer (and other staff as needed) integrate and synchronize information collection and target acquisition to capitalize on their different capabilities to support the commander's intent.

2-74. An information collection capability is any human or automated sensor, asset, or processing, exploitation, and dissemination system that can be directed to collect information that enables better decision making, expands understanding of the operational environment, and supports warfighting functions in decisive action. Factors such as a unit's primary mission, typical size area of operations, number of personnel, and communications and network limitations significantly impact what sensors, platforms, and systems are fielded. Information collection assets provide data and information.

TARGET ACQUISITION

GENERAL CONSIDERATIONS

2-75. *Target Acquisition* is the detection, identification, and location of a target in sufficient detail to permit the effective employment of weapons (JP 3-60). Target acquisition sources provide the means to successfully detect, locate, identify, track, and classify targets.

2-76. The intelligence officer provides the fires cell and members of the targeting working group and targeting board with information and intelligence for targeting the threat's forces and systems with direct and indirect fires (see FM 3-60). The intelligence officer ensures the information collection plan supports targeting (see FM 3-55). Sensors and assets useful for target acquisition include—

- Fire support teams that provide maneuver companies and reconnaissance troops with fire support coordination, targeting, and assessment capabilities (see ATP 3-09.30).
- Forward observers, who provide target refinement, execute planned fires, and request fires for their supported units.
- Special operations forces, scouts, and untrained observers.
- Tactical human intelligence from a military intelligence company and maneuver units down through the squad level operating in the supported commander's area of operations.
- Signal intercept support from electronic intelligence sources such as the Prophet radio frequency intercept system.
- Weapons locating radar and a target processing section found in the FAB's target acquisition battery; and weapons locating radar found in the brigade combat team's field artillery battalion (see FMs 3-09.12, FMs 6-20-40 and -50, and ATP 3-09.24).
- Manned and unmanned aircraft found in aviation brigades and attack reconnaissance squadrons (see FM 3-04.111 and FM 3-04.126).

FIELD ARTILLERY FIRE SUPPORT TEAMS AND OBSERVERS

2-77. The observers are the eyes of the field artillery and a major source of information for field artillery and maneuver commanders. Timely and accurate indirect fire support is essential to the success of combined arms operations. Fire support team personnel and forward observers enable effective artillery and mortar support for the maneuver force. Each of the reconnaissance squadrons and maneuver battalions in the BCT has fire support platoons that include fire support teams and observers. Information may be sent in multiple report formats. Information is also extracted from the target description and the surveillance received in each call for fire.

Fire Support Teams

2-78. A *fire support team* is a field artillery team providing support to each maneuver battalion and selected units to plan and coordinate all available company supporting fires, including mortars, field artillery, naval surface fire support and close air support integration (ADRP 3-09). Fire support teams are employed at maneuver and reconnaissance company level in brigade combat teams and the battlefield surveillance brigade (see ATP 3-09.30) to provide the maneuver companies and reconnaissance troops with fire support coordination, precision targeting, type 2 and 3 close air support information, and effects assessment capabilities.

Forward Observer

2-79. Effective field artillery fires require qualified observers to locate targets call for, and adjust fires. Forward observers are assigned to the fire support team supporting each infantry company or reconnaissance/cavalry troop in the brigade combat team, and battlefield surveillance brigade. A forward observer is an observer operating with front line troops and trained to adjust ground or naval gunfire and pass battlefield information. In the absence of a forward air controller, the observer may control close air support strikes (JP 3-09).

Joint Fires Observers

2-80. Forward air controllers (airborne), joint terminal attack controllers, and naval gunfire spotter teams may not always be available when and where their support is required. Therefore observation teams must be proficient in planning, resourcing, and controlling close air support, close combat attack by Army aviation and naval gunfire.

2-81. With additional training and certification, the platoon forward observer can qualify as a joint fires observer. A *joint fires observer* is a trained Service member who can request, adjust, and control surface-to-surface fires, provide targeting information in support of Type 2 and 3 close air support terminal attack controls, and perform autonomous terminal guidance operations (JP 3-09.3). *Terminal guidance operations* are those 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).

Air Force Joint Terminal Attack Controllers

2-82. A *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. A qualified and current joint terminal attack controller will be recognized across the Department of Defense as capable and authorized to perform terminal attack control (JP 3-09.3). Tactical air control party joint terminal attack controllers provide the commander and his subordinate and supporting unit with recommendations on the use of close air support and its integration with ground maneuver. They also perform terminal attack control of individual close air support missions. *Terminal attack control* is the authority to control the maneuver of and grant weapons release clearance to attacking aircraft (JP 3-09.3). The joint terminal attack controller validates targets of opportunity, advises the commander on proper employment of air assets, submits immediate requests for close air support, controls close air support with the supported commander's approval, and performs battle damage assessment. Currently, most joint terminal attack controllers are enlisted airmen. The joint terminal attack controller must—

- Know the enemy situation, selected targets, and location of friendly units.
- Know the supported unit's plans, position, and desired effects.
- Validate targets of opportunity.
- Advise the commander on proper employment of air assets.
- Submit immediate requests for close air support.
- Control close air support with the supported commander's approval.
- Perform battle damage assessment.

Untrained Observers

2-83. Occasionally the field artillery battalion may need to process fire missions from untrained observers. An untrained observer is anyone not military occupational specialty qualified in requesting and adjusting indirect fire.

Often these are critical requests where the requestor is under fire. Field artillery battalion and field artillery battery fire direction centers should be identified as the primary handlers of untrained observer missions. For more information on untrained observer procedures, see FM 6-40.

UNMANNED AIRCRAFT

2-84. Commanders should consider augmenting the target acquisition assets of the supporting field artillery organizations with unmanned aircraft systems when possible to provide the sensor-to-shooter linkage to facilitate engagement of high-payoff targets at maximum range.

2-85. For detail on unmanned aircraft system organization, capabilities, and employment see ATTP 3-04.15 and FM 3-04.155.

Field Artillery Weapons Locating Radar

2-86. Each FAB has an organic target acquisition battery that includes a radar platoon, a target processing section, and a combined meteorology and survey team—

- The radar platoon is organized and equipped to detect, locate, classify, report, and communicate the point of origin, predicted point of impact, radar cross-section, and velocity of indirect fire systems; it can also confirm the actual burst/impact location of friendly fires.
- The target processing section recommends and coordinates radar sectors of search, monitors operations, develops targets, requests battle damage assessment and acts as net control station for the target acquisition command and intelligence net.
- The combined meteorology and survey teams provide the meteorological support and common survey needed to ensure the accuracy of indirect fires; survey data can be provided to other systems (such as signal) when assets are available.

2-87. Each BCT cannon field artillery battalion has an organic target acquisition platoon that includes a radar section and a survey section. These radar and survey sections are organized and equipped to perform the same functions for the cannon field artillery battalion as their counterpart organizations in the target acquisition battery of the FAB.

2-88. Table 2-1 on page 2-19 provides a summary description of the capabilities of field artillery weapons locating radars.

Table 2-1. Capabilities of field artillery weapons locating radar

Radar	Unplanned Search Sector	Range	Optimized to Detect	Organic to
AN/TPQ-36	1600 mils	0.75 – 24 km	Shorter range, high-angle, lower velocity weapons such as mortars and short range artillery.	Brigade combat team field artillery battalion
AN/TPQ-37	1600 mils	3 – 50 km	Longer range, lower angle, higher velocity weapons such as long-range artillery and rockets.	Field artillery brigade
AN/TPQ-50	6400 mils	0.5 – 10 km	Shorter range, high-angle, lower velocity weapons such as mortars and short range artillery.	Brigade combat team field artillery battalion
AN/TPQ-53	1600 mils	60 km	Longer range, lower angle, higher velocity weapons such as long-range artillery and rockets.	When fully fielded, will replace both the AN/TPQ-36 and AN/TPQ-37 radars.
	6400 mils	20 km	Shorter range, high-angle, lower velocity weapons such as mortars and short range artillery.	
<p>Note: Because the AN/TPQ-36 and AN/TPQ-37 radars cannot radiate in friendly fire mode (used only for indirect fire registration missions) and hostile fire mode at the same time, the commander must issue specific guidance as to when the friendly fire mode should be used. However, the AN/TPQ-50 and AN/TPQ-53 can radiate while performing both missions. The Q-53 must be in the 1600 mils mode to perform friendly and hostile missions. AN/TPQ – Army/Navy (Marine) transportable special purpose (multipurpose) km – kilometers</p>				

2-89. Both the target acquisition battery organic to the FAB and the target acquisition platoon organic to each brigade combat team's field artillery battalion are organized and equipped to detect, locate, classify, report, and communicate the point of origin, predicted point of impact, radar cross section, and velocity of indirect fire from enemy mortars, artillery, and rockets quickly and accurately enough to permit their immediate engagement with counterfire. To increase counterfire responsiveness, radars can establish a digital and/or voice quick-fire channel to a dedicated firing unit.

2-90. Additionally, radars in friendly fire mode can assist in registering friendly indirect fires by providing accurate actual burst, datum-plane, or predicted-impact location data; enabling friendly firing elements to determine registration corrections for nonstandard conditions. This secondary mission is performed only when the commander deems it absolutely necessary since it takes the radar away from its primary mission and exposes its location—any time the radar is radiating it is vulnerable to hostile acquisition. This determination is made based on mission variables of METT-TC, availability of observers, and the ability of the supported unit to meet the requirements for accurate fire.

2-91. For detail on field artillery weapons locating radar organization, capabilities and employment see FM 3-09.12.

SECTION IV – FIRE SUPPORT ATTACK RESOURCES

2-92. This section includes an overview on the main sources of fire support and other attack resources to include field artillery, mortars, rotary- and fixed-wing assets, and naval surface fire support. Cyber/electromagnetic activities are integrated and synchronized through targeting.

GENERAL CONSIDERATIONS

2-93. The commander determines the desired effects for each target. Lethal and nonlethal effects can be achieved by selection of the appropriate weapon system, number and type of munitions fired and the method used to engage a target. Finding ways to accomplish the mission with an appropriate mix of lethal and nonlethal effects is a paramount consideration for every commander. Commanders analyze mission variables to achieve a balance of lethal and nonlethal effects via a range of capabilities. Offensive and defensive tasks place a premium on fires to destroy, disrupt, neutralize, interdict, and suppress enemy forces.

2-94. Lethal effects from fires are at the heart of offensive and defensive tasks and their application is critical to success in these operations. There are times when a lethal weapon may be employed in a nonlethal manner, for example, in a demonstration of force. A precision munition might be fired at a well-located target in an urban area rather than firing numerous rounds of area munitions against the same target, possibly causing collateral damage. Even lethal area munitions such as high explosive rounds may be used to achieve a nonlethal effect. For example, a field artillery battalion or battery might mass its fires on a location in view of an opponent and then follow those rounds with a near surface burst illuminating round on the opponent's position. This demonstration may cause a less determined opponent to surrender or cease hostile actions.

2-95. Nonlethal effects typically neutralize or incapacitate a target or modify adversarial behavior without causing permanent injury, death, or gross physical destruction. At times a target may return to pre-engagement functionality as part of the desired effect. Assessment of this effect is usually measured by time and level of effort required for recovery of the target.

OBSCURATION AND SCREENING FIRES

2-96. Obscuration fires decrease an opponent's capability to visually sight friendly forces and the level of energy available for the functions of seekers, trackers, and vision enhancement devices. Smoke projectiles may be placed on or near adversary or enemy positions to minimize an opponent's observation both within and beyond the position area. Screening fires are delivered in areas between friendly and an opponent's forces or in friendly areas of operation to degrade opponent ground and aerial detection, observation, and engagement capabilities to enable freedom of friendly maneuver and actions.

ILLUMINATION FIRES

2-97. Illumination fires (visible or infrared) are useful in exposing an opponent at night. Illumination fires may give friendly forces an advantage by reducing the enemy forces' ability to operate at night without being targeted and attacked with minimal collateral damage. Infrared illumination enhances the Soldier's use of some night vision devices to more easily locate targets and enable surprise fires on enemy forces not equipped with night vision devices. Illumination fires may also be used for its deterrent effect through its use as a show of force or for area denial.

ARMY MUNITIONS ATTRIBUTES

SPECIAL CONSIDERATIONS

2-98. Use of precision-guided munitions requires special considerations. The effectiveness of precision munitions depends on a host of tactical situation variables. The target must be located to an accuracy of less than 6 meters to achieve the desired effects using precision munitions. Digital point positioning database errors, global positioning system jamming, slant range, altitude, target movement and aim point on the target all have significant effects on the accuracy of the coordinate generated. The commander must consider the accuracy of the grid to the timeliness to engage the target. Usually time to engage should not be sacrificed in order to generate more precise coordinates if the current coordinates, target location error, weapon systems and munitions will create the desired effects on the target. Global positioning system assisted and/or inertial guidance-aided munitions (such as Excalibur or guided-MLRS) can be delivered 24/7 and in all weather conditions. Rules of engagement and the possibility of collateral damage are always considerations for target engagements.

FIELD ARTILLERY

ARMY FIELD ARTILLERY

2-99. Field artillery cannon, rocket, and missile systems organic, assigned, attached, or OPCON to FABs and BCT field artillery battalions provide continuously available fires under all weather conditions and in all types of terrain.

2-100. Field artillery can shift and mass fires rapidly without having to displace. Field artillery units are positioned to provide continuous fires. Field artillerymen at every maneuver echelon man the fires cells, act as forward observers, and are employed as fire support teams and observer parties to integrate all means of fire support for the commander and synchronize fire support with the concept of operations.

MARINE AIR-GROUND TASK FORCE ARTILLERY

2-101. Army units may also support and be supported by Marine artillery. The U.S. Marine Corps relies on the 155-mm towed howitzer as its cannon artillery weapon. The Marine Corps also has the High Mobility Artillery Rocket System (HIMARS). Marine artillery doctrine, tactics, techniques, and procedures are similar to those exercised within the Army. Frequent joint exercises and the permanent exchange of liaison officers between Army and Marine artillery headquarters facilitate an understanding of each Service's procedures.

FIELD ARTILLERY MUNITIONS

2-102. Field artillery cannons, rockets and missiles can deceive, defeat, delay, deny, destroy, disrupt, divert, exploit, interdict, neutralize, or suppress enemy forces and protect friendly operations. A variety of field artillery munitions provide the commander with tremendous flexibility when attacking targets with fires.

Cannon Munitions

2-103. Cannon munitions include area fire high explosive, antipersonnel conventional munitions, dual-purpose improved conventional munitions, scatterable mines, white phosphorus used for incendiary effects and marking, and precision munitions. Other cannon munitions include white phosphorous smoke wedges or hexachloroethane smoke and illumination rounds. Cannon fires are effective against targets from within direct fire range out to more than 30 kilometers. Table 2-2 on page 2-22 provides a summary description of cannon field artillery weapons and munitions capabilities.

Table 2-2. Cannon field artillery capabilities

Artillery	Ammunition		Range (meters)			Rates of fire (rounds per minute)		
	Projectile	Fuze	Maximum	DPICM	RAP	Sustained	Maximum	
105-mm M119-series	HE, HC, WP, ILLUM, APICM, DPICM	PD, VT, MT, ET, MTSQ, Delay	11,500 with charge 7 14,000 with charge 8	12,100	19,500	3 for 30 minutes	8 every 3 minutes	
155-mm M109A5¹	HE, HC, WP, ILLUM APICM, DPICM, M825 Smoke, SCATMINE		18,000 or 22,000 with M795 HE; M825 Smoke	18,000 or 28,200 with M864 base bleed	30,100	2	Zones 3-7: 1 round per minute; zone 8: 1 round per minute until limited by tube temperature sensor	4 every 3 minutes
155-mm M109 A5/A6			18,000 or 21,700 with M795 HE; M825 Smoke; *M982 Excalibur: Block Ia-1 – 24 km Block Ia-2 – 37+ km Block Ib – 40+ km	17,900 or 28,100 with M864 base bleed	30,000			
155-mm M777-series			22,200 w/M201A1 Modular Charge 8S or 22,500 with M232, Modular Charge Zone 5; 24,500 with M982 Excalibur Block 1-1a	N/A		2 in accordance with thermal warning device		
Note: Excalibur not authorized for M109A5. See Appendix I, ATP 3-09.32 for detailed discussion of "danger close".								
APICM – antipersonnel improved conventional munitions DPICM – dual purpose improved conventional munitions ET – electronic time HC – hexachloroethane smoke HE – high explosive ILLUM – illumination MT – mechanical time				MTSQ – mechanical time superquick N/A – not available at this time PD – point detonating RAP – rocket assisted projectile SCATMINE – scatterable mines VT – variable time WP – white phosphorus				

MULTIPLE LAUNCH ROCKET SYSTEM MUNITIONS

ROCKET FIRES

2-104. MLRS/HIMARS rocket range exceeds most cannon munitions and allows force commanders the opportunity to complement cannon fire with a lethal long-range indirect fire capability to further influence the outcome of operations.

2-105. MLRS munitions include free flight M26 and M26A2 extended range rockets and M30/M31/M31A1 guided rockets. These rockets are loaded with dual-purpose improved conventional munitions or unitary high explosive warheads and are effective against personnel, light armor, soft vehicles, and light structures at ranges from 8 to 70+ kilometers depending upon the selected munitions. MLRS can be used for counterfire, counterpreparation fire, raids, suppression of enemy air defenses, and engaging targets out of range of cannon artillery. The targets best suited for MLRS/HIMARS rockets in close combat are personnel, light materiel,

command posts, and artillery. The M31 guided-MLRS unitary warhead munitions offer a significant destructive capability while reducing the possibility of collateral damage. However, the MLRS/HIMARS M26/M26A2 rocket has a large footprint caused by the dispersion of submunitions in the target area and requires detailed coordination when delivered close to friendly troops. Planners should also be aware of the likelihood of dud submunitions. The same planning factors used for cannon field artillery battalion 155-mm artillery or Air Force-delivered dual-purpose improved conventional munitions should be used for MLRS/HIMARS. Planners must consider the risk when firing dual-purpose improved conventional munitions MLRS/HIMARS rockets into areas that friendly units could occupy or pass through during future operations.

MISSILE FIRES

2-106. The MLRS/HIMARS can support the commander's operations with rockets and Army Tactical Missile System (ATACMS) fires. ATACMS munitions include the M39 Block I and M39A1 Block IA with M74 antipersonnel, anti-materiel munitions, and the M48 and M57 Unitary high explosive warheads. These missiles are effective against targets such as enemy command posts and control nodes, sustainment areas, and artillery, missile and air defense systems at ranges from 25-300 kilometers. The MLRS/HIMARS can support the commander's operations with rockets and ATACMS missile fires and is well suited for attack of long-range high-payoff targets, including those with extremely short dwell times where minimizing the time from acquisition to firing is critical. The range capability also allows engagement across the supported headquarters area of operations laterally. Long-range fires are normally planned and scheduled as opposed to immediate, unscheduled fires on targets of opportunity. In the planning process, the following must be considered—

- Clearance of airspace.
- Rocket and ATACMS stockage levels and locations.
- Management and delivery of munitions depend heavily on fire planning decisions made early in the planning process (warhead description and capabilities of the ATACMS missile are addressed in FM 3-09.60).
- Target acquisition and sensor system availability and cueing to detect and/or track targets.
- Communications between the MLRS/HIMARS firing unit, and target acquisition and sensor systems.

2-107. Use of MLRS fires in support of units may be limited if M31 guided-MLRS/HIMARS rounds are not available. The unguided MLRS munitions are best suited for area rather than point targets. Unguided MLRS/HIMARS rockets, because of the nature of these munitions (for example dual-purpose improved conventional munitions) and because of the high dud rate can be dangerous to friendly follow-on forces, may not be the fire support munitions of choice. However, special circumstances may dictate that MLRS/HIMARS be used. For example, the risk of friendly troops in the vicinity of MLRS/HIMARS targets may be acceptable in light of the overall situation. Additionally, targets may be out of range for mortars and cannon artillery. Other means of fire support, such as Army aviation and close air support may be unavailable due to other mission commitments.

ROCKET AND MISSILE CAPABILITIES SUMMARY

2-108. Table 2-3 on page 2-24 provides a summary description of MLRS/HIMARS weapons and munitions capabilities.

Table 2-3. MLRS/HIMARS munitions capabilities

<i>Munition</i>	<i>Variant</i>	<i>Payload</i>	<i>Accuracy</i>	<i>Range</i>	<i>Target Type</i>
Rockets	M26	644 M77 DPICM	Unguided 10+ mils	10-32 km	Personnel, light armor, soft vehicles, area targets
	M26A2 ER-MLRS	518 PI M77 DPICM		13-45 km	
Guided Rockets	M30	404 PI M77 DPICM	GPS circular error probable 5 meters; inertial 0.6 mils	15-84+* km	Personnel, light armor, soft vehicles, area targets, point targets (M31 only)
	M31	51.5 lbs of PBXN 109; VT, PD, or delay fuze; nominal or vertical angle of fall			
ATACMS	Block 1 M39	950 M74 APAM bomblets	Classified	25-165+* km	Personnel, light armor, soft vehicles (stationary)
	Block 1A M39A1	300 M74 APAM bomblets		70-300+* km	
	Quick Reaction Unitary M48/M57	215 lbs of DESTEX; PD fuze; vertical angle of fall		70-270+* km	Block 1-1A targets when duds/ collateral damage are precluded, fixed infrastructure sites (buildings for example)
	ATACMS Unitary	Single unitary warhead with multi-function fuze-proximity, PD or delay		70-300+* km	
Note: Default rates of fire are 5 seconds between rockets and 15 seconds between missiles. All munitions may be fired from both the M142 HIMARS and the M270A1 MLRS.					
* GMLRS and ATACMS minimum and maximum ranges are dependent on local conditions, specifically firing unit elevation. Both munitions will reliably achieve the above listed ranges which can be used as planning factors.					
APAM – antipersonnel, antimateriel			HE – high explosive		
ATACMS – Army Tactical Missile System			km – kilometer		
DESTEX – high explosive (type)			lbs – pounds		
DPICM – dual-purpose improved conventional munitions			MLRS – multiple launch rocket system		
ER-MLRS – extended range multiple launch rocket system			PBXN 109 – explosive, plastic-bonded, cast 109		
GMLRS – guided multiple launch rocket system			PD – point detonating		
GPS – global positioning system			PI – product improved		
HIMARS – High Mobility Artillery Rocket System			VT – variable time		

2-109. For more on MLRS and ATACMS capabilities and munitions, see ATP 3-09.60.

