

AIR FORCE DOCTRINE PUBLICATION 3-60

TARGETING



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“The Air Force organizes, trains, and equips forces to be an air component to a [joint force commander](#) (JFC). As part of the joint force’s air component, our forces must be prepared to accomplish JFC objectives. The air component commander’s administrative authorities are derived from Title 10, US Code, and exercised as the [commander, Air Force forces](#) (COMAFFOR). The air component commander’s operational authorities are delegated from the JFC and exercised as both the COMAFFOR, over Air Force Forces, and as the functional [joint force air component commander](#) (JFACC), over joint air forces made available for tasking. Thus, the air component commander leads Air Force forces as the COMAFFOR and the JFC’s joint air operations as the JFACC. This duality of authorities is expressed in the axiom: **Airmen work for Airmen and the senior Airman works for the JFC.**”

--Air Force Doctrine Publication (AFDP) 1, *The Air Force*

Since the COMAFFOR and JFACC are nearly always the same individual, this AFDP will use the term “air component commander” when referring to duties or functions that could be carried out by either or both, unless explicit use of the term “COMAFFOR” or “JFACC” is necessary for clarity.

FOREWORD

Doctrine embodies the fundamental principles by which military forces guide their actions in support of national [objectives](#). It is a body of carefully developed, authoritative ideas that have been officially approved and establishes a common frame of reference for solving military problems. However, to be an effective guide, the challenge for doctrine is to be simultaneously focused on the past, applicable in the present, and facing toward the future; all in equal measure.

The US Air Force must prepare for a new reality, one in which decision advantage, freedom of maneuver, and freedom of action are increasingly challenged. To deter, compete, and win across the competition continuum, Airmen must advance solutions that allow us to conduct operations in highly contested environments. Broadly, the joint force's approach to meeting this challenge is encapsulated in joint all-domain operations ([JADO](#)). Together with joint all-domain command and control ([JADC2](#)), JADO provides JFC the means to integrate, synchronize, and deconflict the convergence of effects across all domains to achieve operational advantage.

AFDP-1, [The Air Force](#), supports this effort by establishing mission command as the Airman's philosophy for the command and control (C2) of airpower. Despite our advances, adversaries will likely retain an ability to deny or degrade our communications. Therefore, decision makers at all echelons should have the ability to develop understanding, make decisions, and converge effects when disconnected from higher echelons. Mission command embraces centralized command, distributed control, and decentralized execution as the foundation for the responsiveness, flexibility, and initiative necessary at the tactical edge, and ensures capabilities continue to function, even when information is degraded or denied.

AFDP 3-60, *Targeting*, though firmly rooted in existing best practice, also looks to the future, adapting where needed to ensure continued effectiveness and efficiency for the challenges to come. Targeting links ends, ways, and means to ensure resources are employed effectively and efficiently. From assessment back to planning, feedback forms a continuous loop, adapting to ensure continued alignment with objectives. This process must evolve to ensure continued mission accomplishment in a disconnected and degraded environment. Airmen should be trained to plan and execute operations in a distributed and decentralized manner, and execute the mission when isolated from higher-level decision makers. Airmen at all levels should be comfortable making decisions and operating based on the commander's intent and the tenet of mission command.

Though not completely adapted to the challenges identified here, this doctrine represents what we believe based on the best evidence to date. As we continue to advance our capabilities, it is critical we continue to evolve our doctrine. Throughout history, innovative Airmen have developed methods of employment to meet operational challenges. We will continue to do so.

CHAPTER 1: INTRODUCTION TO TARGETING

Targeting is the process of selecting and prioritizing [targets](#) and matching the appropriate response while taking account of command objectives, operational requirements, and capabilities.¹ This process is systematic, comprehensive, and continuous. Combined with a clear understanding of operational requirements, capabilities, and limitations, the targeting process identifies, selects, and exploits [critical vulnerabilities](#) within targeted systems to achieve the commanders' desired end state. Targeting is a command function requiring commander oversight and involvement to ensure proper execution. It is not the exclusive province of one specialty or division, such as intelligence or operations, but blends the expertise of many disciplines.

Targeting occurs at all [levels of warfare](#) (strategic, operational, and tactical), across the competition continuum and over the full range of Air Force operations. It helps translate [strategy](#) into discrete actions by linking ends, ways, means, and risks. It allows commanders to choose the best ways to attain desired outcomes. From strategy comes the plans and guidance used to task specific capabilities through the [tasking process](#). The processes of planning, tasking, targeting, and assessing effects provide a logical progression that forms the basis of decision-making.

Targeting is often tied only to the [kinetic](#) delivery of capabilities. However, JFC objectives can be accomplished through a variety of [non-kinetic](#) capabilities and actions to create [lethal and nonlethal](#) effects. All of this involves the targeting process. To optimize military action, targeting should integrate the full spectrum of capabilities including conventional and nuclear operations. This allows joint forces to continue the fight in, around, and through nuclear or radiological environments. In addition, targeting should occur well before hostilities and continue through post-hostilities.

A target is an entity or object considered for possible engagement or other actions.² Joint doctrine describes entities as facilities, individuals, virtual (nontangible) things, equipment, or organizations. It is a fundamental tenet of targeting that no potential target derives its importance merely because it exists, or even that it is a crucial element within a target system. Any potential target derives its importance only by the extent to which it enables adversary capabilities and actions that must be affected to achieve objectives. Multiple actions may be taken against a single target, and actions may often be taken against multiple targets to achieve a single effect.

Targeting contains two categories: [deliberate](#) and [dynamic](#). Deliberate targeting applies when there is sufficient time to include a target in a plan or an [air tasking order](#) (ATO). Deliberate targeting includes targets planned for attack by scheduled resources. The air tasking cycle is sufficiently flexible to allow for most mobile targets to be planned and attacked with deliberate targeting. Dynamic targeting includes targets that are

¹ Joint Publication (JP) 3-0, [Joint Operations](#).

² JP 3-60, [Joint Targeting](#) (common access card required).

identified too late to be included in deliberate targeting, but when detected, meet criteria specific to achieving objectives. When plans change and planned targets must be adjusted, dynamic targeting can also manage those changes. It is a mistake to associate deliberate targeting with fixed targets and dynamic targeting with mobile targets.

Two subsets of targets that require special consideration are sensitive and time-sensitive. Sensitive targets are targets the commander has determined exceed established national-level notification thresholds due to the physical and collateral effects on noncombatant persons, property, and environments occurring incidental to military operations.³ They may also include those targets that exceed national-level [rules of engagement](#) (ROE) thresholds, or those where the effects from striking the target may have adverse political ramifications. [Time-sensitive targets](#)⁴, are joint force commander-validated targets or sets of targets requiring immediate response. They are highly lucrative, fleeting targets that offer great effects or could pose great danger to friendly forces.⁵ These targets present one of the greatest targeting challenges. Additional information on time-sensitive targeting is provided in Air Force Tactics, Techniques, and Procedures (AFTTP) 3-2.3, [Multi-Service Tactics, Techniques, and Procedures for](#)

Targeting and the Instruments of Power

There are times when targeteers may recommend the [combatant commander](#) (CCDR) request support from another government department or agency to achieve the desired objective. For example, CCDRs may want to conceal the deployment and disposition of their forces from an enemy. During combat operations, the enemy's terrestrial downlinks may be targeted for destruction. However, if combat operations have not yet started, how can CCDRs target their enemy's ability to receive satellite imagery? Perhaps they could select the diplomatic instrument of power (IOP) to get a third party country not to sell the imagery, or they could use the economic IOP to buy up the bandwidth or purchase the imagery at a much higher price. Targeteers must consider all possibilities when deciding how to deny an adversary a certain capability.

³ See Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3122.06, *Sensitive Target Approval and Review (STAR) Process* (classified publication), for more information on sensitive targets.

⁴ Some believe "time-critical target" better describes this target subset. However, this is a distinction without a difference. Time-sensitive targets may be preplanned for synchronization or to achieve a specific effect. They may include targets that require an *immediate* response, whether preplanned or not. For example, the land component may want a bridge destroyed at a specific time to create a trap. This is a preplanned target, which is also time sensitive. If the enemy ground forces moved more quickly than anticipated and were about to use the bridge to facilitate an attack on friendly forces, the ground component commander may want the target status changed. In either case, the bridge is a time-sensitive target.

⁵ [JP 3-60](#).

[Dynamic Targeting](#). Additional information on the categories of targeting is provided in [JP 3-60](#).

TARGETING FUNDAMENTALS

Targeting is focused on achieving objectives. During planning, objectives are translated into detailed actions against adversary targets that produce desired effects. **Every target nominated should contribute to attaining JFC objectives and the end state.** Targeting is [effects-based](#), interdisciplinary, anticipatory, systematic, and integrated with other processes. These principles are fundamental to targeting. Targeting is in part accomplished by targeteers who have specialized training in analyzing targets and developing solutions. It is more than the selection of targets for physical destruction. Destruction may be the best means to the end, but it is only one effect within a spectrum of possible options within joint multi-domain operations. Other options include influence operations, electronic warfare operations, and cyberspace operations. The underlying premise of an effects-based approach is that it is possible to direct the instruments of power—diplomatic, information, military, economic (DIME)—against targets in ways that create effects beyond mere destruction. These effects will influence the adversary’s political, military, economic, social, infrastructure, and information systems, physical environment, and time. Targeting should consider all possible means to achieve desired effects, drawing from all available forces, weapons, and platforms. Target selection must also consider second- and third-order effects that may either positively or negatively contribute to campaign success.

Targeting is interdisciplinary. It requires the expertise of personnel from many functional disciplines. For example, strategists and planners bring knowledge of the context and integrated plans; operators bring experience gained from combat execution; intelligence personnel provide analysis of adversary strengths and vulnerabilities and targeting expertise; and judge advocates provide expertise in the application of the [law of war](#) and interpretation of ROE vital for mission planning and weapons delivery. An effects-based approach to targeting is fundamentally a team effort, requiring these specialties and many more.

Targeting is inherently estimative and anticipatory. Matching actions and effects to targets requires estimating and anticipating future outcomes. In some cases, the outcome is straightforward, such as anticipating that disabling a fire control radar may significantly impact a surface-to-air missile battery’s capability. In most cases, however, estimation is more complex, and planners should consider the following processes to aid in making estimates:

- ★ [Joint intelligence preparation of the operational environment](#) (JIPOE) should yield insight on the adversary and their intentions.
- ★ [Target system analysis](#) should offer understanding of how components of the adversary system interact and how the system functions.

- ★ [Intelligence, surveillance, and reconnaissance](#) (ISR) processing, exploitation, and dissemination should collect and process necessary data to improve the accuracy and extent of estimation.

Such analyses enable planners to select targets and methods of affecting them that increase the probability of desired outcomes and allow the most efficient use of limited airpower resources. This does not imply perfect knowledge or anticipation; uncertainty and friction still apply.

In supporting the commander's objectives, the targeting process is designed to achieve effects in a systematic manner. Targeting, like other planning processes, is rational and iterative. It methodically analyzes, prioritizes, and assigns forces and capabilities against adversary targets. Targeting is not mechanical and does not assume that the same actions always produce the same effects. If the desired effects are not achieved, targets may be re-planned for subsequent engagement, or different targets may be selected.

Targeting should not be separated from commander objectives. Otherwise, it becomes an inputs-based exercise in target servicing—simply matching available resources to those targets. Integrating targeting within the overarching planning processes (e.g., the joint planning process for air and the air tasking cycle) enables an effects-based approach to operations (EBAO). Additional information on EBAO is provided in AFDP 3-0, [Operations and Planning](#).

TARGET CHARACTERISTICS

In general, targets are defined by five characteristics: physical; functional; cognitive control and information; environmental; and temporal. The features of each category are briefly described below.⁶

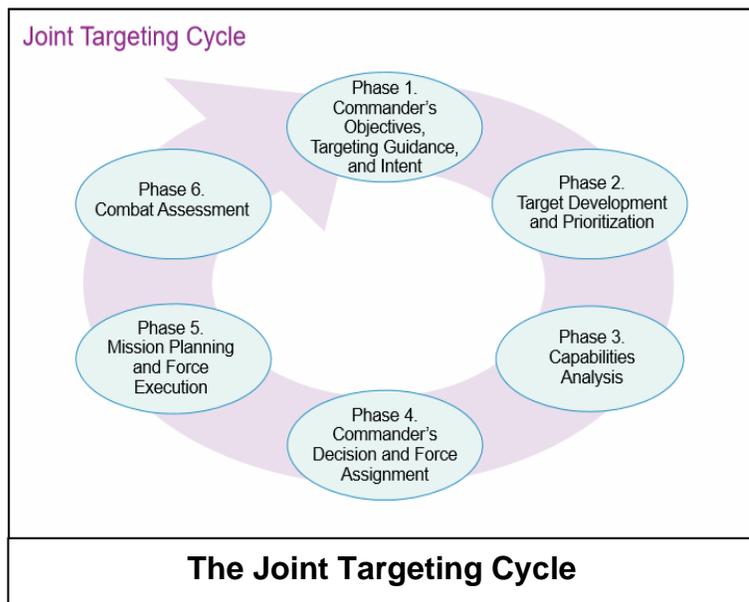
- ★ **Physical Characteristics:** Features that describe what a target *is*. These are discernible to one or more of the five senses or through sensor-derived signatures. They may greatly affect the type and number of weapons, the weapon systems, and the methods or tactics employed against the target.
- ★ **Functional Characteristics:** Features that describe what the target *does* and how it does it. They describe the target's function within the enemy system, how the target or system operates, its level of activity, the status of its functionality, and in some cases, its importance to the enemy. Functional characteristics are often hard to discern because they most often cannot be directly observed. Reaching plausible conclusions can often entail speculation and much deductive and inductive reasoning.

⁶ For more information on target categories, see [JP 3-60](#).

- ★ **Cognitive Control, and Information Characteristics:** Features that describe how some targets *think*, exercise control functions, or otherwise process information. These can be critical to how something is targeted and can be especially important from an effects-based perspective, where [information-related capabilities](#) are considered. These characteristics can also be critical to targeting an enemy system, since nearly every system possesses some central controlling function, and neutralizing this may be crucial to obtaining the desired behavior. As with functional characteristics, these are often difficult to discern or deduce.
- ★ **Environmental Characteristics:** Features that describe the effect of the environment on the target and its surroundings. These characteristics may also affect the types and numbers of weapons, weapon systems, and the methods or tactics employed against the target.
- ★ **Temporal Characteristics:** The factor of time, as a characteristic of a target, describes the targets vulnerability to detection, attack, or other engagement in terms of time available. All targets nominated for attack continually change in priority due to the dynamic nature of the evolving [operational environment](#) (OE). Many targets may be time sensitive. This time factor can help determine when and how to find or engage a target. By comparing this factor to information latency and knowledge of friendly capabilities, the staff can make better recommendations regarding possible actions.

THE JOINT TARGETING CYCLE

The targeting cycle described in joint doctrine is used for joint planning and execution and for Air Force targeting operations. Joint targeting selects and prioritizes targets and matches the appropriate means to engage them, considering operational requirements and capabilities. The [joint targeting cycle](#) is an iterative, non-linear process that provides a framework for successfully conducting joint targeting. The deliberate and dynamic nature of the joint targeting cycle supports the [joint planning process](#) (JPP), [joint planning process for air](#) (JPPA), and the air tasking cycle. The relationship between the joint targeting cycle and the air tasking cycle is explained in more detail in the [“Targeting and the Air Tasking Cycle”](#) section.



COMMANDER'S OBJECTIVES AND INTENT

The military end state is the set of conditions that must be achieved to resolve the situation or conflict on satisfactory terms, as defined by the appropriate authority. It normally represents a point in time and/or circumstances beyond which the President does not require the military instrument of national power as the primary means to achieve remaining national objectives.⁷ The CCDR is primarily concerned with the military end state and related strategic military objectives. Those objectives are developed during the mission analysis step of the JPP or are derived from theater-strategic or national-level guidance. The air component staff, using the JPPA, should establish the air component's objectives that support the JFC objectives and contribute to the achievement of the desired strategic end state.

Objectives are the basis for developing the desired effects and the scope of target development. Effective targeting is distinguished by the ability to generate the type and extent of effect necessary to achieve the commander's objectives. Integrating and employing the appropriate capabilities creates the desired effects.

TARGET DEVELOPMENT AND PRIORITIZATION

This phase of the joint targeting cycle consists of target development, target vetting, target validation, and target list management. Target development is the systematic examination of potential target systems to determine the type and duration of full-spectrum action that should be exerted on each target to create desired effects. A target system is most often considered as a collection of assets directed to perform a specific function or series of functions. Target development always approaches adversary capabilities from a systems perspective. Target vetting leverages the expertise of the national intelligence community to verify the fidelity of the intelligence and analysis used to develop the target(s). Target validation determines whether a target remains a viable element of a target system and whether prosecution of that target complies with the law of war. Validation is a continuous process that occurs until the target is serviced or removed from consideration for servicing. Once candidate targets are developed, vetted, and validated, they are added to the joint target list (JTL), restricted target list (RTL), or no strike list (NSL). Finally, they are prioritized relative to all joint targets in a joint integrated prioritized target list (JIPTL), which is submitted to the JFC for approval. While a single target may be significant because of its characteristics, the target's importance lies in its relationship to other targets within an operational system or across operational systems.

CAPABILITIES ANALYSIS

This portion of the joint targeting process involves evaluating the full spectrum of

⁷ [JP 3-0](#).

available capabilities (including forces, sensors, and weapons systems) against desired effects to determine the appropriate options available. Inputs include [kinetic and non-kinetic](#) considerations such as: target characteristics, desired damage criteria or probability of damage (Pd) calculations, delivery parameters, effects timing and effect duration. The outputs of this stage include the probability of effectiveness (Pe), which is the result of selected capabilities and target pairings required to create desired effects to inform the commander's estimate within the joint planning and execution system.

COMMANDER'S DECISION AND FORCE ASSIGNMENT

Once the JFC has approved the JIPTL, either entirely or in part, tasking orders are prepared and released to the executing components and forces. The joint targeting process facilitates tasking orders by providing amplifying information necessary for detailed force-level planning of operations. The process of resourcing JIPTL targets with available forces or systems and ISR assets lies at the heart of force assignment. The [force assignment process](#) integrates previous phases of joint targeting and fuses capabilities analysis with available forces, sensors, and weapons systems. It is primarily an operations function but requires considerable intelligence support to ensure ISR assets are integrated into the plan. Coordination with other services and special programs at this point in the process is essential to ensure that targets are not serviced by multiple or conflicting resources.

MISSION PLANNING AND FORCE EXECUTION

Upon receipt of tasking orders, detailed planning should be performed for executing operations. The joint targeting process supports this planning by providing tactical-level planners with direct access to detailed information on the targets, supported by the nominating component's analytical reasoning that linked the target with the desired effect (conducted in Phase 2 of the joint targeting cycle). This may provide the background information necessary for the warfighter to focus on the JFC's objectives as the operation unfolds.

COMBAT ASSESSMENT

[Assessment](#) measures whether desired effects are created, if objectives are achieved, and what next steps are required. Effective planning and execution require continued evaluation of the effectiveness of friendly and enemy action. Assessment is much more than "battle damage" and more than an intelligence function that takes place after execution. Planning for it begins prior to commencement of operations, takes place throughout planning and execution, and continues after the conflict is over. Assessing deliberate and dynamic results must be integrated to provide the overall targeting assessment.

COMMAND AND ORGANIZATION

Targeting occurs from the [combatant command](#) (CCMD) level to the tactical unit level. Across this organizational span, Air Force targeting focuses on a wide variety of targeting issues both within and outside of the targeting cycle, such as target planning, target materials production, targeting database maintenance, target systems analysis, targeting automation, and support to weapons acquisition. The air component is responsible for enacting the targeting process for the JFC and servicing approved targets, regardless of which Service or functional component nominates them. Within this command structure the targeting cycle occurs under a very structured process and normally under a compressed timeline.

JFCs organize forces to accomplish the mission based on their vision and [concept of operations](#) (CONOPS). They have many options for organizing the joint force, for providing direction and guidance on command relationships, and designating the air component commander. If a JFACC is appointed, that commander directs execution of all air component capabilities and forces made available for joint or combined operations. Regardless of the organizational option chosen, fundamental doctrinal principles of the joint targeting process should be employed, and the air component commander must establish a close working relationship with the JFC.

This relationship extends from the JFC to the air component commander, to air component commander staffs and other component staffs supporting the JFC with targeting capabilities. The air component commander normally operates from an [air operations center](#) (AOC). The AOC and the air component commander's staff are manned with subject matter experts who reflect the capabilities and forces available to the air component commander for tasking and include appropriate Service and component representation.

THEATER COMMAND AND CONTROL (C2) SYSTEM

The [theater air-ground system](#) (TAGS) is a system of systems that consists of component C2 elements for the purpose of coordinating, planning, and executing operations. TAGS enables the employment of the air targeting cycle from the operational to the tactical level. Comprised of airborne and ground elements, the [theater air control system](#) (TACS) is the Air Force component of TAGS and the mechanism for C2 of airpower.⁸ The AOC is the senior C2 element of TACS.

The [air support operations center](#) (ASOC) is the tactical level organization that facilitates Air Force-Army integration and provides primary control of air power in support of the Army through the TACS Air Force component liaisons aligned with land combat forces. The ASOC's primary mission is to provide direction and control of air

⁸ AFTTP 3-2.17, [Multi-Service Tactics, Techniques, and Procedures for the Theater Air Ground System](#) (common access card required).

operations directly supporting Army ground forces. Within the targeting arena, this is a critical component. It supports deliberate planning and fulfills the dynamic targeting role for time-sensitive targeting support to Army forces.

The [joint air component coordination element](#) (JACCE) is a Service or functional component-level liaison that serves as the direct representative of the air component commander when acting as the JFACC.⁹ The air component commander may establish one or more JACCE elements within other command headquarters to better integrate joint air operations. The JACCE can be critical to targeting processes. For example, the JACCE located with the [joint force land component commander](#) (JFLCC) provides valuable assistance and liaison from the air component commander and assists the JFLCC in planning and synchronizing operational fires and establishing and controlling FSCM.¹⁰

AIR OPERATIONS CENTER

The AOC operates as a fully integrated command center and is staffed by all participating components. It provides the capability to plan, coordinate, allocate, task, execute, monitor, and assess the activities of assigned, attached, and supporting forces, including integrated targeting activities. It continually surveys the environment and provides predictive awareness so the air component commander can effectively prepare for crisis operations. AOC members also plan and coordinate future air operations with the AFFOR staff. In most joint and coalition operations, the AOC is manned or augmented by joint, interagency, allied, and coalition personnel.¹¹ The nucleus of the air component commander staff should be trained in joint air operations and be representative of the joint force. Liaison elements and joint or coalition participants are embedded in this structure.

The air component commander normally has a targeting effects team (TET) as part of the AOC, with varied responsibilities that are key to the targeting process. The TET includes embedded personnel from the targets and tactical assessment (TTA) team of the AOC's ISR division. It links targets and capabilities to guidance on desired effects, deconflicts and coordinates target nominations, and provides other targeting support requiring component input at the operational level. If the JFC delegates joint targeting coordination authority to the air component commander, the TET also receives all target nominations and prioritizes them to form the draft JIPTL.

⁹ JP 3-30, [Joint Air Operations](#).

¹⁰ JP 3-31, [Joint Land Operations](#).

¹¹ Air Force doctrine recognizes that the air operations center, in joint or combined operations is correctly known as a joint AOC (JAOC) or combined AOC (CAOC). However, doctrine simply uses the term "AOC."

