

# Joint Publication 3-09



# Joint Fire Support



12 December 2014



## PREFACE

### 1. Scope

This publication provides fundamental principles and guidance for planning, coordinating, executing, and assessing joint fire support during military operations.

### 2. Purpose

This publication has been prepared under the direction of the Chairman of the Joint Chiefs of Staff (CJCS). It sets forth joint doctrine to govern the activities and performance of the Armed Forces of the United States in joint operations, and provides the doctrinal basis for US military coordination with other US Government departments and agencies during operations and for US military involvement in multinational operations. It provides military guidance for the exercise of authority by combatant commanders and other joint force commanders (JFCs) and prescribes joint doctrine for operations, education, and training. It provides military guidance for use by the Armed Forces in preparing their appropriate plans. It is not the intent of this publication to restrict the authority of the JFC from organizing the force and executing the mission in a manner the JFC deems most appropriate to ensure unity of effort in the accomplishment of the overall objective.

### 3. Application

a. Joint doctrine established in this publication applies to the Joint Staff, commanders of combatant commands, subordinate unified commands, joint task forces, subordinate components of these commands, the Services, and combat support agencies.

b. The guidance in this publication is authoritative; as such, this doctrine will be followed, except when, in the judgment of the commander, exceptional circumstances dictate otherwise. If conflicts arise between the contents of this publication and the contents of Service publications, this publication will take precedence unless the CJCS, normally in coordination with the other members of the Joint Chiefs of Staff, has provided more current and specific guidance. Commanders of forces operating as part of a multinational (alliance or coalition) military command should follow multinational doctrine and procedures ratified by the United States. For doctrine and procedures not ratified by the United States, commanders should evaluate and follow the multinational command's doctrine and procedures, where applicable and consistent with US laws, regulations, and doctrine.

For the Chairman of the Joint Chiefs of Staff:



DAVID L. GOLDFEIN, Lt Gen, USAF  
Director, Joint Staff

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**SUMMARY OF CHANGES  
REVISION OF JOINT PUBLICATION 3-09  
DATED 30 JUNE 2010**

- **Reorganizes the publication to include new chapters on joint fire support execution (Chapter IV, “Joint Fire Support Execution”) and assessment (Chapter V, “Joint Fire Support Assessment”).**
- **Deletes appendix on joint fire support operation order format.**
- **Changes “concept of fires” to “scheme of fires” and expands the discussion.**
- **Adds a discussion on the relationship between joint fire support and joint targeting.**
- **Expands the discussion on command and control (C2) in operational areas to include the supported and supporting joint fire support relationships.**
- **Updates the description and duties of the joint force commander and staff.**
- **Expands the discussion of the joint fires element to explain the key functions and tasks it generally performs.**
- **Updates the discussion on the joint targeting coordination board; adds information on the joint targeting working group.**
- **Introduces the joint air ground integration center.**
- **Adds the maritime operations center fires element to the component fires C2 section.**
- **Simplifies descriptions of C2 and joint fire support systems.**
- **Reorganizes the joint fire support and force capabilities section to include air-to-surface, surface-to-surface, and nonlethal subsections.**
- **Adds discussion on the coordination of lethal and nonlethal actions.**
- **Expands the discussion of the joint fire support planning process to include functions and tasks performed during each step.**

- **Adds airspace coordinating measures to the coordination measures and reference systems section.**
- **New chapter introduces and explains the joint fire support execution process, consisting of battle tracking, coordination, synchronization, target acquisition and identification, and weapons release authority.**
- **New chapter introduces and explains the joint fire support assessment process.**
- **Clarifies discussion on fire support coordination line.**
- **Expands the kill box discussion.**
- **Designates airspace coordination area as a fire support coordination measure.**
- **Expands airspace coordinating measures section to include measures that apply to joint fire support.**
- **Deletes reference to Copperhead cannon-launched guided projectile.**
- **Clarifies laser target designator safety zone in text and figures.**
- **Modifies the definitions of coordinated fire line, counterfire, field artillery, fires, fire support coordination center, fire support coordination line, fire support element, fire support officer, forward observer, kill box, laser-guided weapon, laser rangefinder, schedule of fire, terminal guidance operations, and zone of fire.**
- **Creates new joint terms and definitions for fire support coordinator and scheme of fires.**
- **Moves joint term friendly force tracking to JP 3-09, *Joint Fire Support*, as source, and modifies definition.**
- **Removes the terms directed energy and laser seeker from JP 3-09, *Joint Fire Support*, as source.**
- **Deletes the term concept of fires.**

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## EXECUTIVE SUMMARY

### COMMANDER'S OVERVIEW

- **Presents a joint fire support overview**
  - **Describes the commander's scheme of fires**
  - **Covers joint fire support command and control**
  - **Addresses joint fire support planning**
  - **Describes joint fire support execution**
  - **Explains joint fire support assessment**
- 

#### **Joint Fire Support Overview**

The foundation of joint fire support is based on generating and maintaining combat power throughout an operation. Commanders plan to create desired effects through the use of joint fires, while considering the requirements and costs to project and sustain the units that produce those effects. The principles of joint operations provide a set of time-tested guidelines for employing fire support.

#### ***Scheme of Fires***

The scheme of fires is an integral part of the commander's concept of operations (CONOPS). It describes how to coordinate and synchronize the use of tactical, operational, and strategic fires capabilities to create the joint force commander's (JFC's) desired lethal and nonlethal effects and achieve the desired objectives.

#### ***Joint Fires***

Joint fires are fires delivered during the employment of forces from two or more components in coordinated action to produce desired effects in support of a common objective. Developing policy, guidance, and plans to employ operational and strategic fires are primarily joint activities.

Joint fire support is joint fires that assist air, land, maritime, and special operations forces (SOF) to move,

maneuver, and control territory, populations, airspace, and key waters. Effective integration, synchronization, and employment of joint fire support and joint targeting is essential to creating conditions that provide the supported commander freedom of action.

### ***Joint Targeting***

Joint targeting is a fundamental task of the fires function that encompasses many disciplines and requires participation from all joint force staff elements and components. The purpose of joint targeting is to integrate and synchronize joint fires into joint operations by utilizing available capabilities to create a specific lethal or nonlethal effect on a target.

### ***Target Engagement***

Target engagement is when forces engage targets with fires. Forces engaging targets will carefully analyze JFC objectives and strictly adhere to higher headquarters (HQ) restrictions. Supporting commands must conduct combat identification (CID) prior to and during target engagement. Engaging forces must maintain vigilance on the location and movement of friendly forces throughout the engagement—friendly force tracking (FFT) is inextricably linked to CID and paramount to mitigating the risk of friendly fire incidents.

### ***Assessment***

Assessment of joint fire support requires the development of an assessment plan, which includes, but is not limited to, metrics to be monitored during execution, evaluation of joint fire support activities, and recommended adjustments to future fire support activities.

## **Joint Fire Support Command and Control**

To meet the JFC's objectives, the joint force synchronizes diverse fires assets from US and multinational forces.

### ***Command and Control in Operational Areas—Supported and Supporting Joint Fire Support Relationships***

Clear JFC-designated supported and supporting command relationships define the roles and responsibilities for joint fire support planning and execution.

Supporting commander(s) allocate resources based on joint fire support requirements. Staffs and command and

control (C2) agencies then coordinate to synchronize joint fire support to optimize effects and mitigate risks to friendly forces and civilians in the supported commander's operational area.

*Synchronization of Fires with Movement and Maneuver*

Movement and maneuver and fires are complementary functions that are essential to achieving JFC objectives. The principal purpose of movement and maneuver is to gain positional advantage relative to the enemy center of gravity in order to control or destroy associated critical capabilities.

The commander may use joint fire support separately from, or in combination with, maneuver to destroy, neutralize, degrade, or suppress enemy forces and disrupt enemy maneuver, thus influencing the enemy to act in ways that better enable friendly force operations.

*Structure and Functions*

The JFC's primary targeting responsibility is to establish the objectives, priorities, and desired effects for component commanders. The subordinate component commanders will create the desired effects through the application of joint force capabilities, e.g., joint fire support.

The operations directorate of a joint staff (J-3) is the JFC's principal staff advisor to coordinate, integrate, and synchronize joint fire support with other joint functions such as C2, intelligence, movement and maneuver, protection, and sustainment.

The joint fires element (JFE) is an optional staff element established by the JFC, as required, composed of representatives from the J-3, the components (land, maritime, air, and special operations), and other elements of the JFC's staff, to include the directorates (intelligence, logistics, plans, etc.).

To accomplish targeting coordination, the JFC normally establishes a joint targeting coordination board (JTCB) and appoints the deputy JFC or a component commander to chair it, to provide experience and focus.

In a multinational environment, the JTCB may be subordinate to a multinational targeting coordination board. Additional communications systems may be

*Component Fires Command and Control—Joint Force Land Component*

needed to enable interoperability between all contributing nations.

**US Army Joint Fire Support C2 Agencies.** Fire support personnel are assigned at all levels from company to theater army (which may also be the Army Service component command or joint force land component command HQ).

**United States Marine Corps (USMC) Joint Fires C2 Agencies.** USMC forces may be employed as the joint force land component, as part of the joint force land component; as the joint force maritime component, or as part of the joint force maritime component; or as the joint force air component. Marine Corps forces will operate as a Marine air-ground task force.

*Component Fires Command and Control—Joint Force Maritime Component*

**Maritime Operations Center (MOC) Fires Element (FE).** Fires and targeting personnel who contribute to the various MOC fires functions are organized in the fires element for standardization and coordination. The FE is led by the fires lead, who coordinates all fires functions.

The FE is organized in three operational-level targeting areas: deliberate targeting, dynamic targeting, and operational planning.

In amphibious operations, the supporting arms coordination center plans, coordinates, and controls all fires within the operational area, in support of the amphibious force, if control is not ashore.

The Navy tactical air control center (Navy TACC) is the senior Navy air control agency afloat. During amphibious operations, and before control is passed ashore, Navy TACC controls all air operations within the amphibious objective area.

*Component Fires Command and Control—Joint Force Air Component*

JFCs normally designate a joint force air component commander (JFACC), whose authority and responsibilities are defined by the establishing JFC. The Air Force, Navy, or Marine Corps component commander may be designated as the JFACC.

**Joint Air Operations Center (JAOC).** The JAOC is the JFACC's C2 mechanism for planning, directing, and

executing joint air operations for assigned or attached air forces.

**Joint Air Component Coordination Element (JACCE).** The JFACC may establish one or more JACCEs with other functional component commanders' HQ (joint force land component commander, joint force special operations component commander, joint force maritime component commander, etc.) to better integrate joint air operations with their operations.

*Component Fires Command and Control—Joint Force Special Operations Component*

The joint force special operations component coordinates all fire support in support of special operations and, when tasked, fire support using SOF assets in support of other elements of the joint force. Special operations coordinate fire support through both external and SOF channels.

*Command and Control and Joint Fire Support Systems*

**Joint Automated Deep Operations Coordination System** integrates communication, coordination, collaboration, and execution of joint and multinational targeting and fires.

**Advanced Field Artillery Tactical Data System** is a multi-Service integrated fire support system that processes fire missions, air support requests, and other related information to coordinate and maximize the use of all fire support assets (i.e., mortars, field artillery, attack helicopters, air support, naval gunfire, and offensive electronic warfare).

**Theater Battle Management Core System** is a force-level integrated air C2 system.

**Airborne Intelligence, Surveillance, and Reconnaissance Processing, Exploitation, and Dissemination Systems** process, exploit, and disseminate data so it is recognizable by humans or machines.

**Joint Fire Support Planning**

Joint fire support planners advise commanders on the best use of available joint fires support, develop joint fire support plans, issue necessary orders in the name of

appropriate commanders, and implement approved joint fire support plans for the component or joint force. Joint fire support requirements are considered throughout the JFC's planning and decision-making processes and during all phases of an operation.

***Basic Joint Fire Support Tasks***

Joint fire support is built on four basic fire support tasks:

- Support Forces in Contact.
- Support the CONOPS.
- Integrate and Synchronize Joint Fire Support.
- Sustain Joint Fire Support Operations.

***Joint Fire Support Requirements Planning***

The supported commander defines the joint fire support requirements using the joint targeting cycle, while considering each of the basic joint fire support tasks. During the joint targeting cycle, the supported commander identifies and validates the joint fire support requirements. The supported commander also defines the desired effect, along with time constraints, collateral damage and collateral effects restrictions, and acceptable levels of risk to forces.

***Joint Fire Support Resource Allocation Planning***

The supporting commanders select and control fires providing joint fire support, based on the supported commander's requirements. The selected capability should meet time, collateral damage, and risk criteria.

***Joint Fire Support Coordination***

The supported commander plans, integrates, and synchronizes joint fire support across the joint functions, in coordination with supporting commanders. If planning and execution are concurrent, the JFC's J-3 staff coordinates integration and synchronization of joint fire support.

***Multinational Considerations***

Fire support coordination in multinational operations requires special arrangements with multinational forces and local authorities. Special arrangements include implementation of communications and language standards, exchange of liaison personnel, and adoption of interoperability procedures.

***Joint Fire Support Planning Process***

Joint fire support planning is a continual and cyclical process that synchronizes, executes, and assesses joint fires at tactical, operational, and strategic levels with

joint fire support communications systems and architectures.

***Coordination of Lethal and Nonlethal Actions***

Lethal and nonlethal planning and synchronization is a cross-functional effort, requiring close coordination and information sharing across all staff directorates. This cross-functional collaboration is best accomplished through appropriate organizational processes that are broken down into elements, functional boards, and planning teams composed of representatives from appropriate directorates.

***Targeting Process***

Targeting is selecting and prioritizing targets and matching the appropriate response to them, considering operational requirements and capabilities to create desired effects that achieve stated objectives. The joint targeting cycle is a six-phase, iterative process that methodically analyzes, prioritizes, and assigns assets against targets to create effects that will contribute to the achievement of the JFC's objectives.

***Joint Fires Planning Process***

The Joint Fires Planning Process is initiated during mission analysis, continues through post-execution assessment, and includes: end state and the commander's objectives, target development and prioritization, capabilities analysis, commander's decision and force assignment, mission planning and force execution, and assessment.

***Joint Fire Support Plan***

The commander's joint fire support plan is the product of joint and component fire support planning. It provides guidance to supporting commanders regarding the current or expected enemy, friendly, and environmental situation; the joint fire support mission, describing how joint fires will be used to support the CONOPS; the joint fire support priorities; and the objectives for using air, land, maritime, and special operations forces in a joint fire support role.

***Joint Fire Support Execution***

During execution, control of joint fire support forces is normally exercised through the J-3. The J-3 integrates and synchronizes fires with other major

elements of the operation such as maneuver, information-related capabilities, special operations, and logistics.

When the JFC approves the formation of a JFE, the J-3 may delegate daily joint fire support coordination responsibilities. Since the JFE is composed of representatives from operations, plans, targeting, intelligence, and each subordinate and supporting commander, it can be a powerful coordination and synchronization tool for the J-3.

### ***Battle Tracking***

Battle tracking increases the probability that joint fires will be applied at the proper time and place. At the operational level, battle tracking takes advantage of digital information systems, using multiple sources to generate a coherent picture of the operational environment.

### ***Coordination***

Joint fire support coordination during execution includes all efforts to integrate and synchronize attacks, avoid friendly fire incidents, reduce duplication of effort, and shape the operational environment. Coordination procedures must be flexible and responsive to the ever-changing dynamics of warfighting. Streamlined arrangements for approval or concurrence to joint fires should be established. Coordination helps identify measures to prevent potential friendly fire incidents.

### ***Synchronization***

To synchronize joint fires, commanders and staffs must have a thorough knowledge of each Service's doctrine, major systems, capabilities and limitations, and often their tactics, techniques, and procedures.

### ***Target Acquisition and Identification***

Target Acquisition is the detection, identification, and location of a target in sufficient detail to permit the effective employment of weapons.

CID is characterizing detected objects in the operational environment to support engagement decisions. The CID process complements the identification process to support application of weapons, resources, or other military options. The objective of CID is to obtain the highest confidence identification possible.

FFT is the process of fixing, observing, and reporting the location and movement of friendly forces. Inextricably linked, the composite employment of CID and FFT is requisite to effective target engagement with minimal risk of friendly fire incidents.

Positive identification is an identification derived from observation and analysis of target characteristics, including visual recognition, electronic warfare support systems, non-cooperative target recognition techniques, identification friend or foe systems, other physics-based identification techniques, or human identity-based biometric data collection devices.

Target validation ensures that targets meet the objectives and criteria outlined by the commander's guidance and ensures compliance with the law of war and rules of engagement (ROE).

### *Weapons Release Authority*

The authority and responsibility for the expenditure of any weapon (lethal or nonlethal) rests with the supported commander. The supported commander communicates engagement criteria to the force through ROE and special instructions specific to each operational area. The supported commander may delegate target engagement authority to the lowest level of command of the supported forces.

### **Joint Fire Support Assessment**

The supported commander conducts joint fire support assessment. The commander evaluates how effectively the joint fire support system supports forces in combat, supports the CONOPS, synchronizes joint fire support, and sustains joint fire support operations.

### *Assessment Indicators*

Positive indicators include a continuous flow of targeting information up and down the chain of command; availability of both lethal and nonlethal attack means; access to the requested type of joint fire support; consistent use of the most effective joint fire support; avoiding unnecessary duplication; efficient use of airspace; prompt joint fire support for troops in contact, along with rapid coordination methods; protecting the force; and flexible supported and supporting staffs.

Negative indicators include friendly fire incidents, collateral damage, and civilian casualties.

### *Assessment Components*

Joint fire support assessment consists of:

- Monitoring.
- Evaluating.
- Recommending or directing action.

### *Assessment Plan*

To effectively assess the joint fire support system, metrics of success, failure, or progress toward a goal are developed into a usable format. A good assessment plan includes both quantitative and qualitative indicators.

### *Assessment Process*

The building of an effective joint fire support assessment plan, including the development of collection requirements, normally begins during mission analysis after identification of the initial desired and undesired effects. Use the joint fire support planning process, planning steps, basic joint fire support tasks, and joint fire support coordination principles in the planning and execution chapters of this publication as a starting point to identify relevant, quantifiable measures of effectiveness, measures of performance, and other indicators of successful joint fire support.

## **CONCLUSION**

This publication provides fundamental principles and guidance for planning, coordinating, executing, and assessing joint fire support during military operations.

# CHAPTER I

## JOINT FIRE SUPPORT OVERVIEW

*“Joint fire support includes joint fires that assist air, land, maritime, and SOF [special operations forces] to move, maneuver, and control territory, populations, airspace, and key waters.”*

**Joint Publication 3-0, Joint Operations**

### 1. Introduction

a. The joint force commander (JFC) is responsible for all aspects of joint fires planning, coordination, execution, and assessment. The JFC and component commanders, with the assistance of their staffs, integrate and synchronize joint fire support in time, space, and purpose to increase the effectiveness of the joint force. The JFC organizes forces to accomplish the assigned mission based on the concept of operations (CONOPS). The joint force organization should be sufficiently flexible to meet planned phases of operations and possible variations. The JFC establishes subordinate commands, assigns responsibilities, establishes or delegates command and support relationships, and establishes coordinating instructions for the component commanders. The JFC provides guidance to integrate components' capabilities and synchronize the execution of fires. Systems for delivering fires may be limited, and there are competing priorities for employing these assets. Therefore, JFCs and their staffs balance resources and requirements over the course of a joint operation to employ the appropriate mix of forces and capabilities required to achieve the objective.

b. Fires is a joint function. Joint functions are related capabilities and activities grouped together to help JFCs integrate, synchronize, and direct joint operations to include joint fires tasks (see Figure I-1). This publication concentrates on the joint fires task, “provide fire support.” The foundation of joint fire support is based on generating and maintaining combat power throughout an operation. Commanders plan to create desired

#### Joint Fires Tasks

- Conduct targeting.
- Provide fire support.
- Counter air and missile threats.
- Interdict enemy capabilities.
- Conduct strategic attack.
- Conduct information operations.
- Assess results of employing fires.

**Figure I-1. Joint Fires Tasks**

effects through the use of joint fires while considering the requirements and costs to project and sustain the units that produce those effects. The principles of joint operations provide a set of time-tested guidelines for employing fire support.

*For more information on the principles of joint operations and joint functions, see Joint Publication (JP) 3-0, Joint Operations.*

### 2. Scheme of Fires

The JFC communicates the CONOPS in operation plans (OPLANs) and operation orders (OPORDs). The commander's CONOPS describes how the actions of the joint force components and supporting organizations will be integrated, synchronized, and phased to accomplish the mission. **The scheme of fires is an integral part of the commander's CONOPS.** It describes how to coordinate and synchronize the use of tactical, operational, and strategic fires capabilities to create the JFC's desired lethal and nonlethal effects and achieve the desired objectives. The JFC may provide guidance in the scheme of fires as follows:

a. **Objectives.** The JFC provides clearly defined, decisive, and attainable goals toward which every operation is directed. These stated objectives convey to subordinate commanders what the JFC wants to accomplish with fires.

b. **Priorities.** The JFC defines priorities to focus the weight of effort and timing of the joint force. With joint fires, this includes dedicated assets to planned component-critical targets, high-payoff targets (HPTs), JFC designated time-sensitive-targets (TSTs), and targets of opportunity during dynamic targeting.

c. **Effects.** Effects are a change to a condition, behavior, or degree of freedom. Effects are categorized as lethal or nonlethal in nature and are normally articulated using words such as destroy, delay, deny, neutralize, suppress, or influence.

d. **Munitions.** Munitions are used to create desired effects on targets. The JFC may issue guidance on the use or restricted use of unique weapons or certain munitions types (e.g., cluster munitions or mines), and may prioritize the allocation or use of joint operations area (JOA)-wide systems like the Tomahawk missile or the Army Tactical Missile System (ATACMS) for specific purposes.

e. **No-Strike List (NSL) and Restricted Target List (RTL).** An NSL is published to prevent a person, place, or thing from becoming a target (example: a culturally significant place). An RTL is to prevent unintended effects (example: infrastructure damage which might lead to a humanitarian crisis).

f. **Fire Support Coordination Measures (FSCMs).** Employment of FSCMs can permit or restrict the use of fires in the JOA.

### 3. Joint Fires

a. **Fires are the use of weapon systems or other actions to create specific lethal or nonlethal effects on a target.** Fires are normally synchronized and integrated to achieve synergistic results. Fires can be delivered by air, land, maritime, cyberspace, space, or special operations forces. Employing fires in conjunction with other activities, such as information-related capabilities (IRCs), to create nonlethal effects is particularly important in maintaining or reestablishing a safe and secure environment.

b. **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.** Developing policy, guidance, and plans to employ operational and strategic fires are primarily joint activities. Joint fires assist conventional forces and special operations forces (SOF) in conducting military operations. Joint fires or fires from a single Service may be employed with the forces and/or fires from multinational forces or other US Government departments and agencies to achieve common objectives.

c. **Joint fire support is joint fires that assist air, land, maritime, and special operations forces to move, maneuver, and control territory, populations, airspace, and key waters.** Effective integration, synchronization, and employment of joint fire support and joint targeting is essential to creating conditions that provide the supported commander freedom of action. Joint fire support is enhanced by interoperable systems, a broad understanding of the strengths and limitations of each component's capabilities, and a clear understanding of how they might be applied and integrated. Joint fire support is achieved through coordinated interaction of all of the elements of the fire support system, thorough and continuous planning, aggressive coordination, and vigorous execution. The joint fire support system includes target acquisition (TA), command and control (C2), and attack/delivery systems that collectively deliver fires where and when needed to support the commander's objectives.

### 4. Joint Targeting

a. **Targeting is the process of selecting and prioritizing targets and matching the appropriate response to them, considering operational requirements and capabilities.** Targeting systematically analyzes and prioritizes targets and matches appropriate lethal and nonlethal actions to those targets to create specific desired effects that achieve the JFC's objectives, accounting for operational requirements, capabilities, and the results of previous assessments.

b. **Joint targeting is a fundamental task of the fires function that encompasses many disciplines and requires participation from all joint force staff elements and components. The purpose of joint targeting is to integrate and synchronize joint fires into joint operations by utilizing available capabilities to create a specific lethal or nonlethal effect on a target.** Detailed joint intelligence preparation of the operational environment and country assessments, performed by JFCs within their JOAs, set the stage for detailed targeting within the joint targeting cycle. Many products used to support a contingency or military operation are developed, maintained, and

continuously updated as foundational information for specific targets. Joint targeting focuses on both future and current operations planning. It is executed through a six-phase joint targeting cycle composed of:

- (1) End state and commander's objectives.
- (2) Target development and prioritization.
- (3) Capabilities analysis.
- (4) Commander's decision and force assignment.
- (5) Mission planning and force execution.
- (6) Assessment.

*See JP 3-60, Joint Targeting, and JP 2-01.3, Joint Intelligence Preparation of the Operational Environment, for more detailed information.*

**c. The Relationship Between Joint Targeting and Joint Fire Support.** Joint targeting and joint fire support are both fundamental tasks of the fires function. The joint targeting process enables the JFC to match lethal and nonlethal effects to targets and task subordinate and supporting commands. Joint fire support exploits concentration of force, flexibility, and responsiveness by integrating and synchronizing fires. The supported and supporting C2 elements integrate and synchronize joint fire support and the targeting process, especially during dynamic targeting.

### 5. Target Engagement

**a. Target engagement is when forces engage targets with fires.** Supported commanders may grant engagement authority to supporting commanders. Forces engaging targets will carefully analyze JFC objectives and strictly adhere to higher headquarters (HQ) restrictions. Supporting commands must conduct combat identification (CID) prior to and during target engagement. Engaging forces must maintain vigilance on the location and movement of friendly forces throughout the engagement—friendly force tracking (FFT) is inextricably linked to CID and paramount to mitigating the risk of friendly fire incidents. Observed changes to the operational environment that affect target engagement must be quickly transmitted between supported commands and forces providing joint fires.

**b. Relationship with Joint Fire Support.** If target engagement authority has been delegated, it will remain with the commander assigned the target during the joint targeting process. Controlling agencies integrate and synchronize joint fires between the supported and supporting commanders and transmit engagement orders to controlling agencies. They should also create procedures and mechanisms to enhance further integration and synchronization of joint fires support requests for assigned targets to meet all legal and operational joint targeting functions. While joint fire support provides

assigned commanders with an alternative to organic fires, nothing relieves the supported commander of the legal obligations associated with targeting.

## **6. Assessment**

a. Assessment is a commander-centric process, integral to the joint fire support planning process. Assessments assist in determining the effectiveness of the joint fire support system as it relates to forces in combat, the CONOPS, synchronization, and sustainment operations.

b. Effectively, assessment of joint fire support requires the development of an assessment plan, which includes, but is not limited to, metrics to be monitored during execution, evaluation of joint fire support activities, and recommended adjustments to future fire support activities.

c. Effective assessments enable the commander and staff to measure progress, enhance situational awareness (SA) and knowledge, and direct actions to achieve objectives.

*A detailed discussion on assessment can be found in Chapter V, “Joint Fire Support Assessment.”*

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## CHAPTER II

### JOINT FIRE SUPPORT COMMAND AND CONTROL

*“A superiority of fire, and therefore a superiority in directing and delivering fire and in making use of fire, will become the main factors upon which the efficiency of a force will depend.”*

**Marshal of France Ferdinand Foch**  
*Precepts and Judgments, 1919*

#### 1. Introduction

This chapter reviews the joint force command structure and the fire support functions employed to control joint fires. It includes their roles, responsibilities, and some of the C2 and fire support systems available to them. The successful application of joint fire support depends on the close coordination of these functions. Joint fire support must function in a coordinated and integrated manner to support the JFC’s objectives.

#### 2. Employment Considerations

a. **C2 in Operational Areas—Supported and Supporting Joint Fire Support Relationships.** To meet the JFC’s objectives, the joint force synchronizes diverse fires assets from US and multinational forces. Joint fire support requires planning and detailed coordination to integrate and synchronize the supporting commander’s joint fire support into the supported commander’s operation. Clear JFC-designated supported and supporting command relationships define the roles and responsibilities for joint fire support planning and execution. The supported commander provides joint fire support requirements to the supporting commander(s). Supporting commander(s) allocate resources based on joint fire support requirements. Staffs and C2 agencies then coordinate to synchronize joint fire support to optimize effects and mitigate risks to friendly forces and civilians in the supported commander’s operational area.

(1) Support relationships may be long-term, frequently repeated, or a one-time occurrence.

(a) Long duration support relationships should develop enduring joint fire support planning processes and procedures. The land, maritime, and SOF commanders are the supported commanders within the areas of operations (AOs) designated by the JFC. Within their designated AOs, component commanders not only integrate and synchronize maneuver, fires, and interdiction, but also designate target priority, effects, and timing of fires. Close air support (CAS) is an example where decentralized execution nodes (air support operations center [ASOC], tactical air control party [TACP], and joint terminal attack controllers [JTACs]) are embedded with ground forces to plan and control joint fire support.

(b) Components should also anticipate frequent recurrent joint fire support actions, such as suppression of enemy air defenses (SEAD), against mobile threats in support of air interdiction (AI).

(c) For TSTs, the joint fires element (JFE) may recommend a component as a supported commander because that component can detect the TST and control the sensors to maintain positive identification (PID). However, another component may provide fire support due to its ability to create more appropriate effects or engage the target more rapidly.

(2) **Land and Maritime AO.** Commanders designated by the JFC to execute theater and JOA-wide functions (e.g., joint force air component commander [JFACC]) plan and execute theater- and JOA-wide operations in coordination with the respective commanders. If the theater or JOA-wide operations could have an adverse impact within a land or maritime AO, the commander assigned to execute must resolve the issue with the land or maritime component commander, or elevate any unresolved issues to the JFC for resolution.

(3) **AI.** AI operations are conducted to divert, disrupt, delay, or destroy the enemy's military surface capabilities before they 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. AI indirectly supports land forces and directly supports JFC objectives in the absence of friendly land forces. The JFACC is normally the supported commander for the JFC's overall AI effort; however, within their operational areas, the joint force land component commander (JFLCC), joint force maritime component commander (JFMCC), and joint force special operations component commander (JFSOCC) remain the supported commanders.

*See JP 3-03, Joint Interdiction; JP 3-09.3, Close Air Support; JP 3-31, Command and Control for Joint Land Operations; and Appendix A, "Coordination and Control Measures," for more detailed discussion of AI and the Fire Support Coordination Line (FSCL).*

(4) **Joint Special Operations Areas (JSOA).** A JSOA is an area of land, sea, and airspace assigned by a JFC to the commander of a joint special operations force to conduct special operations activities (e.g., a discrete direct action mission or longer term unconventional warfare operations). JFCs may use a JSOA to delineate and facilitate simultaneous conventional and special operations. Within the JSOA, the JFSOCC is the supported commander.

(5) **Amphibious Objective Areas (AOAs).** An AOA is a geographical area (delineated for C2 purposes in the initiating directive) within which is located the objective(s) to be secured by the amphibious force. This area must be of sufficient size to ensure accomplishment of the amphibious force's mission and must provide sufficient area for conducting necessary sea, air, and land operations. Within the AOA, the designated amphibious force commander is the supported commander.