FIELD ARTILLERY PRECISION-GUIDED MUNITIONS

2-110. A *precision-guided munition* is a guided weapon intended to destroy a point target and minimize collateral damage (JP 3-03). Precision-guided munitions collectively refer to those munitions that home on reflected electromagnetic energy (such as the Hellfire missile) and precision munitions.

2-111. 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. Munitions with a precision capability such as the GPS-aided Excalibur 155-mm projectile, guided MLRS rockets, and the advanced precision munitions initiative 120-mm mortar rounds have a circular error probable of less than 10 meters. Munitions with a near-precision capability have a circular error probable between 10 and 50 meters. Area capabilities have a circular error probable greater than 50 meters. Circular error probable is an indicator of the delivery accuracy of a weapon system, used as a factor in determining probable damage to a target. It is the radius of a circle within which half of the rounds fired at a target will impact. Even at the munitions' largest anticipated delivery error, the aimpoint is within the munitions' anticipated radius of direct effects. The employment of precision munitions requires the use of current cryptological key information.

2-112. Dispensed submunitions from even precision-guided munitions may be subject to ballistic conditions for which a correction may not have been applied. Accurate target location is one of the five requirements of accurate fire. Because precision munitions are more accurate, their effective employment requires target location error to be minimized: strive for target location error to be well within the effects radius of the munitions being employed to attack the target. The Precision Guidance Kit corrects the ballistic path of a projectile based on pre-determined way-points through algorithmic comparison of the computed ballistic path versus the physical ballistic path. The Precision Guidance Kit is capable of guiding a projectile to a circular error probability of 30-50 meters of a specified target coordinate. Even at the munitions' largest anticipated delivery error, the aimpoint is within the munitions' anticipated radius of direct effects.

2-113. Precision fire is not to be confused with the employment of precision munitions. In precision fire (for example, a registration or destruction mission using area munitions), the target must also be accurately located. At a minimum, the observer should send at least an 8-digit grid for precision fire missions using area munitions. If the observer is equipped with a device capable of an accurate 10-digit grid or better, then he should send that grid. The observer should always send the most accurate target location possible, subject to the tactical situation, regardless of the ammunition fired. This is especially true when employing coordinate-seeking precision munitions. For additional information on desired target location accuracies see ATP 3-09.30.

Note: The artillery computer system determines a predicted ballistic impact point for every Excalibur mission fired. The *ballistic impact point* is the projected impact location of a round following an unguided ballistic path (ATP 3-09.30). The predicted ballistic impact point is a calculated impact point that may drift away from the gun-target line due to the meteorological conditions. It is also important to understand that ballistic dispersion error can cause the round to impact as much as 500 meters from the predicted ballistic impact point. If this location does not lie beyond the coordinated fire line/fire support coordination line then this location must be cleared with the maneuver commander as if it were a target location. The supported maneuver commander, however, may be willing to accept risk in clearing these ballistic impact point locations given the fact that if an Excalibur round does fly a ballistic flight path to one of these locations it should impact as a dud, thus causing minimal collateral damage and posing little risk to friendly troops. The munition flight path trajectories are displayed on the same artillery computer system that computed the ballistics. This information may be passed up the organizational chain, particularly for airspace coordination.

ELECTRONIC ATTACK

GENERAL CONSIDERATIONS

2-114. Electronic attack includes both offensive and defensive tasks. These activities differ in their purpose. Defensive electronic attack protects friendly personnel and equipment or platforms. Offensive electronic attack denies, disrupts, or destroys enemy capabilities. In either case, certain considerations are involved in planning for employing electronic attack, such as friendly communications, information collection, electromagnetic spectrum use by local neutral parties, hostile intelligence collection and persistency of effects.

2-115. Electronic attack is especially well suited for targets that cannot be located with the accuracy needed for destructive fires or that require only temporary disruption. Electronic attack can be used against computers, but it is not a computer network attack since a computer network attack relies on the data stream to execute the attack. Electronic attack can play a role in suppressing enemy air defenses and in countering some guided weapons. The electronic warfare officer, the G-2/S-2, the G-3/S-3, the G-6/S-6, the spectrum manager, and the G-7/S-7 coordinate closely to avoid friendly communications interference that can occur when using electronic warfare systems on the battlefield. Coordination ensures that electronic attack system frequencies are properly deconflicted with friendly communications and intelligence systems.

2-116. If not properly coordinated with the G-2/S-2 staff, electronic attack operations could inadvertently interrupt information collection by jamming or interfering with a frequency used to collect data on the threat or by jamming an enemy frequency or system that friendly forces are using as a means of collecting data. These conflicts must be avoided, as either type of interruption could significantly deter information collection efforts and their ability to answer critical information requirements. Coordination between the electronic warfare officer, the

chief of fires/fire support officer and fires cell, and the G-2/S-2 prevents this interference. The electronic working group brings known conflicts between information collection and electronic attack efforts to the G-3/S-3 for resolution.

2-117. The effects of jamming only persist as long as the jammer itself is emitting and is in range to affect the target. Normally these effects last a matter of seconds or minutes, which makes the timing of such missions critical. This is particularly true when units use jamming in support of aviation platforms. For example, in a mission that supports suppression of enemy air defenses, the time on target and duration of the jamming must account for the speed of attack of the aviation platform. They must also account for the potential reaction time of enemy air defense countermeasures. Aside from anti-radiation missiles, the effects of jamming are less persistent than effects achieved by other means. The development of directed-energy weapons may change this dynamic in the future. Electronic attack is especially well suited for targets that cannot be located with the accuracy needed for destructive fires or that require only temporary disruption. For more on the duties of the electronic warfare officer see ATTP 5-0.1.

MORTARS

GENERAL CONSIDERATIONS

2-118. Organic mortars are organized as platoons in maneuver and Ranger battalions and as sections in Stryker BCT and infantry BCT rifle companies.

2-119. 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. They are ideal weapons for attacking targets on reverse slopes, in narrow gullies, in ditches, and in other areas that are difficult to reach with low-angle fire. The proliferation of handheld global positioning system devices and the fielding of the new mortar fire control system partially compensate for the fact that mortar positions are seldom surveyed. The observer must still adjust the impact of mortar rounds. Maneuver unit mortars provide close, immediately responsive fire support for committed battalions and companies. These fires neutralize, suppress, or destroy enemy attack formations and defenses, help (in combination with engineer obstacles and terrain) to block, canalize, fix, or turn enemy forces; obscure the enemy's vision, or otherwise inhibit his ability to acquire friendly targets.

2-120. Mortars can also be used for final protective fire, obscuration, and illumination. The U.S. mortar munitions include a 120-mm precision munition; some multinational mortar units also have precision-guided munitions of different calibers. The maneuver commander decides how and when mortars, as a key fire support asset, will be integrated into his concept of operations. However, since mortars are fire support assets, the battalion or company fire support officer should give advice and make recommendations to the commander on the employment of his mortars. The commander may specify mortar support for subordinate units by changing the command or support relationship, by assigning priority of fires or by assigning priority targets such as final protective fires.

FIRE SUPPORT RESPONSIBILITIES AND MORTAR EMPLOYMENT

2-121. The mortar platoon/section leader and the battalion/company fire support officer have a unique relationship. They must understand the battalion commander's intent for fires and must work closely to see that it is carried out. The mortar platoon/section leader—

- Is the principal advisor to the battalion/company commander and battalion/company fire support officer on the tactical employment of mortars.
- Works closely with the battalion/company fire support officer to ensure mortar fires are planned on appropriate targets and delivered at the correct times.
- Informs the battalion/company fire support officer of anything that affects the mortar platoon/section's ability to execute the commander's fire support plan.

2-122. The high rate of fire achievable by mortars creates effective barriers of fire. The normal allocation of final protective fires is identical to the allocation of priority targets. While firing final protective fires, mortar sections

are not normally allowed to cease-fire and displace due to countermortar fire. They must take precautions to avoid or withstand countermortar fire.

2-123. Mortar units normally have a single final protective fire. A battalion heavy mortar platoon normally has a single 4-mortar final protective fire, but a battalion commander may direct the heavy mortar platoon to prepare 2, 2-mortar final protective fires. This should be done only if terrain dictates the need for more final protective fires than he has been allocated and only after seeking additional artillery allocations.

2-124. A company commander assigned final protective fires is responsible for the precise location of the mortar final protective fire and final protective fire integration into the direct fire final protective lines. A fire direction center plots, computes, and saves all firing data for the final protective fires as early as possible.

2-125. For more on mortar capabilities and employment, to include an expanded discussion of mortar tactical missions and inherent responsibilities, see ATTP 3-21.90.

NAVAL SURFACE FIRE SUPPORT

GENERAL CONSIDERATIONS

2-126. *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). Naval gunfire support is fire provided by Navy surface gun systems in support of a unit or units tasked with achieving the commander's objectives. Naval gunfire support is a subset of naval surface fire support. Due to its flat trajectory, terrain masking affects naval gunfire is more than field artillery. Naval gunfire also results in large range probable errors (the dispersion pattern of the naval gun is roughly elliptical with the long axis in the direction of fire). Hence, coverage of targets such as roads and airfields is most effective when the gun-target line coincides with the long axis of the target. Very close supporting fire can be delivered when the gun target line is parallel to the front line of troops. Oppositely, a gun-target line perpendicular to the front trace can endanger friendly forces.

2-127. Destroyers and cruisers, which mount the Mark (MK) 45 5-inch lightweight gun system, usually provide naval gunfire support. The MK 45 gun system can provide a rate of fire of 16-20 rounds per minute per gun to a range of approximately 23 kilometers. The latest version of the MK 45 gun mount provides a range of more than 36 kilometers with the Navy's new 5-inch cargo projectile and an improved propelling charge. The gun mount modifications include a new 62-caliber barrel, an ammunition recognition system, a gun/extended range guided munition interface and a new control system. The new mount is designed to be used with the MK 171 extended range guided munition for over-the-horizon range and improved lethality.

Note: Electronic warfare can also be conducted from naval platforms as an additional capability of naval surface fire support.

2-128. Within the limits imposed by hydrographic conditions, naval surface ships may be positioned for the best support of the ground force. The ability of the ship to maneuver is an important factor in planning for support of maneuver forces. It also allows selection of the most favorable gun target line. Ships have a variety of ammunition, from standard high explosive projectiles to Tomahawk land attack missiles. The variety and quantity of ammunition carried aboard naval vessels depends upon the class of the ship. Ammunition variety, combined with high rates of fire, high muzzle velocity, and precision fire control equipment make naval surface fires particularly suited for attacking targets that present a vertical face on the forward slopes of hills. The position of the ship must be fixed before each firing in order to achieve firing accuracy. In the absence of satellite positioning capability, bad weather and poor visibility make it difficult to fix the ship position, and they reduce the ability of spotters on the ship to engage targets on the shore. Radio communications can be interrupted by equipment limitations, enemy electronic warfare, and unfavorable atmospheric conditions. Hydrographic conditions, weather and visibility, and enemy naval and air action affect the employment of naval surface fires.

AIR SUPPORT

GENERAL CONSIDERATIONS

2-129. Fixed-wing air missions may be provided by the Air Force, Navy, Marine, or multinational aircraft. The joint force commander's apportionment is the determination and assignment of the total expected air effort by percentage and/or priority that should be devoted to the various air operations and/or geographic operations for a given period of time. *Apportionment* is in the general sense, distribution of forces and capabilities as the starting point for planning (JP 5-0).

2-130. The joint force commander normally apportions by priority or percentage into geographic area, against mission-type orders, and/or by categories significant for the campaign. These categories can include strategic attack, interdiction, counterair, maritime support, and close air support. Following the joint force commander's apportionment decision, the joint forces air component commander allocates the apportioned air sorties to the functions, areas, and/or missions they support, translating them into total numbers of sorties by aircraft type for each operational task. *Allocation* is distribution of limited forces and resources for employment among competing requirements (JP 5-0). The joint force air component commander ensures that the best-suited aircraft are used to support each task.

2-131. Fixed-wing aircraft perform numerous roles ranging from bringing air power to bear against surface targets through strategic attack, counterair, interdiction, and close air support; to providing enhanced capabilities for ground forces through surveillance, reconnaissance, target acquisition, and airlift. These roles define the broad purposes or functions of fixed-wing forces and are determined by objectives, not by the platform or weapons system used.

2-132. A *tactical air coordinator (airborne)* is an officer who coordinates, from an aircraft, the actions of other aircraft engaged in air support of ground or sea forces (JP 3-09.3). The Joint Surveillance Target Attack Radar System performs tactical air coordination (airborne). In the absence of a Joint Surveillance Target Attack Radar System, a forward air controller (airborne) provides communications relay between the Air Force tactical air control party and attack aircraft as well as other agencies of the tactical air control system. Tactical air coordination (airborne) also expedites close air support aircraft-to-forward air controller hand-off during heavy traffic close air support operations. Air Force two-ship forward air controller (airborne) flights, especially in higher threat environments, may divide responsibilities so one aircraft fills the normal forward air controller (airborne) role while the second becomes a tactical air coordinator (airborne).

Close Air Support

2-133. *Close air support* is air action by fixed- and rotary-wing 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 3-0). For maximum effectiveness, all air support missions must be coordinated and synchronized with the other fire support assets. The sorties apportioned and allocated to close air support are distributed to the various ground commanders by the land component commander. The ground commanders determine how the sorties will be used. For more on close air support see JP 3-09.3 and ATP 3-09.32.

2-134. A *forward air controller (airborne)* is a specifically trained and qualified aviation officer who exercises control from the air of aircraft engaged in close air support of ground troops. The forward air controller (airborne) is normally an airborne extension of the tactical air control party. A qualified and current forward air controller (airborne) will be recognized across the Department of Defense as capable and authorized to perform terminal attack control. (JP 3-09.3). Qualified helicopter aircrews can also function as a forward air controller (airborne); providing the ground commander with an additional capability for terminal attack control of close air support. A heliborne joint terminal attack controller may also direct the terminal attack control of close air support. This technique provides the ground commander flexible and responsive terminal attack control across a larger area of operations and is especially useful when joint terminal attack controllers are limited and Army aviation support is available.

Air Interdiction

2-135. *Air interdiction* is air operations conducted to divert, disrupt, delay, or destroy the enemy's military surface capabilities before it can be brought to bear effectively against friendly forces, or to otherwise achieve objectives that are conducted at such distance from friendly forces that detailed integration of each air mission with the fire and movement of friendly forces is not required (JP 3-03).

Counterair

2-136. *Counterair* is a mission that integrates offensive and defensive operations to attain and maintain a desired degree of air superiority. Counterair missions are designed to destroy or negate enemy aircraft and missiles, both before and after launch (JP 3-01). Field artillery may conduct counterair missions by striking enemy aircraft bases, helicopter forward arming and refuel points and missile storage and launch sites.

JOINT AIR ATTACK TEAM

2-137. A *joint air attack team* is a combination of attack and/or scout rotary-wing aircraft and fixed-wing close air support aircraft operating together to locate and attack high-priority targets and other targets of opportunity. The joint air attack team normally operates as a coordinated effort supported by fire support, air defense artillery, naval surface fire support, intelligence, surveillance, and reconnaissance systems, electronic warfare systems, and ground maneuver forces against enemy forces. Joint terminal attack controllers may perform duties as directed by the air mission commander in support of the ground commander's scheme of maneuver (JP 3-09.3).

COMMANDER'S OVERVIEW

2-138. The joint air attack team provides the commander with a flexible force that can engage the enemy in his area of operations. Each Service component involved retains OPCON of its respective units during a joint air attack team operation. A joint air attack team can engage enemy penetrations in the friendly sustainment area or strike targets in enemy territory in conjunction with the shaping operations of the maneuver force. The supported commander is responsible for the synchronization of maneuver and fires. The role of commanders involved with a joint air attack team include—

- The supported commander determines when to employ a joint air attack team, requests the assets and integrates the joint air attack team, other combat units, and supporting fires into his plan.
- Upon receipt of a joint air attack team request, the aviation commander assumes responsibility for the coordination and execution of the joint air attack team mission. He should be keenly aware of the ground and air tactical plan.
- The air mission commander controls the joint air attack team engagement (the aviation commander and the air mission commander may be the same person).

2-139. Indirect fire assets augment the fires of joint air attack team operations. Fires cells develop supporting joint suppression of enemy air defenses plans that support aircraft ingress and egress and necessary fire support coordination measures to allow the simultaneous attack by aircraft and indirect fires.

2-140. For more on joint air attack team operations see ATP 3-09.32.

ARMY AVIATION

GENERAL CONSIDERATIONS

2-141. Army aviation assets are in combat aviation brigades found throughout the Army and at every echelon from division to corps command. The combat aviation brigade is the supported commander's primary integrator of aviation assets. Each combat aviation brigade is tailored for specific missions.

ATTACK RECONNAISSANCE HELICOPTER OPERATIONS

2-142. Army attack reconnaissance helicopters are employed as maneuver forces in combined arms operations using the doctrine, tactics, and procedures in FM 3-04.126. Attack operations destroy or defeat enemy forces in

order to seize, retain, or exploit the initiative. Army attack/reconnaissance helicopters conduct both interdiction attack and close combat attack.

2-143. FM 3-04.126 discusses close combat attack as a hasty or deliberate attack by Army aircraft providing air-to-ground fires for friendly units engaged in close combat. Due to the close proximity of friendly forces, detailed integration is required. During close combat attack, Army helicopters engage enemy units in close contact with friendly forces with direct fire. Close combat attack is coordinated and directed by a team, platoon or company level ground unit using standardized close combat attack procedures in unit standard operating procedures.

2-144. FM 3-04.126 discusses interdiction attack as a hasty or deliberate attack by Army aircraft to divert, disrupt, delay, degrade, or destroy the enemy before they can be used effectively against friendly forces. Interdiction attack is conducted at such a distance from friendly forces that detailed integration with ground forces is not required.

2-145. Attack helicopters are capable of pinpoint destruction using antitank missiles or providing suppressive area fires with rockets and cannons. Reconnaissance operations are conducted to obtain information about the enemy and/or terrain to assist in building and sharing the common operational picture and to focus combat power at the decisive point and time. Reconnaissance helicopters provide near-real-time intelligence and terminal guidance for a variety of weapon systems—including Hellfire and air delivered precision-guided munitions. Security operations provide reaction time, maneuver space and protection to air-ground maneuver.

2-146. For more on attack reconnaissance helicopter operations see FM 3-04.126.

CONTROL OF ARMY AVIATION ASSETS

2-147. Aviation assets normally remain under a combat aviation brigade, aviation battalion task force, or aviation battalion control. The supported commander decides how supporting aviation assets will be integrated into his overall concept of operations and how and when aviation will provide support.

2-148. For more on the capabilities and employment of aviation brigades see FM 3-04.111.

Chapter 3

Fire Support and the Operations Process

Fire support follows the mission command activities performed during operations: planning, preparing, executing, and continuously assessing the operation. These 4 activities serve as a template for coordinating other actions associated with an operation including integrating processes, continuing activities, and actions specific to each operations process activity. Both integrating processes and continuing activities occur throughout an operation. Commanders synchronize them with each other and integrate them into all operations process activities. Section I begins with fire support planning, coordination, and targeting. Section II describes fire support preparation. Section III describes fire support execution. Section IV concludes this chapter by discussing fire support assessment.

SECTION I – FIRE SUPPORT PLANNING, COORDINATION, AND TARGETING

FIRE SUPPORT PLANNING

3-1. The purpose of commander's guidance is to focus staff activities in planning an operation. An *operation* is 1. A sequence of tactical actions with a common purpose or unifying theme. (JP 1) 2. A military action or the carrying out of a strategic, operational, tactical, service, training, or administrative military mission. (JP 3-0).

COMMANDER'S INTENT AND CONCEPT OF OPERATIONS

3-2. The *commander's intent* is a clear and concise expression of the purpose of the operation and the desired military end state that supports mission command, provides focus to the staff, and helps subordinate and supporting commanders act to achieve the commander's desired results without further orders, even when the operation does not unfold as planned (JP 3-0).

3-3. 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 (Army doctrine reference publication [ADRP] 5-0). Understanding the commander's intent, concept of operations and operational requirements for the maneuver elements is necessary for fire support personnel to provide sound advice to the commander and his staff. Fire support planners focus how to employ available fires to achieve the desired effect. **The *scheme of fires* is the detailed, logical sequence of targets and fire support events to find and engage targets to accomplish the supported commander's intent.** The scheme of fires is planned to support the commander's scheme of maneuver and is built on the fire support tasks developed by the FSCOORD/FSO.

COMMANDER'S GUIDANCE FOR FIRE SUPPORT

3-4. The maneuver commander must provide a clear and concise guidance on effects he expects from fires. His emphasis must focus fires within the scheme of maneuver to achieve his objectives. 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. Commander's guidance for fire support emphasizes in broad terms when, where, and how the commander intends to synchronize the effects of fire support with the other elements of combat power to accomplish the mission. 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

should include his priority of fires. *Priority of fires* is the commander's guidance to his staff, subordinate commanders, fire support planners, and supporting agencies to organize and employ fire support in accordance with the relative importance of the unit's mission (ADRP 3-09). Mission orders for supporting field artillery brigades and field artillery battalions should include the supported commander's intent, concept of operations, priority of fires, fire support tasks, and coordinating instructions.