TARGETING RESPONSIBILITIES

AIR COMPONENT COMMANDER RESPONSIBILITIES

The targeting responsibilities of the air component commander are assigned by the JFC. As the air component facilitator for servicing of all targets nominated for airpower effects, the air component commander is responsible for establishing a targeting process that meets the needs of the JFC and all represented components within the AOC. Air component commander responsibilities are completely described in AFDP 3-30, [*Command and Control*](#).

The air component commander presents the JFC with all the equipment they require to conduct combat operations. This includes target data and materials, especially for mission areas like strategic attack and counterair, which are conducted principally by the air component.

UNIT-LEVEL TARGETING RESPONSIBILITIES

Individual units have targeting responsibilities that support and enhance [air operations center](#) efforts and tactical-level execution. Commanders, mission planners, and intelligence specialists within these units should ensure the validity and accuracy of the targeting information provided to them for mission planning purposes. This responsibility may include verification of ATO guidance, targeting coordinates, and adjudication of problems within the ATO if errors or conflicts become evident. Specific data provided to mission planners should be checked for integrity, including verification of the [joint desired point of impact](#) coordinates and elevations, weapon azimuths and impact dive angles, fusing instructions, collateral damage considerations, target area graphics, etc. when direct electronic transfer of such data is not possible or fails.

Air and ground units realize considerable benefits when working together to accomplish mission planning at the tactical level. Army ground liaison officers working with tactical air units can provide insight into ground component plans and offer direct coordination for missions flown in support of ground commanders. Air liaison officers are aligned with tactical ground maneuver units and serve as advisors to ground commanders on targeting and other aspects of [airpower](#). Such coordination is essential for joint operations. Refer to AFTTP 3-IPE, [*Integrated Planning and Employment*](#),¹² Section 1.6, for more discussion of unit-level targeting responsibilities.

SUPPORTING RELATIONSHIPS

Targeting is a collaborative effort. Targeteers should coordinate with many different teams to ensure the flow and management of data and database information in the

¹² Common access card required.

AOC is as seamless as possible.¹³ Ensuring targeting and collection management databases are the same may reduce the time required to task collection assets to support targeting efforts, especially in the case of dynamic targeting. Those with whom targeteers should coordinate include (but are not limited to):

- ✦ **Analysis, Correlation, and Fusion (ACF) Team.** The ACF team in the intelligence, surveillance, and reconnaissance division (ISR/D) is responsible for updating enemy order of battle (EOB) databases. Targeteers should be able to pull from these databases to ensure targeteers are using the most current EOB.
- ✦ **ISR Operations Team.** The ISR operations team in the ISR/D is responsible for planning and coordinating intelligence-gathering missions by air component assets. They also have insight into intelligence-gathering platforms that the air component does not own, including spacecraft.
- ✦ **TTA Team.** The TTA team is comprised of two primary cells, the target development cell and the tactical assessment cell, which provide direct support and embedding of personnel to other AOC divisions to ensure continuity in the targeting effort. This team provides full-spectrum effects-based targeting development, solutions, products, and materials in support of the [air tasking cycle](#). It is also responsible for assessing the immediate results and effects of capability employment during tactical operations. These assessments may lead to some type of follow-on action by friendly forces.
- ✦ **Senior Intelligence Duty Officer (SIDO) Team.** The focal point for ISR execution in the combat operations division, led by (and sometimes consisting only of) the SIDO. The team provides intelligence support to ATO execution in the areas of analysis, collection management, targeting, and assessment. Access to the Joint Targeting Database (JTDB) within the MIDB enables seamless targeting support when the ATO requires modification. This access is magnified when supporting dynamic targeting operations, especially those involving time-sensitive targets.
- ✦ **Operational Assessment Team (OAT).** The OAT in the strategy division is responsible for analyzing the effectiveness of past and present joint air operations. Since the JTDB is used by the OAT, targets tasked or executed during the ATO cycle can be tracked to specific effects and objectives.
- ✦ **Strategy Plans Team.** The strategy plans team in the strategy division is responsible for building the overall air component strategy and the [joint air operations plan](#) (JAOP). This phase of planning may require access to the JTDB within MIDB to support JAOP creation.

¹³ See Department of the Air Force Manual (AFM) 13-1 AOC, Vol. 3, [Operational Procedures-Air Operations Center \(AOC\)/Operations Centers \(OC\)](#) and Air Force Tactics, Techniques, and Procedures (AFTTP) 3-3.AOC, [Air Operations Center](#) (common access card required) for expanded discussions on AOC divisions and teams.

- ✦ **Strategy Guidance Team.** The strategy guidance team is responsible for the AOC's transition from operational-level to tactical-level planning and culminates in the [air operations directive](#) (AOD). The guidance provided is typically short-range, within 24 hours to 10 days from execution. This team develops operational guidance and prioritizes operational and tactical objectives.
- ✦ **Space Operations Specialty Team (SOST).** The SOST consist of space operators to support theater operations. They are embedded into the strategy, plans, and combat operations divisions to fulfill multiple roles to serve as theater advisors for space capabilities (national, military, civil, commercial, and foreign). See AFTTP 3-3.AOC for more information.
- ✦ **Non-Kinetic Team (NKT).** The NKT is the Air Force element of the CCMD's joint electromagnetic operations cell, and provides the focal point for ensuring the synchronized planning, execution, and assessment of information operations (IO) and kinetic or non-kinetic capabilities into the targeting cycle to create nonlethal effects. Its primary operations are electronic attack, electronic warfare support, space control, offensive cyberspace operations, and defensive cyberspace operations. Additionally, the NKT serves as the integration point employing information-related capabilities via military information support, operations security, and military deception. The NKT leads and develops IO and non-kinetic capability requirements as part of the effects-based approach to targeting for both preplanned situations via the air tasking cycle and dynamic situations. See [AFDP 3-0](#); AFDP 3-12, [Cyberspace Operations](#); AFDP 3-13, [Information Operations](#); AFDP 3-14, [Counterspace Operations](#); AFDP 3-51, [Electromagnetic Warfare and Electromagnetic Spectrum Operations](#) and [AFTTP 3-3.AOC](#) for more information.

In addition, targeteers should also coordinate with Service liaisons. Each liaison represents their Service, component, or agency and provides critical communication to the targeting process. This communication includes the submission of targets for consideration, coordination of targeting information and capabilities, targeting support, and many other functions. Please reference [AFDP 3-0](#) for more information. The following list of Service liaisons is not all inclusive:

- ✦ **[Battlefield Coordination Detachment \(BCD\)](#).** The BCD is the Army forces commander's liaison to the supporting air component commander's AOC. BCDs are assigned to Army Service component commands with duty at each numbered Air Force with a geographic AOC. The BCD expedites the exchange of information digitally and performs face-to-face coordination with elements in the AOC. See AFDP 3-03, [Counterland Operations](#), and [AFTTP 3-3.AOC](#) for more information.
- ✦ **[Special Operations Liaison Element \(SOLE\)](#).** The SOLE is a joint element provided by the joint force special operations component commander or joint special operations task force commander. SOLE personnel work with the various AOC functional areas

to ensure that all special operations targets, teams, air taskings, or missions are deconflicted, properly integrated, and coordinated during all planning and execution phases. See [AFDP 3-0](#), AFDP 3-05, [Special Operations](#), and [AFTTP 3-3.AOC](#) for more information.

REACHBACK AND FEDERATED OPERATIONS

Targeteers are consumers of multi-source intelligence and operate across both the intelligence and operations functions. Manning and targeting resources at the [joint task force](#) (JTF), AOC, and [joint intelligence operations center](#) (JIOC) are typically insufficient to support robust target planning and execution. The targeting process requires resources from many organizations to meet the commander's targeting demands. Targeting, therefore, requires [reachback](#) support and federated operations to be effective. Communications, information, and targeting systems of record should be established and coordinated to provide a seamless information flow of data between forward and rear locations. Degraded environments place additional stress on communication systems, which affects both conventional and nuclear forces. Operations in a nuclear or radiological environment increase requirements for communication of information between supporting and supported commanders, and to fielded forces.

Two sources of support normally used in the targeting cycle include reachback and federated operations. Staffing includes multi-domain functional and mission area experts, including ISR; meteorological and oceanographic; logistics; legal; airspace; plans; communications personnel; air-to-air; air-to-ground; ground-to-air; information operations; air refueling; [space operations](#); [cyberspace operations](#); electromagnetic spectrum operations; and other areas.

Reachback is the process of obtaining products, services, applications, forces, equipment, or material from organizations not forward deployed.¹⁴ For example, during contingency operations, an ISR wing may stand up a crisis management element (CME) to provide direct targeting support to the air component commander. Personnel assigned to the CME may operate in a supporting relationship to the air component commander.

[Distributed operations](#) in support of targeting occur when independent or interdependent nodes or locations participate in the operational planning. In some instances, the commander may establish a formal supported-supporting relationship between distributed nodes. In other instances, distributed nodes may have a horizontal relationship.

¹⁴ [JP 3-30](#).

During the course of [Operation] ODYSSEY DAWN, the Air Force Targeting Center developed approximately 75 percent of our targets, 90 percent of our weaponeering solutions and over 90 percent of our TLAM targets. But that's not all...*

Since minimizing collateral damage was a primary objective, pre-strike collateral damage estimates and post-strike battle damage assessments were critical to making effective operational decisions.

The Targeting Center combined Airmen from multiple targeting related disciplines into a single support cell, using newly created procedures and sensitive intelligence to provide rapid, accurate assessments on both sides of the kill chain. All told, the Targeting Center provided approximately three-quarters of our collateral damage and virtually all our battle damage assessments. In my estimation, our ability to rapidly find, fix and target the enemy was a game changer in ODYSSEY DAWN.

—Maj Gen Margaret H. Woodward

Commander 17th Air Force and U.S. Air Forces Africa

Remarks at the Air Force Association's 2011 Air & Space Conference & Technology Exposition, National Harbor MD., 21 Sep 2011

*The Air Force Targeting Center is now the 363 ISR Wing

[Split operations](#) are a type of distributed operations. The term describes those distributed operations conducted by a single organization separated between two or more geographic locations. A single commander should have oversight of all aspects of a split operation. For example, sections of the ATO may be developed from a rear area or backup operation center to reduce the deployed AOC footprint. In this case, the AOC is geographically separated and is a split operation. During split operations, the air component commander has the same degree of authority over geographically separated elements as he or she does over the deployed Air Force forces and AOC.

Although distributed operations are similar to reachback, there is one major difference. Reachback provides ongoing combat support to the operation from organizations that are not forward deployed, while a distributed operation indicates teaming with forward deployed independent or interdependent nodes. With distributed operations, some operational planning or decision-making may occur from outside the joint area of operations. The goal of effective distributed operations is to support the operational commander in the field; it is not a method of command from the rear. The concept of reachback allows functions to be supported by a staff at home station to keep the manning and equipment footprint smaller at a forward location.

Federated operations are based on the needs of CCDRs, other JFCs, or the air component commander. Joint targeting federation needs are coordinated with the larger joint community and national agencies through the JTF staff J-2's targeting directorate. Coordination should delineate specific duties to federated partners, establish timelines, and determine the methods of communication to be used.

While the air component commander may have direct authority over some units, the air component commander may not have control over targeting organizations beyond the AOC or those units/personnel who augment the air component. The AOC is nominally manned day-to-day but may not be suitably manned to support combat phases. Theater strategists, planners, and targeteers must develop the necessary formal and informal relationships with supporting organizations before combat operations to ensure surge planning capability during major contingencies. Formal relationships for targeting support, through federation, distribution, or reachback should be established and documented in the [operation plan](#), JAOP, and memoranda of understanding or memoranda of agreement whenever possible.

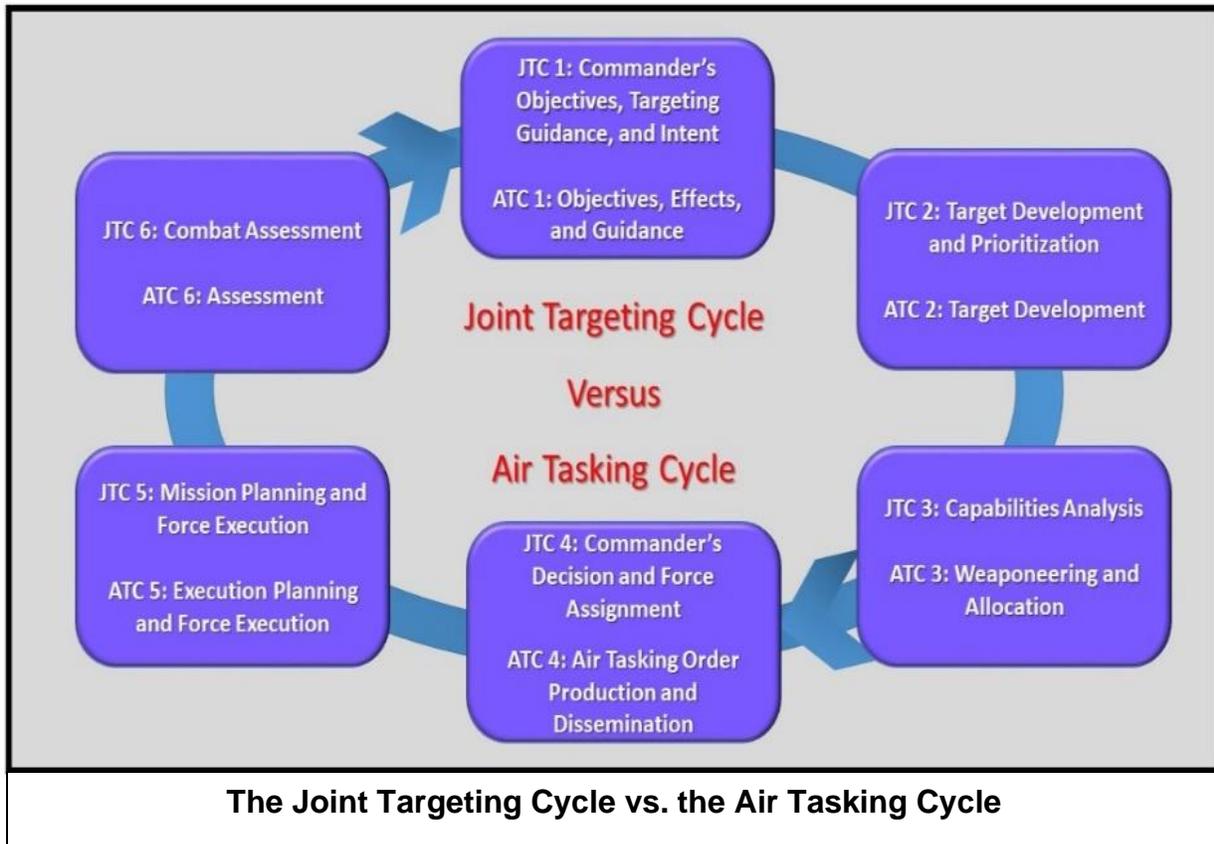
Targeting expertise is spread across the Department of Defense enterprise that encompasses a range of targeting capabilities and specialization. Key organizations and capabilities are listed in [Appendix C](#).

TARGETING AND THE AIR TASKING CYCLE

The [air tasking cycle](#) is the air component commander process for effective and efficient employment of joint air capabilities. It is a methodical, iterative, and responsive process that translates operational-level guidance into tactical-level plans. The air tasking cycle promotes flexibility and versatility with a series of ATO's and related products in progress at any time and by responding during execution to changes in the OE. The air tasking cycle consists of the following stages:

- ✦ Objectives, Effects, and Guidance.
- ✦ Target Development.
- ✦ Weaponeering and Allocation.
- ✦ ATO Production and Dissemination.
- ✦ Execution Planning and Force Execution.
- ✦ Assessment.

The air tasking cycle and joint targeting cycle are separate yet integrally related processes.



CHAPTER 2: DELIBERATE TARGETING

Deliberate targeting provides a systematic analytical approach that focuses targeting efforts on supporting operational requirements and the commander's objectives. It helps focus the appropriate capabilities against adversary targets at the right time and place to impose specific desired effects that achieve joint force objectives.

Deliberate targeting is a planning process for targets that are detected, identified, and developed in sufficient time to schedule actions against them in tasking cycle products such as the ATO. It normally supports future plans which are focused on all planning activities from 72-96 hours in the future, but not including, the current ATO execution day. Deliberate targeting prosecutes targets in one of two ways: 1) plans and schedules specific actions against specific targets and 2) creates on-call packages or missions that deal with targets through a pre-determined CONOPS. Preplanned missions are typically used against fixed targets or targets that are transportable, but operate in fixed locations. On-call missions can be used against fixed, transportable, and mobile targets. For instance, a fixed building may be watched, but does not become a target until some critical person, group, or equipment arrives, at which time the on-call mission is scheduled on the tasking order if actionable intelligence arrives in sufficient time. Other potential targets that are detected or become significant **during** the current execution period (once all formal products of the planning and tasking processes are issued) are dealt with using dynamic targeting.

Deliberate targeting is interwoven throughout the stages up to and including ATO production and dissemination. Effective deliberate targeting comes at a high cost in terms of the volume and flow of information. Targeting and assessment, which are integrally related, impose most of the intelligence collection burden the joint force carries—to support deliberate planning efforts before ATO execution, dynamic requirements during execution, and assessment during and after ATO execution. Successful targeting requires in-depth information on such things as enemy force posture; capabilities and movement; tactics, techniques, and procedures; centers of gravity; target vulnerabilities; enemy leadership's intentions, habits, movement patterns; the flow and interconnections of enemy economic behavior; and the linkages and interconnections within major infrastructure systems, such as electrical power and electronic communications webs. The process also takes into account such things as friendly objectives, CONOPS, ROE, target time constraints, and friendly force capabilities to create five general types of products:

- ✦ Target nominations and target lists intended to achieve desired effects which will accomplish commander's objectives while complying with the published guidance for the use of forces.
- ✦ Capability recommendations based upon effects chosen to achieve commander's objectives.

- ✦ Capability effectiveness estimates logically linked to effects specified during target development to support force application recommendations (may also include commensurate collateral damage estimates for targets of concern).
- ✦ Force and capabilities selection and planning.
- ✦ Target materials built to support current and future targeting efforts.

THE AIR TASKING CYCLE

The air tasking cycle develops the products needed to build and execute an [ATO](#) and accomplish assessment. It is a set of processes for [air apportionment, allocation,](#) and targeting, of joint, coalition, and allied air capabilities to produce the ATO. Refer to [AFDP 3-0](#), for a visual depiction of a typical tasking cycle. These processes are all closely interrelated and should work together as an integral whole if targeting and tasking are to be most effective. **Targeting and ATO production are essential to the tasking cycle. Although the targeting and tasking cycles perform separate and distinct functions, they are highly intertwined and require close coordination; the two cycles run almost in parallel.** Once a daily battle rhythm is established, the tasking cycle as a whole encompasses the entire process of taking commander's intent and guidance; determining where to apply force or other actions to fulfill that intent; matching available capabilities and forces with targets; putting this information into an integrated, synchronized, and coordinated order; distributing that order to all users; monitoring execution of the order to adapt to in the OE; and assessing the results of that execution. The cycle is built around finite time periods required to plan, integrate, coordinate, prepare, conduct, and assess air operations. These time periods may vary from theater to theater, but **the tasking cycle and its constituent processes drive the AOC's battle rhythm and thus helps determine deadlines and milestones for related processes, including targeting.**

A principal purpose of the air tasking cycle is to produce orders and supporting documentation to place a flexible array of capabilities in a position to create desired effects in support of the commander's intent. This cycle is driven by the tyranny of time and distance. Likewise, commanders should have enough visibility on future operations to ensure sufficient assets and crews are available to prepare for and perform tasked missions. These requirements drive the execution of a periodic, repeatable tasking process to allow commanders to plan for upcoming operations. The ATO execution period (usually 24 hours in duration) and the preceding process during which the ATO is developed (usually 72-96 hours in duration) are a direct consequence of these physical constraints.

The ATO conveys tasking for joint air operations for a specific period-of-time, normally 24 hours. Detailed planning generally begins 72 hours prior to the start of execution to properly assess the progress of operations, anticipate enemy actions, make needed adjustments to strategy, and enable integration of all components' requirements.

The air tasking cycle length may be based upon JFC guidance, air component commander direction, and theater needs. The length should be specified in theater standard operating procedures or other directives. If it is modified for a particular contingency, this should be specified in the JFC's [operation plan](#) (OPLAN) or the air component's JAOP. The net result of this part of the tasking cycle—and of the deliberate planning of targets—is that there are usually five [ATOs in various stages](#) of progress at any one time.

- ★ One, or more, previously executed ATO undergoing assessment at various levels.
- ★ Current ATO in execution.
- ★ Next ATO in production.
- ★ Next successive ATO in detailed planning (target development and weaponing).
- ★ Following successive ATO in strategy development (objectives and guidance).

Some assets may not operate within the established cycle. These include most space assets, which are tasked via the [combined space tasking order](#); cyberspace assets, which are tasked via a cyberspace tasking order; and airborne IO assets, which are tasked via the ATO. However, some theater-specific space and cyberspace operations may be included in the daily ATO for the sake of situational awareness, integration, and synchronization. During major conventional operations, special operations function within a 96-hour planning cycle; however, during contingency operations they often operate within or drive the dynamic targeting process. Certain IO and other non-kinetic capabilities operate within a 96-hour cycle as well, and it is critical for AOC planners to know if special operations forces (SOF) and IO personnel may assist with targeting. Intertheater air mobility assets also do not necessarily operate within the tasking cycle. In large operations, the existence of differing planning cycles among components can lead to increased complexity in the process. Most component planning cycles are approximately 72-96 hours. However, the requirement within the air tasking cycle to manage as many as five separate ATOs drives the requirement for discipline to manage defined inputs and outputs during particular segments of time.

Once the ATO is published, adjustments are made in the combat operations division and targeting decisions are handled through dynamic targeting. The final stage of the cycle is assessment, which is closely tied to ISR and may lag established battle rhythms and timelines due to its heavy dependence on [planning and direction, collection, processing and exploitation, analysis and production, and dissemination and integration](#).

It is accomplished primarily by the ISR division and the operational assessment team within the strategy division.¹⁵

At the tactical level, engagement authority normally resides with the weapon system operator for those planned events on the ATO being executed; following the principles of distributed control and decentralized execution. After planned missions on an ATO have been approved by the JFC, the air component commander passes engagement authority to the operators executing those ATO missions, who should adhere to all guidance included in the ATO [special instructions](#) (SPINS), [airspace control order](#) (ACO), ROE, etc.

¹⁵ See [AFM 13-1 AOC, Vol. 3](#), and [AFTTP 3-3.AOC](#), (common access card required) for expanded discussions on AOC divisions and teams.

CHAPTER 3: DYNAMIC TARGETING

[Dynamic Targeting](#) is a term that applies to all targeting that is prosecuted outside of a given day's preplanned ATO targets (i.e., the unplanned and unanticipated targets). It normally supports the current ATO execution with immediate targeting responsiveness to the active environment created by ongoing weapons employment and real-time, all-source identification of emerging and time-sensitive targets (i.e., unplanned and unanticipated targets). Dynamic targeting complements deliberate planning for targets, as part of an overall operation, but it poses special challenges. Likewise, it is controlled by strategy, the law of war, and ROE.

Dynamic targeting occurs in a much more compressed timeline, requiring special consideration and attention for all personnel assigned to support dynamic targeting. The importance of dynamic targeting is further emphasized by joint targeting doctrine. While not the sole responsibility of the air component commander, Airmen are heavily involved in planning and executing unplanned strikes. The JFC ultimately designates the responsibilities and authorities associated with the prosecution of dynamic targets and may often designate specific component responsibilities, based on location, capability, or target types.