*See JP 3-0, Joint Operations, for a more detailed discussion on operational areas. See JP 3-03, Joint Interdiction, for a more detailed discussion on joint fires in interdiction.*

b. **Unity of Effort.** Component forces' planning, execution, and TA capabilities often overlap. Due to the diversity of systems capable of providing joint fire support, C2, and TA, the JFC should strive for unity of effort throughout the joint and multinational force.

c. **C2 of Multinational Forces.** Nations participating in multinational operations rarely, if ever, relinquish national command of their forces. As such, forces participating in multinational operations will almost always have at least two distinct chains of command: a national chain of command and a multinational chain of command. Multinational forces and forces that include other non-military mission partners require considerably more coordination and planning to synchronize the operations of those forces. There are three doctrinal command structures when working with multinational forces: integrated, lead nation, or parallel, in accordance with JP 3-16, *Multinational Operations*. A robust liaison network and coordination centers are two key structural enhancements that should improve the coordination efforts of multinational forces.

*See JP 3-16, Multinational Operations, for more information on multinational C2 relationships.*

### 3. Synchronization of Fires with Movement and Maneuver

a. Joint fire support and maneuver are coordinated through teamwork, unity of effort, and synchronization of capabilities in time, space, and purpose. Maneuver is the movement of forces in relation to the enemy to secure or retain positional advantage, usually in order to deliver—or threaten delivery of—the direct and indirect fires of the maneuvering force. Maneuver positions forces at decisive points to achieve surprise, create psychological effects, and physical momentum. Maneuver also may enable or exploit the effects of massed or precision fires. The focus of maneuver is to render enemies incapable of resisting by shattering their morale and physical cohesion (their ability to fight as an effective, coordinated whole).

*See JP 3-0, Joint Operations, for a more detailed discussion on maneuver.*

b. **Movement and maneuver and fires are complementary functions that are essential to achieving JFC objectives.** The principal purpose of movement and maneuver is to gain positional advantage relative to the enemy center of gravity in order to control or destroy associated critical capabilities. Maneuver of forces relative to enemy critical capabilities can be key to the JFC's operation. Through effective maneuver of friendly forces, the enemy can be placed into a position of disadvantage. **Chances of successful maneuver are improved with fire support and movement.** The commander may use joint fire support separately from, or in combination with, maneuver to destroy, neutralize, degrade, or suppress enemy forces, and disrupt enemy maneuver, thus influencing the enemy to act in ways that better enable friendly force operations. In addition, commanders can achieve strategic objectives or influence populations using joint fires. If the enemy remains in position, their forces may be isolated and destroyed by fires delivered by the joint force. If the enemy withdraws, attempts to establish new defensive positions, or maneuvers their forces for counterattack, they may be exposed to unacceptable losses caused by the effective use of joint fire support. When exploiting the effects of maneuver, commanders may use

joint fire support to neutralize the enemy's forces and destroy their will to fight. Maneuver and fires are complementary dynamics of combat power. Although one might dominate a phase of the battle, their synchronization is a characteristic of successful military operations. The synchronization of fires and maneuver makes the defeat of larger enemy forces feasible and enhances the protection of friendly forces.

c. **Effects.** Typically, lethal fires have an immediate or near term effect in support of friendly operations, while nonlethal fires may have delayed effects. Component commanders synchronize joint fires to support their CONOPS. Integrating joint fire support assets using clearly stated objectives with appropriate sequels and branches, during both deliberate and dynamic targeting processes, can help JFCs attain end states more rapidly and effectively.

#### 4. Structure and Functions

##### a. JFC and Staff

(1) The **JFC** is responsible for all aspects of joint fires planning, execution, and assessment. The JFC should plan joint fires to identify and mitigate duplicate fires, build procedures to prevent friendly fire incidents, and synchronize and integrate joint and component fires. The JFC's primary targeting responsibility is to establish the objectives, priorities, and desired effects for component commanders. The subordinate component commanders will create the desired effects through the application of joint force capabilities, e.g., joint fire support. In addition, the JFC provides guidance on munitions usage and restrictions, restricted targets, and the NSL. The JFC will seek to overwhelm the enemy and destroy the enemy's will to resist through near-simultaneous application of fires.

##### (2) The Operations Directorate of a Joint Staff (J-3)

(a) The J-3 is the JFC's principal staff advisor to coordinate, integrate, and synchronize joint fire support with other joint functions such as C2, intelligence, movement and maneuver, protection, and sustainment. Joint fire support tasks may include:

1. Develop joint targeting guidance, objectives, and priorities for JFC approval.
2. Coordinate and assess joint operations.
3. Coordinate rules of engagement (ROE).
4. Develop and disseminate FSCMs and MCMs to support CONOPS.
5. Monitor munitions supply status and logistic concerns affecting joint force fires.
6. Establish a JFE.

7. Organize and serve as a member of a joint targeting coordination board (JTCCB), if established by the JFC.

8. Coordinate with the airspace control authority on airspace coordinating measures (ACMs), and ensure that ACMs in the airspace control plan are integrated with joint fires planning.

9. Coordinate with the JFMCC and/or submarine operating authority and ensure integration with joint fires planning.

(b) **JFE**

1. The JFE is an optional staff element established by the JFC, as required, composed of representatives from the J-3, the components (land, maritime, air, and special operations), and other elements of the JFC's staff, to include the directorates (intelligence, logistics, plans, etc.). See Figure II-1. If established, the JFE integrates and synchronizes fires planning and coordination on behalf of the JFC and should be near the joint force joint operations center (JOC), and collocated with the information operations (IO) cell, if possible. JFE responsibilities and tasks generally include:

a. Develop JOA-wide joint targeting guidance, objectives, and priorities. This is normally accomplished in conjunction with component planners as part of the joint planning group (JPG).

b. Coordinate, deconflict, and validate target nominations.

c. Coordinate component input to the joint integrated prioritized target list (JIPTL). Forward the JIPTL to the JTCCB for review and then manage the JFC-approved JIPTL.

d. Coordinate, maintain, and disseminate a complete list of FSCMs and operational areas within the JOA to avoid friendly fire incidents and conflicts with other current or future operations, to include management of the RTL and NSL.

e. Develop the roles, functions, and agenda of the JTCCB for JFC approval.

f. Organize a strategy team to address targeting efforts to bridge the gap between current and future operations.

g. Recommend intelligence, surveillance, and reconnaissance (ISR) collection requirements, to include assisting the joint intelligence support element (JISE) in developing targets.

h. Develop the joint fires estimate and courses of action (COAs).

i. Monitor sensitive, TST, and component-critical target operations for the J-3. Recommend procedures to engage TSTs and component-critical targets.

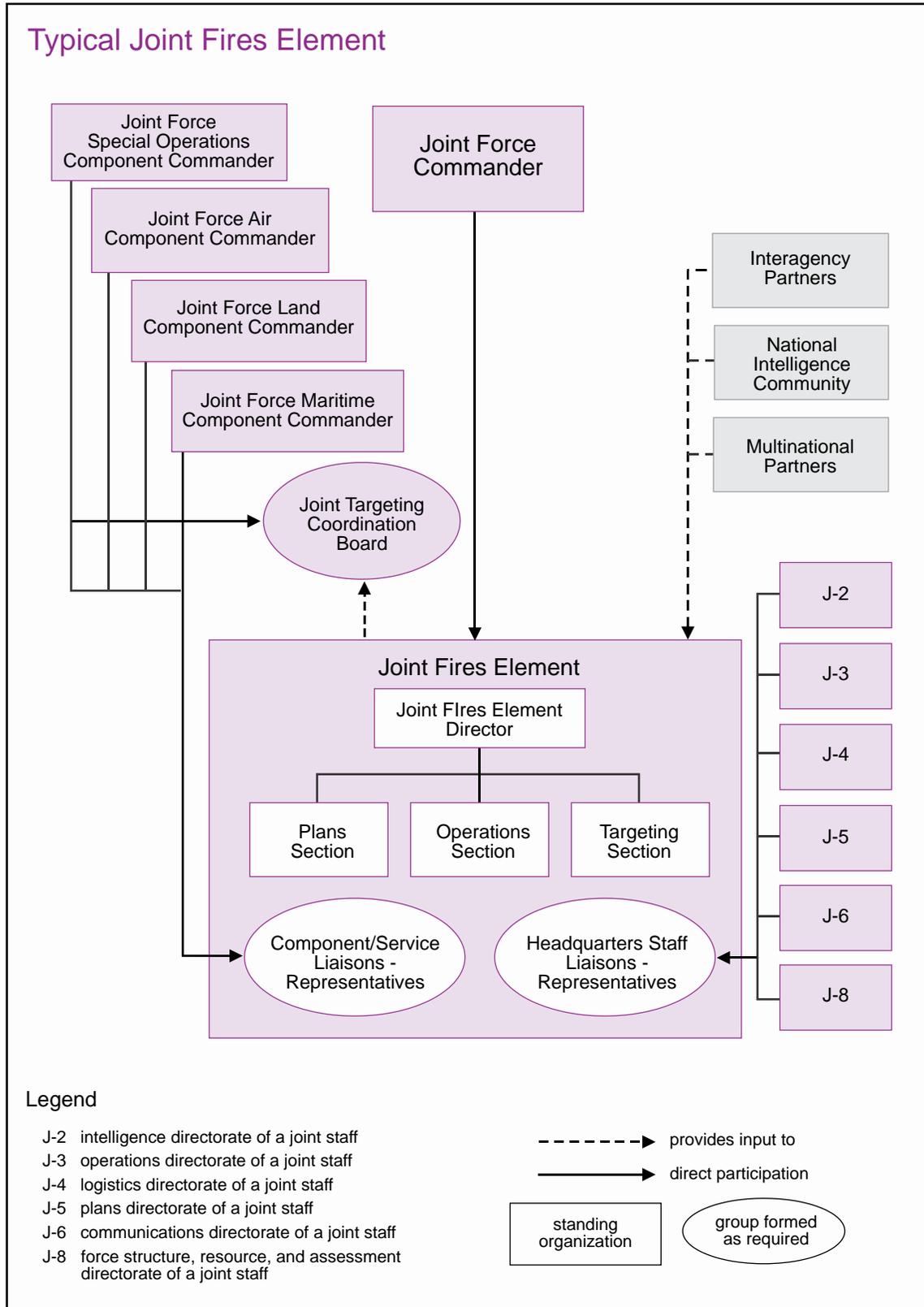


Figure II-1. Typical Joint Fires Element



- c. Provide the J-3 representative to collection management.
- d. Provide the JISE with J-3 targeting priorities and other inputs as required.
- e. Compile and deconflict target nominations from the staff and higher HQ.
- f. Maintain liaison with the IO cell.
- g. Coordinate the tactical and operational assessment efforts with the staff and components.

(3) **Joint Force Staff Functions.** Planners build joint fire support to help accomplish the commander's intent. Joint fire support priorities and goals are typically listed as part of the overall priorities and goals within the CONOPS. The commander's estimate and the CONOPS focus planners to efficiently employ all assets, including joint fires.

(a) **Commander and Staff Estimates.** Estimates help the commander clearly understand the situation and select the best COA. Building estimates sharpens the staff's focus on the current enemy and friendly situation, helps the commander articulate the goal or mission, and clearly expresses COAs. Commander and staff estimates continuously evaluate how to employ joint and component fires.

(b) **CONOPS.** The CONOPS describes how the commander anticipates the operation will unfold. The CONOPS discusses joint force maneuver and the application of joint fire support. The joint fires discussion should reflect the JFC's concept for application of available fires. Guidance for joint fire support should address:

1. Joint force policies, procedures, and planning cycles.
2. Joint fire support assets.
3. Priorities for employing TA assets.
4. Areas that require joint fires to support operational maneuver.
5. TSTs.
6. High-value targets (HVTs) and HPTs.
7. Anticipated joint fire support requirements.
8. FSCMs.

(c) **JTCB.** The JFC supervises the planning, coordination, and deconfliction of the joint targeting process. To accomplish targeting coordination, the JFC normally establishes a JTCB and appoints the deputy JFC or a component commander to chair it, to provide experience and focus. When a JTCB is not established and the JFC decides not to

delegate targeting oversight authority to a deputy or subordinate commander, this task may be performed at the joint force HQ. The JFC coordinates with subordinate commands, other agencies, and multinational partners. Joint targeting is an iterative process that requires close coordination. If the JFC delegates authority for joint target planning, coordination, and deconfliction to a subordinate commander, that commander should have sufficient C2 infrastructure, facilities, and expertise to manage and lead the JFC's joint targeting operations. Should a specific agency be charged with joint functional command responsibilities, a joint targeting mechanism might also be needed to facilitate this task at the component level. All components are normally involved in targeting and should establish procedures and mechanisms to manage their part in joint targeting. In a multinational environment, the JTCCB may be subordinate to a multinational targeting coordination board.

(d) **Joint Targeting Working Group (JTWG).** To assist in the coordination and integration throughout the joint targeting process, the JFC may approve the formation of a JTWG. The JTWG supports the JTCCB by conducting initial collection, consolidation, and prioritization of targets and synchronization of target planning and coordination on behalf of the JFC. The JTWG is an action officer-level venue that meets as required to consolidate and prioritize the draft JIPTL and discuss targeting integration and synchronization issues raised by the JFC, staff, planning teams, and the JFC's major subordinate commands.

*See JP 3-60, Joint Targeting, for more information on the JTCCB and JTWG.*

(e) **Multinational Operations and Collaborative Information Environment (CIE)**

1. When conducting multinational operations, some contributing nations may not have connectivity and access to the joint force information systems. Additional communications systems may be needed to enable interoperability between all contributing nations. A CIE provides and supports mission partner information sharing.

2. The JFC can facilitate information sharing by coordinating with the supported commanders to establish a coalition local area network.

3. The establishment of a CIE with partner nations facilitates information sharing within a multinational force. Operations require US forces and partner nations to understand the tactics, techniques, and procedures for establishing and operating a collaborative network that is enabled by the technical capabilities that each partner nation brings to an operation. Within a CIE, the US commander should balance the need to know with the responsibility to share and understand the associated risk. Multinational information and intelligence sharing should be facilitated by establishing a shared local area network using systems such as CENTRIXS [Combined Enterprise Regional Information Exchange System] or another multinational mission network.

*See JP 6-0, Joint Communications System, for more information.*

(4) **Synchronizing C2 Assets.** The JFC exercises C2 to synchronize ISR and associated processing, exploitation, and dissemination capabilities. Joint, Service, and national agencies engaged in ISR activities support the integration and synchronization

of fires. To synchronize fires, C2 systems must be interoperable and capable of real-time data exchange.

*See JP 2-0, Joint Intelligence, and JP 6-0, Joint Communications System, for additional information.*

### **b. Component Fires C2**

#### **(1) Joint Force Land Component**

**(a) US Army Joint Fire Support C2 Agencies.** Fire support personnel are assigned at all levels from company to theater army (which may also be the Army Service component command or joint force land component command HQ). The following fire support personnel/entities advise the commander on fire support capabilities and joint fire support C2, effective use of fires assets, and assist in the planning, coordination, and execution of fires.

1. At the company level, a fire support officer (FSO) serves as the company commander's principal advisor for fire support. The FSO will head up a fire support team (FIST) to plan and coordinate all available company supporting fires, including mortars, FA, naval surface fire support (NSFS), and CAS integration. Battalion/squadron/brigade combat team FSOs lead the fires cell at their respective HQ and are assisted by subordinate FSOs and fire support noncommissioned officers.

2. The fire support coordinator (FSCOORD) is the brigade combat team's organic field artillery (FA) battalion commander. If a division artillery or an FA brigade is designated as the division force field artillery HQ, the division artillery commander is the division's FSCOORD and is assisted by the chief of fires (COF), who then serves as the deputy FSCOORD during the period the force FA HQ is in effect. The FSCOORD is the primary advisor on the planning for and employment of fires. The responsibilities and authority given to the FSCOORD should be fully delineated by the supported commander.

3. **COF.** A US Army COF is the senior organic fires staff officer at division level or higher who advises the commander on the best use of available fire support resources, provides input to orders, and develops and implements the fire support plan. Under the COF is the deputy FSCOORD, who leads the joint air ground integration center (JAGIC). The JAGIC physically collocates the Army current operations fires cell, airspace element, aviation cell, and air and missile defense (AMD) section with the United States Air Force ASOC and the TACP, to integrate, coordinate, and control fires and air operations within the commander's assigned AO. Assigned air space is normally over the division AO up to the coordinating altitude, and from the rear boundary to the FSCL, and between the lateral boundaries.

4. **Battlefield Coordination Detachment (BCD).** The US Army provides a BCD to interface between the Army forces commander and the supporting air component commander. A BCD is collocated with the joint air operations center (JAOC), or the Air Force air operations center (AOC). The BCD accomplishes tasks that facilitate the exchange of current intelligence and operational data, processing air support requests,

monitoring and interpreting the land battle situation, and coordinating airspace requirements. When a US Army HQ is designated as the joint forces land component command, the BCD may serve as the land component commander's liaison to the air component commander when augmented with other unique land force representatives.

**5. Other Liaisons.** The Army provides liaisons to integrate Army requirements with other components and multinational partners. Typically, Army ground liaison detachments are located at supporting fighter and bomber wings, airlift wings, and reconnaissance liaison detachments at supporting reconnaissance squadrons. The Army provides representatives to the JFE/JTCB, other joint working groups, and supporting elements such as Airborne Warning and Control System (AWACS), JSTARS [Joint Surveillance Target Attack Radar System], and control and reporting center (CRC). Liaison elements from other Services are found at Army units. In addition to the Air Force TACP and ASOC, common liaison elements include air naval gunfire liaison company and special operations command and control element (SOCCE).

**6. Fires Cell.** The fires cell of the theater army main command post oversees the application of joint fire support, artillery, rockets, and IRCs in support of theater army operations. Responsibilities are to:

**a.** Coordinate and synchronize all aspects of operational fires with component commands, major subordinate commands, and multinational forces.

**b.** Synchronize fires with other governmental agencies.

**c.** Oversee the development of the theater army operational fires objectives, supporting target nominations, and attack guidance, through the execution of joint boards and cells.

**d.** Participate as members of the joint and theater army target coordination board, candidate target review boards, and other boards as required.

*See Field Manual (FM) 3-09, Fire Support, for more information on the land component's fires C2 organizations.*

**7. Joint Fires Observer (JFO).** A JFO is a certified and qualified Service member who can request, adjust, and control surface-to-surface fires, provide targeting information in support of Type 2 and Type 3 CAS terminal attack control, and perform autonomous terminal guidance operations (TGO). JFOs cannot perform terminal attack control of CAS missions and do not replace a trained and certified JTAC.

**8. United States Army Air and Missile Defense Command (AAMDC).** The AAMDC, as the Army's operational lead for AMD, plans, coordinates, integrates, and synchronizes the operational elements of theater AMD. The AAMDC, normally collocated with the JAOC, operates in direct support (DS) of the area air defense commander, and is fully integrated into the area air defense commander's air defense C2 system. The AAMDC attack operations cell, and the intelligence section integrated within the JAOC, conduct analysis and targeting focused specifically against the ballistic missile threat. Analysis

includes actions to develop missile information requirements, build operational patterns and profiles, identify trigger events, analyze launch events, conduct counter mobility analysis, and identify electronic warfare (EW) vulnerabilities. Missile targeting actions include nominating attack strategies and submitting target nominations and mission requests directly to the JAOC. When appropriate, the AAMDC commander or representative participates in the JTCB. Also, the AAMDC and BCD will coordinate and synchronize their operations at the JAOC.

*For more information on countering air and missile threats, see JP 3-01, Countering Air and Missile Threats, and JP 3-31, Command and Control for Joint Land Operations.*

(b) **United States Marine Corps (USMC) Joint Fires C2 Agencies.** USMC forces may be employed as the joint force land component, or as part of the joint force land component; as the joint force maritime component, or as part of the joint force maritime component; or as the joint force air component. Marine Corps forces will operate as a Marine air-ground task force (MAGTF) consisting of a command element, a ground combat element (GCE), an aviation combat element (ACE), and a logistics combat element. Various agencies and elements within MAGTFs help commanders to execute fires. These agencies may be used for either landing force (LF) or sustained land operations. The MAGTF command element organizes a force fires coordination center (FFCC), which coordinates overall fires. At each level below the command element (division, regiment, and battalion), a fire support coordination center (FSCC) is established to advise and coordinate fires within the GCE. The FFCC and each FSCC are staffed with subject matter experts and representatives of the various Marine Corps and Navy supporting arms.

1. FFCC. The FFCC is the senior fire support organization for the MAGTF. As such, it assists the MAGTF commander in the planning, coordination, execution, and assessment of fires for a MAGTF. While the FFCC assists the commander in fighting the single battle, its focus is on the deep fight, and when the forces are not ashore, shaping the operational environment. The FFCC coordinates those matters that cannot be coordinated by the GCE (FSCC), ACE Marine tactical air command center (Marine TACC), or combat service support operations center for integration of fire support plans. Additionally, it assists in providing fires in support of close and rear fight. FFCC liaisons are sourced to provide close and continuous coordination. In amphibious operations, prior to control being passed ashore, the FFCC incrementally assumes responsibility for fire support planning and coordination from the supporting arms coordination center (SACC).

*See JP 3-02, Amphibious Operations, for more information on the fire support coordination in amphibious operations.*

2. FSCC. The FSCC is a single location that centralizes communications facilities and personnel for the coordination of all forms of fire support for the GCE. The USMC employs a designated ground combat officer as a fire support coordinator (FSC), who acts as the direct representative of the GCE for the planning and coordinating of all available fire support. The FSCC is organized and supervised by the FSC and is collocated with, and in support of, the operations officer. A USMC FSCC normally includes an air section, naval gunfire liaison section, and artillery section to plan and execute fires in support of the

scheme of maneuver. Additionally, a mortar section may be included in the FSCC for an infantry battalion, but will not be found at any other level of C2 for fire support coordination. In amphibious operations, FSCCs are initially subordinate to the SACC and, if the FFCC is established ashore, subordinate to that agency.

**3. Marine TACC.** The Marine TACC is the senior agency of the Marine air C2 system. It provides the facilities for the commander of the ACE and the battlestaff to command, supervise, and direct MAGTF air operations. The Marine TACC is usually established ashore incrementally, beginning with a tactical air direction center. When the commander of Marine Corps forces is also the JFACC, the commander will augment the Marine TACC with elements from other components to create a JAOC.

**4. Direct Air Support Center (DASC).** The DASC is the principal Marine air C2 system agency responsible for the direction of air support activities affecting the GCE commander's operations and those air missions requiring close coordination with the ground combat forces. The DASC processes immediate requests for air support; coordinates aircraft employment with other supporting arms; manages terminal control assets supporting GCE forces; and controls aircraft transiting through DASC-controlled airspace. When control is afloat, the Navy tactical air control center (Navy TACC) supervises the ashore DASC's operation. When control is ashore, the Marine tactical air direction center or Marine TACC supervises the DASC's operations. The DASC is normally the first major air control agency to land in an amphibious operation. The DASC becomes operational when control of the operation is passed ashore and collocates with the senior FSCC.

**5. TACP.** The Marine Corps TACP establishes and maintains facilities for liaison and communications between supported units and appropriate control agencies. An air officer leads the TACP, normally assigned to maneuver battalions. Their mission is to inform and advise the supported ground unit commander on the employment of supporting aircraft and to request and coordinate air support missions. In addition, the TACP provides terminal attack control for CAS missions.

**6. Tactical Air Operations Center (TAOC).** The Marine TAOC is subordinate to the Marine TACC. Among its duties, the TAOC provides safe passage, radar control, and surveillance for offensive air support aircraft en route to and from target areas.

**7. Shore Fire Control Party (SFCP).** The supporting Marine Corps artillery battalions provide SFCPs to supported units. The SFCP consists of a NSFS liaison team and a NSFS spotting team. The NSFS liaison team is specifically organized to handle NSFS liaison matters for the supported commander, while the spotting team is charged with requesting and adjusting fires of assigned DS ships and general support (GS) ships.

## (2) Joint Force Maritime Component

(a) **Maritime Operations Center (MOC) Fires Element (FE).** Fires and targeting personnel who contribute to the various MOC fires functions are organized in the fires element for standardization and coordination. The FE is led by the fires lead, who coordinates all fires functions. Fires personnel may be assigned from another organization

(e.g., intelligence targeting personnel to the FE for deliberate targeting) or may perform duties under the direction of other MOCs and cells (e.g., maritime dynamic targeting chief to current operations battle watch captain). The FE is organized in three operational-level targeting areas: deliberate targeting, dynamic targeting, and operational planning. The Tomahawk land-attack missile (TLAM) cell is also assigned to the FE and provides expertise for operational-level planning and targeting in addition to their principal responsibilities for TLAM strike mission planning and coordination for organic and joint TLAM execution.

*See JP 3-32, Command and Control for Joint Maritime Operations, and Navy Tactics, Techniques, and Procedures (NTTP) 3-32.1, Maritime Operations Center, for additional detailed guidance on MOC.*

(b) **SACC.** In amphibious operations, the SACC plans, coordinates, and controls all fires within the operational area, in support of the amphibious force, if control is not ashore. It is located aboard a ship configured with the requisite C2 facilities, enabling coordination of all forms of supporting fires (land-, air-, and sea-based). The designated commander may choose either the amphibious task force's (ATF's) supporting arms coordinator, the LF's FSC (if USMC), or FSCOORD (if US Army) to supervise the SACC. Whether the supporting arms coordinator, forces fires coordinator, or FSC supervises the SACC, fire support personnel from both the ATF and LF operate the SACC.

(c) **Navy TACC.** The Navy TACC is the senior Navy air control agency afloat. During amphibious operations, and before control is passed ashore, Navy TACC controls all air operations within the AOA. The Navy TACC plans and conducts air operations, including CAS. Typically, the Navy TACC is onboard the ATF flagship. If the JFACC's command operations center is afloat, the Navy TACC may support operations as the JAOC. The Navy TACC has two sections that control and integrate CAS:

**1. Air Traffic Control Section (ATCS).** The ATCS provides initial safe passage, radar control, and surveillance for CAS aircraft in the AOA. The ATCS can also provide early detection, identification, and warning of enemy aircraft.

**2. Air Support Control Section.** The air support control section supports the Navy TACC by controlling, supporting, or transferring control to subsidiary tactical air direction controllers. The section is located in the SACC to deconflict air missions, routes, and requests for fires.

(d) **Maritime AMD Command.** AMD consists of those measures taken to defend the force against air and ballistic missile attacks. The maritime AMD command collects, evaluates, and disseminates AMD surveillance information to the force, and also plans, directs, monitors, and assesses the employment of AMD resources.

(3) **Joint Force Air Component.** JFCs normally designate a JFACC, whose authority and responsibilities are defined by the establishing JFC based on the JFC's CONOPS. See JP 3-0, *Joint Operations*, and JP 1, *Doctrine for the Armed Forces of the United States*, for additional guidance on the organization of joint forces. The Air Force, Navy, or Marine Corps component commander may be designated as the JFACC. The

following discussion is based upon US Air Force fires C2 capabilities when the commander, Air Force forces, is designated as the JFACC. In this instance, the JFACC exercises tactical control or has a support relationship with other forces made available for tasking. The JAOC is the focal point for tasking and exercising control of these forces.

(a) **JAOC.** The JAOC is structured to operate as a fully integrated command center and should be staffed by members of all participating components, to include key staff positions, to fulfill the JFACC's responsibilities. A JAOC provides the capability to plan, coordinate, allocate, task, execute, monitor, and assess the activities of assigned or attached forces. Through the JAOC, the JFACC monitors execution of joint air operations and directs changes as the situation dictates. As the lead C2 mechanism of the theater air-ground system, the JAOC should have secure and redundant communications with operations, logistics, weather, intelligence centers, and higher and lateral HQ, as well as subordinate units, to preclude degradation in its ability to control joint air forces.

*See JP 3-30, Command and Control for Joint Air Operations, for additional detailed guidance on JAOC operations.*

(b) **ASOC.** The ASOC is the primary control agency within the theater air control system (TACS) for execution of air operations that directly support land operations within division-assigned airspace. The ASOC is an extension of, and directly subordinate to, the JAOC. Normally collocated with the senior Army FE, the ASOC performs a current operations function, while planning and execution functions are performed by members of the TACP. ASOC and TACP personnel at the Army division may be integrated with the division fires cell and airspace element to form a JAGIC. A JAGIC is designed to fully integrate and coordinate all fires and air operations over and within a division commander's AO.

(c) The TACP is an air liaison unit collocated with ground maneuver units. TACPs are under the operational control of the ASOC and have two primary missions: to advise ground commanders on the capabilities and limitations of air operations (the responsibility of the air liaison officer), and to provide terminal attack control of CAS aircraft (the responsibility of the JTACs).

(d) Other elements of the TACS include the CRC and the AWACS. Both provide battle management, early warning and surveillance, weapons control, and data link management. The CRC is a ground-based mobile radar system, while AWACS is an airborne radar system. Finally, the JSTARS is an airborne wide-area surveillance ground moving target indicator and synthetic aperture radar. It provides battle management, early warning and surveillance of ground targets, weapons control, and ISR support.

(e) **Joint Air Component Coordination Element (JACCE).** The JFACC may establish one or more JACCEs with other functional component commanders' HQ (JFLCC, JFSOCC, JFMCC, etc.) to better integrate joint air operations with their operations. When established, the JACCE is a component-level liaison that serves as the direct representative of the JFACC. A JACCE is normally made up of the liaison element(s) of the Service designated to provide the JFACC. The JACCE does not perform any C2 functions

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

#### (4) **Joint Force Special Operations Component**

(a) The joint force special operations component coordinates all fire support in support of special operations and, when tasked, fire support using SOF assets in support of other elements of the joint force. Special operations coordinate fire support through both external and SOF channels. Within SOF channels, various elements are established to assist commanders in the execution of their fire support responsibilities. SOF organizations and elements that provide C2 capabilities include:

**1. Special Operations Joint Task Force (SOJTF).** An SOJTF is the principal organization designed to meet all special operations requirements in major operations, campaigns, or a contingency. The SOJTF commander is responsible for the planning, integration, and execution of all special operations in a designated operational area. The SOJTF can command and control multiple joint special operations task forces (JSOTFs) and a joint special operations air component (JSOAC), or a JTF consisting of both conventional forces and SOF. The SOJTF staff coordinates joint fire support with other components of the joint force and US Government departments and agencies in a major operation, campaign, or contingency. As appropriate, the staff can form a JFE. The JFACC provides a JACCE to the JFSOCC to assist in coordinating joint air operations. The JACCE will typically be located with the JFE at the senior SOF echelon. The JACCE will be active in planning both future and current operations, and will work closely with the JFE to pass the most responsive assets to immediate engagements that require fire support.

**2. JSOTF.** The JSOTF is formed to execute special operations in support of a theater campaign or other operations. The JSOTF provides a capability to command and control multiple special operations task forces (SOTFs), or a JTF consisting of both conventional forces and SOF. The JSOTF staff establishes a JFE and joint air coordination element (JACE) to coordinate joint fire support with other components of the joint force and other US Government departments and agencies. If the JSOTF is the senior SOF echelon then the JFACC will provide a JACCE if required.

#### **3. JSOAC**

**a.** The JSOAC is responsible for planning and executing joint special operations air activities, and for ensuring effective coordination, synchronization, and deconfliction of such activities with conventional air operations. A key responsibility of the JSOAC is to also ensure that close liaison is accomplished with other SOF components. The JSOAC also has direct liaison with the special operations liaison element (SOLE). The JSOAC commander will normally be the commander with the preponderance of aviation assets or the greatest capacity to plan, coordinate, allocate, task, control, and support assigned and attached special operations aviation assets.

**b. Special Tactics Teams (STTs).** STTs are usually included with US Air Force SOF under the JSOAC. STTs are a task-organized element that may include combat control, pararescue, select TACP personnel, and special operations weather personnel. Weather personnel provide forecasting, and environmental reconnaissance in the form of terrain, route, riverine, avalanche, and littoral assessments. Depending on mission requirements, STTs can be employed by both special operations and conventional forces. To prevent potential confusion, command relationships should be clearly articulated.