DEVELOPING THE FIRE SUPPORT PLAN

3-5. Fire support is a force multiplier and can add weight to decisive operations where other assets fail. It is therefore imperative that fire support considerations be included in the planning of all operations. Fires specialists at each echelon of command recommend effects, capabilities, and techniques for delivering fires that will support the commander's guidance and assist the unit in achieving its objectives. Field artillery personnel integrate all available fire support resources and synchronize them in accordance with the commander's intent, concept of operations and priority of fires. Fire support planning is often described as being top down, bottom up. The initial fire support plan is developed by the higher headquarters to meet the supported commander's requirements. Subordinate units do not change the overall plan but provide recommendations and refinements such as improved target locations. Effective fire support planning and coordination permits the maneuver commander to orchestrate and employ all available fires and related resources in an integrated and synchronized fashion consistent with the concept of operations. ***Fire support planning is the continuing process of analyzing, allocating, and scheduling fires to describe how fires are used to facilitate the actions of the maneuver force.*** Fire support planning is focused on using the timely and effective delivery of fires to enhance the actions of the maneuver force. It involves the assignment of mission and positioning of field artillery units and identifies the types of targets to attack, identifies the collection assets that acquire and track targets, specifies the fire support assets to attack each identified target, and establishes the criteria for target defeat. The objective of fire support planning is to optimize the application of combat power. It is performed as part of the operations process. Fire support planning includes developing fire plans (target lists and overlays) and determining forward observer control options to ensure fire support is integrated into the commander's scheme of maneuver and can be executed in a timely manner.

3-6. ***A fire support plan is a plan that addresses each means of fire support available and describes how Army indirect fires, joint fires, and target acquisition are integrated with maneuver to facilitate operational success.*** The FSCoord, chief of fires, brigade fire support officer, and other fire support planners develop an effective and integrated fire support plan to support operations. An effective fire support plan clearly defines fire support requirements, focuses on the tasks and their resulting effects, uses all available acquisition and attack assets, and applies the best combination of fire support assets against high-payoff targets.

3-7. The fire support plan identifies critical times and places where the commander anticipates the need to maximize effects from fire support assets. Fire support planning must take into account existing limitations on the employment of fires, such as rules of engagement and positive identification requirements, presence of special operations forces within the area of operations, desired conditions of subsequent phases, and requirements for collateral damage avoidance. The commander augments maneuver with fires to mass effects, achieve surprise, destroy enemy forces, and obtain decisive results. The commander's guidance gives specified attack criteria for supporting fires assets, thus focusing the fires planning and coordinated execution on critical times and events. The specified attack criteria are developed as a function of the commander's guidance, desired effects, and high-payoff targets and attack priorities. Effective fire support planning and coordination ensures that desired effects are achieved on high-payoff targets without wasting assets through repetitive engagements by multiple friendly systems. Continuous planning and coordination facilitates the immediate actions required to support ongoing operations; and anticipates actions that may be required in the future.

3-8. The fire support plan is an integral part of the operation plan (OPLAN)/operation order (OPORD) and is normally comprised of the Fires paragraph in the OPLAN/OPORD and Annex D, FIRES (if used), and its associated appendices, tabs, or enclosures. The development of the fire support plan is the responsibility of the FSCoord, chief of fires/fire support officer and fires cell. Preparation for and execution of the plan also includes the responsibility for both technical and tactical rehearsals to ensure proper execution. The essential elements of a fire support plan include but are not limited to—

- Clear and concise articulation of fire support tasks by identifying the task, purpose, and effect of each task.
- Allocation of all fire support assets.
- Projected changes to the allocation of fire support assets based on tactical contingencies in the concept of operations.
- Coordination and synchronization instructions for the timely detection and attack of high-payoff targets.
- Requirements for positioning of assets, the makeup of basic loads, and the controlled supply rate.
- Restrictions on ammunition expenditures, types of fires, areas of employment, and creation of obstacles.
- Establishment and changes in fire support coordination measures.

3-9. In developing situations where time is critical, having a quick-fire plan can enable a unit to quickly execute fire support for an impending operation. Brigade, battalion or company fire support officers develop quick-fire plans to support their respective organizations. Like all fire support plans, the maneuver commander approves the quick-fire plan. In quick-fire planning the fire support officer assigns targets (and possibly a schedule of fires) to the most appropriate fire support means available to support the operation. In this type of fire support planning the available time usually does not permit evaluation of targets on the target list and consolidation with targets from related fire support agencies.

FIRE SUPPORT PLANNING PRINCIPLES

3-10. Successful fire support planning is the result of the FSCOORD/chief of fires, FSO's aggressive contribution to the commander's planning and decision making process. In making this contribution, they employ principles of fire support planning, coordination, and execution as a guide. In advising the maneuver commander on the application of fire support, the FSCOORD/chief of fires/brigade fire support officer also review fire support requirements against basic fire support considerations that guide fire support planners in the development of fire support plans—

- Plan Early and Continuously. To effectively integrate fire support with the commander's concept of the operation, planning must begin when the commander states his mission and provides his commanders guidance. Whenever commander's guidance is needed during the planning of an operation, fire support planners should solicit that guidance from the commander. Planning is continuous and keeps pace with the dynamics of the operation.
- Ensure the Continuous Flow of Targeting Information. The fire support planners should ensure that target acquisition requirements for fire support are identified and focused on detecting high-payoff targets. Fire support planners also ensure that target information from all sources are evaluated and routed to the appropriate attack means. This includes information from all echelons and from adjacent and supporting elements.
- Consider the Use of All Capabilities. The fire support planners consider the full range of fires and other capabilities available at all levels. This includes fires and other assets from available joint and multinational forces.
- Use the Lowest Echelon Capable of Furnishing Effective Support. The lowest echelon that has the necessary means to accomplish the mission should furnish the fire support. The fire support planners decide what is needed and, if their assets are inadequate, request additional support.
- Furnish the Type of Support Requested. The fire support requester is usually in the best position to determine his fire support requirements. However, the fire support planners are 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 fire support planner stops the request and notifies all concerned. When possible and necessary, he substitutes a new fire support means and alerts the agencies that are to provide and receive the support.
- Use the Most Effective Fire Support Means. Requests for fire support are transmitted to the force capable of delivering the most effective fires within the required time. In making his decision, the FSCOORD, and chief of fires/fire support officer consider 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.

- Avoid Unnecessary Duplication. A key task for the chief of fires/fire support officer is to ensure that duplications of fire support requests are resolved.
- Coordinate Airspace. All commanders must have the freedom to use airspace to achieve the commander's objectives and must have maximum flexibility to use assets (organic, supporting and joint) within that airspace. Effective airspace management requires a responsive airspace control system, standardization, minimal restrictions, and continuous coordination among all airspace users. The chief of fires/fire support officer provides input concerning fire support use of airspace to those agencies (battlefield coordination detachment, air support operations center tactical air control party, ADAM/BAE) and personnel engaged in airspace management to ensure that conflicts between surface-based indirect fire and air operations are minimized. Using fire support coordination and airspace coordinating measures correctly can prevent fratricide and duplication of effort while increasing the effectiveness of air-to-ground and ground-to-ground ordnance. Planning and coordination are necessary to minimize conflicts between surface-based indirect fire and air operations.
- Provide Adequate Support. The mission and the commander's guidance determine the amount and type of fire support needed for success. The FSCOORD or chief of fires/fire support officer must inform the supported commander when fire support requirements exceed capabilities.
- Provide for Rapid Coordination. Commanders must establish procedures and responsibilities for the rapid coordination of fire support. In some circumstances, coordination of fire support will be detailed and done in advance. In other instances, due to operational circumstances, coordination will be rapid and less detailed. Rigid coordination procedures may delay the delivery of fires and jeopardize the force. The FSCOORD, and chief of fires/fire support officer must know the availability of assets, the concept of operations, the commander's intent, fire support coordination measures in effect, rules of engagement, and any other restrictions.
- Protect the Force. The FSCOORD and chief of fires/fire support officer must be aware of those situations that increase the risk of fratricide. The primary mechanisms for limiting fratricide are command emphasis, restrictive fire support coordination measures, disciplined operations, close coordination among commands at all levels, and detailed situational understanding.
- Provide for Flexibility. The FSCOORD and chief of fires/fire support officer must 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 Fire Support Coordination Measures. While planning is done regardless of boundaries and friendly locations, the execution and coordination of fire support must always account for these realities. To ensure responsive and safe fire support, the FSCOORD, and chief of fires/fire support officer must continuously use and update all types of fire support coordination measures.

FIRE SUPPORT COORDINATION

3-11. Fire support coordination requires continually coordinating fire support plans and managing the fire support assets that are available to a maneuver force. *Fire support coordination* is the planning and executing of fire so that targets are adequately covered by a suitable weapon or group of weapons (JP 3-09). Fire support personnel must stay abreast of the maneuver situation at all times and monitor requests for fire support within the unit to prevent fratricide. Fire support personnel advise the maneuver commander of fire support coordination measures that enhance the responsiveness and effectiveness of fires.

3-12. Fire support planning and coordination integrates and synchronizes Army indirect, air and missile defense, joint, and multinational fires with the other warfighting functions into the commander's concept of operations. Fire support planners work closely with the electronic warfare element to ensure destructive fires are integrated and synchronized with cyber/electromagnetic activities. Munitions allocation along with the commander's guidance for fires is an important part of fire support planning and coordination. Fire support planning and coordination is central to the effectiveness of fire support. Formal coordination binds fire support

resources together in a common effort so that the employment of each fire support asset is synchronized with the commander's intent and concept of operations. Effective coordination during both planning and execution is required to ensure that a suitable weapon system(s) adequately attacks the desired targets at the correct time and place. Effective coordination among the various organizations is necessary for the effective delivery of fire support. Fundamental requirements of fire support coordination are that fire support must: operate as a cohesive entity, be responsive to the needs of the supported commander, and be fully integrated into the supported commander's concept of operations. The supported commander should direct his FSCoord and chief of fires/brigade fire support officer to ensure that all available means of fire support are fully synchronized with his concept of the operation. The supported commander retains the authority to direct target priorities, levels of effort, and the sequence of those efforts to his subordinates.

GENERAL GUIDELINES FOR FIRE SUPPORT COORDINATION

3-13. Fire support coordination ensures the matching of the right attack means with the correct target to deliver the commander's desired effects at the precise time and location needed to support the operation. To achieve the best possible matching of all fire support and targets, the following guidelines for coordination are recommended—

- Positioning field artillery delivery units to engage high-payoff targets.
- If acting as force field artillery headquarters, provide common grid and meteorological data for units attached to or under its operational control (OPCON) or tactical control (TACON).
- Coordinating with the brigade combat team's (BCT's) fires cell and field artillery battalion command post to develop the attack guidance matrix using the munitions effects database in the Advanced Field Artillery Tactical Data System (AFATDS).
- Computing ammunition requirements needed for generating desired effects via the attack of expected enemy target categories with field artillery. Providing this assessment to the commander so that he can formulate his attack guidance.
- Identifying issues that require the field artillery commander's attention or additional guidance.
- Stating the FAB and supported higher headquarters commander's attack guidance by defining "how," and "when," and with what restrictions the commander wants to attack different targets and identify the targeting priorities.
- Requiring refinement by lower echelons to be completed by an established cut-off time.
- Verifying or correcting target locations and trigger points during refinement.
- Recommending the risk the FAB and the supported higher headquarters commander should be willing to accept concerning delivery of indirect fires for maneuver units in close combat.
- Using the fire support execution matrix to brief the fire support portion of the OPORD during rehearsal. Rehearse the fire support portion of the OPORD directly from the fire support execution matrix.
- Conducting rehearsals with the actual units and Soldiers who will execute field artillery tasks.
- Verifying the area of coverage of radars of the units who have a command or support relationship with the FAB.
- Prioritizing requirements for radars and allocate radar zones to reflect the developed situation template, protection priorities, and the scheme of maneuver.
- Explaining fire support-related combat power in terms of the required effects to be generated for the operation.

PROCEDURAL CONTROLS FOR DECONFLICTING FIRES

3-14. During fire support planning and coordination, there should be emphasis on establishing procedural controls to deconflict fires with joint forces, particularly the air component. Missile and guided MLRS targets will often be located beyond the fire support coordination line. Coordination of attacks beyond the fire support coordination line, if established, is especially critical to commanders of air, land, and special operations forces. Forces attacking targets beyond a fire support coordination line must inform all affected commanders in

sufficient time to allow necessary reaction to avoid fratricide, both in the air and on the ground. Finally, this coordination assists in avoiding conflicting or redundant attacks.

FIRE SUPPORT AND TARGETING

3-15. *Targeting* is the process of selecting and prioritizing targets and matching the appropriate response to them, considering operational requirements and capabilities (JP 3-0). A *target* is 1. An entity or object that performs a function for the adversary considered for possible engagement or other action. 2. An area designated and numbered for future firing (JP 3-60). Targeting and its integral functions of decide, detect, deliver, and assess (see table 3-1 on page 3-7) is an integral part the operations process. Targeting occurs continuously throughout an operation. Its steps mirror planning, preparing, executing, and assessing. An important part of targeting is identifying potential fratricide and collateral damage situations and implementing fire support coordination and other control measures that both facilitate operations and minimize fratricide and collateral damage. The targeting working group is typically led by the fires cell; the targeting board is chaired by the chief of staff/executive officer/G-3/S-3. See FM 3-60.

Table 3-1. Synopsis of targeting

→ Decide →		→ Detect →	
Determine	Based on	Determine	Based on
<p>What (task): Enemy focused. Determine what fire support and inform and influence activities tasks are essential to the success of the operation (enemy formation or function and desired effects from attack).</p> <p>Why (purpose): Friendly focused. Determine the purpose for employment of fires (for example to suppress, neutralize, and destroy enemy fire support systems and control nodes).</p>	<p>Receipt of Mission</p> <ul style="list-style-type: none"> • Commander's intent. • Concept of operations. • Initial planning guidance. • Guidance for fires. <p>Mission analysis:</p> <ul style="list-style-type: none"> • Specified & implied tasks • IPB • Target Value Analysis. • High-value targets. 	<p>Who/Where: Focused on detection. Assets are deployed to detect high-payoff targets.</p> <p>Information collection assets identify and locate targets that can be attacked by fires, electronic attack and inform and influence activities.</p>	<p>COA Development.</p> <ul style="list-style-type: none"> • Scheme of Fires. • High-payoff targets. • Target selection standards. • Attack Guidance Matrix. • Fire support tasks. • Electronic attack tasks. • Inform and influence tasks. • Measures of performance. • Measures of effectiveness. <p>COA Analysis</p> <ul style="list-style-type: none"> • Refine above products. • High-payoff Target List. • Target Synch Matrix. • Airspace control request. • Information requirements. <p>Orders Production</p> <ul style="list-style-type: none"> • Finalize above products. • Fire Support Plan. • Information Collection Plan. • Airspace Control Plan. • OPLAN/OPORD. • Fires Paragraph 2e. • Annex D Fires, with tabs.
→ Deliver →		→ Assess →	
Determine	Based on	Determine	Based on
<p>Who/When: Focused on deliver. Addresses the “who” and “when” portion of the task (such as the attack of a specified target, duration of attack and effects desired).</p>	<ul style="list-style-type: none"> • COA development • Scheme of Fires • Wargaming. • COA decision • OPLAN/OPORD • High-payoff Target List • Attack Guidance Matrix. • Target Synch Matrix. • Information Collection Plan • Airspace Control Plan 	<p>Effect: Identifies if the intended effect was achieved by the attack means and how well the attack means functioned.</p>	<ul style="list-style-type: none"> • OPLAN/OPORD • Task execution. • Effects of fire support. • Effects of electronic attack. • Effects of IIA. • Combat assessment • Measures of performance. • Measures of effectiveness.
<p>COA – course of action IIA – inform and influence activities IPB – intelligence preparation of the battlefield</p>		<p>OPLAN – operation plan OPORD – operation order</p>	

DECIDE

3-16. Decide is the first step in the targeting process. It begins with the military decision-making process (MDMP). It does not end when the plan is completed; the decide function continues throughout the operation. The staff develops decide information to address—

- What targets should be acquired and attacked? **Target selection standards are criteria applied to enemy activity (acquisitions and battlefield information) used in deciding whether the activity is a target.**
- When and where are the targets likely to be found?
- How long will the target remain once acquired?
- Who or what can locate the targets?
- What accuracy of target location will be required to attack the target?

- What are the priorities for surveillance, reconnaissance, and target acquisition objectives and asset allocation?
- What intelligence requirements are essential to the targeting effort and how and by when must the information be collected, processed, and disseminated?
- When, where, how, and in what priority should the targets be attacked?
- What are the measures of performance and measures of effectiveness that determine whether the target has been successfully attacked and whether the commander's desired effects have been generated by doing so?
- Who or what can attack the targets, and how should the attack be conducted (for example, number/type of attack assets, ammunition to be used) to generate desired effects and what are the required assets/resources based on commander's guidance?
- What or who will obtain assessment or other information required for determining the success or failure of each attack? Who must receive and process that information, how rapidly, and in what format?
- Who has the decision making authority to determine success or failure, and how rapidly must the decision be made and disseminated?
- What actions will be required if an attack is unsuccessful and who has the authority to direct those actions?

3-17. The joint force commander may prohibit or restrict attacks on specific targets or objects without specific approval based on military risk, the law of war, rules of engagement, or other considerations. Targeting restrictions are typically identified on two lists; the no-strike list and the restricted target list.

3-18. A *no-strike list* is a list of objects or entities characterized as protected from the effects of military operations under international law and/or the rules of engagement (JP 3-60). Attacking these may violate the law of armed conflict or interfere with friendly relations with indigenous personnel or governments. The no-strike list is compiled independently of and in parallel to the candidate target list. It is important to note, however, that entities from the candidate target list may be moved to the no-strike list if, as a result of additional target development, it is determined that attacking them may violate the Law of War. Conversely, targets placed on a no-strike list may be removed from that list and become subject to military action if their status as a protected object or entity has changed.

3-19. A *restricted target list* is a list of restricted targets nominated by elements of the joint force and approved by the joint force commander. This list also includes restricted targets directed by higher authorities (JP 3-60). Actions against targets on the restricted target list that exceed specified restrictions are prohibited until coordinated and approved by the establishing headquarters. A *restricted target* is a valid target that has specific restrictions placed on the actions authorized against it due to operational considerations (JP 3-60).

3-20. Attacking restricted targets may interfere with projected friendly operations. Targets may have certain specific restrictions associated with them that should be clearly documented in the restricted target list (for example, do not strike during daytime, strike only with a certain weapon). Some targets may require special precautions (for example, chemical, biological, or nuclear facilities, or proximity to no-strike facilities) due to possible collateral effects of using artillery on the target. When targets are restricted from lethal attacks, commanders should consider nonlethal capabilities as a means to achieve or support the commander's desired objectives. For more on the no-strike list, restricted targets, and legal considerations for targeting see JP 3-60.

DETECT

3-21. The second step of the targeting process, detect, directs how and which target acquisition assets find the specified targets to the requisite level of accuracy. It focuses specific platforms or assets to search for a specific target in time and space. Typically, the staff closely coordinates with the G-2/S-2 in developing the information collection plan. Identified targets are tracked and engaged by appropriate means. For example target acquisition radars may focus on threat mortars firing at friendly forces, unmanned aircraft may track enemy forces preparing to attack a friendly fire base. The guidance, direction and synchronization provided for information collection and target acquisition enables assets to find specific targets or develop information required to meet

the commander's requirements. Named areas of interest and target areas of interest are used to focus the surveillance effort and are integrated into the information collection plan.

- 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. Named areas of interest are usually selected to capture indications of adversary courses of action, but may be related to conditions of the operational environment (JP 2-01.3).
- A *target area of interest* is the geographical area where high-value targets can be acquired and engaged by friendly forces. Not all target areas of interest will form part of the friendly course of action; only target areas of interest associated with high priority targets are of interest to the staff. These are identified during staff planning and wargaming. Target areas of interest differ from engagement areas in degree. Engagement areas plan for the use of all available weapons; target areas of interest might be engaged by a single weapon (JP 2-01.3).

DELIVER

3-22. Attacks must meet the success criteria developed during the decide step. Close coordination is required between those engaged in detecting targets and those conducting the attack. Close coordination is required between the entities engaged in detecting targets and those conducting the attack. Normally the G-3/S-3 and chief of fires/fire support officer provides guidance for this coordination and synchronization in the attack guidance matrix, information collection plan and fires, electronic warfare and inform and influences activities input to the OPLAN/OPORD.

ASSESS

3-23. Assess occurs throughout the operations process. Targeting is continuously refined and adjusted between the commander and staff as the operation unfolds. Combat assessment measures how effectively attack systems and munitions functioned, effects on the target, and a recommendation as to whether the target should be re-attacked. A *reattack recommendation* is an assessment, derived from the results of battle damage assessment and munitions effectiveness assessment, providing the commander systematic advice on reattack of targets and further target selection to achieve objectives (JP 3-60). The reattack recommendation considers objective achievement, target, and aimpoint selection, attack timing, tactics, and weapon system and munitions selection. The reattack recommendation is a combined operations and intelligence function.

SECTION II- FIRE SUPPORT PREPARATION

GENERAL CONSIDERATIONS

3-24. Fire support preparation creates conditions that improve friendly forces' chances for success. It facilitates and sustains transitions, including those to branches and sequels. Preparation requires action by fire support personnel at every echelon. Mission success depends as much on fire support preparation as on fire support planning. Fire support rehearsals help staffs, units, and individual fire support personnel to better understand their specific role in upcoming operations, synchronize execution of the fire support plan, practice complicated tasks before execution, and ensure equipment and weapons are properly functioning.

3-25. Fire support preparation activities begin before deployment and continue during planning, and throughout an operation. Uncommitted forces prepare for identified contingencies and look to the operation's next phase or branch. Committed units revert to preparation when they reach their objectives, occupy defensive positions, or pass into reserve.

REHEARSALS

3-26. The supported unit headquarters normally conducts the combined arms rehearsal after subordinate units have issued their OPORD. This rehearsal ensures that the subordinate unit's plans are synchronized with those of other units in the organization and that those plans will achieve the intent of the higher commander. A fire support rehearsal in coordination with the field artillery 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 working group.