It is essential for commanders and AOC personnel to keep effects-based principles and the JFC's objectives in mind during dynamic targeting and ATO execution. It is easy for those caught up in the daily battle rhythm to become too focused on tactical-level details, losing sight of objectives, desired effects, or other aspects of commander's intent. When this happens, execution can devolve into blind target servicing, unguided by strategy, with little or no anticipation of enemy actions.

Dynamic targeting is different from deliberate targeting in terms of the timing of the steps in the process, but not different in the substance of the steps. Ultimately, dynamic targets are targets—as such, their nomination, development, execution, and assessment still takes place within the larger framework of the [targeting and tasking cycles](#). Some are fleeting and require near-immediate prosecution if they are to be targeted. Such targets require a procedure that can be completed promptly and that facilitates quick transition from receipt of intelligence (“trigger events”), through targeting solution, to action. This compressed decision cycle is best handled through the specialized dynamic targeting sub-processes. Seen from the larger cycle's perspective, dynamic targeting takes place within stage five (execution planning and force execution) of the targeting and air tasking cycles. The earlier stages serve to provide commanders' targeting guidance and determine the CONOPS that will designate available resources. Ultimately, the JFC and air component commander should make decisions about these targets based on critical effects and timely intelligence information and may require reallocation of resources that could affect ongoing execution.

The combat operations division (COD) is responsible for implementing dynamic targeting within the current ATO cycle.¹⁶ Successful dynamic targeting, however, requires a great deal of prior planning and coordination with other divisions within the AOC and with other components based on the type of target. If dynamic targeting is to be done correctly, planners should develop a system that makes assets available to the COD prior to the start of targeting. This can be done in a number of ways, but the most common methods are:

- ★ Preplanning target reference methods and coordination measures such as kill boxes and combat area entry points or routes for cruise missiles.
- ★ Preplanning on-call or pre-positioned strike and ISR packages (including tanker support) for rapid response to emerging targets (such as on-call electromagnetic warfare, space and cyberspace operations, interdiction, or close air support missions available for tasking during ATO execution; missions on ground alert; and air-to-ground weapons loaded on aircraft performing defensive counterair missions).
- ★ Using JIPOE to determine the most probable areas where targets may emerge during execution.
- ★ Diverting airborne assets assigned to lower priority targets to strike the recently identified target.
- ★ Coordinating and synchronizing dynamic targeting operations by streamlining procedures.
- ★ Developing procedures for rapid handover of the mission tasking to another component for mission execution if the air component cannot attack an emerging target.

Divisions other than the COD have important roles to play in dynamic targeting. The strategy division (SRD) should capture macro-level targeting guidance to include component priorities in the AOD. Many items in the AOD, like commander's intent, anticipated weapons available, ROE, acceptable risk levels, and elements of the ISR collection plan provide vital information needed by operators and targeteers to develop and implement effective and timely effects-based responses. For instance, ROE are especially important to this form of time-compressed targeting. While the SRD typically drafts ROE inputs with advice from the servicing judge advocate, all involved in planning and execution should clearly understand the ROE. Compliance with ROE is a shared responsibility between the air component commander staff, subordinate command elements, and aircrews or operators. Due to the probable time-sensitive nature of

¹⁶ See [AFM 13-1 AOC, Vol. 3](#), and [AFTTP 3-3.AOC](#), (common access card required) for expanded discussions on AOC divisions and teams.

targets prosecuted during execution, clear guidance should be developed to enable rapid prosecution. Planners may need to convey the priority of the dynamic target in terms relative to a target that may not be engaged due to the reprioritization. In that same light, the priority of the ISR asset that may provide assessment information on that target should also be addressed, especially if there may be a dynamic change to the ongoing [joint integrated prioritized collection list](#) (JIPCL) missions.

Liaison officers (LNOs) from coalition partners, other components, and other Services are essential during dynamic targeting. LNOs—particularly the SOLE, BCD, and other government agencies—may be able to provide the air component commander with additional options for dealing with emerging targets, as well as provide locations and activities of friendly forces. LNOs work de-confliction issues and their forces may also assist friendly forces by finding, fixing, tracking, targeting, engaging, and assessing targets.

As stated earlier, dynamic targeting occurs in a much more compressed timeline. Successful prosecution of a target may require that targeting be completed in minutes. To achieve this time compression, the air component commander should consider implementing procedures that enable dynamic targeting to be performed simultaneously rather than sequentially. Ideally, one COD team should perform targeting of all dynamic targets. Creating separate teams may result in unwanted isolation, impede [unity of effort](#), and inhibit the cross-flow of information.

Successful dynamic targeting also requires well organized and well-rehearsed procedures. There is a need for sharing sensor data and targeting information, identifying suitable strike assets, obtaining mission approval, and rapidly deconflicting weapon employment. The reaction time between the sensor and shooter can be greatly accelerated if there are clearly articulated objectives, guidance, priorities, and intent for dynamic targeting before targets are even identified. The appropriate response for each target depends heavily on the level of conflict, the clarity of guidance to define the desired outcome, and ROE.

DYNAMIC TARGETING TASKING

[Dynamic targeting](#) includes prosecution of several [categories of targets](#):

- ✦ **JFC-designated time-sensitive targets (TST)**—targets or target sets of such high importance to the accomplishment of the JFC’s mission and objectives, or one that presents such a significant strategic or operational threat to friendly forces, that the JFC dedicates intelligence collection and attack assets, or is willing to divert assets away from other targets to engage it. Component commanders may nominate targets to the JFC for consideration as TSTs.

- ✦ **Component-critical targets (CCT)**—Targets that are considered crucial for success of friendly component commanders' mission but are not JFC-approved TSTs. If not approved as TSTs by the JFC, these component-critical targets may still require dynamic targeting with cross-component coordination and assistance in a time-compressed fashion.
- ✦ Targets that are scheduled on the ATO being executed but have changed status in some way (such as FSCM changes).
- ✦ Other targets that emerge during execution that friendly commanders deem worthy of targeting, prosecution of which may not divert resources from higher-priority targets.

Each of the four categories of targets specified is prosecuted via the same dynamic targeting portion of the tasking process—they differ only in relative priority.

ROE, [combat identification](#) (CID), [positive identification](#) (PID), and target validation all play important roles in dynamic targeting.

- ✦ ROE comprises the directives that delineate the circumstances and limitations under which US forces will conduct combat operations. They provide a framework that encompasses national policy goals, mission requirements, and the rule of law. **All targeting decisions must be made considering the applicable ROE.**
- ✦ For prospective targets, there are essentially three levels of CID, which must be acquired prior to engagement that are relevant to AOC personnel and those tasked to carry out actions against them. At the first level, the track or entity is identified as friendly, foe, or neutral. At the next level, the prospective target's type of platform is identified. This may aid in determining the nature of tactical action required and assist in prioritizing the target. Finally, a third level entails determining the prospective target's intent (as by its track relative to friendly forces) when possible. This should further aid in establishing the prospective target's priority and may sometimes entail reclassifying a target as a TST based on its potential threat to friendly forces. **CID characterizations, when applied with CCDR ROE, enable engagement decisions and the subsequent use or prohibition of kinetic and non-kinetic capabilities.** CID is used for force posturing, command and control, situational awareness, 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.
- ✦ PID is conducted through observation and analysis of target characteristics including visual recognition, electronic support systems, non-cooperative target recognition techniques, identification friend or foe systems, or other physics-based identification techniques, and **is informed by CID processes.**
- ✦ Target validation ensures that targets meet the objectives and criteria outlined by the commander's guidance and ensures compliance with the law of war. Target validation

during dynamic targeting includes analysis of the situation to determine whether planned targets still contribute to objectives, whether targets are consistent with the existing ROE, whether targets are accurately located, and how planned actions will impact other friendly operations. **The PID decision is crucial to having a valid target.**

Emerging Terminology: JFC Critical Targets

By definition, “time-sensitive target” implies that creating effects against a target needs to happen quickly. Many targets are “time-sensitive”—they may be fleeting targets of opportunity (e.g., enemy leader leaving a compound) or pose an imminent, direct danger to friendly forces (e.g., enemy forces flanking friendly forces). “JFC-TST” is appropriate for such circumstances. However, the way the term is currently used, it also encompasses high priority targets that are not time-sensitive (e.g. enemy higher headquarters or communication node). Using “time-sensitive” in these cases may add confusion to the process and adversely affect decisions relating to whether to strike a target and how to strike it. To distinguish between high priority targets and time-sensitive targets, the term “JFC-Critical Target (JFC-CT)” has been introduced. While “JFC-TST” is still in use, targeteers should ensure they understand target prioritization and timing involved regardless of the title. Of note, JFC-TSTs and JFC-CTs can be targeted in deliberate planning and dynamic targeting cycles.

Although dynamic targeting is presented as separate, sequential stages, the **targeting process is bi-directional, iterative, multi-dimensional, sometimes executed in parallel, and part of a larger set of processes.** It is built on a foundation laid by thorough JIPOE. Participants from the AOC’s strategy; ISR; plans; and operations divisions accomplish various targeting responsibilities, integrating their products into all levels and stages of the air tasking cycle.

THE DYNAMIC KILL CHAIN

Dynamic targeting consists of six distinct steps: find, fix, track, target, engage, and assess (F2T2EA) as explained in AFTTP 3-2.3, [Multi-Service TTP for Dynamic Targeting](#). This method referred to as F2T2EA or colloquially as the “kill chain.” ***The F2T2EA kill chain applies equally to the use of military capabilities to achieve lethal or nonlethal effects through non-kinetic means, such as information operations, airdrop, space operations, or directed energy. The decision to employ these capabilities is based on their availability, desired effects, potential consequences, and the JFC’s guidance.*** Each step is discussed below.

FIND

The [find step](#) involves detection of an [emerging target](#), which various aspects of its characterization will result in it being placed into one of the dynamic targeting categories listed above. The find step requires clearly designated guidance from commanders, especially concerning target priorities, and the focused ISR collection plan based on JIPOE, to include named areas of interest and target areas of interest. Following this collection plan leads to detections, some of which may be emerging targets, that meet sufficient criteria (established by the AOC with commander's guidance) to be considered and developed as targets. The time sensitivity and importance of targets may be initially undetermined. Emerging targets usually require further ISR and analysis to develop and confirm.

Commanders should not task sensors without an idea of what they may collect. They should anticipate results, not request unfocused detection. The result of the find step is a potential target that is nominated for further investigation and development in the fix step.

FIX

The [fix step](#) positively identifies an emerging target as worthy of engagement and determines its position and other data with sufficient fidelity to permit engagement. When the emerging target is detected, sensors are focused upon it to confirm its identity and precise location. This may require implementing a sensor network or diverting ISR assets from other uses to examine it. The air component commander may have to make the decision on whether diversion of ISR resources from the established collection plan is merited, but this decision can often be made by AOC COD personnel. Data correlation and fusion confirms, identifies, and locates the target, resulting in its classification in one of the four target categories listed above. Target location and other information should be refined enough to permit engagement in accordance with PID and ROE requirements. An estimation of the target's window of vulnerability frames the timeliness required for prosecution and may affect the prioritization of assets and the associated risk assessment.

If a target is detected by the aircraft or system that may engage it (for example, by an armed remotely piloted aircraft, or platform with an advanced targeting pod), this may result in the find and fix steps being completed nearly simultaneously, without the need for additional ISR assets. It may also result in the target and engage steps being completed without a lengthy coordination and approval process. Battle management systems (e.g., Airborne Warning and Control System (AWACS) and Joint Surveillance Target Attack Radar System (JSTARS) aircraft) can often fix target locations precisely enough to permit engagement without the need for further ISR collection. Growth in sensor technology has permitted "non-traditional" sources of ISR to supplement the find, fix, and track steps. Integrating data from platforms other than those traditionally dedicated to intelligence collection, to include information gleaned from weapons

systems or even munitions themselves, helps to build a common operational picture that commanders can use to shorten the F2T2EA cycle.

TRACK

The [track step](#) takes a confirmed target and its location, maintaining a continuous track. Sensors should be coordinated to maintain situational awareness and track continuity on targets. Windows of vulnerability should be updated when warranted. This step may require re-prioritization of ISR assets, just as the fix step may, to maintain situational awareness. If track continuity is lost, it may be necessary to re-accomplish the fix step—and possibly the find step as well. The track step results in track continuity and refining the target identification. This is maintained by appropriate sensors or sensor combinations, a sensor prioritization scheme (if required), and updates on the target's window of vulnerability (if required). The process may also be run partially “in reverse” in cases where an emerging target is detected and engaged. Once it becomes clear that it is a valid target, the sensors detecting it can examine recorded data to track the target back to its point of origin, such as a base camp. This could potentially identify threats or more lucrative targets. Such *point of origin hunting* has proven especially useful during stability and counterinsurgency operations such as those in Iraq and Afghanistan.

TARGET

The [target step](#) takes an identified, classified, located, and prioritized target; determines the desired effect and targeting solution against it; and obtains required approval to engage. During this step, COD personnel review target restrictions, including collateral damage, ROE, law of war, the [no-strike list](#), the [restricted target list](#), and [fire support coordination measures](#) (FSCM) In essence, the targeting and operational members of the COD must accomplish all facets of the “target validation” and [joint integrated prioritized target list](#) approval processes that occur for deliberate targeting process. This step also accomplishes effects validation, weaponeering and capabilities analysis, and [collateral damage estimation](#) analysis. COD personnel match available strike and sensor assets against desired effects, then formulate engagement options. They also submit assessment requirements.

The selection of assets for a specific target may be based on many factors, such as the location and operational status of ISR and strike assets, support asset availability, weather conditions, ROE, target range, the number and type of missions in progress, available fuel and munitions, the adversary threat, and the accuracy of targeting acquisition data. This can be the lengthiest step due to the large number of requirements that should be satisfied. In many cases, however, dynamic targeting can be accelerated if target step actions can be completed in parallel with other steps.

ENGAGE

In the [engage step](#), identification of the target as hostile is confirmed and engagement is

ordered and transmitted to the operator of the selected weapon system. The engagement orders should be sent to, received by, and understood by the operator of the weapons system. The engagement should be monitored and managed by the engaging component (for the air component, by the AOC). The desired result of this step is successful action against the target.

ASSESS

In the [assess step](#), predetermined assessment requests are measured against actions and desired effects on the target. ISR assets collect information about the engagement according to the collection plan (as modified during dynamic targeting) and attempt to determine whether desired effects and objectives were achieved. In cases of the most fleeting targets, quick assessment may be required to make expeditious reattack recommendations.

DYNAMIC TARGETING AUTHORITY

The authority to engage should be delegated to the command and control (C2) node that has the best information or situational awareness to execute the mission and direct communications to the operators of the weapon systems involved. If the air component commander is delegated TST engagement authority by the JFC, the air component commander may delegate their engagement authority to a lower level (e.g., AOC director or chief of the combat operations division). The air component commander has the authority to redirect those forces under operational or tactical control. For all others, the affected component commander should approve all requests for redirection of allocated air assets. Components may also recommend changes to the AOC as appropriate, given emerging JFC and component requirements.

In dynamic targeting situations, where the target is not specified in the ATO prior to takeoff or targeting, engagement may require that the operator be “cleared to target” from a C2 element outside the AOC, including the JSTARS, AWACS, tactical air control party, or forward air controllers (ground or airborne). This is due to identification or other restrictions required prior to attack.

Engagement authority for those events that the AOC maintains control over may be passed to aircrews, via the TACS, with required criteria to be met for weapon release, when appropriate. Engagement authority for certain sensitive targets may reside at a higher level than the JFC and should be passed appropriately through the component commander when the situation dictates.

Placing the appropriate level of battlespace awareness at subordinate C2 nodes can streamline the C2 cycle and allow timely dynamic targeting. Decentralized C2 nodes will exchange target information (type, classification identification, location, etc.) through common data links (e.g., Link 16, ultra-high frequency radio, wide area networks, etc.)

with a fidelity that permits them to operate as a single, integrated C2 system to effectively perform decentralized, coordinated execution of time-sensitive attacks.

TARGETING RISKS

Understanding the level of acceptable risk is critical to successful targeting during execution. With compression of the decision cycle comes increased risk due to insufficient time for more detailed coordination and deconfliction. Commanders should assess risk early, determine what constitutes acceptable risk, and communicate their intent. JFC guidance may stipulate acceptable risk when engaging TSTs; if not, the air component commander should seek to obtain it. When new targets are acquired, Airmen in the AOC and in the field should rely on commanders' guidance, ROE, and their own experience to assess acceptable risk.

Some targets may be of such a grave threat to the force or to mission that the air component commander may accept more risk to attack the target immediately upon detection. Items to be considered in the risk assessment include:

- ★ Risk of friendly fire incidents, risk to non-combatants, and collateral damage potential.
- ★ [Law of war](#) and ROE compliance.
- ★ Risk to attacking forces due to accelerated or limited planning and coordination.
- ★ Redundant attacks and wasting limited resources.
- ★ Accepted use of non-optimum capabilities and potentially limited effects.
- ★ Opportunity costs of diverting assets from planned missions.

These considerations should be balanced against the risk of not attacking the target in time, harm to friendly forces, or losing the opportunity to strike the target. More commonly, the risk associated with dynamic targeting involves the trade-off of diverting ISR and strike assets from scheduled missions to emerging targets. This should only be done when commanders' priority given to the new target exceeds that of the preplanned target. Proper planning for on-call assets can mitigate much of this opportunity cost.

CHANGES AND LIMITATIONS DURING DYNAMIC TARGETING

The AOC's COD should be ready to respond with new targeting information to provide seamless operations when changes occur. These include:

- ★ **Responding to changes in friendly operations.** For instance, if an aircraft that was tasked to prosecute a target must abort for maintenance reasons, the COD should know the target's relative priority to provide appropriate targeting guidance. If the

target is low priority, it may be best to place it on a subsequent day's ATO. If higher priority, COD personnel must determine how best to direct or divert resources to prosecute the target. COD personnel may have the best picture of what resources are available and the opportunity cost of diverting such resources. Likewise, if an aircraft or package is diverted to prosecute a TST, the COD should identify the target(s) which may no longer be struck, as well as the new target which may be attacked. This information should be passed to targeteers and intelligence collection managers to ensure coordinated collection and assessment of these new targets.

- ★ **Responding to changes in weather.** Changes in weather may require changes to the platforms or weapons required to engage a particular target. Target planners should ensure that the AOC weather specialty team is engaged and plan accordingly.
- ★ **Re-targeting.** If a target that was to be prosecuted is no longer viable, for whatever reason, targeteers should have alternate targets to assign the strike mission. Time is important because assets may already be airborne.
- ★ **Responding to TSTs.** When a TST is identified, the COD should decide the best time to engage. COD targeteers are involved in these efforts and provide guidance to planners concerning the characteristics and vulnerability of the target. Targeteers should be familiar with possible targets so that quick assessments and guidance can be given before the window of opportunity closes.

Dynamic targeting has two significant limitations: the lack of detailed capability analysis and possible increased threat exposure. Commanders and the COD should consider these limitations when deciding whether to prosecute a target using dynamic targeting methods.

- ★ **Capability Analysis.** Due to reduced planning time available, targets prosecuted using dynamic targeting may be engaged with less consideration given to key issues, such as fuse settings or axes of attack. In some cases, assets may be diverted to prosecute these targets with munitions that are not optimal for the given task. Since these considerations may carry increased risk of mission failure, collateral damage, or even harm to friendly troops, commanders should weigh the potential benefits gained by prosecuting the target quickly. The COD should work with targeteers to ensure their proposed capability analysis solutions work for the given task.
- ★ **Increased Threat.** Denied environment targets are normally attacked by packages with dedicated support, such as electronic jamming and suppression of enemy air defenses. The shortened dynamic targeting planning window may not allow for the same level of support, thereby exposing aircrews to greater risk. Time for threat analysis is also reduced, further increasing risk to aircrews and weapon survivability.

CHAPTER 4: TARGET PLANNING

Planning encompasses all the means through which strategies and courses of action (COAs) are developed, such as operational design and contingency planning. Joint planning employs an integrated process for orderly and coordinated problem solving and decision-making of the JFC's desired objectives. In its peacetime application, the process is highly structured to support the thorough and fully coordinated development of contingency plans. In crisis, the process is shortened as needed to support the dynamic requirements of changing events. In wartime, the process adapts to accommodate greater decentralization of joint planning activities. Joint planning is conducted through the JPP to develop effective plans and orders. The JPP is applicable for all planning and results in campaign plans, contingency plans, or operation orders. See JP 5-0, [Joint Planning](#), for more details on the JPP.

Targeting supports operational-level planning and validates that operational plans can be accomplished within the time and resources available. It helps create the detailed tactical-level products, usually appended to operational-level plans, for the opening phases of action. From guidance to assessment, targeting is a critical component in activities across the [competition continuum](#) and range of military operations. The objectives, guidance, and intent derived during planning guide all efforts, including targeting, throughout employment and assessment. This serves to inextricably tie planning, employment, and assessment together. Operational planning continues once operations commence, the battle rhythm is under way, and as adversary actions are evaluated or anticipated by revising strategy and implementing branches and sequels.

The effects-based principles set forth in AFDP 3-0, [Operations and Planning](#), should guide all planning efforts, including targeting. An effects-based approach is even more critical for success in stability operations such as counterinsurgency and peace enforcement because it may rely more on non-kinetic and nonlethal means and less on types of effects for which cause and effect are well understood. An effects-based approach to operations and targeting ensures that every effect delivered can be linked to the JFC's end state, objectives, and plans. **Within targeting, EBAO focuses on why we are taking an action rather than what action we are taking.** To exploit the full range of possible effects in a given situation, planners should understand what effects are desired, how they relate to actions and objectives, how to measure different effects, and how various types of effects can be exploited to yield desired outcomes.

PLANNING FOR AIR OPERATIONS

As part of a joint or combined force, the Air Force uses the JPPA, the equivalent of the JFC's JPP. It is a seven-step process often performed in sequence or in parallel to the JPP. The JPPA produces the JAOP and the AOD. The AOD guides the rest of the [air tasking cycle](#) through its iterative execution as part of an ongoing battle rhythm. Planning sets the stage for all other actions and is where effects-based principles have the greatest effect on operations. Plans should link actions to effects to objectives, into

a logical, coherent strategy. Air Force targeting principles may be applied to all instances in which military force is planned and executed. Air Force targeting personnel are involved in activities at all levels of command and joint multi-domain operations. Targeteers and other planners should keep effects-based concepts in mind while building formal plans and conducting ongoing [planning of targets](#). Almost all targeting support to pre-conflict planning is accomplished through the JPPA. The targeting intensive aspects of JPPA are discussed below.

INITIATION

The air component commander and staff perform an assessment of the initiating directive to determine time available until mission execution, current status of intelligence products, and other factors relevant to the specific planning situation.

MISSION ANALYSIS

During this step, JIPOE begins. To fully support an effects-based campaign, the intelligence community should conduct robust JIPOE to inform planning. JIPOE provides a comprehensive framework for ISR support to planning and COA selection. Consequently, JIPOE should assist commanders in anticipating enemy intent and enable them to preempt enemy actions. The JIPOE process continues throughout planning by examining adversary and friendly capabilities, adversary intent, and the OE. Enemy and friendly centers of gravity (COGs) are also identified during this initial stage of the JPPA. As mission analysis is refined through later stages of the JPPA, enemy COGs are analyzed, yielding critical vulnerabilities or other key system nodes. These are further examined through target system or nodal analysis to yield targets or target sets, critical elements, and aim points, as well as commander's critical information requirements for JIPOE and tactical assessment.