**4. SOTF.** An SOTF is a grouping of SOF assets formed to carry out a specific operation or a continuing mission. SOTFs are scalable organizations built around the nucleus of an Army Special Forces unit, Ranger unit, Marine Corps special operations unit, or Naval Special Warfare unit. An SOTF establishes a fire support element for targeting coordination and for integrating fires delivered on surface targets by fire-support means, under the control, or in support, of the tactical-level force.

**5. SOCCE.** The SOCCE synchronizes special operations with land and maritime operations. The SOCCE is normally employed when SOF conduct operations in conjunction with a conventional force. It collocates with the command element of the supported commander and performs C2 or liaison functions directed by the special operations commander. The focus of fires coordination is on the synchronization and deconfliction of joint fires.

**(b) SOF Fire Support Coordination.** Liaison between SOF and other elements of the joint force is critical to both effective support and the prevention of friendly fire incidents. SOF liaison elements provide special operations expertise to coordinate, synchronize, and deconflict operations in support of conventional forces and when special operations are conducted unilaterally. SOF C2 organizations, such as a SOCCE, may provide (or act as) liaison elements to coordinate fire support with their respective Service components. Additionally, the following elements provide fire support coordination and/or liaison for SOF:

**1. SOLE.** The SOLE is a team provided by the JFSOCC to the JFACC (if designated) or appropriate Service component air C2 organization, to coordinate, deconflict, and synchronize special operations air, surface, and subsurface operations with conventional air operations. The SOLE director places SOF ground, maritime, and air liaison personnel in divisions of the JAOC to coordinate with the air operations staff. The SOLE coordinates appropriate FSCMs to help avoid friendly fire incidents. Through the SOLE, the JFSOCC ensures special operations aviation activities are coordinated, synchronized, and deconflicted with the JFACC's operations to ensure airspace coordination, flight safety, operations security, and unity of effort.

**2. SOF JFE.** The SOF JFE plans, coordinates, synchronizes, and executes fire support to safeguard both friendly ground and air units while expediting joint fires. Together with the JACCE/JACE, the JFE will monitor and rapidly respond to SOF joint fires requests and can efficiently determine the most responsive resource and delivery means to respond to immediate support requests. The JFE consolidates FSCMs for SOF,

tracks team locations, and reports them to the SOLE to aid the air-ground deconfliction process.

**3. JACE.** The JACE locates with the JFE at the JSOTF. The JACE provides the JSOTF with air operations expertise. The JSOAC and JACE will exchange the necessary liaisons and information to maintain a common operational picture (COP). The JACE functions as the focal point for preplanned air support requests and advises the JSOTF commander on effective use of air operations.

**4. Fire Support Element.** At the tactical operations center echelon, typically the SOTF, the fire support element is responsible for targeting coordination and for integrating fires delivered on surface targets by fire-support means under the control, or in support, of the tactical level force.

**5. Fires Employment.** Although all SOF operators are capable of employing surface fires and aviation fires from AC-130 aircraft, current and qualified SOF JTACs are recognized across all components of US Special Operations Command as the primary fires employment capability at the strategic, operational, and tactical levels. These personnel are specifically organized, trained, and equipped to conduct and support special operations. SOF JTACs are carefully selected to conduct special operations using modified equipment and trained in irregular warfare activities to achieve strategic and operational objectives in austere environments worldwide. SOF also employ SOF aviators as forward air controller (airborne) (FAC[A]). The SOF FAC(A) is normally an airborne extension of the JTAC in support of special operations.

*See JP 3-05, Special Operations, for more information on SOF C2 and liaisons.*

### (5) Additional Entities for CAS

(a) **FAC(A).** The FAC(A) is a specifically trained and qualified aviation officer who exercises control from the air of aircraft engaged in CAS of ground troops. The FAC(A) is normally an airborne extension of the TACP. The FAC(A) also provides coordination and terminal attack control for CAS missions, as well as locating, marking, and attacking ground targets using other fire support assets.

(b) **Tactical Air Coordinator (Airborne) (TAC[A]).** The TAC(A) is an officer who coordinates, from an aircraft, the actions of other aircraft engaged in air support of ground or sea forces. The TAC(A) also expedites CAS aircraft-to-JTAC handoff during heavy-traffic CAS operations.

(c) **JTAC.** A JTAC is a certified and qualified Service member who, from a forward position, directs the action of combat aircraft engaged in CAS and other offensive air operations. A qualified and current JTAC will be recognized across the Department of Defense (DOD) as capable and authorized to perform all types of terminal attack control.

*See JP 3-09.3, Close Air Support, for more detailed information about C2 of CAS operations.*

c. **C2 and Joint Fire Support Systems**

(1) **Joint Automated Deep Operations Coordination System (JADOCS).** JADOCS integrates communication, coordination, collaboration, and execution of joint and multinational targeting and fires. Digital integration of US and allied joint fires information enhances SA to reduce friendly fire incidents and enables timely execution of TSTs, HPTs, and HVTs.

(2) **Advanced Field Artillery Tactical Data System (AFATDS).** AFATDS is a multi-Service integrated fire support system that processes fire missions, air support requests, and other related information to coordinate and maximize the use of all fire support assets (i.e., mortars, FA, attack helicopters, air support, naval gunfire, and offensive EW). It meets the needs of the FA for planning the use of critical resources and for managing, collecting, and passing vital fire support data throughout fire support channels. AFATDS can create, store, and check FSCMs/ACMs for violations during fire mission processing. AFATDS can send both preplanned and immediate air support requests through each echelon of command to the supporting AOC. It is fielded from echelons above Army corps or Marine expeditionary force to firing battery levels. With their AFATDS, the DASC is able to link digitally into the artillery and TA channels to achieve a rapid counterfire capability from either ground or air systems.

(3) **Theater Battle Management Core System (TBMCS).** The TBMCS is a force-level integrated air C2 system. TBMCS provides hardware, software, and communications interfaces to support the preparation, modification, and dissemination of the force-level air battle plan.

(4) **Airborne ISR Processing, Exploitation, and Dissemination Systems.** Processing, exploitation, and dissemination systems process data so it is recognizable by humans or machines. Exploitation then interprets what collected data reveals with regard to the observable data related to essential elements of information. The product derived from exploitation may or may not stand alone, but must often be combined with other forms of intelligence to be processed into suitable forms. A fundamental requirement of processing, exploitation, and dissemination should include the geo coordinates or metadata from the data collection location(s). If collection locations are unknown, the value of the data is limited. Processing, exploitation, and dissemination systems are one of three components comprising ISR. They encompass the equipment that receives, processes, relays, and stores or transmits collected data from the platform; the communications systems architecture and associated bandwidth/throughput that moves collected data to and from an exploitation or allows collected data to be accessed on a server or other media; the exploitation center that receives processed data and turns it into a usable form; and the personnel who process, exploit, and disseminate the information and intelligence that satisfy specific combatant command processing, exploitation, and dissemination requirements.

*See JP 2-01, Joint and National Intelligence Support to Military Operations, for more detailed information about airborne ISR processing, exploitation, and dissemination systems.*

(5) **Service Assets.** Each Service operates additional assets capable of contributing specific capabilities as needed. Examples of such assets or systems include the US Army's Airborne Reconnaissance Low-Multifunction radar, the US Navy's EP-3s, or the US Air Force's RC-135s and U-2s that, if allocated or used in a joint reporting environment, can also provide timely intelligence to joint fire support.

## CHAPTER III JOINT FIRE SUPPORT PLANNING

*“Commanders and leaders must remain flexible and therefore, must keep plans simple. Be nimble of mind.”*

**General Shalikashvili, 13th Chairman of the Joint Chiefs of Staff (1993-1997), quoted at Ft. Polk**

### 1. Introduction

Joint fire support planning helps to integrate and synchronize joint fire support with the JFC’s plan. **The key to effective integration and synchronization of joint fire support is the thorough and continuous inclusion of all component fire support elements in the joint operation planning process, aggressive coordination, and a vigorous execution of the plan.** The supported commander, supporting commanders, joint fire support planners, and joint fires support agency planners should maintain a continuous dialogue.

a. Joint fire support planning is an integral part of the overall joint fires planning process. Joint fire support planners and coordinators actively participate with other members of the staff to develop estimates, provide the commander with recommendations, develop the joint fire support portion of the CONOPS, and supervise the execution of the commander’s decision throughout the joint targeting cycle. The effectiveness of their planning and coordination is predicated on the commander providing clear and precise guidance.

b. **All components plan for and coordinate joint fire support.** Commander’s CONOPS are integral to the scheme of fires. Just as the JFC’s intent and CONOPS should take into account the integration and synchronization of tactical, operational, and strategic operations, the CONOPS for component commanders should integrate and synchronize joint fire support at the tactical as well as the operational level. Joint fire support planning and coordination must be continuous and its execution decentralized.

*See JP 3-0, Joint Operations, and JP 5-0, Joint Operation Planning, for a more detailed discussion of planning and operational considerations.*

### 2. Considerations

a. The purpose of joint fire support planning is to optimize fires by integrating and synchronizing joint fire support with the supported commander’s operations plan. **During the planning phase, commanders develop a CONOPS. From this guidance, the commander and staff develop the scheme of fires to support the scheme of maneuver. Commanders determine how to shape the operational environment with joint fires to create conditions to allow freedom of maneuver.** Plans to achieve subordinate objectives include the effects desired from joint fire support. Decisive operations, freedom of action, massing the effects of fires, and depth and simultaneity are typical considerations. Joint fire support planners advise commanders on the best use of available joint fires support, develop joint fire support plans, issue necessary orders in the name of appropriate commanders, and

implement approved joint fire support plans for the component or joint force. Joint fire support requirements are considered throughout the JFC's planning and decision-making processes and during all phases of an operation.

b. **Basic Joint Fire Support Tasks.** Joint fire support is assessed by evaluating whether it creates desired effects on the enemy, helps create conditions for decisive operations, and supports joint force operations. **Joint fire support is built on four basic fire support tasks:**

(1) **Support Forces in Contact.** The commander provides joint fire support to protect and enable freedom of maneuver to forces in contact.

(2) **Support the CONOPS.** The CONOPS clearly and concisely expresses what the JFC intends to accomplish and how it will be done using available resources. The scheme of fires must describe how joint fires will be synchronized and integrated to support the JFC's objectives, as articulated in the CONOPS.

(3) **Integrate and Synchronize Joint Fire Support.** Joint fire support is synchronized through fire support coordination, beginning with the commander's estimate and CONOPS. Joint fire support must be planned both continuously and concurrently with the development of the scheme of maneuver. Furthermore, joint fire support must be synchronized with other joint force operations (i.e., air operations, cyberspace operations, ISR functions, special operations, personnel recovery, and IO) to optimize limited resources and avoid friendly fire incidents.

(4) **Sustain Joint Fire Support Operations.** Joint fire support planners will mitigate logistic limitations and exploit logistic capabilities.

c. **Joint Fire Support Requirements Planning.** The supported commander defines the joint fire support requirements using the joint targeting cycle, while considering each of the basic joint fire support tasks. During the joint targeting cycle, the supported commander identifies and validates the joint fire support requirements. The supported commander also defines the desired effect, along with time constraints, collateral damage and collateral effects restrictions, and acceptable levels of risk to forces.

(1) Upon completion of joint fire support requirement planning, the supported commander transmits those requirements to the supporting commanders. Greater detail can shorten coordination time, but the supported commander should allow the supporting commanders latitude when deciding how to meet the requirement.

(2) The supported and supporting commanders ensure that joint fire support complies with the law of war principles of military necessity, distinction, proportionality, and avoiding unnecessary suffering.

(3) Supporting commanders must understand all joint fire support requirements and request clarification on any ambiguities. The supporting commanders will help the supported commander comply with all law-of-war requirements and awareness of any contradictory or more limiting application of the law of war by other multinational forces.

d. **Joint Fire Support Resource Allocation Planning.** The supporting commanders select and control fires providing joint fire support, based on the supported commander's requirements. The selected capability should meet time, collateral damage, and risk criteria.

(1) Supporting commanders identify any augmentation the selected capability will require to accomplish the joint fire support mission. Augmentation may include assistance to find, fix, track, or target the supported commander's requirements. Supporting commanders should also provide collateral damage/effects and risk estimates for the allocated joint fire support capability to the supported commander.

(2) The supporting commander needs reliable and redundant communications systems to receive engagement authorization from the supported commander.

e. **Joint Fire Support Coordination**

(1) The supported commander plans, integrates, and synchronizes joint fire support across the joint functions, in coordination with supporting commanders. If planning and execution are concurrent, the JFC's J-3 staff coordinates integration and synchronization of joint fire support.

(2) Coordination between the supported and supporting commands makes joint fire support planning an iterative process. Both supported and supporting commanders need flexibility to rapidly modify existing C2, intelligence, fires, maneuver, protection, and sustainment plans to improve effectiveness and mitigate risks.

f. **Planning Considerations Across the Range of Military Operations**

(1) **Major Operations and Campaigns**

(a) To achieve national strategic objectives or protect national interests, the US national leadership may decide to conduct a major operation involving large-scale combat, placing the US in a wartime state. In such cases, the goal is to **prevail** against the enemy as quickly as possible, conclude hostilities, and establish conditions favorable to the US, the host nation, and multinational partners.

(b) Major operations and campaigns are complex and require detailed planning. Joint fire support for major operations may include, but is not limited to, the lethal effects of air support by manned and unmanned aircraft, NSFS, artillery, mortars, rockets, and missiles, as well as nonlethal effects from electronic attack (EA), cyberspace attack, and other nonlethal capabilities.

(c) Major operations and campaigns involve an ever-changing balance of offensive, defensive, and stability operations throughout all phases of the operation. Stability operations are various military missions, tasks, and activities conducted outside the US in coordination with other instruments of national power that seek to maintain or reestablish a safe and secure environment and provide essential governmental services, emergency infrastructure reconstruction, or humanitarian relief. As the mission in stability operations is to restore vital national services, rather than destruction of enemy forces, the

ROE will normally limit lethal fires employed in support of these activities. Planners should also consider the impact of fires conducted during the early combat phases on later stabilization and reconstruction phases of the operation.

*See Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3121.01, Standing Rules of Engagement/Standing Rules for the Use of Force for US Forces, for more information on ROE.*

### **(2) Crisis Response and Limited Contingency Operations**

(a) Crisis response and contingency operations can be a single, small-scale, limited-duration operation or a significant part of a major operation of extended duration involving combat. The strategic and operational objectives are to protect US interests, to include preventing surprise attacks or further conflict.

(b) Joint fires in support of crisis response and contingency operations may be similar to those employed for major operations and campaigns, but are normally more restrictive in their application. Joint fire support planning for crisis response and contingency operations can be constrained by time limits and rapid execution requirements. During crisis response, joint fire support planning must expeditiously organize and prioritize limited assets.

(c) Joint fire support to multinational crisis response operations may encounter undesirable delays until coordination with partner nations is complete and agreements are ratified. Specifically, developing agreements on multinational ROE may require significant time to coordinate, since most nations require approval from their highest levels of government for national ROE in multinational operations. Integration of digital fire support systems also presents a challenge, as interoperability, approvals to connect, and multi-level security issues tend to impede the rapid formation of multinational information networks. Developing national ROE for multinational operations, and preparing detailed technical descriptions of fire support systems prior to the crisis, can speed coordination, agreement, and approval of multinational joint fire support operations.

### **(3) Military Engagement, Security Cooperation, and Deterrence**

(a) Military engagement, security cooperation, and deterrence operations encompass a wide range of activities where the military instrument of national power supports other US Government departments and agencies and cooperates with intergovernmental organizations (IGOs) such as the United Nations or North Atlantic Treaty Organization (NATO), and other countries, to protect and enhance national security interests and deter conflict. These operations usually combine activities of conventional forces and SOF, US Government departments and agencies, IGOs, and nongovernmental organizations, in a complementary fashion.

(b) Various joint operations, such as a show of force or enforcement of sanctions, support deterrence by demonstrating national resolve and willingness to use force when necessary. Others, such as humanitarian and civic assistance programs, promote international stability through peaceful cooperation.

(c) Lethal joint fires in support of security cooperation and deterrence operations are normally the most restrictive, and may be limited to defensive fires only.

g. **Intelligence.** The limited availability and high demand for intelligence collection assets make it imperative that fire support planners carefully consider their collection requirements, to include potential intelligence gain/loss considerations, and closely coordinate with intelligence planners. Target and munition selection, mitigation of collateral damage and effects, and assessment are enabled through intelligence support. Fire support planners should also consider the intelligence analytical processes involved for the predictive intelligence and personal identity verification (identity intelligence) of HVTs that may be engaged with either lethal or nonlethal capabilities.

h. **Prevention of Friendly Fire Incidents.** The destructive power and range of modern weapons, coupled with the high intensity and rapid tempo of modern combat, increase the potential for friendly fire incidents. Risk management must be fully integrated with planning and executing operations. **Commanders must identify and assess situations that increase the risk of friendly fire incidents.** Commanders minimize and control risks by implementing preventive measures in all plans. The primary preventive measures to limit friendly fire incidents are CID training, command emphasis, disciplined operations, control measures, FSCMs, ACMs, close coordination among component commands, rehearsals, reliable and interoperable coordination systems, battle tracking, and enhanced SA. Employment of FFT-capable systems and devices, and singular preventive measures identified above, assist in preventing friendly fire incidents, but must not be used as a sole means for clearance of fires. Vesting engagement decisions in well-trained and qualified personnel greatly reduces the risk of friendly fire incidents. Commanders balance the application of preventive measures to reduce friendly fire incidents with their impact on the ability to engage enemy forces, since overly restrictive preventative measures risk preserving the enemy's ability to inflict friendly casualties. Special instructions (SPINS) may also specify means to prevent friendly fire incidents in particular missions.

i. **Weapons of Mass Destruction (WMD).** When targeting enemy WMD storage sites, weapon systems, or production facilities, the fires cell must complete detailed collateral damage estimates to determine the potential release hazards caused by the strike. Although the initial impact of conventional munitions on a WMD target may cause little collateral damage, secondary effects could include a release and dispersal of chemical, biological, radiological, or nuclear material. For this reason, WMD targets are usually placed on an RTL; however, mission priorities to counter WMD and military necessity may obligate JFCs to engage WMD targets with joint fires. Ground commanders in the target area must be advised of the predicted hazard area and must be given enough time to take appropriate force protection measures. Effects on the local civilians must be anticipated and planned for as well. This planning must be done not only for WMD sites, but also for targets known or suspected to contain toxic industrial materials (chemical, biological, or radiological). JFCs should plan for follow-on operations to manage the consequences and mitigate the effects of collateral damage from the effects of WMD. There are simulation tools available to aid in the planning of lethal strikes on WMD targets. These software tools can forecast the effectiveness of conventional and agent defeat weapons strikes on WMD targets and the resulting possible collateral effects.

*For more information on WMD, see JP 3-40, Countering Weapons of Mass Destruction, and JP 3-41, Chemical, Biological, Radiological, and Nuclear Consequence Management.*

### **j. Multinational Considerations**

(1) Military operations are inherently joint and multinational. Fire support coordination in multinational operations requires special arrangements with multinational forces and local authorities. To maximize the effectiveness of multinational fire support and to minimize the possibility of friendly fire incidents, the multinational force commander and staff should become familiar with each nation's capabilities and limitations in TA systems, attack and delivery systems, fire support C2 systems, munitions, and training. Special arrangements include implementation of communications and language standards, exchange of liaison personnel, and adoption of interoperability procedures. Commanders should establish a standard operating procedure (SOP) for fire support to implement special arrangements and to communicate the process for the exchange of targeting information. To synchronize forces and optimize mission partner capabilities, the multinational force staff should:

- (a) Identify and integrate joint and multinational fire support C2 systems and procedures.
- (b) Identify and codify attack and delivery system capabilities and limitations.
- (c) Identify specific national C2 organizational requirements (e.g., command positions, liaisons, and technical representatives).
- (d) Plan and coordinate the use of coordination and control measures.
- (e) Develop and promulgate a methodology to assess multinational joint fire support results.

#### (2) Examples of coordinated fire support arrangements:

- (a) Use NATO standardization agreements (STANAGs). These provide participants with common terminology and procedures. When operating with countries not in NATO, similar SOP agreements must be made.
- (b) Use SOF teams assigned to multinational units to provide the JFC with an accurate evaluation of capabilities, location, and activities of multinational forces, thus facilitating the JFC's C2.
- (c) Establish guidelines for clearance of indirect fires in the ROE.
- (d) Use a standard datum.
- (e) Establish common meteorological procedures and standards.
- (f) Provide liaison officers as required.

(g) Establish/coordinate the multinational ROE before the commencement of hostilities, and continually refine them during operations.

(h) Establish the policy for indirect fire systems using non-precision munitions within the ROE.

(i) Establish the policy for using obscurants, illumination, and cluster munitions with inherent high dud potential within the ROE.

(j) Establish SOPs concerning the ways that digitally and non-digitally equipped forces operate together. When automatic interfaces are unworkable, determine liaison officer requirements.

(k) Establish a multinational target numbering system.

*See JP 3-16, Multinational Operations, for further information.*

### 3. Joint Fire Support and Force Capabilities

#### a. Air-to-Surface Capabilities

(1) **Fixed-Wing Aircraft.** Fixed-wing aircraft provide JFCs flexibility, range, speed, lethality, precision, and the ability to mass fires at a desired time and place. Fixed-wing aircraft support the joint fires tasks of strategic attack, countering air and missile threats (including SEAD and offensive counterair), and interdiction. Fixed-wing aircraft provide joint fire support with AI, armed reconnaissance, CAS, airborne C2, ISR, and FAC(A). The capacity of aircraft to deliver precision-guided munitions can enable JFCs to strike otherwise-inaccessible targets and can limit collateral damage. Aircraft may provide real-time attack assessment. Additionally, stealth technology allows for the delivery of standoff weaponry with reduced detectability.

(2) **Attack Helicopters.** The US Army normally employs attack helicopters as maneuver units to conduct two basic types of attack missions: close combat attack, and interdiction. US Army attack helicopters can also perform CAS in support of another component. The USMC employs its attack rotary-wing aviation primarily as a CAS platform. The ACE deploys with the MAGTF to execute CAS in support of the GCE ground maneuver elements. Attack helicopters can employ precision-guided weapons and provide terminal guidance for other weapon platforms. They can also operate during periods of limited visibility.

(3) **Unmanned Aircraft (UA).** The long endurance of UA enables them to provide extended support to TST, HVT, and HPT missions. UA can also support or conduct close combat attack, CAS, strike coordination and reconnaissance, AI, and other joint fires missions. Specific tasks for the UA may include TA and marking, terminal guidance of ordnance, providing precision coordinates for Global Positioning System (GPS)-aided munitions, delivery of onboard precision-guided ordnance, battle damage assessment, signal intelligence, communication/data relays, and retargeting (i.e., shoot-look-shoot). UA should be requested, tasked, routed, controlled, and deconflicted in a manner similar to methods

used for fixed- and rotary-winged manned aircraft, with exceptions made for their unmanned nature (e.g., inability to see and avoid other air traffic). During a mission, a UA may be retasked from one mission to another (e.g., ISR to close combat attack).

### (4) Standoff Weapons

(a) The US Air Force conventional air-launched cruise missile is a near-precision, GPS-aided, standoff weapon launched from a B-52 aircraft. Mission planning for the conventional air-launched cruise missile is accomplished by reachback, to include target intelligence agencies, and close coordination is required between missile planners, B-52 aircraft planners, and AOC planning staffs.

(b) The joint air-to-surface standoff missile (JASSM) and its extended range variant are US Air Force air-launched, low observable, subsonic cruise missiles specifically designed to penetrate air defense systems. The missiles incorporate GPS-aided inertial navigation system (INS) guidance with an infrared seeker in the terminal phase of flight. Optimizing JASSM's full precision and low observable capabilities requires prior coordination with both strike units and target intelligence agencies.

(c) The small diameter bomb (SDB) is a US Air Force air-launched, precision-guided, glide weapon. It provides strike aircraft with high-loadout, all weather, autonomous standoff-attack capability, outside of point defenses. SDB increment I [SDB I] provides precision capability through a GPS-aided INS against fixed targets, while increment II [SDB II] incorporates a GPS-aided INS and additional tri-mode seeker, optimized for engaging fixed, relocatable, moving targets, at any time of day and in adverse weather conditions.

(d) The AGM-154 is a medium-range, precision-guided, air-to-surface glide weapon, employing a variety of cluster and unitary munitions that can be employed against land and sea targets. The AGM-154 is a launch-and-leave weapon that employs a GPS-aided INS, and is capable of day, night, and adverse weather operations.

(5) **Precision Weapons.** US forces employ precision-guided weapons with specific armaments that support the military operations and give the JFC the ability to engage a broad array of potential targets (e.g., equipment and personnel, hard and deeply buried targets, tunnels and enclosed spaces) while minimizing collateral damage.

### b. Surface-to-Surface Capabilities

(1) The ATACMS/Guided Multiple Launch Rocket System (MLRS) provides long-range, surface-to-surface fires against high value, well-defended targets, day or night, and in nearly all weather conditions. ATACMS can support a range of operations including TSTs, SEAD, counterfires, and strikes requiring high levels of accuracy. Their reliability, accuracy, and range make them viable against stationary, non-hardened targets. However, due to their extremely high altitude of delivery (apex of missile trajectory), close coordination must be made with air planners and liaisons in the JAOC to ensure that aircraft are not in the vicinity during missiles' terminal falls. The missiles fired from a MLRS and a high mobility artillery rocket system (HIMARS) launcher deliver warheads that include antipersonnel and antimateriel bomblets, unitary high-explosive charges, or guided

submunitions. MLRS and HIMARS provide the joint force with counterfire and capacity to strike enemy defenses, light materiel, and personnel targets. These weapon systems supplement cannon artillery fires with large volumes of fires against selected targets. The MLRS and HIMARS typically fire free-flight rockets against area targets and guided munitions against point targets. The guided MLRS provides another precision attack capability to support maneuver forces and provide interdiction of HPTs and HVTs.

(2) The US Navy U/RGM-109 Tomahawk is a long-range joint interdiction weapon. All Tomahawk variants can engage well-defended targets at long distances and provide precision fires to the joint force. The U/RGM-109C TLAM is optimized against stationary, non-hardened targets in practically all weather conditions. The U/RGM-109E Tactical Tomahawk can be redirected in flight. Employing the Tomahawk weapon system requires coordination with the maritime component's MOC, Tomahawk strike coordinator, and strike and mission planning cells. Tomahawks require both mission planning to plan the routes and strike planning to coordinate the execution. With proper coordination, Tomahawks can also support SOF direct calls for fire. With proper planning, all variants can be used on short notice, day or night, with few weather restrictions. Tomahawk strikes may be conducted without air support and when the risk of aircraft loss is high. Tomahawks are also capable of neutralizing enemy air defenses to facilitate larger attacks by conventional airpower. In theater, associated afloat planning systems suites provide the JFMCC additional capacity to plan new missions or modify selected missions.

(3) **Cannon Artillery and Mortars.** FA cannon systems and mortars provide continuously available fires under all weather conditions and in all types of terrain. Although cannon artillery and mortars provide close-support fires to maneuver forces, FA can also perform counterfire, interdiction, and SEAD. FA employs precision munitions, such as the Excalibur, that provide all-weather precision strike capability for point targets.

(4) **NSFS**

(a) The mission of NSFS ship units in an amphibious assault is to support the assault by destroying or neutralizing shore installations that oppose the approach of ships and aircraft, defenses that may oppose the LF, and defenses that may oppose the post-landing advance of the LF. NSFS provides fire support by naval surface gun, missile, and EW systems in support of a unit or units tasked with achieving the commander's objectives. Naval assets can provide support in a unique manner and should be considered as one source of fire support along with other components and weapon systems.

(b) When the number of ships permits, individual ships will be assigned as DS to assault battalions. The DS mission establishes the priority in which the ship will process calls for supporting fire and the anticipated zone of fire (ZF). The ship delivers fires on planned targets and targets of opportunity in the ZF, which normally corresponds to the zone of action of the supported unit. When possible, ships capable of performing simultaneous missions will be given a DS mission, to allow for maximum fire support to the forward units of the LF.

(c) The GS mission requires an NSFS ship to support the force as a whole, or that portion of the force assigned to the ship, by attacking targets in the ZF. Prearranged fires are delivered in accordance with a schedule of fires published in the ATF OPORD and the NSFS plan in the LF OPORD. Fires may also be allocated to a subordinate unit for a specific mission(s). Upon completion of the mission(s), the ship reverts to GS. Ships in GS support regimental-sized units or larger.

*For further details and information on joint fires assets, see FM 3-09.32, Marine Corps Reference Publication (MCRP) 3-16.6B/NTTP 3-09.2/Air Force Tactics, Techniques, and Procedures (Instruction) (AFTTP[I]) 3-2.6, J-FIRE, Multi-Service Procedures for the Joint Application of Firepower. For more information on TLAMs, see NTTP 3-03.1, Volume I, Tomahawk Land-Attack Missile Employment Manual.*

c. **Nonlethal.** Nonlethal capabilities can be used to create effects that limit collateral damage, reduce risk to civilians, and may reduce opportunities for enemy exploitation of friendly force actions. They may also reduce the number of casualties associated with the excessive use of force, limit reconstruction costs, and maintain positive relations with the local populace.

(1) **EA.** EA involves the use of electromagnetic energy, directed energy, or antiradiation weapons to attack personnel, facilities, or equipment to degrade, neutralize, or destroy enemy combat capability. The effects of EA can be lethal or nonlethal. EA can be used against a computer when the attack occurs through the electromagnetic spectrum. Integration and synchronization of EA with maneuver, C2, and other joint fires, especially cyberspace fires, are essential.

*For additional guidance on EA, refer to JP 3-13.1, Electronic Warfare.*

(2) **IRCs.** The integration and synchronization of fires with IRCs through the targeting process is fundamental to creating the necessary synergy between IRCs and more traditional maneuver and strike operations.

*For additional guidance on IRCs, refer to JP 3-13, Information Operations.*

(a) **Cyberspace Operations.** Cyberspace operations contribute significantly to information superiority. Both the offensive cyberspace operations (OCO) and defensive cyberspace operations response actions (DCO-RA) missions may require use of fires in cyberspace. OCO are intended to project power by the application of force in and through cyberspace, and DCO-RA uses defensive measures, including fires, outside the defended network to protect it. Cyberspace attacks create various direct denial effects (i.e., degradation, disruption, or destruction) or manipulation that leads to denial in the four physical domains. OCO may target enemy cyberspace functions or use first-order effects in cyberspace to initiate cascading effects into the physical domains to affect weapon systems, C2 processes, critical infrastructure/key resources, etc.

*For additional guidance on OCO and DCO RA, and integration with other fires, refer to JP 3-12, Cyberspace Operations.*

(b) **Space Operations.** Offensive space control operations preclude an enemy from exploiting space to their advantage. Offensive space control operations may target an enemy's space capability (space systems, terrestrial systems, links, or third-party space capability), using a variety of permanent and/or reversible means.

*For additional guidance on offensive space control, refer to JP 3-14, Space Operations.*

(c) **Military Deception (MILDEC).** MILDEC consists of actions taken to deliberately mislead enemy or potential enemy decision makers as to friendly military capabilities, intentions, and operations, thereby causing them to take specific actions (or inactions) that will contribute to the accomplishment of the friendly mission. MILDEC is part of the C2 function. Physical attack/destruction can support MILDEC by shaping an enemy's intelligence collection capability through destroying or nullifying selected ISR capabilities or sites. Attacks can mask the main effort from the enemy.