FIELD ARTILLERY DIGITAL REHEARSALS

Level III Digital Rehearsals

3-27. Level III full-scale digital technical rehearsals are conducted either in conjunction with combined arms/field artillery tactical rehearsals or conducted separately. They involve the use (in real-time) of fire support platforms over actual or similar terrain. These rehearsals are generally conducted in a deliberate/hasty defense or limited offense. Level III rehearsals are resource and time-intensive and, although the most desirable, rarely feasible at FAB or FA battalion level. Significant benefits of technical rehearsals include—

- Database verification for fire support digital systems.
- Validation of the supporting communications architecture. Mobile digital platforms that are spread over a geographic area present unique challenges difficult to replicate with static platforms in an assembly area.
- Verification of the maneuver terrain management plan and time-space relationships between field artillery targets and field artillery movement plans. The intent is to ensure units are in place to provide fires during critical periods.
- Rehearsal of triggers (on the ground if possible), both for movement and for the initiation of fires by primary and backup sensors/observers.

Level II Digital Rehearsals

3-28. Level II digital rehearsals are conducted separate from combined arms/field artillery tactical rehearsals. They are conducted from actual fighting position areas, where "electronic movement" of units and icons in the AFATDS situation screen would adversely affect the current mission. This may be a partial digital rehearsal in that only actual targets within range of friendly assets can be rehearsed and processed among AFATDS operational facilities such as fires cells or fire direction centers. Targets outside the range of friendly assets cannot be processed in AFATDS, even for rehearsal purposes. For these targets, their information (for example, target number, grid, trigger, attack guidance, and firing units) should be verified by voice or text message.

Level I Digital Rehearsals

3-29. Level I full digital rehearsals are conducted separate from combined arms/field artillery tactical rehearsals similar to a normal command post exercise from an assembly area. The database can be rehearsed completely by electronically moving units and icons in the AFATDS situation screen. Movement of the icons on the screen gives rehearsal participants an electronic visualization of how the operation will unfold and how the fire support plan will be integrated. However, before conducting this type rehearsal, units must be certain that it will not interfere with actual missions.

INTEGRATED DIGITAL AND TACTICAL FIRE SUPPORT/FIELD ARTILLERY REHEARSALS

3-30. The AFATDS offers a unique ability to merge digital and fire support/field artillery tactical rehearsals. The commander's preferences should be reflected in unit standard operating procedures.

3-31. The rehearsal net must allow all participants to eavesdrop and follow the rehearsal. Regardless of the net, the fires cell should be the net control station and run the rehearsals. To provide the conceptual framework, the rehearsal should begin with a brief description of the concept of operations and supporting scheme of fires followed by a senior headquarters fires cell phase-by-phase overview of the operation. Topics to be addressed for each phase include—

- Scheme of maneuver/friendly/enemy actions that initiate each phase (fires cell).
- Enemy situation (unit or force field artillery G-2/S-2). For Level I and Level III rehearsals, the G-2/S-2 directs the movement of enemy icons on the AFATDS current situation screen and sends the status either to selected units or to a distribution list to update all AFATDS operational facilities.

- Concept of operations (fires cell).
- Commander's intent for fires during that phase (fires cell).
- Fire support tasks for that phase. (Note: fire support tasks are related in time and space. Therefore, fire support tasks should be discussed in relation to each other.) Information should also include—
 - Target number and grid coordinates.
 - Purpose of the target.
 - Primary and alternate triggers to include periods of limited visibility and description of how triggers are related in time and space to the scheme of maneuver.
 - Primary and alternate sensors/observers.
 - Delivery unit(s).
 - Time-space relationship between the unit response time, duration of fires, and scheme of maneuver.
- After review of each fire support task, missions should be processed from the sensor/observer to the delivery system level. In particular, validate the following—
 - Mission value.
 - System preferences (AFATDS recommends the fire support attack asset).
 - Delivery system attack methods (shell, fuze, unit, volleys).
 - Proper functioning of AFATDS intervention points.
 - Target coordination requirements.
 - Mission routing functions.
- After review of each fire support task, the artillery S-3 should discuss field artillery actions and field artillery tasks to support each phase, to include—
 - Movements required during the phase, their triggers, and relationship in time and space with fire support tasks. For Level I and Level III rehearsals, displacing firing units change their grid location and send status to selected units or a distribution list to update AFATDS operational facilities.
 - Logistic requirements in the phase to include ammunition resupply triggers and special munition distribution.

DIGITAL REHEARSAL CHALLENGES

3-32. The effect of automatic data distribution during digital rehearsals is potentially far reaching. As digital systems are designed to disseminate information automatically, safeguards must be in place to separate digital rehearsals from real world events. In both Level I and Level III rehearsals, AFATDS operational facilities electronically "move" unit icons in AFATDS from assembly areas or battle positions into planned battle positions to engage targets for the rehearsal. Preferably, rehearsal missions must be distinctly separate from live missions. Otherwise, digital rehearsal missions and associated exercise messages should not be automatically passed to addressees unless they are rehearsal participants or are aware of the rehearsal and able to differentiate between actual and rehearsed information. Alternatively, non-participating net members may have to leave the net for the duration of the rehearsal.

3-33. Safeguards must also be taken to prevent live rounds from being fired at 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.

3-34. Although AFATDS permits dividing plans into distinct phases, creating and switching among multiple phases during rehearsals create the potential for introducing database errors. Therefore, phases within a plan should be kept to a minimum and created only when necessary.

SECTION III – FIRE SUPPORT EXECUTION

GENERAL CONSIDERATIONS

3-35. *Execution* is putting a plan into action by applying combat power to accomplish the mission (ADP 5-0). Execution involves the performance of task necessary to effectively deliver fires. Success requires detailed situational understanding necessary to assess progress and adapt the plan as necessary.

3-36. Strikes by fire support assets support maneuver forces in contact with the enemy and ensure the freedom of other forces to maneuver throughout the supported commander's area of operations. Fire support planners must also retain sufficient assets to mass the effects of fires at critical times and places.

3-37. Fires typically produce destructive effects but nonlethal capabilities such as electronic attack can be employed with little or no associated physical destruction. Electronic attack performs several functions to support the commander's operation. For example, during offensive tasks electronic attack resources may concentrate on neutralizing enemy fire control, target acquisition, and intelligence-gathering systems.

CLEARANCE OF FIRES

3-38. The supported ground commander is responsible for the clearance of fires in his area of operations, including the integration of fires with other airspace users. The commander establishes, or requests higher headquarters establishment of control measures (such as graphic control measures, direct fire control measures, airspace coordinating measures, and fire support coordination measures) that serve as a means of separating units, synchronizing fires and maneuver, facilitating clearance of fires, and preventing fratricide. A *graphic control measure* is a symbol used on maps and displays to regulate forces and warfighting functions (ADRP 6-0). The commander may not employ indirect fires across boundaries without receiving clearance from the unit into whose area of operations the fires will impact. He may employ direct fires across boundaries without clearance at specific point targets that are clearly and positively identified as enemy. Commanders may consider early coordination to also grant clearance for indirect fires against targets that are clearly and positively identified as enemy. Airspace clearance remains necessary in any situation.

FIRE SUPPORT FOR OFFENSIVE TASKS

3-39. Fire support for offensive tasks involves attacking the enemy throughout the supported friendly commander's area of operations with massed area or precision indirect fires, rotary-and fixed-wing aircraft, and electronic attack assets. The critical characteristics of offensive actions are the surprise, concentration, tempo, and audacity needed to gain and maintain the initiative (see FM 3-90-1). Fire support execution must support these characteristics and support the maneuver force in seizing and maintaining the initiative. Often, fire support planners can support several characteristics of the offense with one fire support tactic or technique.

SURPRISE

3-40. Commanders can use fire support to achieve surprise by—

- Rapidly and discreetly shifting fire support assets and/or shifting and massing the effects of fire support. *Shifting fire* is fire delivered at constant range at varying deflections; used to cover the width of a target that is too great to be covered by an open sheaf (JP 1-02).
- Using fires to deceive the enemy as to the location of the main effort.
- Using short duration, intense fires against key enemy functions at critical times.
- Using military deception techniques to deceive the enemy as to the types, numbers, locations, and capabilities of friendly fire support and target acquisition assets.
- Changing fire support tactics.
- Foregoing a preparation to achieve surprise in initiating an attack.
- Achieving first round effects on the target.

CONCENTRATION

- 3-41. Commanders can use fire support to support achieve concentration by—
- Allocating fire support assets to support the decisive operation. This includes weapon systems, target acquisition assets, observers, liaison teams, priority targets, and munitions.
 - Assigning priorities of fires and quick-fire channels.
 - Focusing information collection and target acquisition assets.
 - Concentrating fire support assets 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.

TEMPO

- 3-42. Commanders can use fire support to support enhance/maintain the tempo of the offense—
- Using a decentralized organization for combat and decentralized fire support planning and fire control methods 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 and branches or a new operation.
 - Providing fires in support of shaping operations that complement the decisive operation, set the stage for rapid transition to the next phase or new operation, and create new opportunities for maneuver.
 - Developing a thorough sustainment plan that properly anticipates potential culminating points for the fire support structure.
 - Ensuring fire support coordination measures are planned to enhance the speed of the operation.
 - Providing fires to stop reinforcements; use smoke to delay and disrupt the enemy retreat.

AUDACITY

- 3-43. Commanders can use fire support to support the concept of audacity by—
- Aggressively applying firepower.
 - Making well thought-out, risk-taking decisions in the use of fire support assets.
 - Planning fires on the flanks of the supported unit's advance to prevent counterattack; consider use of scatterable mines to seal flank avenues of approach.
 - Limiting the firepower allocated to shaping operations to weight the decisive operation.
 - Placing fire support assets well forward and moving them closely behind lead maneuver units.
 - Using field artillery raids to strike high-payoff targets.

FIRE SUPPORT FOR DEFENSIVE TASKS

3-44. Successful defenses are aggressive. They maximize firepower, protection, and maneuver to defeat enemy forces and regain the initiative. Successful defensive operations share the following characteristics: preparation, security, disruption, massing effects, flexibility, maneuver, and operations in depth (see FM 3-90-1).

PREPARATION

- 3-45. The defender often has the opportunity to select the defensive terrain, and has time to prepare his defenses. Fire support planners must make maximum use of any preparation time available to plan and coordinate supporting fires by—
- Developing the fire support plan to include:
 - Planning indirect fires in support of the barrier and/or obstacle plan.
 - Planning defensive fires in support of patrols, convoys, or quick reaction forces.

- Planning targets, observer positioning, triggers, and fires in support of all engagement areas for all phases of the defensive operation, to include each counterattack option of the striking force.
- Recommending fire support coordination measures to support each phase of the defensive operation, to include all planned counterattack options.
- Planning targets on avenues of approach to disrupt enemy attacks by striking the enemy on his approach and during his assault.
- Coordinating with the supported command's fires cell for close air support and Army aviation close combat attacks.
- Preparing observation posts, marking triggers, and studying the terrain on which the battle will be fought by forward observers and fire support teams.
 - Ensuring that forward positioned observers are resourced with adequate security, mobility, and situational understanding.
- Integrating information sources to identify potential targets.
- Preparing engagement areas to facilitate fires.
- Preparing and hardening artillery and target acquisition positions.
- Conducting rehearsals on the actual terrain.

SECURITY

- 3-46. Fire support must complement and support all security forces and unit protection plans by—
- Fires to:
 - Support security forces and actions in the brigade support area.
 - Engage enemy indirect fire systems.
 - Support deception operations.
 - Suppress and obscure enemy overwatch positions.
 - Support friendly strong points.
 - Target acquisition coverage of critical friendly zones.
 - Direct observation of obstacles and engagement areas.

DISRUPTION

- 3-47. Fire support plays a key role in disrupting an attacker's tempo and synchronization by—
- Planning, identifying, defining, and engaging high-payoff targets as they are located.
 - Employing fires to neutralize and destroy enemy artillery and mortar, target acquisition, command and control nodes, and logistics systems.
 - Disrupting enemy sustainment efforts and troop movements.
 - Ensuring integration of fires in support of obstacles.
 - Assisting in defeating enemy reconnaissance forces, separating enemy forces, isolating enemy units, and attacking or disrupting enemy systems.
 - Employing indirect fires and obscurants in support of counterattacks designed to defeat the enemy before he can consolidate any gains.
 - Conducting integrated fire support (including electronic attack) in synchronization with maneuver.
 - Employing indirect fires and coordinating for electronic attack to disrupt enemy's ability to control his forces such as to reorganize for another attack or prepare a coordinated defense.

MASSING EFFECTS

- 3-48. Fire support plays an essential role in a unit's ability to mass overwhelming combat power at critical places and times. Massed fires—
- Gain maximum efficiency and effectiveness including fires to suppress enemy direct and indirect fire systems.

- Assist a defender to repel an assault.
- 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 risks by using minimal maneuver forces in one area in order to weight another area.
- Create an important demoralizing psychological effect that is not achieved from smaller-scale fires.
- When used in depth, create gaps or separations in attacking units, disrupt enemy movement tempo, and result in significant attrition of enemy forces before they close with friendly forces.

FLEXIBILITY

- 3-49. Fire support planning and execution must address the need for flexibility in defensive operations by—
- Allocating initial priority of cannon field artillery fires to forward security forces.
 - Quickly shifting fires to critical points throughout the area of operations.
 - Executing successive or concurrent programs or fire plans.
 - Shifting fires from support of the defense to support the counterattack and offense.
 - Coordinating and synchronizing air support on known, suspected, and likely enemy locations.

MANEUVER

- 3-50. Fire support planning and execution supports maneuver in defensive operations by—
- Conducting fires on known enemy assembly areas.
 - Delaying the movement of enemy reserves.
 - Providing fires to assist friendly maneuver forces in moving and disengaging.
 - Separating the enemy dismounted infantry from his armor.
 - Transitioning cannon field artillery fires to support the main effort.
 - Coordinating all means of available fire support 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 as combat multipliers.
 - Providing fires to support disengagement of maneuver elements and their repositioning to subsequent battle positions.
 - Channelizing enemy movement into engagement areas.

OPERATIONS IN DEPTH

- 3-51. Fires attack the enemy before he enters close combat. These fires are planned to –
- Disorganize, delay, and attrit the enemy.
 - Disrupt the enemy reconnaissance elements.
 - Impair the enemy vision by causing him to button up in his armored vehicles.
 - Support scouts by screening their movement with smoke and suppressing enemy units engaging the scouts.
 - Conduct fires on known enemy assembly areas.
 - Coordinate for electronic attack to degrade the enemy's ability to control forces.

FIRE SUPPORT FOR STABILITY TASKS

3-52. Offensive, defensive, and stability tasks often occur in the same operational area. This requires close coordination to both coordinate ongoing activities to create desired effects and avoid undesired effects. There is also a requirement for a thorough understanding of when the escalation of force is necessary and when it might be counterproductive.

3-53. Though highly effective for their intended purpose, lethal capabilities may not always be suitable. For example, during stability tasks, the application of lethal fires is normally greatly restricted, making the use of nonlethal capabilities the dominant feasible option. The considerations for use of nonlethal capabilities in targeting should not pertain to only specific phases or missions, but should be integrated throughout the operation. Escalation of force measures can be established in order to identify hostile intent and deter potential threats at checkpoints, entry control points and in convoys. Such measures remain distinct from other use of force guidance such as fire support coordination measures and are intended to protect the force, minimize the use of force against civilians while not interfering with self-defense if attacked by adversaries.

3-54. For more on stability tasks see FM 3-07 and ADP/ADRP 3-07/3-09.

FIRE SUPPORT IN DEFENSE SUPPORT OF CIVIL AUTHORITIES

GENERAL CONSIDERATIONS

3-55. *Defense Support of Civil Authorities* is support provided by U.S. Federal military forces, Department of Defense civilians, Department of Defense contract personnel, Department of Defense component assets, and National Guard forces (when the Secretary of Defense, in coordination with the governors of the affected States, elects and requests to use those forces in Title 32, United States Code, status) in response to requests for assistance from civil authorities for domestic emergencies, law enforcement support, and other domestic activities, or from qualifying entities for special events. Also called DSCA. Also known as civil support. (DOD Directive 3025.18). Defense Support of Civil Authorities tasks stress the employment of nondestructive means to save lives, alleviate suffering, and protect property. Domestic operations are operations in the *homeland* – the physical region that includes the continental United States, Alaska, Hawaii, United States possessions and territories, and surrounding territorial waters and airspace (JP 3-28). Domestic operations are constrained by various laws to a greater degree, in comparison to the Law of Land Warfare and the Hague and Geneva Conventions.

3-56. Commanders gauge unit readiness for Defense Support of Civil Authorities missions by assessing proficiency in 3 warfighting functions: mission command, sustainment, and protection. The requirement to deploy into a domestic operational environment—often with little warning—and to operate with joint and interagency partners requires mission command that can adapt systems and techniques for a noncombat, civilian-led structure.

SPECIAL CONSIDERATIONS FOR FIRE SUPPORT

SIMULTANEOUS OPERATIONS AND DEPTH

3-57. Simultaneous operations conducted throughout the area of operations disrupt enemy decision cycles and overload the enemy. The purpose of simultaneous attack in depth is to achieve a synergy that paralyzes enemy forces, confuses their decision making cycle, preventing them from reacting appropriately and inducing their early culmination.

SYNCHRONIZATION

3-58. *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 the ability to execute multiple related and mutually supporting tasks in different locations at the same time, producing greater effects than executing each in isolation. For example, synchronization of information collection, obstacles, direct fires, and indirect fires results in the destruction of an enemy formation. When conducting offensive tasks, synchronizing forces along multiple lines of operations temporarily disrupts the enemy organization and allows for exploitation.

3-59. Mission command networks greatly enhance the potential for synchronization. They do this by allowing commanders to quickly understand an operational environment and communicate their commander's intent. Subordinate and adjacent units use that common understanding to synchronize their actions with those of other

units without direct control from the higher headquarters. Mission command networks do not guarantee synchronization; however, they provide a powerful tool for leaders to use in synchronizing their efforts.

3-60. Commanders determine the degree of control necessary to synchronize their operations. They balance synchronization with agility and initiative, never surrendering the initiative for the sake of synchronization. Rather, they synchronize activities to best facilitate mission accomplishment. Too much control can limit the initiative of subordinates and undermine mission command.

FIRES IN SUPPORT OF THE DECISIVE OPERATION

3-61. The *decisive operation* is the operation that directly accomplishes the mission (ADRP 3-0). Fires normally contribute to the overall effect of maneuver but the decisive operation need not be a close operation. Examples of fires as the decisive operation might include destroying a particular target through the use of cannon or rocket/missile-delivered precision munitions or air strikes by manned or unmanned aircraft.

FIRES IN SUPPORT OF SHAPING OPERATIONS

3-62. A *shaping operation* is an operation at any echelon that creates and preserves conditions for the success of the decisive operation through effects on the enemy, other actors, and the terrain (ADRP 3-0). Simultaneous attacks in depth, executed at increasingly longer ranges and with terminally guided munitions, are key elements for BCTs, divisions, and corps in shaping the operational environment and accelerating the enemy's defeat. In both offense and defense, shaping operations are conducted to isolate, immobilize, and weaken the enemy in depth, using fire, maneuver, or a combination of the two. Fires in support of shaping operations 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. Fires in support of shaping operations disrupt or destroy the enemy's attacking echelons and fire support, mission command, and logistic infrastructure. They are intended to reduce the enemy's combat strength and rate of arrival in the close combat area to a level manageable by BCT and battalion task force commanders.

3-63. As part of shaping operations, fire support can improve friendly force ratios, protect the force, and provide for successful maneuver. Commanders use fire support to strike enemy maneuver units, indirect fire systems, observation units, control and communications facilities, target acquisition assets, and ammunition/logistics sites. Similarly, fire support in shaping operations can interdict enemy maneuver forces, indirect fire systems, surface-to-surface missile systems, and logistic units/facilities; and limit an opponent's freedom of action while simultaneously enhancing friendly options.

3-64. Field artillery systems are fully capable of conducting long-range strikes with fires throughout the supported force area of operations and massing their effects under all weather conditions, day or night. They provide joint and land component commanders the capability to attack high-payoff targets out to the maximum range of the respective weapons system, when and where required.

FIRE SUPPORT FOR CLOSE COMBAT

3-65. *Close combat* is warfare carried out on land in a direct-fire fight, supported by direct and indirect fires, and other assets (ADRP 3-0). Distances between combatants may vary from several thousand meters to hand-to-hand fighting. Fire support for close combat is undertaken to win the current battle or engagement. Close combat is frequent during urban operations. Particularly during counterinsurgency and/or stability operations these attacks may be ambushes of convoys, patrols or quick reaction forces that occur in built up areas. The use of precision munitions can increase the likelihood of effective fires while reducing the risk of fratricide and limiting collateral damage. Counterfire is used against enemy indirect fire systems to preserve friendly fighting forces and their combat capabilities. Counterfire gives supported elements the freedom to maneuver, while obscurants screen friendly movements and illuminating fires expose enemy formations at night. At BCT level, close support fires in close combat are normally the main concern of unit mortars, close air support, and organic and reinforcing field artillery battalions whose fires may be further augmented by fires from a FAB. *Close support* is that action of the supporting force against targets or objectives which are sufficiently near the supported force as to require detailed integration or coordination of the supporting action with the fire, movement, or other actions of the supported force (JP 3-31). Commanders and planners must ensure that

supported forces engaged in close combat receive an appropriate share of available fire support. Plans must also include provision of fire support for security forces and reserves upon commitment.

FIRES IN SUPPORT OF SUSTAINING OPERATIONS

3-66. A *sustaining operation* is an operation at any echelon that enables the decisive operation or shaping operation by generating or maintaining combat power (ADRP 3-0). Fire support for sustaining operations is conducted to ensure that friendly forces retain freedom of action to sustain combat forces. Fire support must be responsive to any threat. Close air support, field artillery, and mortars are normally the fire support assets available for support of sustaining operations. Army attack aviation may also be available.