Such analysis carries a considerable information-flow cost. To properly identify collection and exploitation requirements for targeting, [target system analysis \(TSA\)](#) **and or targeting effects studies should begin well in advance of operations and should continue throughout.** It should begin during the initial stages of JIPOE and draw upon as much ongoing peacetime intelligence and targeting material as is available for the theater or area of operations. Space, cyberspace, the electromagnetic spectrum, and information operations should already be fully integrated into mission analysis, JIPOE, and TSA. Target development should also integrate specialized analysis in support of space, cyberspace, electromagnetic spectrum, and information operations.

COA DEVELOPMENT

JIPOE is refined during this stage and includes detailed analysis of COGs identified during mission analysis. COG analysis is important to targeting efforts because it identifies the enemy's sources of power and will to fight and tries to discover how and

where those sources of power are vulnerable, what critical nodes exist, and how they can be exploited by the full capabilities of the joint force (e.g., air, space, cyberspace, electromagnetic spectrum, information operations, etc.). Critical vulnerabilities can be difficult to discern from critical requirements or to translate into explicit target sets. Translating vulnerabilities into targets is normally the foundation for COAs. However, the JFC may direct a certain COA.

PLAN AND ORDER DEVELOPMENT

The JAOP, describes how the air component supports the JFC's operational plan. During JAOP development, deliberate planning of targets is used to develop targets and target sets included in the JAOP and its attachments. Even if targeting information developed during planning is not included in the JAOP or its attachments, JAOP development may require considerable targeting effort to validate selected COAs, [concepts of operations](#), and other elements of the plan. Commanders and planners should know, at least approximately, how much effort and what resources are required to achieve the operation's desired effects. This knowledge can be gained by conducting some (at least notional) deliberate targeting systems analysis using existing TSA products, functional system products (e.g., power, roads, communications, chemical), targeting databases, and assessment of the total number of potential targets within the modern integrated database (MIDB) binned into functional categories (e.g., airfields, air defense, ballistic missile) before the conflict begins. Target selection should be based upon desired effects against enemy COGs, which in turn should be based upon the objectives for the conflict.

The JAOP should be effects-based, including lethal or nonlethal effects, as appropriate. It is the air component's main source of guidance. Targeting efforts play a major role in building an effects based JAOP by relating effects to particular targets and target systems while helping validate whether planned resources can achieve those effects. It should provide broad guidelines for prioritizing targets and target systems, as well as making clear which categories or sets are most important to the campaign. The JAOP should also provide guidance on the sequencing of targeting actions or effects, which is not the same thing as priority. Although parallel effects are generally best, sometimes targets require a higher priority to enable effects against other targets. The JAOP, as well as subsequently published [special instructions](#), AOD, and ATOs, should clearly articulate the commander's ROE that ensure operations comply with the law of war.

Finally, the JAOP should establish guidelines for dynamic, especially time-sensitive, execution. Dynamic targeting is one of the most labor-intensive and intellectually demanding challenges the air component faces. Anticipating as much of the challenge as possible and spelling out guidance and priorities in the JAOP may ease the burden on commanders and [air operations center](#) combat operations division personnel once

the daily battle rhythm begins.¹⁷ This may prevent mistakes during employment or may mitigate them. Planners should address as broad a scope as possible in as much detail as time and planning resources allow. This should include robust ROE and related legal considerations (see [Appendix A](#)).

Combatant commands with global functional missions, such as [US Cyber Command](#) (USCYBERCOM) and [US Strategic Command](#) (USSTRATCOM), may have [operational control](#) and [tactical control](#) of some functional capabilities. In such cases, coordinating authorities at the JFC and component level should be authorized to plan, coordinate, integrate, and execute their respective functional capabilities within the [operational area](#). Coordination requirements associated with these functional capabilities may result in long lead times that should be considered within the AOC planning and execution processes.

BASIC ENCYCLOPEDIA NUMBER SYSTEM

Target identifiers are a unique alphanumeric convention that can be assigned to a range of entities including facilities, individuals, equipment, organizations, and virtual structures. Target identifiers are included in the widely recognized basic encyclopedia number (BEN) system. Targeteers should understand the theater BEN plan. While many targets already have unique entity identification assigned, many identified during combat do not. Without an established plan for assigning BENs, components may take it upon themselves to assign them, creating the potential for confusion and incompatibility with targeting automation and databases. Confusion can adversely affect the [battle rhythm](#), or worse, result in targeting errors.

The naming convention should address both static and mobile targets. It is usually not feasible to assign standard BENs to mobile targets including high-value targets. However, for proper data base management, such mobile targets still require some sort of identification. While the numbers may not be actual BENs, the theater should have procedures to identify the target that aligns with the naming convention within Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3370.01C, *Target Development Standards*.

Ensuring standardized JDPI numbering is also important, especially given that the majority of JDPI production will be tasked to multiple supporting organizations. A theater DPI registry may ensure standardization of DPIs and eliminate duplication and possible error.

Proper database management is necessary for effective targeting. The Joint Targeting Toolbox (JTT) is the tool of record for the joint targeting community. However, there are still systems used in the field that are “stovepiped” and cannot talk to JTT or store data

¹⁷ See [AFM 13-1 AOC, Vol. 3](#), and [AFTTP 3-3.AOC](#), (common access card required) for expanded discussions on AOC divisions and teams.

within the modernized integrated database (MIDB). If support organizations lack appropriate interoperable systems and databases, it is the responsibility of the supported entity to work with the supporting entity and targeting and systems maintenance staffs to develop procedures during steady-state operations to overcome the difficulties associated with using systems that are not interoperable. Ideally, everyone should work from the same databases (i.e., data and imagery) to facilitate effective use of manpower and coordination.

The main targeting database is the MIDB with its associated data access layers, which can be accessed via the JTT and C2 tools like the Theater Battle Management Core System. Problems with compatibility between different versions of MIDB within the AOC weapons system versus the MIDB installed at CCDRs and the Defense Intelligence Agency has forced targeteers in some theaters to use workarounds to transfer data between systems. Specialized databases also exist with functional tools like Joint Capabilities Analysis and Assessment System and the Space Integrated Planning Service. Given the potential for incompatibility and diverging information, a thorough understanding of the interoperability and processes to maintain synchronicity between databases and C2 tools is necessary for successful execution of operations.

Steps have been taken to prevent datum errors. CJCSI 3900.01, [*Position \(Point and Area\) Reference Procedures*](#), was produced to provide clear guidance on the use of both horizontal and vertical datums and standard coordinate and height formats for most operations. The National Geospatial Intelligence Agency produces all new maps with the World Geodetic System 1984 (WGS 84) datum and in joint operations users should now reference horizontal and vertical coordinates to this datum. GPS also broadcasts its coordinates in this same datum. However, some possibility for error still exists. NGA reproduces certain older maps that use a WGS 72 datum. Also, if one is forced to use local maps, different countries use different datums. Most of the time, using datum conversion software can minimize the possibility for error. In any case, targeteers should understand the different datums used in their theater prior to hostilities so measures can be taken to ensure accurate coordinates are provided to warfighters.

Limiting the number of datums used in theater is the obvious solution. However, as this is not always possible, especially in coalition operations, targeteers should be aware of the different datum needs of all the capabilities that may be used in the operation.

AIR TASKING CYCLE STAGES

OBJECTIVES, EFFECTS, AND GUIDANCE

Purpose of the Objectives, Effects, and Guidance Stage

Objectives are the clearly defined, decisive, attainable, and measurable goals toward which every military operation should be directed. They provide focus for those at all stages of the [air tasking cycle](#) and give targeting personnel the overarching purpose for

their efforts. Clear understanding of the commander's objectives and guidance is essential for effective tasking and targeting. Guidance sets limits and boundaries on the objectives and how they are attained. It establishes constraints—things we *must* do—and restraints—things we *must not* do. Together, the two embody a large part of commander's intent for military operations.

This stage starts with JFC guidance to the joint force components. The JFC then decides on modifications to component commanders' COAs or schemes of maneuver, and issues guidance and intent. This may occur through the efforts of a [joint targeting coordination board](#) (JTCB). The JFC determines whether a separate JTCB will be created or whether this role will be performed by the JFACC. The JTCB provides a forum in which all components can articulate strategies and priorities for future operations to ensure they are synchronized and integrated. The JTCB normally facilitates and coordinates joint force targeting activities with the components' schemes of maneuver to ensure that the JFC's priorities are met. Accordingly, the air component commander should issue further guidance on the specific scheme of maneuver.

Additionally, the JFC should delegate authority to conduct execution planning, coordination, and deconfliction associated with joint air component tasking to the air component commander and should ensure that this process is a joint effort.

The air component commander should possess a sufficient C2 infrastructure, adequate facilities, readily available joint planning expertise, and a mechanism for accomplishing targeting, weaponeering, and assessment. The AOC provides the air component commander with these capabilities.

The JTCB should cover four broad topics:

- ✦ Assessment of campaign progress since the last meeting (usually the last 24 hours), with recommendations for future action.
- ✦ Broad guidance for the next 72 hours issued by the JFC.
- ✦ Major operations (schemes of maneuver) over the next 48 hours, briefed by each of the components.
- ✦ Macro-level review and guidance on joint maneuver and fires (especially, targeting and intelligence, surveillance, and reconnaissance [ISR] priorities) over the next 24 hours, to help guide joint dynamic targeting efforts for the upcoming execution period.

The air component commander should prepare for the JTCB by consulting with senior component liaisons and the staff to determine what modifications are needed to the air scheme of maneuver and to determine the [air apportionment](#) recommendation for JFC approval.

Once battle rhythm starts, the apportionment period is usually 24 hours. The apportionment recommendation can be approved as part of the JTCB or separately after it. Once approved, the apportionment decision should be included in the ultimate product of this stage, the AOD. In deriving guidance that may be considered at the JTCB and published in the AOD, the air component commander is supported by the AOC SRD's strategy plans and strategy guidance teams.¹⁸ The strategy guidance team is primarily responsible for producing the AOD. The SRD should also ensure the cyberspace and space operations directives are fully integrated and synchronized with the AOD produced by the AOC.

The objectives, effects, and guidance stage is also where effects and their accompanying measures of effectiveness (MOEs) and measures of performance (MOPs) are determined. Strategy guidance and strategy plans teams work closely with the CPD TET, and the ISRD to determine effects that achieve the stated objectives, select appropriate measures and indicators for assessment, and determine ISR requirements to collect against the MOEs. Results of this effort may be published as lists of tasks or desired effects in the AOD.

Finally, considerations of the law of war and ROE for the conflict may directly affect all stages of the tasking process (and thus targeting). Targeteers should understand and be able to apply the basic principles of these disciplines as they relate to targeting. See [Appendix A](#) for further discussion of the law of war and ROE.

Products of the Stage

The AOC SRD drafts the AOD for air component commander approval. In a normal battle rhythm, this is done on a daily basis. The AOD is the vehicle for the air component commander to express their intent for a specific day and communicate the JFC's air apportionment decision. Air apportionment guidance should reflect prioritized operational objectives and relevant tactical tasks with approximate weights of effort for each objective. Specific weights of effort should be avoided due to the difficulty in precisely measuring effects of air, space, and information operations, and to allow maximum flexibility in planning the application of airpower. However, the CPD can use these weights of effort, along with existing friendly force capabilities, to estimate the numbers of aim points by effect or objective to focus target development.

The prioritized tasks in the AOD should be effects-based and reflect commander's guidance and intent. By crafting effects-based tasks for the AOD, target developers within the AOC's ISRD gain the flexibility to identify and nominate the most effective means to create desired effects. Tasks that are not effects-based are often target-based, meaning that there is little flexibility in the selection of targets, and can lead to the inefficient use of scarce airpower resources. **The AOD is the primary**

¹⁸ See [AFM 13-1 AOC, Vol. 3](#), and [AFTTP 3-3.AOC](#), (common access card required) for expanded discussions on AOC divisions and teams.

vehicle for communicating desired effects to target developers and others involved in targeting on a daily basis. Detailed, logical lists of effects-based tasks with appropriate measures and ISR collection requirements are a necessary part of the AOD.

The JIPTL and JFACC Responsibilities

The air component commander should be delegated authority to approve the JIPTL as the JFC's representative. Accomplished in full view and in coordination with all components, this arrangement yields efficiencies by locating the JIPTL approval process with the targeting expertise resident within the AOC and potentially eliminating the requirement for a JTCCB. Alternatively, similar efficiencies can be gained by appointing the JFACC chair of the JTCCB versus a member of the JFC staff.

The AOD should also be used to express the JFC's and air component commander's guidance regarding what target categories (target sets) are time-sensitive, what the priority is among them, and what types of dynamic targeting would cause preplanned missions to be re-tasked. Categories of TSTs, high-value targets, and other objects of dynamic targeting should be presented in the context of the desired effects, and those desired effects prioritized against the desired effects for preplanned targets. This allows the COD to rapidly assess the value of preplanned targets against TSTs or emerging targets to determine whether to re-task air, space, or information assets. This guidance also reduces the possibility of all newly detected targets being struck. Just because a target can be engaged within the ATO execution period does not mean that effort should be diverted from preplanned targets to engage it.

While daily guidance is critical to subsequent stages of the ongoing tasking cycle, the SRD strategy plans team also works on longer-range planning, including study of branches and sequels. Conclusions drawn from this study should be disseminated throughout the AOC to assist in focusing later target development and intelligence collection efforts.

Finally, the AOD should include the air component commander's guidance on which targets or target sets require immediate assessment feedback. ISR and PED assets are usually limited in number and the collection requirements for target development, JIPOE, indications and warnings, and other taskings may have a higher priority than [combat assessment](#). Operations may be more efficient if assessment is focused on a select few high priority targets or sets.

TARGET DEVELOPMENT

Purpose of the Target Development Stage

Target development requires thorough examination of the adversary as a system of systems to understand where critical linkages and vulnerabilities lie. This is the stage in which the efforts of [deliberate targeting](#) relate specific targets to objectives, desired effects, and accompanying actions. Targeteers within the ISRD, the CPD, TET, and NKT take the effects determined during the objectives, effects, and guidance stage and analyze which targets should be struck (or otherwise affected). Critical elements are those elements of a target that enable the target to perform its primary function. Targeteers determine which critical elements enable enemy capabilities or actions are the focus of the commander's objectives and thus the source of the desired [direct and cascading effects](#) on the system. Critical linkages within a system often enable the functioning of several interrelated parts of the system. Affecting them in the right way can disable several components, or even cause cascading system-wide failure. Vulnerable targets are those that can be attacked or otherwise affected. Thorough analysis should identify critical vulnerabilities if they exist. These are elements of the adversary's system that are both critical and vulnerable.

Analysis is made effective through access to the community of subject matter expertise and information regarding the functioning of systems that support adversary capabilities. This research may require expertise beyond that normally available on the air component commander's planning staff. In such cases, [reachback and federation](#) entities may fill air component commander staff shortfalls. It requires cooperation with other planning staffs and national interagency groups throughout the process.

Target development involves six distinct functions, each discussed below:

- ★ Target analysis.
- ★ Target vetting.
- ★ Target validation.
- ★ Target nomination.
- ★ Intelligence gaps, collection, and exploitation requirements.
- ★ Target List Development.

The purpose of these together is to relate target development to tasking. The target nomination part of the process and the component [target nomination list](#) (TNL) usually culminates in a target coordination meeting, held by the TET with the assistance of the various joint components and multinational liaison elements. The TET collates target

nominations from all sources. It works with the ISRD and other agencies to analyze targets. It screens all nominated targets to ensure they meet [commander's intent](#) and are relevant. It allocates and prioritizes the nominated targets based on the best potential to achieve desired effects and objectives and coordinates to ensure other components' priorities and timing requirements are met. The product of this effort, when approved by the JFC or designated representative, is the JIPTL.

Target development influences and ultimately leads to target nominations and development of the JIPTL, JTL, RTL, and NSL. In combination with each component TNL, the JIPTL is ultimately created. As noted, all the stages of the tasking process are intertwined. Target development efforts can frequently force refinement of desired effects or even objectives, especially if weaponeering and allocation efforts indicate that a particular targeting avenue of approach is impractical. Target development efforts also frequently reach forward to influence weaponeering and allocation choices, dynamic targeting during execution, and the assessment process. The results of detailed target development are often stored in target system studies, individual target folders and targeting databases that can be studied by all levels of command and used in future target development efforts. Additionally, when detailed targeting development data are not available (e.g., a non-joint, strategic campaign plan-directed, planning effort), targeting and planning staffs should leverage the intelligence community functional target systems studies, models and simulations, and experts to support target development efforts.

Target Analysis

Target analysis takes the desired effects determined during planning or the first stage of the tasking cycle and matches them to specific targets. This analysis looks at the importance of various potential targets as enablers of enemy capabilities, as critical elements within enemy systems, or as potential trigger points for desired enemy behavior changes. There are many means available to accomplish this by applying capabilities across the spectrum of targeting (i.e., influence operations, physical attack, cyberspace attack, electromagnetic spectrum operations, etc.). Two of the most common means used in the past are target system and system-of-systems analysis.

TSA approaches targets and target sets as systems to determine exploitable vulnerabilities. Targeteers review how a functional target system works as a whole and analyze the interactions between components. TSA takes a system-of-systems approach to look at interdependencies and vulnerabilities between systems as well as intra-system dependencies to maximize the effectiveness of target development. Ideally, TSA production begins in peacetime, before the commencement of conflict, and is accomplished with federated support and reachback.

As part of a comprehensive system-of-systems analysis (SOSA) approach, TSA focuses on one or more of the many functional target systems identified by the Defense Intelligence Agency (DIA). These include infrastructure targets across an entire region

or nation (e.g., electrical power or petroleum, oil, and lubricants production), or non-infrastructure systems such as financial networks. SOSA seeks to find nodes common to more than one system, focusing on the interactions and interrelationships between system elements, to determine their degree and points of interdependence and to discern linkages between their functions. The goal of TSA is to find critical nodes and vulnerabilities that, if disrupted or affected in a specific manner, create effects that achieve the commander's objectives.

The analysis performed in target development proceeds through successively greater levels of detail, flowing from the macro (broad scope) level to the micro (narrowly focused) level. This winnowing approach is essential to preserve the linkage between desired effects and objectives and the specific actions that are taken against targets. It determines the necessary type, breadth, and duration of action that should be exerted on each target to generate effects that are consistent with the commander's objectives. Targets for consideration come from a variety of sources. Many are developed pre-conflict and confirmed during planning. These may or may not come from a theater JTL maintained in peacetime. Many more are suggested during JAOP development or by the SRD as the air component's strategy evolves during a conflict. Many are derived by the AOC's targeteers themselves, as target analysis suggests the means of creating desired effects.

Many targets are nominated by space, cyberspace, and electromagnetic spectrum operations elements and other joint force components in the form of a TNL to create that component's desired effects. Upon dissemination of the AOD, and based on JFC guidance, components begin to develop their nominations for inclusion in the next ATO. Some targets may be suggested by government agencies outside the Department of Defense or by foreign governments. The product of target analysis is a list of proposed target nominations designed to achieve the effects determined in earlier stages of planning (such as JAOP development or the objectives, effects, and guidance stage of the tasking cycle), which may then be validated. Other products may include creating or adding to no-strike or restricted target lists (see "products of the stage," below). Target research within the tasking cycle often entails studying previously unidentified or unlocated targets. Responsibility for the research lies primarily, but not solely, with the TTA team of the ISRD, which uses federated and reachback support to ensure that the AOC obtains, analyzes, and disseminates the information needed for further target development. Integration of full spectrum targeting capabilities is a critical part of identifying targeting opportunities and creating the appropriate lethal and nonlethal effects.

Determining the status of previously struck targets; enemy recovery and recuperation efforts, and changes in enemy tactics, processes, and strategy is a function of the TTA team. This information is critical in validating the effectiveness of friendly action. It helps shape ongoing target development within the tasking cycle by showing where re-strikes or other further action may be required. It is also crucial to the SRD's efforts to identify needed changes in the overall campaign strategy.

Target Vetting

Target vetting assesses the accuracy of the supporting intelligence used to develop the target. Additionally, the vetting process results in identifying and documenting collateral concerns associated with a specific target, as well as intelligence gain-loss concerns.

Target Validation

Target validation ensures all vetted targets are compliant with the law of war. Validation also ensures targets create the effects and achieve the objectives outlined in commander's guidance, and are coordinated and de-conflicted with agencies and activities that might present a conflict with the proposed action. It also determines whether a target remains a viable element of the target system. During the development effort, the targets may also require review and approval based on the sensitive target approval and review process, coordinated through the CCDRr to national authorities. This stage is done by targeteers within the CPD TET, in consultation with the strategy plans team within the SRD and other experts and agencies, as required. The first part of validation asks such questions as:

- ★ Does the target meet air component commander or higher commanders' objectives, guidance, and intent?
- ★ Is the target consistent with law of war?
- ★ Is the desired effect on the target consistent with the end state?
- ★ Is the target politically or culturally sensitive?
 - ★★ What may the effect be on public opinion (enemy, friendly, and neutral)?
- ★ What are the risks and likely consequences of collateral damage?
- ★ Is it feasible to attack this target? What is the risk?
- ★ Is it feasible to attack the target *at this time*?
- ★ What are the consequences of *not* attacking the target?
- ★ May attacking the target negatively affect friendly operations due to current or planned friendly exploitation of the target?

The second part of validation starts the coordinating and integrating actions against the target with other operations. This continues after the ATO is produced and responsibility

is assumed by the COD. Part of coordination is de-confliction. Many offices and agencies should be coordinated to prevent friendly fire incidents, collateral damage, or enemy propaganda leverage. Some examples of where coordination and integration are required:

- ★ **Special operations forces.** The joint force special operations component commander deconflicts joint special operations with the JFC and the other component commanders to avoid friendly fire incidents. This is best done at an air component commander's targeting coordination meeting held as part of the TET's function. The AOC should work through the SOLE for deconfliction.
- ★ **Land forces.** AOC personnel should work through the BCD and [Marine liaison element](#) (when appropriate) and the ASOC to ensure that air component targeting is coordinated and integrated with land component operations. Careful crafting and placement of FSCM facilitate this.
- ★ **Maritime forces.** AOC personnel maintain close liaison with the maritime component through the [naval and amphibious liaison element](#) and provide air, space, and cyberspace support, as required.¹⁹
- ★ **Search and rescue (SAR).** SAR personnel must deconflict with current targeting operations and other ongoing operations to ensure the safety of any SAR operations.
- ★ **Space, cyberspace, electromagnetic spectrum, and information operations.** Space, cyberspace operators should be cognizant of both intended and unintended effects created by the targeting process and ensure that these effects do not adversely affect JFC objectives and strategies.
- ★ **Other government agencies.** Targeting personnel should be aware of agency involvement and should work closely with the JFC national intelligence support team.

Target Nomination

Once all component, allied, and agency target nominations for a given ATO are received, the TET prioritizes the nominated targets and places them in an integrated TNL based on the commander's objectives. The TET then presents the integrated TNLs through the appropriate coordinating bodies representing the joint force components and other required agencies to ensure their requirements are supported, joint force priorities are met, and desired effects are achieved.

If targeting functions are delegated appropriately, the final deconfliction and coordination of component nominations should be at a target coordination meeting run by the TET. Component representatives should be prepared to justify target selections,

¹⁹ JP 3-32, [Joint Maritime Operations](#).

since not all targets may be engaged based on the JFC's [air apportionment](#) decision and the air component commander's [allocation](#). If differences arise and cannot be resolved at the meeting, the issue should be coordinated at higher levels for resolution. The meeting should not generally address mating of specific weapons to targets, but it should consider all capabilities and initiate the planning and coordination needed for those options. Additionally, the meeting may address the availability of certain high-demand weapons or munitions on a specific ATO. However, the availability of weapons or capability should not drive the nomination of targets—this is contrary to an effects-based approach.