*For additional guidance on MILDEC, refer to JP 3-13.4, Military Deception.*

(d) **Military Information Support Operations (MISO).** MISO are planned operations to convey selected information and indicators to foreign audiences to influence their emotions, motives, objective reasoning, and ultimately the behavior of foreign governments, organizations, groups, and individuals in a manner favorable to the originator's objectives. Selected audiences may include enemies, adversaries, friends, and neutral groups or populations. Military information support forces devise actions and craft messages using visual, audio, and audio-visual formats, which can then be delivered by air, land, and maritime means, and through cyberspace, to selected individuals and groups. Military information support personnel follow a deliberate process that aligns commander's objectives with an analysis of the operational environment. Many actions of the joint force, such as strikes, have psychological impact, but they are not MISO unless their primary purpose is to influence the attitudes, rules, norms, beliefs, and subsequent behavior of a target audience. However, the psychological impact of such events can significantly enhance or undermine MISO effectiveness and must be considered as part of the planning, execution, and assessment of MISO. Regardless of the circumstances, all MISO are conducted within carefully reviewed and approved programs and under mission-tailored product approval guidelines that flow from national-level authorities. Military information support officers advise the commander and operations officer on the possible psychological impacts of all actions and impacts to ongoing operations.

*For additional guidance on MISO, refer to JP 3-13.2, Military Information Support Operations. MISO support to non-US military is outlined in Department of Defense Directive (DODD) S-3321-1, Overt Psychological Operations Conducted by the Military Services in Peacetime and in Contingencies Short of Declared War (U).*

### (3) **Other Nonlethal Joint Fire Support**

(a) **Civil Affairs (CA).** CA introduces civil considerations and analysis into the JTCCB and targeting process. CA planners provide nonlethal targeting options to support the commander's end state, when appropriate, support lethal targeting with analysis of

second- and third-order effects, and mitigate the effects of lethal targeting on the local population. Specifically, CA analysis supports target development by participating in target system analysis (TSA), target folder, and target list development processes, which is the responsibility of joint fires. Nonlethal targeting can include technologies designed to separate civilians from combatants, as well as those intended to influence the attitudes of the population as a whole.

*For additional guidance on CA, refer to JP 3-57, Civil-Military Operations.*

(b) **Electronic Warfare Support (ES).** ES refers to the division of EW involving actions tasked by, or under direct control of, an operational commander to search for, intercept, identify, and locate or localize sources of intentional and unintentional radiated electromagnetic energy, for the purpose of immediate threat recognition, targeting, planning, and conduct of future operations. ES prepares the electromagnetic environment for the commander to perform operational missions. ES synchronizes and integrates the planning and operational use of sensors, assets, and processes within a specific battle space to reduce uncertainties concerning the enemy, environment, time, and terrain. ES data can be used to produce signals intelligence, provide targeting for electronic or physical attack, and produce measurement and signature intelligence.

*For additional guidance on ES, refer to JP 3-13.1, Electronic Warfare.*

(c) **Other.** Other nonlethal joint fire support includes obscurant fires to mask friendly positions, and illumination fires, when required for night operations.

#### 4. Joint Fire Support Planning Process

a. **Introduction.** Joint fire support planning is a continual and cyclical process that synchronizes, executes, and assesses joint fires at tactical, operational, and strategic levels with joint fire support communications systems and architectures.

##### b. Coordination of Lethal and Nonlethal Actions

(1) Commanders and their planners should integrate lethal and nonlethal actions early in the planning process rather than adding on nonlethal actions at the end. A clear understanding of the problem, planning guidance, commander's intent, and the operational framework provide the necessary direction for the coherent integration of lethal and nonlethal actions at the operational level, while appropriately leaving synchronization of detailed execution to subordinate tactical units.

(2) Lethal and nonlethal planning and synchronization is a cross-functional effort, requiring close coordination and information sharing across all staff directorates. This cross-functional collaboration is best accomplished through appropriate organizational processes that are broken down into elements, functional boards, and planning teams composed of representatives from appropriate directorates. A JFE is a subordinate component of the J-3, specifically formed to plan and synchronize joint fires for the JFC. Functional boards synchronize particular functions (e.g., lethal and

nonlethal actions), allocate resources between ongoing and future operations, and maintain continuity across ongoing operations, in accordance with the commander's guidance and decisions. Planning teams solve problems related to specific tasks or requirements. Pre-execution, most joint fire support planning is accomplished by the future plans and future operations planning teams. Upon campaign execution, the current operations team joins the joint fire support planning effort.

*See JP 3-33, Joint Task Force Headquarters, and JP 5-0, Joint Operation Planning, for more information on JTF cross-functional staff organizations and operational activities.*

(3) Some degree of synchronization is necessary at the operational level to prevent parallel, unaligned actions and effects. However, operational-level HQ cannot synchronize every lethal and nonlethal action. Such detailed synchronization is contrary to the reasoning behind mission command and mission-type orders, and it is impossible to keep up with the totality of actions occurring in the operational area. For this reason, a clear understanding of the commander's intent and the overall scheme of fires is essential at all levels of the force.

### c. Targeting Process

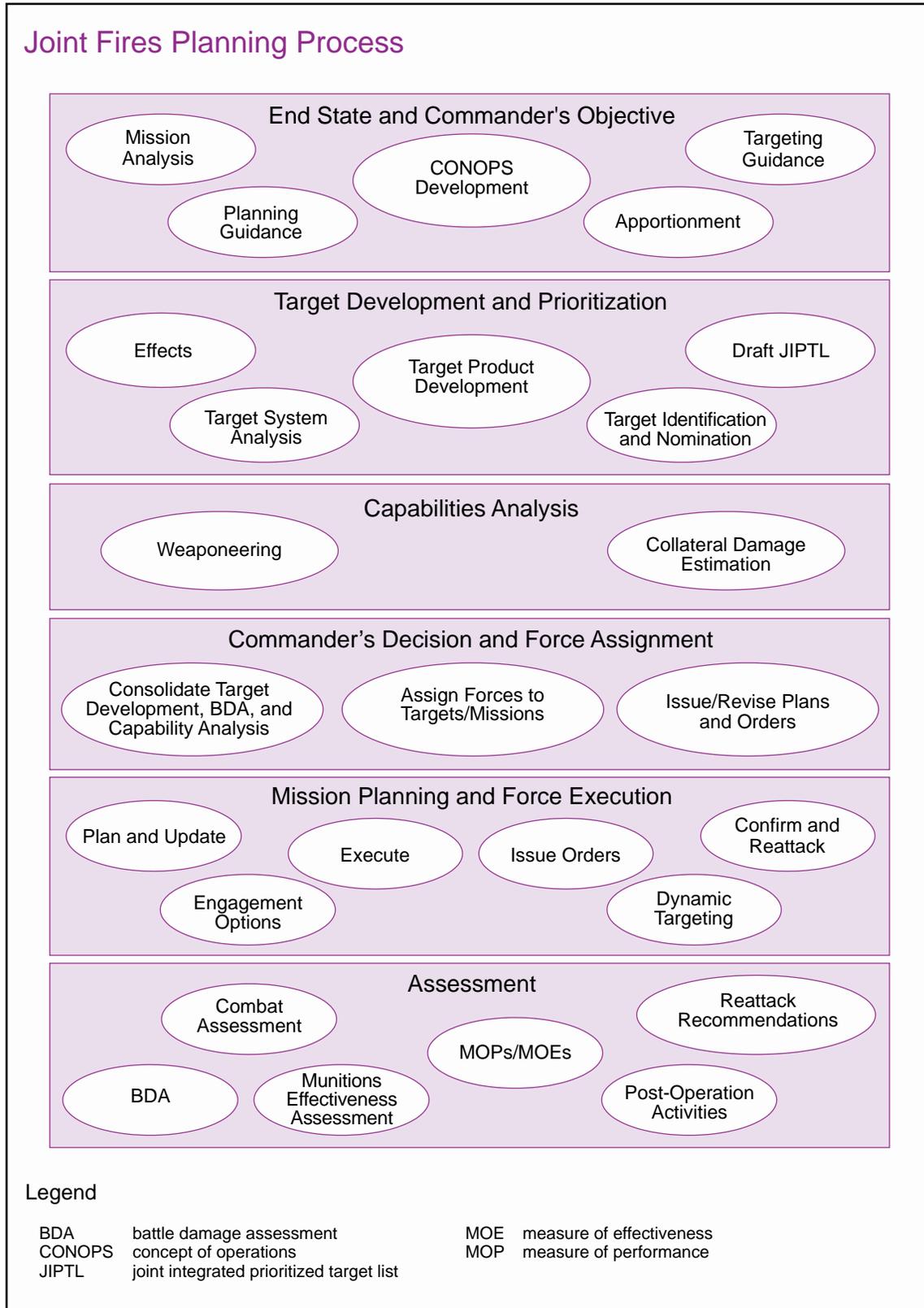
(1) The JFC's requirements for joint fires are planned and executed using the joint targeting process. Joint fire support planning is a critical part of the overall joint targeting process.

(2) Targeting integrates and synchronizes fires into joint operations by utilizing available capabilities to create a specific lethal or nonlethal effect on a target. Targeting is selecting and prioritizing targets and matching the appropriate response to them, considering operational requirements and capabilities to create desired effects that achieve stated objectives. The joint targeting cycle is a six-phase, iterative process that methodically analyzes, prioritizes, and assigns assets against targets to create effects that will contribute to the achievement of the JFC's objectives. It also helps link the effects of fires to actions and tasks at the joint force component level.

(3) Targeting must create specific effects to achieve the JFC's objectives or the subordinate component commander's supporting objectives. Targeting proceeds from the definition of the problem, to assessment of the effectiveness of the employment of capabilities and the results achieved through executed COAs. The process allows testing of multiple proposed solutions, a thorough analysis of the problem, and refinement of proposed solutions. The joint targeting process is flexible and adaptable to a wide range of circumstances.

*Detailed information on targeting can be found in JP 3-60, Joint Targeting.*

d. **Joint Fires Planning Process.** As part of the joint operation planning process, it is initiated during mission analysis, continues through post-execution assessment, and includes the following steps: end state and the commander's objectives, target development and prioritization, capabilities analysis, commander's decision and force assignment, mission planning and force execution, and assessment (see Figure III-1).



**Figure III-1. Joint Fires Planning Process**

**(1) End State and Commander’s Objective—CONOPS Development**

(a) Mission Analysis. Mission analysis helps the JFC and staff understand the problem and purpose of the operation and issue appropriate guidance to drive the rest of the planning process. As part of the planning for joint fires and joint fire support, planners participate in the mission analysis to anticipate what forces and assets are needed to support the operation. Output includes the JFC’s intent statement and updated planning guidance.

(b) Planning Guidance. The commander provides the staff with refined planning guidance following mission analysis, including a clear statement of the problem to be solved, conditions necessary to achieve objectives, and the commander’s vision of the operational approach to achieve the objectives, including joint fires and joint fire support’s role in the operations.

(c) Targeting Guidance. The commander, in coordination with components and other agencies, develops and issues deliberate targeting and dynamic targeting guidance, including targeting priorities, TST criteria and procedures, component-critical targets, TA and identification criteria, and authorized actions against targets. Targeting and joint fires and fire support planners use the JFC’s targeting guidance to aid in COA development.

(d) Apportionment. The staff uses the JFC’s envisioned distribution of forces and capabilities as a starting point for joint fires and fire support planning.

**(2) Target Development and Prioritization—Target Product Development**

(a) Effects. Targeting, joint fires, and joint fires support planners use joint fire support capabilities to create the JFC’s desired effects.

(b) TSA. TSA examines potential target systems for relevance to the JFC’s objectives, military importance, and priority of attack.

(c) Target Identification and Nomination. The target nomination list (TNL) includes targets from the joint target list and the RTL. Planners use TSA results to assist in the target nomination process.

(d) Approved JIPTL. The JIPTL is the ranking of all targets from the TNL, which are prioritized according to JFC objectives.

**(3) Capabilities Analysis**

(a) Weaponeering. Planners match appropriate weapons or other capabilities with the TNL or JIPTL target elements to create the desired effect on the target.

(b) Collateral Damage Estimation (CDE). **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. Such damage is not unlawful so long as it is not excessive in light of the overall military advantage anticipated from the attack. However, even though such fires may be lawful, commanders should ensure that fires do not

negatively impact operational or strategic objectives. For example, in conducting counterinsurgency operations, a commander may place additional constraints on fires, beyond what might be legally required, to avoid collateral damage that might bolster the local population's support for the insurgency, decrease its support of US involvement, or degrade the US population's support for the operation. CDE should not be confused with risk estimate distances, which are tools used by ground commanders to make risk decisions regarding the employment of CAS or fire missions near friendly forces.

1. Under the law of war, the principle of proportionality requires that the anticipated loss of civilian life and damage to civilian property incidental to attacks must not be excessive in relation to the concrete and direct military advantage expected to be gained. **Commanders, therefore, are responsible for taking all practicable precautions to minimize incidental death, injury, and damage to civilians and civilian objects in the conduct of military operations, taking into account military and humanitarian considerations.** CDE is an important step in the target development process; however, it should not necessarily preclude the inclusion of valid military targets on a target list.

*See CJCSI 3160.01, No-Strike and Collateral Damage Estimation Methodology, for more information.*

2. Beyond the fundamentals of ensuring PID of the target and deriving and using properly mensurated target coordinates, **collateral damage may be minimized through various methods.** Optimizing selection of delivery system, munition type, warhead, warhead fuzing, delivery heading, and weapon flight path to the target, weapon impact angle, impact velocity, shielding, and use of aimpoint offsets may also help reduce unintended second- and third-order effects and consequences of fires. When targeting sites containing WMD or other toxic industrial materials, among other things, planners will consider the potential release and dispersal hazards.

3. **JFCs and planners will seek to accomplish their missions through the discriminate application of lethal and nonlethal fires with minimal collateral damage.** Joint standards and methods for estimating collateral damage potential provide mitigation techniques and assist commanders with weighing collateral risk against military necessity and assessing proportionality within the framework of the military decision-making process.

(c) Target coordinate mensuration is the measurement of a feature or location on the earth to determine absolute latitude, longitude, and elevation. It is used in targeting to refer to the exact location of a target. Point mensuration has always been an important part of targeting, since the mensurated points represent the desired points of impact for coordinate-seeking munitions or desired mean points of impact for multiple non-coordinate-seeking weapons. Mensurated points, combined with coordinate-seeking weapons, can help minimize collateral damage caused by inaccurate weapons. When accomplished before air tasking order (ATO) execution, target mensuration permits employment of an entire class of GPS-aided weapons, and may allow JAOC personnel to significantly shorten the targeting process.

See *CJCSI 3505.01, Target Coordinate Mensuration Certification and Program Accreditation*, for more information.

**(4) Commander's Decision and Force Assignment**

(a) Consolidate Target Development and Capability Analysis. Planners collate results from weaponeering and CDE with available forces, sensors, and weapons systems. It is primarily an operations function, but requires intelligence support to identify appropriate intelligence collection assets and ensure that they are properly integrated into the plan.

(b) Engagement Options. The planning staff considers the full range of lethal and nonlethal capabilities available when developing engagement options for JFC approval.

(c) Assign Forces to Targets/Missions. The draft JIPTL usually contains more targets than there are assets available to service them. The JTCB provides the commander with recommendations which match available resources to targets. A cut line is used to determine which targets are at the top of the list for the given time period. Planners use the JIPTL cut line to assign forces to targets.

(d) Issue/Revise Plans and Orders. The JFC issues tasking orders to the assigned combat and support forces based on the approved plan.

**(5) Mission Planning and Force Execution**

(a) Issue Orders. Following a commander's engagement decision, C2 systems are used to transmit engagement orders to forces tasked to provide supporting forces. Supporting forces engaging targets must understand the mission in order to thoroughly plan for target engagement.

(b) Plan and Update. When possible, assigned forces perform detailed target engagement planning. Supported and supporting commanders continuously integrate and synchronize joint fires through their C2 networks.

(c) Execute. Supporting commander engages the target based on authorization from the supported commander.

(d) Confirm and Reattack. For both lethal and nonlethal attacks, the initial assessment will determine whether reattack is recommended.

(6) **Assessment.** Joint fire support assessment measures how effectively joint fires support forces in combat. The joint fire support system can also be assessed to evaluate how effectively it synchronizes and sustains joint fire support operations.

e. **Component Planning Steps.** Joint force staff and component staffs coordinate joint fires support through a series of interrelated steps.

(1) **Receipt of Mission.** Upon receipt of a mission, joint fire support personnel assist the component commander in mission analysis. These personnel must understand the commander's guidance on the following:

- (a) Specific COAs.
- (b) Objectives and end state.
- (c) ISR.
- (d) TSTs, HVTs, and HPTs.
- (e) Use of weapons effects and special munitions such as blast, fragmentation, cluster, nuclear, mines, and lasers.
- (f) Acceptable risks.
- (g) C2.
- (h) Commitment of the reserve force.
- (i) Critical events to be considered.
- (j) Commander's assumptions.
- (k) ROE.
- (l) Assessment.
- (m) Host nation concerns.

(2) **Capabilities Analysis.** The component commander establishes targeting guidance that must be incorporated into the joint fire support planning process. The commander establishes targeting guidance for the joint fire support planning process. The commander establishes the priorities and describes the importance of a target set or category. During an air assault operation, for example, attacking known enemy air defense systems may be more important than attacking enemy artillery sites. Targeting tactics, techniques, and procedures are discussed in JP 3-60, *Joint Targeting*. The effectiveness and efficiency of the joint fires/joint fire support planning process increases as leaders consider:

- (a) The type and amount of delivery assets and munitions available.
- (b) The effectiveness of weapon system and/or munitions.
- (c) The size, type, ability to detect, and posture of the target.
- (d) Joint fire support asset characteristics (range, accuracy, rate of fire, and response time).

- (e) Civilians and damage to civilian objects.
- (f) Target selection standards and decision criteria for target reattack.
- (g) Damage criteria.

(3) **Preparing the Joint Fire Support Estimate.** Typically component staffs employ a joint fire support estimate to determine requirements. This estimate influences how joint fire support resources are employed to support COAs and helps joint fire support planners and coordinators integrate and synchronize the joint fires. **The estimate is a realistic appraisal of the effort required to support the operation.** It serves as a basis to identify joint fire support priorities that support the commander's intent. Factors that could affect the mission and may be considered in the joint fire support estimate include:

- (a) The task organization of subordinate forces and their missions.
- (b) The availability of joint fire support resources, including FA, CAS (by both fixed-wing and rotary-wing aircraft), NSFS, SOF, EW, cyberspace attack, and intelligence collection assets.
- (c) The probable enemy fires plan.
- (d) Enemy fires capability.
- (e) The identification of TSTs, HVTs, and HPTs.
- (f) Consumption factors (type and quantity), positioning requirements, and priority of logistic support.
- (g) Joint fires-related decision points.

(4) **Commander's Estimate.** Based on information provided in the staff estimates, the commander issues an estimate. It should provide joint fire support planners and coordinators guidance to prioritize targets, desired lethal and nonlethal effects, and reattack.

(5) **COA Analysis.** COA analysis is a systematic review process performed by a commander and staff to determine the best COA for a given operation. Each COA must be analyzed to consider the implications of both friendly and enemy options during an operation. Joint fire support planners and coordinators advise commanders on the joint fire support assets available and recommend the most effective use of these assets during COA analysis. As the analysis progresses, joint fire support planners and coordinators continuously evaluate the integration of joint fire support into the commander's emerging CONOPS, to include branches and sequels. As a result of this interaction, the commander's options are influenced by the availability and allocation of joint fire support assets. The finished product is a COA that integrates fires with

maneuver and synchronizes operations. Joint fire support planners use the results of COA development in the targeting process.

(6) **Initiating Planning Actions.** Once the commander selects a COA, joint staff and fires planners:

- (a) Refine named areas of interest, decision points, and HVTs/HPTs.
- (b) Integrate and refine the collection, TA, and assessment plan. Collection assets are tasked and integrated to mitigate gaps in the coverage of the operational area.
- (c) Develop joint fire support tasks, responsibilities, and requirements.
- (d) Develop the joint fires employment concept and joint fire support plan.

## 5. Coordination Measures and Reference Systems

a. **FSCMs.** JFCs manage their operational area through continuous coordination with all participants using standardized coordination measures. FSCMs are used to deconflict and synchronize joint fires and other military operations in the operational area. See Appendix A, “Coordination and Control Measures,” for a detailed discussion of FSCMs.

b. **ACMs.** Airspace is a common medium for both fires and maneuver. Freedom of maneuver for joint forces using airspace enables all joint functions. Commanders use ACMs to facilitate the efficient use of airspace to accomplish air operations and fires, in support of JFC objectives, and simultaneously provide safeguards for friendly forces.

*See Appendix A, “Coordination and Control Measures,” for a detailed discussion of ACMs.*

c. **Waterspace Management.** Waterspace management allocates waterspace for antisubmarine warfare weapons control to permit the rapid and effective engagement of enemy submarines, while preventing inadvertent attacks on friendly submarines.

*For more information, see Naval Warfare Publication 3-21.0, Coordinated Submarine/Task Group Operations Manual.*

d. **Global Area Reference System (GARS).** GARS provides commanders with a worldwide frame of reference to help coordinate, deconflict, integrate, and synchronize joint fires.

*For more detailed information on GARS, see JP 2-03, Geospatial Intelligence in Joint Operations.*

## 6. Joint Fire Support Plan

The commander's joint fire support plan is the product of joint and component fire support planning. The joint fire support plan is attached as Appendix 6 (Joint Fire Support) to Annex C (Operations) to the OPORD or OPLAN. In it, the JFC provides guidance to supporting commanders regarding the current or expected enemy, friendly, and environmental situation; the joint fire support mission, describing how joint fires will be used to support the CONOPS; the joint fire support priorities; and the objectives for using air, land, maritime, and special operations forces in a joint fire support role. Tabs to the appendix outline specific tasks and guidance for organizing and operating a JFE, coordinating fire support, integrating fire support C2 systems (e.g., AFATDS, JADOCS), conducting dynamic targeting, integrating multinational fires, and incorporating fire support liaisons. See Chairman of the Joint Chiefs of Staff Manual (CJCSM) 3130.03, *Adaptive Planning and Execution (APEX) Planning Formats and Guidance*, for an example format.

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## CHAPTER IV JOINT FIRE SUPPORT EXECUTION

*“No plan of operations extends with any certainty beyond the first contact with the main hostile force.”*

**Field Marshall Helmut Carl Bernard Graf von Moltke the Elder,  
Chief of Staff of Prussian General Staff 1857-1871 and  
Great General Staff from 1871-1888**

### 1. Introduction

Joint fire support execution begins when the supported commander issues an execute order for an operation to commence, and continues until the operation is terminated or the mission is accomplished. Commanders and their staffs simultaneously execute the supported commander’s plan while continuing the planning process for subsequent operations.

### 2. Considerations

a. **Combat Operations Are Dynamic.** Force execution occurs when targets are engaged (or otherwise affected) and effects are created. During force execution, the operational environment changes as the enemy responds and deviates from friendly force assumptions. As individual joint fire support activities are executed, synchronization of tactical activities can become overwhelming for an operational staff. Fast-paced and geographically dispersed operations are best executed through mission command. Mission command is the conduct of military operations through decentralized execution based on mission-type orders. Thorough understanding of the commander’s intent at every level of command is essential to mission command.

*See JP 3-09.3, Close Air Support, for information on tactical-level joint fire support execution, and JP 1, Doctrine for the Armed Forces of the United States, for additional information on mission command.*

b. **Maintain SA of the Operational Environment.** To coordinate and synchronize tactical units throughout the operational environment, the JFC and staff must have a high level of SA. SA enables supported and supporting commanders to share a common understanding of the operational environment and allows dynamic targeting of targets of opportunity. Dynamic targeting can provide a responsive use of on-call or re-tasked missions to exploit enemy vulnerabilities that may be of limited duration.

*See JP 3-60, Joint Targeting, for information on dynamic targeting.*

c. **Leverage Interoperable Fire Support and C2 Systems.** Joint digital fire support and C2 systems that are interoperable with all forces, when available, help maintain information flow between the supported and supporting commanders and their staffs. Digitally aided fire support enables machine-to-machine exchange of required fire support and targeting information for efficient and effective target prosecution by joint and

multinational assets. C2 and fire support systems also allow staffs to review priority of fires through battle tracking, position reports, execution checklists, etc.

d. **Use the Lowest Echelon Capable of Furnishing Effective Support.** To keep joint fire support responsive, the lowest level capable should deliver it. If fire support assets are inadequate, joint fire support planners and coordinators should request additional joint fire support from the appropriate echelon or component. Fire support coordination between Service and functional components should occur at the lowest possible level. When coordination cannot be accomplished at the lower levels or additional guidance is required, the next higher echelon should be consulted.

e. **Furnish the Type of Joint Fire Support Requested.** The supported commander best determines joint fire support requirements. However, the component, unit, or organization providing the joint fire support has the most expertise and is best able to determine and recommend the type and quantity of fire support to meet the supported commander's requirement.

f. **Use the Most Effective Joint Fire Support Means.** Requests for joint fire support are tasked to the force capable of delivering the most effective joint fires within the required time. When developing a recommendation for a weapon system, the joint fire support planners and coordinators should consider the nature and importance of the target, the engagement time window, the availability of attack assets, and the desired effects on the target. In some circumstances, it may be necessary to sequence the attack by fixing the enemy with immediately available joint fire support assets, while coordinating a subsequent, more detailed, attack by more effective assets. It may be necessary to use multiple assets to create the desired effects on a target.

g. **Planning During Execution.** Planning continues during execution, with an initial emphasis on refining the existing plan and anticipating joint fire support requirements for follow-on actions to include branches and sequels. As the operation progresses, joint operation planning generally occurs in three distinct but overlapping timeframes: future plans, future operations, and current operations. Future plans and future operations primarily concentrate on subsequent operations or branches to current operations. Assessment of current operations feeds these two planning efforts. Current operations addresses the immediate or very-near-term issues associated with ongoing operations, focused on the execution phase of the operation. This normally occurs in the JOC or J-3. The nature and time frame associated with current operations planning (usually the current 24-hour period) typically require the immediate responsiveness of dynamic targeting.

h. The commander's decision cycle, encapsulated in the battle rhythm, regulates the sequencing of events during the execution phase. The commander's battle rhythm enables the synchronization of current and future operations. Subordinate and supporting commanders must synchronize their own battle rhythms with the JFC. Some of the joint fire support activities that influence, and are influenced by, the JFC's battle rhythm include the joint targeting cycle and the joint air tasking cycle.

*Refer to JP 5-0, Joint Operation Planning, for more information on planning during execution, and JP 3-60, Joint Targeting, for a detailed discussion on dynamic targeting.*

### 3. Process

During execution, control of joint fire support forces is normally exercised through the J-3. The J-3 integrates and synchronizes fires with other major elements of the operation such as maneuver, IRCs, special operations, and logistics. When the JFC approves the formation of a JFE, the J-3 may delegate daily joint fire support coordination responsibilities. Since the JFE is composed of representatives from operations, plans, targeting, intelligence, and each subordinate and supporting commander, it can be a powerful coordination and synchronization tool for the J-3. The JFE performs the tasks outlined by the J-3. The JFE may assess joint fires and joint fire support operations, providing rapid feedback to the JFC for decision making. Joint fire support execution requires operational battle tracking of friendly forces and equipment, targets, and threats to friendly forces. The JFE can assist the J-3 with implementing measures to reduce the risk of friendly fire incidents to include disciplined execution of OPORDs, airspace control orders (ACOs), ATO, SPINS, targeting guidance, ROE, CID, and PID procedures, and maintain the detailed SA necessary to synchronize the joint fire support system.

a. **Battle Tracking.** Battle tracking builds and maintains a picture of the operational environment that is accurate, timely, and relevant. Battle tracking increases the probability that joint fires will be applied at the proper time and place. At the operational level, battle tracking takes advantage of digital information systems, using multiple sources to generate a coherent picture of the operational environment. Battle tracking helps maintain SA of friendly and enemy progress, reduce redundant targeting, and reduce the possibility of friendly fire incidents. The components will normally share their part of the COP with other joint forces via the GCCS [Global Command and Control System], if available, to meet the JFC's reporting criteria. The goal is to provide rapid information exchange to facilitate a shared understanding of the COP. The COP is normally generated with interfaced systems information applications used by the joint force. It is incumbent on operators to realize the accuracy, capabilities, limitations, and potential latency issues associated with the joint C2 systems architecture.

(1) Tracking friendly forces and equipment will aid in reducing the possibility of friendly fire incidents. Given the complexity inherent in joint fire support, prevention of friendly fire incidents must always be a high priority. Commanders at all levels must continuously reduce the potential for friendly fire incidents.

(2) Targets for joint fire support can be identified and nominated in the targeting cell of the operational HQ, or identified, nominated, vetted, validated, and prioritized at the point of engagement with the enemy.

(3) Threats to friendly forces must be located, tracked and communicated to joint fire support forces. Threats to supporting forces may require synchronized operations to suppress or destroy the threats prior to joint fire support forces primary mission.

b. **Coordination.** Joint fire support coordination during execution includes all efforts to integrate and synchronize attacks, avoid friendly fire incidents, reduce duplication of effort, and shape the operational environment. Coordination procedures must be flexible and responsive to the ever-changing dynamics of warfighting. Streamlined arrangements for approval or concurrence to joint fires should be established. Coordination helps identify measures to prevent potential friendly fire incidents.

(1) **Provide for Rapid Coordination.** Commanders must establish procedures and responsibilities to rapidly coordinate joint fire support. Coordination of joint fire support should be detailed and done in advance, but in some instances, due to operational circumstances, coordination will be rapid and less detailed. Poor communication and collaboration procedures or inadequate FSCMs may delay the delivery or clearance of joint fires, and jeopardize the force. Joint fire support planners and coordinators must know the availability of assets, the CONOPS, the commander's intent, FSCM and ACMs in effect, ROE, clearance of joint fires procedures, and any other operational limitations.

(2) **Employ Coordination and Control Measures.** Commanders employ permissive and restrictive coordination measures to facilitate planning and efficient execution of maneuver, air operations, and fires while simultaneously providing safeguards for friendly forces.

(a) FSCMs and maneuver control measures (MCMs) are employed to expedite attack of targets; protect forces, populations, critical infrastructure, and sites of religious or cultural significance; clear joint fires; integrate and synchronize joint fire support operations; and establish conditions for future operations. Along with other control measures, FSCMs, MCMs, and their associated usages and procedures help ensure that joint fire support does not jeopardize troop safety, interfere with other attack means, or disrupt operations of adjacent or subordinate units. Maneuver commanders position and adjust coordination and control measures consistent with the commander's objectives, location of friendly forces, CONOPS, anticipated enemy actions, and in consultation with superior, subordinate, supporting, and affected commanders. The primary purpose of permissive measures is to facilitate the attack of targets. The primary purpose of restrictive measures is to safeguard forces. See Appendix A, "Coordination and Control Measures," for more information on FSCMs and MCMs.

(b) ACMs facilitate efficient use of airspace to accomplish air operations and fires and simultaneously provide safeguards for friendly forces. Commanders ensure that ACM nominations support and do not conflict with joint operations prior to forwarding to the JAOC. Aircraft (manned and unmanned) and fires may transit through an ACM when coordinated with the owning airspace control element. See Appendix A, "Coordination and Control Measures," for more information on ACMs.