3-67. Usually, fire support will be provided to sustainment units on a contingency basis. There may, however, be times when field artillery is positioned in a supported command's sustainment area to prepare against a pending threat. Fire support assets located in such sustainment areas do not constitute fire support in reserve but are committed field artillery. Considerations concerning fire support for sustainment operations—

- Army aviation or close air support may be the most responsive fire support asset for use in sustainment areas when units are widely separated and range to target is a factor.
- Fire support coordination measures must be used to protect friendly units.
- When a BCT is committed against Level III threats, fire support will usually consist of that brigade's field artillery battalion.
- Target acquisition and sensor management assets should be an integral part of the fire support plan for sustainment area defense.
- Consider the use of critical friendly zones.

FIRE SUPPORT CONSIDERATIONS FOR MULTINATIONAL OPERATIONS

3-68. *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). To maximize fire support, the multinational force must integrate joint and multinational systems and procedures. Special arrangements can include communications, language requirements, liaison personnel, multinational transition teams, and interoperability procedures.

SECTION IV— FIRE SUPPORT ASSESSMENT

MEASURES OF PERFORMANCE AND EFFECTIVENESS

3-69. Assessment involves a comparison of forecasted outcomes to actual events using measures of performance and measures of effectiveness. They often require readjustment as the situation changes and objectives evolve. The commander, FSCoord, chief of fires/fire support officer, and fires cell at each echelon determine fire support related measures of performance and measures of effectiveness during planning. They consider them as early as mission analysis, and include them and related guidance in commander and running estimates. Assessment helps the commander determine progress toward accomplishing tasks and achieving objectives and the end state. It includes evaluating the operation against measures of performance and measures of effectiveness.

3-70. A *measure of performance* is a criterion used to assess friendly actions that is tied to measuring task accomplishment (JP 3-0). Measures of performance are criteria that determine whether the fire support tasks or actions were performed as the commander intended. They confirm or deny that the fire support structure and its subordinate elements are doing things right. For instance a measure of performance might ask, "Were fire support weapons systems employed as the commander intended on the planned target?" A *planned target* is a target that is known to exist in the operational environment, upon which actions are planned using deliberate targeting, creating effects which support the commander's objectives. There are two types of planned targets: scheduled and on-call (JP 3-60).

3-71. A *measure of effectiveness* is a criterion used to assess 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). Measures of effectiveness focus on the results or consequences of friendly fire support action taken. For the commander, FSCoord, and chief of fires, they answer the question: “Is the fire support structure doing the right things? Or are additional or alternative actions required?” The primary purpose of a measure of effectiveness is to assess progress. For instance a measure of effectiveness might ask, “Did the expected physical or functional damage to the target occur or did the enemy change his behavior?”

FIRES RUNNING ESTIMATE

3-72. 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). The fires cell at each echelon analyzes the current situation in terms of the mission variables and prepares the fires running estimate. The fires cell continuously conducts assessment of the impact of new information on the conduct of fire support for the operation, updating the estimate and determining if adjustments to fire support for the operation are required. Examples of the factors that may be considered in the fires running estimate include—

- The task organization of subordinate forces and their missions.
- The status of field artillery resources, including cannons and MLRS launchers, ammunition, and target acquisition assets.
- The availability of other fire support resources, including mortars, naval gunfire, and tactical air support.
- In the attack, the enemy dispositions, the degree of protection afforded the enemy, and the number of phases. These will affect the allocation of fire support resources to subordinate units.
- In the defense, the mission of the covering force, the location of the main battle area, the plans for a counterattack.
- Courses open to the enemy artillery commander, especially his most probable course of action. These are derived from the intelligence estimate and knowledge of enemy artillery doctrine. Consideration of this factor results in—
 - The probable enemy artillery plan.
 - Enemy artillery vulnerabilities.
 - Any information requirements on enemy artillery that may have significant influence on the tasking of weapons locating sensors.
 - The allocation of resources, weapons, and munitions for counterfire.
 - The recommended counterfire priorities for each phase of the battle.
 - The identification of new high-payoff targets.
 - 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 and resupply rates, re-positioning requirements, and priority of sustainment.
 - Changes to survey and meteorological conditions.

3-73. Commanders typically empower their FSCoord, chief of fires/fire support officer and fires cell to make adjustments to fire support for the operation as needed. The commander, FSCoord, and chief of fires/fire support officer and fires cell monitor the current situation for unexpected fire support successes, failures, or enemy actions that can prevent the operation from progressing toward the desired end state. As they assess progress they look for opportunities, threats and acceptable progress. They also accept risks, seize opportunities, and mitigate threats. Throughout the operation the commander, advised by the FSCoord/chief of fires/fire support officer, visualizes, describes, and directs changes to fire support for the operation.

3-74. The chief of fires at the division and corps, and the senior fire support officer at the brigade and battalion level, is responsible for integrating targeting beginning with the MDMP and maintaining that responsibility throughout the operations process for the fires warfighting function. This analysis includes—

- Higher headquarters mission specified and implied tasks.
- Fires running estimate to identify capabilities and limitations including the status of—
 - Field artillery weapons.
 - Field artillery ammunition.
 - Field artillery target acquisition radars.
 - Close air support and other related fixed wing support.
 - Other assets allocated from higher headquarters.
- Field artillery and mortar survey support requirements.
- Established/recommended fire support coordination measures.
- Impact of rules of engagement on fire support.
- Area of operations geometry, terrain, and weather's impact on fires (such as smoke, close air support, air interdiction, naval surface fire support, laser designation and range finding), both friendly and enemy.
- Reconnaissance and surveillance support and requirements.
- Initial high-payoff target list.
- Fire support input to the intelligence preparation of the battlefield analysis.

Chapter 4

Fire Support Coordination and Other Control Measures

Commanders are responsible for the 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.*** The center of this process is in the current operations cell. Clearance of fires may be assisted through a staff process, control measures, embedded in automation control systems, or through active or passive recognition systems. The FSCOORD, chief of fires, fire support officer, and fires cell plan and coordinate all fire support impacting in the supported commander's area of operations, including that fire support requested by the supported unit. Airspace coordination, while not specifically a part of the clearance of fires, is assisted through the staff process. Fire support planners ensure that fire support will not jeopardize troop safety, will interface with other fire support means, will ensure the most responsive fires possible, and/or will not disrupt adjacent unit operations. Control measures are vital to the successful clearance of fires by the supported commander, FSCOORD, chief of fires, fire support officer and fire cell planners. Section I begins the chapter by describing fire support coordination measures. Section II describes boundary, phase line and other key considerations for fire support. Section III closes the chapter with a discussion of target acquisition control and airspace coordinating measures.

Note: The airspace coordinating and fire support coordination measure graphics depicted in this chapter are examples for illustrative purposes only. The authority for constructing such graphics is Army doctrine reference publication (ADRP) 1-02, JP 3-09, JP 3-52 and Military Standard (MIL-STD) 2525C.

SECTION I - FIRE SUPPORT COORDINATION MEASURES

4-1. 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). Fire support coordination measures govern the employment of artillery and mortars, close combat attack and interdiction attack by Army aviation rotary-wing aircraft, fires from unmanned aircraft, and close air support and air interdiction by fixed-wing aircraft. Locations and implementing instructions for fire support coordination measures are disseminated electronically by message, database update, and/or overlay through command and fire support channels, to higher, lower, and adjacent maneuver and supporting units.

4-2. The establishment or change of a fire support coordination measure is typically initiated through the operations cell and ultimately approved by the establishing commander. Fire support coordination measures 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. Commanders position and adjust fire support coordination measures 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 time. Conditions that dictate the change of fire support coordination measures are also coordinated with the other agencies and components as appropriate. As conditions are met, the new fire support coordination measure effective time can be projected and announced. Following direction to execute the change, the current operations cell should confirm with all liaison elements that the fire support coordination measure changes have been disseminated. This ensures that affected units are aware of new fire support

coordination measure locations and associated positive control measures are being followed, thus reducing the risk of fratricide.

PERMISSIVE FIRE SUPPORT COORDINATION MEASURES

4-3. Permissive fire support coordination measures facilitate the attack of targets by reducing the coordination necessary for the clearance of fires. Fires must be cleared with both terrain owners and other airspace users. By establishing a fire support coordination line close-in, yet at sufficient depth so as to not limit high-tempo maneuver, commanders ease the coordination requirements for engagement of targets within their areas of operations by forces that may not be under their direct control such as during the conduct of Army aviation interdiction attack by rotary-wing aircraft, or air interdiction by fixed wing aircraft. The commander adjusts the location of the fire support coordination line as required to keep pace with operations. In high-tempo maneuver operations, the fire support coordination line may change frequently.

COORDINATED FIRE LINE

4-4. A *coordinated fire line* is a line beyond which conventional and indirect surface fire support means may fire at any time within the boundaries of the establishing headquarters without additional coordination. The purpose of the coordinated fire line is to expedite the surface-to-surface attack of targets beyond the coordinated fire line without coordination with the ground commander in whose area the targets are located (JP 3-09). A brigade or division commander or equivalent, usually establishes the coordinated fire line but it can also be established, especially in amphibious operations, by a maneuver battalion. It is located as close to the establishing unit as possible without interfering with the maneuver forces. There is no requirement for the coordinated fire line to 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. A higher headquarters may consolidate subordinate coordinated fire lines.

4-5. A dashed black line, with “CFL” followed by the establishing headquarters above the line and the effective date-time group below the line provides graphic portrayal of the coordinated fire line (figure 4-1). Locations for coordinated fire lines are disseminated by message and/or overlay through maneuver and fire support channels to higher, lower, adjacent maneuver, and supporting units.

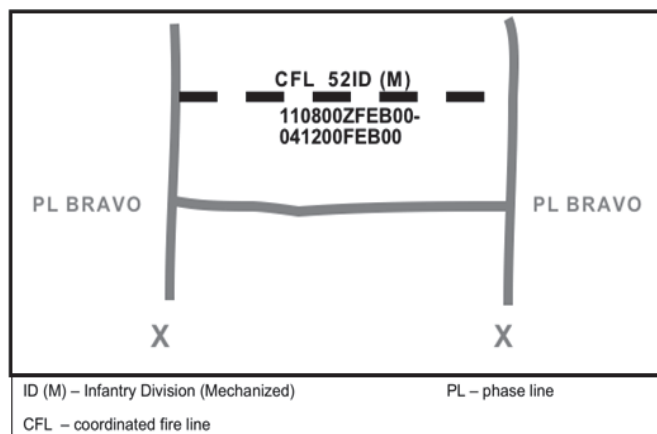


Figure 4-1. Coordinated fire line example

FIRE SUPPORT COORDINATION LINE

4-6. A *fire support coordination line* is a fire support coordination measure that is established and adjusted by appropriate land or amphibious force commanders within their boundaries in consultation with superior, subordinate, supporting, and affected commanders. Fire support coordination lines facilitate the expeditious attack of surface targets of opportunity beyond the coordinating measure. A fire support coordination line does

not divide an area of operations by defining a boundary between close and deep operations or a zone for close air support. The fire support coordination line applies to all fires of air, land, and sea-based weapon systems using any type of ammunition. Forces attacking targets beyond a fire support coordination line must inform all affected commanders in sufficient time to allow necessary reaction to avoid fratricide. Supporting elements attacking targets beyond the fire support coordination line 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 fire support coordination line. This control is exercised through the operations staff or with pre-designated procedures. The fire support coordination line should follow well-defined terrain features. Coordination of attacks beyond the fire support coordination line is especially critical to commanders of air, land, and special operations forces. In exceptional circumstances, the inability to conduct this coordination will not preclude the attack of targets beyond the fire support coordination line. However, failure to do so may increase the risk of fratricide and could waste limited resources (JP 3-09).

4-7. By establishing a fire support coordination line close-in, yet at sufficient depth so as to not limit high-tempo maneuver, commanders ease the coordination requirements for engagement of targets within their areas of operations by forces that may not be under their direct control such as during the conduct of Army aviation interdiction attack by rotary-wing aircraft, or air interdiction by fixed wing aircraft. The commander adjusts the location of the fire support coordination line as required to keep pace with operations. In high-tempo maneuver operations, the fire support coordination line may change frequently. Current technology and collaboration tools between the elements of the joint force determine the times required for changing the fire support coordination line. The joint force commander should establish a time standard in his guidance for shifting fire support coordination lines.

4-8. The fire support coordination line is a term oriented to air-land operations and is normally located only on land, however in certain situations, such as littoral areas, the fire support coordination line may affect both land and sea areas. If possible, the fire support coordination line should follow well-defined terrain features to assist identification from the air. The commander, landing force after coordination with the commander, amphibious task force normally establishes the fire support coordination line for amphibious operations. Changes to the fire support coordination line require notification of all affected forces within the area of operations and must allow sufficient time for these forces and/or components to incorporate the fire support coordination line change. Current technology and collaboration tools between the elements of the joint force determine the times required for changing the fire support coordination line. The joint force commander should establish a time standard in his guidance for shifting fire support coordination lines. Whenever possible; restrictive measures are employed by commanders to enhance the protection of friendly forces operating beyond the fire support coordination line—measures such as restrictive fire areas and no-fire areas.

4-9. A solid black line extending across the assigned areas of the establishing headquarters provides the graphic portrayal of the fire support coordination line (see figure 4-2 on page 4-4). The letters “FSCL” followed by the establishing headquarters are annotated above the line, and the effective date-time-group below the line. Fire support coordination lines do not have to follow traditional straight-line paths. Positioning the fire support coordination line on terrain identifiable from the air is a technique that may further assist in fratricide prevention. Curved and/or enclosed fire support coordination lines have applications in joint operations conducted in non-contiguous areas of operation.

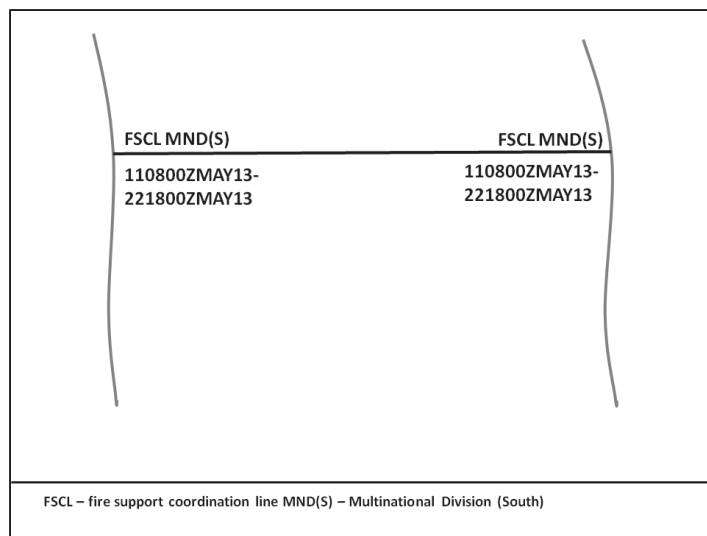


Figure 4-2. Fire support coordination line example

4-10. The decision on where to place or even whether to use a fire support coordination line requires careful consideration. If used, its location is based on estimates of the situation and concept of operations. The establishment of a fire support coordination line does not create a free-fire area beyond the fire support coordination line. Engagements beyond the fire support coordination line must be consistent with the establishing commander's priorities, timing, and desired effects and deconflicted whenever possible with the supported headquarters. 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 fire support coordination line is normally positioned closer to the forward line of own troops in the defense than in the offense; however, the exact positioning depends on the situation. Placing the fire support coordination line at greater depths will typically require support from higher organic headquarters and other supporting commanders. Also, when the fire support coordination line 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 fire support coordination line.

4-11. Air strikes short of the fire support coordination line, both close air support and air interdiction, must be under positive or procedural control to ensure proper clearance of joint fires—for example, joint terminal attack controllers or forward air controllers (airborne). Land commanders must consider the need for extra control measures.

4-12. The establishing commander adjusts the location of the fire support coordination line as required to keep pace with operations. In high-tempo maneuver operations, the fire support coordination line may change frequently. A series of disseminated “on-order” fire support coordination lines will help accelerate the coordination required. The establishing commander quickly transmits the change to higher, lower, adjacent, and supporting headquarters to ensure that appropriate controlling agencies coordinate engagement operations.

4-13. Varying capabilities for acquisition and engagement may exist among adjacent commanders in a multinational operation. Corps and division level commanders may establish a fire support coordination line to support their operations. Layered fire support coordination lines and multiple, separate, noncontiguous corps and/or Marine Expeditionary Force fire support coordination lines positioned at varying depths create a coordination and execution challenge for supporting commanders (for example, tracking effective times, lateral boundaries, and multiple command guidance). In cases such as these, when the components share a mutual boundary, the joint force commander or joint force land component commander may consolidate the operational requirements of subordinates to establish a single fire support coordination line. This fire support coordination line may be noncontiguous to reflect the varying capabilities of subordinate commands. When possible a single fire support coordination line best facilitates air ground operations synchronization.

FREE-FIRE AREA

4-14. A *free-fire area* is a specific area into which any weapon system may fire without additional coordination with the establishing headquarters (JP 3-09). Where both surface-to-surface fires and aircraft emergency munitions jettison share a free-fire area, 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 a free-fire area. Preferably, the free-fire area should be located on identifiable terrain; however, grid coordinates or the Global Area Reference System may be used to designate the free-fire area.

4-15. The free-fire area is graphically portrayed (figure 4-3) by a solid black line defining the area and the letters “FFA” within, followed by the establishing headquarters and the effective date-time-group (ADRP 1-02).



Figure 4-3. Free-fire area example

KILL BOX

4-16. A *kill box* is a three-dimensional area used to facilitate the integration of joint fires. (JP 3-09).

4-17. When established, the primary purpose of a kill box is to allow lethal attack against surface targets without further coordination with the establishing commander and without terminal attack control. When used to integrate air-to-surface and surface-to-surface indirect fires, the kill box will have appropriate restrictions. The goal is to reduce the coordination required to fulfill support requirements with maximum flexibility, while preventing fratricide. A kill box will not be established for close air support missions. If a close air support mission is required within an established kill box, the portion of the kill box requiring detailed integration should be closed.

4-18. 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 ground to a maximum altitude; a “purple” kill box within its boundaries typically specifies a minimum and maximum altitude. The “purple” kill box allows indirect fire trajectories to pass above the maximum altitude or below the minimum altitude. *Altitude* is the vertical distance of a level, a point or an object considered as a point, measured from mean sea level (ATP 3-09.30).

4-19. Kill boxes can augment traditional fire support coordination measures such as fire support coordination lines and coordinated fire lines. They help the commander focus the effort of air interdiction and indirect fire assets. Fire support coordination measures are not mutually exclusive, so a kill box could contain other measures within its boundaries to include no-fire areas, restriction operations areas, or airspace coordination

areas. Restrictive fire support coordination measures and airspace coordinating measures will always have priority when established in a kill box.

4-20. Optimally, there should be no friendly ground forces within or maneuvering into an established kill box. If circumstances require otherwise, then no-fire areas must be established to cover those forces or the kill box must be cancelled. The establishing commander must maintain awareness on locations of friendly ground forces and the status of kill boxes within the area of operations and maintain timely kill box management to prevent fratricide. All aircraft not assigned to an active kill box are restricted from flying through or delivering air-to-surface munitions into the kill box unless coordinated with the kill box coordinator. Effects and trajectories of surface-to-surface indirect fires also are not allowed, without coordination, to pass through the airspace of an active kill box.

4-21. Commanders facilitate coordination through their appropriate fire support personnel and airspace organization to deliver surface-to-surface indirect fires into or through an established kill box. Authority to engage is not automatically granted by the establishment of a kill box; the kill box reduces coordination with the establishing headquarters for mission accomplishment because all requirements for targeting guidance, clearance of fires, and deconfliction with other ground assets are accomplished in the process of establishing the kill box.

4-22. Engagement authority is granted through standard mission orders but does not relieve aircrew of the responsibility for complying with mission requirements such as designated target priority, effects, and timing of fires; positive identification, collateral damage estimation and rules of engagement. Integration of air-to-surface fires and surface-to-surface fires requires application of appropriate restrictions: altitude, time, or lateral separation. The establishing commander will determine which restrictions are appropriate for the mission and ensure dissemination through appropriate control nodes. Although the establishment of a kill box does not restrict surface-to-surface direct fires, it is important to recognize that in certain terrain, Army direct fire guns, missiles, and rockets may be employed from high terrain and the gun-target line of these weapons should be considered by aircraft operating in the kill box.

4-23. A kill box is established and adjusted by supported component commanders in consultation with superior, subordinate, supporting, and affected commanders, and is an extension of an existing support relationship established by the joint force commander. Requirements for kill boxes and other control measures are determined using normal component targeting and planning processes and are established and approved by commanders or their designated staff. The location and size of the kill box are determined by the expected or known location of targets in a specified area. Both blue and purple kill boxes permit air interdiction in the kill box without further coordination with the establishing headquarters; however the purple kill box also allows land and maritime component commanders to employ surface-to-surface indirect fires—enabling maximum use of joint fires within the kill box to achieve synergistic effects with maximum potential for engaging targets.

4-24. The dimensions of a kill box are normally defined using an area reference system such as the Global Area Reference System but could follow well defined terrain features or be located by grid coordinates or by a radius from a center point. The airspace block located above the kill box target area is protected and extends from the surface (or coordinating altitude if established) up to a ceiling established by the airspace control authority. The airspace for a purple kill box includes a floor and a ceiling to enable separation between aircraft delivering air-to-surface fires, trajectories of surface-to-surface fires, and other aircraft. The height of the ceiling should be established in the airspace control plan, airspace control order and special instructions for air interdiction. These parameters are developed by coordination between fire support and airspace organizations.

4-25. Graphically portray a kill box (figure 4-4) by the use of a solid black line defining the area borders. The kill box will be listed as either a “**BKB**” (blue kill box) or a “**PKB**” (purple kill box) and the commander will assign a measure number (001-999), establishing headquarters, and affected altitudes. In addition to the kill box name, a date-time group depicting the “established” and “cancelled” times for the kill box must be included. The “established” and “cancelled” times by be written as on-order. The unit identifier for the establishing headquarters will be consistent with designations in operation plans (OPLANs) and operation orders (OPORDs). Units and/or automation systems may add color to the boxes for visual recognition; however, the basic graphic follows the standards of a fire support coordination measure. Kill box names will not be used more than once (FM 3-09.34).