Target nomination processes remain unchanged when addressing offensive, non-kinetic operations and should be leveraged appropriately by planners. That is, target development and selection are based on what the commander wants to achieve rather than on the available ways and means to achieve it. Therefore, non-kinetic targets should be nominated, vetted, and validated within the established targeting processes. However, non-kinetic operations may require parallel target development, selection, nomination, capability analysis, and allocation, etc. that arise from unique authorities (e.g., cyberspace targets), which may extend the planning and execution approval timelines. Targeting personnel should work closely with the appropriate liaisons to these authorities to synchronize target planning within the ATO.

The result of coordination is the draft JIPTL, which is submitted to the JFC or designated representative for approval. Again, targets may be added to no-strike or restricted target lists as part of the process highlighting RTL targets (for possible approval) and targets requiring the sensitive target approval and review process.²⁰

INTELLIGENCE GAPS, COLLECTION AND EXPLOITATION REQUIREMENTS

Identifying collection and exploitation requirements through assessment is critical to targeting efforts. This stage attempts to answer the question, “How may we know that we have achieved the desired effects,” by establishing intelligence collection and exploitation requirements for each nominated target. This stage begins with target analysis and runs parallel to the other stages. The requirements should be articulated early in the tasking process to support target development and ultimately assessment. Targeteers should work closely with collection managers to ensure that target development, pre-strike, and post-strike requirements are integrated into the collection plan, along with any changes that occur throughout the tasking cycle. Intelligence support is also required to prepare for future targeting during execution (e.g., to pre-task real-time ISR assets) and to support post-strike assessment of success. It should be noted that first-order effects of non-kinetic operations are often subtle or may be of short duration for enabling purposes only, or require days to months for the effect(s) to emerge, if at all. They may have effects that relate to the broader context of the target

²⁰ See CJCSI 3122.06 (classified publication), for more information on sensitive targets.

system (e.g., only visible at the operational or strategic level). Further, assessment of second- and third-order effects can be even more difficult. For these reasons, nonlethal pre-strike and post-strike collection requirements are critical for ensuring a cohesive means exists to assess the intended effects.

The product of this stage is the JIPCL. **The JIPCL is a prioritized list of intelligence collection and exploitation requirements needed to support indications and warning, analysis, and future target development efforts and to measure whether desired effects and objectives are being achieved. It contains a prioritized list of targets and associated data approved by the JFC or designated representative and maintained by the joint force.** An approved JIPTL is the central product of the target development stage. Targets and priorities are derived from the recommendations of components in conjunction with their proposed operations supporting the JFC's objectives and guidance. Although it draws from many sources, the CPD TET has primary responsibility for the JIPTL within the AOC.

Requirements and priorities are derived from the recommendations of components in conjunction with their proposed operations supporting the JFC's objectives and guidance. An approved JIPCL is a product of answering information gaps as well as the collection and exploitation requirements stage of target development. The ISRD has primary responsibility within the AOC for the JIPCL, although considerable consultation with the strategy division's operational assessment team is required.²¹

TARGET LIST DEVELOPMENT

Various target lists are created for use by the JFC to ensure the accuracy of target intelligence and validity of deliberate targeting in relation to guidance and the law of war. These JFC managed lists include the JTL, RTL, and the NSL.

The daily JIPTL is created for use by the air component commander to support the desired effects to be achieved on the corresponding ATO. Responsive and verifiable procedures should be in place for additions or deletions to any of the lists. However, commanders should be aware of the larger impact to effects-based planning when individual targets are removed from the JIPTL or restrictions are applied. The removal or servicing restriction of one seemingly isolated target on a JIPTL may cause an entire target set grouping to become invalid thus requiring the identification of a different grouping of targets within the same, or across one or more additional/alternate target sets, to create the same effect.

The JFC's staff, joint forces subordinate to the JFC, supporting unified commands, and components all submit [target development nominations](#) (TDN) to the JFC for inclusion on the [candidate target list](#) (CTL). A candidate target is developed, vetted, and validated

²¹ See [AFM 13-1 AOC, Vol. 3](#), and [AFTTP 3-3.AOC](#), (common access card required) for expanded discussions on AOC divisions and teams.

then submitted to the JFC for approval leading to the JTL. The JFC may also prohibit or restrict joint force attacks on specific targets or objects based on military risk, law of war, ROE, or other considerations. These targeting restrictions fall into two categories, no-strike (sometimes called prohibited) and restricted. Each category requires a separate target list.

No Strike List: The NSL is a list of objects or entities characterized as protected from the effects of military operations under international law or the ROE.

Attacking these targets may violate the law of war (e.g., cultural and religious sites, embassies belonging to countries not party to the conflict, hospitals, and civilian schools), interfere with friendly relations with other nations, indigenous populations, or governments; or breach national guidance and ROE that stipulates authorized targets/target systems (e.g., national guidance not to damage the nation's economic infrastructure). Combatant commanders and JFCs determine which targets are included on the NSL based upon inputs from components, supporting unified commands, or higher authorities. Targets on this list require national-level approval to strike. Targets on the NSL can only be moved to the RTL or JIPTL with national-level approval. The NSL is compiled independently of, and in parallel to, the CTL. It is important to note, however, that entities from the CTL may be moved to the NSL if, as a result of additional target development, it is determined that attacking them may violate the law of war or commander's guidance. Conversely, targets placed on a NSL may be removed and become subject to military action if their status as a protected object or entity has changed. It is critical to include the relevant staff judge advocate in all aspects of target development and target list management. For example, religious and medical structures that function as weapons storage or barracks facilities may lose their protected status and may be legally attacked. However, not all situations create an automatic revocation of protection. For instance, the placement of an anti-aircraft artillery (AAA) piece on a medical facility, though an action in violation of the law of war, does not result in the loss of protection; but neither does the protection status negate the legal authority to attack the AAA. The situation requires special handling by planners and attackers to determine whether the AAA must be attacked and to ensure minimal effects upon the hospital when attacked, to include the appropriate [collateral damage estimation](#) (CDE) review and approval.

Restricted Target List: A restricted target is a valid target that has specific restrictions placed on the actions authorized against it due to operational considerations. Targets are restricted because certain types of actions against them may have negative political, cultural, or propaganda implications, or may interfere with projected friendly operations. Actions that exceed specified restrictions are prohibited until coordinated and approved by the establishing headquarters.

Attacking restricted targets may interfere with projected friendly operations. This list also includes restrictions on targets directed by higher authorities. The targets on the RTL are nominated by elements of the joint force, approved by the JFC, and include

restricted targets directed by higher authorities. Targets may have certain specific restrictions associated with them that should be clearly documented in the RTL, such as do not strike during daytime or strike only with a certain weapon. Some targets may require special precautions, such as chemical, biological, or nuclear facilities, or targets near no-strike targets. If targets are restricted from lethal effects, targeteers should consider nonlethal effects as a means to achieve the commanders' objectives. Actions taken by an opponent may remove a target from the RTL.

The JFC determines on which list a target should be placed (NSL, RTL or JTL). The JTL is a consolidated list of unrestricted targets with military significance in the JFC's operational area. Joint force components select targets from the JTL to compile their respective TNLs and forward them to the JFC. The TNLs are then combined, validated, and prioritized to form a draft JIPTL based on prioritized JFC objectives, estimated available force capabilities, and their ability to affect the targets. The JFC may delegate the authority to create the draft JIPTL to the air component commander. If given this authority, the air component commander's TET should create the draft JIPTL and submit it to the JTCB for finalization.

The list usually contains more targets than can be serviced by the resources available. Thus, a draft JIPTL "cut line" is usually established. This "cut line" should reflect which targets should most likely be serviced for that ATO cycle, as well as the space tasking order and cyberspace tasking order cycles. It should be clearly understood that the "cut line" simply reflects an estimate of the line above which targets are expected to be serviced by available resources, in priority order, and does not guarantee that a specific target will be attacked. Other variables such as time-sensitive targets, changes in JFC priorities, emerging crises, and changing resource availability may have an impact on target servicing. The AOC should establish procedures to ensure that the organizations nominating targets receive continuous feedback on the status of their nominations throughout the tasking cycle. For example, not all targets nominated may be approved for the draft JIPTL, nor may all targets on the approved JIPTL be included on the ATO. There should be a feedback mechanism to ensure that targets not attacked, for any reason, are reported to the nominating authority for consideration on future TNLs.

Even in a mature theater, unanticipated conflicts may not have a JTL from which components may select their TNLs. In this case, as seen in Afghanistan, components will nominate targets for engagement without reference to a standing list. At each successive level throughout the life cycle of a target, a validation process occurs that checks targets against the NSL, RTL, ROE, current intelligence, commander's guidance, etc. Component commanders request that the JFC (or the JFC's appointed representative) review and approve RTL targets nominated to the JIPTL that exceed the specified restrictions before execution. During operations, the joint targeting process and the air tasking cycle should synchronize in every way to ensure the air component is adhering to JFC guidance and objectives.

Products of the Stage

- ★ JIPTL.
- ★ JIPCL.
- ★ NSL.
- ★ RTL.
- ★ **Target System Analysis:** Provides an all-source examination of potential target systems to determine relevance to stated objectives, military importance, and priority of attack.
- ★ **Electronic target folders (ETF):** ETFs will contain data on the target characterization, significance, location, type, function, expectation, elements, collateral damage considerations, intelligence gain or loss, and facility graphics (see CJCSI 3370 [classified document] for complete details on ETF content at basic and intermediate levels to include graphics types).

WEAPONNEERING AND ALLOCATION

Purpose of the Weaponneering and Allocation Stage

Weaponneering and allocation are two aspects of the air tasking cycle that function together to produce the MAAP. These efforts commence before the JIPTL is approved and continue past MAAP production into execution planning. They are integral to all aspects of targeting.

Weaponneering

Weaponneering is the process of determining the quantity of a specific type of kinetic or non-kinetic means required to create a desired effect on a given target. Weaponneering considers such things as the desired effects against the target (both direct weapons effects and indirect desired outcomes, including the second- and third-order effects), target vulnerability, delivery accuracy, damage criteria, and weapon reliability. Targeteers quantify the expected results of kinetic and non-kinetic capabilities employment against prioritized targets to create desired effects. This results in probable outcomes given many replications of an event. It does not predict the outcome of every munitions delivery, but represents statistical averages based on modeling, weapons tests, and real-world experience.

With modern weapons, the probabilities of accurate delivery and of achieving intended direct effects are high and steadily increasing. Weaponneering is normally done by TTA team(s) prior to the TET using validated data and methodologies automated by the Joint

Technical Coordinating Group for Munitions Effectiveness and the Defense Threat Reduction Agency, as well as appropriate data and methodologies for specialized and emerging capabilities associated with space, cyberspace, and information warfare.

Weaponizing for space (non-terrestrial) and cyberspace targets is conducted by the Combined Space Operations Center and the 616th Operations Center, through their parent CCMDs US Space Command and US Cyber Command respectively, using applicable tools and methods. The final weaponizing solution is chosen by the MAAP team. The output of the air tasking cycle weaponizing planning process is a recommendation of the quantity, type, and mix of kinetic and non-kinetic weapons needed to create desired effects while minimizing collateral damage. All approved targets are weaponized to include at least the following:

- ★ Target identification and description.
- ★ Recommended aim point(s) or joint desired points of impact (JDPIs) and nonlethal reference points (NLRPs).
- ★ Desired scope, level(s), and duration of damage, destruction, degradation, denial, disruption, deterrence, suppression, corruption, usurpation, neutralization, delaying, influence, exploitation, or other planned effects.
- ★ Weapon system and munitions recommendations.
- ★ Fuzing requirements (if applicable).
- ★ Probability of achieving desired direct effect(s).
- ★ Target area terrain, weather, and threat considerations for the OE, including its physical, electromagnetic spectrum, and information (including cyberspace) components.
- ★ Collateral damage considerations.
- ★ Collateral effects.

Precautions should be taken to reduce the risk of harm to civilians and other persons and objects protected from being made objects of attack. The danger of collateral damage varies with the type of target, terrain, weapons used, weather, the proximity of civilians and their private property, and the level of integration or shared communication infrastructures among the military, civil, government, private, and corporate environments.

According to the law of war, incidental damage to civilian objects must not be excessive in relation to the expected concrete and direct military advantage to be gained. Collateral damage criteria were established on this foundational principle.²²

Collateral damage methodologies are aids to the decision-maker when approving targets for military action. They provide logical and repeatable methods to ensure due diligence in limiting civilian suffering while enabling the commander to assess risk in accomplishing military objectives. Collateral damage estimates are not designed to limit military action, but to mitigate, as much as possible, unintended consequences. Targets are limited to those objects which, by their nature, location, purpose, or use make an effective contribution to the adversary's military action. Only those targets whose total or partial destruction, capture, or neutralization, in the circumstances ruling at the time, offer a definite military advantage may be attacked.

If an attack is directed against dual-use object, it might be a legitimate military objective (in the legal sense), but also serve a legitimate civilian need (e.g., electrical power or telecommunications), then this factor should be carefully balanced against the concrete and direct military advantage when making a weapons selection, as must reconstruction and stabilization considerations following the end of hostilities. Thus, those conducting weaponeering should always keep commander's objectives and the end state in mind, as should those in other AOC teams and divisions who review weaponeering solutions and the MAAP. This also applies to non-AOC weaponeering and attack planning processes for non-kinetic operations. The methodologies and data used for weapon effectiveness estimation are also capable of producing estimations of collateral damage risk to noncombatants and non-targeted facilities. Established ROE and law of war also address collateral damage concerns (see [Appendix A](#)). Targeteers must comply with Joint Chiefs of Staff (JCS) [collateral damage estimation](#) directives and instructions. For example, it may sometimes be necessary to strike a target more precisely than would otherwise be necessary to avoid collateral damage. Certain levels of collateral damage estimation require expertise that lies outside of the air component commander or JFC and should be coordinated through the TTA team via [reachback and federated](#) relationships. External organizations should also comply with the same strict guidance on collateral damage estimation that is imposed under ROE, law of war, and current CJCSI.

It is critical to stress that all estimates generated during this stage are situation-specific, reflecting the pairing of a particular capability against a particular target, under a particular condition of employment. As such, users of this information should be cautioned against assuming that the estimated effectiveness of a force capability under one set of circumstances is broadly applicable to other circumstances. Relatively minor targeting variations may have an exaggerated impact on effects estimates. It is equally important to stress that these estimates of performance are not designed to take into

²² CJCSI 3160.01, [No-Strike and Collateral Damage Estimation Methodology](#) (common access card required).

account considerations outside of the realm of weapon-target interaction (e.g., they do not address whether or not the delivery system may survive to reach the target).

Targeteers should know the capabilities and availability of kinetic and non-kinetic platforms, weapons, and fuses. They should also be familiar with the standard conventional load platforms in their theater and delivery tactics. Weaponing results may only be useful if the employment parameters assumed in weaponing match those used in combat. Targeteers should work closely with the operations and logistics staff to obtain required information. As a rule of thumb, theater component targeting branches should request a copy of the time-phased force and deployment data (TPFDD) to obtain units' expected input options selected from the employed automated weaponing programs, and to provide realistic planning data. Targeteers should consider space, cyberspace, and special access programs' capabilities throughout the process to incorporate capabilities not available via TPFDD and weaponing tool synchronization. Weaponing should also consider availability of the various weapons being considered. Certain high value weapons, such as those capable of deep penetration or other special effects, are normally limited in number and should only be used against those targets that both require the weapon for successful attack and are of sufficiently high priority to warrant the expenditure of the resource. Finally, some weapons, particularly certain capabilities, require long lead times in planning, deployment, and approval, which means that such capabilities should be considered early and included at the beginning of the [joint planning process for air](#).

The weaponing stage of the tasking cycle is also where lethal and nonlethal effects may be planned against targets. Coordination with the NKT²³ is critical during this stage to ensure all multi-domain operations (space, cyberspace, information, electromagnetic warfare, etc.) are deconflicted, appropriately resourced, and phased over the battle space. TTA provides planners with a variety of tools to help summarize and quantify the effects of non-kinetic operations. Since these techniques and capabilities are not fully normalized in most AOCs, it may be necessary to leverage the assistance of specialized teams in the Department of Defense, other US Government agencies, and academic communities.

Allocation

Allocation is the translation of the air apportionment decision into the total number of sorties or missions by weapon system type available for each objective or task. It falls under the AOC's CPD MAAP team, which takes the final prioritized list of weaponed targets and allocates airpower by melding available capabilities and resources, and weaponing recommendations. The result is a translation of the total weight of air effort into the total number or sorties or missions required to achieve desired effects.

²³ See [AFM 13-1 AOC, Vol. 3](#), and [AFTTP 3-3.AOC](#), (common access card required) for expanded discussions on AOC divisions and teams.

Prior to the TET target coordination meeting, the MAAP team determines how many aim points can be serviced on the given ATO day. The TET then reviews the lists of nominated targets and determines which “make the cut” on that day’s proposed JIPTL. The TET should work closely with the AOC’s SRD and the MAAP team to ensure that the prioritized list ties into the JAOP and AODs appropriately. The SRD should ensure the TET understands how effects and objectives are prioritized, how they are to be achieved over time, and that it has a macro-level idea of the number of targets associated with each objective. The TET then collects target nominations from other sources and works a daily allocation of targets that have been planned against the effects and objectives to build the daily JIPTL. Approaching JIPTL construction in this way helps avoid an ad hoc, target-servicing approach.

Each air capable joint force component submits an [allocation request](#) (ALLOREQ) message to the air component commander staff (timed to coincide with the beginning of the MAAP part of the tasking process, usually not later than 36 hours prior to the start of a given ATO day). ALLOREQs contain requests for air and space component support and information on sorties from other components not required for organic component support that are available for air component commander tasking. The MAAP team works with the TET to take the approved JIPTL (to include weapon restrictions, timing issues, and other restraints) and inputs from the component liaisons, the air mobility division (especially concerning tanker availability), and others to produce the MAAP. They determine an overall sortie flow for the ATO period and determine how that flow should be divided into packages—discrete sets of missions and sorties designed to complement each other or provide required multi-domain support (for example, tankers and electromagnetic warfare assets packaged with the strike assets supported). They also determine required times over target or times on station. Packages are arranged in sequence and used to determine a timeline and resource requirements for the ATO period. Each package should be de-conflicted in time, space, and effect.

Products Of The Stage

The MAAP is the air component commander’s time-phased air component scheme of maneuver for a given ATO period, synthesizing commander’s guidance, desired effects, supported components’ schemes of maneuver, friendly capabilities, and likely enemy COAs, and allocating friendly resources against approved targets.²⁴ The MAAP is developed by CPD’s MAAP team and usually presented in the form of a decision briefing for the air component commander. This product is critical for the targeting personnel to provide information to the collection managers in developing their collection and assessment planning.

²⁴ Note: this modifies the joint definition found in [JP 3-60](#) (“A plan that contains key information that forms the foundation of the joint ATO”) and is provided for clarification.

Weaponizing solution determines the quantity of kinetic and non-kinetic weapons required to create a desired effect on the target, considering target vulnerability, weapons characteristics and effects, and delivery parameters. Weaponizing identifies the whole range of engagement options that may affect the target and highlights or selects the most appropriate engagement capabilities commensurate with desired effects for each relevant phase of the campaign.

JDPIs and associated graphic comprise the mensurated, three-dimensional, geophysical coordinates that identify the aim point for kinetic weapon employment. **NLRPs** designate the intended “aim” point of nonlethal effects, and they are always associated with an entity or element but not necessarily a physical location.

Collateral damage estimation (CDE) and associated graphic establish the potential given the specific weapon-target pairing to create unintentional or incidental injury or damage to persons or objects that would not be lawful military targets in the circumstances ruling at the time. The CDE may result in specific constraints on weapons and delivery parameters.

Sensitive target approval and review package conveys the request of the commander to garner approval from higher headquarters for the authority to strike a target that is considered to have significant CDE concerns or will create significant political or media interest.

AIR TASKING ORDER PRODUCTION AND DISSEMINATION

Purpose of the ATO Production and Dissemination Stage

Accomplished by the AOC’s CPD ATO production team, this stage finalizes the ATO and associated orders, produces them, and disseminates them to combat units. It is based on commander’s guidance (especially the [AOD](#)), the MAAP, and component requirements. Airspace control and air defense instructions should be provided in sufficient detail to allow components to plan and execute all missions listed in the ATO. These are usually captured in the [ACO](#) and the day’s [SPINS](#). Instructions contained in the SPINS and the ACO are updated as frequently as required. The ATO, ACO, and SPINS provide operational and tactical direction at appropriate levels of detail. The level of detail should be very explicit when forces operate from different bases and multi-component or composite missions are tasked. By contrast, less detail is required when missions are tasked to a single component or base. Components may submit critical changes to target requests and asset availability during this stage of the [air tasking cycle](#). Parallel information-related capabilities processes may also result in the production of functional specific task orders like the cyber tasking order, [combined space tasking order](#), and electromagnetic spectrum (EMS) control order, as based upon applicable functional guidance like the cyber control order and EMS control plan.

This stage of the process is where targeting instructions are communicated from the [operational level](#) to the [tactical level](#) (i.e., weapons standard conventional

loads, weapon pairing with target and JDPIs, time on target, and fuse settings). It is imperative that targeting instructions include the desired objectives of the mission. The mission commander is the final decision-maker prior to execution and should understand the desired effect to be created. Concurrent with the ATO, the AOC should make available relevant target materials that may assist tactical units in their mission planning efforts.

Products Of The Stage

The ATO is a medium used to task and disseminate to components, subordinate units, and command and control agencies projected sorties, capabilities, and forces to targets and specific missions. It normally provides specific instructions to include call signs, targets, controlling agencies, etc., as well as general instructions. The ATO may subsume the ACO and SPINS or each may be published as separate orders.

SPINS are a set of instructions that provide information not otherwise available in the ATO, but are necessary for its implementation. This may include such information as commander's guidance (often including the AOD itself), the command and control battle management plan, combat search and rescue procedures, the communications plan, and general instructions for intertheater and intratheater airlift.

ROE are directives issued by competent military authority that delineate the circumstances and limitations under which US forces will initiate or continue combat engagement with other forces encountered.

The ACO provides direction to integrate, coordinate, and deconflict the use of airspace within the operational area. (Note: this does not imply any level of command authority over air assets.)

The reconnaissance, surveillance, and target acquisition (RSTA) annex is produced during this stage by the ISR division within the AOC. The RSTA annex is the ISR supplement to the ATO. It contains detailed tasking of intelligence collection sensors and processing, exploitation, and dissemination (PED) nodes and provides specific guidance to tasked ISR assets, including ISR platforms, sensors, and PED.

The finalized JIPTL cutline associated with the ATO is fed back into the target development process for situational awareness on status of targets to be serviced to accurately produce the follow-on JIPTL.

As the ATO is finalized, the targeting staff will continue to **update and refine targeting products** in accordance with the coordination activities in developing the MAAP. Guidance may preclude a particular weaponeering solution, or risk assessment may require combined kinetic and non-kinetic solutions to create the desired effect(s). These refinements will be documented within electronic target folders and specific products modified (e.g., JDPI, collateral damage estimation) accordingly.

CHAPTER 5: EXECUTION PLANNING AND FORCE EXECUTION

Execution planning includes the preparation necessary for combat units to accomplish the decentralized execution of the ATO. Force execution refers to the 24-hour period an ATO is executed by combat units, which generally includes 12 hours immediately prior to the start of a given day's execution period. The AOC aids both, preparing input for, supporting, and monitoring execution.