(3) **Coordinate Airspace**

(a) Component commanders must have the freedom to use airspace to achieve the JFC's objectives and must have maximum flexibility to use assets (organic and joint) within that airspace. Joint doctrine recognizes the need for each Service and functional

component to use the airspace with maximum availability, consistent with the JFC's acceptable level of risk. The JFC's acceptable level of risk for all airspace users (including fires) should be clearly delineated in the airspace control plan. Airspace control is enabled by responsive airspace control systems, standardization of airspace practices, minimal restrictions, and continuous integration and coordination among all airspace users. Joint planning and coordination minimize mutual interference, while deploying and employing air defense and fire support assets. Many FSCMs and MCMs have a vertical component that must be considered and coordinated when traversing or firing ordnance.

*See JP 3-52, Joint Airspace Control, and JP 3-30, Command and Control for Joint Air Operations, for additional information.*

(b) Commanders, assisted by joint fire support planners and coordinators, ensure that conflicts between surface-based indirect fire and air operations are minimized. For example, joint force land component attacks deep into the surface AO are cross-checked to minimize the risk that enemy air defenses are repositioned just prior to a planned air strike. Similarly, an uncoordinated air mission beyond the FSCL could influence the enemy forces to interfere with the ground scheme of maneuver.

(c) All Services operate systems for airspace control. When similar Service systems are linked with the airspace control authority by communications, standardized procedures, and liaison, they form an integrated airspace control system. The highest probability of interference between aircraft and surface-to-surface weapons occurs at relatively low altitudes in the immediate vicinity of firing locations and target impact areas. FSCMs and ACMs exist within a network of component joint FISTs, liaison parties, and fire coordination elements and must be shared, understood, and managed across the entire joint force to be effective. Using FSCMs and ACMs correctly can prevent friendly fire incidents and duplication of effort while increasing the effectiveness of air-to-ground and ground-to-ground ordnance.

(d) The change of established FSCMs and ACMs must be coordinated as far in advance as possible. All joint force coordinating agencies must inform their forces of the effective times and locations of new FSCMs and ACMs. Following direction to execute the change, the component operations cells should confirm the changes to ensure that affected forces are aware of new FSCM and ACM locations and that associated positive control measures are being followed.

*JP 3-52, Joint Airspace Control, contains a detailed discussion on airspace control.*

c. **Synchronization.** Synchronization is the arrangement of military actions in time, space, and purpose to produce maximum relative combat power at a decisive place and time. To synchronize joint fires, commanders and staffs must have a thorough knowledge of each Service's doctrine, major systems, capabilities and limitations, and often their tactics, techniques, and procedures.

d. **TA and Identification.** Joint fire support planners and coordinators should identify TA requirements for joint fire support and focus on detecting priority targets. Staffs evaluate

target information from all sources and route it to the appropriate supporting commands. This includes information from all echelons and from adjacent and supporting elements.

(1) **TA**

(a) TA is the detection, identification, and location of a target in sufficient detail to permit the effective employment of weapons. TA is one component of the joint fire support system (the other components being C2 and the attack and delivery systems). TA can occur at numerous points along the execution timeline and at all levels of command, including the attack and delivery system performing the final attack. The JFC will issue SPINS to provide guidance to the force on specific TA requirements prior to target engagement. TA normally includes CID, PID, and target validation components.

(b) **TA Methods.** Detecting, identifying, and locating a target can be accomplished by a wide range of capabilities, from the simple visual identification to sophisticated electronic means. Once a target is detected, identified, and located, the target information must be communicated to the attack and delivery system assigned to engage the target. One method to communicate the location of intended targets is through laser designators and coordinate seeking weapons (CSW). Laser designator and CSW acquisition devices can enhance current capabilities of artillery, NSFS, and aircraft in the delivery of munitions. Both aircraft (manned and unmanned) platforms and ground-based observers can laser-designate targets for laser-guided weapons (LGWs) and provide precision coordinates for CSW. Lasers can provide fire support personnel precise target marking, enhanced visual TA, and surprise. Lasers can also reduce the weapon or sortie attack requirements. Joint fire support planners and FSCs must understand advantages and limitations when employing lasers. The unpredictable trajectories of CSW and LGWs will create challenges for the airspace managers, terminal attack controllers, and fires observers that must be considered. Additional guidance can be found in Appendix B, “Laser-Guided Systems,” and JP 3-09.3, *Close Air Support*.

(2) **CID.** CID is characterizing detected objects in the operational environment to support engagement decisions. The CID process complements the identification process to support application of weapons, resources, or other military options. The objective of CID is to obtain the highest confidence identification possible. This characterization may be limited to “friend,” “enemy,” “neutral,” or “unknown.” Other characterizations may be required, including, but not limited to, class, type, nationality, and mission configuration. CID characterizations, when applied with combatant commander ROE, enable engagement decisions and the subsequent use or prohibition of lethal and nonlethal fires. CID is used for force posturing, C2, SA, and strike/no-strike employment decisions. Effective CID not only reduces the likelihood of friendly fire incidents, but also enhances joint fire support by instilling confidence that a designated target is, in fact, as described. CID-related information exchange orients on SA for friendly and neutral forces, restricted sites and structures, and identification of threat objects. CID is acquired prior to engagement.

(3) **FFT.** FFT is the process of fixing, observing, and reporting the location and movement of friendly forces. Inextricably linked, the composite employment of CID and FFT is requisite to effective target engagement with minimal risk of friendly fire incidents.

Whereas CID emphasizes characterization of all detected objects in the target area, the FFT component seeks to positively discern and report relevant friendly force position location information to decision makers throughout the target engagement sequence. During mission execution, CID and FFT information should be constantly coordinated and conveyed to PID decision makers in clear and concise language.

(4) **PID.** PID is an identification derived from observation and analysis of target characteristics, including visual recognition, ES systems, non-cooperative target recognition techniques, identification friend or foe systems, other physics-based identification techniques, or human identity-based biometric data collection devices. The JFC will issue special instruction for PID requirements for attack and delivery platforms by asset and mission type. CID and FFT processes, such as those methods noted above, should inform PID decisions. The degree of accuracy of a PID method is specific to that method and should remain a constant, whereas CID criteria can be changed by the JFC or decentralized decision maker based on ROE. Comprehensive PID training, in conjunction with effective PID procedures and available technology, can greatly reduce the risk of friendly fire incidents. The JFC's PID procedures should be developed early during planning and ROE development. When developing the JFC's PID procedures, important considerations include the missions, capabilities, and limitations of all participants, including multinational forces, other US Government departments and agencies, IGOs, and nongovernmental organizations. US and multinational forces use many different CID and FFT processes and systems. Early identification of common PID procedures significantly increases PID effectiveness.

(5) **Target Validation.** Target validation ensures that targets meet the objectives and criteria outlined by the commander's guidance and ensures compliance with the law of war and ROE. Target validation during dynamic targeting includes analysis of the situation to determine whether planned targets still contribute to objectives, whether targets are accurately located, and how planned actions will impact other friendly operations. Target re-validation ensures that the target remains relative to the current situation and is part of target identification. The PID decision is crucial to having a valid target.

e. **Weapons Release Authority.** The authority and responsibility for the expenditure of any weapon (lethal or nonlethal) rests with the supported commander. The supported commander communicates engagement criteria to the force through ROE and SPINS specific to each operational area. The supported commander may delegate target engagement authority to the lowest level of command of the supported forces.

*See JP 3-09.3, Close Air Support, and JP 3-03, Joint Interdiction, for more information on delegation of weapons release clearance authority.*

f. **TGO.** TGO 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. Various ground elements or aircrews conducting a wide variety of missions can search for, identify, and provide the location of targets, using systems like GPS, laser designators/range finders, aircraft targeting pods, etc. Unless qualified as a JTAC or FAC(A), personnel conducting TGO do not have the authority to grant weapons release to attacking aircraft. These functions must be done by appropriate C2 authorities or a

JTAC/FAC(A). Terminal guidance is guidance applied to a weapon between midcourse guidance and arrival in the vicinity of the target, and may be a function of TGO, CAS, interdiction, or other missions.

(1) TGO can be used to facilitate attacks on targets in locations where the supported commander determines that the distance from friendly forces to the target is adequate to preclude the need for a JTAC or FAC(A) to perform detailed integration of each air mission with the fire and movement of friendly forces.

(2) TGO independent of CAS (not in close proximity to friendly forces) requires personnel conducting TGO to have direct or indirect communications with the individual operating/commanding the delivery system, plus connectivity with TGO weapons release authority.

(3) For TGO to be successful, C2 is essential; ACMs and radio procedures need to be established and understood by all participating units and aircrew. TGO may leverage CAS, TST, or other tactics, techniques, and procedures to aid in execution (such as the CAS nine-line briefing format), but **TGO should not be confused with CAS operations requiring detailed integration performed by a qualified JTAC or FAC(A) in close proximity to friendly forces.**

## CHAPTER V JOINT FIRE SUPPORT ASSESSMENT

*“Assessment is a continuous process that measures the overall effectiveness of employing joint force capabilities during military operations.”*

**Joint Publication 3-0, Joint Operations**

### 1. Introduction

The JFC and component commanders assess the operational environment and the progress of operations, and compare them to their initial vision and intent.

### 2. Considerations

a. Assessment is a commander-centric process. The commander has the best overall understanding of the progress of the unit toward mission accomplishment. All assessment efforts must ultimately inform the commander about the contribution of the assessed process or system toward the desired end state and time frame.

b. The supported commander conducts joint fire support assessment. The commander evaluates how effectively the joint fire support system supports forces in combat, supports the CONOPS, synchronizes joint fire support, and sustains joint fire support operations. Positive indicators include a continuous flow of targeting information up and down the chain of command; availability of both lethal and nonlethal attack means; access to the requested type of joint fire support; consistent use of the most effective joint fire support; avoiding unnecessary duplication; efficient use of airspace; prompt joint fire support for troops in contact, along with rapid coordination methods; protecting the force; and flexible supported and supporting staffs. Negative indicators include friendly fire incidents, collateral damage, and civilian casualties.

c. Joint fire support assessment is continuous; it precedes and guides every operational process, and continues after each operation or phase of an operation concludes. Joint fire support assessment consists of:

(1) **Monitoring.** Monitoring the current situation to collect relevant joint fire support-related information (“What happened?”).

(2) **Evaluating.** Analyzing how joint fire support activities are impacting progress toward attaining end state conditions, achieving objectives, and performing tasks (“What was supposed to happen?” “Why did it happen?”).

(3) **Recommending or directing action.** Identifying and making adjustments for improving joint fire support actions (“What do we need to do?”).

d. **Assessment Indicators.** To effectively assess the joint fire support system, metrics of success, failure, or progress toward a goal are developed into a usable format. Indicators must be measurable, collectible, and relevant. These assessment indicators or elements

should provide data to indicate the effectiveness of joint fire support, and progress toward or away from goals. A good assessment plan includes both quantitative and qualitative indicators. An example of a joint fire support assessment indicator could be the speed with which important information is communicated to, and acknowledged by, components of the joint fire support system.

e. **Targeting and Combat Assessment.** Targeting assessment is phase 6 of the joint targeting cycle and is conducted at all levels of warfare. Combat assessment is a subcomponent that focuses on determining the results of engaging a target with lethal or nonlethal capabilities or weapons. To conduct combat assessment, it is important to fully understand the linkages between the targets and the JFC's objectives, guidance, and desired effects. Combat assessment is composed of four related elements: battle damage assessment, munitions effectiveness assessment, collateral damage assessment, and reattack recommendations or future targeting.

*Refer to JP 3-60, Joint Targeting, and CJCSM 3162.01, Joint Methodology for Battle Damage Assessment, for further information on combat assessment.*

### 3. Process

a. Ultimately, joint fire support assessment is a process that measures the progress of the joint FIST toward mission accomplishment. The JFC may direct the formation of a cell, whose primary function is to develop and execute the assessment plan, to conduct assessments. The assessment cell is a cross-functional organization with representatives from applicable J-code directorates, the staff judge advocate, components, and multinational and interagency partners. The assessment cell operates during both planning and execution phases of an operation. Joint fire support may have a subordinate assessment team or working group that feeds the assessment cell.

b. **Develop the Joint Fire Support Assessment Plan.** Joint fire support assessment is a continuous process that is refined throughout planning and execution. The building of an effective joint fire support assessment plan, including the development of collection requirements, normally begins during mission analysis after identification of the initial desired and undesired effects. Use the joint fire support planning process, planning steps, basic joint fire support tasks, and joint fire support coordination principles in the planning and execution chapters of this publication as a starting point to identify relevant, quantifiable measures of effectiveness (MOEs), measures of performance (MOPs), and other indicators of successful joint fire support.

(1) **Develop Joint Fire Support MOEs and Indicators.** As operational level effects are seldom created or observed instantaneously, joint fire support related MOEs provide a framework to conduct trend analysis of joint fires effects over time, both positive and negative. The development of joint fire support MOEs and indicators can commence immediately after the identification of desired and undesired effects. MOEs help to answer questions such as: "Are we doing the right things?" "Are our actions producing the desired effects?" "Are alternative actions required?"

(2) **Develop Joint Fire Support Indicator Threshold Criteria.** Criterion development during planning establishes a consistent baseline to assess trend analysis and reduce subjectivity of reporting agencies.

(3) **Develop Joint Fire Support MOPs.** MOPs are criteria to assess friendly actions tied to measuring task accomplishment. MOPs and task metric development are normally conducted concurrently with, or shortly following, COA development. MOPs are developed and tracked by the current operations integration cell, and in individual staff sections' running estimates, but are not normally part of the formal assessment plan. MOPs help to answer the following questions: "Are we doing things right?" "Was the action taken?" "Were the tasks completed to standard?" "How much effort was involved?"

(4) **Develop the Collection Plan.** Each joint fire support indicator should be matched with its source(s) in subordinate units responsible for reporting them, as well as the staff member responsible for collecting that information. They should ensure that the reporting requirements for subordinate units are sustainable, and that they leverage other reporting requirements to minimize separate, redundant assessment reporting requirements on subordinate units and staffs. The plan should be periodically reviewed and updated.

(5) **Assign Responsibilities for Conducting Analysis and Generating Recommendations.** In addition to collection, members of the staff analyze assessment data and develop recommendations.

(6) **Identify Feedback Mechanisms.** In units with an assessment cell, both the assessment cell and the staff principal present their findings to the commander at a tempo determined by the commander's decision cycle and formalized in the commander's battle rhythm. The assessment cell presents the assessment framework with current values and discusses key trends. Insights from the statistical analysis of the information are presented. After the assessment cell presents its framework, staff principals can agree or disagree with the values provided and present insights and factors not considered or not explicit in the formal model. The staff principal then provides actionable recommendations based on the assessment.

(7) **Write the Joint Fire Support Assessment Plan.** Incorporate joint fires into plans and orders, providing guidance and direction to subordinate organizations. The joint fire support assessment plan may be included as an appendix to the Operations annex or alternatively, in the Reports annex. It should provide a detailed matrix of the MOEs associated with the desired effects, as well as subordinate indicators. The joint fire support assessment plan should identify collection means and reporting responsibilities for specific MOEs, MOPs, MOE indicators, methods to analyze and evaluate data, venues where the staff and commander can interface, and actions for improvement (see Figure V-1).

c. **Execute the Joint Fire Support Assessment Plan.** As part of the overall assessment, the staff's assessment measures the progress toward, or regression from, the achievement of objectives. It should begin as soon as information concerning MOPs, MOEs, and associated indicators are received. Assessment steps are:

<b>Notional Assessment Plan Development Matrix</b>			
Assessment Aspects	Task Assessment	Operational Environment Assessment	Campaign Assessment
Source (basis) for criteria	Directed tasks in operation order.	Desired conditions (operational environment) in operation order.	End state objectives (success criteria).
Criteria	Primarily measure of performance.	Primarily measure of effectiveness.	Measure of effectiveness.
Indicators	Largely quantitative (e.g., is task accomplished to standard?). May have commander qualitative input.	Balance of quantitative and qualitative input.	Balance of quantitative and qualitative input.
Collection means	Reports, significant actions, subordinate commanders, circulation.	Reports, polls, subordinate commanders, stakeholders, circulation.	Reports, polls, subordinate commanders, stakeholders, circulation.
Analysis and evaluation	Current operations-centric, hot wash, and commander qualitative.	Staff analysis and evaluation through staff-wide efforts, with focused assessment cell and working group. Commander parallel evaluation based on qualitative (opinion-based) indicators through commander crosstalk and circulation. Informed by staff efforts.	Combination of the quantitative staff efforts and commander qualitative analysis and evaluation. Trend analysis.
Commander-staff interface venues	Daily updates, hot washes.	Periodic operational environment staff assessment updates, commander post-circulation reports.	Formal assessment briefings and conferences.
Actions for improvement	Staff and subordinate commanders provide recommendations. Commander decisions.	Staff and subordinate commanders provide recommendation. Commander decisions.	Staffs and subordinate commanders provide recommendations. Commander decisions.

**Figure V-1. Notional Assessment Plan Development Matrix**

(1) **Monitor.** Monitoring is the continuous observation of conditions relevant to the current operation. Monitoring within the joint fire support assessment process allows staffs to collect relevant information, specifically information about the current situation that can be compared with the forecasted situation described in the commander’s intent and CONOPS.

(2) **Evaluate.** The staff analyzes joint fire support information, collected through monitoring, to evaluate its impact on the operation’s progress. Evaluation examines criteria to judge progress toward desired conditions and to analyze the rate of progress. Evaluation helps commanders identify what works and what does not work, and gain insight to better accomplish

the mission. Well-devised measures can help the commanders and staffs understand the causal relationship between specific tasks and desired effects. Joint fire support-related MOEs and MOPs help identify progress toward completing tasks, achieving objectives, and attaining end state conditions. The frequency of staff assessments should be determined by the commander's decision cycle. Normally, formal staff assessments may be conducted once or twice monthly. During high-tempo operations, staff assessments may be required more frequently—weekly, or even daily. Staff assessments are usually conducted in three distinct phases: assessment of actions taken to create effects (MOEs), task assessment (MOPs), and, if needed, deficiency analysis.

(3) **Recommend or Direct Action.** Monitoring and evaluating are critical activities; however, joint fire support assessment is incomplete without feedback and recommendations to direct action. Assessment may diagnose problems, but unless the diagnosis recommends adjustments to joint fire support activities, its use to the commander is limited. Based on the evaluation of progress, the staff brainstorms recommendations to the joint fire support plan and makes preliminary judgments about the relative merit of those changes. Making adjustments includes assigning new tasks to subordinates, reprioritizing joint fire support, and modifying the COA. Assessment occurs during all military operations. Assessment diagnoses threats, suggests improvements to the joint fire support plan, reveals opportunities, and considers partner-nation fire support systems. Assessment also considers transition from conflict to post-conflict and actions that could impair access to joint or partner-nation fire support capabilities during the conflict phases. The staff presents the results and conclusions of its assessments and recommendations to the commander as an operation develops.

d. **Assess the Plan.** The staff should continuously evaluate the assessment plan to add missing information and eliminate duplication and unnecessary reporting. The staff should make recommendations for changes and improvement, and update the plan as required, in order to provide the best information possible to the commander.

#### 4. Results and Products

a. **Results.** Assessment of the joint fire support system provides various benefits to the joint force. In addition to measuring results and progress toward a goal, assessment is used to improve planning, support decision making, manage, and improve staff SA of the composition and capabilities of forces available.

(1) **Measure Results.** MOEs help evaluate the progress of operations (“Are we on track to achieve the objective?”).

(2) **Measure Progress.** MOPs evaluate task execution, asking whether actions are performed as planned.

(3) **Improved Planning.** Determining how to measure the effectiveness of actions taken to create effects, or the progress toward achieving an objective, enhances conceptual understanding and leads to better-designed plans and more insightful objectives.

(4) **Support Decision Making.** Assessment conclusions and recommendations feed adjustments into the plan and give evidence to support commanders' decisions.

(5) **Support Management of Resources.** Assessment results and recommendations allow commanders to efficiently allocate resources and funds.

(6) **Increase Knowledge.** Assessment produces significant material for the identification of best practices, and for the historical study of operations contributing to the development of lessons learned. (See *CJCSI 3150.25*, Joint Lessons Learned Program, and the Joint Lessons Learned Information System, <https://www.jllis.mil/apps/>.)

(7) **A Means to Motivate.** Assessment helps commanders set goals and provide specific and measurable targets to direct their staffs and forces. Assessment can confirm success or highlight failures.

b. **Products.** Assessment reports may be formal or informal. Commanders provide planning guidance on the level of detail for upcoming operations. In protracted stability operations, commanders may require formal assessment plans, assessment working groups, and standard reports. In fast-paced offensive or defensive operations, or in an austere theater of operations, a formal assessment may be impractical. To assess progress in those cases, commanders rely more on reports and assessments from subordinate commanders, the COP, operation updates, assessment briefings from the staff, and their personal observations. The joint fire support assessment results will probably be combined with the assessment results from other mission areas to form a comprehensive operations and intelligence assessment report. Examples of assessment report tools include:

(1) **Effects-to-Task Summary.** Desired effects may not be created after all supporting tasks are completed. In these cases, a task-to-effect analysis should be performed to determine whether the discrepancy is due to a time lag between tasks or actions completion and anticipated results, or whether the tasks or actions cannot achieve the intended results. Mismatches should be investigated, and remedies should be developed and communicated.

(2) **MOE Indicator Analysis Matrix.** When there is a mismatch between tasks or action completion and the creation of the anticipated effect, a review of the associated MOE indicator data is the first step in deficiency analysis. The deficiency analysts should ensure that the reported data is timely and of sufficient fidelity to support a high level of confidence in the assessment of the effectiveness of the action taken to create the desired effect.

(3) **Task Analysis Matrix.** After the effects status is verified, the status of the tasks and underlying actions should be verified. If tasks and actions are verified as completed, the analysis team must determine whether sufficient time has elapsed for changes to be reflected in the indicators. If so, the team should inform the JPG, who will determine whether the OPLAN or OPORD should continue unchanged, or whether additional or alternative tasks or actions are warranted.

(4) **Assessment Summary.** Following the formal assessment team meeting, assessment personnel finalize the assessment summary for review by the formal assessment board (if established) and the commander. While the specific format for the assessment summary varies, at a minimum the effects summary display should include the effect title, current assessment status, previous assessment status, and confidence level.

## APPENDIX A COORDINATION AND CONTROL MEASURES

### 1. Introduction

The purpose of this appendix is to familiarize commanders and staff with those coordination and control measures necessary to C2 operations as part of a joint force. Commanders and staff establish various FSCMs, MCMs, and ACMs to facilitate effective joint military operations. Commanders use these measures consistent with the location of friendly forces, the CONOPS, anticipated enemy actions, and in consultation with superior, subordinate, supporting, and affected commanders. Coordination and control measures are directives to subordinate commanders to assign responsibilities, coordinate actions, and control operations. Commanders tailor their use of control measures to conform to the higher commander's intent, their mission, and the amount of authority delegated to subordinates.

### 2. Fire Support Coordination Measures

a. Locations and implementing instructions for FSCMs are disseminated electronically by message, database update, and/or overlay through both command and joint fire support channels to higher, lower, and adjacent maneuver and supporting units. Typically, they are further disseminated to each level of command, to include the establishing command and all concerned joint fire support agencies. Not all measures may apply to a joint operation; however, knowledge of the various FSCMs used by each component is necessary for the effective use of joint fire support.

(1) **Planning and Coordination Considerations.** Commanders position and adjust FSCMs consistent with the operational situation and in consultation with superior, subordinate, supporting, and affected commanders. The operations cell informs coordination elements of the change and effective time. Conditions that dictate the change of FSCMs are also coordinated with the other agencies and components as appropriate. As conditions are met, the new FSCM effective time can be projected and announced. Following direction to execute the change, the operations cell should confirm with all liaison elements that the FSCM changes have been disseminated. This ensures that affected units are aware of new FSCM locations and associated positive control measures are being followed, thus reducing the risk of friendly fire incidents.

(2) **Multinational Considerations.** Before commencing multinational operations, joint force and component staff members must verify the status of any international agreements concerning FSCMs. STANAG 2245, *Field Artillery and Fire Support Data Interoperability*, is an example of an international joint fire support agreement.

(3) Before discussing specific FSCMs, a brief background on operational environment geometry will provide a better understanding for the application of the different types of FSCMs.

(a) Operational areas may be contiguous or noncontiguous. When they are contiguous, a boundary separates them and when noncontiguous, they do not share a boundary; the CONOPS links the elements of the force. Noncontiguous operational areas normally are characterized by a 360-degree boundary with the higher HQ responsible for the area between noncontiguous operational areas. Within both contiguous and noncontiguous areas, operations may be linear or nonlinear in nature.

1. In linear operations, commanders direct and sustain combat power toward enemy forces in concert with adjacent units, usually along lines of operations with identified forward lines of own troops. Emphasis is placed on maintaining the position of the land force in relation to other friendly forces, usually resulting in contiguous operations where surface forces share boundaries. Linear operations are normally conducted against a deeply arrayed, echeloned enemy force, or when the threat to lines of communications requires control of the terrain around those lines of communications. In these circumstances, linear operations allow commanders to concentrate and integrate combat power more easily.

2. In nonlinear operations, forces orient on objectives without geographic reference to adjacent forces and are usually characterized by more operations in noncontiguous areas. Nonlinear operations emphasize simultaneous operations along multiple lines of operation from selected bases and place a premium on intelligence, mobility, and sustainment.

*See JP 3-0, Joint Operations, for more information on linear and nonlinear operations and contiguous and noncontiguous operational areas.*

(b) Within their AOs, land and naval force commanders employ permissive and restrictive FSCMs to facilitate the rapid engagement of targets, and simultaneously provide safeguards for friendly forces. Permissive FSCMs facilitate attacks and include coordinated fire lines (CFLs), battlefield coordination lines (BCLs), FSCLs, free-fire areas (FFAs), and kill boxes. Restrictive measures safeguard friendly forces and include airspace coordination areas (ACAs), restrictive fire lines (RFLs), no-fire areas (NFAs), restrictive fire areas (RFAs), and ZFs.

#### **b. Permissive FSCMs**

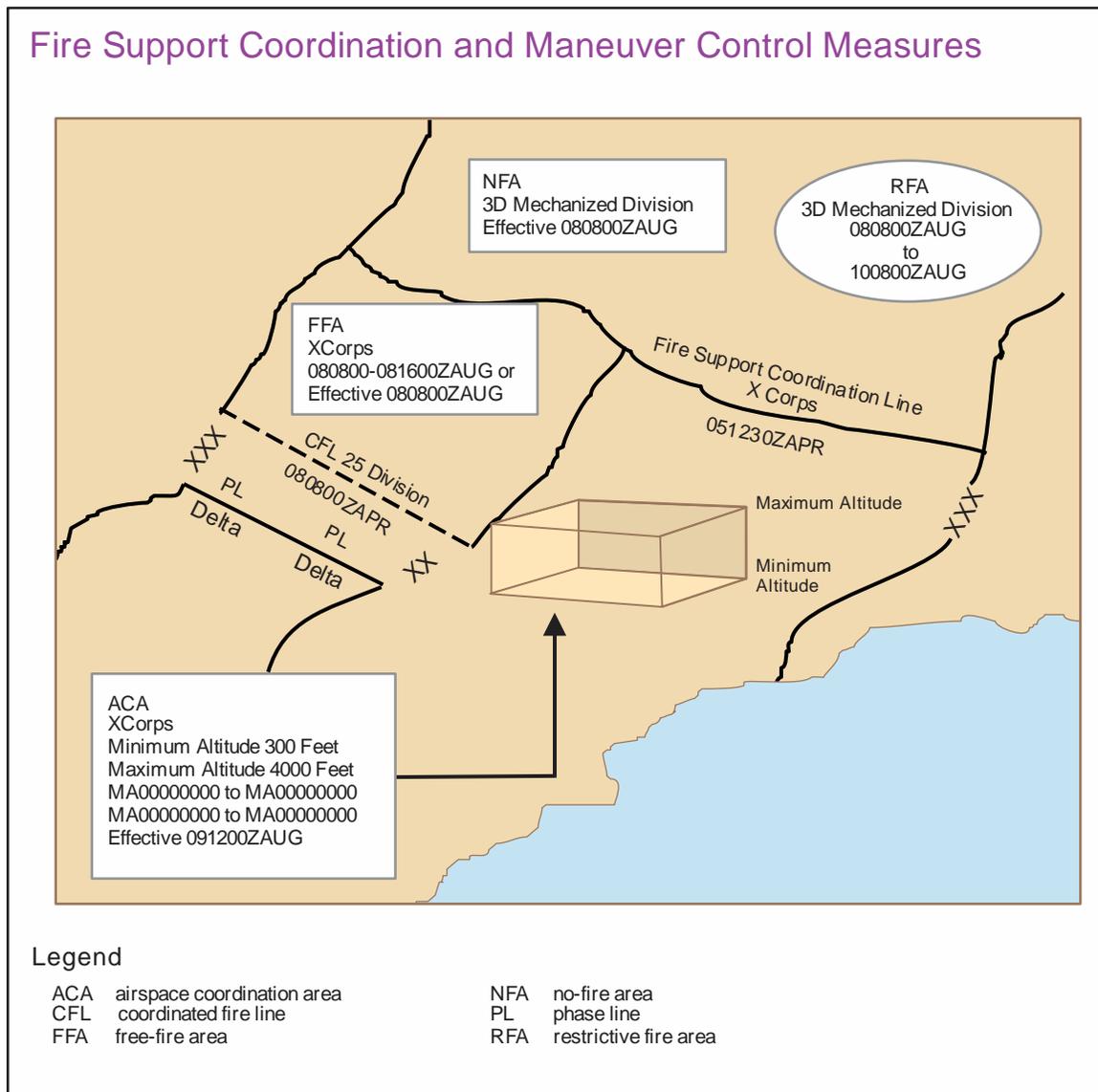
##### **(1) CFL**

(a) **Purpose.** The CFL is a line beyond which conventional surface-to-surface direct fire and indirect fire support means may fire at any time within the boundaries of the establishing HQ, without additional coordination. The purpose of the CFL is to expedite the surface-to-surface engagement of targets beyond the CFL without coordination with the land commander, in whose AO the targets are located. The CFL does not eliminate the requirement/responsibility to coordinate the airspace required to conduct the mission. Such fires must still comply with ROE and law-of-war targeting constraints; designation of a CFL is not authorization to fire indiscriminately into the area.

(b) **Establishment.** The CFL is usually established by a brigade or division commander equivalent, 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 CFL 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. Subordinate CFLs may be consolidated by higher HQ.

(c) **Graphic Portrayal.** The CFL is graphically portrayed by a dashed black line with “CFL,” followed by the establishing HQ above the line, and the effective date-time group (DTG) below the line (see Figure A-1).



**A-1. Fire Support Coordination and Maneuver Control Measures**

(2) **BCL**

(a) **Purpose.** A BCL is a Marine Corps-specific FSCM that facilitates the expeditious attack of surface targets of opportunity between the measure (the BCL) and the FSCL. When established, the primary purpose is to allow MAGTF aviation to attack surface targets without approval of a GCE commander, in whose area the targets may be located. To facilitate air-delivered fires and deconflict air and surface fires, appropriate coordination measures, such as ACAs and kill boxes, may typically be established in the area between the BCL and the FSCL. Ground commanders may strike any targets beyond the BCL, and short of the FSCL, with artillery and/or rockets, without coordination, as long as those fires deconflict with the established ACA overhead. This includes targets in an adjacent ground commander's zone that falls within the BCL-FSCL area. Such fires must still comply with ROE and law-of-war targeting constraints; designation of a BCL is not authorization to fire indiscriminately into the area.