4-26. Depiction of a kill box may vary among automation systems. Until the system displays are synchronized, fire support personnel must be aware of the meanings of the system's visual display. Figure 4-4 depicts an example kill box depiction on a paper map. For more information on establishment and employment of the kill box, see JP 3-09 and FM 3-09.34. For a more detailed description of the Global Area Reference System, see JP 2-03.



Figure 4-4. Kill box example

RESTRICTIVE FIRE SUPPORT COORDINATION MEASURES

4-27. Restrictive fire support coordination measures are those that provide safeguards for friendly forces and noncombatants, facilities, or terrain.

NO-FIRE AREA

4-28. 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 headquarters approves joint fires within the no-fire area on a mission-by-mission basis.
- When an enemy force within the no-fire area 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.

4-29. Any size unit may establish no-fire areas. If possible, the no-fire area is established on identifiable terrain. It may also be located by a series of grids or by a radius from a center point.

4-30. The no-fire area is graphically portrayed (see figure 4-5 on page 4-8) as an area outlined with a solid black line with black diagonal lines inside. The letters “NFA” are within, followed by the establishing headquarters and the effective date-time group.

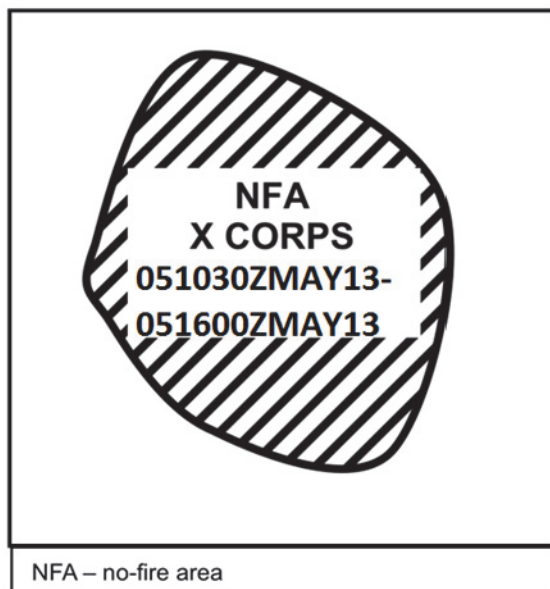


Figure 4-5. No-fire area example

RESTRICTIVE FIRE AREA

4-31. A *restrictive fire area* is an area 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).

4-32. A maneuver battalion or higher echelon normally establishes a restrictive fire area. Usually, the restrictive fire area is located on identifiable terrain, by grid, or by a radius from a center point. To facilitate rapidly changing operations, on-call restrictive fire areas may be used. The dimensions, locations, and restrictions of the on-call restrictive fire areas are prearranged.

4-33. A restrictive fire area is graphically portrayed with solid black line defining the area and the letters “RFA” within, followed by the establishing headquarters and the effective date-time group provides graphic portrayal of the restrictive fire area. See figure 4-6 on page 4-9. The restrictions may be included within the graphic if space allows, or reference may be made to a specific OPOD or OPLAN (ADRP 1-02). For example, a commander may identify a particular type of ammunition, such as dual-purpose improved conventional munitions, to preclude its firing within the RFA.

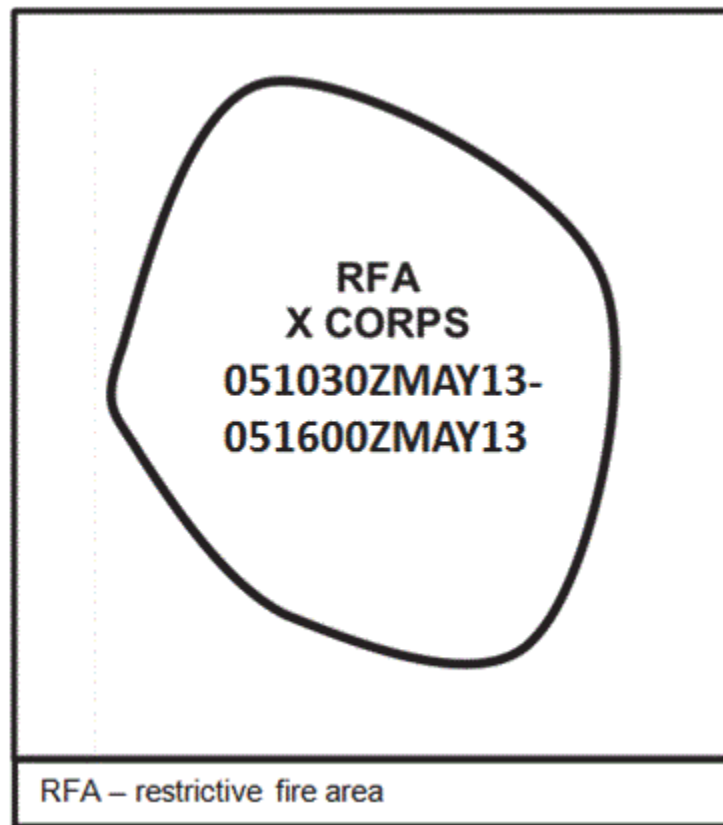


Figure 4-6. Restrictive fire area example

RESTRICTIVE FIRE LINE

4-34. A *restrictive fire line* is a line established between converging friendly surface forces that prohibits fires or their effects across that line (JP 3-09).

4-35. The purpose of the restrictive fire line is to prevent fratricide and duplication of engagements by converging friendly forces.

4-36. A restrictive fire line (see figure 4-7 on page 4-10) is graphically portrayed by a solid black line, with “**RFL**” followed by the establishing headquarters above the line and the effective date-time group below the line provides graphic portrayal of the restrictive fire line.

4-37. The commander common to the converging forces establishes the restrictive fire line. 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 fire support of the linkup force.

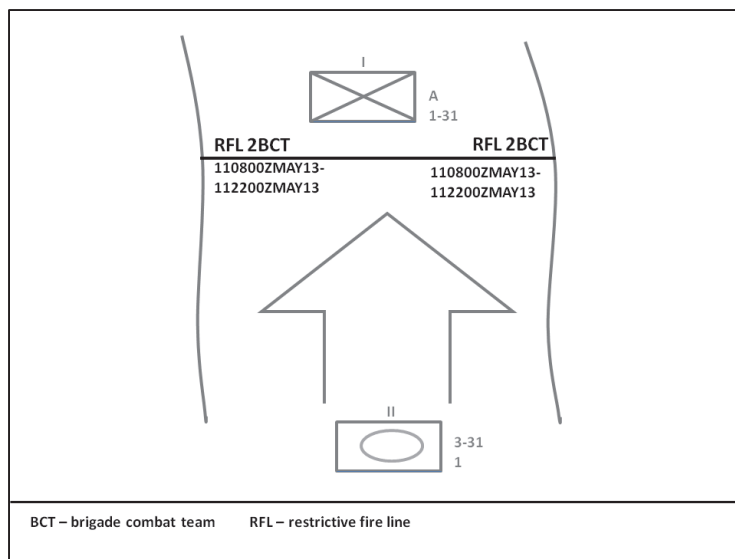


Figure 4-7. Restrictive fire line example

FIRE SUPPORT AREA AND A FIRE SUPPORT STATION

4-38. 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 fire support areas and fire support 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 fire support area is normally associated with amphibious operations but can be used whenever it is desirable to have a fire support ship occupy a certain geographic position. The fire support 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).

4-39. Fire support areas are designed with Roman numerals (for example “FSA I, II, or III”) and are graphically portrayed on the naval surface fire support operations overlay. Fire support stations are designated by numbers (for example “FSS 1, 2, or 3”) and are shown on the naval surface fire support operations overlay as an “X” indicating the exact position of the ship. (MIL-STD 2525C). Figure 4-8 provides examples of a graphic representation of the fire support area and fire support station.

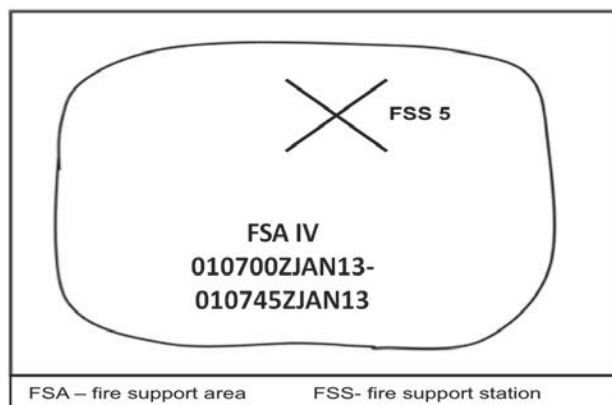


Figure 4-8. Fire support area and fire support station examples

ZONE OF FIRE

4-40. 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. Fire may or may not be observed (JP 3-09). Gunfire support ships and units are assigned land divided into zones of fire as a means 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.

4-41. Graphically portray a zone of fire (figure 4-9) by the use of broken lines (solid lines if unit boundaries are used as depicted), with designating Arabic numerals, for example “ZF3” (JP 3-09).

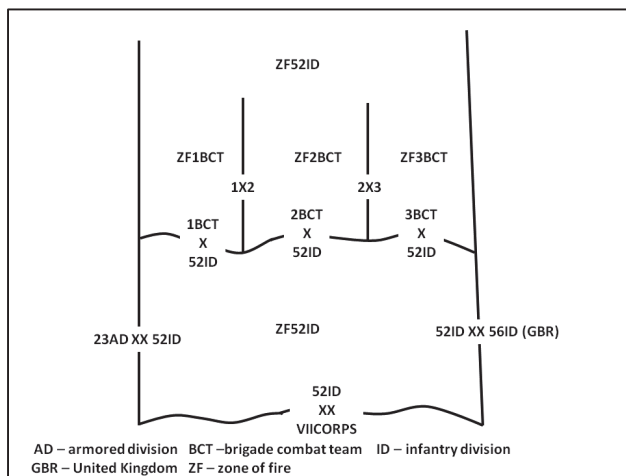


Figure 4-9. Zone of fire example

Note: JP 3-09 directs the use of only Arabic numerals to identify a zone of fire. The AFATDS software uses the zone of responsibility graphic to implement a zone of fire. 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.

4-42. The commander of the maritime force providing naval surface fire support establishes and assigns zones of fire for the forces. The zone of fire for an artillery battalion or a ship assigned the support relationship or mission of direct support (DS) normally corresponds to the area of operations of the supported unit. The zone of fire for an artillery battalion or a ship assigned the support relationship or mission of general support (GS) should be within the boundaries of the supported unit. When used in conjunction with naval gunfire, the size and shape of a zone of fire will depend on the following—

- **Boundaries.** In order to permit ready identification by the spotter and the individual fire support 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 zone of fire 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 zone of fire should be such that the fire support ships, or ships assigned to observe and/or 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 fire support ship(s) assigned to the zone.

4-43. A field artillery unit's higher headquarters may also assign a field artillery unit a zone of fire. The zone of fire for artillery units assigned to a maneuver unit or assigned the DS support relationship corresponds to the area of operations of the parent or supported unit. The zone of fire for an artillery unit assigned the reinforcing (R) support relationship corresponds to the zone of fire of the reinforced artillery unit. The zone of fire for an artillery unit assigned the general support-reinforcing (GSR) support relationship corresponds to the area of operations of the supported unit including the zones of fire of the reinforced artillery unit. The zone of fire for an artillery unit assigned the GS relationship corresponds to the area of operations of the supported unit.

4-44. See JP 3-02 for more information on amphibious operations.

TARGET CONTROL MEASURES

FINAL PROTECTIVE FIRE

4-45. *Final protective fire* is an immediately available preplanned barrier of fires designed to impede enemy movement across defensive line or areas (JP 1-02). Both direct- and indirect-fire weapons can provide final protective fires. The commander normally places final protective fire along the topographical crest and employs them as the enemy reaches the first row of defiladed obstacles. The commander uses the reserve to counterattack and expel the enemy from the topographical crest, if massed indirect fires do not defeat the attack. The commander can only assign each firing battery or platoon a single final protective fire. A final protective fire is a priority target for an element or system, and those fire units are laid on that target when they are not engaged in other fire missions. When the enemy force initiates its final assault into a defensive position, the defending unit initiates its final protective fires to kill enemy infantry soldiers and suppress enemy armored vehicles.

4-46. Graphical portrayal of the final protective fire consists of a single black line. Two anchor points, one at each end of the line, determine the line's length and orientation. The final protective fire is designated by two letters followed by four numerals above the line, and the letters "FPF," followed by the firing unit responsible and the caliber of that unit's weapons below the line. Figure 4-10 portrays the assigned final protective fires of A Battery, 1st Battalion 16th Field Artillery (155-mm), a priority target for that unit.

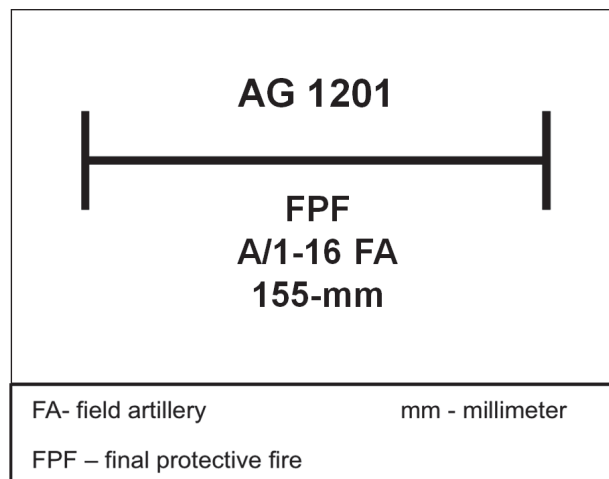


Figure 4-10. Final protective fire example

OTHER TARGET CONTROL MEASURES

4-47. Other target control measures and their symbols are found in FM 3-60 and MIL-STD 2525C.

SECTION II – BOUNDARY, PHASE LINE, AND OTHER KEY CONSIDERATIONS FOR FIRE SUPPORT

BOUNDARIES

4-48. 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—

- They are permissive in that a maneuver commander, unless otherwise restricted, enjoys complete freedom of fire and maneuver within his 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 boundaries unless the fires are coordinated with the adjacent unit or the fires are allowed by a permissive fire support coordination measure, such as a coordinated fire line. These restrictions apply to conventional and special munitions and their effects. When fires such as obscuration and illumination affect an adjacent unit, coordination with that unit is normally required. A commander may employ direct fires without clearance at specific point targets that are clearly and positively identified as enemy. Targets and their triggers should be kept within the same unit’s boundary without overriding other tactical or doctrinal considerations.

4-49. For more on boundaries, see FM 3-90-1.

PHASE LINE AND TRIGGER LINE

4-50. A *phase line* is a line utilized for control and coordination of military operations, usually an easily identified feature in the operational area (JP 3-09). Phase lines (figure 4-11) 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.

4-51. A *trigger line* is a phase line located on identifiable terrain that crosses the engagement area—used to initiate and mass fires into an engagement area at a predetermined range for all or like weapon systems (ADRP 1-02). The commander designates a phase line as the trigger line for his fire support attack assets. He bases the trigger line’s location 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 (figure 4-11). This gives time for the fire support 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.

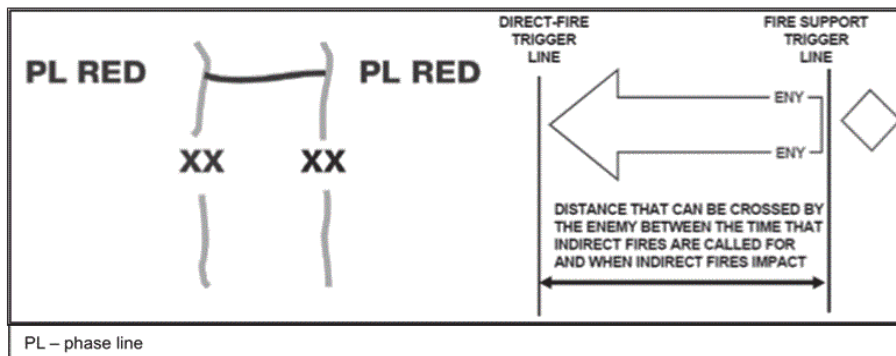


Figure 4-11. Phase line and trigger line examples

4-52. The commander can establish another trigger line for his most accurate long-range weapon system in the vicinity of the area where the fire support impacts to capitalize on the asymmetric attack. However, dust and debris resulting from the artillery fire may prevent his direct fire systems from engaging the enemy. He establishes other trigger lines for shorter-range systems. He 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.

4-53. When the enemy reaches these closer trigger lines, the commander establishes a decision point to help him determine if he wants his longer-range systems to continue to fire in depth or to concentrate his fires on a single point. Many factors impact his decision, most of which concern the enemy and how he maneuvers and the effects of the defending force's fires.

4-54. 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 headquarters. Any commander given an area of operations can establish a phase line. For more on phase lines see FM 3-90-1.

POSITION AREA FOR ARTILLERY

4-55. A *position area for artillery* is an area assigned to an artillery unit where individual artillery systems can maneuver to increase their survivability. A position area for artillery is not an area of operations for the artillery unit occupying it (FM 3-90-1) (figure 4-12). The maneuver commander assigns position areas for artillery as a terrain management technique. A position area for artillery potentially attracts enemy counterfire so other units should stay away from that area to avoid enemy artillery attacks. The exact size of a position area for artillery depends on the mission variables of mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC). As a rule of thumb, a Paladin platoon normally requires a position area for artillery encompassing over 4 square kilometers, and a multiple launch rocket system (MLRS) platoon requires 12 square kilometers.

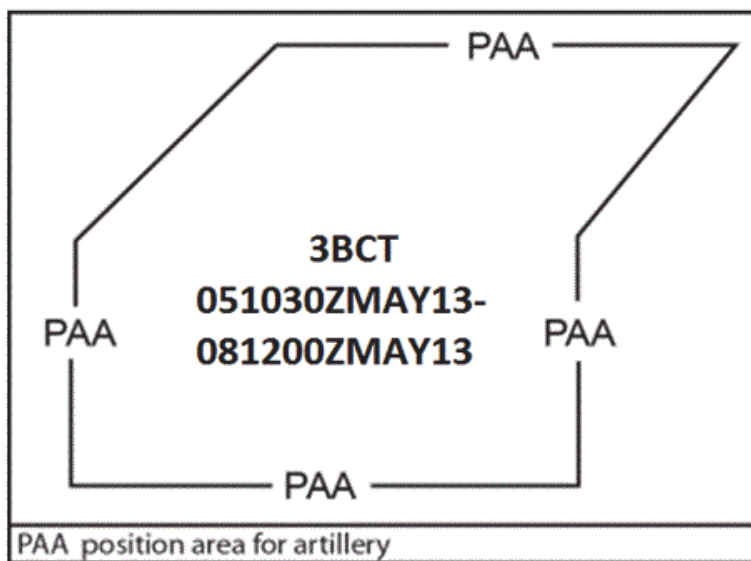


Figure 4-12. Position area for artillery example

4-56. The position area for artillery is graphically portrayed by a solid black line defining the area and the letters "PAA" within, followed by the establishing headquarters and the effective date-time-group (ADRP 1-02).

4-57. The maneuver echelon operations officer (G-3 or S-3) establishes position areas for artillery within the unit area of operations. The artillery unit occupies but does not control the position area for artillery and has neither the authority nor responsibilities that are associated with a unit assigned an area of operations. For example, other units can move through a position area for artillery without clearing that movement with the

occupying artillery unit. The artillery unit occupying a position area for artillery establishes liaison with the unit with authority for the area of operations where the position area for artillery is located. The echelon fire support officer is usually responsible for liaison in accordance with standard command and support relationships.

4-58. The decision to establish a position area for artillery affects airspace control and coordination for rotary-, fixed-wing, and tilt-rotor aircraft integration. A position area for artillery 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 on position areas for artillery see FM 3-90-1.

SECTION III – TARGET ACQUISITION CONTROL AND AIRSPACE COORDINATING MEASURES

RADAR ZONES

4-59. The designation of radar zones provides a means of prioritizing 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. Four types of zones can be entered into radars. Radars can store up to nine different zones. There are four different types of zones used with the radar.

CRITICAL FRIENDLY ZONE

4-60. A *critical friendly zone* is an area, usually a friendly unit or location which the maneuver commander designates as critical to the protection of an asset whose loss would seriously jeopardize the mission (ADRP 1-02).

4-61. A critical friendly zone is graphically portrayed (figure 4-13) 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. The critical friendly zone requires a minimum of 3 and a maximum of 6 anchor points to define the boundary of the area. The size and shape of the critical friendly zone 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.

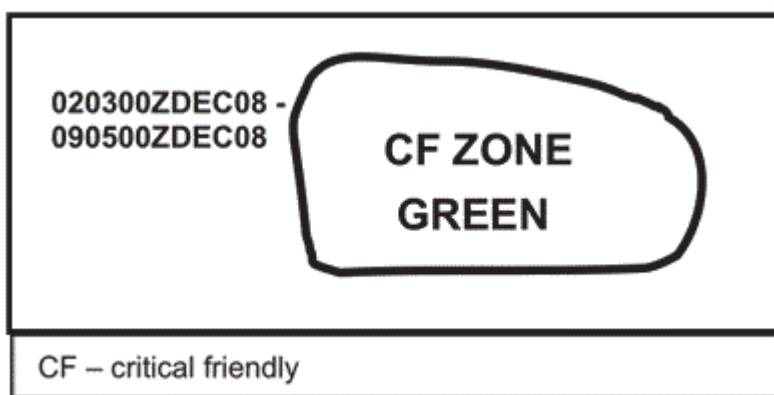


Figure 4-13. Critical friendly zone example

4-62. Critical friendly zones 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 critical friendly zones include maneuver assembly areas, command posts, forward arming and refueling points, friendly breaching sites and other troop concentrations. The maneuver commander may also designate critical civilian infrastructure as a critical friendly zone.