During execution, the AOC is the central agency for revising the tasking of air forces, the Combined Space Operations Center is the central agency for revising the tasking of space forces, and the 616th Operations Center is the central agency for revising the tasking of Air Force cyberspace forces. They are also responsible for coordinating and deconflicting any changes with appropriate agencies or components. These operations centers may or may not have authority to redirect use of other capabilities supporting theater efforts, depending upon the asset.

Due to OE dynamics, the air component commander may be required to make changes to planned operations during execution. The air component commander coordinates redirection of sorties that were previously allocated for support of component operations with affected component commanders. The AOC should be flexible and responsive to changes required during execution of the ATO. **Forces not allocated for joint or combined operations, but included on the ATO for coordination purposes, can be redirected only with the approval of the respective component or coalition commanders.** During execution, the air component commander is also responsible for re-tasking air assets to respond to emerging targets or changing priorities. The air component commander may delegate the authority to redirect missions made available for higher priority targets to command and control mission commanders as necessary. The AOC should be notified of all redirected missions. This can have significant impact on the intelligence, surveillance, and reconnaissance collection planning efforts, often requiring significant oversight by targeting personnel within the AOC.

The AOC's COD supervises the detailed execution of the ATO. Targeteers monitor ATO execution and recommend alternate targets when necessary. Normally, targeting changes are needed due to adverse weather, assessment requirements, or modification of priorities. The ability to recommend good alternate targets quickly is very important to the flexibility of airpower. Combat operations targeteers should be aware of all significant information on the current ATO to include targets, desired effects and objectives, guidance, ROE, weaponeering, and collateral damage estimates.

The rational use of force relies on the capability to achieve [PID](#) and geolocation of adversary entities as a precursor to taking action against them. Conducting [CID](#) of **all** OE entities is thus a critical enabling capability in any use, or potential use, of military force. Identifying adversary entities is essential, of course, but so is identifying friendly and neutral entities. Friendly force tracking (FFT) is a core function of CID. FFT is the process of fixing, observing, and reporting the location and movement of friendly forces.

The purpose of FFT is to provide commander's enhanced situational awareness and to reduce friendly fire incidents.

Targeting products produced in the previous stages become the primary means for imparting targeting information to the unit level in their preparation for and execution of force employment. This includes coordinating and deconflicting changes to targeting information with tasked units.

CHAPTER 6: ASSESSMENT

PURPOSE OF THE ASSESSMENT STAGE

Assessment is a continuous process that measures the overall effectiveness of employing joint force capabilities during military operations. It is also the determination of the progress made toward accomplishing a task, creating a condition, or achieving an objective.²⁵ It helps answer basic questions such as:

- ★ “Are we doing the right things?”
- ★ “Are we doing things right?”
- ★ “Are we measuring the right things?”

The first question addresses the level at which the commander’s desired *effects* are being observed in the OE and prompts examination of the **links** between performance and effects. The second question addresses the **performance** of planned air operations by assessing the completion of tasks. The third question addresses the process of assessment itself and the importance of understanding how we choose to measure the links between performance, cause, and effect. When determined properly, the answers to these questions should provide the commander with valid information upon which to base decisions about strategy.

In an effects-based construct, planners should consider actions and effects in concert with how accomplishment of those effects should be measured. Effects and objectives should always be measurable and planning for them should always include means of measurement and evaluation. **Assessment is not a separate stage of the air tasking—or any other—cycle, as descriptions and graphics often imply for the sake of conceptual clarity. Rather, it is interwoven throughout the planning and execution stage; an inseparable, integral component of the effects-based approach to conflict.** Planning for assessment begins prior to commencement of operations and continues well after operations are over. It is a central part of an effects-based approach to conflict assessment that occurs at the strategic, operational, and tactical levels. From an Air Force perspective, assessment is conducted at unit level with intelligence and operational personnel identifying estimated level of mission success with supporting data (e.g., mission reports, weapon system video) and at the operational level by AOC, Combined Space Operations Center, and 616th Operations Center personnel, who may leverage other organizations for [reachback](#) support. Each lower level feeds the levels above it and provides a basis for broader-based evaluation of progress. Products from each level provide the foundation for strategic-level assessments that include target system and overall campaign assessment.

²⁵ [JP 3-0](#).

Any comprehensive view of assessment should tie evaluation of progress at the tactical level to all other levels of conflict, up to and including the national strategic level. The proper focus of assessment conducted by the air component should be on the [operational level of war](#). An effective assessment construct should also support commanders' objectives at all levels, support commanders' decision cycles in real time, and provide the basis for analysis. To accomplish these things, an effective assessment construct should address the entire spectrum of operations and all levels of war, permit component validation of assessment elements, focus on effects, standardize federation, use intelligence specialties effectively, and integrate analysis efforts to the maximum extent possible.

Part of the allocation and MAAP portions of the tasking cycle is the creation of an ISR collection assessment plan. Early planning for assessment is critical to ensure that target status can be quickly determined to meet restrike recommendation criteria. Theater ISR collection assets should be carefully orchestrated to ensure optimal coverage of the OE. Collection assets should be positioned not only to provide assessment of targets planned for attack, but should also be able to detect and collect on emerging targets and be flexible enough to collect against them, as well. At the same time, ISR collection assets should continue to monitor the OE to help discern whether desired effects are being created and whether the enemy is adapting their COAs favorably. The collection assessment plan cannot be made in a vacuum and should be closely coordinated with all other planning efforts.

MEASURES AND INDICATORS

At all levels of assessment, planners should choose criteria that describe or establish when actions have been accomplished, desired effects created, and objectives achieved. These criteria are called "measures and indicators." There are two common types of measures:

- ★ **Measures of performance (MOPs):** An indicator used to measure a friendly action that is tied to measuring task accomplishment.²⁶ An example of this would be five offensive cyberspace operations performed, 100 combat sorties flown, and 98% ordnance delivered.
- ★ **Measures of effectiveness (MOEs):** An indicator used to measure a current system state, with change indicated by comparing multiple observations over time to gauge the achievement of objectives and attainment of end states.²⁷ An example would be to prevent the enemy's weapons factory from delivering weapons to the enemy for at least 48 hours.

²⁶ [JP 5-0.](#)

²⁷ [JP 5-0..](#)

Measures and indicators are selected MOEs and MOPs established during planning. When selecting assessment measures, planners should identify the essential elements of information required to collect and provide guidance in the collection plan and JIPCL if special ISR resources are needed. These measures should be refined or amended during the tasking cycle, as the tactical situation or the status of the target changes. Selection of assessment measures is an iterative, ongoing effort.

To be useful as a gauge of effectiveness, a measure, whether a MOP or MOE, should be meaningful, reliable, and either observable or capable of being reliably inferred. Meaningful means it should be tied, explicitly and logically, to objectives at all levels. Reliable means it should accurately express the intended effect. If quantitative measures are used, they should be relevant. It is not sufficient to choose, for example, “fifty percent of enemy armor attritted” as an MOE without understanding *why* that measure is relevant to objectives. Observable means that existing ISR collection methods can measure it with the required precision to detect the intended change. MOEs and MOPs may be quantitative or qualitative. Sometimes subjective measures, independent of other empirical measures, determine whether indirect effects and the objectives they lead to are being accomplished. Often the numbers involved in quantitative measures can deceive. In this case, qualitative judgments should be made in the absence of meaningful quantitative measures. Seemingly “scientific” quantitative measures are often poorer representations of what should happen in the OE than more qualitative measures, like “enemy armor units A, B, and C not offering larger than platoon sized resistance to forces closing on Phase Line X until at least day Y.” Such a measure may be much more relevant to the friendly scheme of maneuver, be easier to collect against, and be easier for commanders to act upon.

It is often easier, especially at the higher levels of assessment, to choose qualitative measures that are logically tied to objectives. Quantitative measures, on the other hand, can, through their very seeming certainty, take on a life of their own, leading to actions that do not contribute to accomplishing objectives or the end state. For example, during Operation DESERT STORM, strategic attack missions took down key nodes to deny power within the Iraqi electrical system. This effect was accomplished with little destruction of Iraqi civilian electrical power infrastructure. Nonetheless, many power generator plants were destroyed later in the campaign, in part because traditional empirical measurements of electrical capacity showed that the Iraqis still had substantial usable resources. By failing to apply a qualitative analysis to the empirically derived information, this destruction of Iraqi power plants ultimately hampered civilian recovery following the campaign. This example points out the importance of integrating assessment into employment planning and target development efforts early on.

LEVELS OF ASSESSMENT AND MEASURES

Assessors perform many types of assessment across the strategic, operational, and tactical levels to inform a wide array of decisions. These levels are distinct, yet

interrelated. [Strategic-level assessment](#) addresses issues at the joint force (e.g., winning a specific conflict) and national levels (e.g., enduring security concerns and interests). It involves a wide array of methodologies, participants, and inputs. The President and Secretary of Defense rely on progress reports produced by the CCDR or other relevant JFC. These assessments often shape national or global perception of progress in an operation.

[Operational-level assessment](#) begins to evaluate complex indirect effects, track progress toward operational and strategic objectives, and make recommendations for strategy adjustments and future action extending beyond tactical reattack. Assessment at this level often entails evaluation of COA success, assessment of the progress of overall strategy, and joint force vulnerability assessment. These are commonly performed by joint force component commanders and JFC staffs.

[Combat assessment](#) (CA) is defined as the determination of the overall effectiveness of force employment during military operations. CA is composed of three major components: battle damage assessment, munitions effectiveness assessment, and reattack recommendation.²⁸ CA typically focuses on task accomplishment and specific engagements. The results of tactical tasks, measured by measures of performance (MOPs), are often physical in nature, but also can reflect the impact on specific functions and systems. CA may include assessing progress by phase lines; destruction of enemy forces; control of key terrain, people, or resources; security or reconstruction tasks. Assessment of results at the tactical level helps commanders determine operational and strategic progress, so JFCs should have a comprehensive, integrated assessment plan that links assessment activities and measures at all levels. From the Air Force perspective, these would include, but are not limited to, in-flight reporting, weapon system video (WSV), mission reports (MISREPs), full motion video (FMV), and cyberspace ISR activities.

CA determines the results of weapons employment (with both lethal and nonlethal effects), and thus is an important component of joint fires and the joint targeting process. To conduct CA, it is important to fully understand the linkages between the targets and the JFC's objectives, guidance, and desired effects.

Battle Damage Assessment. The purpose of battle damage assessment²⁹ (BDA) is to compare post-execution results with the projected results generated during target

²⁸ With a broader concern for assessing operational, campaign level results, AFDP 3-0 uses the term "Tactical Assessment" over "CA" because it is more broadly applicable and descriptively accurate: Not all operations (and hence not all assessments at the tactical level) involve combat. The name should apply to all tactical-level evaluation. The terms, however, are functionally equivalent for most purposes.

²⁹ For additional information on CA and BDA processes, see CJCSI 3162.02, [Methodology for Combat Assessment](#), Defense Intelligence Agency (DIA) instruction (DI)-820-4-03, *Battle Damage Assessment Quick Guide*; DI 2800-2-YR, *Critical Elements of Selected Generic Installations (Critical Elements Handbook)*; and [JP 3-60](#), Appendix D (common access card required).

development. Comprehensive BDA requires a coordinated and integrated effort between joint force intelligence and operations functions. Traditionally, BDA is a phased process. It begins with aim point-level evaluations of primary damage mechanisms and effect upon the targeted elements of a given target type (facility, individual, virtual entity, equipment, or organization). These assessments are aggregated and form the basis of system-level assessments. BDA is defined in three phases:

- ★ **Phase I BDA:** The initial target assessment reporting on physical damage assessment (PDA) and/or change assessment with initial functional damage assessment (FDA) of the target. This BDA level phase is often derived from single source reporting. Typical timelines associated with this phase are one to two hours after information becomes available (e.g., sortie debrief, WSV review, initial imagery report). It also provides initial inputs for a restrike recommendation. Reporting for this phase is normally provided 24 hours after information becomes available.
- ★ **Phase II BDA:** The supplemental target assessment report on the physical, change assessment, and functional damage assessment of the target. This report is a detailed PDA, FDA, and change assessment normally based on multi-source reporting. Phase II BDA reporting is provided when there is a significant change to the Phase I reporting to include multi-source verification and change to the confidence level of the initial reporting.
- ★ **Phase III BDA:** The target system assessment and represents the aggregate of previous phase reporting. This assessment is normally produced by national-level intelligence agencies working closely with the joint force assessment teams (J2, J3, & J5). It represents an in-depth target system FDA with respect to a target system (collection of related facilities or entities) and provides commanders with high-level assessments that help determine future weights of effort for future planning and execution. Since phase III BDA is a data-intensive process, it typically requires weeks to months to accumulate the data to assess the impact on the target system.
- ★ **Munitions effectiveness assessment (MEA)** evaluates whether the selected weapon or munition functioned as intended. It examines the munitions' known parameters, the delivery tactics used, and the interaction between the munition and the delivery platform. MEA is fed back into the planning process to validate or adjust weaponeering and platform selections. It is also the form of assessment with the highest potential return on investment in terms of weapons and tactics development, because the data it generates is fed into the Joint Munitions Effectiveness Manual (JMEM) revision process, resulting in more accurate future capability analysis. MEA is a combined operations and intelligence function.
- ★ **Estimated damage assessment (EDA)** is a type of PDA and is the process of anticipating damage using the probability of weapon effectiveness to support estimated assessments and allows the commander to accept risk in the absence of other information. Often during execution, it is not possible to wait on ISR verification

of strike results without inordinately delaying presentation of assessments to decision-makers. EDA is an evolving technique of using Service documented munitions effectiveness (e.g., reliability, accuracy, effects), MISREPs, and other data to predict weapons effectiveness on targets and target systems as place holders for the probabilities of success in absence of reported BDA; it is a process facilitated by the precision and reliability of modern weapon systems. For instance, depending on the target type, size, number of weapons employed, and associated probability of damage, a prediction can be made of the target's continued level of operational capability. This information is also used to weigh the need for additional collection in lieu of inherent reporting from the weapon(s), aircraft, or aircrew to provide an assessed prediction of the level of physical and functional damage inflicted on selected targets and target systems. Essentially, the prediction becomes more accurate as additional information is received and incorporated if the additional accuracy is needed. Due to EDA's requirements for empirical data, its use should be limited to weapons that have Air Force-certified data or are contained in JMEM. How and when EDA is used should be determined during deliberate planning, but should also be reviewed prior to each tasking order execution. In general, it is appropriate for all but high-priority targets, but considerations for schemes of maneuver and strategic implications must always be considered. Normally, the air component commander will provide guidance as to what level of risk he or she is willing to accept for a given target or target set when authorizing assessments based on EDA.

- ★ **Reattack Recommendations and Future Targeting:** Future target nominations and reattack recommendations merge the picture of what was done (BDA) with how it was done (MEA) and compares the result with predetermined MOEs that were developed at the start of the joint targeting cycle. The purpose of this phase in the process is to determine the degree of success in achieving objectives and to formulate any required follow-up actions, or to indicate readiness to move on to new tasks on the path to achieving overall JFC objectives. Both operations and intelligence should work closely to present each target considered for restrike recommendation with the best and most current available information. Analysts may also discover that other targets in the system or network are now logical follow-on targets, or that the commander's objectives have now been met in regard to certain target(s), and that it is appropriate to recommend an end to further targeting within that target system or network. From the Airman's perspective, this element of tactical assessment occurs at the operational level. AOC planners are an integral part of providing the information to accomplish this for the air component commander. Reattack recommendations should be consistent with JFC objectives and guidance.

Assessment is an inherently joint force process. It relies upon intelligence and operational data from multiple levels. As such, organizations and individuals who may conduct assessment require access to the intelligence analyses of those who developed the targets and the operational information from the ATO which executes against those targets. Both joint and national agencies often provide federated subject

matter expertise to support all phases of BDA and other assessments. See [Appendix B](#) for an expanded discussion on federated support for targeting and assessment.

PRODUCTS OF THE STAGE

Assessment products are standardized, but can be tailored in accordance with the level and type of assessment. For more on tactical and combat assessment refer to JP 5-0, [Appendix K](#); JP 3-60, [Appendix D](#); AFTTP 3-2.87, [Operation Assessment](#); [AFM 13-1 AOC, Vol. 3](#), [CJCSI 3162.02](#), CJCSI 3370.01; and DI-28209-2-03, *Commander's Handbook for Joint Battle Damage Assessment*.

APPENDIX A: TARGETING AND LEGAL CONSIDERATIONS

Legal considerations and international legal obligations directly affect all phases of targeting. Those involved in targeting should have a thorough understanding of these obligations and be able to apply them during targeting analysis. The legal considerations impacting targeting include:

- ✦ Basic principles of the law of war.
- ✦ Law of war considerations concerning personnel, objects, and places.
- ✦ ROE considerations.
- ✦ The role of [judge advocates](#) in targeting.

Targeting must adhere to the law of war and all applicable ROE. It is the policy of the Department of Defense (DOD) to comply with the law of war during all armed conflicts and other military operations regardless of how such conflicts and operations are characterized. The law of war encompasses all international law for the conduct of hostilities binding on the US or its individual citizens, including treaties and international agreements to which the US is a party, and applicable customary international law.³⁰ Military necessity does not provide authorization or justification for acts that are otherwise prohibited by the law of war. Instead, military necessity must be applied in conjunction with other law of war principles.

NOTE: This appendix is not all encompassing and is no substitute for legal advice from the appropriate staff judge advocate. Constant coordination between planners, operators, and judge advocates is essential. Commanders, planners, operators, and targeteers must understand the relevant legal framework to comply with the laws and policies, the application of which may be challenging given the nature of non-kinetic operations (e.g., ubiquity of cyberspace operations, regional effect of information operations, etc.), irregular and modern warfare and the often geographic orientation of domestic and international law.

BASIC PRINCIPLES OF THE LAW OF WAR AND THEIR TARGETING IMPLICATIONS

The law of war rests on five fundamental principles that are inherent to all targeting decisions: military necessity, unnecessary suffering (humanity), proportionality, distinction (discrimination), and honor (chivalry).

³⁰ DOD Directive 2311.01, [Law of War Program](#). See also the DOD [Law of War Manual](#).

MILITARY NECESSITY

Is this action (e.g., attack) permitted under applicable international law and is it required to quickly and efficiently defeat the enemy? A separate, but intimately related, question is whether the target of the attack is a valid military objective. The DOD [Law of War Manual](#), citing Additional Protocol I to the Geneva Convention, describes military objectives as "... [T]hose objects which by their nature, location, purpose or use make an effective contribution to military action and whose total or partial destruction, capture or neutralization, in the circumstances ruling at the time, offers a definite military advantage." Although the United States is not a signatory to the Additional Protocol I, it views this definition as an accurate restatement of customary international law.³¹

However, the US recognizes two categories of objects as military objectives as a matter of law; (1) military equipment and bases, and (2) objects containing military objectives. For these two categories of objects, there is no requirement to analyze whether attacking the object would offer a definite military advantage. The principle of military necessity legally justifies attacks against military objectives which are indispensable to securing the rapid submission of the enemy. An attack upon other than a valid military objective would violate the principle of distinction, be impermissible under international law, and therefore not justifiable as a military necessity.

For example, a residential home does not make an effective contribution to military action and so is not a military objective. However, a residence may become a military objective (target) if an adversary uses it for military purposes (e.g., a military command post or a fighting position). In that case, the adversary's actions change the purpose and use of the structure and it may become an objective. If a concrete and definite military advantage will be achieved through its destruction or neutralization, it may be attacked.

UNNECESSARY SUFFERING (HUMANITY)

Will the normal or expected use of a particular weapon cause unnecessary suffering? The principle of humanity is based forbids the infliction of suffering, injury, or destruction unnecessary to accomplish a legitimate military purpose. Humanity underpins certain law of war rules, including the restrictions against the employment of weapons, projectiles, or materials and methods of warfare of such nature as to cause superfluous injury or unnecessary suffering; as well as the prohibition of weapons that are inherently indiscriminate. All weapons in the US inventory are permissible for use unless otherwise restricted by higher authority for operational reasons. These weapons have been reviewed for compliance with the law of war and were determined not to cause unnecessary suffering when used in the manner for which they were designed

³¹ The word "objective" as used above should not be confused with the definition "objective" in [JP 5-0](#): "The clearly defined, decisive, and attainable goal- towards which every operation is directed."

and also determined not to be inherently indiscriminate. This principle also prohibits using an otherwise lawful weapon in a manner that causes unnecessary suffering.

An example of causing unnecessary suffering is modifying munitions to disperse glass projectiles for the purpose of complicating the medical treatment of the wounded. The bottom line is to use the weapon or munitions as they are designed.

PROPORTIONALITY

Is the expected loss of civilian life, injury to civilians, and damage to civilian objects excessive in relation to the concrete and direct military advantage to be gained by striking the target? Proportionality requires the expected collateral damage to civilian objects or persons from an attack not be excessive in relation to the anticipated concrete and direct military advantage. If collateral damage is anticipated, planners and commanders should carefully weigh this factor against the military advantage from affecting a military objective when making a proportionality determination. The anticipated military advantage refers to the advantage from those actions considered as a whole, and not only from isolated or specific actions. A “military advantage” is not just a tactical gain, but can span the spectrum of [tactical, operational, or strategic levels](#).

For example: an armored vehicle used in combat is located at a school. The vehicle is a military objective. However, destroying the vehicle with certain types of munitions may cause incidental or collateral injury to civilian persons and damage to civilian objects. Commanders, planners, and operators should weigh the anticipated collateral consequences against the concrete and direct military advantage of striking the vehicle. The potential for collateral consequences should also help guide their selection of capability (kinetic and non-kinetic) to use against the vehicle.

DISTINCTION (DISCRIMINATION)

Distinction obliges parties to a conflict to distinguish principally between the armed forces and the civilian population, and between unprotected and protected objects. This principle, based on customary international law, requires parties to direct operations only against combatants and military objectives. It prohibits indiscriminate attacks which are attacks not directed at specific military objectives, those that employ a method or means of combat that cannot be directed at a specific military objective, and those that employ a method or means of combat the effects of which cannot be limited. The use of unguided munitions against enemy combatants or military objectives is not of itself an indiscriminate attack.

For example: Dropping munitions—guided or unguided—in a residential area without regard to whether there are combatants or military objectives in the area simply because there may be adversary forces there would be an indiscriminate attack.

HONOR (CHIVALRY)

Is this an honorable means of warfare or a type of conduct that would be unfair or constitute a breach of trust with the enemy? Honor demands a certain amount of fairness and mutual respect between adversaries. Parties to a conflict must accept that their right to adopt means of injuring each other is not unlimited, they must refrain from taking advantage of the adversary's adherence to the law by falsely claiming the law's protections, and they must recognize that they are members of a common profession that fights not out of personal hostility but on behalf of their respective States.

LAW OF WAR TARGETING RESTRICTIONS

PERSONNEL

Are we targeting personnel protected under the law of war? Intentional direct attacks on civilians are prohibited. However, this is distinctly different from the incidental injury that may be caused to civilians or civilian objects as a result of an attack on a military objective. Collateral damage is an issue of proportionality.

Protection of the Civilian Population. Civilian populations may not be intentionally targeted for attack. Acts of violence designed to spread terror among the civilian population are prohibited. Further, civilians may not be used as 'human shields' to protect military objects from attack. The presence of human shields does not necessarily prevent the military object from attack. As directed or time permitting, targets surrounded by human shields will be reviewed by higher authority, taking into account policy and legal considerations. Civilians may lose their protection from direct attack if engaged in combat or otherwise directly participating in hostilities.