(b) **Establishment.** The MAGTF commander establishes the BCL. The BCL should follow well-defined terrain features that are easily identifiable from the air. The positioning of the BCL must consider the tactical situation. This should include the scheme of maneuver or plan of defense, weather, terrain, type and source of aircraft, and overall flexibility of maneuver and fire support. The BCL is disseminated by the establishing MAGTF commander to the FSCCs of subordinate, adjacent, and higher HQ, as required. It is further disseminated at each level of command, including the establishing command, to all concerned fire support agencies, such as the DASC, Marine TACC, fire direction center, SACC, and NSFS ships. Since the BCL typically includes airspace parameters for the safe employment of aviation assets, it has been likened to a purple kill box (PKB).

(c) **Graphic Portrayal.** BCL location is graphically portrayed on fire support maps, charts, and overlays by a solid black line with the letters "BCL," followed by the establishing HQ in parentheses above the line, and effective DTG below the line.

(d) **Considerations.** Normally, Marine units prefer placing the FSCL close to the forward edge of the battle area so that organic indirect fires can range most targets short of the FSCL and organic air assets have maximum freedom to engage targets beyond the FSCL. However, since in many operations the FSCL is controlled by the JFC, the FSCL may be placed at a significantly greater distance than the maximum range of Marine Corps indirect fire assets. This gives the enemy a sanctuary between the maximum range of indirect fire supporting arms and the FSCL, in which aviation assets cannot freely engage without coordination, and that GCE assets are unable to influence. The BCL was thus developed as a supplemental measure that may or may not be used. A key factor is the range and positioning of GCE organic weapon systems and the positioning of the FSCL. If the FSCL is placed in such a way that a sanctuary exists between the range of Marine artillery and the FSCL, the MAGTF commander can use this internal coordinating measure to facilitate the attack of targets within this area. The BCL allows MAGTF fire support assets to attack surface targets without further coordination with the GCE commander, in whose area the targets may be located. Marine aviation may strike any target beyond the BCL and short of the FSCL without further coordination, including targets in an adjacent Marine commander's zone between the BCL and FSCL. Before firing, the ground commander

should coordinate with the ACE (DASC) if surface delivered fires will violate ACAs associated with the BCL.

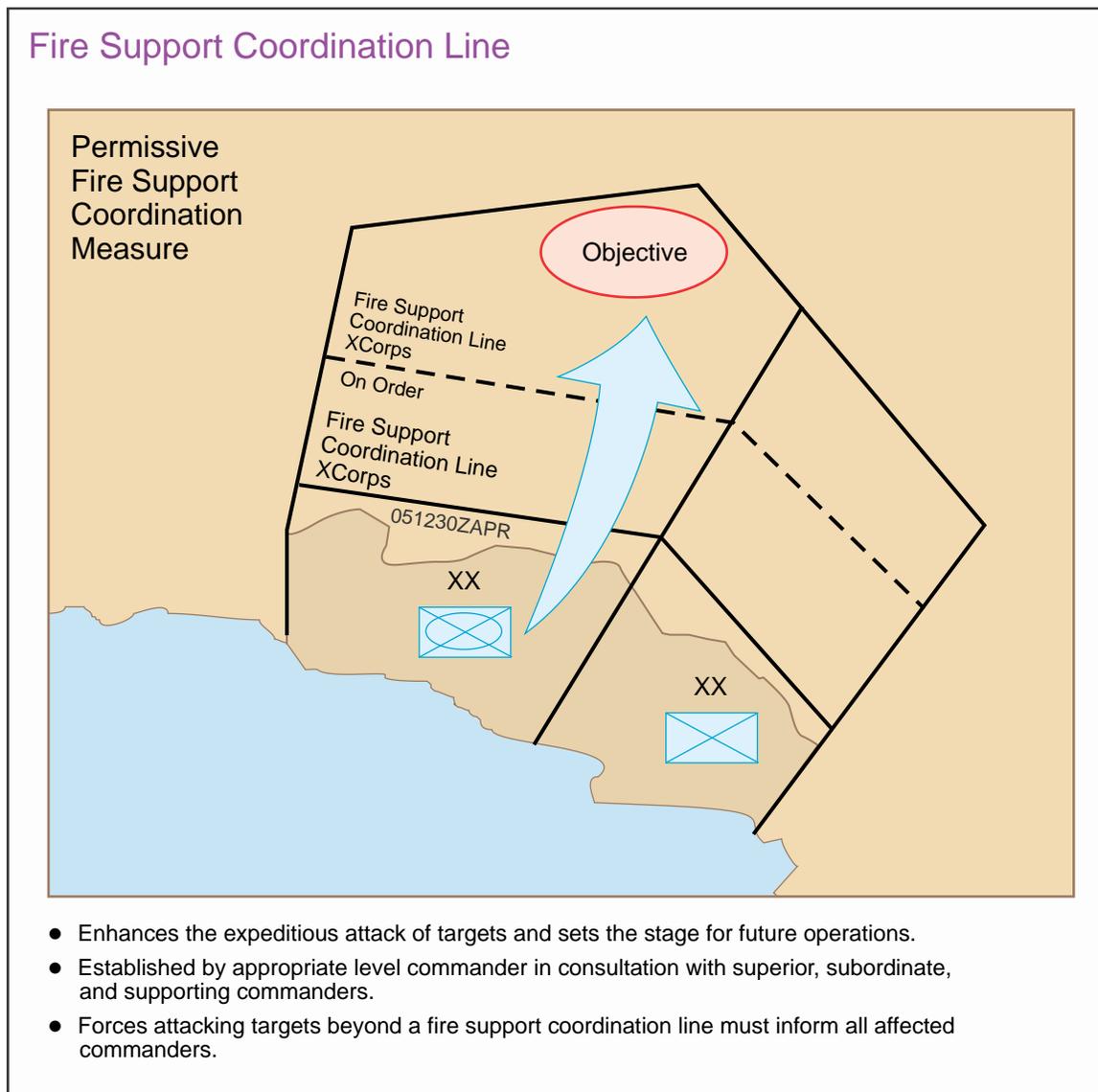
### (3) FSCL

(a) **Purpose.** The FSCL is an FSCM established by the land or amphibious force commander that requires the coordination of joint fires in support of common objectives beyond the measure with affected force HQ. FSCLs facilitate the expeditious engagement of targets of opportunity beyond the coordinating measure. The FSCL applies to all fires of air, land, and maritime-based weapon systems using any type of munition against surface targets. The FSCL is a permissive FSCM—the permissive area being beyond the coordination measure. The air component, while recognizing this aspect of the FSCL, also views the FSCL as a restrictive FSCM when regarding the area short of the coordination measure. The JFLCC and JFMCC cannot employ fires long of the FSCL without coordination with affected commanders, and the JFACC cannot employ fires short of the FSCL without coordination with the JFLCC or JFMCC. The FSCL is a significant consideration during interdiction operations. The FSCL is primarily used to establish C2 procedures for planning and execution purposes—it does not define mission types. Interdiction can occur both short of, and beyond, the FSCL. Attacks on surface targets short of the FSCL, during the conduct of joint interdiction operations, must be controlled by, and/or coordinated with, the appropriate land or amphibious force commander.

(b) **Establishment.** An FSCL is established and adjusted by the appropriate land or amphibious force commander within their boundaries, in consultation with superior, subordinate, supporting, and affected commanders. If possible, the FSCL should follow well-defined terrain features to assist identification from the air. The FSCL is oriented to air-land operations and is normally located only on land; however, in certain situations, such as littoral areas, the FSCL may affect both land and maritime areas. In amphibious operations, the FSCL is normally established by the commander, LF, after coordination with the commander, amphibious task force (CATF). Changes to the FSCL require notification of all affected forces within the AO and must allow sufficient time for these forces and/or components to incorporate the FSCL change. Current technology and collaboration tools between the elements of the joint force determine the times required for changing the FSCL. The JFC should establish guidance for shifting FSCLs. The decision of where to place (or whether even to use) an FSCL requires careful consideration. Placement of the FSCL should strike a balance, so as not to unduly inhibit operational tempo, while maximizing the effectiveness of organic and joint force interdiction assets. The optimum placement of the FSCL varies with specific AO circumstances, but considerations include the ground force positions and anticipated scheme of maneuver during the effective time period of the FSCL, and their indirect fire support systems' range limits, where typically the preponderance of lethal effects on the AO shifts from the ground component to the air component. In this way, the FSCL placement maximizes the overall effectiveness of the joint force, and each component will suffer only a small reduction in efficiency. The proper location for the FSCL may also shift from one phase of the operation (or campaign) to the next, depending on the scale and scope of each component's contribution during that phase. The FSCL is not a boundary—the synchronization of operations on either side of the FSCL is the responsibility of the establishing commander, out to the limits of the land or amphibious

force boundary. **The establishment of an FSCL does not create an FFA beyond the FSCL.** When targets are engaged beyond the FSCL, supporting elements' engagements must not produce adverse effects on, or to the rear of, the line. Engagements beyond the FSCL must be consistent with the establishing commander's priorities, timing, and desired effects, and deconflicted, whenever possible, with the supported HQ.

(c) **Graphic Portrayal.** The FSCL is graphically portrayed by a solid black line extending across the assigned areas of the establishing HQ. The letters "FSCL" are followed by the establishing HQ above the line, and the effective DTG below the line. FSCLs do not have to follow traditional straight-line paths. Positioning the FSCL on terrain identifiable from the air is a technique that may further assist in friendly fire incident prevention. Curved and/or enclosed FSCLs have applications in nonlinear joint operations (see Figure A-2).



**Figure A-2. Fire Support Coordination Line**

(d) **Considerations.** The commander's decision on FSCL location is based on estimates of the situation, CONOPS, the location of enemy forces, anticipated rates of movement, concept and tempo of the operation, organic weapon capabilities, and other factors. The FSCL 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 FSCL at greater depths will typically require support from higher HQ and other supporting commanders. Also, when the FSCL is positioned at a greater depth, there is increased responsibility for detailed coordination placed upon the establishing commander.

1. By establishing the FSCL close-in, yet at sufficient depth to avoid limiting high-tempo maneuver, land and amphibious force commanders ease the coordination requirements for engagement operations within their AOs by, and with, forces not under their control, such as NSFS or AI. Unless a permissive control measure such as a kill box is established, air strikes short of the FSCL (both CAS and AI) must be approved by the establishing commander in near real-time, thus approving/revalidating both preplanned and dynamic missions before they engage targets. CAS missions will be conducted in accordance with terminal attack control procedures found in JP 3-09.3, *Close Air Support*. Attacks on surface targets short of the FSCL during the conduct of joint interdiction operations must be controlled by, and/or coordinated with, the appropriate land or amphibious force commander.

2. Within these AOs, land and maritime commanders are designated the supported commander for the integration and synchronization of maneuver, fires, and interdiction. Accordingly, land and maritime commanders designate the target priority, effects, and timing of interdiction operations within their AOs. Further, in coordination with the land or maritime commander, a component commander designated as the supported commander for theater/JOA-wide interdiction has the latitude to plan and execute JFC-prioritized missions within a land or maritime AO. Commanders executing such a mission within a land or maritime AO must coordinate the operation to avoid adverse effects and friendly fire incidents. If those operations would have adverse impact within a land or maritime AO, the commander assigned to execute the JOA-wide functions must readjust the plan, resolve the issue with the land or maritime component commander, or consult with the JFC for resolution. FSCL placement is determined by the land or maritime component commander, based on mission and objectives. For targets engaged by the air component beyond the FSCL, the land or maritime commander will relay, through their BCD or naval and amphibious liaison element, their plan for priority, effects, and timing (via the joint targeting cycle's component TNL). Any changes to those priorities, effects, and timing desired by the land or maritime commanders, will also be relayed through their BCD or naval and amphibious liaison element to effect changes beyond the FSCL.

3. Coordination of engagements beyond the FSCL is especially critical to commanders of air, land, and SOF units operating beyond the FSCL. Such coordination is also important when engaging forces are employing wide-area munitions or those with delayed effects. Finally, this coordination assists in avoiding conflicting or redundant engagement operations.

4. The establishing commander adjusts the location of the FSCL as required to keep pace with operations. In high-tempo maneuver operations, the FSCL may change frequently. A series of predisseminated “on-order” FSCLs will help accelerate the coordination required. The establishing commander quickly transmits the change to higher, lower, adjacent, and supporting HQ to ensure that engagement operations are appropriately coordinated by controlling agencies. Anticipated adjustments to the location of the FSCL are normally transmitted to other elements of the joint force sufficiently early to reduce potential disruptions of their current operations. Careful planning and coordination is essential for changes to the FSCL. This planning is necessary to minimize the risk of friendly fire incidents and to avoid disrupting operations.

5. Varying capabilities for acquisition and engagement may exist among adjacent commanders in a multinational operation. Normally, commanders at senior tactical echelons establish an FSCL to support their operations. Layered FSCLs and multiple, separate, noncontiguous corps and/or MAGTF FSCLs positioned at varying depths, create a coordination and execution challenge for supporting commanders (e.g., tracking effective times, lateral boundaries, and multiple command guidance). In cases such as these, when the components share a mutual boundary, the JFC or a designated component commander may consolidate the operational requirements of subordinates to establish a single FSCL. This FSCL may be noncontiguous, to reflect the varying capabilities of subordinate commands. A single FSCL facilitates air support, accommodates subordinate deep operations requirements, and eases coordination of FSCL changes.

6. The maritime AO may be contiguous or non-contiguous and does not normally employ an FSCL. However, targets may be in close proximity to friendly forces, requiring detailed integration in order to maximize joint fires and minimize friendly fire incidents. Depending on the phase of the operation, maritime targets may be designated as TSTs, while war-at-sea targets should be planned targets that may include other functional components.

(4) **FFA**

(a) **Purpose.** An FFA is a specific designated area, into which any weapon system may fire without additional coordination with the establishing HQ. It is used to expedite joint fires and to facilitate jettison of aircraft munitions. Such fires must still comply with ROE and law-of-war targeting constraints; designation of an FFA is not authorization to fire indiscriminately into the area.

(b) **Establishment.** An FFA may be established only by the military commander with authority over the area (usually, a division or higher commander). Preferably, the FFA should be located on identifiable terrain; however, it may be designated by grid coordinates or GARS.

(c) **Graphic Portrayal.** The FFA is graphically portrayed by a solid black line defining the area and the letters “FFA” within, followed by the establishing HQ and the effective DTG (see Figure A-1).

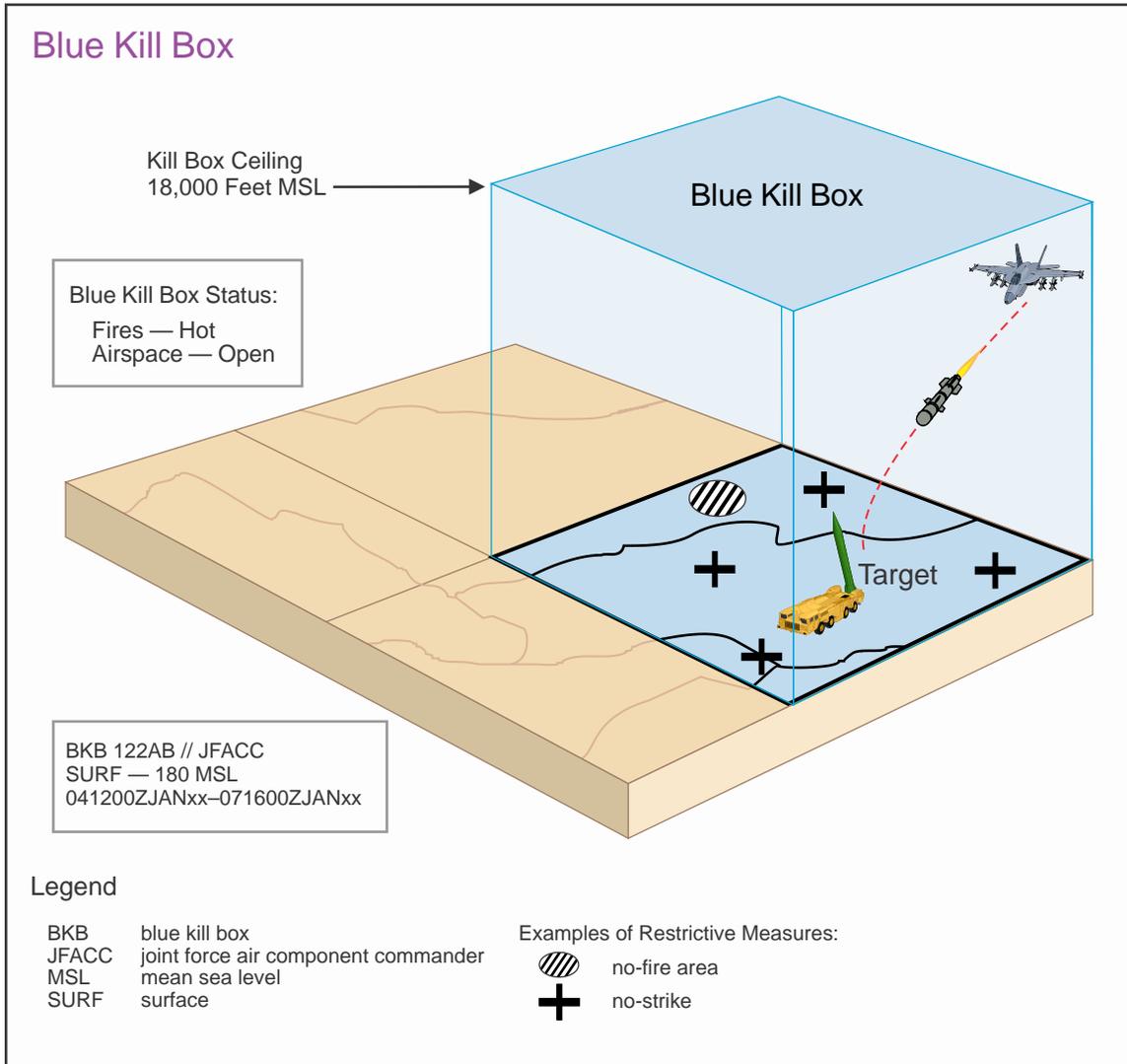
## (5) Kill Boxes

(a) **Purpose.** A kill box is a three-dimensional FSCM with an associated ACM used to facilitate the integration of fires. A kill box is a measure, not a mission. Kill boxes are established to support AI efforts as part of the JFCs joint targeting process. Kill boxes allow lethal attack against surface targets without further coordination with the establishing commander and without the requirement for terminal attack control. When used to integrate air-to-surface and subsurface/surface-to-surface indirect fires, the kill box will have appropriate restrictions. These restrictions provide a three-dimensional block of airspace in which participating aircraft are deconflicted from friendly surface fires. The restrictive measures also prevent non-participating aircraft and maneuver forces from entering the kill box. The goal is to reduce the coordination required to fulfill support requirements with maximum flexibility (permissive attributes), while preventing friendly fire incidents (restrictive attributes). Fires executed in a kill box must comply with ROE and law-of-war targeting constraints; designation of a kill box is not authorization to fire indiscriminately into the area.

**Note:** A kill box fires status is either hot or cold. “Hot” is a term used to describe a kill box or a portion of a kill box where fires or effects of fires are allowed without further coordination or deconfliction. “Cold” is a term used to describe a kill box or portion(s) of a kill box where fires or effects of fires are not allowed without further coordination. A cold kill box does not restrict the airspace associated with the kill box.

(b) **Establishment.** 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 JFC. 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 (i.e., G-3, FSC, COF, or JAOC combat operations). Information about the type, effective time, duration, and other attributes will be published and disseminated using existing voice and digital C2 systems. Component commanders, acting on JFC authority, establish and adjust kill boxes within their AO in consultation with higher, subordinate, supporting, and affected commanders. Requirements for kill boxes and other control measures are determined using normal component targeting and planning processes. There are two types of kill boxes: a blue kill box (BKB) and a purple kill box.

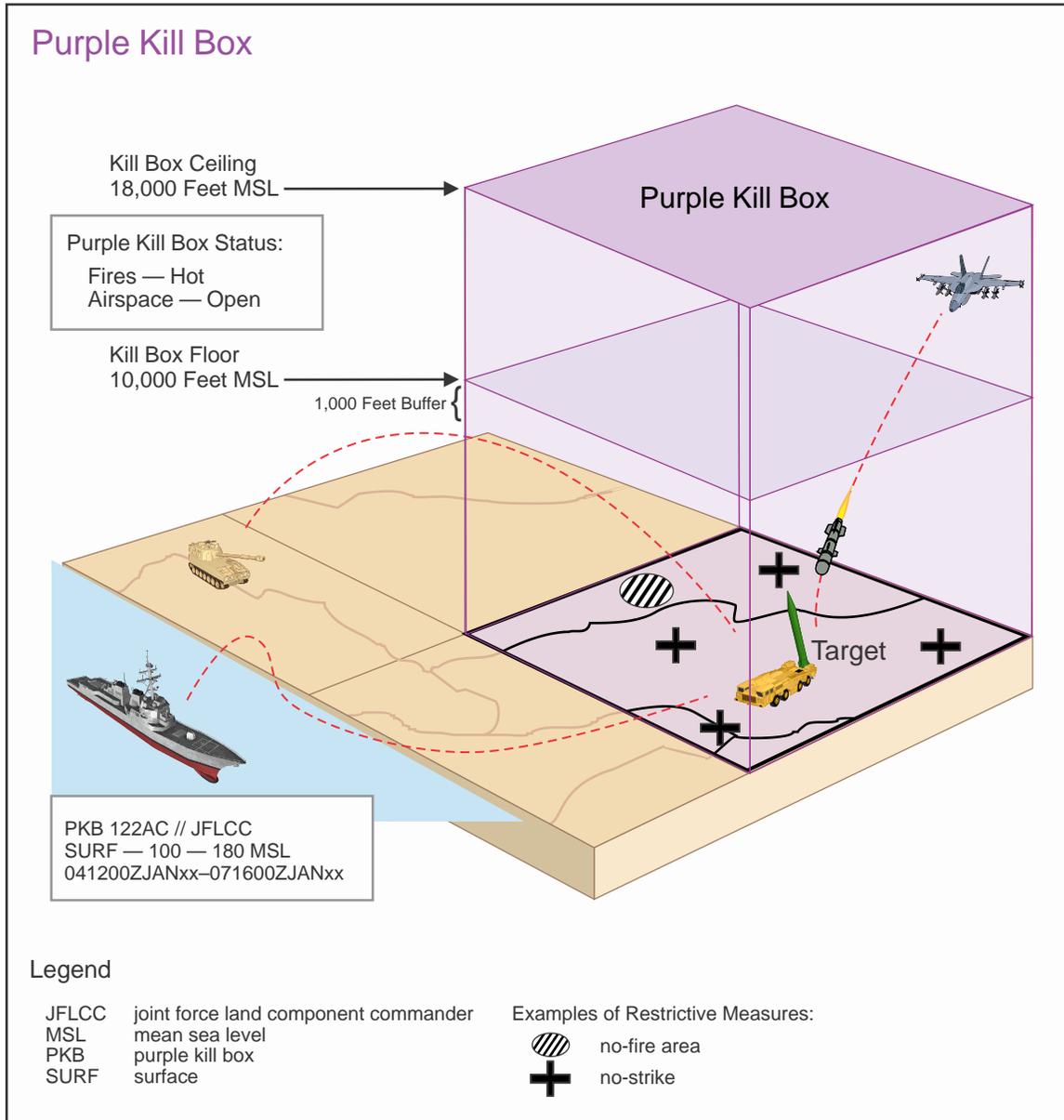
1. **BKB.** The purpose of a BKB is to facilitate the attack of surface targets with air-to-surface munitions. The airspace included by a BKB extends from the surface up to the limit established by the airspace control authority. Surface-to-surface direct fires are not restricted by the establishment of a BKB. See Figure A-3 for a graphic example of a BKB. Coordination is required with the establishing HQ, appropriate fire support, and airspace organization, if ordnance is to be delivered from outside the airspace defined by the kill box.



**Figure A-3. Blue Kill Box**

**2. PKB.** The purpose of a PKB is to facilitate the attack of surface targets with subsurface/surface-to-surface, and air-to-surface munitions. The PKB allows joint fires in the kill box to create synergistic effects with maximum potential for engaging targets. Surface-to-surface direct fires are not restricted by the establishment of a PKB. See Figure A-4 for a graphic example of a PKB.

(c) **Graphic Portrayal.** Portray a kill box using a solid black line defining the area borders. Label the measure with the kill box name; establishing HQ; affected altitudes, abbreviated in hundreds of feet mean sea level, or as flight level (hundreds of feet), as published in the ACO; and effective times, using DTGs. The unit identifier for the establishing HQ will be consistent with designations in OPLANs and OPORDs. Units or automation systems may add color to the boxes for visual recognition; however, the basic graphic follows the FSCM standards.



**Figure A-4. Purple Kill Box**

See *FM 3-09, Field Artillery and Fire Support*, and *Army Tactical Publication (ATP) 3-09.34/MCRP 3-25H/NTTP 3-09.2.1/AFTTP 3-2.59, Multi-Service Tactics, Techniques, and Procedures for Kill Box Planning and Employment*, for further information.

**c. Restrictive FSCMs**

(1) **ACA.** The ACA is the primary FSCM that reflects the coordination of airspace for use by air support and indirect joint fires.

(a) **Purpose.** ACAs are used to ensure aircrew safety and the effective use of indirect supporting surface joint fires by deconfliction through time and space. The ACA is a block or corridor of airspace in which friendly aircraft are reasonably safe from friendly

surface fires. A formal ACA (a three dimensional box of airspace) requires detailed planning. More often, an informal ACA is established using time, lateral separation, or altitude to provide separation between surface-to-surface and air-delivered weapon effects.

*For additional information on the ACA, see JP 3-09.3, Close Air Support, and JP 3-52, Joint Airspace Control.*

(b) **Establishment.** The airspace control authority establishes formal ACAs at the request of the appropriate commander. Though not always necessary, formal ACAs should be considered. Vital information defining the formal ACA 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 ACA is used. The informal ACA can be requested by the maneuver commander requesting CAS or employing helicopters, and is approved at battalion or higher level. Both types of ACAs are constructed with the assistance of the air liaison officer to ensure they meet the technical requirements of the aircraft and weapon systems.

(c) **Graphic Portrayal.** A formal ACA is shown as an area enclosed by a solid black line. Depicted inside the enclosed area are “ACA,” the establishing HQ, the minimum and maximum altitudes, the grid coordinates for each end of the baseline, and the effective DTG or the words “on order.” Informal ACAs are not normally displayed on maps, charts, or overlays (see Figure A-1).

(2) **RFL**

(a) **Purpose.** The RFL is a line established between converging friendly forces—one or both may be moving—that prohibits joint fires or the effects of joint fires across the line without coordination with the affected force. The purpose of the line is to prevent friendly fire incidents and duplication of engagements by converging friendly forces.

(b) **Establishment.** The commander common to the converging forces establishes the RFL, which is located on identifiable terrain when possible. In linkup operations, it is usually closer to the stationary force, to allow maximum freedom of action for the maneuver and joint fire support of the linkup force.

(c) **Graphic Portrayal.** The RFL is graphically portrayed by a solid black line, with “RFL,” followed by the establishing HQ above the line, and the effective DTG below the line.

(3) **NFA**

(a) **Purpose.** The purpose of the NFA is to prohibit joint fires or their effects into an area. There are two exceptions:

1. When the establishing HQ approves joint fires within the NFA on a mission-by-mission basis.

2. When an enemy force within the NFA engages a friendly force and the engaged commander determines that there is a requirement for immediate protection and responds with the minimal force needed to defend the force.

(b) **Establishment.** Any size unit may establish NFAs. If possible, the NFA is established on identifiable terrain. It may also be located by a series of grids or by a radius from a center point.

(c) **Graphic Portrayal.** The NFA is graphically portrayed as an area outlined with a solid black line with black diagonal lines inside. The letters “NFA” are within, followed by the establishing HQ and the effective DTG (see Figure A-1).

(4) **RFA**

(a) **Purpose.** An RFA is an area where specific restrictions are imposed, and in which joint fires, or the effects of joint fires, that exceed those restrictions, will not be delivered without coordination with the establishing HQ. The purpose of the RFA is to regulate joint fires into an area according to the stated restrictions.

(b) **Establishment.** A maneuver battalion or higher echelon normally establishes an RFA. Usually, the RFA is located on identifiable terrain, by grid, or by a radius from a center point. To facilitate rapidly changing operations, on-call RFAs may be used. The dimensions, locations, and restrictions of the on-call RFA are prearranged.

(c) **Graphic Portrayal.** The RFA is graphically portrayed by a solid black line defining the area and the letters “RFA” within, followed by the establishing HQ and the effective DTG. The restrictions may be included within the graphic if space allows, or reference may be made to a specific OPORD or OPLAN (see Figure A-1).

(5) **ZF**

(a) **Purpose.** A ZF is an FSCM that includes the area within which a designated ground unit or fire support ship delivers, or is prepared to deliver, joint fire support. Joint fires may or may not be observed. Land is divided into ZFs, which are assigned to gunfire support ships and units 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 ZFs are responsible for engaging known targets and targets of opportunity according to their mission and the guidance of the supported commander.

(b) **Establishment.** The commander of the maritime force providing NSFS establishes and assigns ZFs for the forces. The ZF for an artillery battalion or a ship assigned the mission of DS normally corresponds to the AO of the supported unit. The ZF for an artillery battalion or a ship assigned the mission of GS should be within the boundaries of the supported unit. When used in conjunction with naval gunfire, the size and shape of a ZF will depend on the following:

1. **Boundaries of ZF.** In order to permit ready identification by the spotter and the individual fire support ship, the boundaries of the ZFs should be

recognizable both on the terrain and on a map and should correspond to the zones of action of the LF units supported. It may be necessary to divide a large ZF into two or more smaller zones due to considerations that follow.

**2. Size.** The size of each ZF 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 ZFs are delineated, known or suspected targets, scheduled for destruction in each zone, are plotted, after which the number and type of targets are compared to the capability of the ship.

**3. Visibility.** Observation from seaward is a desirable feature for ZFs, since it permits a ship to deliver more accurate and rapid fire.

**4. Accessibility to Fire.** The ZFs must be accessible to the trajectory of the fire support ship(s) assigned to the zone.

(c) ZFs are also assigned to FA units by their higher HQ. The ZF for FA units assigned to a maneuver unit, or assigned the mission of DS, corresponds to the AO of the parent or supported maneuver unit. The ZF for an artillery unit assigned the mission of reinforcing, corresponds to the ZF of the reinforced artillery unit. The ZF for an artillery unit assigned the mission of GS-reinforcing, corresponds to the ZF of the reinforced artillery unit and is within the AO of the supported maneuver unit. The ZF for an artillery unit assigned the mission of GS, corresponds to the AO of the supported maneuver unit.

(d) **Graphic Portrayal.** ZFs are delineated by the use of broken lines (solid lines if unit boundaries are used) and are designated by Arabic numerals, e.g., “ZF3.”

*For more information on ZF, see FM 3-09, Fire Support.*

### 3. Maneuver Control Measures

Land, maritime, and amphibious commanders use MCMs to define lines of responsibility in support of movement and maneuver of friendly forces.