4-63. Designation of a critical friendly zone requires radar coverage of the designated area and weapons platforms to provide counterfire. The supporting field artillery unit's automated fire support system places any radar-located enemy weapon system firing into a critical friendly zone in priority ahead of all other counterfire targets with an immediate call for fire generated unless the system operator manually overrides the automated call for fire.

CALL FOR FIRE ZONE

4-64. A **call for fire zone** is a radar search area from which the commander wants to attack hostile firing systems. A call for fire zone would be placed around an enemy fire support position identified as a high-payoff target. The call for fire zone provides the second most responsive priority for fires from the radars.

4-65. On the basis of intelligence preparation of the battlefield and other target indicators, call for fire zones are used to monitor suspect areas from which threat indirect fires may jeopardize the mission. Establishing a call for fire zone will facilitate immediate counterfire of enemy artillery disrupting the friendly scheme of maneuver.

4-66. A call for fire zone is graphically portrayed (figure 4-14) by a solid black line defining the area and the letters "CFF ZONE," followed by the establishing headquarters within, plus the effective date-time-group. The call for fire zone requires a minimum of 3 and a maximum of 6 anchor points to define the boundary of the area. The size and shape of the call for fire zone 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.

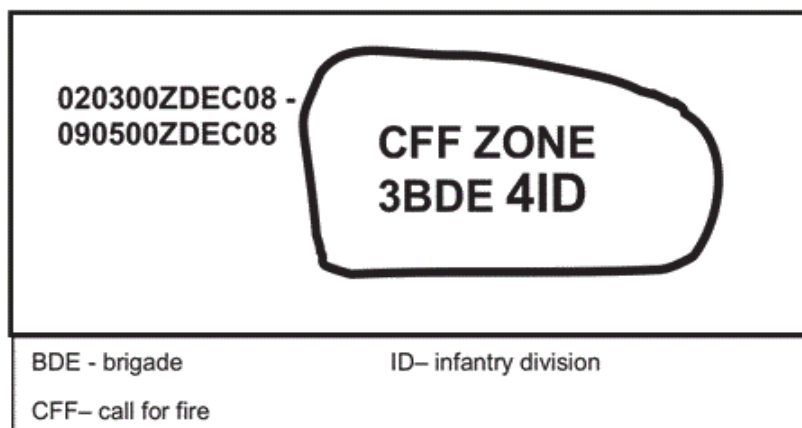


Figure 4-14. Call for fire zone example

ARTILLERY TARGET INTELLIGENCE ZONE

4-67. An **artillery target intelligence zone** is an area in enemy territory that the commander wishes to monitor closely. Any weapon detected in the artillery target intelligence zone will be reported ahead of all acquisitions other than those from critical friendly zones or call for fire zones.

4-68. 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.

4-69. An artillery target intelligence zone is graphically portrayed (see figure 4-15 on page 4-17) by a solid black line defining the area and the letters "ATI," followed by the establishing headquarters within plus the effective date-time-group. The artillery target intelligence zone requires a minimum of 3 and a maximum of 6 anchor points to define the boundary of the area. The size and shape of the call for fire zone is determined by the anchor points and may be circular, rectangular, or irregular.

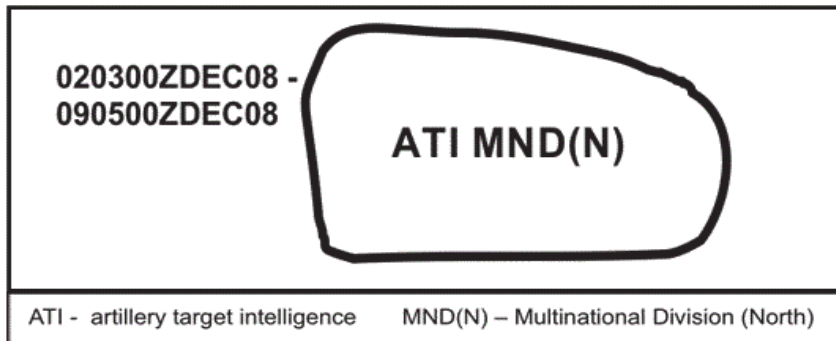


Figure 4-15. Artillery target intelligence zone example

CENSOR ZONE

4-70. A *censor zone* is an area from which radar is prohibited from reporting acquisitions. Normally placed around friendly weapon systems to prevent them from being acquired by friendly radars (FM 3-09.12). The censor zone can be used to prevent radars from reporting acquisitions from other sensitive areas as well.

4-71. A censor zone is graphically portrayed (figure 4-16) 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 artillery target intelligence zone requires a minimum of 3 and a maximum of 6 anchor points to define the boundary of the area. The size and shape of the call for fire zone 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.

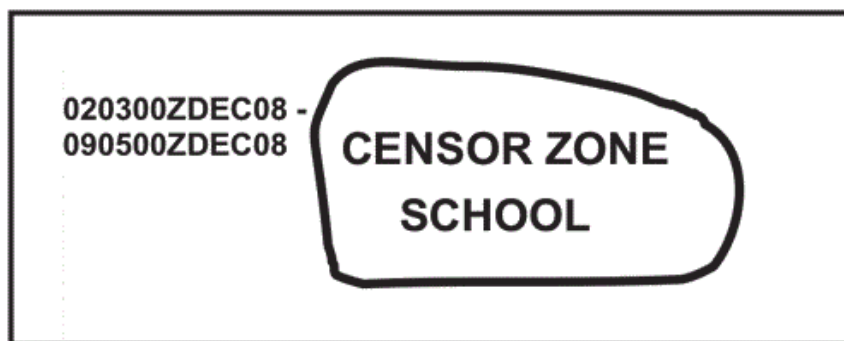


Figure 4-16. Censor zone example

COMMON SENSOR BOUNDARY

4-72. 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.

4-73. An effective method of reducing the duplication of these targets for attack is to establish a common sensor boundary (see figure 4-17 on page 4-18). A *common sensor boundary* is a line (depicted by a series of grid coordinates, grid line, phase line, or major terrain feature) established by the force counterfire headquarters that divides target acquisition search areas into radar acquisition management areas.

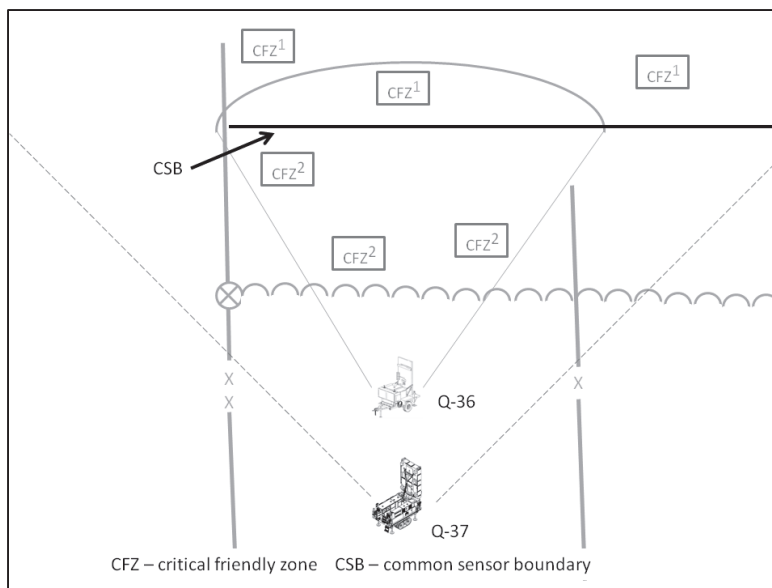


Figure 4-17. Common sensor boundary example

AIRSPACE COORDINATING MEASURES

4-74. A key to effectively coordinating joint fires is to constantly view the operational area as a three dimensional area. Airspace coordinating measures are nominated from subordinate headquarters through component command headquarters, 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).

4-75. Most airspace coordinating measures affect direct and indirect joint fires trajectories and unmanned aircraft systems because of their airspace use. The establishment of airspace coordinating measures in coordination with fire support coordination measures results in the most efficient use of airspace for all friendly airspace users. Some airspace coordinating measures may be established to permit surface joint fires or unmanned aircraft system operations. The component commanders ensure that airspace coordinating measures nominations support and do not conflict with joint operations prior to forwarding the nominations to the joint air operations center. The airspace control authority approves formal airspace coordinating measure nominations and includes them in the airspace control order. The *airspace control authority* is the commander designated to assume overall responsibility for the operation of the airspace control system in the airspace control area. (JP 3-52).

4-76. The airspace control authority consolidates, coordinates, and deconflicts the airspace requirements of the components and publishes the airspace coordinating measures in the airspace control order. The airspace control order is normally published at least daily and is often distributed both separately and as a section of the air tasking order.

- An *airspace control order* is an order implementing the airspace control plan that provides the details of the approved requests for airspace coordinating measures. It is published either as part of the air tasking order or as a separate document (JP 3-52).
- An *air tasking order* is a method used to task and disseminate to components, subordinate units, and command and control agencies projected sorties, capabilities, and/or forces to targets and specific missions. Normally provides specific instructions to include call signs, targets, controlling agencies, etc., as well as general instructions (JP 3-30).

4-77. See JP 3-52 and JP 3-30 for further information on the conduct and control of air operations.

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 feet to meters to permit system entry. Fire support personnel must also be aware that altitude is sometimes expressed as measured from ground level rather than mean sea level.

4-78. Army commanders use airspace coordinating measures to facilitate the efficient use of airspace and simultaneously provide safeguards for friendly forces. Procedural control airspace coordinating measures are used to delineate an airspace boundary or define airspace dimensions for enabling other systems (such as fire support systems) to discriminate friendly coordination joint engagement measures from enemy, employ fires across boundaries, and coordinate joint attack of targets for a particular operation. Restricted operations zones denote airspace reserved for specific activities in which the operation of one or more airspace uses is restricted. The airspace coordinating measures that frequently affect fire support include the airspace coordination area, the coordinating altitude, and the restricted operations zone. Those are discussed here. See FM 3-52 and JP 3-52 for other airspace coordinating measures.

AIRSPACE COORDINATION AREA

4-79. An *airspace coordination area* is a three-dimensional block of airspace in a target area, established by the appropriate ground commander, in which friendly aircraft are reasonably safe from friendly surface fires. The airspace coordination area may be formal or informal (JP 3-09.3).

4-80. 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 maneuver commander requesting close air support or employing helicopters can request an informal airspace coordination area; the informal airspace coordination area is approved at battalion or higher level. Both types of airspace coordination areas are constructed with the assistance of the air liaison officer to ensure they meet the technical requirements of the aircraft and weapon systems.

4-81. Army aviation, air defense artillery, military intelligence, maneuver, unmanned aircraft systems, electronic warfare assets, fire support, and joint and multinational air and ground forces all use airspace. Maneuver commanders at all levels exercise airspace control within their assigned areas through the integration of positive and procedural control. Airspace control maximizes the simultaneous use of airspace. At decisive moments, commanders are able to exploit all available combat power—synchronized in time, space, and purpose.

4-82. 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.

4-83. A formal airspace coordination area is graphically shown (see figure 4-18 on page 4-20) as an area enclosed by a solid black line. Depicted inside the enclosed area are “ACA,” the establishing headquarters, 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 North Atlantic Treaty Organization (NATO) field artillery tactical doctrine the airspace coordination area is a fire support coordination measure 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).

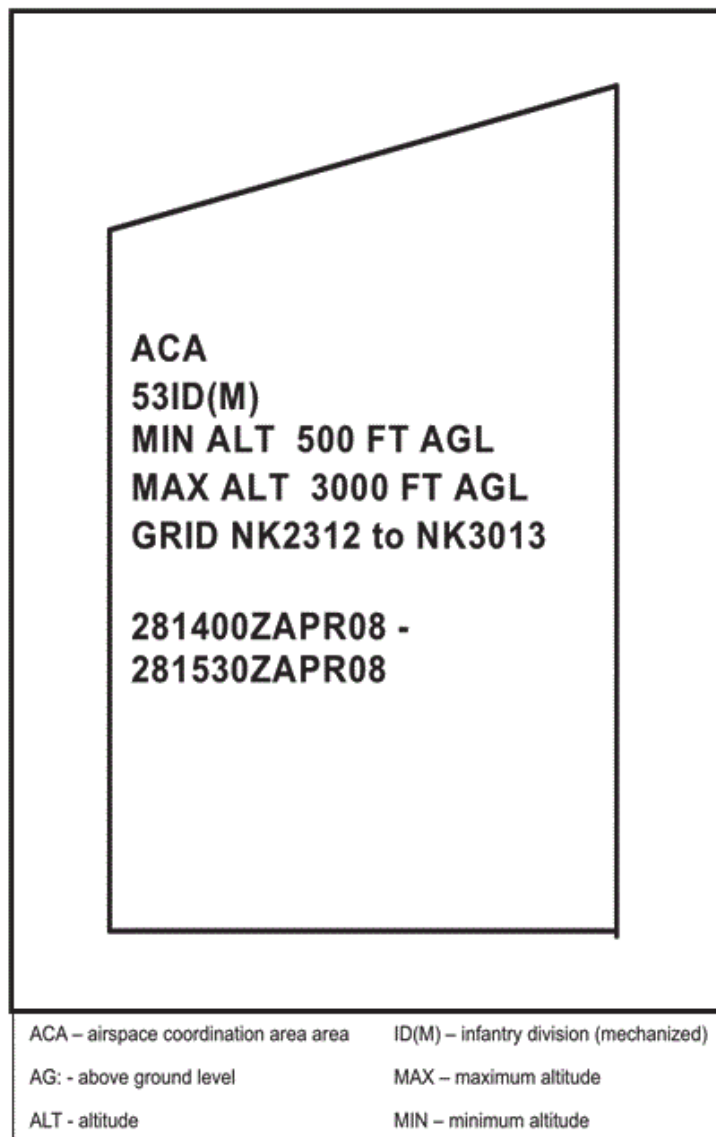


Figure 4-18. Formal airspace coordination area example

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.

Coordinating altitude

4-84. The *coordinating altitude* is an airspace coordinating measure that uses altitude to separate users and as the transition between different airspace coordinating entities (JP 3-52). It uses altitude to separate users and as

the transition between different airspace coordinating entities. Examples of Army airspace coordinating entities include air defense artillery and Army corps/division airspace control elements. Army echelons incorporate airspace control plan guidance and integrate the airspace control order, area air defense plan, special instructions, and the air tasking order via operation orders. All airspace users should coordinate with the appropriate airspace coordinating entities when transitioning through or firing through the coordinating altitude.

4-85. 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.

Restricted Operations Area

4-86. A *restricted operations area* is airspace of defined dimensions, designated by the airspace control authority, in response to specific operational situations/requirements within which the operation 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, unmanned aircraft system launch and recovery areas and areas identified by the area air defense commander as “weapon free” zones.

4-87. A restricted operations area (figure 4-19) is graphically shown as an area enclosed by a solid black line. Depicted inside the enclosed area are “ROA,” the establishing headquarters, 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 meters, and the effective date-time group or the words “on-order.”

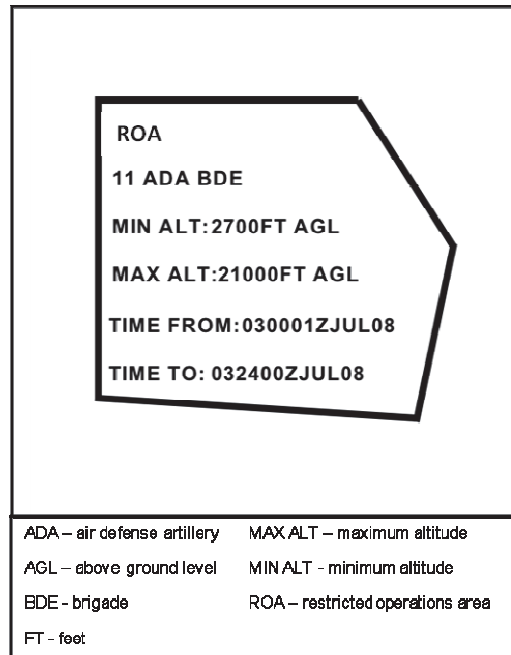


Figure 4-19. Restricted operations area example

Note: The depiction of restricted operations zones on a two-dimensional surface such as on a map does not depict the possibly cylindrical, rectangular, or irregularly shaped three-dimensional restricted operations zones that may be constructed within automation systems, such as the Advanced Field Artillery Tactical Data System (AFATDS), that can provide information for airspace clearance.

4-88. For additional information on the airspace coordination area, coordinating altitude, restricted operations zone, and other airspace coordinating measures, see FM 3-52, FM 3-52.1, JP 3-09.3, and JP 3-52.

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Glossary

SECTION I – ACRONYMS AND ABBREVIATIONS

ADAM	air defense airspace management
ADP	Army doctrine publication
ADRP	Army doctrine reference publication
AN/TPQ	Army/Navy (Marine) transportable radar special purpose (multipurpose)
ATACMS	Army Tactical Missile System
ATP	Army techniques publication
ATTP	Army tactics, techniques, and procedures
BAE	brigade aviation element
BCT	brigade combat team
BSB	brigade support battalion
CEP	circular error probable
DA	Department of the Army
DASC	direct air support center
DOD	Department of Defense
DPPDB	Digital Point Positioning Database
DS	direct support
FFCC	force fires coordination center (U.S. Marine Corps)
FAB	field artillery brigade
FM	field manual
FSCC	fire support coordination center (U.S. Marine Corps)
FSCOORD	fire support coordinator
G-2	assistant chief of staff, intelligence
G-3	assistant chief of staff, operations
GS	general support
GSR	general support-reinforcing
HIMARS	high mobility artillery rocket system
JAGIC	Joint Air-Ground Integration Center
JP	joint publication
MACCS	Marine air command and control system (U.S. Marine Corps)
MAGTF	Marine air-ground task force (U.S. Marine Corps)
MCWP	Marine Corps warfighting publication
MDMP	military decision making process
METT-TC	mission, enemy, terrain and weather, troops and support available, time available, civil considerations (mission variables)
MIL-STD	military standard
MK	Mark (naval gunfire mount platform or munition designator)
MLRS	multiple launch rocket system

NATO	North Atlantic Treaty Organization
OPCON	operational control
OPLAN	operation plan
OPORD	operation order
R	reinforcing
S-2	battalion or brigade intelligence staff officer
S-3	battalion or brigade operations staff officer
SACC	supporting arms coordination center (U.S. Navy)
STANAG	standardization agreement (NATO)
TACC	tactical air control center (U.S. Navy)
TACON	tactical control
TACP	tactical air control party (U.S. Air Force/U.S. Marine Corps)
U.S.	United States

SECTION II – TERMS

air interdiction

(joint) Air operations conducted to divert, disrupt, delay, or destroy the enemy's military surface capabilities before it can be brought to bear effectively against friendly forces, or to otherwise achieve objectives that are 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 tasking order

(joint) A method used to task and disseminate to components, subordinate units, and command and control agencies projected sorties, capabilities, and/or forces to targets and specific missions. Normally provides specific instructions to include call signs, targets, controlling agencies, etc., as well as general instructions. (JP 3-30)

airspace control authority

(joint) The commander designated to assume overall responsibility for the operation of the airspace control system in the airspace control area. (JP 3-52)

airspace control order

(joint) An order implementing the airspace control plan that provides the details of the approved requests for airspace coordinating measures. It is published either as part of the air tasking order or as a separate document. (JP 3-52)

airspace coordinating measures

(joint) 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

(joint) A three-dimensional block of airspace in a target area, established by the appropriate ground commander, in which friendly aircraft are reasonably safe from friendly surface fires. The airspace coordination area may be formal or informal. (JP 3-09.3)

allocation

(joint) Distribution of limited forces and resources for employment among competing requirements. (JP 5-0)

altitude

(joint) The vertical distance of a level, a point or an object considered as a point, measured from mean sea level. (ATP 3-09.30)

apportionment

(joint) In the general sense, distribution of forces and capabilities as the starting point for planning (JP 5-0)

area defense

A defensive task that concentrates on denying enemy forces access to designated terrain for a specific time rather than destroying the enemy outright. (ADRP 3-90)

artillery target intelligence zone

An area in enemy territory that the commander wishes to monitor closely. (FM 3-09.12)

assign

(joint) 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

(joint) The placement of units or personnel in an organization where such placement is relatively temporary. (JP 3-0)

attack

An offensive task that destroys or defeats enemy forces, seizes and secures terrain, or both. (ADRP 3-90)

azimuth of fire

The direction, expressed in mils, that a fire unit is laid (oriented) on when it occupies a position. (FM 6-50)

ballistic impact point

The projected impact location of a round following an unguided ballistic path. (ATP 3-09.30)

boundary

(joint) 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 the unit employs all available means to break through or establish a passage through an enemy defense, obstacle, minefield or fortification. (FM 3-90-1)

breakout

An operation conducted by an encircled force to regain freedom of movement or contact with friendly units. It differs from other attacks only in that a simultaneous defense in other areas of the perimeter must be maintained. (ADRP 3-90)

***call for fire**

A request for fire containing data necessary for obtaining the required fire on a target.

***call for fire zone**

A radar search area from which the commander wants to attack hostile firing systems.

***censor zone**

An area from which radar is prohibited from reporting acquisitions. Normally placed around friendly weapon systems to prevent them from being acquired by friendly radars.

chief of fires

The senior fires officer at division and higher headquarters level who is responsible for advising the commander on the best use of available fire support resources, providing input to necessary orders, developing and implementing the fire support plan. (ADRP 3-09.)

***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

(joint) Air action by fixed- and rotary-wing 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 3-0)

close combat

Warfare carried out on land in a direct-fire fight, supported by direct and indirect fires and other assets. (ADRP 3-0)

close support

(joint) That action of the supporting force against targets or objectives which are sufficiently near the supported force as to require detailed integration or coordination of the supporting action with the fire, movement, or other actions of the supported force. (JP 3-31)

collateral damage

(joint) 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).

commander's intent

A clear and concise expression of the purpose of the operation and the desired military end state that supports mission command, provides focus to the staff, and helps subordinate and supporting commanders act to achieve the commander's desired results without further orders, even when the operation does not unfold as planned (JP 3-0).