Protection of Wounded and Sick. Direct attacks on wounded and sick who are no longer contributing to an adversary's military operations are prohibited by the Geneva Conventions. The incidental additional injury that might be caused to sick and wounded still on the battlefield in the proximity to military targets is an issue of proportionality. Also, the sick and wounded may not be used as shields to protect military objects from attack. Their use as human shields does not necessarily prevent the military target from attack. As directed or time permitting, targets surrounded by human shields will be reviewed by higher authority taking into account policy and legal considerations.

Protection of Prisoners of War. Direct attacks on prisoners of war (POWs) are also prohibited by the Geneva Conventions. This protection begins the moment they surrender or are captured because they are no longer considered combatants. POW camps or detention facilities should be marked so as to be visible from the air. However, it is also important that POW facilities are on a NSL to ensure aircrews do not confuse POW facilities with adversary forces conducting rear-area operations.

OBJECTS AND PLACES

Are we targeting an object or place protected under the law of war? Intentional direct attacks on civilian objects generally are prohibited. However, this is distinct from the incidental damage caused to civilian objects resulting from an attack on a military target. Likewise, there are instances when, based on the facts of a particular situation, a civilian object may be a military objective. These are discussed below.

Protection of Civilian Objects. Civilian objects may not be intentionally targeted for attack. However, civilian objects are military objects if, by their nature, location, purpose or use, they make an effective contribution to military action and whose total or partial destruction, capture or neutralization, in the circumstances ruling at the time, offer a concrete and definite military advantage. Examples of civilian objects that may also be military objects:

- ★ **Dual-Use Objects.** These are facilities or objects that serve both a military and civilian purpose. For example a power grid that supports an enemy airbase, but also supports civilian cities/towns is dual-use. These targets need to be examined in light of *proportionality*; specifically, commanders and planners weigh whether the collateral effects of striking the power grid on the civilian population outweigh the concrete and direct military advantage. Dual-use targets may require a higher level of approval authority because of the potential impact on the civilian population.
- ★ **Economic Objects.** These are typically factories, workshops and plants that make an effective (though not necessarily direct) contribution to an adversary's military capability. Like dual-use targets, these may require a higher level of approval because of the potential impact on the civilian population.
- ★ **Lines of Communication.** Transportation systems (roadways, bridges, etc.) and communication systems (TV, radio), while civilian in nature, may also be considered military objectives based on their use. Like dual-use and economic objects, these may require higher level approval based on the particular facts and circumstances regarding nature, location, use, and purpose of the target.

Protection of Medical Units, Hospitals and Medical Transport. Under the Geneva Conventions, these are not to be attacked. These should be marked by a distinctive medical emblem such as the Red Cross, Red Crescent, or some other internationally recognized symbol to show that they are for medical use. Known medical facilities and structures are typically placed in the Ccdr's NSL database. Like civilian personnel, these may not be used to shield military objectives. For instance, placing a surface-to-air missile (SAM) system next to a hospital does not prevent an attack on the SAM system, if necessary for self-defense. The Ccdr may issue guidance concerning the approval authority for mobile systems placed next to such protected objects when not acting in self-defense.

Protection of Religious, Cultural, and Charitable Buildings and Monuments. Under international treaties and customary law, buildings and monuments devoted to religion, art, charitable purposes, or historical sites are not to be attacked. These should be marked with internationally recognized distinctive emblems (such as the blue shield with two white triangles). Known buildings and monuments devoted to religious, cultural, and charitable purposes are typically placed in the CCDR's NSL database. Properties considered to be cultural in nature are usually considered irreplaceable and the property of all mankind. Like civilians, these may not be used to shield military objectives. For instance, placing a SAM in the ruins of an ancient temple would not prevent an attack on the SAM system, if necessary for self-defense. The CCDR may issue guidance concerning the approval authority for striking mobile systems placed next to such protected buildings or monuments when not in self-defense.

RULES OF ENGAGEMENT

Have applicable restrictions or requirements imposed by the ROE been complied with prior to striking a target? The ROE are directives issued by competent military authorities to delineate the circumstances and limitations under which multi-domain forces may initiate or continue combat engagement with other forces encountered. Essentially, ROE are rules for a particular operation that govern the use of force to reflect the will of the civilian and military leadership. ROE constrain the actions of US military forces to ensure their actions are consistent with domestic and international law, national policy, and objectives. Although ROE are not law, they are authoritative restrictions issued at the appropriate level of command to control the use of force. ROE are based upon domestic and international law, history, strategy, political concerns, and a vast wealth of operational wisdom, experience, and knowledge provided by military commanders and operators. ROE may be more *restrictive* than the law of war for a given situation, but they cannot be more *permissive* than allowed under the law of war—therefore compliance with ROE should guarantee compliance with the law of war. Targeting personnel and judge advocates should be involved in the development and refinement of ROE. Just as tasking and targeting are cyclical, so too is ROE development, and it may require constant input and refinement to meet operational requirements.

What is contained in ROE? There is usually information in the ROE that is directly applicable to how, when or under what circumstances targets may be struck. The ROE may contain such information as target approval authorities for certain types or classes of targets (economic objects, lines of communication), and approval authority for time-sensitive or high-collateral damage targets. It may also contain information regarding what weapons may be used (like cluster bombs or anti-personnel mines), the conditions for use, and approval authority for their use.

Where are ROE found? ROE may be found in the **standing ROE (SROE)**, a CCDR's theater-specific ROE, and ROE issued specifically for an operation). SROE are contained in a classified Chairman of the Joint Chiefs of Staff instruction. The SROE

provide implementation guidance on the inherent right of self-defense and the application of force for mission accomplishment. The SROE also provide a framework for the development and implementation of ROE across the competition continuum and range of military operations. The important point to remember is that the SROE are not tailored to specific military operations. They provide guidance in the absence of operation-specific ROE, and do not contain specific targeting restrictions or considerations based on the circumstances of a specific operation.

Theater-Specific ROE. The CCDR's theater-specific ROE address strategic and political sensitivities of the AOR and should be approved by the CJCS. Theater-specific ROE may have been issued in a separate message. Like the SROE, these may not provide specific targeting restrictions or considerations based on the circumstances of a specific operation.

Operation-Specific ROE. These ROE are promulgated by the President, Secretary of Defense, CCDR, and component commanders and are based upon the specific factors underlying the operation. The ROE might be sent to the components via message from the CCDR or could be incorporated into the [operations order](#) (OPORD). *The ROE are usually re-stated in the JAOP and in Section Five of the air component's daily special instruction (SPINS).*

ROE and Modern Warfare

Operations INHERENT RESOLVE (OIR) and FREEDOM'S SENTINEL (OFS) demonstrate the complexity of applying ROE in modern warfare. In OIR, the Islamic State of Iraq and Syria (ISIS), a non-State actor, controlled significant territory. Several state and non-state actors engaged in military operations against ISIS, other groups, and, in some cases, against each other. These complex circumstances required different sets of ROE depending on the adversary and the coalition or partner nation involved. Because OFS supported the North Atlantic Treaty Organization's (NATO's) Operation RESOLUTE SUPPORT (ORS), NATO and US theater ROE were in effect in the same area of responsibility. The ROE in effect for the mission depended on the circumstances. The multitude of state and non-state actors, high operations tempo, urban environments, and multiple combat operations occurring simultaneously present operators a complex environment. Despite the complexities, Air Force operators were responsible for ensuring they understand which theater-specific ROE apply and who may authorize engagement of a target.

AFDP 3-84, [Legal Support](#). This AFDP provides guidance on developing ROE. Considerations include: ROE development is a collaborative effort (vertical and

horizontal among organizations); ROE development should integrate all players (judge advocate, commanders, planners, and operators); ROE should not be too specific or restrictive; and ROE must provide simple, clear guidance to accomplish the mission.

“RULE OF ENGAGEMENT-LIKE” RESTRICTIONS IMPACTING TARGETING

Restrictions that are not formally issued as ROE may exist in other documents. In theory, these would be explicitly incorporated in the ROE or at least incorporated by reference. In practice, this is not always the case. As such, it is imperative that all personnel involved in targeting—operators, planners, and judge advocates—ensure they are aware of *all* applicable targeting restrictions regardless of how these restrictions are characterized or issued. Some examples are listed below.

Target Lists. The JTL, RTL, and NSL are compiled and maintained by the CCMD. An NSL may contain those facilities and structures that are protected under the law of war (churches, hospitals, etc.). The RTL contains facilities and structures for which approval, in some cases, must first be obtained from the establishing authority before targeting. These facilities are on the RTL because there is some function or valid military reason that mitigates against a strike. Targets on the JTL may also contain restrictions in the target folders. Although a target itself may be approved for strike, its target folder may restrict specific JDPI from being struck or restrict the size or type of munitions that may be used against the target or some of its JDPIs. For example, if a target is near a sensitive site, such as a school, the JDPIs closest to the school may be restricted entirely or restricted to only certain types of weapons.

Collateral Damage Estimation Methodology (CDEM). Guiding documents now delineate a coherent five-step process that standardizes DOD CDEM practices.³²

Plans. The JAOP, cyberspace operations plan (CyOP), and joint space operations plan (JSOP). Many restrictions from the CCCR, JFC, [US Cyber Command's](#) Joint Force Component Commander-Space, and the air component commander may be found in sections of the JAOP, CyOP, and JSOP that set forth standing orders and commander's intent.

SPINS. SPINs are periodically issued by the AOC and usually have several sections that may contain ROE. Most SPINs have a subsection specifically called “ROE” that may contain ROE changes until a new version or regular changes to the OPORD can be published. This section may also contain any amplification the air component commander deems necessary for complex ROE provisions.

Fragmentary Orders (FRAGO). In some past operations, restrictions from the CCCR impacting targeting were also published in FRAGOs.

³² See CJCSI 3160.01, [No-Strike and Collateral Damage Estimation Methodology](#) (common access card required)

Fire Support Annex. The fire support annex to an OPORD may also contain additional guidance or information concerning targeting.

Coalition Concerns. Coalition forces may have their own set of ROE that may not be similar to US ROE. That may impact whether coalition forces have the authority to strike certain sensitive targets such as leadership or weapons of mass destruction, or the type of support they are able to provide to US forces striking those targets. US forces operating from coalition bases (e.g., Diego Garcia) may also have restrictions placed on them—and on the targeting they execute—by coalition ROE as well. Close coordination is required with coalition partners during targeting to facilitate the understanding of their ROE and the limits it may impose on them.

ROLE OF THE JUDGE ADVOCATE

The judge advocates assist the commander, planners, and operators with reviewing targets for compliance with applicable law of war and ROE restrictions (including collateral damage and other CCDR restrictions) prior to mission execution. Legal advice and counsel is necessary to develop, interpret, modify, and properly implement the ROE. Judge advocates and their support staff should be trained, operationally oriented, and readily accessible to assist commanders, planners, and operators with international legal considerations and ROE or related issues. Judge advocates provide legal advice to commanders and their staffs consistent with the international and domestic legal obligations and the governing ROE.

The complexity of international legal considerations along with the ROE requires judge advocates to be constantly available to the strategy, plans, and operations divisions within an AOC at all stages in the tasking cycle. Additionally, Judge advocates are usually available at the expeditionary wing and group level to assist commanders, aircrew, and planners at the tactical level with targeting-related issues. It should be emphasized, however, that the military commanders and operators make the ultimate targeting decisions after counsel provided by the judge advocates. Legal considerations should be addressed when analyzing military necessity, imminent threat, or operational gain by the air component commander and JFC.

NUCLEAR TARGETING

Nothing discussed within this document, including the law of war and targeting implications, precludes the use of nuclear weapons. Nuclear targeting mirrors the conventional targeting principles discussed, with consideration given for specific weapons effects. Commanders must assess the military, as well as political impact, a nuclear strike would have on their operations. Nuclear planning guidance issued at the CCDR level is based on national-level political considerations and is influenced by the military mission. Air Force targeteers assigned to [US Strategic Command](#) conduct nuclear planning in coordination with supported CCDRs and certain allied commanders.

However, the supported commander does not control the decision to use nuclear weapons.

Effects-based targeting should account for the potential use of nuclear weapons across the conflict continuum. Nuclear weapons effects must be understood in relation to the conventional operations that they support or with which they are supported.

APPENDIX B: TARGETING AUTOMATION

Targeting data and information should pass seamlessly horizontally, vertically, and across domains and environments. Target and information systems of record between Service and joint organizations may not be identical or interoperable in all cases. Therefore, when [targeting support and supporting relationships](#) are established they should confirm connectivity or identify agreed workarounds that allow [reachback](#), distributed and federated support functions. The following sections discuss common targeting tools and applications.³³

Targeting Tools. Automated tools assist targeteers through the targeting process of the joint targeting cycle.

Analytical Tools. Targeting requires all-source intelligence data, systematic analysis, and the appropriate tools for planning, execution and assessment during all phases of operations. While specific details are beyond the scope of this document, commanders should ensure that targeteers, all source analysts, and collection managers have the tools necessary to collect and analyze the information they need for targeting.

Geospatial Intelligence Tools. [Geospatial intelligence](#) (GEOINT) is “the exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the earth.” GEOINT is necessary for OE visualization, enabling planners to “see” natural and cultural features. Most geospatial products are now presented in digital formats and are available through web access and automated means. As one example, scene visualizations provided by AOC weather personnel incorporate atmospheric effects from sensor to and at the target and may aid targeteers and mission planners in seeing a variety of these features. Commanders need to ensure that all planning processes have access to appropriate digital tools and backup systems for use by AOC personnel.

Targeteers need access to current imagery for target development and assessment. Numerous types of geospatial imagery products can be requested from various joint and national agencies; service centers; and component organic production, exploitation, and dissemination organizations. Imagery sources include national technical, tactical, or commercial means.

Targeteers also require mensuration tools to provide precise coordinates with the accuracy necessary for precise munitions employment. Point mensuration tools needed for these activities include a digital point position database controlled and rectified by the National Geospatial-Intelligence Agency.

Capability Analysis Tools. The Joint Munitions Effectiveness Manual Weaponering System (JWS) provides the standard automated methodology for estimating the

³³ For more on targeting automation see Joint Publication 3-60, [Joint Targeting](#).

employment effectiveness of most non-nuclear, kinetic weapons and facilitating decision-making for force sizing. The JWS augmented by the Integrated Munitions Effectiveness Assessment Tool, is a modeling application specifically designed to estimate weapon effectiveness against hardened and deeply buried targets. The Hazard Prediction and Assessment Capability is used for chemical, biological, or radiological plume hazard in support of collateral damage estimation when targeting weapons of mass destruction threats. The Joint Capabilities Analysis and Assessment System includes tools that support weaponeering for cyber, electronic attack, and military support operations. As non-kinetic capabilities continue to evolve, decision-makers and targeteers require training in the integration and blending of kinetic and non-kinetic capabilities and methods to fully exploit effects-based approach to operations. Commanders can assist by ensuring targeteers receive training and tools to exploit such capabilities as they become available.

Collateral Damage Estimation Tools. [Collateral damage estimation](#) (CDE) is the process that determines undesired consequences and hazards presented by weapons effects and makes recommendations on how to mitigate those effects in compliance with ROE and law of war. CDE analysts should apply the specific guidance and data of CJCSI 3160.01 [No-Strike and Collateral Damage Estimation Methodology](#). However, the joint community has mandated use of the Digital Precision Strike Suite Collateral Damage Estimation tool for collateral damage analysis of kinetic weapons.

Common Operational Picture (COP) Tools. A [COP](#) of the environment assists the targeteers in determining deliberate and dynamic targeting requirements.

APPENDIX C: REACHBACK AND FEDERATED SUPPORT TO TARGETING AND ASSESSMENT

Targeting and assessment requirements are typically more than theaters can support internally, due to deficiencies in manpower and specialized expertise. Thus, in practice, targeting is shared among many different organizations through [reachback](#) and federation—in the theater, in the US, and worldwide.

AOC strategists, planners, targeteers, and intelligence analysts are generalists in the sense that they should have knowledge of a wide variety of weapon, target, and political systems. Reachback and federated targeting organizations have specialists with extensive knowledge on specific target systems in specific nations. Using this expertise is necessary if targeteers are to conduct effective target development that imposes the specific effects chosen by planners to achieve commanders' objectives.

The key to an effective reachback and federation system is to know the capabilities of the various units and organizations that can be called upon for support. There are many organizations that can and often do produce intelligence and other information useful to theater targeting and assessment efforts. Such expertise has always been important, but it is essential for an effects-based approach to conflict, which relies on greater situational awareness, more comprehensive planning, and deeper knowledge of the adversary than an attrition-based approach.

Traditional approaches to targeting and assessment support have emphasized imagery intelligence—usually overhead imagery from satellites and reconnaissance aircraft. While imagery is certainly still important, human intelligence (HUMINT), signals intelligence (SIGINT), measurement and signature intelligence (MASINT), and open-source intelligence (OSINT) can be equally—and sometimes more—important to targeteers and planners. Collaboration with reachback and federated organizations may enable analysts to pull together this multitude of intelligence to use in targeting.

TARGETING SUPPORT CLASSIFICATION

There are two fundamental ways to classify targeting support, which affect how relationships are built, how taskings are conveyed, and how information is disseminated: Air Force and Joint-National, or Official and Unofficial. Both ways are required for effective federation

AIR FORCE AND JOINT-NATIONAL

AOC planners are concerned with two systems: one that is internal to the Air Force (reachback) and one that involves joint and national agencies (federated). The Air Force has control over only its reachback capabilities. The joint and national system is based on the needs of geographic CCDR's or JFC's. These needs are coordinated with the larger joint community through the JCS intelligence directorate's Deputy Director for Targeting (J26). However, the air component commander should submit requirements

through the CCDR or JFC for any joint or national federated support needed. In both cases, targeting support should be coordinated prior to hostilities. Such coordination should delineate specific duties for partners, establish timelines, and determine the methods of communication to be used. Additionally, whenever possible, air component commanders should coordinate federated partner participation in theater exercises. Without proper coordination, federated partners may be unclear of duties once hostilities begin. Exercise participation may reveal points of friction, process errors, and operational limitations that coordination alone may not reveal. Federated partners may also have conflicting priorities if multiple contingencies occur simultaneously in different theaters as most federated partners are not subordinate to a single, specific theater. Solid peacetime working relationships may help reduce the impact of such seams or priority conflicts.

OFFICIAL AND UNOFFICIAL

Targeting and assessment are year-round efforts. In the past, many organizations supported theater targeting efforts even though they were not officially part of a targeting team. This support was often slow, due to limitations of existing communication technology. Development of the internet and creation of Intelink, however, ushered in a whole new era of partnerships. Much of the intelligence that was created for and sent to specific theaters in years past is now disseminated through global networks. Peacetime support, therefore, is often informal. During hostilities, however, formal relationships are necessary since timelines are severely reduced. For instance, the National Geospatial-Intelligence Agency (NGA) creates imagery-based products daily that can be used for target development, even though they are based on a multitude of requirements other than targeting support. AOC planners can coordinate with NGA to obtain these products, but they require no formal relationship to do so. While the intelligence community is doing its mission, the AOC is simply taking advantage of available resources. During a conflict, however, the AOC's needs may require specific NGA action and be much more time critical. This may require a formal request for support from the JFC to the NGA. Obviously, if the need can be anticipated and planned for, the partners can accomplish the necessary requests and coordination, which may improve the timeliness and quality of the support. The bottom line is that, while peacetime requirements may be met using a less formal structure, contingencies dictate that all targeting partners know exactly what support is required, timelines involved with providing the support, and in what manner they need to provide it.

TYPES OF REACHBACK AND FEDERATED SUPPORT

Reachback and federated partners can provide support to many stages of targeting.

OBJECTIVES, EFFECTS, AND GUIDANCE

Many reachback and federated organizations have analysts who have studied specific targets, target sets, nations, and regions for many years. Many of the analysts with

deepest understanding are civilians working for national intelligence agencies and military ISR units. Their comprehensive expertise may be useful to AOC strategists when developing multi-domain objectives, effects, and measures of effectiveness.

TARGET DEVELOPMENT

Reachback and federated targeting units conduct target development year-round. Theater targeting units can use this information, reducing redundancy as well as workload. Many intelligence and other analytic organizations specialize in certain targets or target systems. For instance, the Joint Warfare Analysis Center (JWAC) has engineers who specialize in lines of communication; electrical power generation; and petroleum, oils, and lubricants (POL) distribution. The Defense Intelligence Agency's (DIA's) Missile and Space Intelligence Center (MSIC) are experts in surface-to-air missiles. Within the Air Force, the 363 ISRW has experts in Service-specific target systems to include air forces and airfields; air defense; weapons of mass destruction; command, control, communications, computers, and intelligence (C4I); ballistic missiles; space forces; and cyber forces. These, and many other organizations, can be called upon to provide expertise for specific targeting efforts. Even if these organizations are not official members of a theater reachback or federated targeting effort, they can still be used to assist with target development.

COLLATERAL DAMAGE ESTIMATION

While AOC personnel and reachback organizations can conduct most of the effort required to estimate collateral damage, some estimates require advanced estimation methods which only national organizations have the expertise. For example, JWAC and the Defense Threat Reduction Agency (DTRA) have specialists who can assist in analyzing effects of potential chemical or biological effects created through an offensive strike.

WEAPONNEERING

Many units specialize in weaponneering for specific munitions or target categories. For instance, the 363 ISRW specializes in weaponneering for the Joint Air-to-Surface Standoff Missile (JASSM) and is the only source of the Target Area Model used for end-game mission guidance on the JASSM. Targeteers at USSTRATCOM specialize in similar focused activities. Weaponneering is time-consuming; using reachback and federated partners to conduct weaponneering frees AOC planners to focus on other critical planning activities.

POINT MENSURATION

Reachback and federated partners can assist AOCs with point mensuration. Because it is so time consuming, mensuration may overwhelm AOC targeteers. Many Air Force and joint units can provide expertise in this area.

ASSESSMENT

Partners can assist AOCs in determining appropriate [measures of effectiveness](#) and in analyzing collected data. Joint and national agencies may be particularly useful in helping make political and economic types of assessment. Ideally, the same units that provide support for target development should also assist with the post-attack assessment of those targets and target sets, regardless of the means of attack. Obviously, analysts who support target development may already have detailed knowledge that can be used during assessment. Establishing reachback and federated relationships early may help ensure this happens.

The previous list is not all-inclusive. AOC targeteers should understand and use all reachback and federated specialties available. Understanding the capabilities of all possible reachback and federated partners may provide insight into the types of support that are available for use throughout all AOC processes.

THEATER AIR FORCE ORGANIZATIONS

There are also several theater organizations that may be called upon to support targeting and assessment efforts. It is imperative that AOC targeteers understand the organizations that can support AOC targeting efforts, both in peacetime and during wartime.

AIR OPERATIONS CENTER

The ISR division within the AOC provides targeting expertise through the [TTA](#). This team works with other AOC divisions to ensure continuity of the targeting process. Primary outputs from the TTA team are electronic target folders (ETFs) that contain target data, target materials, weaponeering solutions, collateral damage estimates, and mensurated aim points for air component [target nomination list](#) (TNL), integrated TNLs, and sensitive target approval and review packages.³⁴ When contingency operations exceed available manning and system requirements in the ISR division, the air component commander can request reachback support.

In addition, theaters have two supporting intelligence organizations: the 480th ISR Wing's Distributed Common Ground System (DCGS) with five supporting nodes, and the 67th Cyberspace Wing's offensive cyberspace operations capability within the 67th Cyberspace Group. These two organizations can provide intelligence and offensive capabilities to support lethal and nonlethal targeting solutions. Further, the director of space forces (DIRSPACEFOR) and the director of cyberspace forces (DIRCYBERFOR) may be of assistance in coordinating space and cyber requirements in support of targeting.

³⁴ See CJCSI 3122.06 (classified publication), for more information on sensitive targets.