#### a. Boundaries

(1) **Purpose.** A boundary is an MCM. In land warfare, it is a line by which surface AOs between adjacent units and/or formations are defined. Boundaries designate the geographical limits of the AO of a unit. Within their own boundaries, units may execute joint fires and maneuver without close coordination with neighboring units, unless otherwise restricted. Normally, units do not fire across boundaries unless the fires are coordinated with the adjacent unit or the fires are beyond an FSCM, such as a CFL. These restrictions apply to conventional and special munitions and their effects. When fires such as obscurants and illumination affect an adjacent unit, coordination with that unit is normally required. A commander can, in certain situations, decide to fire across boundaries at positively identified enemy elements, without coordination. However, direct and observed joint fires should be used when firing across boundaries at positively identified enemy forces when there is no time to coordinate with adjacent friendly units.

(2) **Establishment and/or Portrayal.** Any commander given an AO can establish boundaries for subordinate units. These boundaries will be respected by all Service and functional components. Boundaries are depicted as solid black lines with a symbol placed on the boundary to show the size and designation of the highest echelons that have the boundary in common. If the units are of unequal size, the symbol of the higher unit is shown and the designation of the lower unit is given completely (see Figure A-1).

**b. Phase Lines (PLs)**

(1) **Purpose.** A PL is an MCM used by land forces for control and coordination of military operations. It is usually a recognizable terrain feature extending across the zone of action. Units normally report crossing PLs, but do not halt unless specifically directed. PLs can be used to identify limits of advance, monitor rates of movement, control joint fires (when dually designated as a FSCM), or define an AO. The purpose of each PL, and any actions required by forces affected by the PL, will be specified on the OPOD of the establishing HQ.

(2) **Establishment and/or Portrayal.** Any commander given an AO can establish PLs. A PL is depicted as a solid black line labeled “PL” and assigned letters, numbers, or code-name designations (see Figure A-1).

**c. Fire Support Area (FSA) and/or Fire Support Station (FSS)**

(1) **Purpose.** An FSA is an appropriate maneuver area assigned by the maritime commander to fire support ships, from which they deliver surface joint fire support to an operation ashore. An FSA 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. An FSS is an exact location at sea from which a fire support ship delivers fires. This designation is used to station ships, in order to be able to reach certain targets. For example, a ship in a FSA may not be able to reach a certain target except when it is stationed at the FSS.

(2) **Establishment.** The officer in tactical command, typically the CATF, establishes FSAs and FSSs. In amphibious operations when attack groups are formed and separate landing areas are designated, the CATF may assign each attack group commander the responsibility for control of naval gunfire support within the area.

(3) **Graphic Portrayal.** FSAs are designated by Roman numerals (e.g., FSA I, II, III) and are shown on the NSFS operations overlay. FSSs are designated by numbers (e.g., FSS 1, 2, 3) and are shown on the NSFS operations overlay as an X, indicating the exact position of the ship.

**4. Airspace Coordinating Measures**

**ACMs.** ACMs are employed to facilitate the efficient use of airspace to accomplish missions and simultaneously provide safeguards for friendly forces. Effectively and efficiently integrating and coordinating joint fires depends on the understanding and realization that the operational environment is a three-dimensional area, or volume of space, through which air assets operate, and through which fires are employed. ACMs are nominated from subordinate HQ through component command HQ, and forwarded to the airspace control authority, in accordance

with the airspace control plan. Additionally, some ACMs may be established to permit surface joint fires or UA operations. The component commanders ensure that ACM nominations support and do not conflict with joint operations, prior to forwarding to the airspace control authority. The airspace control authority consolidates, coordinates, and deconflicts the airspace requirements of the components and publishes the ACMs in the ACO. Simply stated, ACMs are approved by the airspace control authority and promulgated via the ACO. The ACO is published to meet the operations tempo and should be promulgated to meet the pace of the ACM request process. Expect the ACO to be distributed both separately and as a section of the ATO. ACMs also have specific usages that further help to define use and purpose to assist with effective planning, integration, and execution. ACMs that have joint fire support applicability are listed below.

a. An **Air Corridor (AIRCOR)** is a restricted air route-of-travel specified for use by friendly aircraft established for the purpose of preventing friendly aircraft from being fired upon by friendly forces. AIRCOR procedures are used to route ACEs between such areas as forward arming and refueling points, holding areas, and battle positions. AIRCOR usages include minimum-risk routing, transit corridors and routes, and low-level transit routes. Altitudes of an AIRCOR do not exceed the coordinating altitude, if established.

b. A **Restricted Operations Zone** is airspace reserved for specific activities in which the operation of one or more airspace users is restricted. Restricted operations zones may support air-to-air refueling, CAS, personnel recovery, and combat air patrol.

c. The **Coordinating Altitude** is an ACM that uses altitude to separate users and as the transition between different airspace control elements.

d. A **No Fly Area** is airspace of specific dimensions set aside for a specific purpose, in which no aircraft operations are permitted, except as authorized by the appropriate commander and controlling agency. No fly area procedures can be used to enforce a diplomatically designated no-fly zone, which can stipulate which flights are authorized and which are prohibited. Since no fly areas negatively impact air operations, their use must be balanced against the needs of affected commanders.

e. A **High-Density Airspace Control Zone (HIDACZ)** is airspace in which there is a concentrated employment of numerous and varied weapons and airspace users. A HIDACZ has defined dimensions, which usually coincide with geographical features or navigational aids. Access to a HIDACZ is normally controlled by the maneuver commander, who can also direct a more restrictive weapons status within the HIDACZ. A HIDACZ allows ground/MAGTF commanders to restrict a volume of airspace from users not involved with ongoing operations. The restriction is necessary because of the large volume and density of fires supporting ground operations within the described geographic area.

f. A **Coordination Level** is a procedural method to separate fixed-wing and rotary-wing aircraft by determining an altitude below which fixed-wing aircraft normally will not fly.

*See JP 3-52, Joint Airspace Control, for further information.*

## APPENDIX B LASER-GUIDED SYSTEMS

### 1. General

a. Laser-guided systems provide the joint force with the ability to locate and engage targets with an increased first-round hit probability. Laser-guided systems can effectively engage a wide range of targets, including moving targets. LGWs can reduce the number of weapons and/or weapon systems required to create an effect to achieve an objective, because of increased accuracy. Based on the threat level and environment, laser-guided systems provide additional capabilities, but also have distinct limitations. Those performing laser-designation tasks should strive for simplicity and use all available resources to help ensure first-pass success.

b. **Laser Capabilities.** Laser designators radiate a narrow beam of pulsed energy. Current tactical lasers operate in the near infrared wavelength spectrum, which is not visible to the human eye. When within range, the laser designator can be aimed so that the energy precisely designates a chosen spot on the target. Laser target designators (LTDs) mark targets for laser spot trackers (LSTs) and LGWs. Some laser systems can accurately determine target range and location. When coupled with horizontal and vertical scales, they can measure target azimuth and elevation.

c. **Laser Target Ranging and Designation Systems.** Laser target ranging and designation systems can provide accurate range, azimuth, and elevation information to locate enemy targets. These systems may vary from handheld to aircraft-mounted devices and perform similar functions with varying degrees of accuracy. In combination with GPS, lasers can provide accurate enemy target locations. In addition, lasers in combination with GPS can provide for target area analysis. This analysis can be used to fire weapons accurately at the enemy, to accurately locate future friendly observer locations, and to enable friendly forces to effectively conduct maneuver operations, as well as command and control their forces by accurate identification of terrain reference points.

d. **Laser Acquisition Devices.** Of the **two types** of laser acquisition devices, **the first, the LST, is used to aid visual and sensor acquisition of the target** to be attacked by another weapon. This type of laser acquisition device is normally mounted on most fixed-wing aircraft and some helicopters. **The second type of acquisition device is a seeker and guidance kit** mounted on LGWs, which guide on coded laser energy.

e. **Basic Considerations.** There are five basic considerations for using LSTs or LGWs:

(1) **Line of sight (LOS)** must exist between the designator and the target and between the target and the LST/LGW.

(2) **Pulse repetition frequency (PRF) codes** of the laser designator and the LST/LGW must be compatible.

(3) **The direction of attack** must allow the LST/LGW to sense enough reflected laser energy from the target for the seeker to acquire and lock on the target.

(4) **The LTD** must designate the target at the correct time, and for the correct length of time. If the length of time is insufficient, the seeker head could break lock and the flight pattern of the LGW becomes unpredictable.

(5) **The delivery system (air or ground)** must deliver the LGW within the specific LGW envelope to ensure that the weapon can physically reach the target. There is an **increased hazard to friendly forces** when aircrews release weapons behind friendly lines.

f. **Environmental factors can affect laser designators and seeker head performance.** Tactics and techniques must consider low clouds and fog, obscurants, haze, snow and rain, solar saturation, target obscuration from previous strikes, and other visually limiting phenomena.

g. **Beam divergence, target size, and spillover.** Laser spot size is a function of beam divergence and the distance from the laser designator to the target. If an LTD has a beam spread or divergence of one milliradian, its spot would have a diameter of approximately one meter at a distance of 1,000 meters in front of the designator. If this spot were aimed at a 3-meter-by-3-meter box, 3,000 meters away, the laser spot would be as wide and tall as the box. LGWs may lock onto and track laser energy that spills over beyond the edges of the intended target, causing a miss.

h. **Target Reflection.** Most surfaces have a mixture of mirror-like (specular) and scattered (diffuse) reflections. Laser energy reflects in an arc, but is strongest at the angle where it would reflect if the surface were a mirror. If the LTD is perpendicular to a surface, the reflection can be seen from all angles on the designated side, but can be detected best near the laser-to-target line (LTL), which is a line from the LTD to the target, usually expressed in degrees magnetic. When the surface is at an angle to the laser designator, the angle of strongest reflection is also predictable. Glass, water, and highly polished surfaces are poor surfaces to designate, because they reflect laser energy in only one direction. This requires the seeker to be in this small region, and looking toward the reflected energy, to achieve TA. Battlefield dynamics will rarely provide the opportunity to perfectly align laser designation/reflectivity in the direction of approaching aircraft or munitions. Strict adherence to laser wedges or baskets and center-mass target designation will best ensure success.

i. **Enemy Use of Laser Countermeasures.** US enemies realize the **importance of laser countermeasures** in a conflict with the US or its multinational partners. Many of the techniques for countering laser energy and sensitive electro-optical equipment are common knowledge throughout much of the world. US enemies are well-equipped to detect and counter the sophisticated laser designator and guidance systems used by the armed forces of Western nations.

j. **Legal Uses of Lasers on the Battlefield.** Protocol IV to the Certain Conventional Weapons Convention (Protocol on Blinding Laser Weapons) **prohibits the use of lasers specifically designed to cause permanent blindness** to unenhanced vision. For all other types of lasers, such as those used for detection, targeting, range-finding, communications, and target destruction, parties to the Protocol have an obligation to **“take all feasible precautions to avoid the incidence of permanent blindness to unenhanced vision.”** It is DOD policy on blinding lasers that recognizes that accidental or incidental eye injuries may occur on the battlefield through the use of lasers for detection, targeting, range-finding, communications, and target destruction; however, it is DOD policy “to strive, through training and doctrine, to minimize these injuries.”

*For a discussion of laser-guided considerations for CAS, see JP 3-09.3, Close Air Support.*

*For additional information on laser operations, see FM 3-09.32/MCRP 3-16.6A/NTTP 3-09.2/AFTTP(I) 3-2.6, JFIRE, Multi-Service Tactics, Techniques, and Procedures for the Joint Application of Firepower.*

## 2. Laser Hardware

a. **LGWs.** All LGWs home in on PRF-coded reflected laser energy. Some LGWs require target lock-on before launch (LOBL) and during the entire time of flight. Other LGWs allow target lock-on after launch (LOAL) and require illumination only during the terminal portion of flight. All LGWs require illumination until weapon impact. Typical LGWs include:

(1) **Laser-guided bombs (LGBs).** Paveway II, III, and enhanced Paveway III (GPS-aided).

(2) **Laser-guided missiles (LGMs)** include the AGM-65E Laser Maverick and AGM-114 Hellfire. **LGMs generally provide greater standoff launch ranges than LGBs.** Greater range provides increased survivability for aircrews operating in a high threat environment. Aircrews and JTACs must exercise caution when launching LGMs from behind friendly troops.

(a) Laser Maverick employment considerations include:

1. In the event the laser signal is lost, the weapon will safe itself and overfly the target. The Maverick system allows aircrew to engage targets designated by either air or ground sources with inflight selectable PRF codes.

2. Delivery aircraft must have unobstructed LOS to the target to achieve Maverick lock-on.

3. The missile requires LOBL.

4. The Maverick and the laser designator must be set to the same PRF code prior to launch.

5. For other than self-designation, the attack heading must be adjusted to optimize the reflected laser energy.

(b) Hellfire employment considerations include:

1. In the event that the laser signal is lost after lock-on, the missile seeker is programmed to begin searching for properly coded laser energy. The Hellfire system allows aircrews to engage targets designated by either air (buddy or autonomous, fixed-wing or rotary-wing) or ground forces with inflight selectable PRF codes.

2. The Hellfire can be employed in a LOBL or LOAL mode. In LOBL, the missile must acquire the laser energy prior to launch. In LOAL, the missile can be fired from defilade or behind a mask and climbs on a preprogrammed profile, searching for properly coded laser energy as it executes its fly-out. The trajectory of the missile can be altered by delaying laser designation.

3. The Hellfire missile uses last pulse logic in case of under-spill and to protect the designator. The missile will hit the most distant laser spot within the seeker field of view.

4. The Hellfire is unimpeded by ceilings of 2,000 feet (ft) above ground level (AGL) and above. For employment when ceilings are below 2,000 ft, the aircrew will vary the missile mode, designator delay, and employment range to shape the trajectory. The rule-of-thumb minimum ceiling for Hellfire employment is 500 ft AGL.

(3) **Laser-Guided Joint Direct Attack Munition (LJDAM).** GBU-54 LJDAM is a GPS-aided weapon that can be terminally laser-guided. If terminal laser-guidance does not occur, the weapon will guide to GPS coordinates with the same accuracy as a GBU-38 joint direct attack munition. **LJDAMS generally provide greater standoff launch ranges than either LGMs or LGBs.**

(4) **Laser-Equipped UA**

(a) **General Procedures**

1. **Employment.** Laser-equipped UA utilize the same procedures and communications as an airborne laser designator operator (LDO). In some cases, the UA may also act as a strike aircraft, using the same procedures as other strike aircraft.

2. **TA Considerations.** If a laser-equipped UA is being utilized by the LDO, coordination between the UA flight crew and the attack aircrew is critical for both safety and laser geometry. LST-equipped strike aircraft should notify the LDO that they are LST capable upon arriving on-station. The LDO, through standard communication, will then direct the UA mark onto the target. The LDO may pass the UA laser PRF code to the attack aircraft, or the attack aircraft may pass its weapons code to the LDO.

3. **Deconfliction of Airspace.** Standard procedures used by LDOs to deconflict fixed-wing and rotary-wing aircraft apply to laser-equipped UA employed on laser

designation operations. Proper laser geometry and 2,000-ft altitude blocks for the UA stationing orbit are recommended when using a UA to mark for strike aircraft.

b. **LTDs.** Ground laser target designators (GLTDs) are employed by ground forces to illuminate targets with laser energy. LGWs use this energy to guide munitions onto the target. LSTs use the reflected laser energy as a reference point for lock-on and tracking. The laser energy PRF is adjustable and must match the PRF setting on the weapon or tracker. GLTD ranges vary from 10 meters to 20 kilometers. Airborne laser target designators (ALTDs) are carried on aircraft and provide the same function as the GLTD. ALTDs are capable of very long range lasing and are normally employed below 30,000 ft AGL. See Figure B-1 for advantages and disadvantages of airborne and ground designators.

**Note:** The PRF of LGBs is only adjustable prior to flight and cannot be changed once airborne. Other missiles, such as Maverick and Hellfire, can have the PRF adjusted prior to launch from the aircraft. JTACs and aircrews must ensure that the laser designator PRF matches the code programmed into the weapon, or the weapon will not guide.

c. **Laser Rangefinders/Target Locating Devices.** Laser rangefinders use low-power laser pulses to measure range to an object. **Digital magnetic compass systems will not provide the accuracy needed for a single inertially aided munition weapon to hit a point**

Airborne and Ground Designator Advantages and Disadvantages		
Type Designators	Advantages	Disadvantages
Airborne	<ul style="list-style-type: none"> <li>• Increased standoff</li> <li>• Larger target area footprint</li> </ul>	<ul style="list-style-type: none"> <li>• Larger laser spot size</li> <li>• Increased susceptibility to podium effect</li> </ul>
1. Trail Position	<ul style="list-style-type: none"> <li>• Increased probability of success (spot detection)</li> <li>• Increased standoff</li> </ul>	<ul style="list-style-type: none"> <li>• Axis restrictive</li> <li>• Increased platform predictability</li> </ul>
2. Overhead Wheel Position	<ul style="list-style-type: none"> <li>• Decreased platform predictability</li> <li>• Good standoff</li> </ul>	<ul style="list-style-type: none"> <li>• Decreased effectiveness in target areas with varying vertical developments (podium effect)</li> </ul>
3. Offset or Opposing Wheel Position	<ul style="list-style-type: none"> <li>• Decreased platform predictability</li> <li>• Excellent standoff</li> </ul>	<ul style="list-style-type: none"> <li>• Axis restrictive</li> <li>• Increased susceptibility to podium effect</li> <li>• Coordination intensive</li> </ul>
Ground	<ul style="list-style-type: none"> <li>• Smaller laser spot size</li> <li>• Decreased targeting ambiguity</li> <li>• Rapid battle damage assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Axis restrictive</li> <li>• Increased designator exposure</li> <li>• Coordination intensive</li> </ul>

Figure B-1. Airborne and Ground Designator Advantages and Disadvantages

**target.** Target locating devices are devices that incorporate a laser rangefinder, magnetic or gyroscopic compass, tilt measurement devices, and GPS. These systems measure the range and angles from their positions, provided by the GPS, to mathematically derive a target location. If used correctly, the quality of the target location is generally much better than that of a hand-derived coordinate. The accuracy of the coordinate is dependent on many variables. **Errors are induced by inaccurate GPS data, poor azimuth, range and elevation data, system calibration, and user skill. These errors are magnified with range and can result in significant target location errors. Due to the variables listed previously, target location errors may vary from 10 meters at 1 kilometer to more than 300 meters at maximum ranges.**

d. **LSTs** are systems that allow acquisition of a coded laser-designated target. LSTs are laser sensors that provide both sensor and heads-up display cueing for aircraft equipped with these systems. While scanning for laser energy, these systems have a limited field of view that depends on range and switch settings. In general, the chances of acquisition are improved when cueing aids such as target marks, landmarks, and INS/GPS coordinates help the pilot point the aircraft in the direction of the target.

### 3. Laser Designation Operations

a. **Laser designation operations** are divided into three primary categories: laser target ranging, TA, and weapons guidance.

(1) **Target Ranging** systems can provide accurate range, azimuth, and elevation information to identified targets.

(2) **TA** involves the use of an LST carried by the aircraft and an LTD aimed by a ground team, or in some cases, from the same or another aircraft.

(3) **Weapons Guidance** allows an LGW to home in on reflected laser energy placed on a target by an LTD. This allows precision delivery of weapons, some at standoff distances.

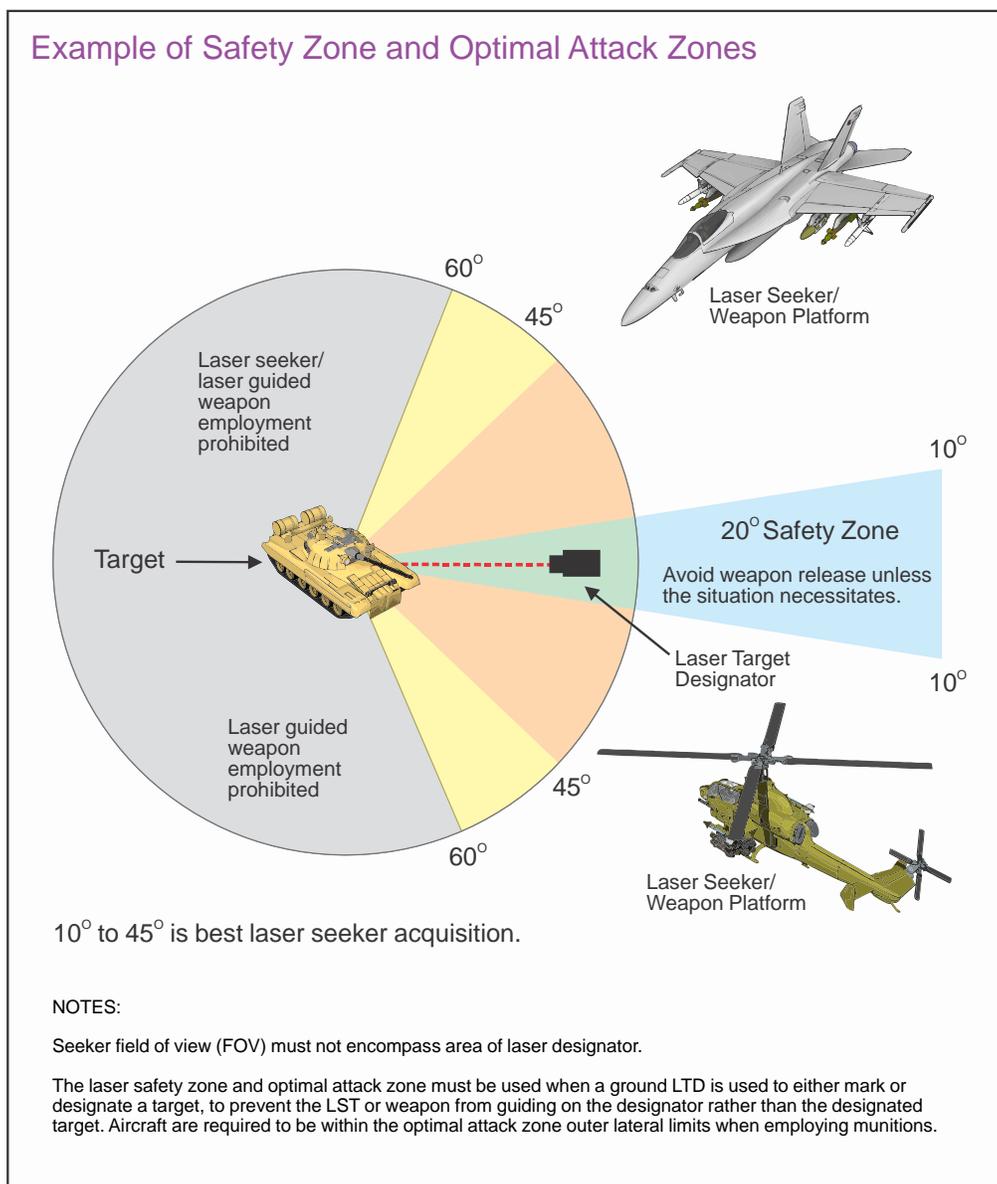
b. **Laser Designation Position.** In selecting a laser designation position, the LDO must consider LOS, expected munitions trajectory, tactical situation, cover and concealment, weather, and communications requirements. **The LDO should select positions that are near expected locations of high-priority targets while minimizing risks to friendly forces.** If redundant LTDs are going to be employed, mutual support and coordination with maneuver elements should be addressed. The observer or controller team should determine its position as accurately as possible.

c. **Employment.** When employing LSTs, GLTDs, and LGWs, the following procedures will be used:

(1) **Attack headings** and LTLs, sometimes called designator target lines or pointer target lines, are normally pre-coordinated between the LDO and LGW-employing aircrew. The LTL is normally expressed in degrees magnetic, unless otherwise requested.

(2) **Safety Zone.** Due to the possibility of false target indications from atmospheric scatter of the laser beam close to the laser exit port, final attack headings must avoid the 20-degree safety exclusion zone unless the tactical situation dictates otherwise. **The safety zone** is a 20-degree wedge that extends 10 degrees on either side of the target-to-laser designator line, from the surface to infinity, and whose apex is at the target (see Figure B-2).

(3) **Friendly Fire Incidents.** Designator profiles behind the launch platform are inherently the safest and will minimize the possibility of friendly fire incidents. **The possibility of friendly fire incidents still exists while operating anywhere within the optimal attack zone.** It is highest in the designated safety zone or when a false lock-on is achieved. Attack headings should be planned with consideration for friendly forces and noncombatant civilian locations. Ultimately the primary mechanisms for limiting friendly fire incidents are command



**Figure B-2. Example of Safety Zone and Optimal Attack Zones**

emphasis, disciplined operations, close coordination among component commands, rehearsals, and enhanced SA.

(4) The optimal **attack zone** is inside a 120-degree wedge that extends 60 degrees on either side of the target-to-laser designator line, is outside the 20-degree safety zone, and whose apex is at the target. To give the laser trackers or LGWs a better chance of acquiring the reflected laser spot, a smaller, 90-degree wedge (+/-45 degrees) is preferred.

(5) **Hellfire Designator Exclusion Zone.** The LTL must be given to the aircrew in degrees magnetic. The aircrew needs this information to align the helicopter, ensuring positive seeker lock-on of the LGM for LOBL delivery or positive in-flight seeker lock-on of the LGM for LOAL. The LTL will also allow the aircrew to prevent inadvertently engaging the LTD. The LDO must be outside a 30-degree by 40-degree zone from the aircraft, but within a 120-degree wedge from the target (see Figure B-3).

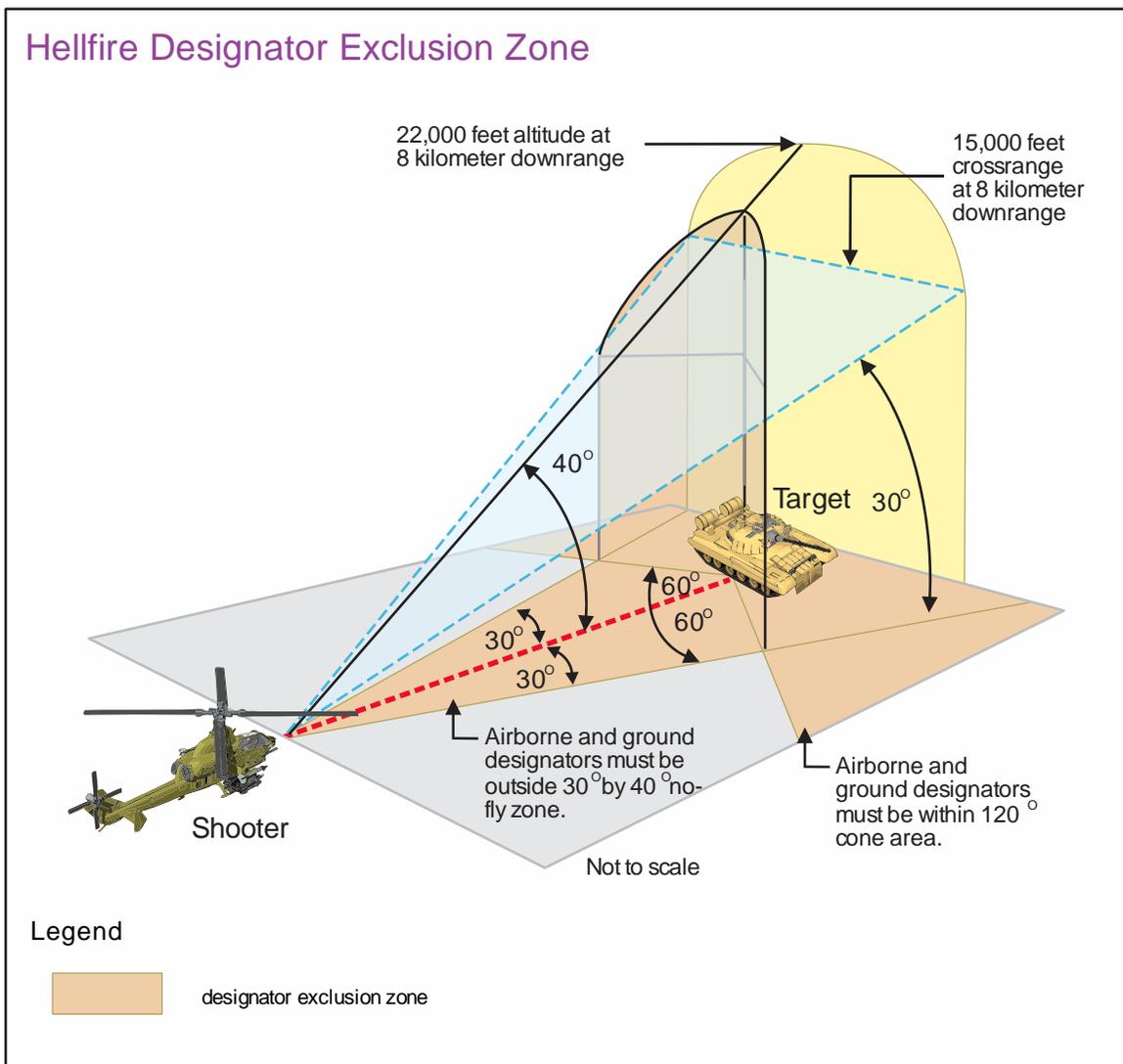


Figure B-3. Hellfire Designator Exclusion Zone

#### d. Terrain and Target Concealment

(1) If the LDO suspects that the **target may be partially masked** from the view of the incoming laser weapon, the LDO should aim the laser at a point on the target believed to be within LOS of the seeker. If the target is well concealed, the laser spot may be aimed at some overhead or nearby object. However, this method is not preferred and should be used only when the situation demands an immediate attack on the target.

(2) If a designated mobile **target moves out of the view** of the LDO, it may still be possible to salvage the attack. A point near the target may be designated until the target again comes into view or until designation responsibility can be passed to another operator who has the target in sight. It is also possible to move the laser spot to another target in the immediate vicinity. If the LST or LGW has already locked on, the laser spot should be moved slowly, and without interrupting laser output, to the new target location.

e. **LDO Survivability.** To enhance survivability, the LDO should keep designation time to the minimum necessary for the weapon or seeker being used. This reduces the time available for the enemy to detect, locate, and act to suppress the LTD and/or LDO.

f. **Laser Designation Timing.** Successful use of LGWs or LSTs depends on the ability of the LDO to designate the target at the proper time. Laser designation must be closely coordinated with the delivery of an LGW. Timing requirements should take into account the following:

- (1) Weapons **requiring** LOBL.
- (2) Weapons allowing LOAL.
- (3) Remaining LTD battery life (if applicable).
- (4) Laser radiation time constraints due to overheating.
- (5) Susceptibility to laser countermeasures.

g. **Joint Interoperability.** Laser designation operations and weapons delivery units must have compatible and secure communications equipment and common secure codes or the authentication codes necessary for joint communications on non-secure nets.

## 4. Execution Considerations

#### a. TA Considerations

(1) Using LTDs can provide a fast and accurate means of marking targets for both LGWs and LST-equipped aircraft. Using target coordinates, obscurants, and illuminating flares complements LTD target-marking and improves the chances for successful first pass TA. Without cueing, aircraft may be pointed too far away from the target to acquire the laser spot. Therefore, when the tactical situation allows,

supplemental marking is recommended to avoid losing sorties or having to reattack. Care should be taken to avoid obscuring the target with the visual mark.

(2) **Attack Angles.** Aircrews release or launch LGWs so that the reflected laser energy will be within the seeker field of view at the appropriate time. The maximum allowable attack angle (laser-to-target/seeker-to-target) depends on the characteristics of the weapon system employed. If the angle is too large, the seeker will not receive enough reflected energy to sense the laser spot.

(3) **Coordination with JTAC.** If the attack aircraft has an LST, the JTAC can designate the target for aircrew identification. The aircrew can use the LST for sensor acquisition or to visually locate the target. Once the aircrew locates the target, it can conduct an attack using unguided ordnance.