***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.

***common sensor boundary**

A line (depicted by a series of grid coordinates, grid line, phase line or major terrain feature) established by the force counterfire headquarters that divides target acquisition search areas into radar acquisition management areas.

concept of operations

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. (ADRP 5-0)

coordinated fire line

(joint) A line beyond which conventional and indirect surface fire support means may fire at any time within the boundaries of the establishing headquarters without additional coordination. The purpose of the coordinated fire line is to expedite the surface-to-surface attack of targets beyond the coordinated fire line without coordination with the ground commander in whose area the targets are located. (JP 3-09)

coordinating altitude

An airspace coordinating measure that uses altitude to separate users and as the transition between different airspace coordinating entities. (JP 3-52)

counterair

(joint) A mission that integrates offensive and defensive operations to attain and maintain a desired degree of air superiority. Counterair missions are designed to destroy or negate enemy aircraft and missiles, both before and after launch. (JP 3-01)

counterfire

(joint) Counterfire is fire intended to destroy or neutralize enemy weapons. Includes counterbattery and countermortar fire. (JP 3-09)

***counterpreparation fire**

Intensive prearranged fire delivered when the imminence of the enemy attack is discovered.

danger close

(joint) In close air support, artillery, mortar, and naval gunfire support fires, is the term included in the method of engagement segment of a call for fire which indicates that friendly forces are within close proximity of the target. The close proximity distance is determined by the weapon and munition fired. (JP 3-09.3)

decisive operation

The operation that directly accomplishes the mission. (ADRP 3-0)

defeat

A tactical mission task that occurs when an enemy force has temporarily or permanently lost the physical means or the will to fight. The defeated force's commander is unwilling or unable to pursue that individual's adopted course of action, thereby yielding to the friendly commander's will and can no longer interfere to a significant degree with the actions of friendly forces. Defeat can result from the use of force or the threat of its use. (FM 3-90-1)

Defense Support of Civil Authorities

(DOD) Support provided by U.S. Federal military forces, Department of Defense civilians, Department of Defense contract personnel, Department of Defense component assets, and National Guard forces (when the Secretary of Defense, in coordination with the governors of the affected States, elects and requests to use those forces in Title 32, United States Code, status) in response to requests for assistance from civil authorities for domestic emergencies, law enforcement support, and other domestic activities, or from qualifying entities for special events. Also called DSCA. Also known as civil support. (DOD Directive 3025.18))

***delay**

To slow the time of arrival of enemy forces or capabilities or alter the ability of the enemy or adversary to project forces or capabilities.

destroy

A tactical mission task that physically renders an enemy force combat-ineffective until it is reconstituted. 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. (FM 3-90-1)

***destruction**

1. 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. 2. A type of adjustment for destroying a given target.

destruction fire

1. An element of the method of engagement portion of the call for fire requesting destruction fire. 2. Fire delivered for the sole purpose of destroying materiel. (FM 6-40)

direct support

(Army) 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. (ADRP 5-0)

disrupt

A tactical mission task in which a commander integrates direct and indirect fires, terrain, and obstacles to upset an enemy's formation or tempo, interrupt his timetable, or cause enemy forces to commit prematurely or attack in a piecemeal fashion (FM 3-90-1) 2. An obstacle effect that focuses fire planning and obstacle effort to cause the enemy force to break up its formation and tempo, interrupt its timetable, commit breaching assets prematurely, and attack in a piecemeal effort. (FM 90-7)

diversion

(joint) 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.. (JP 3-03).

electronic attack

(joint) Division of electronic warfare involving the use of electromagnetic energy, directed energy, or antiradiation weapons to attack personnel, facilities, or equipment with the intent of degrading, neutralizing, or destroying enemy combat capability and is considered a form of fires. (JP 3-13.1)

electronic warfare

(joint) Military action involving the use of electromagnetic and directed energy to control the electromagnetic spectrum or to attack the enemy. (JP 3-13.1)

encirclement operations

Operations 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. (ADRP 3-90)

execution

Putting a plan into action by applying combat power to accomplish the mission. (ADP 5-0)

exploitation

An offensive task that usually follows the conduct of a successful attack and is designed to disorganize the enemy in depth. (ADRP 3-90)

field artillery

(Army) The equipment, supplies, ammunition, and personnel involved in the use of indirect fire cannon, rocket, or surface-to-surface missile launchers. (ADRP 3-09) (joint adds) Field artillery cannons are classified according to caliber as:

- Light — 120-mm and less.
- Medium — 121 to 160-mm.
- Heavy — 161 to 210-mm.
- Very heavy — greater than 210-mm. (JP 3-09)

final protective fire

(joint) An immediately available prearranged barrier of fire designed to impede enemy movement across defensive lines or areas. (JP 1-02)

fire control

All operations connected with the planning, preparation, and actual application of fire on a target (FM 6-40)

fire direction

1. 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. 2. The methods and techniques used to convert target information into the appropriate fire commands. (FM 6-40)

fire direction center

(joint) 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. The fire direction center receives target intelligence and requests for fire, and translates them into appropriate fire direction. The fire direction center provides timely and effective tactical and technical fire control in support of current operations. (JP 3-09.3)

fire for effect

(1) A command to indicate that fire for effect is desired. (2) Fire that is intended to achieve the desired result on target. (FM 6-40).

fire mission

1. The specific assignment given to a fire unit as part of a definite plan. 2. An order used to alert the weapon/battery area and indicate that the message following is a call for fire. (FM 6-40)

***fire plan**

A tactical plan for using the weapons of a unit or formation so that their fire will be coordinated.

fires

(joint) The use of weapon systems to create a specific lethal or nonlethal effect on a target. (JP 3-09)

fire support

(joint) Fires that directly support land, maritime, amphibious, and special operations forces to engage enemy forces, combat formations, and facilities in pursuit of tactical and operational objectives. (JP 3-09)

fire support area

(joint) 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

(joint) The planning and executing of fire so that targets are adequately covered by a suitable weapon or group of weapons. (JP 3-09)

fire support coordination measure

(joint) A measure employed by commanders to facilitate the rapid engagement of targets and simultaneously provide safeguards for friendly forces. (JP 3-0)

fire support coordination line

(joint) A fire support coordination measure that is established and adjusted by appropriate land or amphibious force commanders within their boundaries in consultation with superior, subordinate, supporting, and affected commanders. Fire support coordination lines facilitate the expeditious attack of surface targets of opportunity beyond the coordinating measure. A fire support coordination line does not divide an area of operations by defining a boundary between close and deep operations or a zone for close air support. The fire support coordination line applies to all fires of air, land, and sea-based weapon systems using any type of ammunition. Forces attacking targets beyond a fire support coordination line must inform all affected commanders in sufficient time to allow necessary reaction to avoid fratricide. Supporting elements attacking targets beyond the fire support coordination line must ensure that the attack will not produce adverse effects on, or to the rear of, the line. Short of a fire support coordination line, all air-to-ground and surface-to-surface attack operations are controlled by the appropriate land or amphibious force commander. The fire support coordination line should follow well-defined terrain features. Coordination of attacks beyond the fire support coordination line is especially critical to commanders of air, land, and special operations forces. In exceptional circumstances, the inability to conduct this coordination will not preclude the attack of targets beyond the fire support coordination line. However, failure to do so may increase the risk of fratricide and could waste limited resources. (JP 3-09)

fire support coordinator

The brigade combat team's organic field artillery battalion commander; if a FIB is designated as the division force field artillery headquarters, the FIB commander is the division's fire support coordinator and is assisted by the chief of fires who then serves as the deputy fire support coordinator during the period the force field artillery headquarters is in effect. (ADRP 3-09)

fire support officer

The field artillery officer from the operational to tactical level responsible for advising the supported commander and assisting the senior fires officer of the organization on fires functions and fire support. (ADRP 3-09)

***fire support plan**

A plan that addresses each means of fire support available and describes how Army indirect fires, joint fires, and target acquisition are integrated with maneuver to facilitate operational success.

***fire support planning**

The continuing process of analyzing, allocating, and scheduling fires to describe how fires are used to facilitate the actions of the maneuver force.

fire support station

An exact location at sea within a fire support area from which a fire support ship delivers fire (JP 3-02)

fires warfighting function

The related tasks and systems that provide collective and coordinated use of Army indirect fires, air and missile defense, and joint fires through the targeting process. (ADRP 3-0)

force field artillery headquarters

If designated by the supported commander, is normally the senior field artillery headquarters organic, assigned, attached, or placed under the operational control of that command. The supported commander specifies the commensurate responsibilities of the force field artillery headquarters and, if necessary, the duration of those responsibilities. (ADRP 3-09)

forward air controller (airborne)

(joint) A specifically trained and qualified aviation officer who exercises control from the air of aircraft engaged in close air support of ground troops. The forward air controller (airborne) is normally an airborne extension of the tactical air control party. A qualified and current forward air controller (airborne) will be recognized across the Department of Defense as capable and authorized to perform terminal attack control. (JP 3-09.3)

forward observer

(joint) An observer operating with front line troops and trained to adjust ground or naval gunfire and pass battlefield information. In the absence of a forward air controller, the observer may control close air support strikes. (JP 3-09)

free-fire area

(joint) A specific area into which any weapon system may fire without additional coordination with the establishing headquarters. (JP 3-09)

gap crossing

The projection of combat power across a linear obstacle (wet or dry gap). (ATTP 3-90.4)

general support

(joint) That support relationship which is given to the supported force as a whole and not to any particular subdivision thereof. (JP 3-09.3)

general support-reinforcing

(Army) A support relationship assigned to a unit to support the force as a whole and to reinforce another similar-type unit. (ADRP 5-0)

graphic control measure

A symbol used on maps and displays to regulate forces and warfighting functions. (ADRP 6-0)

high-angle fire

Fire delivered at elevations greater than the elevation of maximum range of the gun and ammunition concerned. Range decreases as the angle of elevation increases. (FM 6-40)

high-payoff target

(joint) A target whose loss to the enemy will significantly contribute to the success of the friendly course of action. (JP 3-60)

***high-payoff target list**

A prioritized list of high-payoff targets by phase of the operation.

high-value target

(joint) A target the enemy commander requires for the successful completion of the mission. (JP 3-60)

indirect fire

1. Fire delivered at a target not visible to the firing unit. 2. Fire delivered to a target that is not itself used as a point of aim for the weapons or the director. (FM 6-40)

joint air attack team

(joint) A combination of attack and/or scout rotary-wing aircraft and fixed-wing close air support aircraft operating together to locate and attack highpriority targets and other targets of opportunity. The joint air attack team normally operates as a coordinated effort supported by fire support, air defense artillery, naval surface fire support, intelligence, surveillance, and reconnaissance systems, electronic warfare systems, and ground maneuver forces against enemy forces. Joint terminal attack controllers may perform duties as directed by the air mission commander in support of the ground commander's scheme of maneuver. (JP 3-09.3)

joint fires

(joint) 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

(joint) A trained Service member who can request, adjust, and control surface-to-surface fires, provide targeting information in support of Type 2 and 3 close air support terminal attack control, and perform autonomous terminal guidance operations. (JP 3-09.3)

joint fire support

(joint) Joint fires that assist air, land, maritime, and special operations forces to move, maneuver, and control territory, populations, airspace, and key waters. (JP 3-0)

joint terminal attack controller

(joint) 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. A qualified and current joint terminal attack controller will be recognized across the Department of Defense as capable and authorized to perform terminal attack control. (JP 3-09.3)

kill box

A three-dimensional area used to facilitate the integration of joint fires. (JP 3-09)

lay

1. To direct or adjust the aim of a weapon. 2. The setting of a weapon for a given range, deflection, or both. (FM 6-40)

main effort

A designated subordinate unit whose mission at a given point in time is most critical to overall mission success. (ADRP 3-0)

massed fire

1. The fire of the batteries of two or more ships directed against a single target. 2. Fire from a number of weapons directed at a single point or small area. (JP 3-02)

measure of effectiveness

(joint) A criterion used to assess 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)

measure of performance

(joint) A criterion to assess friendly actions that is tied to measuring task accomplishment. (JP 3-0)

mensuration

(joint) The process of measurement of a feature or location on the earth to determine an absolute latitude, longitude, and elevation. (JP 3-60)

military deception

(joint) 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. (JP 3-13.4)

mobile defense

A defensive task that concentrates on the destruction or defeat of the enemy through a decisive attack by a striking force. (ADRP 3-90)

mobility

(joint) A quality or capability of military forces, which permits them to move from place to place while retaining the ability to fulfill their primary mission. (JP 3-17)

mobility operations

Those combined arms activities that mitigate the effects of natural and man-made obstacles to enable freedom of movement and maneuver. (ATTP 3-90.4)

movement to contact

An offensive task that is designed to develop the situation or regain contact. (ADRP 3-90)

multinational operations

(joint) 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

(joint) That support which units render each other against an enemy, because of their assigned tasks, their position relative to each other and to the enemy, and their inherent capabilities. (JP 3-31)

named area of interest

(joint) The geospatial area or systems node or link against which information that will satisfy a specific information requirement can be collected. Named areas of interest are usually selected to capture indications of adversary courses of action, but may be related to conditions of the operational environment. (JP 2-01.3)

naval surface fire support

(joint) 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 that results in rendering enemy personnel or materiel incapable of interfering with a particular operation. (FM 3-90-1)

no-fire area

(joint) An area designated by the appropriate commander into which fires or their effects are prohibited. (JP 3-09.3)

no-strike list

(joint) A list of objects or entities characterized as protected from the effects of military operations under international law and/or the rules of engagement. (JP 3-60)

offensive counterair

(joint) Offensive operations to destroy, disrupt, or neutralize enemy aircraft, missiles, launch platforms, and their supporting structures and systems both before and after launch, and as close to their source as possible. (JP 3-01)

offensive task

A task conducted to defeat and destroy enemy forces and seize terrain, resources, and population centers. (ADRP 3-0)

operation

(joint) 1. A sequence of tactical actions with a common purpose or unifying theme. (JP 1) 2. A military action or the carrying out of a strategic, operational, tactical, service, training, or administrative military mission. (JP 3-0).

operational control

(joint) 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)

organic

(joint) 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)

passage of lines

(joint) 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

(joint) A line utilized for control and coordination of military operations, usually an easily identified feature in the operational area. (JP 3-09)

planned target

(joint) Target that is known to exist in the operational environment, upon which actions are planned using deliberate targeting, creating effects which support the commander's objectives. There are two types of planned targets: scheduled and on-call. (JP 3-60)

point target

A target that is less than or equal to 200 meters in width and length. (ATP 3-09.30)

position area for artillery

An area assigned to an artillery unit where individual artillery systems can maneuver to increase their survivability. A position area for artillery is not an area of operations for the field artillery unit occupying it. (FM 3-90-1)

precision-guided munition

(joint) 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.

predicted fire

The delivery technique of applying accurately computed corrections (not determined by firing) to standard firing data for all nonstandard conditions (weather, weapon, ammunition, rotation of the earth) to deliver accurate surprise, nuclear, or nonnuclear fire on any known target in any direction from any weapon limited only by the characteristics of the weapon and ammunition used. (FM 6-40)

***preparation fire**

Normally a high volume of fires delivered over a short period of time to maximize surprise and shock effect. Preparation fire include electronic attack and should be synchronized with other electronic warfare activities.

priority of fires

The commander's guidance to his staff, subordinate commanders, fire support planners, and supporting agencies to organize and employ fires in accordance with the relative importance of the unit's mission. (ADRP 3-09)

***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.

pursuit

An offensive task designed to catch or cut off a hostile force attempting to escape, with the aim of destroying it. (ADRP 3-90)

rearward passage of lines

Occurs when a unit passes through another unit's positions while moving away from the enemy. (ADRP 3-90)

reattack recommendation

(joint) An assessment, derived from the results of battle damage assessment and munitions effectiveness assessment, providing the commander systematic advice on reattack of a target. (JP 3-60)

reinforcing

A support relationship requiring a force to support another supporting unit. (ADRP 5-0)

restricted operations area

(joint) Airspace of defined dimensions, designated by the airspace control authority, in response to specific operational situations/requirements within which the operation of one or more airspace users is restricted. (JP 3-52)

restricted target

(joint) A valid target that has specific restrictions placed on the actions authorized against it due to operational considerations. (JP 3-60)

restricted target list

(joint) A list of restricted targets nominated by elements of the joint force and approved by the joint force commander. This list also includes restricted targets directed by higher authorities. (JP 3-60)

restrictive fire area

(joint) An area 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

(joint) A line established between converging friendly surface forces that prohibits fires or their effects across that line. (JP 3-09)

retrograde

A defensive task that involves organized movement away from the enemy. (ADRP 3-90)

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 accomplish the supported commander's intent.

security operations

Those operations undertaken by a commander to provide early and accurate warning of enemy operations, to provide the force being protected with time and maneuver space within which to react to the enemy, and to develop the situation to allow the commander to effectively use the protected force. (ADRP 3-90)

shaping operation

An operation at any echelon that creates and preserves conditions for the success of the decisive operation through effects on the enemy, other actors, and the terrain. (ADRP 3-0)

shifting fire

(joint) Fire delivered at constant range at varying deflections; used to cover the width of a target that is too great to be covered by an open sheaf. (JP 1-02)

stability tasks

Tasks conducted as part of operations outside the United States in coordination with other instruments of national power to maintain or reestablish a safe and secure environment, and provide essential governmental services, emergency infrastructure reconstruction, and humanitarian relief. (ADP 3-07)

strike

(joint) An attack to damage or destroy an objective or capability. (JP 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. (ADRP 3-0)

suppress

A tactical mission task that results in temporary degradation of the performance of a force or weapons system below the level needed to accomplish the mission. (FM 3-90-1)

***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.

suppression of enemy air defenses

(joint) 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.

sustaining operation

An operation at any echelon that enables the decisive operation or shaping operation by generating or maintaining combat power. (ADRP 3-0)

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 air control party

(joint) A subordinate operational component of a tactical air control system designed to provide air liaison to land forces and for the control of aircraft. (JP 3-09.3)

tactical air coordinator (airborne)

(joint) An officer who coordinates, from an aircraft, the actions of other aircraft engaged in air support of ground or sea forces. (JP 3-09.3)

tactical control

(joint) 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)

tactics

(joint) The employment and ordered arrangement of forces in relation to each other. (Chairman of the Joint Chiefs of Staff manual 5120.01)

target

(joint) 1. An entity or object that performs a function for the adversary considered for possible engagement or other action. 2. An area designated and numbered for future firing. (JP 3-60)

target acquisition

The detection, identification, and location of a target in sufficient detail to permit the effective employment of weapons. (JP 3-60)

target area of interest

(joint) The geographical area where high-value targets can be acquired and engaged by friendly forces. Not all target areas of interest will form part of the friendly course of action; only target areas of interest associated with high priority targets are of interest to the staff. These are identified during staff planning and wargaming. Target areas of interest differ from engagement areas in degree. Engagement areas plan for the use of all available weapons; target areas of interest might be engaged by a single weapon. (JP 2-01.3)

target coordinate mensuration

(joint) The process of measurement of a feature or location on Earth to determine an absolute latitude, longitude, and height. For targeting applications, the errors inherent in both the source for measurement and the measurement processes must be understood and reported. Mensuration tools can employ a variety of techniques to derive coordinates. These may include, but are not limited to, direct read from DPPDB [Digital Point Positioning Database] stereo-pairs in stereo or dual mono mode, multi-image geopositioning, or indirect imagery correlation to DPPDB. (Chairman of the Joint Chiefs of Staff instruction 3505.01B)

target selection standards

Criteria applied to enemy activity (acquisitions and battlefield information) used in deciding whether the activity is a target. (FM 3-60)

targeting

(joint) The process of selecting and prioritizing targets and matching the appropriate response to them, considering operational requirements and capabilities. (JP 3-0)

task organizing

The act of designing an operating force, support staff, or sustainment package of specific size and composition to meet a unique task or mission. (ADRP 3-0)

terminal attack control

(joint) The authority to control the maneuver of and grant weapons release clearance to attacking aircraft. (JP 3-09.3)

terminal guidance operations

(joint) Those 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)

trigger line

A phase line located on identifiable terrain that crosses the engagement area—used to initiate and mass fires into an engagement area at a predetermined range for all or like weapon systems. (ADRP 1-02)

urban operations

Operations across the range of military operations planned and conducted on, or against objectives on a topographical complex and its adjacent natural terrain, where man-made construction or the density of population are the dominant features. (FM 3-06)

weaponing

(joint) The process of determining the quantity of a specific type of lethal or nonlethal weapons required to achieve a specific level of damage to a given target considering target vulnerability, weapons characteristics and effects, and delivery parameters. (JP 3-60)

zone of fire

(joint) An area within which a designated ground unit or fire support ship delivers, or is prepared to deliver, fire support. Fire may or may not be observed. (JP 3-09)

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References

Reference military publications are listed by title. When a field manual has been published under a new number for the first time, the old number is provided in parenthesis after the new number. Most joint publications are available at the Joint Doctrine, Education and Training Electronic Information System web portal. Most Army doctrinal publications are online through Army Knowledge Online.

REQUIRED PUBLICATIONS

These documents must be available to the intended users of this publication.

ADRP 1-02, Terms and Military Symbols, 24 September 2013 (as amended).

JP 1-02, Department of Defense Dictionary of Military and Associated Terms, 08 November 2010 (as amended through 15 December 2013).

RELATED PUBLICATIONS

These documents contain relevant supplemental information.

NORTH ATLANTIC TREATY STANDARDIZATION AGENCY AGREEMENTS

Most North Atlantic Treaty standardization agreement agency publications are available online. The site requires requesting and justifying the need for login and a password: <http://nsa.nato.int/nsa/>.

STANAG 2484 Allied Artillery Publication-5 (A), *NATO Field Artillery Doctrine*: 25 November 2010.

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