AIR FORCE DISTRIBUTED COMMON GROUND SYSTEM (AF DCGS)

The Air Force has developed an intelligence weapon system to provide enhanced intelligence processing, exploitation, and dissemination support for worldwide operations. While these units do not typically provide support directly to targeteers, they do provide imagery intelligence support to theater AOCs that ultimately support targeting and assessment, and signals intelligence, measurement and signature intelligence. The AF DCGS provides planning and direction, collection, processing, and exploitation, analysis, and dissemination for a variety of platforms including the U-2, RQ-4 Global Hawk, MQ-9 Reaper, MC-12 Project Liberty, and others.

There are currently five operational distributed ground system (DGS) units. While each DGS is regionally aligned to a primary theater for familiarity and situational awareness, the DCGS operates as a single entity and specific DGS units can be called upon to flex from their primary theater to support a more critical area, as warfighter needs dictate. Targeteers should keep this in mind when the ISR division requests support from the AF DCGS. The AF DCGS is not part of a theater AOC or a theater's assigned forces. However, AF DCGS products, reporting, and support can prove beneficial to AOC, JIPOE, targeting, collection management, and assessment efforts.

NATIONAL TACTICAL INTEGRATION (NTI)

The Air Force NTI team embedded in the AOC makes available a cadre of expertise to provide substantive and timely reachback and integration of national signals intelligence to inform and enhance targeting, planning, operations, and force protection.

THEATER JOINT AND NATIONAL ORGANIZATIONS

JIOC OR JOINT INTELLIGENCE OPERATIONS CENTER EUROPE ANALYTIC CENTER (JAC)

The theater JIOC (or JAC in [US European Command](#)) is the central point for theater intelligence tasking, collection, analysis, and production. JIOC and the JAC also have targeting offices that produce target folders based on deliberate planning taskings. In addition, JIOCs and JAC, in coordination with theater J-2s, maintain the JTL, NSL, and RTL for specific OPLANs or [concept plans](#) (CONPLANS). JIOCs and JAC have liaisons from the major national intelligence agencies to facilitate effective national intelligence support to the theaters. These liaisons typically include personnel from the DIA, NGA, the National Security Agency (NSA), and the Central Intelligence Agency (CIA). The roles of these organizations are explained later in this appendix.

THEATER CRUISE MISSILE SUPPORT AGENCY (CMSA)

CMSA-Pacific (Camp Smith, Hawaii) and CMSA-Atlantic (Norfolk, Virginia) can provide valuable targeting information for Tomahawk Land Attack Missile (TLAM) employment

(seaborne).

CRYPTOLOGIC CENTER (CC)

A CC is an NSA site to ensure NSA-derived intelligence supports theater planning, force employment, and assessment. AOC planners can coordinate with the CC or go through the theater NSA representative at the JIOC or JAC (the Cryptologic Support Group); but a theater cannot directly task a CC—it must go through NSA. However, planners can consult with their theater's supporting CC. There are four US-based CCs (Colorado, Georgia, Texas, and Hawaii), each with a focus on a specific theater or global interest area.

NATIONAL INTELLIGENCE SUPPORT TEAM (NIST)

A NIST is a team composed of personnel from DIA, NSA, NGA, CIA, or other national intelligence agencies that is deployed, upon request by a JFC, to facilitate the flow of timely all-source intelligence between their JTF and other US Government agencies during crises or contingency operations. The NIST concept is designed to create a dynamic flow of intelligence to and from the JTF operational area. The NIST provides reachback to national intelligence agencies and provides the JFC and the JFC's staff with knowledge of each agency's resources and capabilities that normally does not exist at the JTF level. Team members provide a direct agency liaison for the JTF and understand where to go in their parent agency to obtain the best support for the commanders' priority intelligence requirements.

AIR FORCE CONUS ORGANIZATIONS

HEADQUARTERS AIR FORCE

AF/A2 and AF/A3/5 are the focal points for coordinating the Air Force's CONUS-based targeting and assessment reachback support.

National Air and Space Intelligence Center (NASIC) is the sole national center for integrated intelligence analysis on air, space, and cyberspace systems, forces, and threats. It assesses current and projected foreign air, space, and cyberspace capabilities and intentions; produces scientific and technical intelligence (S&TI) reports that can be used to augment targeting and mission planning; and evaluates evolving technologies of potential adversaries. Such technical information is useful in determining how to create specific effects on specific targets and target systems. In addition to expertise on worldwide air assets, NASIC provides expertise on adversary air capabilities, and has resident expertise on adversary ballistic missiles (> 1000 km), space systems, and cyberspace operations.

Air Force Office of Special Investigations (AFOSI) is a field operating agency under the administrative guidance and oversight of The Inspector General of the Air Force

(SAF/IG). It is a federal law enforcement agency with responsibility for conducting criminal investigations, counterintelligence (CI) and specialized investigative activities, protective service operations and integrated force protection for the Air Force. AFOSI is also a combat-ready military organization that provides the Air Force a wartime capability to conduct, in hostile and uncertain environments, counter-threat operations to find, fix, track, and neutralize enemy threats. AFOSI is the Air Force's focal point for working with US and foreign nation law enforcement and security services to provide timely and accurate threat information in all environments. AFOSI is the only Air Force entity with CI authority, and per Joint Publication 3-60, [Joint Targeting](#), CI is a key element of federated production planning and BDA.

AIR COMBAT COMMAND (ACC)

ACC is the lead MAJCOM for targeting.

ACC Intelligence Directorate (ACC/A2) plays a large part in coordinating the Air Force CONUS-based reachback support.

Sixteenth Air Force (16 AF)

16 AF, also known as the Air Force's information warfare numbered air force, integrates multisource ISR, cyberspace warfare, electromagnetic warfare, and information operations capabilities across the conflict continuum to ensure that the Air Force is fast, lethal, and fully integrated in both peacetime and war. Sixteenth Air Force (Air Forces Cyber) provides mission integration of information warfare at operational and tactical levels via the 616th Operations Center.

The 9th Reconnaissance Wing is responsible for providing national and theater command authorities with timely, reliable, high-quality, high-altitude reconnaissance products.

The 55th Wing conducts a global flying mission with worldwide reconnaissance and treaty verification tasked by our nation's highest levels, as well as the National Airborne Operations Center.

The 480th ISR Wing is the lead wing for the AF DCGS, as well as provides national cryptologic, information technology, cyberspace ISR, tactical analysis, air component command support, and national-to-tactical signals intelligence integration.

The 70th ISR Wing (70 ISRW) delivers timely and actionable intelligence across the spectrum of contingencies and crises, operational planning, and combat operations. It executes global ISR operations in air, space, and cyberspace to enable strategic, operational, and tactical effects for the National Command Authority, the joint warfighting team, air component operations, and Air Force mission partners. The 70 ISRW serves as the Air Force's designated lead wing for National Tactical Integration

(NTI) operations and synchronization and executes global ISR missions in support of CCMD and air component operations via the DCGS and the global cryptologic enterprise. Additionally, the 70 ISRW is the Air Force's designated lead wing for ISR operations enabling both cyberspace effects and space superiority operations.

The 363 ISRW, formerly known as the Air Force Targeting Center, provides operations planning and execution support to major commands, component numbered air forces, and theater air operations centers.

AIR NATIONAL GUARD (ANG) TARGETING PRODUCTION AND ANALYSIS UNITS

There are specific ANG units to provide the 363 ISRW a surge-to-war target production capability accomplished through the use of imagery analyst, targeteering analyst, and intelligence applications. These ANG units also provide local, state, and federal authorities a domestic incident awareness and assessment, including damage assessment of critical infrastructure and key resources during defense support to civil authorities.

AIR MOBILITY COMMAND (AMC)

AMC Intelligence Directorate (AMC/A2) maintains databases on airfields worldwide in the event AMC must use those bases. Such information may be useful when targeting enemy airfields.

AIR FORCE MATERIEL COMMAND (AFMC)

AFMC provides effective nuclear materiel management (NMM) support to the warfighter by managing human capital, organizations, processes, and procedures used to conduct, execute, and support nuclear deterrence. Included are nuclear weapons infrastructure and lifecycle activities, delivery platforms and supporting systems, and intellectual and technical competencies to ensure robust, reliable, flexible, and survivable Air Force nuclear systems. NMM responsibilities cut across all AFMC and headquarters organizations and must be focused on providing agile cradle-to-grave support to the warfighter.

Air Force Nuclear Weapons Center (AFNWC) is the AFMC-supported center responsible for synchronizing NMM across AFMC and the Air Force. AFNWC is delegated direct support authority in support of Air Force Global Strike Command (AFGSC) regarding all areas of NMM. Commander, AFNWC derives authority to organize, train, and equip from Commander, AFMC and is dual-hatted as Air Force Program Executive Officer for Strategic Systems. AFNWC duties include:

- ✦ Synchronize all NMM activities across AFMC and, as designated by Commander, AFMC via direct support authority, serve as the command's supported center and principal representative to AFGSC for all NMM-related matters with primary

responsibility, authority, and accountability to provide agile support to the warfighter. This also includes the responsibility to serve as AFMC's primary advocate for NMM-related resource prioritization and to communicate directly with AFGSC at all levels regarding such matters.

- ✦ Serve as the primary advocate for all NMM requirements across the Air Force and collaborate with HAF, MAJCOMs, and AFMC centers to identify strategy, planning, and programming process and sustainment requirements relevant to NMM, including NMM requirements for dual and multi-use platforms and systems.
- ✦ Communicate and collaborate with AFGSC at all levels to ensure force provider NMM requirements are satisfied in a timely manner.
- ✦ Collaborate with program offices, North Atlantic Treaty Organization (NATO) allies, US Air Forces Europe, and the Air Force Safety Center in the oversight and execution of nuclear safety, security, and compatibility design guidance for nuclear weapons and weapon systems, and engineering consulting to system program offices and product support centers.
- ✦ Support Air Force program executive officers and program managers by providing integration authority related to air-delivered capabilities and the nuclear command, control, and communications (NC3) weapon system. Authority and responsibility pertain to weapon system architecture, configuration management, integration, test, verification, and certification.

Air Force Life Cycle Management Center (AFLCMC) Armament Directorate is responsible for the development, acquisition, testing, deployment and, sustainment of all non-Nuclear air-delivered weapons. The information they provide may be beneficial during weaponeering and conducting munitions effectiveness assessments.

Air Force Research Laboratory (AFRL) conducts research and development activities addressing technology and capability gaps across the Air Force. AFRL will: (1) Conduct research and development of nuclear technology and capability gaps, with requirements provided by ACC, AFGSC, AFMC, AMC, AFNWC, and the US Space Force. (2) Conduct research and development of future capabilities and enabling technology, in coordination with ACC, AFGSC, AFMC, AFNWC, AMC, and the Space Force.

Air Force Installation and Mission Support Center (AFIMSC), as a field operating agency aligned under AFMC, consolidates the delivery of installation and mission support capabilities, and provides globally integrated management, resourcing and combat support operations for Air Force programs.

AIR FORCE GLOBAL STRIKE COMMAND

As a component MAJCOM of USSTRATCOM, AFGSC provides (per Air Force Instruction 13-500, [Air Force Nuclear Mission Responsibilities](#)) combat ready forces for deterrence and global strike operations on behalf of the President and CCDRs. Per Air Force Program Directive 10-9, *Lead Command Designation and Responsibilities for Weapon Systems*, AFGSC is lead command for intercontinental ballistic missile systems (Minuteman III and Ground Based Strategic Deterrent), conventional B-1 bombers, B-2/B-52 bombers with nuclear and conventional missions, B-21 development and fielding, E-4B (National Airborne Operations Center) aircraft, UH-1N helicopters with escort and emergency response missions, gravity and precision guided nuclear weapons, nuclear cruise missiles, Mobile Consolidated Command Center, Air Force NC3 weapon system, and supporting squadrons.

JOINT AND NATIONAL CONUS ORGANIZATIONS

JOINT CHIEFS OF STAFF (JCS)

Intelligence Directorate (J-2), Deputy Director for Targeting (J26). The J-2 is the national-level focal point for crisis intelligence to support military operations as well as warning intelligence. J26 is the coordinator for all joint and national federation needs of a unified command or JTF. The AOC coordinates their federation needs with the JFC's J-2 after determining which of its needs can be met using Air Force reachback partnerships.

Joint Information Operations Warfare Center (JIOWC). Subordinate to the joint staff, this center is responsible for the integration of IO into military plans and operations across the range of military operations. The center provides direct command and control warfare (C2W) tactical and technical analytical support to operational commanders. The center supports the integration of operations security, military information support operations, military deception, electromagnetic warfare throughout the planning and execution phases of the operations. Direct support is provided to unified commands, JTFs, functional and service components, and subordinate commanders. The center maintains specialized expertise in C2W systems engineering, operational applications, capabilities, and vulnerabilities.

NATIONAL AGENCIES

Defense Intelligence Agency. The JCS J-2 is dual-hatted as the Director of DIA. DIA is a major producer and manager of foreign military intelligence with a worldwide outlook. DIA is normally the first stop when analysts need foreign military intelligence to support targeting and assessment. In addition to the main DIA center in Washington, DC, DIA maintains two specialized intelligence centers, the Missile and Space Intelligence Center and the National Center for Medical Intelligence.

Missile and Space Intelligence Center (MSIC) provides worldwide scientific and technical intelligence concerning threat guided missile systems, directed energy weapons, selected space programs or systems, and related command, control, and communications to support operationally deployed forces. MSIC has experts knowledgeable on SAMs as well as short-range ballistic missiles.

National Center for Medical Intelligence (NCMI) produces finished, all-source medical intelligence in support of military planning and operations. Assessments, forecasts, and databases are prepared on worldwide infectious disease occurrence, global environmental health risks, foreign military and civilian health care capabilities and trends, and militarily significant life science technologies.

National Geospatial-Intelligence Agency is the primary national producer of geospatial-intelligence, which is the exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the earth. Products include controlled imagery, digital elevation data and selected feature information, which can be rapidly augmented and fused with other spatially referenced information such as intelligence, weather and logistics data resulting in an integrated, digital view of the mission space. NGA also produces many of the maps and charts Airmen use for mission planning.

National Security Agency is a combat support agency which employs mathematicians, linguists, engineers, and computer scientists focusing on signals intelligence and information assurance. NSA's employees collect, process, analyze, and exploit adversaries' communications. NSA maintains its headquarters at Fort Meade, Maryland and has four cryptologic centers, each with a regional focus.

Defense Threat Reduction Agency is a combat support agency charged with developing methods to deal more effectively with threats by nuclear, radiological, chemical, biological, and high explosive weapons of mass destruction (WMD) and preventing future threats. The agency focuses DOD efforts to prepare for and respond to WMD attacks. These technologies provide commanders options for effective targeting against enemy WMD capabilities, WMD delivery methods, and underground or hardened structures, as well as enhanced capabilities to assess enemy WMD operations.

Defense Information Systems Agency (DISA) is a combat support agency responsible for planning, engineering, acquiring, fielding, and supporting global net-centric solutions and operating the Defense Information System Network. DISA seeks to guarantee our forces global information dominance by providing jointly interoperable systems that have assured security, survivability, availability, and superior quality. Because of DISA's expertise in developing, maintaining, and protecting US information methods, they may prove useful in developing targeting strategies to attack enemy information methods and systems.

UNIFIED COMMANDS

Unified Command JIOCs. The continental US-based unified commands with functional missions—USSTRATCOM, US Transportation Command (USTRANSCOM), and US Special Operations Command (USSOCOM)—each have a JIOC. Each of these unified commands has a global outlook and, as such, is capable of providing targeting and assessment support to CCMDs worldwide in the areas of special operations, transportation, WMD, space, nuclear forces, and information operations, to name a few.

UNITED STATES CYBER COMMAND

USCYBERCOM plans, coordinates, integrates, synchronizes and conducts activities to direct the operations and defense of specified DOD information networks; prepare to, and when directed, conduct full spectrum military cyberspace operations to enable actions in all domains and environments; and ensure US and allied freedom of action in cyberspace and deny the same to our adversaries. In addition, targeteers at USCYBERCOM nominate targets for engagement with non-kinetic capabilities, in both supported and supporting roles, to meet functional and geographic CCDR objectives.

UNITED STATES SPACE COMMAND (USSPACECOM)

The USSPACECOM mission is to deter aggression and conflict, defend U.S. and allied freedom of action, deliver space combat power for the joint or combined force, and develop joint warfighters to advance US and allied interests in, from, and through the space domain.

Combined Space Operations Center (CSpOC). The CSpOC is the primary USSPACECOM interface for space effects to the supported commander, to include all aspects of contingency planning, crisis planning, adaptive campaign planning, and the air tasking cycle. The CSpOC is responsible for analyzing and targeting enemy space capabilities in support of theaters in addition to their global mission. CSpOC targeteers can evaluate theater AODs and nominate specific space-related targets to meet a theater commander's objectives. In addition, targeteers at USSPACECOM nominate targets for engagement with kinetic and non-kinetic capabilities, in both supported and supporting roles, to meet functional and geographic CCDR objectives. Assets from any domain may be used to conduct counterspace missions in support of joint operations in any domain and in one, or more geographic areas. These assets may be used to fulfill single theater, multiple theater, or global objectives.

UNITED STATES STRATEGIC COMMAND

Joint Warfare Analysis Center (JWAC). A component of USSTRATCOM, JWAC provides planners with specialized lines of communications analysis for use in developing targeting strategies. JWAC provides innovative and accurate engineering and modeling-based targeting options with an understanding of risks and

consequences, including collateral damage estimates.

Joint Electromagnetic Spectrum Operations (JEMSO) Office. The USSTRATCOM JEMSO office is aligned under the USSTRATCOM J-3 to develop and execute the process to integrate command electromagnetic spectrum-related staff actions, offices, and activities to support mission requirements and to carry out JEMSO-related responsibilities.

USSTRATCOM Joint AOC (608 AOC). The mission of the 608 AOC is to support USSTRATCOM Deterrence and Global Strike missions by developing integrated plans; directing, synchronizing, and monitoring execution; and assessing deterrence and global strike options in response to a full range of global threats to meet the CDR's guidance and objectives. Global strike options are rapidly planned, limited-duration, extended-range precision attacks to achieve strategic objectives. The 608 AOC is prepared to provide the full range of command and control functions over assigned and attached forces. The 608 AOC conducts planning and integration with USSTRATCOM component commands and organizations, other CCMDs, AOCs, and when authorized, non-DOD partners, to ensure unity of effort in support of military and national security operations, as well as support to civil authorities.

SISTER SERVICES

The United States Space Force (USSF) conducts space operations to achieve space superiority for the US as a Service core competency. The USSF has three levels of space operations commands: tactical units, field commands (e.g., Space Operations Command), and a headquarters command (USSF). The USSF integrates and optimizes space operations and capabilities for theater-level joint operations through its specially trained space operators, who are assigned to Service and joint billets at all echelons and integrated in key CCMD operational and planning elements. The Combined Space Operations Center provides a common operating picture to the Combined Force Space Component Commander (CFSCC) to enable broad, shared awareness of the CFSCC's critical information requirements, status of forces, space situational awareness, and the full range of military activities arranged in time, space, and purpose. Space cells, space planners, and space operations-focused operational planning teams typically accomplish the day-to-day duties associated with coordination of space operations.

The US Army maintains an intelligence collection and analysis structure that Airmen may use when conducting operations. The Intelligence and Security Command (INSCOM) provides a wide variety of ground-based intelligence through its main production center, the National Ground Intelligence Center (NGIC).

Joint Technical Coordinating Group for Munitions Effectiveness (JTTCG/ME) is a joint activity that develops operational effectiveness estimates and collateral damage estimates for all non-nuclear munitions and continuously updates Joint Munitions Effectiveness Manuals used by the Services for training and tactics development,

operational targeting, weapons selection, aircraft load outs, and planning for ammunition procurement, survivability, and development of improved munitions. JTTCG/ME directs the analytical effort of working groups necessary to determine degrading effects of various terrain environments on non-nuclear munitions effectiveness and improving the database for target vulnerability, delivery accuracy, and weapons characteristics. JTTCG/ME promotes and develops standardized procedures and models used by the Services and the munitions industry for the evaluation of non-nuclear munitions effectiveness and conducts special studies concerning munitions effectiveness.

JTTCG/ME is managed through the JTTCG/ME program office within the Army Materiel systems Analysis Activity at Aberdeen Proving Grounds, Maryland. Part-time participants from the various Services are organized into working groups that represent the major areas of interest. These groups include air-to-surface, surface-to-surface, anti-air, target standardization, special effects, and information operations.

The US Navy also maintains an intelligence collection, analysis, and production structure that Airmen may use when conducting operations. Navy intelligence has a focus in many ways similar to Air Force intelligence. There are three main organizations that Airmen can use for targeting and assessment support. The Office of Naval Intelligence's main production center is the National Maritime Intelligence Center.

US Marine Corps, through the Marine Corps Intelligence Activity, provides tailored intelligence based on expeditionary profiles in littoral areas.

NON-MILITARY ORGANIZATIONS

CENTRAL INTELLIGENCE AGENCY

CIA gathers, analyzes, and produces most of the nation's human intelligence (HUMINT). HUMINT may be able to provide targeteers with information not available through other intelligence collection methods. This may be particularly important in the case of terrorist organizations, which are often distributed networks with limited physical infrastructure. HUMINT is essential for analysis of such organizations.

DEPARTMENT OF STATE (DOS)

DOS's Bureau of Intelligence and Research (INR). As the lead foreign affairs agency and the enabler of US diplomacy, DOS has a unique perspective on the nations of the world. Such insight, as collected, analyzed, and produced by INR, can be extremely influential when planning, executing, and assessing military operations. Intelligence concerning political and military leaders, cultural trends and thoughts, and economics—to name just a few areas—can give Airmen intelligence that ties military strategy to the entire spectrum of national power, which can be essential for a truly effects-based approach to conflict. Even from a purely military standpoint, such intelligence can

enhance understanding of adversary motivations, helping to influence or bend them to comply with US will, the ultimate goal in any operation.

DEPARTMENT OF HOMELAND SECURITY (DHS)

Encompassing Citizen and Immigration Services, Customs and Border Patrol, Transportation Security, the Secret Service, and the Coast Guard, DHS, with its three primary missions—prevent terrorist attacks within the United States, reduce America’s vulnerability to terrorism, and minimize the damage from potential attacks and natural disasters—has a wealth of intelligence on enemies, and potential enemies, of the United States. Although DHS looks “inward,” airpower planners may be able to use DHS-derived intelligence when it leads to foreign-based terrorist organizations and infrastructures.

THE DEPARTMENT OF ENERGY

Office of Intelligence and Counterintelligence provides timely technical intelligence analysis on all aspects of foreign nuclear weapons, nuclear materials, and energy issues worldwide.

DEPARTMENT OF THE TREASURY

The Office of Foreign Assets Control administers and enforces economic and trade sanctions based on US foreign policy and national security goals against targeted foreign countries and regimes, terrorists, international narcotics traffickers, those engaged in activities related to the proliferation of WMD, and other threats to the national security, foreign policy or economy of the US.

DEPARTMENT OF JUSTICE (DOJ)

With subordinate organizations such as the Federal Bureau of Investigation and the Drug Enforcement Administration, DOJ-derived information, like that of the DHS, may help focus targeting efforts when it leads to foreign-based terrorist organizations and infrastructures.

The Federal Bureau of Investigation is tasked with understanding threats to our national security and penetrating national, as well as transnational, networks that wish to and can harm the US. They focus on terrorist organizations, foreign intelligence services, weapons proliferators, and criminal enterprises.

The Drug Enforcement Administration shares any drug-related intelligence with the intelligence community that is acquired while executing their drug enforcement duties.