(4) **Employment of LGBs in conjunction with coded LTDs is either autonomous or assisted.** Autonomous LGB employment uses the aircraft's onboard LTD for terminal weapons guidance. Most aircraft capable of delivering LGBs can provide on-board autonomous self-designation. Assisted LGB employment uses an off-board LTD for terminal weapons guidance. This is typically accomplished by a ground team operating a GLTD (such as a ground/vehicle laser locator designator) or by another aircraft (known as buddy lasing). Aircraft without onboard ALTDs that can carry and deliver LGBs, but have no on-board terminal weapons guidance capability, require assisted LGB employment. **Coded LTDs are ground and airborne systems that have two specific purposes.** First, they provide terminal weapons guidance for LGWs. Second, they designate targets for coded LSTs. Coded LTDs emit laser energy with a PRF and require input of specific laser codes for operation. Codes are assigned to LGWs and directly relate to the PRF that harmonizes the designator and seeker interface. **Coded LTDs used for terminal weapons guidance must be set to the same code as the LGW.** Certain LGWs, such as LGBs, are coded prior to takeoff and cannot be changed once the aircraft is airborne. However, all coded LTDs can change codes while airborne. The JTAC will have to coordinate efforts to ensure that both the aircraft and designator are on the same code. Coordination for the LTD to match the LGW code is conducted through the ATO, DASC/ASOC, or JTAC nine-line briefing. Sometimes, a LTD will serve the dual purpose of target designation for a coded laser acquisition/spot tracker and terminal weapons guidance for LGWs. In these cases, the LTD, LST, and LGW must have the same code. Laser codes are always passed as four digits to avoid confusion. When briefing LST-equipped aircraft, JTACs include the four-digit laser code and LTL in accordance with the CAS briefing format. If aircraft check in with a different code, then it is the JTAC's responsibility to make appropriate corrections. Even if the aircraft is capable of self-designation, the JTAC should have a backup GLTD ready if it is available.

(5) **Laser Designation Time.** The aircrew may request a longer laser-on time, based on munitions characteristics. If communications are unreliable, the JTAC should begin designating 20 seconds before time on target or with 20 seconds remaining on time to target (unless the aircrew is using loft delivery). Laser designation time with LGBs delivered from a loft profile will vary depending on the weapon being delivered. Refer to appropriate tactics manuals for loft laser designation time rules of thumb. While

reducing laser operating time is important in a laser countermeasure environment or when using battery-operated designators, designation time must be long enough to guarantee mission success.

**b. LGW Delivery**

(1) TA is usually followed by the delivery of LGWs. Some LGWs, such as laser Maverick, and low-level LGB and/or Paveway III, can be released at ranges that may reduce the delivery aircraft's exposure to enemy air defense systems and increase aircraft survivability.

(2) Once released, the weapon homes in on reflected laser energy.

(3) Like any air-delivered weapon system, the maneuver commander must fully understand and accept the consequences of a possible failure of the weapon to properly guide to the target. **The final decision to release LGWs from behind friendly lines in a laser designation operations environment rests with the maneuver commander. Restriction of the aircraft's final attack heading in the CAS brief may help mitigate the risk to friendly forces.**

**c. Concept of Employment**

(1) **TACP.** The TACP is the Marine Corps or Air Force tactical air control agency located with the supported ground unit. Its functions are providing air liaison, advising on the use of air assets, and coordinating and controlling laser designation operations missions to support the ground commander's scheme of maneuver. The TACP provides the terminal attack control of laser designation operations in support of ground forces.

(2) **FIST, Combat Observation and Lasing Team (COLT), and Forward Observer (FO) Procedures for LDO.** When possible, the LDO should be located with the FIST/COLT, and the FIST/COLT should place a radio close to the LDO (USMC LDOs may or may not be collocated with their FOs). Placing a radio close to the LDO will minimize the need to relay laser calls between the pilot and the FIST/COLT. At times, the LDO will not be with the FIST/COLT and may not be able to see the target. The LDO will coordinate laser designation with the FIST/COLT. When the LDO and FIST/COLT are not together, aircrews may make laser calls directly to the FIST/COLT on a frequency assigned by the LDO in the remarks section of the LDO briefing. In situations where the USMC LDO is not in an optimum position to designate the target, the LDO may control the aircraft with the FO actually designating the target. The USMC LDO and FO can communicate and coordinate using the TACP local net; however, prior coordination is required.

**d. Rotary-Wing Procedures**

(1) **General.** Using rotary-wing aircraft to deliver LGWs allows the ground commander to destroy high-threat-point targets. Rotary-wing aircraft may be equipped with any combination of ALTDS, LSTs, and LGWs. All LTDs can assist laser-system-equipped rotary-wing aircraft in TA and provide terminal weapons guidance. Rotary-wing aircraft are employed by the Army as maneuver elements under direct control of the ground commander

or aviation unit commander. One of the functions of Marine attack helicopters is to provide laser designation operations in support of the MAGTF. Precise engagements will be aided by the use of LGWs. Army special operations attack helicopter crews are also trained to perform laser designation operations with LGWs.

(2) **Laser Designation for Rotary-Wing Aircraft**

(a) **Employment.** Laser designation for TA provides fast and accurate target hand-off. Certain rotary-wing aircraft are equipped with LSTs and aid the pilot's visual TA by providing cockpit indications on the location of the laser spot. TA can be followed with the delivery of either LGWs or nonguided weapons. The aircraft can designate either for their own weapons or for other aircraft.

(b) **Communication** between the LDO and the aircrew is essential for positive target hand-off to LST-equipped rotary-wing aircraft. Positive target hand-off requires prior coordination. The LDO must provide the appropriate laser code, LTL in degrees magnetic, and laser spot offset (if applicable).

(3) **Laser Designation for Rotary-Wing Aircraft with Hellfire LGMs.** The lock-on and launch ranges of LGMs can be several miles. LGMs provide extended standoff for high-threat targets. The pilot has several options for firing mode, firing method, and missile seeker lock-on.

(a) **Firing Modes**

1. **Single Fire or Manual Mode.** In the single-fire mode, one missile is launched. This mode can be used with autonomous direct, remote direct, and remote indirect fire methods.

2. **Rapid Fire.** Rapid fire is a technique of launching two or more missiles on the same code. Multiple targets can be engaged by launching missiles at least eight seconds or more apart, as specified by the LDO. Once the first missile hits the first target, the LDO must smoothly move the laser spot to the next target.

3. **Ripple Fire.** In the ripple fire mode, missiles are fired one after the other on different codes. For best effect, multiple LTDs should be used to achieve ripple fire. Each LTD operates on a different laser code, and the weapon's seekers are coded to match each designator.

4. **Rapid or Ripple Fire.** Using multiple codes and LTDs, the combination of rapid or ripple fire can be achieved.

(b) **Firing Methods**

1. **Direct Fire Method.** Direct fire is achieved using either autonomous or remote LTDs. When using remote designators, the rotary-wing aircraft is free to resume terrain masking or engage other targets after each LGM launch. This capability is called "fire and forget" and increases aircraft survivability and flexibility.

**2. Indirect Fire Method.** Indirect fire is achieved by using remote LTDs. Vulnerability of rotary-wing aircraft to enemy direct-fire weapons and radar detection is minimized by employing LGMs in the indirect-fire method. The LGM is launched while the aircraft is positioned behind masking terrain features, like trees and hills. The pilot selects a trajectory for the LGM (either high or low) over the masking terrain feature. The seeker will then locate and lock on to the remote laser-designated target.

**(c) Hellfire Missile Seeker Lock-on Options**

**1. LOAL.** The LOAL option can be used in the direct-fire mode and is always used for the indirect-fire method. The LGM is launched on a trajectory toward the target with seeker lock-on occurring in flight. This option allows missile launching toward the target area during adverse weather, hazy days, long ranges, or temporary target obscuration. Lock-on will occur when the obstruction to the seeker's view dissipates or is bypassed during the approach to the target area.

**2. LOBL.** The LOBL option requires direct LOS to the target and requires the seeker to be locked on to the target before launch.

**(d) Friendly Fire Incidents.** To keep the Hellfire missile from locking onto the designator instead of the target, Angle-T between the designator-target line and the missile target line should be less than 1,065 angular mils (60 degrees). The LDO must ensure the launch platform operator knows the location of the observer so that the launch platform can be repositioned if necessary for safety.

*For additional information on the Army FA laser operations, see ATP 3-09.30, Techniques for Observed Fire.*

*See ATP 3-09.32/MCRP 3-16.6A/NTTP 3-09.2/AFTTP(I) 3-2.6, JFIRE, Multi-Service Tactics, Techniques, and Procedures for the Joint Application of Firepower, for additional information on laser operations.*

*See JP 3-09.3, Close Air Support, for expanded discussion of laser-guided considerations for CAS and TGO.*

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## APPENDIX C REFERENCES

The development of JP 3-09 is based upon the following primary references:

### 1. Department of Defense Publications

- a. DODD 2311.01E, *DOD Law of War Program*.
- b. DODD 3000.03E, *DOD Executive Agent for Non-Lethal Weapons (NLW) and NLW Policy*.
- c. DODD 3002.01, *Personnel Recovery in the Department of Defense*.
- d. DODD S-3321-1, *Overt Psychological Operations Conducted by the Military Services in Peacetime and in Contingencies Short of Declared War (U)*.
- e. DOD Policy on Blinding Lasers (17 January 1997).

### 2. Chairman of the Joint Chiefs of Staff Publications

- a. CJCSI 3121.01B, *Standing Rules of Engagement/Standing Rules for the Use of Force for US Forces*.
- b. CJCSI 3150.25E, *Joint Lessons Learned Program*.
- c. CJCSI 3160.01A, *No-Strike and the Collateral Damage Estimation Methodology*.
- d. CJCSI 3270.01A, *Personnel Recovery Within the Department of Defense*.
- e. CJCSI 3505.01B, *Target Coordinate Mensuration Certification and Program Accreditation*.
- f. CJCSI 3900.01C, *Requirements for Geospatial Information and Services*.
- g. CJCSI 3900.01C, *Position (Point and Area) Reference Requirements*.
- h. CJCSM 3162.01, *Joint Methodology for Battle Damage Assessment*.
- i. JP 1, *Doctrine for the Armed Forces of the United States*.
- j. JP 1-04, *Legal Support to Military Operations*.
- k. JP 2-0, *Joint Intelligence*.
- l. JP 2-01, *Joint and National Intelligence Support to Military Operations*.
- m. JP 2-01.3, *Joint Intelligence Preparation of the Operational Environment*.

- n. JP 2-03, *Geospatial Intelligence in Joint Operations*.
- o. JP 3-0, *Joint Operations*.
- p. JP 3-01, *Countering Air and Missile Threats*.
- q. JP 3-02, *Amphibious Operations*.
- r. JP 3-05, *Special Operations*.
- s. JP 3-09.3, *Close Air Support*.
- t. JP 3-12, *Cyberspace Operations*.
- u. JP 3-13, *Information Operations*.
- v. JP 3-13.1, *Electronic Warfare*.
- w. JP 3-13.2, *Military Information Support Operations*.
- x. JP 3-13.3, *Operations Security*.
- y. JP 3-13.4, *Military Deception*.
- z. JP 3-14, *Space Operations*.
- aa. JP 3-16, *Multinational Operations*.
- bb. JP 3-30, *Command and Control of Joint Air Operations*.
- cc. JP 3-31, *Command and Control for Joint Land Operations*.
- dd. JP 3-32, *Command and Control for Joint Maritime Operations*.
- ee. JP 3-33, *Joint Task Force Headquarters*.
- ff. JP 3-40, *Countering Weapons of Mass Destruction*.
- gg. JP 3-41, *Chemical, Biological, Radiological, and Nuclear Consequence Management*.
- hh. JP 3-50, *Personnel Recovery*.
- ii. JP 3-52, *Joint Airspace Control*.
- jj. JP 3-60, *Joint Targeting*.
- kk. JP 5-0, *Joint Operation Planning*.
- ll. JP 6-0, *Joint Communications System*.

mm. Joint Doctrine Note 1-14, *Operation Assessment*.

nn. *Commander's Handbook for Assessment Planning and Execution*.

### **3. Multi-Service Publications**

a. ATP 3-09.32/MCRP 3-16.6B/NTTP 3-09.2/AFTTP(I) 3-2.6, *JFIRE, Multi-Service Tactics, Techniques, and Procedures for the Joint Application of Firepower*.

b. FM 3-09.34/MCRP 3-25H/NTTP 3-09.2.1/AFTTP(I) 3-2.59, *Multi-Service Tactics, Techniques, and Procedures for Kill Box Employment*.

c. ATP 3-91.1/AFTTP 3-2.86, *The Joint Air Ground Integration Center*.

### **4. Service Publications**

a. FM 3-09, *Fire Support*.

b. ATP 3-09.30, *Techniques for Observed Fire*.

c. ATP 3-37.31, *Civilian Casualty Mitigation*.

d. NTTP 3-32.1, *Maritime Operations Center*.

e. Naval Warfare Publication 3-21.0, *Coordinated Submarine/Task Group Operations Manual*.

### **5. Multinational Publication**

STANAG 2245, *Field Artillery and Fire Support Data Interoperability*.

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## APPENDIX D ADMINISTRATIVE INSTRUCTIONS

### 1. User Comments

Users in the field are highly encouraged to submit comments on this publication to: Joint Staff J-7, Deputy Director, Joint Education and Doctrine, ATTN: Joint Doctrine Analysis Division, 116 Lake View Parkway, Suffolk, VA 23435-2697. These comments should address content (accuracy, usefulness, consistency, and organization), writing, and appearance.

### 2. Authorship

The lead agent and Joint Staff doctrine sponsor for this publication is Joint Staff J-6, Deputy Director for Cyber and Command, Control, Communications, and Computers Integration, ATTN: Joint Fires Division.

### 3. Supersession

This publication supersedes JP 3-09, *Joint Fire Support*, 30 June 2010.

### 4. Change Recommendations

a. Recommendations for urgent changes to this publication should be submitted:

TO: JOINT STAFF WASHINGTON DC//J7-JED//

b. Routine changes should be submitted electronically to the Deputy Director, Joint Education and Doctrine, ATTN: Joint Doctrine Analysis Division, 116 Lake View Parkway, Suffolk, VA 23435-2697, and info the lead agent and the Director for Joint Force Development, J-7/JED.

c. When a Joint Staff directorate submits a proposal to the CJCS that would change source document information reflected in this publication, that directorate will include a proposed change to this publication as an enclosure to its proposal. The Services and other organizations are requested to notify the Joint Staff J-7 when changes to source documents reflected in this publication are initiated.

### 5. Distribution of Publications

Local reproduction is authorized, and access to unclassified publications is unrestricted. However, access to and reproduction authorization for classified JPs must be in accordance with DOD Manual 5200.01, Volume 1, *DOD Information Security Program: Overview, Classification, and Declassification*, and DOD Manual 5200.01, Volume 3, *DOD Information Security Program: Protection of Classified Information*.

## 6. Distribution of Electronic Publications

a. Joint Staff J-7 will not print copies of JPs for distribution. Electronic versions are available on JDEIS Joint Electronic Library Plus (JEL+) at <https://jdeis.js.mil/jdeis/index.jsp> (NIPRNET) and <http://jdeis.js.smil.mil/jdeis/index.jsp> (SIPRNET), and on the JEL at <http://www.dtic.mil/doctrine> (NIPRNET).

b. Only approved JPs are releasable outside the combatant commands, Services, and Joint Staff. Release of any classified JP to foreign governments or foreign nationals must be requested through the local embassy (Defense Attaché Office) to DIA, Defense Foreign Liaison, PO-FL, Room 1E811, 7400 Pentagon, Washington, DC 20301-7400.

c. JEL CD-ROM. Upon request of a joint doctrine development community member, the Joint Staff J-7 will produce and deliver one CD-ROM with current JPs. This JEL CD-ROM will be updated not less than semi-annually and when received can be locally reproduced for use within the combatant commands, Services, and combat support agencies.

## GLOSSARY

### PART I—ABBREVIATIONS AND ACRONYMS

AAMDC	United States Army Air and Missile Defense Command
ACA	airspace coordination area
ACE	aviation combat element (USMC)
ACM	airspace coordinating measure
ACO	airspace control order
AFATDS	Advanced Field Artillery Tactical Data System
AFTTP(I)	Air Force tactics, techniques, and procedures (instruction)
AGL	above ground level
AI	air interdiction
AIRCOR	air corridor
ALTD	airborne laser target designator
AMD	air and missile defense
AO	area of operations
AOA	amphibious objective area
AOC	air operations center
ASOC	air support operations center
ATACMS	Army Tactical Missile System
ATCS	air traffic control section
ATF	amphibious task force
ATO	air tasking order
ATP	Army tactical publication
AWACS	Airborne Warning and Control System
BCD	battlefield coordination detachment
BCL	battlefield coordination line
BKB	blue kill box
C2	command and control
CA	civil affairs
CAS	close air support
CATF	commander, amphibious task force
CDE	collateral damage estimation
CFL	coordinated fire line
CID	combat identification
CIE	collaborative information environment
CJCSI	Chairman of the Joint Chiefs of Staff instruction
CJCSM	Chairman of the Joint Chiefs of Staff manual
COA	course of action
COF	chief of fires
COLT	combat observation and lasing team
CONOPS	concept of operations
COP	common operational picture
CRC	control and reporting center

CSW	coordinate seeking weapons
DASC	direct air support center
DCO-RA	defensive cyberspace operations response actions
DOD	Department of Defense
DODD	Department of Defense directive
DS	direct support
DTG	date-time group
EA	electronic attack
ES	electronic warfare support
EW	electronic warfare
FA	field artillery
FAC(A)	forward air controller (airborne)
FE	fires element
FFA	free-fire area
FFCC	force fires coordination center (USMC)
FFT	friendly force tracking
FIST	fire support team
FM	field manual (Army)
FO	forward observer
FSA	fire support area
FSC	fire support coordinator (USMC)
FSCC	fire support coordination center (USMC)
FSCL	fire support coordination line
FSCM	fire support coordination measure
FSCoord	fire support coordinator (Army)
FSO	fire support officer
FSS	fire support station
ft	feet
GARS	Global Area Reference System
GCE	ground combat element (USMC)
GLTD	ground laser target designator
GPS	Global Positioning System
GS	general support
HIDACZ	high-density airspace control zone
HIMARS	High Mobility Artillery Rocket System
HPT	high-payoff target
HQ	headquarters
HVT	high-value target
IGO	intergovernmental organization
INS	inertial navigation system

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IO	information operations
IRC	information-related capability
ISR	intelligence, surveillance, and reconnaissance
J-3	operations directorate of a joint staff
JACCE	joint air component coordination element
JACE	joint air coordination element
JADOCS	Joint Automated Deep Operations Coordination System
JAGIC	joint air-ground integration center
JAOC	joint air operations center
JASSM	joint air-to-surface standoff missile
JFACC	joint force air component commander
JFC	joint force commander
JFE	joint fires element
JFO	joint fires observer
JFLCC	joint force land component commander
JFMCC	joint force maritime component commander
JFSOCC	joint force special operations component commander
JIPTL	joint integrated prioritized target list
JISE	joint intelligence support element
JOA	joint operations area
JOC	joint operations center
JP	joint publication
JPG	joint planning group
JSOA	joint special operations area
JSOAC	joint special operations air component
JSOTF	joint special operations task force
JTAC	joint terminal attack controller
JTCB	joint targeting coordination board
JTF	joint task force
JTWG	joint targeting working group
LDO	laser designator operator
LF	landing force
LGB	laser-guided bomb
LGM	laser-guided missile
LGW	laser-guided weapon
LJDAM	laser-guided joint direct attack munition
LOAL	lock-on after launch
LOBL	lock-on before launch
LOS	line of sight
LST	laser spot tracker
LTD	laser target designator
LTL	laser-to-target line
MAGTF	Marine air-ground task force

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Marine TACC	Marine Corps tactical air command center
MCM	maneuver control measure
MCRP	Marine Corps reference publication
MILDEC	military deception
MISO	military information support operations
MLRS	multiple launch rocket system
MOC	maritime operations center
MOE	measure of effectiveness
MOP	measure of performance
NATO	North Atlantic Treaty Organization
Navy TACC	Navy tactical air control center
NFA	no-fire area
NSFS	naval surface fire support
NSL	no-strike list
NTTP	Navy tactics, techniques, and procedures
OCO	offensive cyberspace operations
OPLAN	operation plan
OPORD	operation order
PID	positive identification
PKB	purple kill box
PL	phase line
PRF	pulse repetition frequency
RFA	restrictive fire area
RFL	restrictive fire line
ROE	rules of engagement
RTL	restricted target list
SA	situational awareness
SACC	supporting arms coordination center (USMC)
SDB	small diameter bomb
SEAD	suppression of enemy air defenses
SFCP	shore fire control party
SOCCE	special operations command and control element
SOF	special operations forces
SOJTF	special operations joint task force
SOLE	special operations liaison element
SOP	standard operating procedure
SOTF	special operations task force
SPINS	special instructions
STANAG	standardization agreement (NATO)
STT	special tactics team

TA	target acquisition
TAC(A)	tactical air coordinator (airborne)
TACP	tactical air control party
TACS	theater air control system
TAOC	tactical air operations center (USMC)
TBMCS	theater battle management core system
TGO	terminal guidance operations
TLAM	Tomahawk land-attack missile
TNL	target nomination list
TSA	target system analysis
TST	time-sensitive target
UA	unmanned aircraft
USMC	United States Marine Corps
WMD	weapons of mass destruction
ZF	zone of fire

## PART II—TERMS AND DEFINITIONS

**adjust.** None. (Approved for removal from JP 1-02.)

**assault fire.** None. (Approved for removal from JP 1-02.)

**barrage.** None. (Approved for removal from JP 1-02.)

**check fire.** None. (Approved for removal from JP 1-02.)

**chief of fires.** The senior organic fires Army staff officer at division and higher headquarters level who advises the commander on the best use of available fire support resources, provides input to necessary orders, and develops and implements the fire support plan. Also called **COF**. (Approved for inclusion in JP 1-02.)

**combat identification.** The process of attaining an accurate characterization of detected objects in the operational environment sufficient to support an engagement decision. Also called **CID**. (JP 1-02. SOURCE: JP 3-09)

**concept of fires.** None. (Approved for removal from JP 1-02.)

**controlled firing area.** None. (Approved for removal from JP 1-02.)

**coordinated fire line.** A line beyond which conventional surface-to-surface direct fire and indirect fire support means may fire at any time within the boundaries of the establishing headquarters without additional coordination. Also called **CFL**. (Approved for incorporation into JP 1-02.)

**coordinating point.** None. (Approved for removal from JP 1-02.)

**counterfire.** Fire intended to destroy or neutralize enemy weapons. (Approved for incorporation into JP 1-02.)

**defilade.** 1. Protection from hostile observation and fire provided by an obstacle such as a hill, ridge, or bank. 2. A vertical distance by which a position is concealed from enemy observation. 3. To shield from enemy fire or observation by using natural or artificial obstacles. (JP 1-02. SOURCE: JP 3-09)

**destroyed.** None. (Approved for removal from JP 1-02.)

**destruction fire.** None. (Approved for removal from JP 1-02.)

**disabling fire.** None. (Approved for removal from JP 1-02.)

**field artillery.** Equipment, supplies, ammunition, and personnel involved in the use of cannon, rocket, or surface-to-surface missile launchers. Also called **FA**. (Approved for incorporation into JP 1-02.)

**fires.** The use of weapon systems or other actions to create specific lethal or nonlethal effects on a target. (Approved for incorporation into JP 1-02.)

**fire support.** 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 1-02. SOURCE: JP 3-09)

**fire support area.** An appropriate maneuver area assigned to fire support ships by the naval force commander from which they can deliver gunfire support to an amphibious operation. Also called **FSA**. (JP 1-02. SOURCE: JP 3-09)

**fire support coordination.** The planning and executing of fire so that targets are adequately covered by a suitable weapon or group of weapons. (JP 1-02. SOURCE: JP 3-09)

**fire support coordination center.** A single location in which are centralized communications facilities and personnel incident to the coordination of all forms of fire support for Marine forces. Also called **FSCC**. (Approved for incorporation into JP 1-02.)

**fire support coordination line.** A fire support coordination measure established by the land or amphibious force commander to support common objectives within an area of operation; beyond which all fires must be coordinated with affected commanders prior to engagement, and short of the line, all fires must be coordinated with the establishing commander prior to engagement. Also called **FSCL**. (Approved for incorporation into JP 1-02.)

**fire support coordinator.** 1. The officer in charge of the fire support coordination center. Also called **FSC**. 2. The brigade combat team's organic fires battalion commander; if a fires brigade is designated as the division force field artillery headquarters, the fires brigade 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. Also called **FSCOORD**. (Approved for inclusion in JP 1-02.)

**fire support element.** That section of the tactical operations center at every echelon above company responsible for targeting coordination and for integrating fires under the control or in support of the force. Also called **FSE**. Also called **fires cell (FC) within the United States Army**. (Approved for incorporation into JP 1-02.)

**fire support officer.** The field artillery officer from the operational to tactical level responsible for advising the supported commander or assisting the senior fires officer of the organization on fires functions and fire support. Also called **FSO**. (Approved for incorporation into JP 1-02.)

**forward observer.** An observer operating with front line troops trained to adjust ground or naval gunfire and pass back battlefield information. Also called **FO**. (Approved for incorporation into JP 1-02.)

**free-fire area.** A specific area into which any weapon system may fire without additional coordination with the establishing headquarters. Also called **FFA**. (JP 1-02. SOURCE: JP 3-09)

**friendly force tracking.** The process of fixing, observing, and reporting the location and movement of friendly forces. Also called **FFT**. (Approved for incorporation into JP 1-02.)

**grid coordinates.** Coordinates of a grid coordinate system to which numbers and letters are assigned for use in designating a point on a gridded map, photograph, or chart. (JP 1-02. SOURCE: JP 3-09)

**howitzer.** None. (Approved for removal from JP 1-02.)

**inertial navigation system.** A self-contained navigation system using inertial detectors, which automatically provides vehicle position, heading, and velocity. Also called **INS**. (JP 1-02. SOURCE: JP 3-09)

**kill box.** A three-dimensional permissive fire support coordination measure with an associated airspace coordinating measure used to facilitate the integration of fires. (Approved for incorporation into JP 1-02.)

**laser-guided weapon.** A weapon that uses a seeker to detect laser energy reflected from a laser marked/designated target and through signal processing provides guidance commands to a control system, which guides the weapon to the point from which the laser energy is being reflected. Also called **LGW**. (Approved for replacement of “laser guided weapon” and its definition in JP 1-02.)

**laser rangefinder.** A device that uses laser energy for determining the distance from the device to a place or object. (Approved for incorporation into JP 1-02.)

**laser spot.** The area on a surface illuminated by a laser. (JP 1-02. SOURCE: JP 3-09)

**laser spot tracker.** A device that locks on to the reflected energy from a laser-marked or designated target and defines the direction of the target relative to itself. Also called **LST**. (JP 1-02. SOURCE: JP 3-09)

**laser target designator.** A device that emits a beam of laser energy which is used to mark a specific place or object. Also called **LTD**. (JP 1-02. SOURCE: JP 3-09)

**naval gunfire support.** Fire provided by Navy surface gun systems in support of a unit or units tasked with achieving the commander's objectives. Also called **NGFS**. (Approved for incorporation into JP 1-02.)

**phase line.** A line utilized for control and coordination of military operations, usually an easily identified feature in the operational area. Also called **PL**. (1-02. SOURCE: JP 3-09)

**prearranged fire.** None. (Approved for removal from JP 1-02.)

**proper clearance.** None. (Approved for removal from JP 1-02.)

**reduced charge.** None. (Approved for removal from JP 1-02.)

**restrictive fire area.** 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. Also called **RFA**. (JP 1-02. SOURCE: JP 3-09)

**restrictive fire line.** A line established between converging friendly surface forces that prohibits fires or their effects across that line. Also called **RFL**. (JP 1-02. SOURCE: JP 3-09)

**salvo.** None. (Approved for removal from JP 1-02.)

**schedule of fire.** Groups or series of fires that are fired in a definite sequence according to a definite program. (Approved for incorporation into JP 1-02.)

**scheme of fires.** The detailed, logical sequence of targets and fire support events to find and engage targets to support the commander's objectives. (Approved for inclusion in JP 1-02.)

**shifting fire.** None. (Approved for removal from JP 1-02.)

**shore fire control party.** A specially trained unit for control of naval gunfire in support of troops ashore. Also called **SFCP**. (Approved for incorporation into JP 1-02.)

**small arms.** None. (Approved for removal from JP 1-02.)

**small arms ammunition.** None. (Approved for removal from JP 1-02.)

**spotter.** 1. An observer stationed for the purpose of observing and reporting results of naval gunfire to the firing agency and who also may be employed in designating targets. (JP 3-09) 2. In intelligence, an agent or illegal assigned to locate and assess individuals in positions of value to an intelligence service. (JP 1-02. SOURCE: JP 2-01.2)

**strafing.** None. (Approved for removal from JP 1-02.)

**summit.** None. (Approved for removal from JP 1-02.)

**supporting fire.** Fire delivered by supporting units to assist or protect a unit in combat. (JP 1-02. SOURCE: JP 3-09)

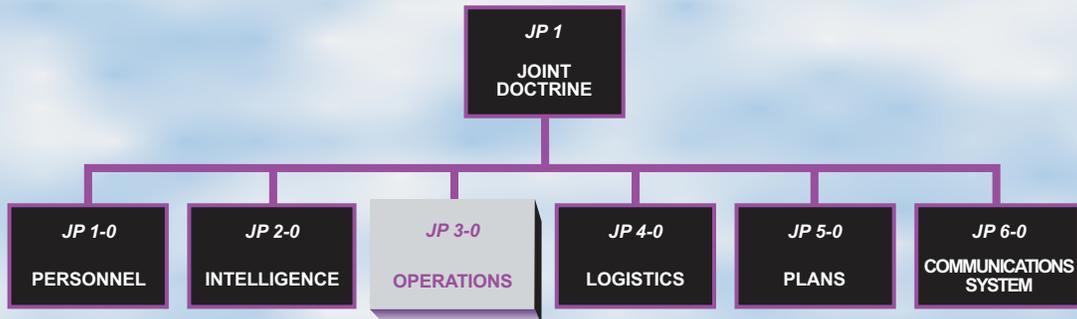
**terminal guidance operations.** Actions using electronic, mechanical, voice, or visual communications that provide approaching aircraft and/or weapons additional information regarding a specific target location. Also called **TGO**. (Approved for incorporation into JP 1-02.)

**time of flight.** In artillery, mortar, and naval gunfire support, the time in seconds from the instant a weapon is fired, launched, or released from the delivery vehicle or weapons system to the instant it strikes or detonates. Also called **TOF**. (Approved for incorporation into JP 1-02.)

**zone of action.** A tactical subdivision of a larger area, the responsibility for which is assigned to a tactical unit; generally applied to offensive action. (JP 1-02. SOURCE: JP 3-09.)

**zone of fire.** An area into which a designated ground unit or fire support ship delivers, or is prepared to deliver, fire support. Also called **ZF**. (Approved for incorporation into JP 1-02.)

# JOINT DOCTRINE PUBLICATIONS HIERARCHY



All joint publications are organized into a comprehensive hierarchy as shown in the chart above. **Joint Publication (JP) 3-09** is in the **Operations** series of joint doctrine publications. The diagram below illustrates an overview of the development process:

