



CURTIS E. LEMAY CENTER

FOR DOCTRINE DEVELOPMENT AND EDUCATION



ANNEX 3-0 OPERATIONS AND PLANNING

CATALOG OF DOCTRINE TOPICS

Introduction to Operations and Planning

General Considerations for Strategy
The Effects-Based Approach to Operations
Applying Airpower

Airpower and the Range of Military Operations

Threats to Operations
Termination and Transition of Operations

The Common Operations Framework

Operational Design Fundamentals
 Methods of Operational Design
 Practical Design: The Coercion Continuum
Planning Operations: Air Force Planning in the Context of Joint Planning
 An Effects-Based Approach to Planning
The Common Operations Framework: Execution
Assessment: General Considerations
 Assessing Strategy
 Assessment Criteria
 Assessment Measures
 Assessment Interpretation

Steady-State Operations: General Considerations

Steady-State Design: Shaping the Operational Environment
Steady-State Planning
Steady-State Execution
Steady-State Assessment

Operations during Crises and Contingencies: General Considerations

The Joint Operation Planning Process for Air
Service Component Planning During Contingencies
Contingency and Crisis Execution: The Tasking Cycle
 Contingency and Crisis Execution: Tasking Cycle Stages
Operation Assessment during Contingencies and Crises

Appendix A: Center of Gravity Analysis Methods

Appendix B: Specialized Planning Perspectives



CURTIS E. LEMAY CENTER

FOR DOCTRINE DEVELOPMENT AND EDUCATION



ANNEX 3-0 OPERATIONS AND PLANNING

INTRODUCTION TO OPERATIONS AND PLANNING

Last Updated: 04 November 2016



Airpower has become predominant, both as a deterrent to war, and—in the eventuality of war—as the devastating force to destroy an enemy’s potential and fatally undermine his will to wage war.

— General Omar Bradley

Air Force Doctrine Annex 3-0 is the Air Force’s foundational doctrine publication on [strategy](#) and [operational design](#), planning, employment, and [assessment](#) of [airpower](#). It presents the Air Force’s most extensive explanation of the [effects-based approach to operations](#) (EBAO) and contains the Air Force’s doctrinal discussion of operational design and some practical considerations for designing operations to coerce or influence adversaries. It presents doctrine on [cross-domain integration](#) and [steady-state operations](#)—emerging, but validated concepts that are integral to and fully complement EBAO. It establishes the framework for Air Force [components](#) to function and fight as part of a larger [joint](#) and [multinational](#) team. Specific guidance on particular types of Air Force operations can be found in other operational-level doctrine as well as [Air Force tactics, techniques, and procedures](#) documents. This publication conveys basic understanding of key design and planning processes and how they are interrelated. It also educates [Airmen](#) in ways of thinking through these processes.

The US’ national security and national military strategies establish the ends, goals, and conditions the armed forces are tasked to attain in concert with non-military instruments of national power. [Joint force commanders](#) (JFCs), in turn, employ strategy to determine and assign military objectives, and associated tasks and effects, to obtain the ends, goals, and conditions stipulated by higher guidance in an effort to produce enduring advantage for the US, its allies, and its interests. Strategy is a prudent idea or set of ideas for employing the instruments of national power in a synchronized and integrated fashion to achieve theater, national, and multinational objectives. Airmen should follow a disciplined, repeatable approach to strategy development in order to maximize airpower’s contribution to overarching national aims.

This annex presents the following topics:

- ✦ An introduction to strategy and some time-tested insights that guide its

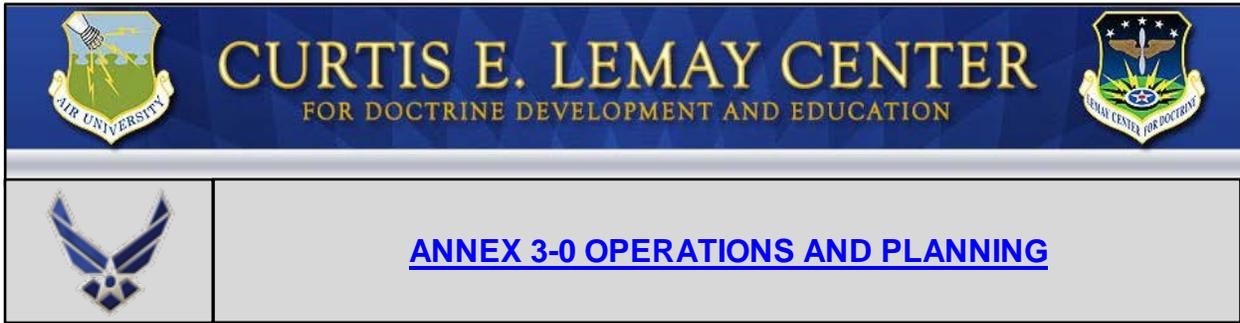
implementation.

- ✦ A discussion on how airpower is used across the [range of military operations \(ROMO\)](#).
- ✦ An introduction to common processes used to design, plan, execute, and assess Air Force participation in all types of operations.
- ✦ A discussion of elements to consider when attempting to coerce or influence adversaries, to help guide design and higher-level planning in practical terms.
- ✦ An introduction to the processes and framework common to planning for both steady-state and crisis/contingency conditions.
- ✦ An introduction to processes and considerations specific to operations during ongoing, steady-state conditions, such as normally apply in peacetime.
- ✦ An introduction to processes and considerations specific to operations during crises and contingencies, such as apply in wartime and other major operations and campaigns.

Today, the United States faces many security challenges including an ongoing conflict against implacable extremists, engagement with regimes that support terrorism, and the need to support international partners. Against this backdrop, US military forces may be called upon to conduct a full range of operations in a variety of conflicts and security situations, including [major operations and campaigns](#), [irregular warfare](#), [information operation](#), [homeland defense](#), [humanitarian assistance/disaster relief](#) efforts, building partnerships with other nations, and others.

The operational environments in which airpower is employed may be characterized by simultaneous action by Air Force forces against more than one adversary at a time—including the potential for near-peer and peer competitors—who may attempt to achieve [objectives](#) against US interests by using [asymmetric](#) advantages across all [instruments of power](#): diplomatic, informational, military, and economic. Conflicts may occur with little or no warning and they may stretch the Air Force as it works with JFCs to provide support for the joint force while simultaneously addressing Air Force-unique missions.

Airpower commanders and strategists should not only design and plan strategy, they should *think strategically*—focusing beyond the designated end states of operations that may be ongoing at a particular time. This requires Airmen to contribute to formulating and carrying out strategy in peacetime and, when possible, to anticipate conflicts and other operations as contingencies of ongoing, steady-state strategies. It also suggests that Airmen need to adapt flexibly, since not all contingencies and adversary actions can be anticipated.



GENERAL CONSIDERATIONS FOR STRATEGY

Last Updated: 04 November 2016

STRATEGY

Strategy is a major focus of this document. The very broad joint definition of strategy¹ suffices for the most expansive military meanings (such as described in national-level strategy documents), but in its more commonly understood sense, strategy is a method of arranging and managing ways, means, and risks to achieve an end or set of ends. It produces a coordinated set of options an actor can choose from to achieve continuing advantage. Strategy, in its military sense, is the art of creating military courses of action and encompasses the processes of operational design, planning, execution, and assessment.

GENERAL CONSIDERATIONS

Effective Strategy Seeks to Gain *Enduring Advantage*

From a strategic perspective, the methods used to achieve objectives and reach the end state(s) generally carry implications beyond the conclusion of an operation. The purpose of military strategy is not just to “win” or conquer, it is to *resolve the conflict* on favorable terms for the US, and do so in a way that endures for as long as possible. Such resolution is sought by creating conditions that are at least better for friendly interests, and are often better for all parties involved. Thus, a **strategy’s ultimate purpose is the attainment and maintenance of a set of future conditions – an end state** (or states) – **that leads to *continuing and enduring advantage* for friendly interests**, for as long as possible and that will often create advantage for neutral and formerly hostile interests as well. This should include envisioning the after-effects of military operations on the operational environment. Strategists should ask: What should conditions be like several years down the road, as well as what conditions will most likely prevail? Strategists should seek to answer these questions and the answers should guide operations in order to produce a better peace.

Strategy Encompasses Ends, Ways, Means, and Risks

Strategy should illuminate the reasons an operation is being conducted—its purpose—state the objectives and end state(s) (*ends*); prescribe the methods by which the ends

¹ “A prudent idea or set of ideas for employing the instruments of national power in a synchronized and integrated fashion to achieve theater, national, and/or multinational objectives.” ([Joint Publication \(JP\) 3-0, Joint Operations](#))

are achieved—military [courses of action](#) (COAs) (*ways*); determine the tools and resources needed to execute the strategy, such as military forces and supplies (*means*); and clarify the amount of cost, uncertainty, and vulnerability the commander and national leadership are willing to accept and will need to commit in order to execute the strategy, (*costs and risks*).

Desired Future Conditions and Commander’s Intent Should Drive Strategy

Desirable future conditions are achieved by accomplishing **objectives**. The principle of the objective is to “direct military operations toward a defined and attainable objective that contributes to strategic, operational, and tactical aims” ([Volume 1, Basic Doctrine](#)).

The accomplishment of all military objectives should lead to a desired set of future conditions, the military *end state*.² **The attainment of military aims, however, is subordinate to attainment of a set of conditions that must be achieved to resolve the situation or conflict on satisfactory terms and gain enduring advantage, as defined by appropriate civilian authority** (such as the President or Secretary of Defense [SecDef] at the national [strategic level](#)). **This set of conditions is the national strategic *end state***, and it involves political, cultural, economic, informational, and other considerations in addition to desired military conditions.

Military objectives should flow naturally and logically from the [commander’s intent](#), which includes the military end state. The military end state, in turn, should flow logically from the national strategic end state. Again, always looking to the end state, there should be a COA identifying what should be accomplished in addition to attainment of military objectives. The latter is the focus of military commanders, but commanders should also be familiar with the larger context in which their military actions take place.

Strategy is Adaptive, Not Static

Strategy should adjust as the adversary reacts to friendly moves and as circumstances change. Therefore, strategy creation should be cyclic and iterative. Unforeseen circumstances and the enemy always “have a vote,” and the operational environment changes as the antagonists and other parties react and adapt to actions taken. Objectives, desired effects, and tasks often change as the operational environment changes. Strategists should adjust to such changes and adapt to enemy choices and actions. Mental preparation via the design and planning processes, as well as anticipation, are the best defenses against surprise.

² In joint doctrine the “end state” is, “The set of required conditions that defines achievement of the commander’s objectives.” Note that the text above is *not* intended as an alternate definition, only to explain the concept in a wider context. In joint doctrine, the “military end state” typically refers to a point in time and circumstances when objectives have been achieved and the military instrument of national power can “disengage” from the operation. It is also described as, “the way the commander wants the operational environment to look at the conclusion of operations.” ([Joint Publication \[JP\] 5-0, Joint Operation Planning](#)).

Strategy and Planning Are Not the Same and Benefit from Discourse

Strategy formulation begins with the process of [operational design](#), which helps frame the problem the joint force is tasked to solve and design a basic construct for solving it that can be further refined in subsequent planning. Operational design is defined as “the conception and construction of a framework that underpins a campaign or major operation plan and its subsequent execution” ([JP 5-0, Joint Operation Planning](#)). In operational design, commanders’ and strategists’ thoughts and discourse resemble the interplay between architects and their clients at the start of a building project. They should determine a broad framework for the problem³ (are they building a hospital or a highway?) Planners should try to break the larger problem down into less complex elements that can be engineered, while the commander and strategists continue to regard the problem in “holistic” terms. Maintaining a “holistic” perspective is necessary, since solving a problem’s simpler constituent elements does not guarantee solving a larger complex problem as a whole. In other words, winning a battle (complex element) does not guarantee winning the war (holistic view). Strategists should determine how broadly and deeply differing aspects of the operational environment must be researched during mission analysis in order to create a proper framework. Design also requires fairly open discussion up and down the chain of command—in which “clients” (national leadership), the “architect” ([joint force commander \[JFC\]](#)), and the “engineers” (strategy and planning staff) should converse frankly and feel free to openly disagree about concepts that underpin planning for campaigns and major operations.

Ultimately, design results in mission and intent statements that reflect the commander’s vision for the overall operation (including end states that lead to continuing advantage). With this guidance clearly given, strategists and planners can concentrate on discrete problems that can be solved through the military’s more formalized planning processes. This is akin to engineers taking the architect’s sketches or models and turning them into blueprints and schematics that can then be used by craftsmen (the equivalent of tactical-level planners) to flesh out detail and implement the plan. The type of thinking involved in planning is thus more formalized and structured, is more concerned with matching resources to requirements, and involves more “operational science” than does design (although operational art is also required during planning).

Strategy is Art and Science

Executing military strategy depends upon [operational art](#), the creative means through which commanders and staffs develop strategies to organize and employ military forces.⁴ As such, there is as much art as science to the military commander’s craft. There are many aspects of operations that yield to scientific scrutiny. For instance, direct, immediate weapon effects can be accurately anticipated. The further one gets from immediate effects, however, the harder it becomes to predict indirect outcomes. Science can greatly aid strategy formulation, but the utility of science often does not extend beyond immediate effects—assessment and adaptation require judgment and intuition on the part of commanders and strategists.

³ “Operational design is a process of iterative understanding and problem framing that supports commanders and staffs in their application of operational art.... “[Problem framing](#)” is widely regarded as a crucial element of design, in both military and civilian applications.

⁴ “Operational art is the use of creative thinking by commanders and staff to design strategies, campaigns, and major operations and organize and employ military forces” ([JP 3-0](#)).

Strategy should not be deterministic or prescriptive,⁵ no matter how advanced intelligence analysis technology becomes. Even “perfect” knowledge of the operational environment does not impart perfect or predictive knowledge of adversaries and their intentions, because the results of contact between adaptive systems such as military forces and political actors, which, like living systems, are interactively complex and non-linear.⁶ They lead to emergent behaviors that often cannot be anticipated before interaction begins. **Strategy should be *estimative* and *anticipatory*, rather than prescriptive or deterministic.**

Many times numbers are used to give the illusion of objectivity, but they obscure the fact that many quantifiable evaluation criteria are as subjective as qualitative (non-numerical) criteria. Commanders and strategists should avoid “numbers traps.” They should not trust quantified or seemingly empirical solutions to problems only because they appear more “objective,” more “scientific,” or better able to produce quantifiable (but nonetheless often deceptive) measures of success.

Strategy Should Integrate Military Power at All Levels with Other Instruments of National and Multinational Power

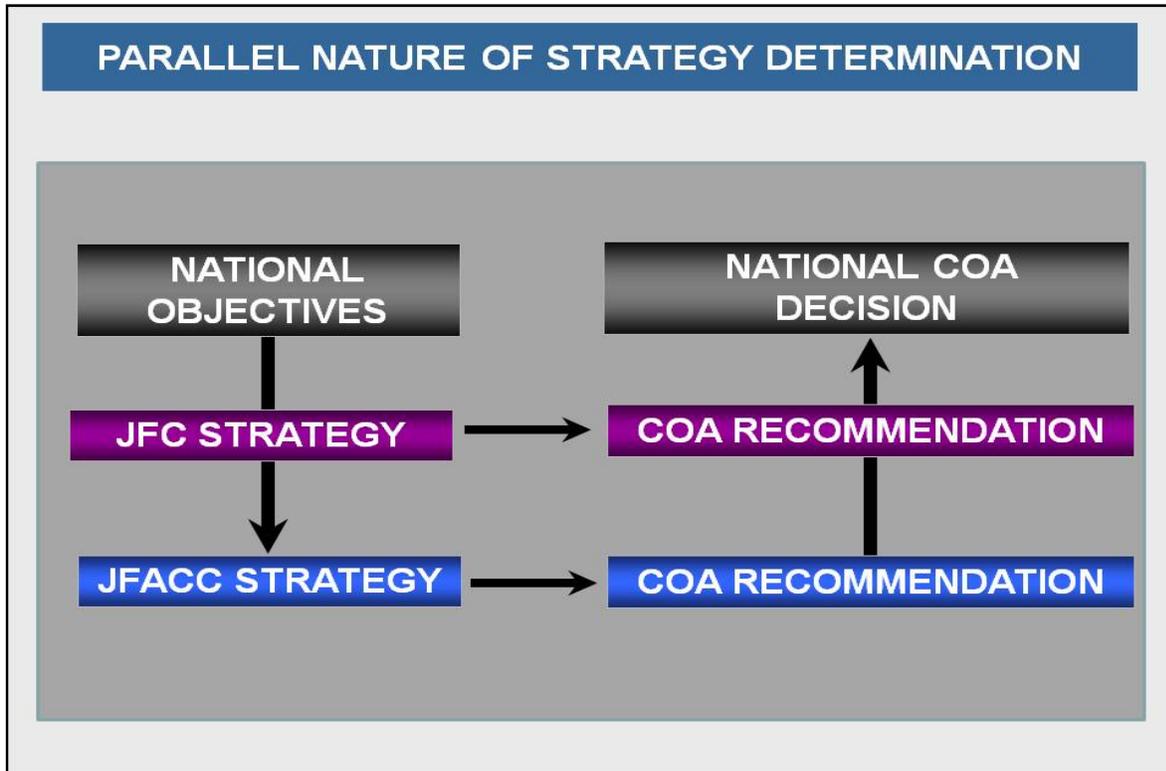
Effective military operations require careful integration of the efforts of all appropriate “actors” within the operational environment. All the [instruments of power](#) (IOPs) that actors (state or non-state) may wield are interrelated. Political considerations are critical, but so are economic, cultural, informational, and other considerations. Strategy should seek to integrate all relevant IOPs in order to deliver an end state that is, itself, a combination of conditions reflecting all aspects of power. It is usually beyond the scope of authority for [commanders, Air Force forces](#) (COMAFFORs) to direct the integration of elements of national power beyond the military forces for which they are directly responsible. In fact, this is often beyond the authority of the JFC or even the [combatant commander](#) (CCDR) in whose [area of responsibility](#) (AOR) an operation is taking place. Nonetheless, all commanders are usually constrained to operate with other agencies of the United States government, within international coalitions, and with international nongovernmental organizations (NGOs). Sometimes these relationships can restrain commanders’ freedom of action, but just as often they open opportunities for integrating diplomatic, informational, and economic IOPs with military efforts and thus give commanders a wider range of options with which to create intended effects. COMAFFORs, who are normally designated as [joint force air component commanders](#) (JFACCs) and may also be [joint task force](#) (JTF) commanders, should be prepared to operate as part of a multi-agency and [multinational](#) team and, in some cases, to direct personnel from non-Department of Defense (DOD) agencies and multinational partners in support of JFC objectives.

Military strategy at the theater level is normally derived from strategy guidance given by US leadership and multinational partners. At the same time, theater strategy (and all efforts down to tactical tasks) seeks to attain an end state that will enhance national strategic interests, and often those of an alliance, coalition, community of interested

⁵ Deterministic and prescriptive systems obey fixed laws and have no randomness involved in development of future system states, thus always yielding the same outcomes given the same inputs. This is not true of strategy or warfare in general.

⁶ This implies that new behaviors often emerge as a result of interaction with other systems, that it may not be possible to predict these new behaviors before-hand, and that many different possible outcomes from system behaviors—even relatively simple ones—are likely. For more on the implications of complexity and nonlinearity, see [“The Effects-Based Approach to Operations”](#)

states or multinational organizations, embodying the doctrinal concept of [unity of effort](#). JFCs, [component](#) commanders, and their staffs should incorporate members of other governmental agencies, representatives of other governments (especially their militaries), NGOs, and intergovernmental organizations (like the United Nations [UN]), as appropriate, in their strategy deliberations. It is often very important for COMAFFORs, JFACCs, and their staffs to have such connectivity, since their forces can be called upon to create strategic effects directly aimed at achieving the strategic-level objectives of these organizations. The JFC and component commanders may also have a significant influence on the COA chosen by higher authorities and so component commanders' strategists should normally assist with operational design. Operational-level planning may also be conducted in parallel at the JFC and component levels (See figure, "The Parallel Nature of Strategy Determination").



The Parallel Nature of Strategy Determination

JFCs may task the joint force components to develop concept plans to accomplish strategic objectives or achieve elements of the military end state. Components may be charged to plan in concert or separately. Separate planning is usually done to gather a variety of COAs from different perspectives. Due to the speed, range, flexibility, and versatility of airpower, the JFC may depend on air component planning to set initial conditions, whether through operations directly against an adversary or through persistence and deterrent effects.

Operational-level Air Force planners (both Service and functional joint air components) should recognize that during theater campaign planning as well as planning for contingencies, the CCDR or subordinate JFC and staffs will develop COAs, and will likely lack the detailed airpower planning expertise or perspective of their subordinate Air Force component staffs. Therefore, operational planners on Air Force component staffs should develop relationships with the CCDR's joint planning group (JPG) leads

and develop processes to integrate planning efforts. This will generally require the Air Force component planners to have “flyaway” teams with cross-functional expertise (strategy, logistics, mobility, etc.) in key areas, dictated by the nature of the operation, that can rapidly deploy and integrate with CCDR JPG staffs and may have to remain in place at the CCDR or JTF staff location for the duration of the crisis or operation. Parallel planning efforts will occur at the Air Force component level, so sufficient expertise to conduct both forms of planning should be present on operational staffs.

Strategists Should Realize that Tactical and Operational “Victory” Do Not Guarantee Strategic Success

Success at the tactical and operational levels should contribute to strategic success, but this is by no means guaranteed. Many times in history, one side has “won all the battles, but lost the war.” This implies that failure at lower levels does not guarantee strategic failure. (If this were so, for instance, the American colonies might never have won their revolutionary war.) It is possible—even easy—for commanders and strategists to become so enamored of success at lower levels that they lose sight of larger strategic trends, exaggerate the influence of lower-level assessment “markers,” engage in “wishful thinking” when analyzing the effects of ongoing operations, or incline toward strategic overreach.

This applies to operations during steady-state and peacetime conditions as during war, albeit the temptation to do these things may be greater in wartime due to the pressures of higher operational tempo and level of effort.

The lower the level of the military commanders involved, the more likely they will remain focused on [tactical](#) aspects of a conflict. It is also tempting for leadership at the [operational](#) and strategic levels to focus too much on tactical events. However, there are [indirect effects](#) and strategic end state considerations that all leaders, from the lowest level through the JFC, should keep in mind. National civilian leadership can also make this mistake and focus on the military instrument and the tactical aspects of operations, at the cost of losing sight of the larger cultural and political context, as some critics maintain happened in Vietnam.



Victory in Battle Does Not Equal Strategic Victory

Napoleon's armies won a string of spectacular military victories against their Spanish and British opponents in 1808; yet Napoleon lost the Peninsular War. Napoleon invaded Russia with an army of 600,000 men and won all of the major battles en route to capturing Moscow, yet he was compelled to retreat and his 1812 campaign ended in utter defeat. Hitler's armies crushed France in 1940 and inflicted millions of casualties on the Russian army in the summer and fall of 1941; yet Nazi Germany was totally defeated in World War II. Japanese forces initiated World War II in the Pacific with a series of impressive feats of arms from Pearl Harbor to Singapore; yet Japan shared the fate of Nazi Germany. During the Chinese Civil War, which continued after the end of World War II, Chiang Kai-shek's Nationalist armies at first greatly outnumbered and were better equipped than their Communist foes; yet in three years Chiang and his armies were utterly defeated. The United States never lost a major battle during the Vietnam War; yet in 1972 a dispirited America withdrew from the frustrating Asian war, and three years later did nothing when North Vietnam drove all the way to Saigon.

— Dr. Joseph Strange, *Capital "W" War*

Strategy Seeks to Influence Adversaries and Other Actors

Operations affect the perceptions and behaviors of adversaries, allies, noncombatants, and neutral parties. It is important that commanders and planners deliberately consider the effects of operations to the information environment. All capabilities employed by Air Force forces can contribute to effects and objectives that influence and should be integrated, coordinated, and synchronized to achieve a unified effort. Even strategies based on pure attrition of military forces seek to modify the enemy's behavior. Combat operations should attempt to confuse, dislocate, and misdirect the enemy whenever practical. Specialized information-related capabilities within [information operations](#) (IO), such as [military deception](#), [military information support operations](#) (MISO), and operations security can help commanders prepare and shape the operational

environment by conveying selected information and indicators to specific target audiences. Influencing all adversaries and informing the decisions of neutral and friendly actors should be a principal consideration in the minds of commanders and strategists.

Historically, commanders have built kinetically-focused [operation plans](#) (OPLANs) while relegating IO and “influence” considerations to an annex. Influence, however, spans the ROMO and all phases of conflict. Nonlethal means, such as IO, present the COMAFFOR with capabilities to achieve objectives when lethal actions may not be the best option. When integrated with other means, IO may allow a commander’s objective to resonate more deeply with target audiences, profoundly affecting adversary behavior rather than just denying the adversary military capability. Plans and orders should be built around the influence commanders are attempting to create and then incorporate lethal and nonlethal missions, as well as kinetic and nonkinetic actions into the appropriate parts of the plan or order to attain the desired effects.

An example of IO integration during a humanitarian assistance operation might include the JFC and component commanders strategically messaging the host nation, emphasizing regional cooperation through integration of truthful [public affairs](#) (PA) broadcasts and MISO messaging designed to shape the operational environment to facilitate safe and orderly humanitarian assistance among the local populace. During a major combat operation, a commander may strive to influence the adversary commander’s ability to communicate using lethal and nonlethal attacks across all domains.

Strategy should be Integrated, Synchronized, and Coordinated

In addition to integrating all relevant IOPs, strategy should take all aspects of military power into consideration—put them together in space and time, arranging and integrating those that bear on the military task, in accordance with the doctrinal principle of [unity of effort](#).⁷ Failure to do so may lead to less effective operations (at best), or failure of operations outright (at worst). Historically, there has sometimes been a tendency to plan overall strategy from the ground perspective only and add the other components to strategy as an afterthought. In order to achieve unity of effort, the modern, interdependent joint force should be fully integrated, to the extent possible, at all levels to be most effective. Unity of effort facilitates unified action⁸ among all the IOPs, helping coordinate the military’s actions with interagency partners and the interorganizational community.

Strategy Extends Beyond “*The Plan*”

Strategists should pay close attention to the planning, execution, and assessment processes once execution begins. One reason is to ensure that strategic and operational-level guidance continues to be translated into effects and tasks at lower levels. The commander and strategists should remain keenly aware that they should anticipate, adapt, and affect future planning in order to gain enduring friendly

⁷ Coordination and cooperation toward common objectives, even if the participants are not necessarily part of the same command or organization, which is the product of successful unified action. ([JP 1](#))

⁸ “The synchronization, coordination, and/or integration of the activities of governmental and nongovernmental entities with military operations to achieve unity of effort” ([JP 1](#)).

advantage. Operational designs and plans codify strategy only for particular contexts and for specific periods of time. The commander and strategists should take the current operational environment as it evolves and try to establish a context in which continuing advantage is possible, which may sometimes entail completely reframing the problems faced.

Assessment is Crucial—Strategists Should Analyze the Opportunities and Risks that Changing Conditions Create

Strategists should weigh for the commander the costs of adjusting (or not adjusting) the selected COA. Determining how this course may unfold requires strategists to ascertain the operation's past and current state through [assessment](#) that relies on accurate and continually refined [joint intelligence preparation of the operational environment](#) (JIPOE). Assessing the effects of yesterday's and today's operations is an inherent part of envisioning how future operations may unfold. Planning for assessment should begin as early in the operational design process as possible.

Since, as Carl von Clausewitz explains, the outcome of war often does not consist of a "single short blow," there is often considerable value in *persistence*—in staying with a particular COA until its effects have time to work their way through an adversary's system. In many cases, there may be little external indication that a state change in the adversary's system is about to take place, even if it is. Commanders and strategists should have "operational patience," i.e., allow *time* for certain changes to take place and COAs to have desired effects. How *much* time, however, is often a matter of operational art rather than science and underscores the importance of JIPOE—understanding the operational environment and its impact, and evaluating the adversary to determine their intent, systems, culture, and probable COAs in a holistic sense.

Strategy has Limitations

Strategy options are frequently limited by policy, resources, the requirements of the joint force and multinational partners, constraints and restraints placed on commanders, and other factors. Additionally, strategists operate in the realms of uncertainty, friction, and the fog of war. Even the most advanced [intelligence, surveillance, and reconnaissance](#) capabilities cannot convey situational awareness that eliminates uncertainty, friction, and the fog of war. Even if it was possible to determine and gather all relevant information on a given situation, it would still be nearly impossible to turn all the data into useful information – into situational understanding. Once a strategy is set in motion, Clausewitz' saying that "everything in war is simple, but the simplest thing is difficult" comes into play. Every element in a strategy has potential for generating friction that makes execution and assessment difficult.



THE EFFECTS-BASED APPROACH TO OPERATIONS (EBAO)

Last Updated: 04 November 2016

The Air Force designs, plans, conducts, and assesses operations according to an [effects-based approach](#). An effects-based approach is “an approach in which operations are planned, executed, assessed, and adapted to influence or change systems or capabilities in order to achieve desired outcomes.” In the most basic sense, this entails determining the effects that the military should create in order to accomplish the military objectives that help achieve the military strategy, as it contributes to overall strategic success—and then applying the best combination of capabilities to create those effects. **EBAO is not a planning methodology; it is a way of thinking about operations that provides guidance for design, planning, execution, and assessment as an integral whole.** In a more comprehensive sense, EBAO is an approach that emphasizes:¹

- ✦ Operations are driven by desired ends ([end states](#) and [objectives](#)), and should be defined by the [effects](#) required to attain these ends, not just by what *available* forces or capabilities can do, nor by what the Air Force “customarily” does with a given set of forces.
- ✦ Commanders should realize they are dealing with interactively complex problems not solvable by deterministic or “checklist” approaches. Interactive complexity carries implications that are important for commanders to realize.
- ✦ The “human element,” “friction,” and the “fog of war” can never be eliminated.
- ✦ There is never a single “right” solution. Commanders seek solutions that are “better” or “worse” and solving one set of problems often causes others to emerge.
- ✦ Commanders seek solutions that are most effective first—the solutions to achieve the objectives and end state—and then, given that, strive for efficiency.
- ✦ Commanders try to maximize options available and thus consider integrated use of all available military means and other instruments of power (IOPs) to gain continuing advantage within a given strategic context.

A GUIDE TO EBAO

The concepts and guidelines described in this section are not wedded to the term “effects-based”—they could have as easily been described as an “objectives-,” “outcomes-,” “results-,” “impact-,” or “consequence-based” system of thought. Nonetheless, “effects-based” is the term that is most widely recognized in Air Force

¹ Note that this list of considerations is not exhaustive.

circles. Further, this approach fully complements and helps reinforce the general considerations for military operations and strategy described in the previous sections. The section below presents a more complete explanation of the body of sanctioned ideas that define EBAO, but also presents general considerations that are often ignored in military literature on strategy, and which should help shape the thinking of commanders and strategists. (The order in which the explanatory paragraphs are presented does not necessarily represent their relative importance or priority—these may change from operation to operation.)

EBAO is a comprehensive approach—it cuts across all domains and dimensions, all disciplines and partnerships, all levels, and all IOPs. EBAO provides an overarching way of thinking about action that encompasses operational design, planning, execution, and assessment of operations involving all IOPs across the [range of military operations](#) (ROMO). It is not directly tied to any specific strategy or type of operation. It should not mandate a particular strategy, such as “parallel attack” or the “indirect approach,” but should help commanders and planners consider all options in the context of the objectives and end state(s). “All” in this context encompasses:

- ★ **All domains and dimensions**—Air Force forces exploit the vertical dimension, the electromagnetic spectrum, and time to create effects within the [air](#), [space](#), and [cyberspace domains](#) in ways that other forces do not or cannot. From this multi-dimensional perspective, Airmen can apply military power against an adversary’s entire array of diplomatic, informational, military, and economic IOPs. It may be easier to defeat adversaries in a domain where they are strong through operations in another domain where they are weak. By exploiting airpower’s speed, range, and flexibility, precision, tempo, and lethality, commanders can also gain significant temporal advantages over an adversary, as when pacing operations faster than the adversary can adapt in order to cause psychological shock and paralysis.
- ★ **All disciplines and partnerships**—Airmen should consider that their own set of capabilities or “tools” may not offer all, or even the best, options for solving a problem in a given situation. Other functional specialties, [components](#), Services, agencies, or international partners may offer the best prospect for creating particular desired effects.
- ★ **All levels**—This means breaking down the boundaries between the [strategic](#), [operational](#), and [tactical](#) levels of war, realizing, for instance, that events with even a limited tactical impact can have immense strategic consequences.
- ★ **All instruments of power**—EBAO entails the conscious integration of all the IOPs, leveraging the capabilities of the US Departments of State, Commerce, and Homeland Security, among others, to complement military operations. However, it may also entail aligning with the complementary power of partner nations, non-governmental organizations such as the International Red Cross, and even multinational corporations. An effects-based approach can often be more important to non-combat operations, such as stabilization and civil support, because outcomes in these types of operations require integration of many non-military components with military action and are thus more interactively complex than some types of combat operations, requiring more careful anticipation of effects.

EBAO is about creating effects, not about platforms, weapons, or particular methods. An effects-based approach starts with desired outcomes—the end state(s),

objectives, and desired effects—then determines the resources needed to achieve them, while identifying critical resource limitations. It does not start with particular capabilities or resources and then decide what can be accomplished with them. It also assigns missions or tasks according to mission-type orders, leaving decisions concerning the most appropriate mix of weapons, units, and platforms to the lowest appropriate levels within a given organization. Air Force commanders should encourage commanders from other Services, when tasking the Air Force or air component, to request particular effects instead of specific assets. Further, while EBAO is not about technology, there are new platforms, weapons, and methods that can enable new types of effects. These do not become truly useful to the warfighter until they are joined with appropriate employment doctrine and strategy. Tanks, radios, and airplanes by themselves did not yield *Blitzkrieg*.

EBAO integrates strategy—all design, planning, execution, and assessment efforts—into a unitary whole. These should be inextricably bound together, because effective and efficient execution almost always involves design, planning, and assessment in some form as well, even if not as part of a formal or “official” process. Effective operations should be part of a coherent plan that logically supports and ties all objectives and the end state together; the plan to achieve the objectives should guide execution; and that means of measuring success, gaining feedback, and adapting to changes should be planned for and evaluated throughout execution. Strategy encompasses all the means through which [courses of action](#) (COAs) are developed and evaluated, such as the [Adaptive Planning and Execution](#) (APEX) system at the national level, the [joint operation planning process](#) (JOPP) at the [joint force commander](#) (JFC) level, and the [joint operation planning process for air](#) (JOPPA), formerly known as the “joint air estimate process,” at the component level. These are the collaborative, iterative, and adaptive processes that help integrate strategy from national through joint force component levels. The JOPP and JOPPA are integral and complementary to the APEX process: Adaptive planning describes force and logistical requirements, while the JOPP and JOPPA outline the objectives and tasks military forces are to accomplish.

Operational design and planning set the stage for all subsequent planning activities and thus are where sound effects-based principles may have the greatest impact. Execution encompasses and implements all the various tasking processes and the ongoing operational [battle rhythm](#), as well as all the individual unit actions that comprise implementation of airpower operations; integrating, synchronizing, and deconflicting their accomplishment, as well as disseminating mission-critical information to those needing it. Execution that is not effects-based often devolves into a “checklist mentality,” that becomes excessively process-driven and loses sight of the larger context (such as the objectives and end state). This can negate sound planning, as when focusing too narrowly on one or another aspect of the battle rhythm—for example, [air tasking order](#) production. Execution that is not effects-based runs the risk of devolving into blindly servicing a list of targets, with little or no anticipation of or adaptation to enemy actions or changes in the operational environment like weather. Assessment encompasses all efforts to evaluate effects and gauge progress toward objective accomplishment. Assessment is used to adapt operations as events unfold and thus feeds the revision of plans. One should always attempt to measure performance of actions and the effectiveness of those actions in terms of creating desired effects and achieving objectives.

EBAO emphasizes that war is a uniquely human endeavor—a dynamic and often unpredictable process involving the collision of interactively complex, adaptive

systems. War is a contest of human wills, a clash of living forces that creatively adapt to stimuli. This has implications that have not always been fully exploited in the US approach to conducting operations. Airmen should note that operations other than warfare—even operations during steady-state or peacetime conditions—are often interactively complex and entail many of the same considerations discussed below.

War's outcome is never easily predictable or guaranteed, plans should never be considered static or prescriptive, unforeseen circumstances are always "in play," the adversary always "has a vote," and the ability to adapt often equals the ability to survive or succeed. Commanders and strategists should be wary of any plan, technique, methodology, or wargame that claims to offer deterministic or predictive insight into warfare's outcome. **The approach to operations—especially warfare—should not be deterministic; military success ultimately relies on the judgment of commanders as well as the will, insight, and moral courage of all participants in the conflict.**

Operations—especially warfare—are non-linear and “interactively complex.”

Classical Western culture and scientific method are based on analyzing and designing structurally complex systems, which contain many moving parts,² but which behave according to linear and predictable cause and effect relationships—the behavior we expect from properly-performing machines. Interactions of living systems are always interactively complex, even if structurally simple (few moving parts). This means that the interaction of components is non-linear and the results are not easily predictable according to deterministic rules of cause and effect, unlike that of most machines. In structurally complex systems, components interact with each other dynamically and adaptively, determining overall system behavior and affecting how constituent parts and sub-systems behave and adapt. New and unanticipated behaviors emerge as system elements interact. Adding the element of “will”—the ability of system components to freely make choices—can add further orders of magnitude to the complexity of problem solving. Understanding gleaned from engineering and scientific disciplines (arrived at using discrete, isolated experiments) can be unreliable in understanding military operations, especially in war and often cannot explain real-world outcomes when dealing with actors possessing free will. Theories incorporating interactive complexity try to better explain and predict these outcomes. Aspects of structural complexity that normally apply to machines and “conventional” scientific inquiry (and that most people are accustomed to) may no longer apply because of interactive complexity, as the following paragraphs explain.

❖ **Input/Output Proportionality**³ means that system outputs are directly proportional to inputs—small inputs lead to small outputs and large inputs to large outputs. However, in practice, small inputs often lead to unexpectedly large outputs. This insight has been the key to good military practice for millennia: great commanders have always sought ways to have the greatest effect on the enemy for the least expenditure of lives and resources. An often-cited example is Doolittle's raid on Japan in 1942, which achieved only very minor tactical effects in the short run, but

² The more “moving parts” a system has, the more structurally complex it is.

³ Use of “[proportionality](#)” here refers to its scientific meaning. However, the term also has a very specific meaning as part of the [law of armed conflict](#): “Proportionality may be defined as the principle that even where one is justified in acting, one must not act in a way that is unreasonable or excessive. Proportionality has also been viewed as a legal restatement of the military concept of economy of force.” ([Department of Defense Law of War Manual.](#))

which changed Imperial Japan's entire approach to the war, by demonstrating Japan's vulnerability to direct attack. This directly resulted in Japan's decision to attack Midway Island, where the subsequent American victory altered the course of the war decisively in the Allies' favor. Conversely, poorly informed choices can lead huge inputs to yield operationally insignificant outputs, as was the case with World War I's trench warfare, a classic example of a needlessly wasteful attritional approach.

- ★ **Additivity** means that the whole equals the sum of its parts, but this is not true of living systems, which are more complex and often greater in output than the sum of their components, just as the joint force working as an integrated whole is more effective than its components working independently ("synergy"). The behavior of interactively complex systems often depends more upon the linkages between components than upon the components themselves. In fact, system-wide behavior often cannot be deduced from analysis of the component parts (see "*reductionism*," below).

One example is human social interaction—individuals are often defined by their social connections, such as jobs, family, and group affiliations rather than by individual characteristics and these affiliations drive much behavior, even though the connections are often chosen by internal, individual motivations. Clearly also, people consist of only a few dollars' worth of common chemicals and water but when "assembled" represent the best example of the whole being greater than the sum of the parts.

- ★ **Replicability** holds that the same inputs always yield the same outputs, as usually seen with machines and controlled experiments conducted by mathematically linear rules, but this is untrue of more complex phenomena. In fact, replicability is a central tenet of scientific inquiry, in which researchers strive to isolate experiments from outside influences to permit others to replicate their procedures. However, outside the laboratory, many unknown and uncontrolled variables and system interconnections continually make exact replication of results impossible. What worked in the last "similar" operation often provides guidelines for current operations, but no two operations are ever the same. "Sameness" is an illusion, but similarity⁴ often yields useful insights. That is why doctrine is authoritative—advocating best practices—but not directive. However, repeating the pattern of any operation (at any scale) should be avoided when possible, as doing so is what an adversary is likely to expect.

- ★ **Predictability** is a corollary of replicability, allowing the consequences of actions to be anticipated consistently and repeatedly. This is an important aspect of the testability of hypotheses according to the scientific method. With respect to interactively complex phenomena, however, friction and the "fog of war" must be dealt with, meaning the effects of "the numerous chance events, which touch everything" and "the numerous difficulties that inhibit accurate execution of the precise plans that theory tends to formulate."⁵ This encompasses the impact of danger, exertion, and exhaustion on the ability to think and act effectively; on uncertainties and imperfections in the information on which plans were based; and in the play of unpredictable circumstances upon operations. Despite increases in the

⁴ "Same" and "similar" are often regarded as synonymous in common usage, but for military purposes, "same" denotes "identical," "similar" denotes having many common features, but not identical.

⁵ Carl von Clausewitz, quoted in Peter Paret, *Clausewitz and the State*, p 191.

effectiveness and pervasiveness of [intelligence, surveillance, and reconnaissance](#) (ISR) capabilities, fog and friction have remained pervasive elements of war and other military operations. An obvious example affecting air operations is weather—which can have a huge operational impact, but is usually predictable only within a narrow range of time.

- ★ **Reductionism** is the common scientific method of analyzing systems, by “pulling them apart” conceptually and examining how each component operates separately to determine overall system behavior. It has been the main technique behind machine design for centuries, as well as “nodal” methods of “systems analysis.” However, reductionist methods may yield less insight than ways of examining systems as a whole—analyzing how the system behaves in relation to other systems in its environment, as well as how components of the system interact, and then trying to anticipate how the interaction of these systems may cause certain types of behavior, or allow new behaviors to emerge. Breaking a complex problem into constituent, structurally complex parts and solving each part will not necessarily solve the overarching problem, just as winning every battle does not guarantee winning a war. Victory most often also depends upon the interactions of all the instruments of power wielded by all actors in a conflict, which strategists should examine when designing and planning operations.
- ★ **Cause and effect** can be traced, often via a linear progression, from a particular cause through a chain of logically connected, predictable effects. However, causes and effects are often hard to trace and harder to demonstrate, since common “linear” rules frequently do not apply—especially in cases involving human will. Emphasizing this might seem ironic in an approach claiming to be based on anticipating “effects,” but it is a central insight that warfighters should understand: **most cause-effect relationships important to them involve indirect and often intangible, unquantifiable linkages that are normally discerned inductively (through real-world observation), not deductively (by being able to prove a theorized outcome through logic alone).**

Returning to the 1942 Doolittle raid as an example, Allied planners anticipated a boost in US morale and corresponding loss of Japanese home front morale, and they created these indirect intended effects. However, they also altered the thinking of the Imperial Japanese high command, leading to withdrawal of Japanese Army aircraft from China to Japan, which had significant operational-level effects on the Allied campaign in China, and setting the Imperial Japanese Navy on the road to Midway, which proved decisive in the Central Pacific campaign—unintended indirect effects that could not be foreseen. In many cases, effects will accumulate to achieve objectives, but progress may not be evident until the objectives are nearly achieved. In other cases, the mechanisms through which they are accomplished may not be readily apparent. Warfighters should be aware of this, seeking ways to increase anticipatory situational awareness and understanding, counseling patience to commanders and national leadership with respect to results. Progress often is assessed qualitatively, not quantitatively, since it is far more difficult to evaluate unfamiliar, ill-structured, dynamic, and interactively complex problems.

- ★ **“Stopping rules”**—In statistical analysis and clinical trials, scientists make rules that define when an experiment or problem is “over” and assessments can be made. In real world practice, such rules do not exist, so events continue to evolve and systems continue to change even when planned end states have been reached. It is

rarely, if ever, possible to leave complex systems in stable equilibria “after the war is over” and one set of problems often bleeds inexorably into another. World War II (WW II) ended as decisively as any major event has in modern times, leading victorious Allied governments into a degree of complacency, until the closely entailed problems of post-war recovery of shattered Axis nations and the aggressive expansion of communism forced the Allies to design plans to meet these challenges.

In a related sense, “real-world” problems usually don’t yield a single “right” solution, only “better” or “worse” outcomes in terms of continuing strategic advantage. A substantial design effort was put into the recovery of Europe as a whole, leading to the Marshall Plan, Containment doctrine, and the Berlin crisis not escalating into war. In Asia, on the other hand, much effort was put into Japan’s recovery, while Korea and China received relatively little attention. Japan’s recovery was relatively swift and smooth, while China and northern Korea fell to communism and the Korean peninsula erupted in war not five years after the end of WW II. Some have argued that the “solution set” for Europe was “better;” that in Asia, “worse” for the interests of the US and its allies.

EBAO should account for how all actors, especially the adversary, may respond and adapt to planned actions. Good design and planning should anticipate change. All interactively complex systems adapt to changes in their environments and any systematic approach to warfare should account for this. An effects-based approach includes processes to account for likely adversary responses and adaptations. Commanders and strategists should also consider that the beliefs, customs, and habits of adversaries who do not ascribe to a Western worldview may not respond in ways anticipated by Americans (“mirror imaging”), potentially creating unanticipated and unfavorable higher-order effects. Mirror imaging the motivation of an implacable enemy in North Vietnam—assuming that Communist leaders would respond to limited-war offensive measures and gradual escalation of the conflict in a measured, “rational” manner when those leaders had devoted their entire lives to the struggle to “liberate” Vietnam—was a mistake that was a major factor in the failure of US strategy.

EBAO focuses on behavior, not just physical changes. The force-on-force approach to warfare made destruction of the enemy’s military forces the leading aim in war, usually accomplished through attrition—wearing the enemy down through fire and maneuver until their losses exhausted them—or annihilation—destroying their main strength directly, resulting in their complete overthrow. These methods accomplish objectives and are still valuable parts of strategy, but EBAO emphasizes that there are alternatives; that the ultimate aim in war is not just to overthrow the enemy’s military power, but to compel them to do one’s will. Careful examination of all types of effects often suggests more effective and perhaps less costly options than attrition or annihilation. Another aspect of this principle is one can often achieve objectives more effectively (and efficiently) by maximizing the psychological impact of friendly operations upon an adversary, as when coalition “tank-plinking” conditioned Iraqi armor crews to abandon their vehicles during Operation DESERT STORM, but this applies not just to the fielded forces, but to leadership and other critical systems of control as well. One can carefully tailor messages to adversary populations, encouraging cooperation or other desired behavior from them. Finally, affecting the behavior of friendly and neutral actors within the operational environment can often be as important as affecting adversary behavior. When establishing [rules of engagement](#) (ROE) that prohibit striking cultural or religious landmarks during operations, for instance, the intended “target” in doing so is likely to be a friendly and neutral audience more than the adversary. As a

consequence, the integration of strategic communications themes and IO are vitally important to overall strategy. For the steady state, EBAO may also focus on the capabilities military partners require or can wield, not on specific platforms; upon access, not bases; and upon relationships between partners, not the specifics of actual agreements.

EBAO seeks to achieve objectives most effectively, then to the degree possible, most efficiently. Operations should always accomplish the mission, but planners should seek to provide alternatives to attrition and annihilation, which are often among the *least* efficient means of achieving ends in war. Thorough evaluation of the range of possible effects should lead to COAs that achieve objectives in ways that best support the desired objectives and end state, but do so with the least expenditure of lives, resources, time, or opportunities. The ultimate aim is to be *effective*. The paradoxical nature of effective strategy sometimes requires that *inefficient means* be employed (see vignette). Airpower may often be the most effective means of achieving objectives because it cannot easily be countered, not because it is most efficient, although it may be so, particularly in terms of lives. Sometimes this requires a strategy based on attrition or annihilation, but these should be selected only after careful deliberation has determined that they are the most effective (or only) choices.

Effective versus Efficient

Consider an ordinary tactical choice... To move toward its objective, an advancing force can choose between two roads, one good and one bad, the first broad, direct, and well paved, the second narrow, circuitous, and unpaved. Only in the paradoxical realm of strategy would the choice arise at all, because it is only in war that a bad road can be good precisely because it is bad and may therefore be less strongly defended or even left unguarded by the enemy. Equally, the good road can be bad precisely because it is the much better road...more likely to be anticipated and opposed....

A paradoxical preference for inefficient methods of action, for preparations left visibly incomplete, for approaches seemingly too dangerous, for combat at night or in bad weather, is a common expression of tactical ingenuity – and for a reason that derives from the essential nature of war...when there is a live enemy opposite, who is reacting to undo everything being attempted, with his own mind and his own strength.

**—Edward Luttwak,
Strategy, the Logic of War and Peace**

EBAO should consider all possible types of effects. Warfare has traditionally focused on [direct effects](#) and more immediate [indirect effects](#) like attrition. An effects-based approach should, to the extent possible, consider the full array of outcomes in order to give decision-makers a wider range of options and provide a realistic estimation of unintended consequences. Each type of effect can play a valuable role in the right circumstances and thinking through the full range encourages a flexible and versatile approach to war fighting. Airmen today can offer a wider array of options to commanders than they could at any time during the past. To explore the full range of possible effects in particular contexts, commanders and strategists should also make use of people with in-depth cultural, historical, and regional knowledge, such as foreign

area officers, air advisors, mobile training team members, and naturalized personnel. The intelligence community should offer effective federation of intelligence sources from across the United States government and [multinational](#) partners. Leveraging this knowledge, together with dynamic interaction with the ISR community, offers the best option for acquiring the requisite information and understanding it in context. In assimilating information, another consideration is the abundance of data available to decision-makers, and the inherent difficulty of deciphering useful information. The volume of information itself becomes a form of friction, precipitating confusion, lengthening decision times, and diminishing anticipatory awareness.

Knowledge of the Operational Environment is Critical, but Ultimately Limited. The operational environment is the composite of conditions, circumstances, and influences that affects the employment of capabilities and bears on the decisions of the commander.⁶ Understanding of the [operational environment](#) should account for interested parties not directly involved in the conflict; the physical environment; threats to the joint force; and the overall cultural, historical, political, and economic context of the conflict, not just the characteristics of the adversaries or their systems. On the other hand, the very volume of data available to be turned into “actionable” information often creates a form of friction, and even “perfect” knowledge (assuming such is possible) may *not* impart predictive awareness of events, contrary to some opposing claims.

EBAO is not new. Sun Tzu wrote, “to subdue the enemy without fighting is the acme of skill...thus what is of supreme importance in war is to attack the enemy’s strategy.” This intuitive application of effects-based tenets was echoed by Napoleon when he said, “if I always appear prepared, it is because before entering on an undertaking, I have meditated long and have foreseen what may occur.” History’s great commanders approached warfare from an effects-based perspective, though not so named, when they looked beyond mere destruction of enemy forces to the more general problem of bending the enemy to their will, in the process considering the full range of means through which this was accomplished. “Effects-based” is simply a catch-all for some of history’s best practices, coupled with doctrine and some recent refinement of concepts, such as complexity, that enables proper employment of many recent capabilities. In many ways, EBAO is an elaboration of the “strategy-to-task” methodology that has guided Air Force planning for decades and is directly analogous to “maneuver warfare” theory advocated by the United States Army and Marine Corps.

⁶ Based on JP 3-0, [Joint Operations](#).



CURTIS E. LEMAY CENTER

FOR DOCTRINE DEVELOPMENT AND EDUCATION



ANNEX 3-0 OPERATIONS AND PLANNING

APPLYING AIRPOWER

Last Updated: 04 November 2016

[Airpower](#) entails the use of military power and influence to achieve objectives at all levels by controlling and exploiting air, space, and [cyberspace](#). It encompasses military, civil, and commercial capabilities, the industrial infrastructure, and a doctrine of employment. Airpower is an indivisible, unitary construct—one that unifies [Airmen](#), rather than portraying them as a collection of “tribes” broken into technological or organizational “stovepipes.” Other doctrine publications deal with specific aspects of airpower or specific types of Air Force operations, but in all cases readers should remember that airpower accomplishes or contributes to achieving national objectives across all domains¹ via operations in and through air, space, and cyberspace.

Due to speed, range, and its multidimensional perspective, **airpower operates in ways that are fundamentally different from other forms of military power; thus, the various aspects of airpower are more akin to each other than to the other forms of military power. Airpower is the product, not the sum, of air, space, and cyberspace operations. Each depends on the others to such a degree that the loss of freedom of action in one may mean loss of advantage in all other domains.** Airpower has the ability to create effects across an entire theater and the entire globe, while surface forces, by their nature, are constrained to divide the battlespace into discrete operating areas. Airmen view operations, including the application of force, more from a functional than a geographic perspective, and usually classify actions taken against targets (including nondestructive and nonkinetic actions) by the effects created rather than the targets’ physical locations within the battlespace.

AIRPOWER AS MANEUVER IN WARFARE

The multidimensional nature of airpower provides distinct advantages. Traditionally, the physical structure of ground [maneuver](#) forces has consisted of fronts, flanks, and rears. While these concepts do not apply as readily to airpower, it can be useful to make an analogy in surface terms in order to convey the Air Force’s contribution to joint warfare. In such terms, airpower adds flanks in other dimensions that make the vertical and virtual battle as important as the horizontal battle. Using a metaphor from surface warfare, the airspace above the battlespace is like an additional flank in the third dimension, which can be exploited to achieve a relative advantage. Thus, as with surface flanks, commanders should seek to gain positions of advantage by turning an enemy’s vertical flank, while trying not to expose their own vertical flank(s). Through cross-domain effects (effects created in one or more domains through operations in another), airpower can also create virtual “flanks” or “rears” in other dimensions, such

¹ Land, air, maritime, space, and cyberspace.

as time and cyberspace (or assist the joint force in doing so). Air Force forces can help ensure the success of friendly actions, disrupt adversary strategies, and even paralyze adversary action by using time more effectively than the adversary through disruption of his operational rhythm. When authorized, Airmen can create positions of decisive advantage (maneuver) through use of computer code and manipulation of electronic infrastructure in cyberspace.

In a larger sense, by exploiting this third dimension, the electromagnetic spectrum (EMS), and time, **airpower can strike directly at an adversary's centers of gravity (COGs), vital centers, decisive points (DPs), and critical vulnerabilities (CVs)**. This enables airpower to create operational and strategic effects well beyond the tactical realm of specific combat actions, enabling US forces to gain enduring advantage over adversaries. The nature of airpower also makes it an effective instrument to achieve information superiority. Airpower can quickly and directly affect adversary information systems in many different ways that can undermine enemy will and decision-making ability. **Airpower can wrest the initiative from the adversary, set the terms of battle, establish a dominant tempo of operations, better anticipate the enemy through superior observation, take advantage of opportunities, and thus strike directly at the adversary's capabilities and strategy by making effective use of the vertical dimension, the electromagnetic spectrum (EMS), and time.**

Integrated with surface forces, airpower can reduce the need for operations like surface probing actions through such capabilities as wide-ranging intelligence, surveillance, and reconnaissance (ISR), information exploitation, and comprehensive situational awareness and understanding. This enables freedom of action for surface forces, greatly enhancing their effectiveness and that of the entire joint force.

Both joint and Air Force doctrine recognize airpower as a form of maneuver. Rapid, long-range, multidimensional maneuver and fires; kinetic and nonkinetic actions; and lethal and nonlethal effects,² are inherent in airpower, as is the ability to inflict both physical and psychological dislocation on an adversary. Thus, in cases where airpower presents the joint force commander (JFC) with the preponderance of counter-surface effects, it may be appropriate for the joint force air component commander (JFACC) to be the supported commander for affecting enemy surface forces, with friendly surface force commanders acting in a supporting role. This was the case with the ballistic missile suppression effort in Iraq's western desert during OIF, and is often the case when the JFACC's forces perform the theater-wide air interdiction and strategic attack functions.

Airmen bring an understanding of airpower's capabilities to the process of building strategy, which may help them shape the design of strategies that offer a greater range of options and more decision space to JFCs. Numerous options pose a series of potential challenges against which an adversary must defend. Strategists should also identify and leverage favorable asymmetries of all kinds enabled when friendly forces possess air, space, and cyberspace superiority. The flexibility and responsiveness of Air Force forces may allow the United States to have more control over the strategic situation; that is, attempting to impose the terms of the contest on opponents rather than allowing the adversary to set the contest's terms. At the same time, strategists should assume the adversary is capable, aggressive, motivated, and adaptive.

² These categories include nuclear weapons, which use both kinetic and nonkinetic means to create lethal and nonlethal effects.

Joint doctrine allows for Service and [functional components](#) to be involved at various levels in the initial stages of joint strategy development. The [commander, Air Force forces](#)' (COMAFFOR's) or JFACC's planners should normally aid JFC-level planners in the [joint operation planning process](#) (JOPP), and still be able to keep airpower planners in the [air operations center](#) (AOC) apprised of strategy development. In any case, to ensure effective integration of airpower, the COMAFFOR, even before being appointed as JFACC, should make every effort to ensure that as many appropriately-trained Airmen as possible join the JFC's planning staff, including members with air, space, and cyberspace expertise. Each theater or [joint task force](#) (JTF) operation will probably be different and the best way for Air Force commanders to ensure that airpower is properly represented in design and planning efforts is to develop personal relationships with key commanders and personnel at the [combatant commander](#) (CCDR) level (those who will likely form the central cadres of JTF staffs) during peacetime. Theater-level planning exercises can also help ensure proper planning integration when real-world contingencies arise.

The COMAFFOR and staff should be fully integrated into the JFC's planning process (normally as part of the COMAFFOR's role as JFACC, but also in his/her retained role as Service component commander). The [joint operation planning process for air](#) (JOPPA) belongs to the COMAFFOR and JFACC, as does the air tasking cycle.³ The JOPPA and the tasking cycle are performed in the AOC in cooperation with the COMAFFOR's staff. If not already provided, the COMAFFOR or JFACC should request or formulate a strategic communication plan to coordinate and influence all aspects of [information operations](#) (IO). This may help the commander frame the problem(s) and determine the desired [end state](#). Issues include: What should the state of peace following the conflict look like? How may the affected population respond to friendly actions? What are the long- and short-term political objectives for this operation and region? How may (or should) third party nations respond to friendly actions?

Airpower strategists should develop and recommend the most advantageous design for airpower employment. In general, all designs hold several competing factors in tension, seeking to optimize contending goals and, ultimately, enduring advantage.

Certainty versus [Economy of Force](#). Overwhelming force may nearly always guarantee an outcome, but may not be in the nation's best interests, since such operations entail using more resources (or, especially, sacrificing more lives) than are necessary to accomplish objectives. Conversely, committing too little force risks failure of the overarching operation. Commanders and strategists should weigh the costs of certainty and derive a strategy that maximizes economy of force, but still accomplishes the underlying mission. Generally, the larger the campaign or operation, the greater the need for economy of force, due to the increased mass required and the larger opportunity cost.

Time versus Cost. More time to accomplish a mission often adds certainty and reduces risk from a military standpoint, but potentially comes with political, economic, cultural, and opportunity costs. Opportunity costs involve what other activities the forces involved might accomplish in a given time—an especially important consideration in larger campaigns where there are competing demands for resources. Cultural costs—

³ Unless no JFACC is appointed and airpower planning functions are not retained at the JFC's level. See Joint Publication (JP) 3-30, [Command and Control for Joint Air Operations](#), or further explanation.

usually related to the loss of lives and damage to cultural institutions—may drive nations out of wars. For example, Russia was driven from World War (WW) I on the eve of its allies' victory due to the cultural costs of the war. The longer a war progresses, the more it costs economically. This is especially important for free-market nations, as economic stress contributes disproportionately to political tensions within them. The longer a struggle continues, the more frugal planners at all levels need to be in balancing the efficient use of resources against the effective use of them. Political costs may be the greatest factor impinging on commanders, especially in democratic nations like the United States. Generally, long wars erode political support due to other types of cost. Since the Vietnam War, the United States has endeavored to quickly and decisively conclude major combat operations to minimize economic and political ramifications. Attainment of the strategic end state(s) may not immediately follow the conclusion of major combat, as events after WW II and during Operation IRAQI FREEDOM (OIF) demonstrate. Operational-level commanders, such as the COMAFFOR/JFACC, should work with higher levels of command and, through them, with national leadership to develop strategies that deliver the end state at an acceptable political cost.

Direct versus Indirect. “Direct” strategies tend to favor attrition or outright destruction of enemy fielded military forces (those capabilities the enemy possesses that face friendly forces *directly*) as a means of achieving military objectives. “Indirect” strategies seek to achieve objectives while avoiding direct confrontation with the enemy’s strength. Indirect approaches may include maneuvering to place the enemy at an untenable disadvantage, critically affecting resources that the enemy depends upon to act, denying the enemy certain strategic or operational choices without forcing the issue by direct engagement with their forces, and so on. Indirect strategies are often more effective (creating more shock, dislocation, and other [asymmetric](#) effects within enemy systems) and are normally more efficient (allowing, for example, a smaller force to have a disproportionately large impact).

Capability versus Will. Finally, in order to take action, an adaptive system such as an army or nation requires both the ability and willingness to act. Either of these may be targeted directly, although it can be argued that all [targeting](#) ultimately seeks to influence will. *Directly* targeting capability and will, however, usually yields different sets of targets. Removing an enemy’s ability to act usually entails engaging his armed forces or similar means of acting in the operational environment (e.g., finances and critical resources), but achieving this at the operational or strategic levels can be extraordinarily costly. Targeting the enemy’s will is more subtle and usually much more difficult. This may entail strikes against a leader (as in the opening actions against Saddam Hussein in OIF), engagement of leadership’s key interests (such as [law of armed conflict](#) [LOAC]-compliant strikes against the industries controlled by followers of Serbian leader Slobodan Milosevic in Operation ALLIED FORCE [OAF]), or directly targeting national political will (like North Vietnam did against the United States in the Vietnam War). Targeting willpower involves IO against and [strategic communication](#) with an adversary population. Successfully targeting willpower also requires an enemy whose “heart is not in the fight”—whose motivation to engage in conflict is relatively low. The more motivated an enemy is to fight, the greater the need to reduce his capability to fight before his will is broken. Most successful efforts to target enemy willpower have involved at least some removal of capability, even against poorly motivated enemies. Thus, the most effective strategies involve targeting both will and capability. It is also true that, when targeting the will to fight, it is often much more difficult to reliably build a cause-effect chain from which to plan. This is because the desired effects reside in

adaptively complex human, rather than just structurally complex physical, responses that are difficult to accurately predict.

PARALLEL OPERATIONS

Air Force capabilities are usually employed to greatest effect in parallel, asymmetric operations. *Parallel operations* are those that apply pressure at many points across an enemy's system in a short period of time to cause maximum shock and dislocation effects across that system. *Sequential*, or serial, *operations*, in contrast, are those that apply pressure in sequence, imposing one effect after another, usually over a significant period of time. Parallel operations limit an enemy's ability to react and adapt and thus place as much stress as possible on the enemy system as a whole. For example, in Operation DESERT STORM, the Iraqi command and control structure was severely degraded through parallel attacks on the electric grid, communications nodes, and command facilities. In the past, target sets were often prioritized and attacked sequentially, and thus it usually took considerable time for effects to be felt across an enemy system. While focusing on one node in a system, the enemy was often able to adapt to losses or compensate with other resources, thus slowing or even negating desired effects. Today, airpower often enables a truly parallel approach.

"Asymmetric," in this context, refers to any capability that confers an advantage for which the adversary cannot directly compensate. Asymmetric operations can confer disproportionate advantage on those conducting them by using some capability the adversary cannot use, will not use, or cannot effectively defend against. Conversely, symmetric operations are those in which a capability is countered by the same or similar capability. For example, tank-on-tank battles, like the battle of Kursk during WW II, are symmetric, as was the Allied battle for air superiority over Germany in that same war. The use of Coalition air power to immobilize and defeat Iraqi armored forces in Operations DESERT STORM and IRAQI FREEDOM was asymmetric, since the Iraqis could not counter this coalition strength. Similarly, al Qaeda's use of airliners as terror weapons against the United States on 11 September 2001 was asymmetric, since a direct counter would not be used by the United States to prevent the attacks and the US had no effective defense in place at the time. Asymmetric warfare pits friendly strengths against the adversary's weaknesses and maximizes our capabilities while minimizing those of the enemy to achieve rapid, decisive effects.

Experience has shown that parallel, asymmetric operations are more effective, achieve results faster, and are less costly than symmetric or serial operations.

Symmetric force-on-force warfare is often required, such as the air-to-air combat associated with achieving air superiority. At the beginning of a conflict, other offensive operations can sometimes be accomplished in parallel with counterair operations. If the enemy strongly challenges air superiority, however, all available assets should be dedicated to winning air superiority before any other offensive operations are conducted, constraining other forces to conduct defensive operations.

Airpower can provide simultaneous and rapid attack on key nodes and forces, producing effects that can overwhelm the enemy's capacity to adapt or recover.

As a result, the effects of parallel operations can be achieved quickly and may have decisive impact, thereby maximizing the simultaneity, depth, timing, and tempo elements of operational design. Further, the shock and surprise of such attacks, coupled with the uncertainty of when or where the next blow may fall, can negatively

affect the enemy's morale. This can decisively influence an enemy's decision cycle and open opportunities for exploitation.

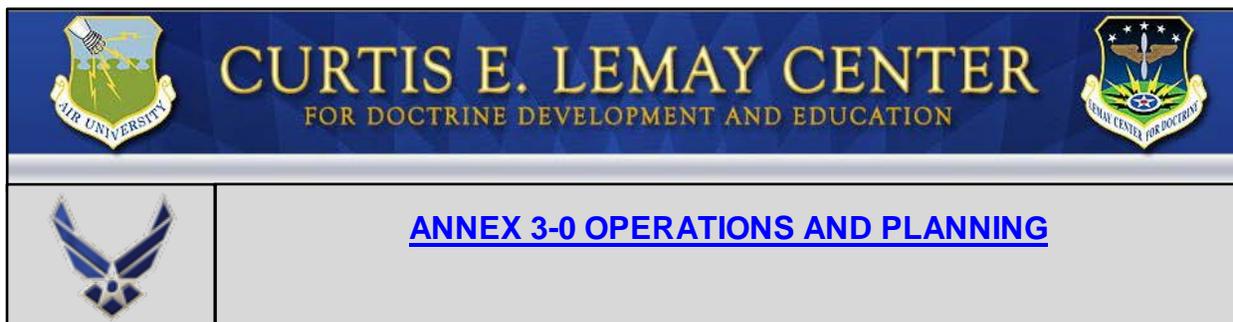
Parallel operations should be conducted in conjunction with other elements of a joint force to maximize synergy of effects against the adversary's critical vulnerabilities. For example, [counterland](#) operations, in conjunction with attack by surface forces, can overwhelm an enemy's reinforcement and resupply capacity or his ability to command his forces, creating synergistic effects that have an adverse impact throughout the enemy system. In this case, the surface and air maneuver elements of the joint force should be integrated in time and tempo with each other in mutual support to achieve decisive results. Cyberspace capabilities can contribute disproportionately to asymmetric force strategy by disabling critical adversary systems, exploiting information, or disrupting adversary decision-making processes.

Parallel operations are not always possible. When limitations in basing, ramp space, forces, weapons, the magnitude of critical target sets, or other factors such as political restraints preclude parallel targeting, planners should consider the optimum sequence for employing forces. Early attention to certain adversary capabilities, such as air defenses or high-value forces in garrison, may have significant benefits. When parallel operations are not feasible, planners need to examine which target sets are most time-critical as well as what measures the adversary will take in response to attacks.

ADDITIONAL CONSIDERATIONS

In some situations, airpower may be the only force immediately available and capable of providing an initial response. Due to the speed at which Air Force capabilities can be employed, this may occur early in a crisis, before significant friendly surface forces can build up in theater. In such cases, airpower can be brought to bear against the enemy system to directly reduce the enemy's ability to achieve immediate war aims, often through [strategic attack](#).

When employed aggressively, air, space, and cyberspace forces can conduct operations aimed at directly accomplishing the JFC's objectives. These types of operations may not rely on concurrent surface operations to be effective, nor are they necessarily affected by the geographical disposition of friendly surface forces. Instead, they are planned to achieve dominant and decisive effects by striking directly at enemy COGs and critical vulnerabilities, which may include fielded forces. Such operations are planned to disrupt the enemy's overall strategy or degrade the enemy's ability and will to fight.



AIRPOWER AND THE RANGE OF MILITARY OPERATIONS

Last Updated: 04 November 2016

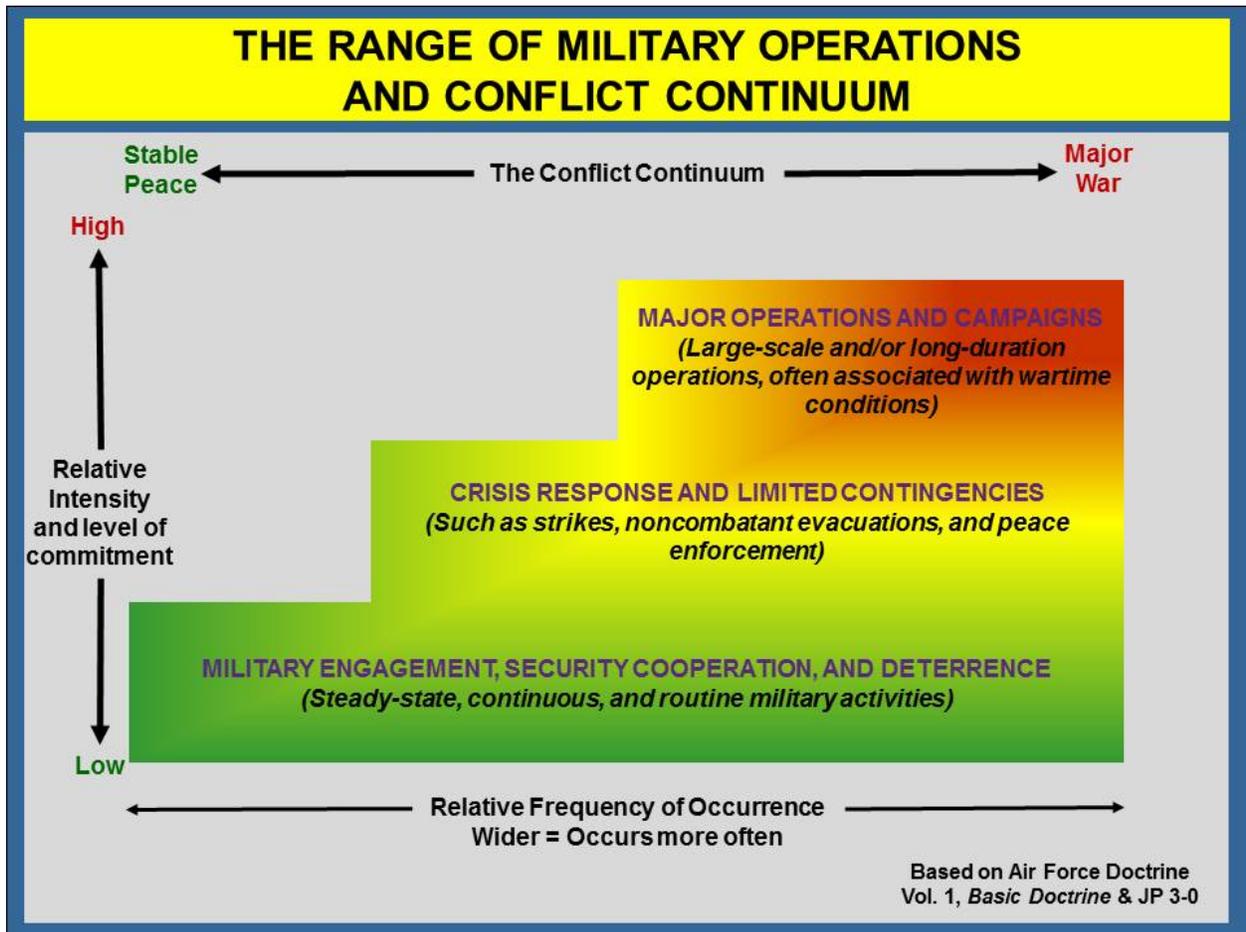
The Air Force conducts operations along a varying scale of military involvement and violence, referred to as the range of military operations (ROMO). They range from continuous and recurring operations such as [military engagement](#), security cooperation, and [deterrence](#); through smaller-scale contingencies and crisis response operations, as well as irregular warfare; to [major operations and campaigns](#) such as declared wars. Conflicts may escalate or de-escalate from one form to another. Warfighters may find that military activities like security cooperation and engagement take place simultaneously with major combat operations and irregular warfare. No two operations are alike: scope, duration, tempo, and cultural/political context vary widely. Military leaders should carefully assess the nature of their assigned missions to determine the appropriate mix of forces and discern implied missions and requirements. As military professionals, Airmen should possess the skills and apply airpower doctrine to design, plan, execute, and assess military operations across the ROMO. As an institution, the Air Force organizes, trains, and equips to conduct operations across the ROMO.

Military operations take place in and through the air, land, maritime, space, and cyberspace domains and the [information environment](#). **The Air Force exploits advantages in the air, space, and cyberspace domains to achieve [joint force commander](#) (JFC) and national objectives in all domains and the information environment.** In either a supporting or supported role, these functions can be conducted independently from, or in concert with, land and maritime operations.

THE RANGE OF MILITARY OPERATIONS AND THE CONFLICT CONTINUUM

Airpower is a vital component of successful military operations and can often provide for decisive, rapid, and more efficient attainment of enduring advantage. It has been an asymmetric advantage for the United States in many operations. Defeating enemy forces has traditionally been the most important of the tasks assigned to the military, and while that remains vitally important, national strategic guidance increasingly emphasizes the importance of preventing conflict, deterring adversaries, and shaping the operational environment so as to obtain continuing strategic advantage for the US and its allies. The Department of Defense (DOD) refers to the ongoing and recurring operations intended to accomplish this apart from the realm of war and other major operations as the steady state, and can design, plan, execute, and assess steady-state operations and activities as part of geographically-aligned theater campaigns. The strategies created to accomplish this are called theater campaign plans (TCPs). From a

Service perspective, preparation is a foremost priority during the steady state, as success in a crisis depends upon preparedness and readiness at the beginning of that crisis.



The Range of Military Operations and Conflict Continuum

The ROMO is a continuous range of operations, rather than a set of discrete and increasingly escalatory steps. Most military operations fall somewhere along this continuous range and may have attributes of more than one “step.”

Military Engagement, Security Cooperation, and Deterrence

Military Engagement, security cooperation, and deterrence establish, shape, maintain, and refine relations with other nations and domestic civil authorities. The overall objective is to protect US interests at home and abroad; this is largely achieved through preparedness, prevention, deterrence, and shaping the operational environment. These operations occur throughout the ROMO in varying degrees, may be the primary efforts during peacetime, and usually do not involve the immediate use or threat of force. Prudent use of military forces in peacetime helps keep the day-to-day tensions between nations or groups below the threshold of armed conflict and maintains US influence in foreign lands. Examples of such operations include: ¹

¹ Refer to Joint Publication (JP) 3-0, [Joint Operations](#), and other appropriate joint publications for more detailed discussion of various types of operations, as well as the general joint phasing model for major operations.

- ✧ Arms control operations.
- ✧ Counterdrug operations.
- ✧ Military-to-military contacts.
- ✧ Unilateral and multilateral exercises.
- ✧ Building partner capacity.
- ✧ Senior leader engagements with international and domestic partners.
- ✧ Security assistance.
- ✧ Shows of force.
- ✧ Demonstrations.
- ✧ Theater security package-related operations.
- ✧ National Guard Bureau State Partnership Program.

Crisis Response and Limited Contingencies

[Crisis response and limited contingency operations](#) may be single small-scale, limited-duration operations or a significant part of a major operation of extended duration involving combat. The general objectives are to protect US interests and respond appropriately to any form of limited conflict or crisis. These operations may occur during periods of slightly increased US military readiness, and the use or threat of force may be more probable. Many of these operations involve a combination of military forces and capabilities in close cooperation with other organizations. Examples of such operations include:

- ✧ [Combating terrorism](#).
- ✧ Some types of [counterproliferation](#) operations, (when arms control operations are not successful).
- ✧ [Consequence management](#) (especially of [weapons of mass destruction](#) [WMD]-related events).
- ✧ Enforcement of sanctions and maritime intercept operations.
- ✧ Enforcing exclusion zones.
- ✧ Ensuring freedom of navigation and passage, in both maritime and aerial operations, including protection of shipping and overflight.
- ✧ Ensuring freedom of action in air, space, and relevant portions of cyberspace.
- ✧ [Noncombatant evacuation operations](#).
- ✧ [Peace operations](#).

- ★ Strikes and raids.
- ★ Support to [counterinsurgency](#).
- ★ Support to insurgency operations that support US and Allied security objectives.
- ★ Recovery operations.
- ★ Foreign humanitarian assistance.
- ★ Humanitarian assistance and disaster relief.

Major Operations and Campaigns

[Major operations and campaigns](#) are large-scale, sustained combat operations to achieve national objectives and protect national interests. Such operations may place the United States in a wartime state and are normally conducted against a nation state that possesses significant military capability with the will to employ that capability in opposition to or in a manner threatening to US national security. Such operations typically involve a joint [campaign](#) comprised of multiple [phases](#). Operations DESERT STORM, ALLIED FORCE, ENDURING FREEDOM, and IRAQI FREEDOM are examples of joint campaigns. The goal is to achieve national objectives and conclude hostilities on conditions favorable to the United States and its [multinational](#) partners, generally as quickly and with as few casualties as possible, and in a manner that confers enduring strategic advantage for the United States and its partners.

Major operations and campaigns may be combined with irregular warfare, stability, and security cooperation activities, sometimes even within the same [operational area](#). Establishing conditions that confer enduring friendly advantage often requires follow-on stability operations to restore security, provide services and humanitarian relief, enable civil authority, and perform reconstruction. A fully integrated approach to international security requires the capability to conduct operations simultaneously across a broad spectrum of activities, even as part of the same operation.

CAMPAIGNS

Military operations are often linked together and described collectively as a campaign. Joint Publication 5-0, *Joint Operation Planning*, defines a campaign as a “series of related major operations aimed at achieving strategic and operational objectives within a given time and space.” While JFCs may elect to establish task forces consisting solely of one Service, it is important to note that all campaigns and operations, regardless of the Service composition of the forces that execute them, derive their authority from and fall under the command of a JFC. The Services do not conduct independent campaigns or independent operations. The ongoing theater campaigns conducted by combatant commanders and defined by TCPs shape and influence the operational environment during the steady state, and if planners successfully anticipate events within their theaters of operation, contingencies and major operations may already be planned for in branch or sequel² plans attached to the TCP. This is one of the major advantages of the

² Branches are contingency options built into the base plan used for changing the mission, orientation, or direction of movement of a force to aid success of the operation based on anticipated events, opportunities, or disruptions caused by enemy actions and reactions. Sequels are subsequent major

TCP construct, since it can provide better context and preparation for contingency and follow-on events under the umbrella of an overarching strategy.

HOMELAND OPERATIONS

The Air Force plays a significant role in [homeland operations](#). It employs airpower to assist federal, state, and local governments, as well as other branches of the [Department of Defense](#) (DOD) and non-governmental organizations (NGOs) in detecting, helping preempt, responding to, mitigating, and recovering from a full spectrum of threats and incidents, man-made and natural, within the United States and its territories and possessions. Homeland operations consist of two major mission areas: homeland defense and [defense support of civil authorities](#) (DSCA), along with the integral subset mission of emergency preparedness.



Disaster relief efforts, such as the response to Hurricane Katrina, are a visible example of defense support of civil authorities in homeland operations.

While homeland operations may arguably be considered a subset within the ROMO previously described, Air Force doctrine considers these activities important enough to warrant separate discussion.

Homeland Defense

DOD defines homeland defense as “the protection of US territory, sovereignty, domestic population, and critical infrastructure against external threats and aggression.”³ Homeland defense missions include force protection actions; counterintelligence; air, space, and cyberspace warning and control; counter-terrorism; critical infrastructure protection; air, space, cyberspace, and missile defense; and information security operations. Homeland defense also includes protection of military installations and facilities within the United States. In all of these missions, DOD either acts as the designated lead federal agency, or with a high level of autonomy within the national security structure.

The most familiar Air Force role here is fulfilling North American Aerospace Defense Command’s (NORAD’s) air sovereignty mission through [defensive counterair](#). Future missions may involve the employment of “traditional” capabilities in nontraditional ways against such asymmetric threats as terrorism. In extreme cases, military forces may be directed by the President to use deadly force to prevent a terrorist attack.

operations or phases based on the possible outcomes (success, stalemate, or defeat) of the current major operation or phase. ([JP 5-0](#))

³ [Joint Publication \(JP\) 3-27, Homeland Defense](#)

Defense Support of Civil Authorities

The term DSCA denotes DOD support provided during and in the aftermath of domestic emergencies—such as terrorist attacks or major disasters. DSCA missions include, but are not limited to, preventing or defeating terrorist attacks; response to natural disasters; support to civilian law enforcement agencies; counterdrug operations; border security; and response to civil disturbances or insurrection. It also covers consequence management due to CBRN incidents, including toxic industrial chemicals and materials. In all of these missions, various federal, state, or local environments may be further complicated by the differences in duty status and authority of civilian agencies who are primarily responsible for the management of the particular incident. DOD's involvement is supportive and is normally dependent on a request from the lead agency. DSCA missions may involve operating in legally complex environments, and may be further complicated by the differences in duty status and authority between regular, Guard, and Reserve forces (contained in United States Code, Titles 10 and 32).

The military's role in domestic emergencies is well defined and, by law, is limited in scope and duration. **Military agencies temporarily support and augment, but do not replace local, state (including National Guard forces in state active duty status), and federal civilian agencies that have primary authority and responsibility for domestic disaster assistance.** Air Force contributions in DSCA operations will likely be in support of a federal agency designated by the President or as indicated in the National Response Framework.

US Air Force organization for homeland operations should be consistent with the organizational model for any other expeditionary operation. See [Annex 3-27, Homeland Operations](#), for more detail.

Emergency Preparedness

Emergency preparedness activities are those planning activities undertaken to ensure DOD processes, procedures, and resources are in place to support the President and Secretary of Defense in a national security emergency. This includes continuity of operations, continuity of government functions, and the performance of threat assessments.

CROSS-DOMAIN INTEGRATION

Synergy is common to successful military operations—combat or otherwise—and can be created by controlling or influencing more than one [domain](#). Control within a single domain, particularly land, can secure success, but control within, or influence through, more than one domain usually helps achieve continuing advantage more effectively and efficiently. For example, in the Civil War, the gradual capture of southern coastal ports and the Mississippi River in the [maritime domain](#) aided the Union effort just as did defeat of Confederate armies in the field.

The advent of military aircraft made a third domain accessible, which all belligerents exploited to gain military advantages in WW I and to create decisive effects in and after WW II. Allied Combined Bomber Offensive targeting of the German transportation system in WW II was cited as one of the major reasons for the rapid German collapse during the last months of 1944 through surrender in May 1945. This is an example of the decisive use of the [air domain](#) to affect the land domain. In a similar manner, recent revolutions in spaceflight and computer technology have opened two new domains of [space](#) and [cyberspace](#) to military exploitation. Technical advances, operational best practices, and other military innovation will likely allow use of these domains in ways that permit decisive effects in the near future. Many argue that cyberspace has already reached this point. Because of the relatively low “entry cost” for adversaries, and because so much of Western economy and society depend on technology in cyberspace, cyberspace weapons may become “weapons of choice” for use *against* the United States, its partner nations, and its interests.

Air operations, of course, rely upon surface–land and maritime–basing and sustainment. This is a critical concern for commanders during contingencies far from developed basing infrastructure, or during the buildup to major operations. Developing basing options is a major focus of peacetime steady-state strategy development.

From an Airman’s perspective, several concerns remain: first, [air superiority](#) is normally a **desired state before all other combat operations.** **Attaining air superiority– and [air supremacy](#), when required–helps provide both the freedom to attack and freedom from attack, as well as enhancing freedom of action and maneuver. Operating without air superiority or supremacy radically increases risk to surface and air operations.** Gaining air superiority and supremacy involves both offensive and defensive missions. The [commander, Air Force forces](#) (COMAFFOR) is normally also the [joint force air component commander](#)



[Through] dominance across domains the Air Force grants joint freedom of maneuver in all warfighting domains: land, [maritime], air, space, and cyberspace. This, in turn, allows the Joint Force Commander to achieve desired outcomes across the full range of military operations: from humanitarian relief saving those in need, through preventing war via dissuasion and deterrence, to inflicting strategic paralysis on implacable opponents. Without the Air Force’s ability to present this spectrum of capabilities to the joint team in peace, crisis, and war, national security would be at risk.

*--The Nation’s Guardians:
America’s 21st Century Air Force,”
Chief of Staff of the Air Force White Paper,
29 December 2007*

(JFACC) and [area air defense commander](#) (AADC). The AADC is responsible for defensive counterair operations. The JFACC is charged with integrating [offensive](#) and [defensive counterair](#) operations to achieve air superiority for the JFC. See [Annex 3-01, Counterair Operations](#), for more information concerning air superiority. Second, [space superiority](#) is important in maintaining unique advantages in precision applications, global [command and control](#) (C2), [situational awareness](#) and understanding, and [operational reach](#). Space superiority ensures the freedom to operate in the space domain while denying the same to an adversary. Like air superiority, space superiority involves offensive and defensive aspects. The COMAFFOR or JFACC should normally be designated the supported component commander for space control operations within a joint force. See [Annex 3-14, Space Operations](#), for more information. Finally, [cyberspace operations](#) are also vital for maintaining advantages in *all* domains. All components of the joint force contribute to operations in cyberspace. In many cases, JFCs may retain control of cyberspace operations at their level. Cyberspace superiority ensures freedom to operate in cyberspace.



[ANNEX 3-0 OPERATIONS AND PLANNING](#)

THREATS TO OPERATIONS

Last Updated: 04 November 2016

Threats to national interests exist across the [range of military operations](#). Since tactical actions can have strategic consequences, threats that are perceived as small can have a large-scale impact on operations. Commanders should consider the [effects](#) that the guiding agent(s) behind a threat intend to produce, not just the nature of the threat itself.

Small-scale actions conducted by agents, insiders, saboteurs, sympathizers, partisans, extremists, and agent-supervised or independently initiated terrorist activities may present a grave danger to Air Force operations. These threats may derive their personnel from nation states or non-state actors. Often [asymmetric](#) in nature, these threats may be unorganized or well-orchestrated. They may take the form of insider threats, riots, random sniper incidents, physical assaults, cyberspace incidents, kidnappings, aircraft hijackings, or bombings. In addition, commanders should consider threats, both natural and man-made, to force health protection.

Major attacks by large conventional forces that may use operations in the [air](#), [space](#), [land](#), [cyberspace](#), or [maritime](#) domains are at the large-scale end of state-to-state conflicts. Attacks may also come from aircraft and theater missiles/artillery armed with conventional weapons or [weapons of mass destruction](#). Engagement of such forces is generally considered part of major combat operations rather than [force protection](#).



CURTIS E. LEMAY CENTER

FOR DOCTRINE DEVELOPMENT AND EDUCATION



ANNEX 3-0 OPERATIONS AND PLANNING

TERMINATION AND TRANSITION OF OPERATIONS

Last Updated: 04 November 2016

Planning for [termination](#), transition, and [redeployment](#) from operations can be just as critical as planning to engage in an operation in the first place. Air Force commanders should focus on creating the proper airpower effects to help meet the operational commander's military objectives and achieve the desired end state. Once the [joint force commander's objectives](#) are met and the proper conditions for terminating the operation exist, commanders should be prepared to execute their disengagement [strategy](#). The commander's strategy should be coordinated with other agencies and organizations involved in the operation, and will likely include the State Department, other coalition forces, the host nation, nongovernmental organizations, and international organizations. In some cases, Air Force forces may disengage when appropriate [effects](#) have been created and the commander's objectives are met. In some cases, Air Force forces may disengage from smaller [contingencies](#) and redeploy to larger conflicts.

CONFLICT TERMINATION

Conflict termination is a vital aspect of tying military actions to [strategic](#) objectives, establishing an [end state](#) that provides a "better state of peace," and ensuring that the United States and its strategic partners achieve continuing advantage in the strategic environment. Cessation of major hostilities usually follows one of three patterns. The first is one (or more) imposing its (or their) will on another combatant by force of arms. The unconditional surrender of the Axis powers ending WW II is an example. Another method may be through a mutual, negotiated settlement between the parties involved, such as the Paris Peace Accords that ended US involvement in the Vietnam War. Finally, a settlement may be imposed or brought about by a third power. For example, the North Atlantic Treaty Organization's intervention in the Bosnian civil war resulted in the Dayton Accords, which effectively ended that conflict. The end of conflict is rarely predictable and even a seemingly final end state often leads to new, emergent conditions within the operational environment that the United States and its partners may need to respond to.

Termination planning should establish the conditions and detail the actions needed to achieve the military portion of the desired end state and create enduring advantage. Also, the way a conflict is conducted may have a great effect on the actual end state(s) achieved. For example, unnecessarily destructive operations may foster ill feelings among a host-nation's populace, may aggravate refugee problems, and may increase collateral civilian damage or destroy so much infrastructure that enabling civil authority is more difficult, expensive, and time consuming. In contrast, campaigns that effectively reduce an adversary's military capacity to commit aggression while minimizing collateral

damage to the civilian populace can contribute to regional stability and discourage other potential aggressors from military action.

Planning for termination should begin as early as possible, preferably prior to the beginning of major operations. Termination planning is extremely difficult, as conflicts can evolve in many directions, forcing revision of the original termination plans. The greatest difficulty at the operational level is translating national goals into measurable military objectives that create the conditions needed to achieve an end state conveying continued strategic advantage.

Regardless of how the end state is brought about, operational concerns should be addressed early in the termination effort to avoid resumption of combat. Provision for the security of remaining forces, responsibilities toward the civilian population, prisoner of war accounting, and repatriation are all issues that should be addressed. Providing for the security of former adversaries and other basic human needs may significantly enhance peaceful resolution of a conflict, as may restoring elements of vital public infrastructure that may have been damaged or destroyed by combat or other violence. Establishing [rules of engagement](#); targeting criteria; [intelligence, surveillance, and reconnaissance](#) and [information operations](#) requirements; relations with the media; funding and force structure requirements; along with plans for medical care and coordination with nonmilitary organizations are key considerations for friendly forces to better understand their role. These considerations may lead to expanded or increasingly constrained postures to preclude the resurgence of hostilities, enhance public support, and ensure the security of military operations and enable or legitimize civil authority. The influence of nonmilitary [instruments of national power](#) (IOPs) may increase as termination approaches and the end state is achieved. Consideration of the requirements for the other IOPs will significantly support achieving the desired end state.

Whether conflict termination is imposed by decisive military action or through a negotiated settlement, [airpower](#) may play a critical role in any post-hostility transition. Airpower offers national leaders a potent force to support political and economic IOPs during post-hostilities. Component commanders should therefore clearly and explicitly define the capabilities of their respective forces to meet the objectives of conflict termination.

TRANSITION TO FOLLOW-ON OPERATIONS

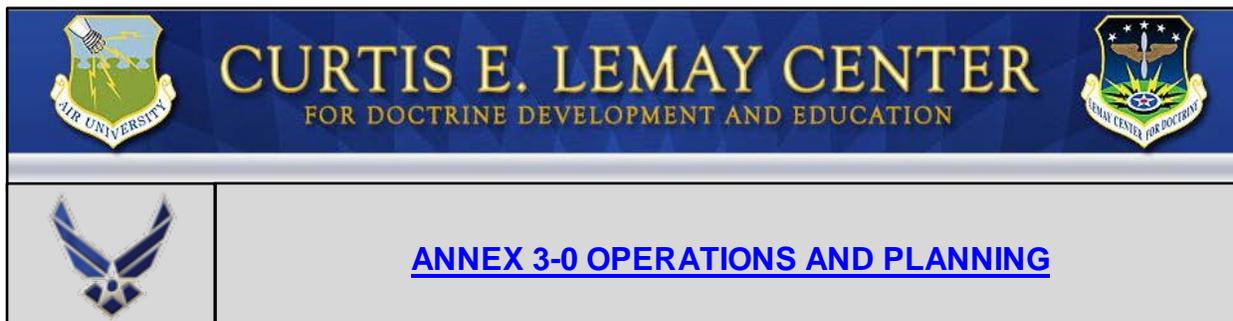
Transition occurs when control of the ongoing mission is transferred to another organization or when a change of mission is brought about by changing circumstances or objectives. As with planning for conflict termination, planning for transition should extend throughout the planning process and into operations and redeployment. [Joint task force](#) operations may be transferred to another military force, a regional organization, an international agency such as the United Nations, or civilian organizations. The process of transferring control of an operation to another military force or organization is situation-dependent; often, high-level [interagency](#) approval is required, with long lead times. After a conflict, regeneration of force capabilities may be a primary consideration in the transition plan. Key transition decisions may involve the following considerations:

- ★ Requirements for a residual force or response capability.

- ✦ Follow-on civil support, nation-building, or humanitarian missions.
- ✦ [Force protection.](#)
- ✦ Alliance and coalition force considerations.
- ✦ Availability of intertheater and intratheater air mobility assets.
- ✦ Applicable host nation environmental standards.

REDEPLOYMENT

Redeployment activities concern the transfer of individuals, units, and materiel and can begin at any point during operations. Planners should begin redeployment planning early so operations reflect exit or transition strategy developed during mission analysis and support both the operation's desired end state and the steady-state strategy for the operational area. Redeployment is not just reversing the deployment process; it is a mission-based operation within the overall context of the joint mission. Redeployment may include movement of individuals, units, and materiel deployed in one area to another location within the same area, to locations for the purpose of further employment, or to their home bases.



THE COMMON OPERATIONS FRAMEWORK

Last Updated: 04 November 2016

Although the [range of military operations](#) (ROMO) is a continuum that extends from continuous and recurring operations, such as security cooperation during peacetime, to major combat operations in war, there are some significant differences between the focus of strategy during steady-state conditions and the focus during contingencies and major operations. During steady state, strategy focuses on shaping the environment for regional and global stability, deterring aggression, and preventing conflict. Time horizons are thus usually much longer and considerations of readiness, budgeting, and the training and equipping of forces—all of which are outside the scope of doctrine—impact strategy significantly. Contingencies and major operations are the traditional subject of military strategy and doctrine, and thus military decision-making processes described in planning and operations doctrine have focused upon them.

Nonetheless, operations in recent decades have shown that there is significant common ground between steady-state and contingency conditions, and there are considerable advantages to designing coherent and comprehensive strategies for shaping the actual steady-state environment. Potential contingencies and major operations are then considered [branches](#) to combatant commanders' overarching theater¹ or global² campaign plans. Contingency planning and steady-state planning employ a common logical approach and process.

A common framework of processes helps to foster coherence in Air Force strategy creation by:

- ✦ Creating explicit linkages to national objectives and desired end states.
- ✦ Encouraging continuity in thinking used to design and plan operations, regardless of where they occur in the ROMO, whether during steady-state or contingency operations.
- ✦ Providing a common method for commanders and staff elements to use in designing and planning contingencies as logical follow-ons to ongoing operations.
- ✦ Encouraging logical linkages between resources needed for ongoing operations and those to be flowed in to support emerging contingencies.

¹ In the case of geographic combatant commanders.

² For global functional combatant commanders.

The common framework for operations is broken into the following general considerations:

- ✦ Fundamentals of operational design, including discussion of the elements and methods of operational design, the coercion continuum as a practical design construct, and additional considerations specific to airpower.
 - ✦ General planning considerations, including discussions on Air Force planning in the context of broader joint planning and the effects-based approach to planning.
 - ✦ General execution considerations.
 - ✦ Fundamentals of assessment, including discussions on assessing strategy in general, assessment criteria, assessment measures and indicators, and assessment interpretation.
-



ANNEX 3-0 OPERATIONS AND PLANNING

OPERATIONAL DESIGN FUNDAMENTALS

Last Updated: 04 November 2016

As an element of [strategy](#), [operational design](#) is defined as “the conception and construction of the framework that underpins a campaign or major operation plan, and its subsequent execution” (Joint Publication [JP] 5-0, [Joint Operation Planning](#)).

Operational design helps establish a logically consistent structure from which to understand an operation’s aims and, broadly, the methods and means to be used in obtaining them. In other terms, design provides a necessary “front end”

to the formal planning processes described in JP 5-0 and elsewhere in this volume. The “process” of determining the overall focus of an operation—of deciding on the end state, objectives, desired effects, and so on, has been largely a matter of art throughout most of military history. Understanding certain aspects of problem solving can make portions of the commander’s art more systematic, although it will never make them “scientific”—in the sense of making them prescriptive and predictable. Approaching operational design deliberately, however, can provide a foundation that facilitates decision-making by creating a structure linking decision analysis to emerging opportunities. Creating such a linkage can substantially reduce the risks associated with an operation and increase the utility of a plan following first contact with an adversary.

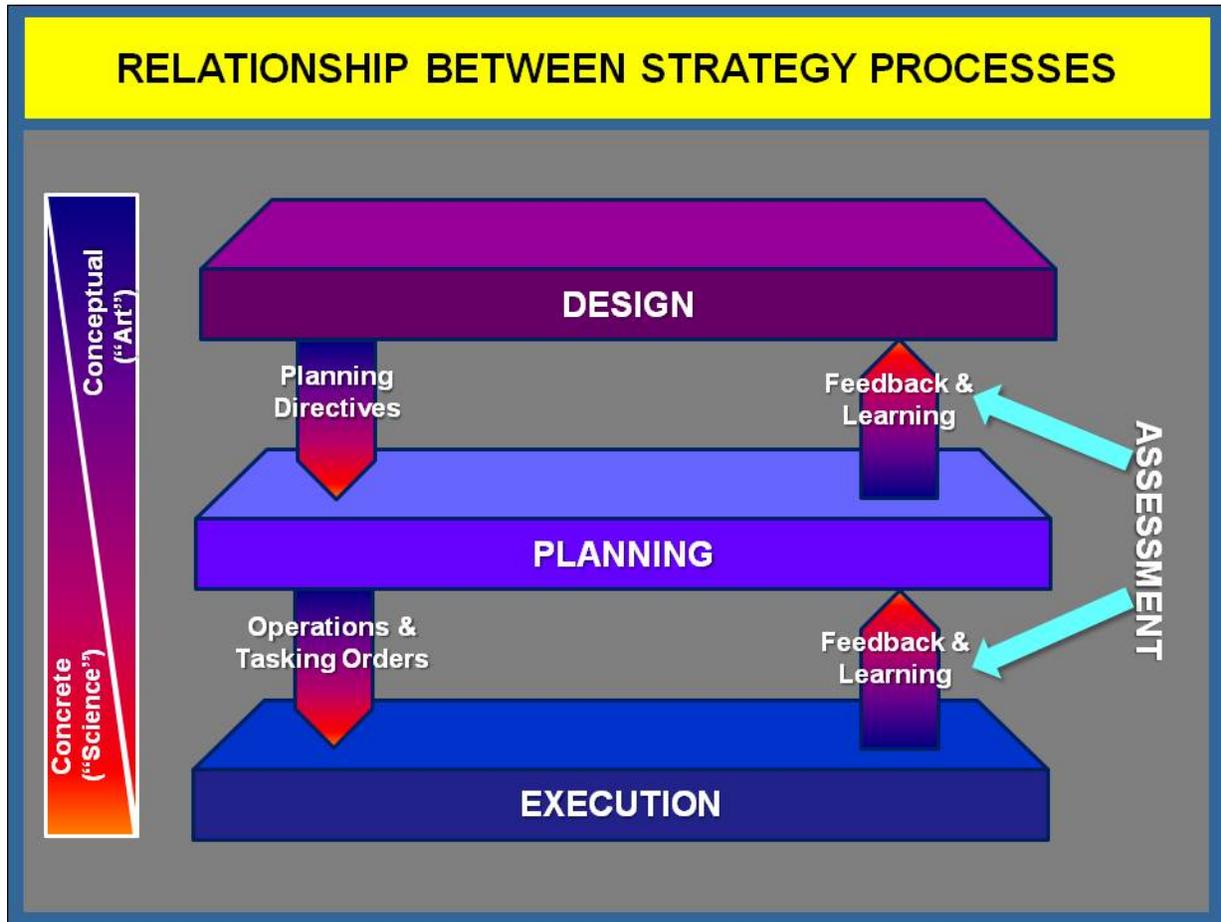
Design consists of three closely interrelated activities, which collectively allow commanders and their staffs to understand and visualize an operation’s purpose. These activities are *framing the operational environment*, *framing the problem*, and *developing the operational approach*. (Further discussion on these processes can be found in [Methods of Operational Design](#), further along in this volume.) Design helps formulate an operational approach and the commander’s initial statements of mission and intent, which in turn feed the process of course of action (COA) analysis and selection, which feeds the creation of detailed plans and assessment criteria. Plans are then executed by accomplishing tasks at the tactical level. The results are assessed and operations are adapted based on that assessment, providing input to strategy revision. Design is thus cyclic and iterative, like many other aspects of planning in general.

Design

Design does not replace planning, but planning is incomplete without design. The balance between the two varies from operation to operation as well as within each operation. Design helps the commander provide enough structure to an ill-structured problem so that planning can lead to effective action toward strategic objectives [emphasis in original].

—General James Mattis
Former Commander, US Joint Forces Command
Vision for a Joint Approach to Operational Design,
6 October 2009

Operational design is the job of commanders with the support of their strategists and staffs. Planning and design are closely interrelated, since planners take the commander's overarching design concept and intent to create detailed COAs, plans, and orders for operations. Planning and design make it possible to convert broad guidance from national leadership and senior commanders and turn it into discrete tasks at the tactical level. The figure, "Relationship between Strategy Processes," illustrates these relationships.



Relationship Between Strategy Processes

Design can aid creation of formal planning products as part of deliberate and [crisis action planning](#) (CAP). The [joint operation planning process](#) (JOPP) activities and products are generally the basis for concurrent [joint operation planning process for air](#) (JOPPA) activities, which result in the JFACC's [joint air operations plan](#) (JAOP) and the commander, Air Force forces' (COMAFFOR's) component plan. The JAOP and component plans provide operational guidance until the [battle rhythm](#) is initiated, at which point strategy guidance is provided through the [air operations directive](#) (AOD). The cycle proceeds through execution to feed the reiteration of strategy formulation based on the results of the continuous process of assessment. The first steps of the JOPP and JOPPA reiterate and re-examine the products of operational design, such as the commander's mission and intent statement. The intermediate planning steps, involving the JOPP, JOPPA, JAOP, and AOD, are discussed in greater detail elsewhere in this annex.

Design work done by commanders and strategists can be likened to that of an architect in a building project, working directly with the project's "sponsors" (the clients in this illustration; national leadership in a military operation) and the engineers who help realize specific aspects of the architect's design. The engineers are the higher-level planners who accomplish the JOPPA and produce the JAOP and AODs. Tactical planners and controllers (those who produce and execute the [air tasking order](#) [ATO]) are like the artisans who create specific details of the plan. **Tactical plans tend to solve well-structured problems**, where tactics and techniques yield one (or a very few) indisputably correct solutions to objective, empirical problems (like the best ordnance to use on a particular target). **Operational plans tend to solve medium-structured problems**, where doctrine suggests courses of action that have clear objectives and end state, but may have a number of possible correct solutions (like the best way to win a specific battle). **Commanders and strategists, however, usually deal with ill-structured problems¹**, which are far more complex and which possess the following characteristics:

- ✦ **They cannot be definitively formulated**—The information needed to understand the problem depends very much on how the problem is defined (framed). Such problems rarely have a single cause and stakeholders usually see relationships between causes and their importance differently, just as the North Vietnamese leadership saw the war they were fighting in very different terms than did US national leadership.
- ✦ **Each problem is unique and novel, as is every solution**—Doctrine and historical understanding may suggest COAs for similar circumstances, but each problem is subtly and significantly different, as are the potential solutions: Spain from 1808-12 was not Iraq in the twenties, which was not Malaysia in the fifties, which was not Iraq in the twenty-first century, despite similarities among these conflicts.
- ✦ **They have no "stopping rule"**—It is impossible to say when the problem has been "solved" conclusively and one "solution set" usually leads to another set of problems to be solved. In Europe at the end of World War II, collapse of the Nazi regime set in motion a communist conquest of Eastern Europe and required the Marshall Plan and Truman Doctrine to rebuild and protect countries remaining in the Western sphere.
- ✦ **There is no fixed set of solutions; there is no "right or wrong," only "better or worse"**—Each ill-structured problem requires a one-of-a-kind solution, and that solution often has no objective measure of success that stakeholders agree upon. "Success" often devolves into the best better-worse compromise possible among stakeholders.
- ✦ **One cannot understand such a problem without proposing a solution**—Understanding entails conceiving a solution. For example, if a regional insurgency is conceived as a result of poor governance, this yields both a different problem and a different potential solution set than if the problem is conceived of as a failure of local governance and security. Proposed solutions do not have to be fully "fleshed out," encompassing all the elements of operational design, but the framework used to conceive the problem points in the direction of a solution or set of solutions.

¹ Sometimes also referred to as "wicked problems" in planning literature, especially older material.

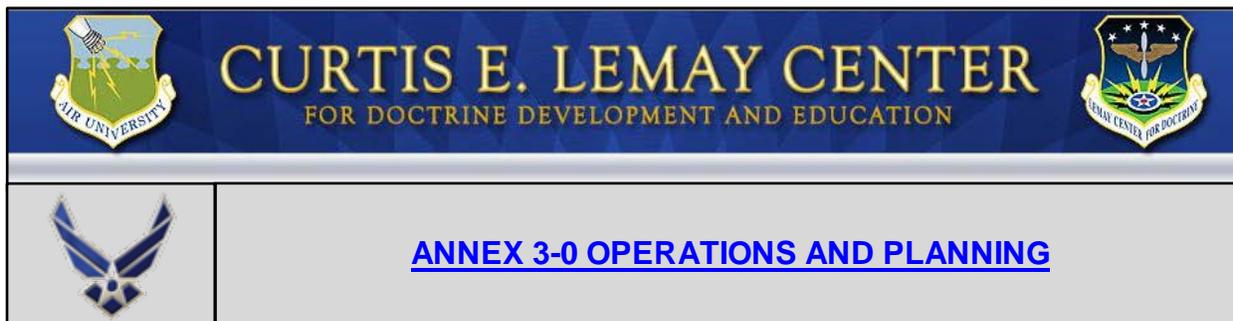
★ **They are always interactively complex**—All actors in a given environment have great freedom of action and their interaction is non-linear, so very minor actions can create disproportionately great effects, but the same action performed at a later time may produce a very different result. In 1942, Lieutenant Colonel Jimmy Doolittle and his raiders executed a small attack against Japan that had psychological effects well out of proportion to the damage done, but massive conventional aerial attacks later in the war, including the devastation of Tokyo, after the Japanese had adapted to the reality of bombing, did not have a comparable effect on the Japanese war effort.

The interaction of complex adaptive systems almost always yields ill-structured problems. Warfighters are problem-solvers by nature, but most have been trained to solve either well- or medium-structured problems. With ill-structured problems, however, there is often disagreement even concerning the desired end state or the basic parameters that define the problem to be solved.

Design is a methodology for applying critical and creative thinking to understand, visualize, and define complex, ill-structured problems and develop approaches to solve them. Design requires the right people and the right command climate in order to succeed. Design is not a mechanistic, “checklist,” or institutionally-entrenched activity and it cannot be accomplished by any one person, although the commander drives the process and plays a central role. To succeed, the organization practicing design should have a climate that encourages open, honest dialogue and exchange of ideas.

Design requires close interaction among an organization’s commander, staff, the commanders and staffs of higher and lower echelons, as well as supporting commanders and their staffs. It is through interchange between different levels that shared understanding and common vision can be achieved. Leaders and staffs at higher echelons may have clear strategic understanding of the problem; those at lower levels may better understand local circumstances. Bridging these perspectives is crucial to achieving a common vision, which enables unity of effort.

Joint functional and Service [components](#) need to be involved at various levels in the initial planning stages of joint strategy development. In some cases, however, the [joint force air component commander](#) (JFACC) and key [air operations center](#) planners may need to volunteer to be included early in the [joint force commander’s](#) (JFC’s) design process. In such cases, **joint integration requires that a sufficient number of trained Airmen be included on the JFC planning staff.** The air component liaisons, if established, can help make the JFACC aware of pending or ongoing design and planning efforts, but it is also the JFC’s responsibility to actively seek airpower expertise. Each theater or [joint task force](#) operation will likely be different, and prior coordination is required on how overall joint strategy development may occur and how airpower should be included in that effort. Theater-level design and planning exercises are vital to ensure proper integration when operations commence.



METHODS OF OPERATIONAL DESIGN

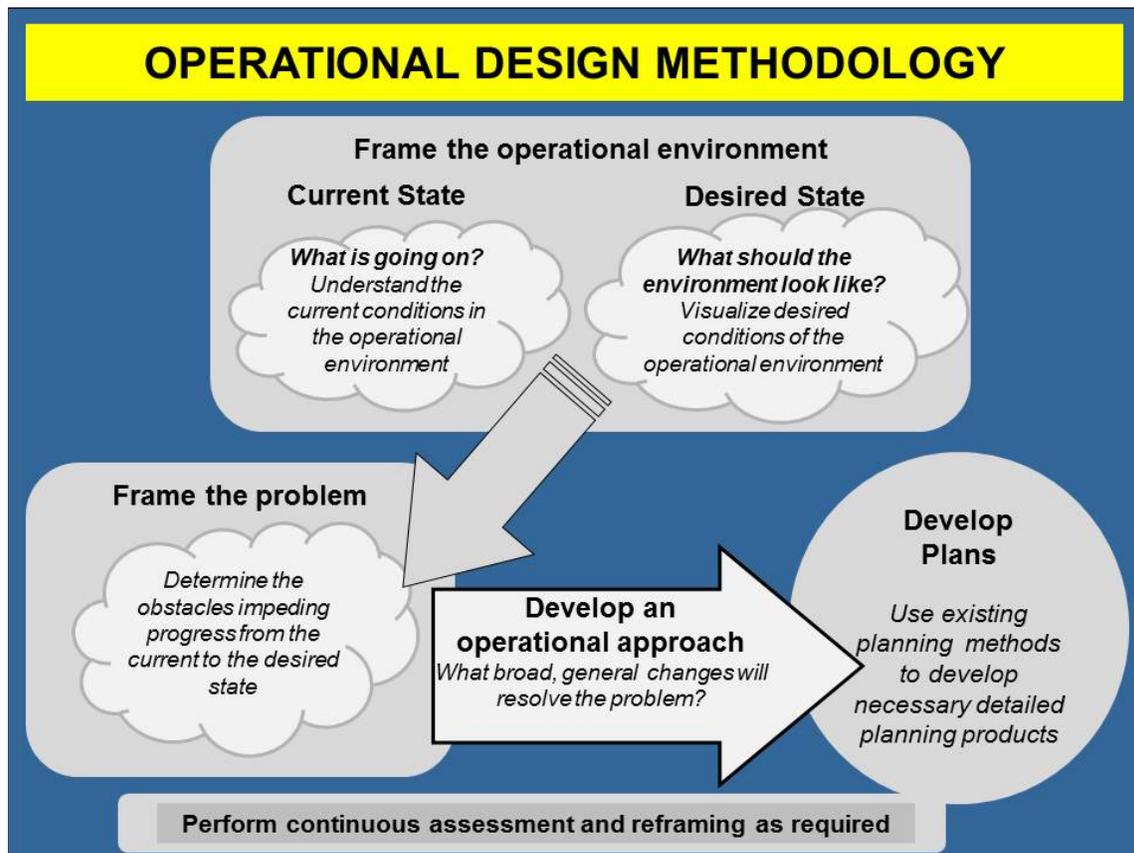
Last Updated: 04 November 2016

[Operational design](#) is the first level of [strategy](#) implementation and rests upon [operational art](#), which is defined as the “cognitive approach by commanders and staffs—supported by their skill, knowledge, experience, creativity, and judgment—to develop strategies, campaigns, and operations to organize and employ military forces by integrating ends, ways, and means” (Joint Publication [JP] 5-0, [Joint Operation Planning](#)). Operational art uses the commander’s vision and [intent](#) to determine broadly what should be accomplished in the [operational environment](#); it is guided by the “why” from the [strategic level](#) and implemented with the “how” at the [tactical level](#). In applying operational art, the commander draws on judgment, perception, creativity, experience, education, intelligence, boldness, and character to visualize the conditions necessary for success before committing forces. This visualization is captured in the commander’s operational approach, which is a description of the broad actions the force must take to transform current conditions into those desired at the end state (JP 5-0, *Joint Operation Planning*).

OPERATIONAL DESIGN METHODOLOGY

Design provides an ordered way to create the conceptual framework of a plan. Strategists and planners can then use the joint operation planning process (JOPP) to create detailed subordinate plans and orders. The purpose of design is to create an operational approach that can be “fleshed” into more detailed plans. In order to derive the operational approach, the commander and staff should understand the operational environment and the problems the [joint force commander](#) (JFC) has been given to solve. Thus, broadly speaking, operational design consists of *framing (or understanding) the operational environment, framing (or defining) the problem, and developing the operational approach*. See the figure, “Operational Design Methodology,” for a general overview.

OPERATIONAL DESIGN METHODOLOGY



Operational Design Methodology

Framing the Operational Environment

Operational design begins with framing the operational environment (OE)—establishing the larger context of a situation within which the commander should act in order to realize the operation’s aims. This entails reviewing all existing guidance from higher authorities (including existing theater campaign and country plans that govern steady-state activities) and examining all actors (opponents, friends, and neutrals) and their relationships within the OE. The aim is to understand existing conditions in order to derive the set of conditions we wish to see at the end of operations (often the restoration of stable steady-state conditions), as well as understanding the competing conditions that other actors would like to see. Based on overarching guidance, the JFC will derive that portion of the end state the military is responsible for delivering (the military end state) and assign the military objectives required to arrive at that end state. These objectives form the basis for the operational approach.

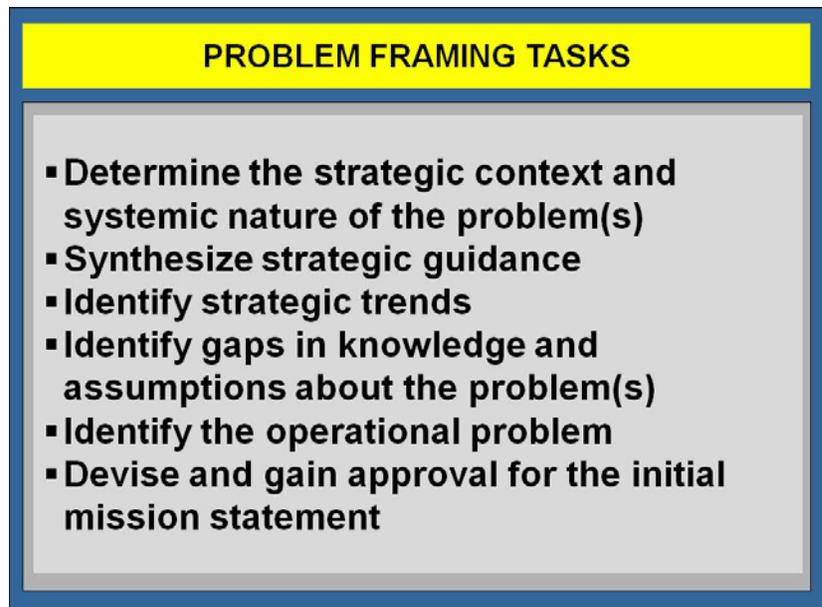
The principal means by which the commander and staff gain understanding of the OE is joint intelligence preparation of the operational environment (JIPOE). Guidance concerning JIPOE can be found in JP 2-01.3, *JIPOE* and [JP 5-0, Chapter IV](#).

Framing the Problem

This part of the process entails reviewing the tendencies and potential actions of all actors within the relevant OE and coming to an understanding of the root causes of the issue at hand. This is not the same as problem solving, which planners do at lower levels to create solutions to medium- and well-structured problems within the conceptual

framework created by the commander and strategists. Problem framing entails determining the overall boundaries and aims of the operation, much as an architect does for a building project. In many cases, only the most prominent tendencies and potential actions of all the actors in a situation can be considered in a finite time by a well-informed staff. In-depth understanding may require a lifetime of study and immersion and the military must often go outside its own channels—to the interagency community, regional experts, academics, and local nationals—to leverage such knowledge. When possible, open, collegial dialogue among the commander, “sponsors,” other government agencies, and nongovernmental organizations, staff strategists, and planners can be very beneficial during this process. As operational design progresses into planning, the process becomes more formalized and the models strategists and planners work with become more empirical as they engage in course of action (COA) development, analysis, and wargaming. Operational design, however, focuses upon providing basic, overarching structure to the problems that planners may have to solve “further down the road.” The “collegial dialogue” should help establish the basic context of the problem to be solved and the logical relations between its elements.

Several tasks help provide structure to the problem framing efforts of the commander and planning staff and make it easier to break ill-structured problems into smaller “chunks” of medium- to well-structured problems. These tasks are depicted in the figure, “Problem Framing Tasks,” and consist of the following:



Problem Framing Tasks

- ✦ **Determine the strategic context and systemic nature of the problem(s)**— Examine the reasons the problem came to exist, its history, and how it may develop. Examination should include analysis of all actors—friendly, adversary, and neutral—and encompass all instruments of power, as well as unique aspects of the operational environment that may play a role (like distinctive terrain, climate, and cultural aspects).
- ✦ **Synthesize strategic guidance**—Determine what guidance from national leadership, the [combatant commander](#), etc., already exists concerning the desired strategic end state. In some cases, guidance from national leaders will not be logically coherent and military commanders, including the [joint force air component commander](#) (JFACC) and the commander, Air Force forces (COMAFFOR), may need to help clarify such guidance, as was the case during the “design phase” leading up to Operation DESERT STORM). Answer questions like, “are vital national or [multinational](#) interests at stake?,” “Are the strategic aims consistent with previously established policy and strategy?,” etc. Attempt to create clear *boundaries* to the problem and a coherent, logical end state that represents continuing strategic advantage.

- ★ **Identify strategic trends**—Describe how the strategic situation is expected to evolve over time—what trends yield outcomes favorable and unfavorable to friendly interests? What can be done to arrest or encourage trending? This effort should begin to suggest broad COAs. If systems are transformed, what behaviors might emerge?
- ★ **Identify gaps in knowledge and assumptions about the problem(s)**—Speculation on COAs and system-wide effects should suggest gaps in knowledge and provide the basis for later determination of [commander's critical information requirements](#) (CCIRs). CCIRs include [priority intelligence requirements](#),¹ [friendly force information requirements](#),² and, in many cases, host nation information. Gaps in knowledge also suggest key assumptions that need to be made about the problem(s) to provide a coherent framework for design and for the JFACC's and/or COMAFFOR's decision-making. Assumptions can encompass political factors, adversary behavior, forces required, time limits, etc. This is a critical step in the design process. Assumptions endow a design with focus, as well as the ability to identify the greatest risks to an operation. For example, Allied operations analysts and air planners during World War II assumed (correctly) that ball bearings were an essential industrial bottleneck for the Axis war economy. However, they incorrectly assumed the Germans neither recognized this weakness nor prepared to counter the effects of Allied attacks. Ultimately, Allied bombers did succeed in heavily damaging German ball bearing factories, but their efforts—attained at a huge cost in Allied lives and aircraft—did not significantly impede the Axis war effort.
- ★ **Identify the operational problem(s)**—Thinking through the steps above should give commanders and staffs enough information to identify the problem's critical factors, along with the problem's logical boundaries and a framework for viewing the critical factors. This should entail assessing the desired strategic end state from higher leadership's guidance (or, in some cases, synthesizing and recommending it, where none has been explicitly established). Commanders and strategists then use that assessment to develop the military end state and termination criteria. Correct identification of the operational problem, its boundaries, and key assumptions also helps guide selection of broad indicators and measures of success. These help focus [intelligence, surveillance, and reconnaissance](#) operations and help further determine CCIRs.

Developing the Operational Approach

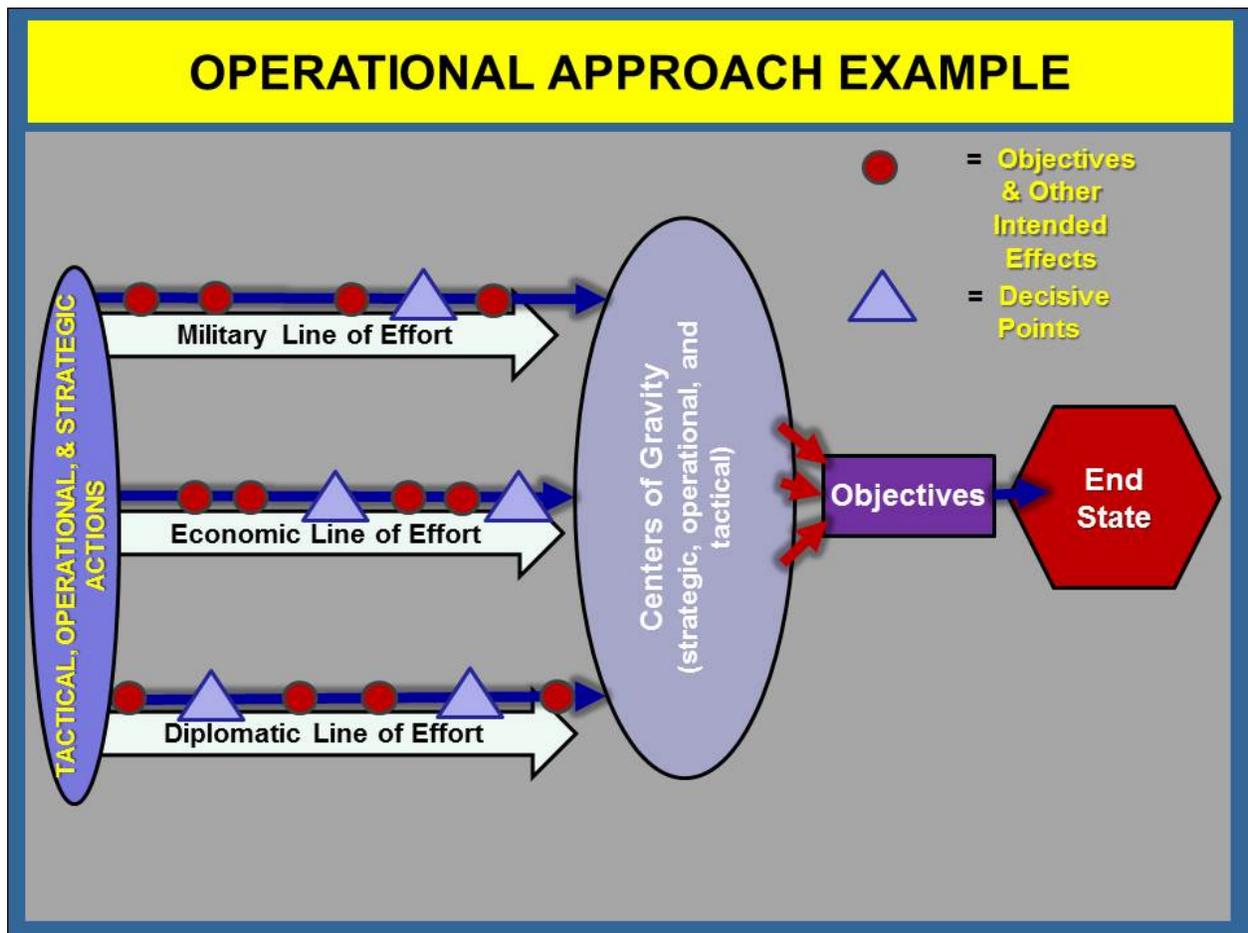
The operational approach describes in broad terms how the OE should be changed from existing conditions to desired conditions. It is a commander's means to describe what the joint force must do to achieve objectives that bring about the desired end state. Frame the mission with a clear, concise statement of the purpose to be achieved and the essential tasks to be accomplished—who, what, when, where, and why. It may be helpful to both conceive and present the operational approach graphically, as well as in words, as shown in the figure, “Operational Approach Example.”³

¹ Intelligence requirements, stated as priorities for intelligence support, that the commander and staff need to understand the adversary or other aspects of the operational environment. (JP 2-01, [Joint and National Support to Military Operations](#).)

² Information the commander and staff need to understand the status of friendly force and supporting capabilities. ([JP 3-0](#))

³ Figure adapted from Jeffrey M. Reilly, *Operational Design: Distilling Clarity for Decisive Action*.

The figure, “Operational Approach Example,” depicts a summary “cognitive map” of the alignment of operational design’s key elements. It depicts how actions at the tactical level lead to effects, which can be usefully depicted using [lines of effort](#) (LOEs).⁴ LOEs lay out critical desired effects, decisive points (DPs), and other events along a timeline that relates these to COGs, commander’s objectives, and the operation’s end state in a manner that shows relationships between all the elements, but is easy to comprehend. Creating desired effects should lead to correct decisions at DPs, which are specific places, key events, critical factors, or functions that, when acted upon, allow commanders to gain a marked advantage over an adversary or contribute materially to achieving success.⁵ Achievement of these along an entire LOE allows friendly operations to decisively affect COGs, which are sources of power that provide all actors within the operational environment (adversary, friendly, and neutral) with physical strength, freedom of action, or the will to act.⁶



Operational Approach Example

Decisively affecting COGs leads to achievement of friendly objectives. When all objectives are achieved, by definition,⁷ the end state should also have been achieved.

⁴ In some joint planning literature and Marine Service doctrine, LOEs are still referred to as “lines of operation” or “logical lines of operation.” Joint doctrine, however, now recognizes the distinction between lines of operation and LOEs and uses the latter in [JP 5-0](#).

⁵ [JP 5-0](#).

⁶ Ibid.

⁷ Joint doctrine defines the end state as “the set of required conditions that defines achievement of the commander’s objectives” ([JP 3-0](#)). The Air Force definition further refines and illustrates the concept, but the joint definition is most applicable here.

Note that operations take place in the order described above. They are designed and planned, however, in the opposite “direction”—starting with the strategic and military end states as a product of operational design and “concluding” with detailed planning for tactical actions (along with assessment of those actions and all intermediate steps, performed by analysts, planners, strategists, and commanders at all levels).

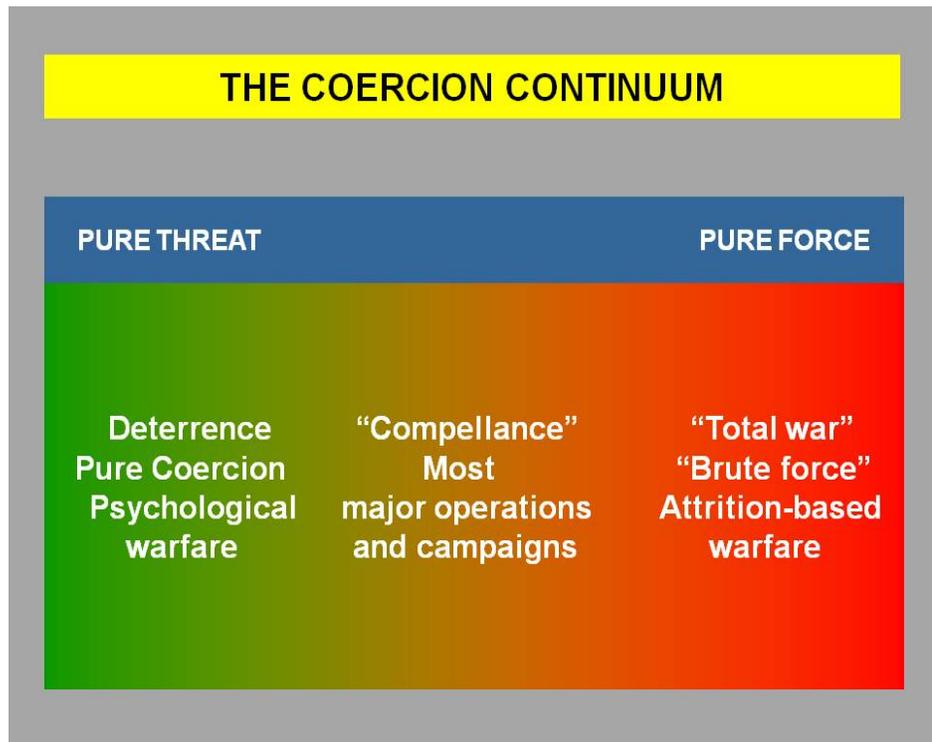
The statement of commander’s intent should explicitly express the military end state and how it fits into the larger context of the national and international strategic end state. Finally, these statements should be explained to and approved by national leadership or other relevant higher commanders.

PRACTICAL DESIGN: THE COERCION CONTINUUM

Last Updated: 04 November 2016

All military [strategy](#) seeks to coerce or persuade an adversary or other actor to do one's will. [Coercion](#) is convincing an adversary to behave differently than it otherwise would through the threat or use of force. All coercive military action works along a continuum from pure threat (only implied use of force, or using peaceful means to defeat adversary strategies) to pure force (engaging military forces and government control mechanisms), as illustrated in the figure, "The Coercion Continuum."

Most combat operations, regardless of size or intensity, reside near the middle of the continuum, however many conflicts may span the entire spectrum. Each conflict has its own character. Many campaigns in World War II (WW II), for example, were close to the "pure force" extreme of the continuum. Operation ALLIED FORCE (OAF), relatively limited in scope and violence, was much closer to the left end of the spectrum. The degree of violence and "brute force" required depends very much upon the national interests at stake, the "target audience," and that audience's determination to resist one's will. It can also be critical to understand that what may be a limited conflict to one side may be viewed as total war by the other—the level of violence and degree of commitment may depend upon the eye of the beholder.



The Coercion Continuum

Effective use of airpower can help facilitate conflict resolution closer to the "pure threat" end of the continuum, helping achieve objectives and the end state on more favorable terms, in less time, and more efficiently than might otherwise be possible. However,

airpower is capable of creating effects anywhere along the continuum. The destruction of German industry from the air during WW II represented one form of near-pure force strategy, as did the attrition of Iraqi tanks and artillery during Operation DESERT STORM. US maintenance of a credible deterrent during the Cold War approximated the “pure threat” end of the spectrum, helping prevent major combat operations. The Berlin Airlift of 1948-49 was an example of using peaceful means (albeit backed by implied force) to defeat an enemy’s strategy (“pure coercion”). [Law of armed conflict](#) (LOAC)-compliant air attacks upon key sites from which Serbian leader Slobodan Milosevic’s associates derived their income and influence probably helped compel him to withdraw Serbian troops from Kosovo during OAF. OAF’s limited but threatening use of force is common to many operations and is in the middle of the coercion spectrum.

Notes on the Terms “Lethal” “Nonlethal” “Kinetic” and “Nonkinetic”

The terms “lethal” and “nonlethal” are currently recognized, although not formally defined, in joint doctrine. The existing dictionary definitions of these words describe them adequately. Joint doctrine refers to “lethal or nonlethal military force” (Joint Publication [JP] 3-0, [Joint Operations](#)), “lethal and nonlethal fires” (JP 3-09, [Joint Fire Support](#)), and “lethal and nonlethal effects” on targets ([JP 3-09](#)). This volume refers to the effects that both lethal and nonlethal weapons and fires have on targets exactly as joint doctrine does.

Two other terms are in widespread, if informal, use as well: “Kinetic” and “nonkinetic,” intended to mean, roughly, weapons or actions that cause destruction of targets and those that don’t. To avoid confusion, the joint doctrine community deliberately removed all references to “kinetic” and “nonkinetic” in joint doctrine, substituting lethal and nonlethal. Nonetheless, the terms, even though informal, have a somewhat different meaning. They have attained general recognition in the military and elsewhere in the US government, so that even the President and his close advisors use them. President Obama, for instance, referred to “nonkinetic support to [operations in Libya]” in a letter to Congress concerning compliance with the War Powers Resolution (15 Jun 11).

Since the terms show no signs of disappearing from common use, this publication proposes definitions that convey useful and distinct military meaning while keeping them as close as possible to the technical meaning of the terms in physics. **Kinetic:** *Relating to actions designed to produce effects using the forces and energy of moving bodies and directed energy, including physical damage to, alteration of, or destruction of targets. Kinetic actions can have lethal or nonlethal effects.* **Nonkinetic:** *Relating to actions designed to produce effects without the direct use of the force or energy of moving objects and directed energy sources. Nonkinetic actions can have lethal or nonlethal*

Attrition and Annihilation.¹ The larger the campaign and the greater the stakes for the actors involved, the more likely a conflict as a whole will approximate a “brute force” approach. There are two such approaches. Attrition involves wearing down an enemy’s forces—often gradually—through sustained attack and pressure. The North Vietnamese used this strategy effectively, first against France then against the US, during the Vietnam War. Sometimes such a strategy can be successful even if all it does is allow friendly forces to remain in the field to threaten future military action, as was the case with George Washington’s army during the American Revolution.

Annihilation involves seeking complete defeat of an enemy’s main force directly, main strength against main strength—if possible through a single decisive battle. Many historical examples exist, from Marathon to Midway, but it may be hard to force an enemy into such a battle, and thus many such campaigns transition to maneuver and attrition. This happened in Virginia during the last year of the American Civil War: Union commander Lt Gen U.S. Grant wanted to force a decisive battle, but many factors forced him into pursuit and eventually into a siege of Confederate forces. Nonetheless, he accomplished the mission of destroying the Army of Northern Virginia, thus hastening Union victory.

Even in limited contingencies, attrition-based or “pure force” means may have to be used if the enemy’s willpower cannot be broken by other means. Attrition-based strategies have the advantage of being relatively simple. The links between cause and effect are easy to understand: Enemy capability and enemy casualties tend to be inversely proportional. Unfortunately, strategies based on attrition are usually the most costly. Recent developments in precision munitions and targeting capability enable modern aircraft to attrit enemy fielded forces much faster than in previous conflicts. An effects-based approach to strategy development, however, requires that attrition and annihilation be considered when they are the only means of effectively achieving the objectives and end state. Attrition is seldom the most *efficient* way of attaining an objective, but it is sometimes the most *effective and timely* means of doing so.

Leadership attack (both lethal and nonlethal) is a very specific, modified form of attrition that has been used as part of US strategy that entails the removal of enemy leadership through direct attack when members of that leadership have been determined to constitute lawful targets in accordance with the LOAC and applicable US laws. It can also entail the use of direct attack to sever [command and control](#) (C2) links between enemy leadership and its fielded military forces. Leadership attack supports punishment and denial (see below) by threatening the enemy leadership’s survival or their basic ability to command and control their forces. Attacking the military chain of command supports annihilation or denial by rendering enemy C2 ineffective. Such efforts can be accomplished or greatly aided by [information operations](#) (IO) conducted by air, space, and [cyberspace](#) forces. Attacking national or organizational leadership, when it is a legal target, can support risk and punishment strategies by putting at risk a regime’s ability to maintain power. Enemy regimes either comply with the coercer’s demands or risk removal from power. [Airpower](#) is well suited to conducting either form of leadership attack because it can often strike enemy leadership targets without having to first engage enemy fielded military forces that protect them. Air, space, and cyberspace effects can be created in concert to make such attacks more effective.

¹ “Attrition strategy” is also referred to as “exhaustion” and “erosion” in some contexts, but they all have essentially the same meaning. See Russell Weigley, *The American Way of War*, and Hans Delbruck, *History of the Art of War*, for more examples.

Leadership attack tends to be most effective when an adversary is led by a single charismatic figure who cannot be easily replaced or when the organization has a rigid, hierarchical leadership structure where the leaders and their potential replacements can all be identified, located, and removed. It may be ineffective against a diffuse, cellular organization or one that has multiple leadership succession plans available—such as the United States’ democratic government. Furthermore, when considering a regime-changing strike, even if such an option exists, planners at all levels should anticipate who or what a potential replacement will be and consider if that will be better or worse in terms of desired effects than leaving the existing leadership intact, and instead attempting to coerce or compel them to change their behavior. In cases of strategic leadership attack, no effective replacement for a charismatic leader may exist and the long-term stability of a country may be jeopardized, resulting in civil war and the long-term commitment of US and allied/coalition resources to attempt to recover and maintain stability.

Compellance.² Compellance aims to change an adversaries’ behavior forcibly, whereas deterrence intends to change behavior without the actual use of force. Compellance generally takes one of three forms: *denial*, *risk*, or *punishment*, or consists of a combination of these. Denial attempts to reduce the probability that resistance will yield benefits; risk tries to raise the probability of suffering costs; and punishment tries to raise the costs of continued resistance.

★ **Denial.** Destroying or neutralizing a portion of the adversary’s physical means to resist or of otherwise denying them the ability to execute a desired [course of action](#) (COA). This may take the form of limited attrition, or may entail a less direct mechanism, such as destruction of key war-making resources. Credible threat of force may also be used to deny certain strategy choices. Denial seeks to change adversary behavior by making his action seem pointless. Denial tries to convince adversaries that defeat is inevitable because their means of resistance will be removed, and thus it is better for them to capitulate. Most major operations and campaigns in traditional war involve use of denial as a coercion mechanism. Generally, the smaller and less intense the conflict, the less attrition-based denial is necessary. Most conflicts require some degree of denial, however. Air Force forces are well suited to conducting denial-based strategies against enemy fielded military forces because persistent and pervasive intelligence, surveillance, and reconnaissance (ISR) allow the pinpointing of military targets and precision engagement that enable discriminate and reliable action against those targets.

★ ★ **Paralysis.** A form of denial in which wide-spread, parallel attacks across the adversary’s entire system, including their leadership and C2 mechanisms, render the adversary largely incapable of running their society or selected systems. Parallel attack is usually a valuable complement to other forms of denial, helping lessen military resistance and increasing the psychological effectiveness of attrition and destruction. Airpower is uniquely suited to inducing paralysis because it can strike the widest possible array of targets in the shortest time across the depth of the operational environment,

² The term was coined by Thomas Schelling in *Arms and Influence* and has been used extensively in the technical literature on coercion and deterrence.

potentially leaving no parts untouched, and all components of airpower can be used to facilitate inducing paralysis.

- ★ **Risk.** Placing that which the adversary values at credible potential for loss. Typically, risk strategies slowly raise the probability of damage to the adversary's systems. The key is to increase costs at a gradually increasing rate in order to convince the opponent that much more severe damage may follow if concessions are not made. Operations are slowly escalated in intensity, extent, or both. The coercer should signal clearly that the attacks are contingent on the adversary's behavior and will stop upon compliance with demands. At the same time, the coercer should be careful not to destroy everything of value to the adversary, for then it would be impossible to threaten more to come. For this reason, space and cyberspace capabilities may offer useful options by providing reversible effects that effectively coerce without causing permanent damage to adversary systems. Risk strategies have an uneven historical record, failing most notably during the Vietnam War's early bombing campaigns against North Vietnam; the early days of OAF used a form of risk strategy and were of limited success against Serbia. Risk strategies may have limited value in some contingencies, however, and may allow achievement of objectives at a lower cost than denial and attrition strategies. Airpower is generally the instrument of choice in pursuing risk strategies because of its ability to bypass enemy fielded military forces and put targets with strategic value at risk.
- ★ **Punishment.** Administering some form of damaging action against adversaries until they act in a desired manner (or cease undesired action). The word is often used to refer to a strategy, "which attempts to inflict enough pain on enemy civilians so that they cause their leaders to change their behavior.... The hope is either that the government will concede or the population will revolt."³ The elements of this strategy may also be executed against elements of an adversaries' personal or national power, as was done to some extent during OAF.

The term "punishment" in this context does not mean "reprisal"—it simply means inflicting damage (against any variety of target types) once an adversary has initiated undesired behavior in order to coerce a change in that behavior. *The United States does not conduct operations simply for the sake of reprisal.* Like risk strategies, punishment has a checkered history—it has worked less often than denial-based strategies—but it may be effective against an adversary with relatively low will or staying power. Such was the case in OAF, where a punishment strategy against the Serb leadership's income-producing industries (which were LOAC-validated military objectives) may have helped coerce a Serbian troop withdrawal from Kosovo. As with risk strategies, punishment may permit accomplishment of objectives at less cost than attrition or denial strategies. Strategists should clearly understand the adversary and his motivations for punishment strategies to work. Airpower enjoys unique advantages in pursuing punishment strategies, due to its ability to discriminately engage targets anywhere within an adversary's system across the entire operational area.

Deterrence, Assurance, and Dissuasion. The "pure threat" end of the coercion continuum involves the implied, rather than actual, use of force—where the *threat* of force alone may be sufficient to coerce. An overarching purpose of strategies at this end of the coercion spectrum is *prevention*—averting or hindering the emergence of conflicts

³ Robert A. Pape, *Bombing to Win: Air Power and Coercion in War.*

and discouraging others from developing undesirable capabilities or COAs (for example, preventing proliferation of [weapons of mass destruction](#) [WMD]), thus advancing US interests without the direct use of force. This requires the integration of all [instruments of power](#) (IOPs) and may entail various forms of military coercion executed in concert. Subordinate commanders, such as the [commander, Air Force forces](#) (COMAFFOR), may be called upon to perform detailed planning and execution in these scenarios, even though they may be working to create effects that directly meet the objectives the [joint force commander](#), [combatant commander](#) (CCDR), and higher-level leadership have established. In many cases, airpower can offer CCDRs and other JFCs strategy options that can effectively coerce adversaries and still be available very quickly and offer great flexibility. The key to these forms of coercion is to threaten or assure with sufficient strength and credibility that opponents choose one's preferred actions (or decide not to act), due to the perceived cost of non-compliance.

Purely coercive strategies may be implemented independently or in conjunction with operations at any point across the [range of military operations](#), including major wars. The "pure coercion" end of the spectrum consists of several distinct types of strategy options:

✦ **Deterrence** is defined as "the prevention of action by the existence of a credible threat of unacceptable counteraction and/or belief that the cost of action outweighs perceived benefits. Deterrence is a state of mind brought about by the existence of a credible threat of unacceptable counteraction.⁴ For 60 years, the Air Force has provided a flexible, responsive, and stabilizing deterrent, through both nuclear and conventional forces. Nuclear deterrence remains a crucial, but not the only, means through which the Air Force deters. The ability to destroy targets using conventional weapons with pinpoint accuracy anywhere on the globe with very little notice is a vital contribution to deterrence, as is the ability to forward-deploy a variety of capabilities swiftly; operate securely from forward-located, unimproved facilities; provide accurate, globally-integrated ISR; and use air mobility to deploy assets of all the Services rapidly around the world.

Deterrence today is not only a matter of averting nuclear war between global powers, but involves preventing use⁵ of WMD by rogue states, non-state actors, regional powers in their own conflicts, and lesser states in conflict with the United States and its partners. It also involves using both nuclear and conventional means to deter adversaries from taking undesirable COAs. To a greater extent than during the Cold War, deterrence is also tied to uses of other elements of strategy, particularly compellence in the form of denial and risk. Deterring the leaders of rogue states or non-state (often radical and terrorist) actors may be considerably more difficult than doing so with more rational actors, such as major nation-states with clear interests to protect. Thus, a threat of punitive action that may have been effective in the Cold War may not be as effective against an opponent willing to accept great risks and losses. Conversely, such a "reckless" opponent may be militarily deterred by denying that opponent a practicable chance of success in ways that were not possible against Cold War adversaries without serious threat of war. Joint doctrine provides significant guidance for uses of deterrence during the

⁴ Joint Publication (JP) 3-0, [Joint Operations](#).

⁵ As well as transfer, procurement, and production of WMD, a fact as true of the subsequent discussions of assurance and dissuasion.

approach to conflict through flexible deterrent and response options.⁶ Non-nuclear deterrence is also sufficiently fixed in joint doctrine that the joint phasing model includes a “deterrence phase,” dedicated to preventing “undesirable adversary action by demonstrating the capabilities and resolve of the joint force. It includes activities to prepare forces and set conditions for deployment and employment of forces in the event that deterrence is not successful.”⁷ For deterrence to be effective, several conditions should be met:

- ★ ★ The threat must be communicated accurately to the target.⁸
 - ★ ★ The target must clearly understand the threat.
 - ★ ★ The target must believe that the anticipated cost of its undertaking the action outweighs potential benefits.
 - ★ ★ The target must believe that the “deterrer” will take the threatened action(s).
- ★ **Assurance** (also known as extended deterrence in relation to some nuclear deterrence discussions) is a set of strategy options closely related to deterrence, intended to persuade actual and potential partners not to pursue COAs contrary to friendly interests (for example, pursuit of their own WMD arsenals), because the United States and its allies can assure security under the umbrella of US and allied deterrent capability. Although nuclear deterrence has always been a vital aspect of assurance, there have always been diplomatic/political and non-nuclear military aspects to it as well. The creation of the North Atlantic Treaty Organization is an example of where political and conventional military aspects played as large a part in assuring our allies as did nuclear deterrence. Today, assurance extends to non-nuclear military capabilities, like anti-missile defenses, to an even greater extent than in the Cold War.
- ★ **Dissuasion** is also closely related to deterrence, consisting of actions taken to persuade an actor that costs will be too high or benefits too low to justify embarking on a COA contrary to US interests. It evolved from the world of nuclear deterrence, to describe a form of “pre-deterrence” in which a potentially threatening actor is dissuaded not only from using threatening military capability (such as WMD), but from even developing or acquiring it in the first place. Dissuasion requires a whole-of-government approach to succeed. It can also have a place in preventing a neutral or allied party from taking undesired actions. There are several critical considerations for successful dissuasion:
- ★ ★ The party employing dissuasion should be able to elevate the target’s perception of anticipated costs. This can be done through means like economic sanctions, political/diplomatic pressure, and military actions designed to lower the target’s belief that it can prevail in conflict (exercises, arms sales to opponents, etc.).

⁶ JP 5-0, [Joint Operation Planning, Appendices E and F](#).

⁷ See JP 5-0, Chapter III.

⁸ “Target” in this context refers to the term in its broadest possible meaning: “An entity...considered for possible engagement or other action.” JP 1-02, [Department of Defense Dictionary of Military and Associated Terms](#).

- ✪ ✪ The “dissuader” should be able to lower the target’s perception of anticipated benefits. This can be done by persuading the target that the capability it seeks is not survivable or the action it contemplates can be easily neutralized in the event of hostilities. It can also be done by diminishing the target’s perception of the operational effectiveness of the capability or action, often through active and passive defenses. Finally, a target’s benefit perception can be lowered by changing the character of the competition.

Deterrence, assurance, and dissuasion strategies will most often be implemented by US national leadership. In conjunction with geographic CCDRs in a whole-of government approach, Air Force forces can provide very capable and flexible coercive forces-in-being, equally useful in assuring international partners and of being instruments in dissuasive strategies. In many cases, the COMAFFOR’s forces may be the coercive tools of choice, due to their ability to be deployed and employed farther and more quickly than some other forms of military power, enabling them to form a more credible threat in some situations.

General Coercion Considerations. Past operations have shown that successful coercion of all types is a product of one or more of the following factors:

- ✪ *Escalation dominance*—The ability to increase the adversaries’ cost of defiance while denying them the opportunity to neutralize those costs (e.g., the threat of a major increase in the tempo of operations against them).
- ✪ *Defeating the adversary’s strategy*—Denying the adversary certain strategic options through deterrence or compellant mechanisms (e.g., preventing use of [chemical, biological, radiological, and nuclear](#) weapons through maintenance of a credible nuclear deterrent).
- ✪ *Magnifying threats from third parties*, such as internal dissidents or hostile nations external to the conflict.
- ✪ *Credible threat or use of force*—The adversary should have reason to believe the coercing power will use force, even if that use is only implied (as in deterrence).
- ✪ *Enemy susceptibility to coercion*—The adversary must be vulnerable in some way to the coercive mechanism chosen. The susceptibility of an adversary to any coercive mechanism is usually inversely related to its willpower and the potential stakes of the conflict—the less it wants to be in the fight, the more susceptible it will be to coercion.
- ✪ *Understanding of the adversary’s thinking and level of motivation*—Failure to understand the conflict as the adversary does generally results in “mirror imaging,” or projecting one’s own values, motivation, and perception of what is “rational” onto the adversary—which can be a formula for defeat. Motivation determines how susceptible an enemy is to coercion, so determining how strong the enemy’s will to fight is can help determine how much punishment and risk they are willing to assume before they change behavior.⁹ Assuming equivalent perception of rationality may be equally dangerous: what US observers consider “irrational” may be entirely logical in the context of the adversary’s culture, religion, institutional structures and

⁹ For greater detail concerning these factors and other coercive mechanisms, see Annex 3-70, [Strategic Attack](#).

pressures, and psychological factors (such as the degree of stress adversary citizens or leaders are accustomed to). Commanders and strategists should attempt to understand what motivates their adversaries and how they think.



[ANNEX 3-0 OPERATIONS AND PLANNING](#)

**PLANNING OPERATIONS:
AIR FORCE PLANNING IN THE CONTEXT OF JOINT PLANNING**

Last Updated: 04 November 2016

Joint operation planning is an integrated process for orderly and coordinated problem solving and decision-making across the spectrum of conflict. In its peacetime application, the process allows the thorough and fully coordinated development of plans for operations during steady-state conditions as well as contingencies. During crises, the process is shortened as needed to support the dynamic requirements of changing events. During execution, the process adapts to accommodate changing factors in the operational environment and maximize the flexibility of operations. For today's commanders, plans are useful as necessary points of departure— planning as a process is still the most important.

Joint operation planning is conducted at every echelon of command, during peacetime as well as conflict, and across the [range of military operations](#). Joint operation planning is accomplished through the [adaptive planning and execution](#) (APEX) system, which is “the Department of Defense- (DOD-)level system of joint policies, processes, procedures, and reporting structures, supported by communications and information technology, that is used by the joint planning and execution community to monitor, plan, and execute mobilization, deployment, employment, sustainment, redeployment, and demobilization activities associated with joint operations” (JP 5-0, [Joint Operation Planning](#)). The APEX system facilitates iterative dialogue and collaborative planning between the many echelons of command, including between the [commander, Air Force forces](#) (COMAFFOR), who usually acts as the [joint force air component commander](#) (JFACC), and the [joint force commander](#) (JFC) and other components. This helps ensure that the military [instrument of national power](#) (IOP) is employed in accordance with national priorities, and that plans are continuously reviewed and adapted to accommodate changes in strategic guidance, resources, the actions of adversaries and other actors, and the [operational environment](#). Joint operation planning also identifies capabilities outside the DOD, and provides the means of integrating military actions with those of other IOPs and [multinational](#) partners in time, space, and purpose to create all effects necessary to achieve objectives required to attain the desired end state.

The APEX System formally integrates the activities of the entire [joint planning and execution community](#) (JPEC), which facilitates seamless transition from [operational design](#) and planning efforts to execution in times of crisis. APEX, and the [joint operation planning and execution system](#) (JOPES) technology that underpins it, provides for planning that is integrated from the national level down to theater and component levels.

STEADY-STATE PLANNING

The [steady state](#) is a stable condition involving continuous and recurring operations and activities with simultaneous absence of major military, crisis response, and contingency operations (Air Force Instruction [AFI] 10-421, [Operations Planning for the Steady State](#)). The steady state is characterized by shaping operations and activities at a relatively low level of intensity, urgency, and commitment of military forces. Steady-state shaping operations are designed to influence the operational environment in order to deter and prevent future conflict, mitigate operational risks, and strengthen United States and partner capabilities to respond to crises and contingencies. Steady-state planning operationalizes [combatant commanders'](#) (CCDRs') strategies for their geographic theaters or global functional responsibilities. Theater and functional strategies outline a CCDR's vision for integrating and synchronizing military operations with other IOPs, as well as the activities of partner nations and international organizations, in order to achieve strategic objectives.

The DOD's principal steady-state plan is the CCDR theater campaign plan. It is the instrument through which the CCDR militarily executes his or her strategy, by comprehensively and coherently integrating steady-state activities with contingency operations. The CCDR's campaign plan conveys a design for operations that achieve prioritized theater and global campaign objectives¹, and serves as the integrating framework that informs and synchronizes all subordinate and supporting planning and operations.

CCDR theater campaign plans focus on steady-state activities—including military engagement, security cooperation, and other ongoing operations—considered achievable over a two- to five-year planning horizon. The delineated operations seek to generate and sustain defense posture, deter unwanted adversary behavior, and shape the operational environment so as to proactively defuse strategic problems before they become crises and resolve crises before they reach the stage requiring large-scale military operations.

At the same time, campaign plans should set the conditions for success should contingency operations become necessary. Contingency plans for responding to crises can then be derived from the overarching campaign plan as branch or sequel plans, articulating designs for supporting subsequent operations and campaigns.

COMAFFORs support steady-state planning through their own strategy documents, which outline the COMAFFOR's long-term vision for the Air Force component to the CCDR and provide an Airman's perspective on the CCDR's strategy. Component-specific activities in support of the CCDR's campaign plan are contained in the COMAFFOR's campaign support plan (CSP) and country plans. The COMAFFOR's country plans are theater security cooperation plans at the operational level that align with the CCDR's respective country plans. They focus on achieving country-level objectives related to partner relationships, capacities, and capabilities; as well as

¹ Derived primarily from the *Guidance for Employment of the Force*.

access and interoperability. For detailed guidance concerning steady-state planning, see AFI 10-421.

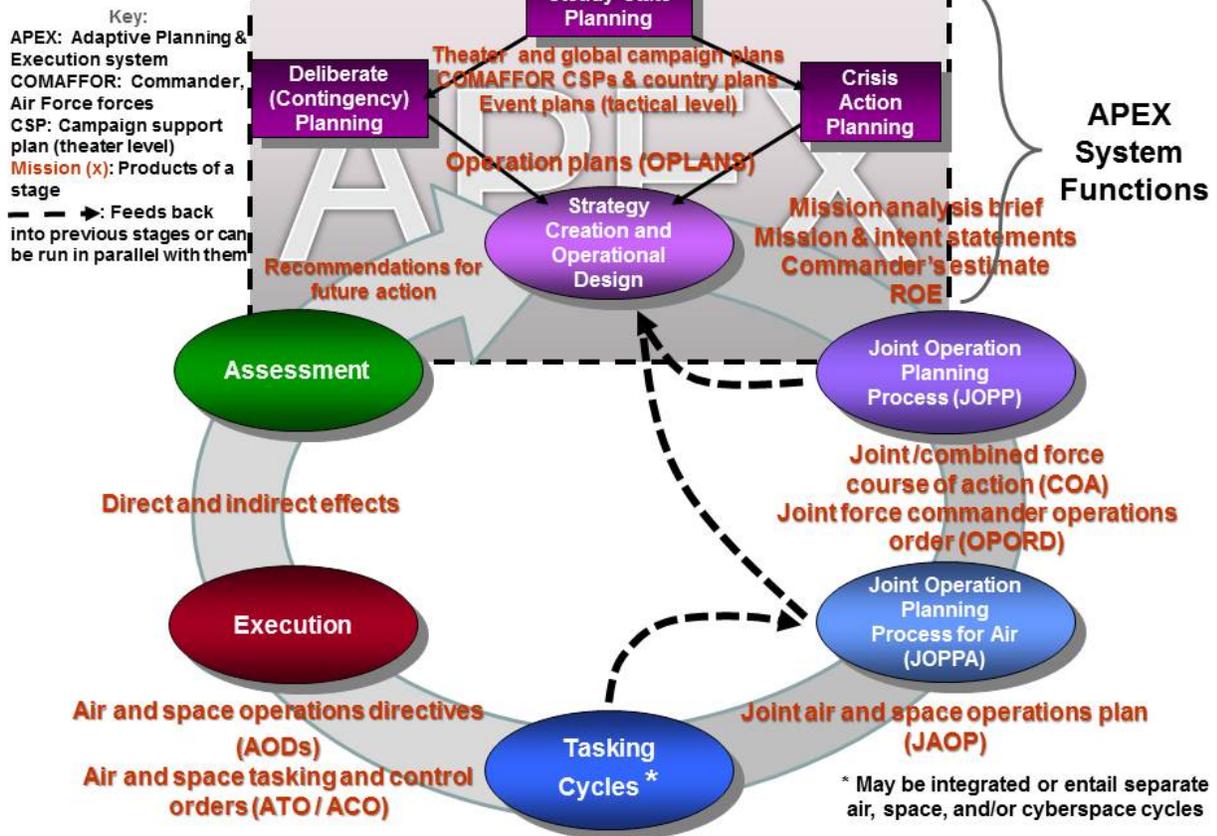
DELIBERATE AND CRISIS ACTION PLANNING

Under the larger APEX “umbrella,” joint operation planning for contingencies is divided into [deliberate](#) and [crisis action planning](#) (CAP). Deliberate planning in the context of APEX is a process that is used to develop global and theater campaign plans, which operationalize a CCDR’s ongoing theater or functional strategies in peacetime, as well as joint operation plans for contingencies identified in joint strategic planning documents. “Traditional” [contingency](#) plans (the type that have been developed by the JPEC for decades) are now often considered [branches](#) of ongoing CCDR theater or functional [strategies](#). During deliberate planning, the [Secretary of Defense](#), the Chairman of the Joint Chiefs of Staff (CJCS), and CCDRs determine the level of detail required and participate in in-progress reviews of each respective plan. This process prepares for possible contingencies based on the best available information and using forces and resources apportioned in strategic planning documents. It relies heavily on design assumptions about political and military circumstances that may prevail when the plan is implemented. Plan production generally takes six or more months and involves the entire JPEC. The Air Force Service component (the COMAFFOR’s staff) usually develops supporting plans following the same process used by the JFC. During the steady state, this plan is a campaign support plan. During contingencies, this plan is the COMAFFOR’s component plan.

CAP procedures are used in time-limited situations to adjust previously prepared [operation plans](#) (OPLANs) or otherwise conduct design and planning for military action. Here, the crisis may occur with little or no warning, the situation will be dynamic, and time for planning may be very limited. Operational design and planning should revalidate or correct the majority of the assumptions made during deliberate planning, if accomplished. In some cases, however, commanders and their strategists must start the process with a “blank slate,” accomplishing design and planning based on assumptions made in the absence of facts or the products of previous deliberate planning. An adequate and appropriate military response in a crisis demands flexible procedures keyed to the time available, rapid and effective communications, and use of previous planning and detailed databases and region analyses whenever possible. CAP often entails the positioning of forces, or at least the start of that process. CAP generally produces joint operation orders and other orders associated with the time-sensitive execution of operations.

JOPES technology and processes are still a vital, necessary part of Air Force planning, even though the joint operation planning process (JOPP) and joint operation planning process for air (JOPPA) are often accomplished separately from APEX system processes. JOPES helps planners focus on the identification and flow of resources and sequencing required to support a given [course of action](#) (COA) determined by APEX processes. Once a COA is selected, JOPES helps create detailed [time-phased force and deployment data](#) (TPFDD) to support the JFC’s plan of operations. This entails reconciliation of the TPFDD with the requirements of the operation’s major tasks and phasing. The areas in which the joint operation planning and JOPES processes overlap are shown in the shaded area in the figure, “The Cyclical Nature of Strategy, Design, and Planning.”

CYCLICAL NATURE OF STRATEGY, DESIGN, AND PLANNING



Cyclical Nature of Strategy, Design, and Planning

There are no separate joint or Air Force procedures for deliberate and crisis action planning beyond some internal coordination and staffing procedures at the various component headquarters. When developing supporting plans, some of the steps may not be as in-depth, as they may reiterate work already done by the JFC and staff.

The contribution of JOPES processes extend beyond the TPFDD and other deployment considerations. These processes also provide a whole series of staff estimates and coordination steps, conducted by national-level agencies down through Air Force major command staffs carrying out force-provider responsibilities. Further, only JFC and Service component (e.g., the COMAFFOR's) staffs possess the information technology infrastructure to interface with many JOPES processes, thus the [air operations center's](#) (AOC's) contribution to JOPES is dependent upon the COMAFFOR's staff.² Specifics concerning the products of the deliberate and crisis action planning processes can be found in the JOPES/APEX manuals.³

² That is, those elements of the COMAFFOR's staff that do not directly support the COMAFFOR's operational responsibilities as JFACC; these elements remain explicitly under the COMAFFOR (as the "A Staff") to help accomplish his or her responsibilities as Air Force Service component commander. See Volume 3, [Command](#), for a delineation of the COMAFFOR's responsibilities.

³ Further information on these (and other forms of planning) can be found in CJCS Manuals 3122.01-03, *JOPES*, Volumes I through III. See CJCS Guide 3130, *APEX Overview and Policy Framework*, for more information. See also [JP 3-30](#) for the general joint perspective on the JOPPA.

Absorbing lessons learned and adapting to them appropriately is critical to operational success. Observations should be captured after every operation in the form of lessons learned. Events should be documented in detail to provide information that improves planning and execution of future actions. Planners should review after-action reports and other lessons-learned analysis in preparation for the planning process to ensure they benefit from past experience, and use what they learn to inform and adapt both steady-state and contingency planning.

THE RELATIONSHIP BETWEEN OPERATIONAL DESIGN AND PLANNING

In many respects, operational design constitutes a necessary “front end” of planning, since the commander should frame the problem he or she seeks to solve and determine its scope and parameters. It logically forms the first steps of campaign, deliberate, crisis action, and other operational planning. It makes sense to determine an operation’s overall end state before detailed steady-state or employment planning begins (or, for that matter, before many aspects of force deployment and sustainment planning begin). In other respects, design and planning are complementary and even overlap: Design may begin before initiation of the JOPP or JOPPA, but some portions of the mission analysis stage of the JOPP and JOPPA may provide insights needed to properly frame an operational problem. Design often begins with step 1 of the JOPP (“Initiation”), but certain formal products of contingency planning (such as warning and planning orders) may be issued after design efforts have begun but before more detailed planning has started. Design often also continues after completion of initial JOPP and JOPPA planning. There is no clear demarcation between when design ends and planning begins (or vice versa), especially during the “first round” of design and planning. Strategists often also identify possible branches and sequels at various points based on planning assumptions. In doing so, they must often make assumptions in the absence of facts in order to allow planning to continue. The need for many assumptions is typical of designing and planning for ill-structured problems.

Later, during plan execution and assessment, operational design may be conducted in concert with planning to adapt to emerging situations or behaviors. In this part of the process, commanders and strategists determine whether to implement pre-planned branches or sequels, or even initiate complete re-design of an operation.



ANNEX 3-0 OPERATIONS AND PLANNING

AN EFFECTS-BASED APPROACH TO PLANNING

Last Updated: 04 November 2016

The [effects-based approach to operations](#) (EBAO) informs every aspect of how the Air Force designs, plans, executes, assesses, and adapts operations. The effects-based approach applies as well to steady-state planning (such as campaign support plans and country plans) as it does for planning the employment of forces (as in the joint air operations plan). This section elaborates the definitions of several key concepts and terms used in EBAO. There is no single “effects-based planning” methodology or process. Rather, understanding the principles of an effects-based approach to operations should yield certain insights and enhance comprehension of many general planning concepts.

Effects

An act...produces not only one effect, but a series of effects. Of these effects, the first alone is immediate; it appears simultaneously with the cause; it is seen. The other effects emerge only subsequently; they are not seen; we are fortunate if we foresee them [emphasis in original].

— **Frederic Bastiat, What Is Seen and What Is Not Seen**

“**Effect**” refers to “the physical or behavioral state of a system that results from an action, a set of actions, or another effect.”¹ Effects are elements of a causal chain that consists of tasks, actions, effects, [objectives](#), and the [end state](#)(s), along with the causal linkages that conceptually join them to each other. “Tasks” refer to an action or actions that have been assigned to someone to be performed. Actions are the results of assigned tasks. Actions produce specific direct effects, those effects produce other, indirect effects that **influence** the adversary and other actors within the operational environment, and this chain of cause and effect creates a mechanism through which objectives and ultimately the end state are achieved. The end state is a set of conditions that needs to be achieved to resolve a situation or conflict on satisfactory terms, as defined by appropriate authority.²

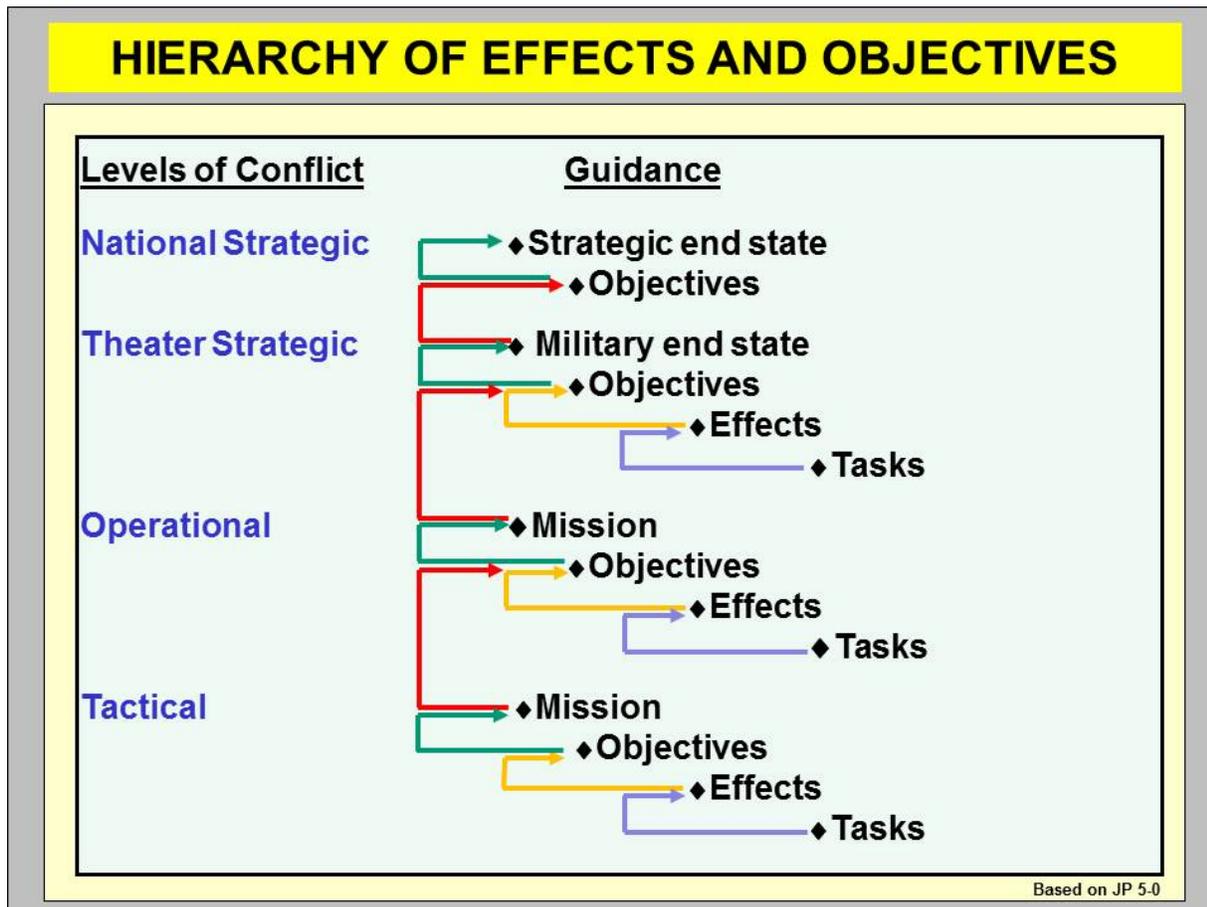
Objectives at one level may be seen as effects at other, higher levels. **Effects, however, comprise all of the results of actions, whether desired or undesired, intended or unintended, immediate or ultimate.** From a military planning perspective, operations should be planned “from the top down,” starting with the desired military end

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

² Note: This description is intended only to clarify the concept of end state, not to supplant the existing doctrinal definition in JP 5-0, [Joint Operation Planning](#).

state, determining subordinate objectives needed to bring about that end state, then deriving the effects and causal linkages needed to accomplish the objectives, and finally determining the actions and resources necessary to create those effects. The end state should explain the operation’s ultimate purpose—the outcome that is sought. The objectives and effects should explain *what* results are required to attain that outcome. The task and their resultant actions should explain the steps needed to achieve the required results.

Perspective is important here. What may seem like an action to the operational-level warfighter may seem like an objective to warfighters at tactical units. Conversely, what may be an objective for a [component](#) commander may seem like an action to the President of the United States. This is illustrated in the figure, “Hierarchy of Effects and Objectives.”



Hierarchy of Effects and Objectives

Planners should maintain awareness of the “big picture”—how the component’s effects and objectives support the [joint force commander’s](#) (JFC’s) effects and objectives. This is especially important during execution, where it is easy to get caught up in the details of daily processes and lose sight of the end state. For example, “gain and maintain [air superiority](#) to X degree in and over area Y for Z period” may be an **objective** for the [joint force air component commander](#) (JFACC), but will likely be one of the **effects** the JFC directs the JFACC to deliver (often stated as an execution task) in support of the notional objective “defeat enemy A’s offensive into region B.” In turn, the JFACC’s **objective** may seem like an **action** to the President, who has given the JFC the desired effect of “defeating A’s offensive” in order to accomplish his national strategic objective

of restoring stability and maintaining political order in the applicable global region.

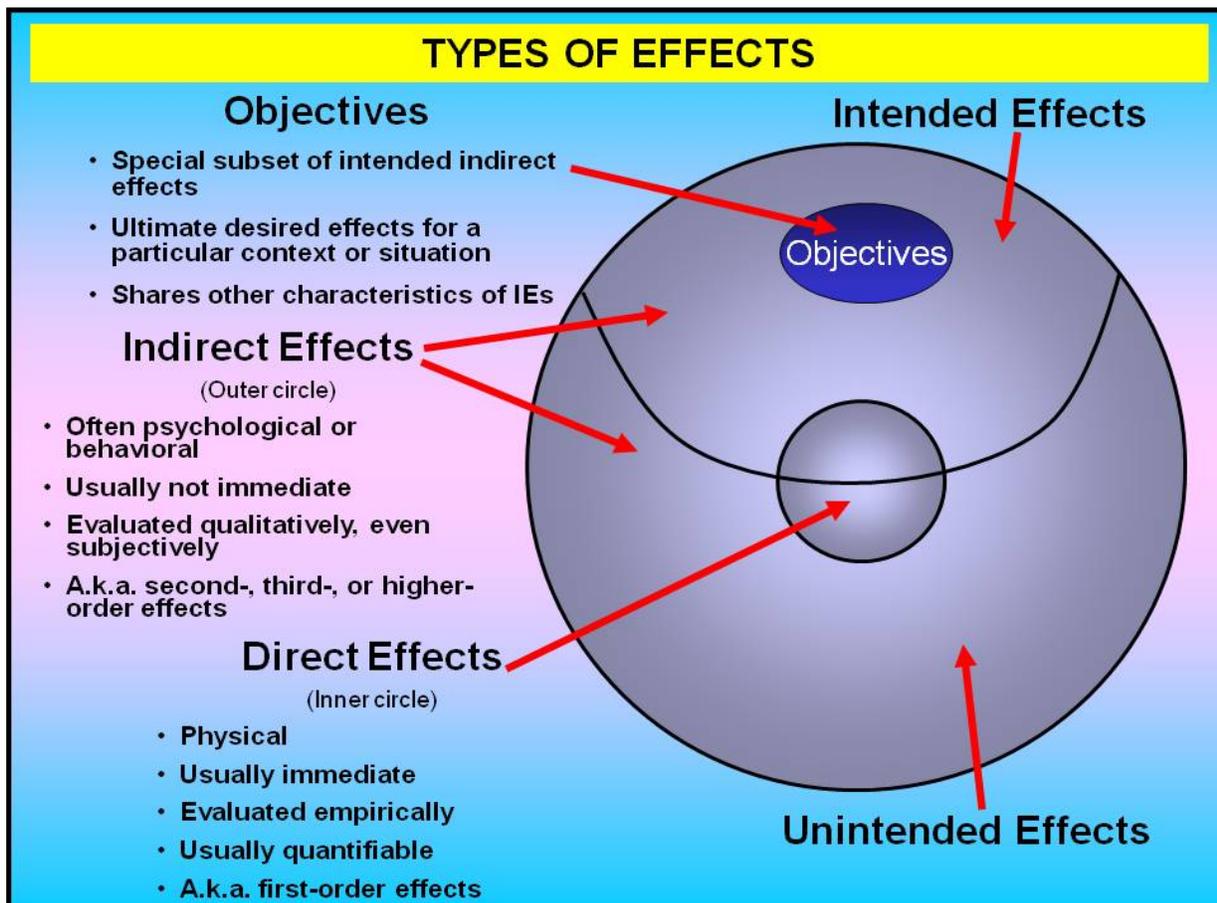
*For the purposes of this discussion, it is the operational-level warfighter's perspective that matters—the perspective of both the JFC and the [commander, Air Force forces](#), who is also normally the JFACC—as well as strategists and planners in the AOC. From this perspective, actions are individual sorties, missions, or accomplished tactical tasks. Objectives are the component's tactical and operational-level objectives. Effects are the consequences of tasks, which link tasks to the objectives. From this perspective, a bomb dropped on a particular target is an *action* and the efforts designed to get the bomb there are an element of a tactical *task*. The effects range from direct (the bomb detonates on target and causes damage) through indirect at varying levels (the damage may disable an enemy air defense operations network, for instance, which helps gain air superiority), to objectives (“gain and maintain air superiority to X degree in and over region Y for Z period”).*

ACTIONS

An action is performance of an activity to create desired effects. In general, there are two broad categories of actions that are relevant at the tactical and operational levels: [Kinetic](#) and [nonkinetic](#). Examples of kinetic actions include the use of explosive munitions and directed energy weapons. Examples of nonkinetic actions include use of [cyberspace](#) weapons, an [information operations](#) radio broadcast to encourage enemy surrender, and employment of electronic warfare capabilities.

TYPES OF EFFECTS

There are **four broad categories of effects**, which often overlap. These categories are: *direct*, *indirect*, *intended*, and *unintended*. Within these categories, especially within the realm of indirect effects, there are many subcategories. A few types (but by no means all) are highlighted in the following section because of their doctrinal implications. Understanding these types of effects is vital to an effects-based approach to war. The relationship among these four types of effects and the objectives, a special subset of intended indirect effects, is shown in the figure, “Types of Effects.”



Types of Effects

Direct Effects

Direct effects are the results of action with no intervening effect or mechanism between act and outcome. They are also known as “first-order effects.” In most cases they are physical, often immediate, and easy to recognize. They can usually be assessed empirically and can often be meaningfully quantified.

Indirect Effects

Direct effects trigger additional outcomes—intermediate effects or mechanisms that produce additional outcomes or results. These are indirect effects, sometimes also known as “second-,” “third-,” or “higher-order effects.” Indirect effects can be categorized many ways, including physical, psychological, and behavioral. They may also occur in a cumulative or cascading manner, can occur sequentially or in parallel (since they are caused by direct effects that may be applied sequentially or in parallel), and may be intended or unintended and lethal or nonlethal. They are usually displaced from direct effects in time and space, and often can be hard to quantify or measure empirically. They are often assessed or evaluated in qualitative terms. Generally, the less direct the effect—the further removed it is in the causal chain or in time from the initial action—the harder it is to predict before the fact and measure after. Historically, it has proven extremely difficult to predict beyond third-order effects with any degree of certainty.

Direct and Indirect Effects

A practical example of direct and indirect effects might involve a bomb hitting an enemy battlefield command vehicle.

The destruction of the vehicle and its crew by the bomb is the **direct effect** of the tactical action or task.

A part of the direct effect in this case is loss of the command vehicle's [command and control](#) (C2) equipment, leading to the indirect effect of degrading the unit's cohesiveness. The vehicle might also have represented a portion of the unit's physical combat capability, which is also degraded by its loss. Loss of so precise a target may help condition enemy troops to abandon their heavy equipment for fear of being killed near them, further degrading combat capability. Neutralization or degradation of the unit may be a [tactical level](#) objective. Loss of the vehicle and its crew may also degrade the unit's ability to communicate and function as part of a larger unit, so the capability and cohesion of larger echelons may be affected. If the vehicle contained a commander, this unit's ability to function will probably be further degraded, although if the commander was ineffective and his replacement talented, this may represent a net gain in enemy effectiveness, an unintended effect. If a senior commander was killed in the vehicle, this may have [operational-level](#) consequences, rippling down to all the enemy's tactical units and facilitating accomplishment of friendly operational objectives like defeat of the enemy army. If the senior commander was also an enemy national leader, this tactical action may have profound [strategic-level](#) consequences, affecting many enemy systems, affecting all instruments of the enemy's power, and greatly hastening achievement of friendly strategic objectives and the end state. All of these outcomes are **indirect effects**.

The principal purpose of military operations is to influence the behavior of the adversary or other actors in the operational environment. Even pure attrition does not ordinarily seek a decrease in the size of an enemy force for its own sake. The purpose of attrition is often to weaken resistance and resolve within the enemy force and its commanders, and incline them toward ceasing resistance altogether, causing the attrited unit(s) to become combat ineffective (as through dissolution as a fighting force or surrender). Of course, this may not hold against very committed enemy units, which may be attrited mainly to reduce their capability. Similarly, an enemy force that is being interdicted will likely not be destroyed outright, but may be *persuaded* that further movement toward its objective will render it combat ineffective.

It should be clear that military operations consisting of nonkinetic action that lead to nonlethal effects are almost purely persuasive, seeking influence without combat. For example, the Berlin Airlift, a very large, purely military resupply effort, directly prevented starvation, indirectly increased West Berlin's resolve, and, over time, influenced Soviet

behavior, leading to the indirect effects of causing the Soviets to abandon their ground blockade of West Berlin through East Germany. The airlift had a further indirect effect of demonstrating to the Soviet Union and its allies that West Berlin could be sustained without resorting to combat, leading to the desired end state of a blockaded West Berlin secured against Soviet aggression. All of these desired results involved influencing adversary behavior without firing a shot.

Objectives are the ultimate desired effects in a particular context or situation—*what* an actor desires to accomplish in a given set of circumstances. **Objectives should be clearly defined, decisive, attainable, and measurable.** Objectives exist at all levels, from national-strategic down to tactical, and all levels should be logically tied to each other and to the overall end state. All military operations should be directed toward achieving them. It can be beneficial to write objectives as if they were end state conditions, not tasks, since they are conditions required to meet the end state. Frequently, however, tactical objectives tend to be written in terms of tasks. Objectives are a special subset of indirect intended effects and share many of the characteristics of indirect effects, but planners and targeteers should regard effects, in most planning and targeting contexts, as outcomes subordinate to and supporting achievement of the objectives. Objectives are always planned and predicted. Even if a tactical-level “objective” is expressed in terms of direct physical damage (“destroy the enemy command vehicle,” or “attrit enemy armor by fifty percent”), the effect being sought is really indirect (degradation of enemy command function and cohesion in the first case, degradation of enemy combat power and ability to act in the second).

The desired outcome serves as the basis for using an effects-based approach. Effects-based planning starts with the end state and objectives and works to determine what actions and intermediate effects are needed to attain them. **Effects-based design and planning logically tie effects at all levels together and integrate the end state, objectives, effects, and actions into a logical, coherent whole.** An effects-based plan should be able to explicitly trace the reasons for every tactical action through the hierarchy of tactical effects and objectives, operational-level effects and objectives, to national and strategic ends. Actions that do not support the commander’s intended structure of effects and objectives represent a waste of resources.

During planning, the end state and objectives should be known *before* subordinate effects and actions are identified. Planning based on the resources available to carry out a “customary” list of actions leads to “input-based” planning, which focuses on *how* to attack and answers the question, “given my resources, what targets *can* I attack?” It provides no guidance on *why* targets should be struck, or how operations support overarching objectives. Resources will always be limited and effects-based planning cannot take place in a vacuum devoid of resource considerations. Resource considerations may constrain the joint force to follow certain COAs or restrain it from following others. Planning without consideration of resource limitations might lead to plans that are too resource-intensive to execute. Resources, however, should not be the factor that drives design and planning—the end state and objectives should. If the desired end state cannot be reached with given resources, then commanders should appeal for resources that will enable them to reach it, or inform their leadership that the objectives and end state are not realistic given the available resources.

Cumulative and Cascading Effects

Indirect effects can be achieved in a cumulative or cascading manner. Effects that result from the aggregation of many effects are said to be cumulative. These effects typically flow from lower to higher levels of employment.

Some indirect effects ripple through an adversary system, usually affecting other systems. These are called **cascading effects**. Typically, they flow from higher to lower levels and are the result of affecting nodes that are critical to many related systems or sub-systems.

As a practical matter, some of the most desirable effects have both cumulative and cascading aspects. The point at which a military unit “fails” and ceases to act as a coherent fighting force is a common example. The collapse itself may be triggered by an accumulation of losses (although the precise point at which collapse occurs is often difficult to predict).

The unit’s collapse, however, may foster significant changes that spread through constituent elements, subordinate units, and other connected or related systems. These are cascading effects.

Cascading effects may accomplish desired ends more effectively than **cumulative effects**, since removal of critical nodes may ensure more thorough collapse or more complete neutralization than might a cumulative, attritional approach. They may also achieve ends more efficiently, requiring fewer resources to achieve equivalent effects, thus freeing them for other uses. Some systems do not lend themselves to this type of

Cumulative and Cascading Effects

In the C2 vehicle example, the lessening of the enemy unit’s combat power through loss of the vehicle would be part of the **cumulative effects** of attack upon the unit, as would the unit’s eventual collapse through attrition of many of its vehicles and personnel. The effects of the loss of the combat commander in the vehicle on subordinate and associated units would be a **cascading effect**.

In the case of an integrated air defense system (IADS), air superiority may be achieved through the accumulation of effects against the IADS’ components and achieving it may cascade into many other desirable effects, giving the air component greater freedom of action and leading to increasing advantages for other components of the joint force.

An electrical network, as an integrated complex system, demonstrates a different aspect of cascading effects. Bombing many generator halls, substations, and power distribution junctions can cumulatively lead to the desired effect of widespread system failure. However, so can targeting a few critical nodes within the network, then allowing internal system stress to cause successive cascading system-wide failure. Nature has inadvertently caused such effects with US power grids several times and Coalition forces were able to achieve them early in Operation DESERT STORM by attacking a few key Iraqi power plants and distribution nodes.

approach and it may not always be possible to identify or target key nodes, but targeting efforts should strive to do so whenever possible.

Other Types of Indirect Effects: Physical, Psychological, Behavioral, and Functional

Physical effects are the results of actions or effects that physically alter an object or system. Most physical effects are direct, but some may be indirect. Often, unintended or undesirable physical effects, like “collateral damage” can be major concerns in an operation.

Psychological effects are the results of actions or effects that influence the emotions, motives, and reasoning of individuals, groups, organizations, and governments. These may result in changes in the outward behavior of these actors, which are known as behavioral. The term **behavioral effects** commonly refers to effects on the behavior of living constituents of systems. When the living components of a system act in concert to produce a given function (as when those manning an [integrated air defense system](#) [IADS] operate that system), intended behavioral effects may lead to changes in the behavior of the system as a whole. These changes are known as **functional effects**. While it is seldom possible to measure psychological effects in living systems directly, behavioral results (and related functional results) can be measured. Nonetheless, the intermediate psychological states leading to behaviors can be important to understanding causal mechanisms during planning. In most cases, targeting is intended to produce some effect on enemy behavior (e.g., by changing it, preventing it, compelling it to remain the same, or by removing strategy choices.). Unless the enemy is destroyed outright, all such changes entail a change in the enemy’s emotions, motivations, or reasoning. Thus, **there is a psychological component to almost every set of effects in living systems and this component is often among the most important in terms of achieving objectives**, especially at the operational and strategic levels. Operational level objectives have historically entailed defeat of enemy forces, and defeat inevitably involves a psychological component. There are very few instances in history where an enemy, however thoroughly beaten, was completely denied means of resistance. Ultimately, collapse entails a series of choices framed by emotion, motivation, and reason. The same is true of the resistance of an enemy nation or system as a whole at the strategic level. Here, the psychological component is even stronger. In combat or coercive operations, defeat is an event that occurs in the mind of the adversary, who chooses to end resistance or aggression and otherwise act (behave) as we desire. All airpower efforts should contribute to this outcome. Good strategy requires realizing this and tailoring effects to produce the maximum psychological impact upon the enemy. A good example of this is Japan at the end of WW II. The atomic bombings of Japanese cities were intended to demonstrate that the Japanese homeland could be crippled and devastated without invasion—in fact, with relative impunity. The psychological dislocation that the weapons imposed far outweighed their material destructiveness. This psychological impact aided greatly in coercing Japanese surrender, even though the Japanese home islands were still capable of robust defense.

Sequential and Parallel Effects

Sequential, or serial, effects are the results of actions or effects that are imposed one after another. If commanders seek to cause adversary system failure, *it can be better to impose effects in parallel rather than sequentially.* [Parallel attack](#) has greater potential for causing system-wide failures by placing stress on the enemy system in a manner that overwhelms its capacity to adapt. This is common sense—everyone is better at handling problems coming one after another from a single source than from many different sources or

directions simultaneously. Some of the advantages conferred by parallel attack are purely physical, but many are psychological. Simultaneous stress from many sources is a major cause of psychological strain or breakdown and thus effects-based targeting should attempt to place the enemy under maximum psychological stress through parallel efforts. Even if one is seeking predominantly physical effects, the psychological strain may act in synergy with the physical to have more impact than the physical effects would on their own. Another advantage of [parallel operations](#) is that they can take less time to achieve desired effects and objectives. If shortage of time is an overriding concern in a campaign, planners and targeteers should consider a parallel approach.

Effects from parallel operations come at a cost, however. They are almost always harder to impose, require more resources (except time), are more complex, and should be planned more thoroughly, especially in terms of integration and synchronization of operations. Further, there may be reasons effects cannot or should not be imposed in parallel. In some cases, there may not be sufficient resources or capabilities to impose them in this manner. This was the case in the Combined Bomber Offensive during WW II. There were not enough bombers to attack German systems in parallel until very late in the war, when parallel attack on the transportation and fuel industries became possible (and were effective). In other cases, a sequential approach is necessary because events need to happen in a certain order to enable other effects to take place and ensure success. Some degree of air superiority is almost always required prior to commencing major land or maritime operations.

For example, in the opening minutes of Operation DESERT STORM, certain key early warning nodes were targeted to facilitate penetration of Baghdad's air defenses by other coalition aircraft. This one sequential strike helped guarantee the success of the parallel efforts that followed. In other cases, political considerations may so restrain operations as to make a parallel approach infeasible or unacceptable.

Sequential and Parallel Effects

In the case of an IADS, an example of sequential effects might be a counterair operation that first takes down early warning radars, then sector operation centers, then airfields and enemy aircraft, and finally now-autonomous enemy missile sites. Parallel effects might be the results of the same operation conducted against all these nodes simultaneously in order to place greater stress on the system and complicate the enemy's adaptation requirements.

Intended and Unintended Effects

Intended effects are the desired, planned, and predicted outcomes of an action or set of actions. They can be direct or indirect. They should always represent a net gain in terms of accomplishing objectives or the end state. Unintended effects are outcomes of an action that are not part of the original intent. These effects may be undesired or desired, presenting opportunities for exploitation. Almost all actions produce some unintended effects. These can be direct, but are usually indirect. If unplanned, they can also be desirable or undesirable from the friendly point of view, leading to outcomes that help or hinder achievement of friendly objectives. The case of the enemy commander being replaced by a more capable officer is an illustration of an undesired unintended effect. Unwanted civilian injuries or collateral damage to civilian property are examples of unintended effects that are planned, or for which risk is accepted, but which are undesired. Collateral civilian damage, of course, is a major concern for commanders today.

There is another aspect of unintended effects that is easy to overlook in planning. Even successful operations carry a cost in terms of lost opportunities. For example, destroying certain C2 or communications nodes in order to degrade enemy cohesion can remove valuable sources of friendly intelligence, or prevent transmission of surrender guidance by the adversary government. Likewise, destroying transportation nodes like bridges in order to impede enemy movement may interfere with future friendly schemes of maneuver or recovery efforts accompanying conflict resolution.

Effective planning should account for these “opportunity costs.” Effective air, space, and cyberspace planning should also account for other components’ schemes of maneuver, so that effects created by the airpower component are not undesired effects for the other components. EBAO may often suggest alternatives to outright destruction that can create desired effects without removing future opportunities for exploitation or negatively affect the end state. For instance, in strategic attacks against enemy electrical power, carried out to cripple conflict-sustaining resources and disrupt national leadership functions, planners can use nondestructive weapons to bring down power for a given period, or can destroy only a few critical nodes, in order to avoid wholesale destruction of infrastructure that could impede later stabilization efforts. In other cases, good planning can suggest opportunities for exploitation. In Operation DESERT STORM, planners deliberately took down bridges in Iraq that carried fiber-optic trunks in order to force Iraqi leadership to resort to more exploitable, radio-based communications, an effort that impeded later recovery efforts. This requires the integrated efforts of the entire joint, multinational, and multiagency team.

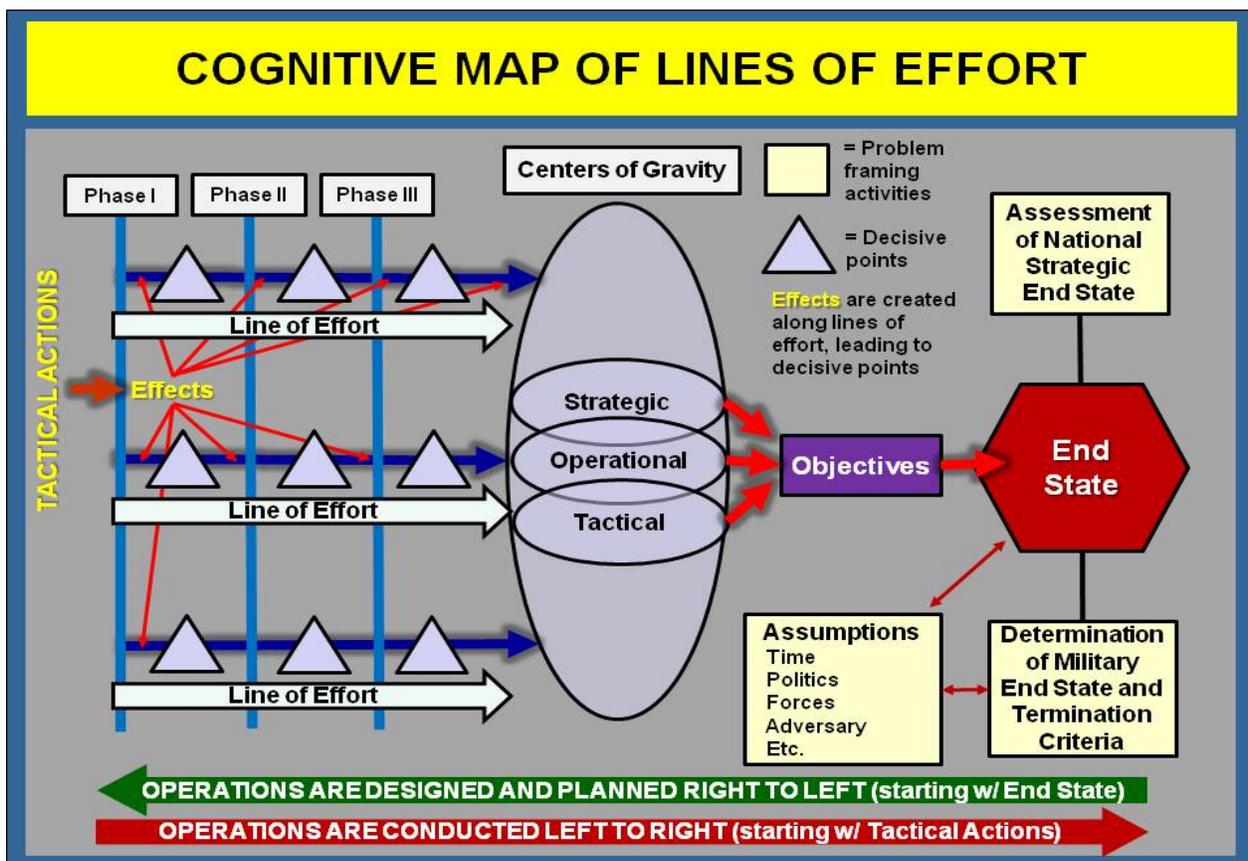
LINES OF EFFORT

It is very helpful during design and planning to have a tool that depicts the relationship of effects to [decisive points](#) (DPs), [centers of gravity](#) (COGs), objectives, and other events and concepts, using the logic of purpose—cause and effect. Such a tool is usually arranged in proper time sequence to help commanders and strategists visualize how operations evolve and interact over time. [Lines of Effort](#) (LOE) provide just such a tool.³

³ LOEs are similar to physical “[lines of operation](#),” but rather are *logical* lines that use the purpose (cause and effect) to focus efforts toward establishing operational and strategic conditions by linking multiple tasks and missions (Joint Publication [JP] 5-0, [Joint Operation Planning](#)). There are also physical lines of

Commanders and strategists may use LOEs to link multiple actions and effects on nodes and DPs with COGs and objectives to enhance effects-based planning efforts. LOEs help visualize COAs, laying them out in time sequence and helping identify where certain effects should be created and where DPs are located in time relative to other events. LOEs may be particularly useful when working with [interagency](#) and multinational partners, helping commanders and strategists visualize how military means can support all instruments of national and multinational power. The aggregate of the effects of all [instruments of power](#) (IOPs) acting together form a series of LOEs leading directly to the strategic end state.

There is usually a discrete set of conditions the military will be tasked to deliver. In some cases, a military portion of the end state may actually be a required part of the strategic end state—i.e., the military directly delivers a condition of the strategic end state. In many cases, however, LOEs employing other IOPs are required to complete the strategic condition that military action has enabled or partially achieved. Each LOE can be broken down into constituent objectives, DPs, effects, and actions or tasks, as illustrated in the figure, “Cognitive Map of Lines of Effort.”⁴



Cognitive Map of Lines of Effort

In most cases, single LOEs are connected to other LOEs within the operational environment. The interconnectivity between LOEs can be used to show key decision points that connect the concept of operations with branches and sequels. Potential DPs

operation: physical lines that define the interior or exterior orientation of a force in relation to the enemy or that connects actions on nodes or decisive points related in time and space to an objectives ([JP 5-0](#)).

⁴ Adapted from Reilly, *Operational Design*.

should be identified during mission analysis, if possible. The arrangement of operations involves a detailed consideration of how LOEs align with friendly and adversary COGs and the vertical and horizontal relationship of DPs between different LOEs. All LOEs should contribute to accomplishing objectives. Objectives that contribute to accomplishment of subsequent objectives along the same LOE and contribute to accomplishment of objectives in other LOEs may define DPs.

Each LOE can be refined further by including tactical-level objectives, effects, and individual tactical tasks. In theory, given sufficiently sophisticated planning tools, each organization's tasks could be shown as LOEs. Regardless of whether each task is so depicted, however, there is merit in each tasked organization understanding how its assigned task contributes to the overall end state. This helps keep effects-based principles in the minds of all involved in the process and can aid in understanding the cross-domain effects of given actions.



CURTIS E. LEMAY CENTER

FOR DOCTRINE DEVELOPMENT AND EDUCATION



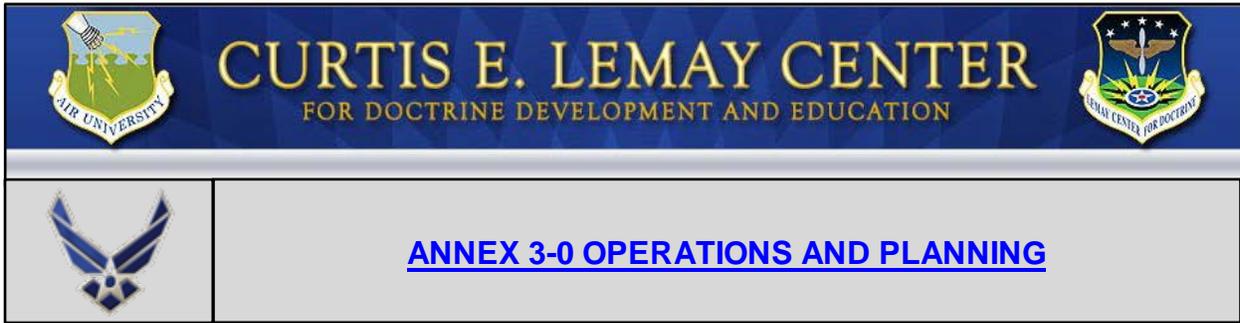
ANNEX 3-0 OPERATIONS AND PLANNING

THE COMMON OPERATIONS FRAMEWORK: EXECUTION

Last Updated: 04 November 2016

Plans describe the ways and means through which given ends ([objectives](#) and [end states](#)) can be achieved. Plans are carried out through a process called “execution,” which involves putting into effect any courses of action, orders, or subordinate plans needed to achieve the ends specified by the governing plan. Execution takes place within the timeframe specified in the governing plan and usually encompasses some mechanism through which forces are tasked or ordered to carry out specific missions. Assessment of ongoing operations usually takes place during execution.

The process of tasking forces and generating orders for specific missions itself entails cycles of planning, execution, and assessment. Generally speaking, planning refers to activities intended to govern future operations and execution refers to actions taking place inside the timeframe spanning from whenever an order is given to carry out the governing plan to the point when the commander has decided that the operation can be terminated. Execution encompasses the commander’s “battle rhythm”—the deliberate cycle of command, staff, and unit activities intended to integrate and synchronize current and future operations. The tasking cycles that govern execution vary greatly between steady-state conditions (one or two fiscal years) and contingency or crisis operations (days or hours).



ASSESSMENT: GENERAL CONSIDERATIONS

Last Updated: 04 November 2016

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 toward accomplishing a task, creating an effect, or achieving an objective (Joint Publication [JP] 3-0, [Joint Operations](#)). The purpose of assessment is to support the commander's decision-making process by providing insight into the effectiveness of the strategy and accompanying plans. Many types of assessment exist, and may be used in support of operations, but assessment in this document refers to activities that support the commander's decision-making process. In an [effects-based approach](#), assessment should provide the commander with the answers to these basic questions:

- ✦ Are we doing things right?
- ✦ Are we doing the right things?
- ✦ Are we measuring the right things?

The first question addresses the *performance* of planned airpower operations by assessing the completion of [tasks](#). The second question addresses the level at which the commander's desired *effects* are being observed in the [operational area](#) and prompts examination of the *links* between performance and effects. The third question addresses the process of assessment itself and the importance of understanding how one chooses 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.

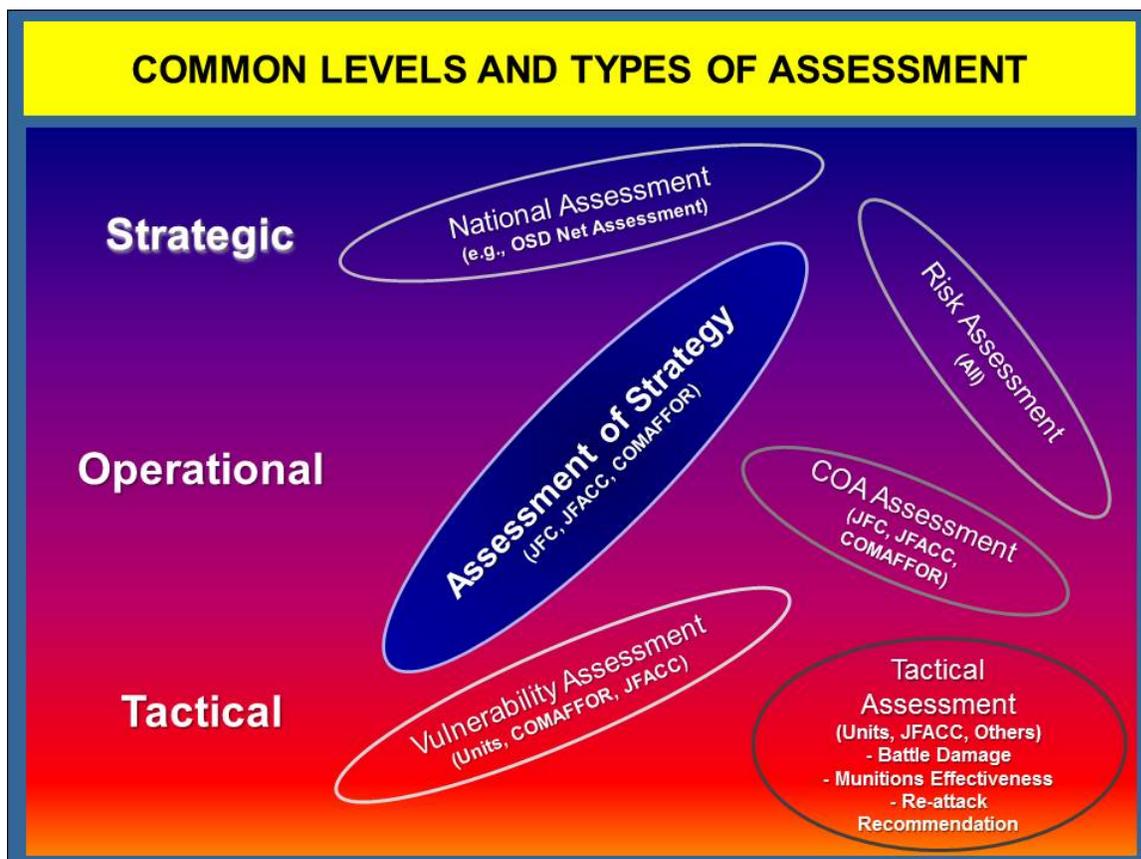
While often depicted as a separate "stage" of the [tasking cycle](#) for conceptual clarity, assessment is actually interwoven throughout [operational design](#), planning, and execution. The assessment process should begin as the broad [strategy](#) is laid out (including development of assessment criteria), continue through detailed planning (with the development of metrics and data sources), and extend to evaluation of measures during and after execution. This process is iterative as assessment results influence future strategy and planning.

Assessment consolidates data from many sources and summarizes that data clearly, concisely, and in context. It should follow a rigorous, defensible analytical process that provides commanders and planners the ability to view details of methods used and results produced. It communicates relevant uncertainty in the data and the associated

risks. In short, assessment provides analytically supportable judgments on a commander's strategy.

LEVELS OF ASSESSMENT

Assessors perform many types of [assessment](#) across the [strategic](#), [operational](#), and [tactical levels](#) to inform a wide array of decisions. The figure, "Common Levels and Types of Assessment" displays some common types of assessment and, broadly, the levels where each would most likely be applied (the depiction is not all-inclusive). The figure also shows the level of commander who commonly directs a given type of assessment (e.g., the [joint force commander](#) [JFC] and [joint force air component commander](#) [JFACC]). At all levels—but especially at the operational level—the commander, Air Force forces (COMAFFOR), JFACC, and respective staffs should observe how the JFC takes information "on board" and craft assessment products that convey the Airman's perspective without seeming "air-centric" or presenting a biased view. All these types of assessment, with certain combat-related exceptions in the realm of tactical assessment, apply across the range of military operations, in steady-state as well as contingency conditions.



Common Levels and Types of Assessment

Tactical-level assessment is generally performed at the unit or joint force component level and typically measures physical, empirical achievement of direct [effects](#). Combat assessment (CA) is an umbrella term covering [battle damage assessment](#) (BDA), [munitions effectiveness assessment](#) (MEA), and recommendations for re-attack (RR).

BDA is the estimate composed of physical and functional damage assessment, as well as target system assessment, resulting from the application of lethal or nonlethal

military force. BDA consists of three phases. Phase I BDA consists of reporting physical damage (kinetic) or other changes (nonkinetic) to the target and, if possible, evaluating the physical damage or change to the target quantitatively or qualitatively. Phase II BDA measures what effect the weapon had on that individual target and to what extent it can perform its intended function. Phase III BDA then measures the effect of striking a particular target on the overall target system (e.g., what effect does taking out a [command and control](#) [C2] node have on the overall combat capability of an [integrated air defense system](#)? This might relate to the overall effect of gaining and maintaining [air superiority](#)). MEA evaluates whether the selected weapon or munition functioned as intended. MEA is fed back into the planning process to validate or adjust weaponeering and platform selections. RR and future targeting recommendations merge the picture of what was done (BDA) with how it was done (MEA), comparing the result with predetermined measures of effectiveness, to determine the degree of success in achieving objectives and to formulate required follow-on actions, or indicate readiness to move on to new tasks.

Another assessment consideration at the tactical level is estimated damage assessment (EDA). EDA is a type of physical damage assessment; it anticipates damage using the probability of weapon effectiveness to support estimated assessments and allows commanders to accept risk in the absence of other information. Often in execution, it is not possible to wait on verification of strike results without inordinately delaying the presentation of assessments to decision makers. EDA uses a host of data to estimate weapons effectiveness on targets and target systems prior to BDA confirmation. This is made possible by the precision and reliability of modern weapon systems. In general, EDA is appropriate for all but high-priority targets, but consideration for schemes of maneuver and the strategic implications should always be considered. Normally, the COMAFFOR (as such, or in his role as JFACC) provides guidance as to which targets and target sets he is willing to accept risk for when authorizing assessments based on EDA.

Tactical-level assessment should also be accomplished following tactical employment of [nonkinetic actions](#) and non-offensive capabilities. Examples include [military information support operations](#) (MISO; e.g., Commando Solo missions), [public affairs](#) (PA; e.g., media engagements), [cyberspace](#) operations (e.g., temporary utility outages), [operations security](#) (OPSEC; e.g., signature management), etc. Tactical-level assessment is described in greater detail in Annex 3-60, [Targeting](#).

Operational-level assessment is the component's evaluation of whether its objectives—at the tactical and operational levels—are being achieved. Operational assessment addresses effects, operational execution, environmental influences, and attainment of success indicators for the objectives to help the COMAFFOR/JFACC decide how to adapt the component's portion of the joint force strategy. Assessment at this level 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 re-attack. Assessment at this level often entails evaluation of [course of action](#) (COA) success, assessment of the progress of overall strategy, and joint force vulnerability assessment. Operational assessment should also include evaluation of changes to key parameters of adversary force performance, changes in adversary capabilities, and what the adversary is doing to limit the effects of friendly actions and to overcome friendly strategy. These are commonly performed by joint force component commanders and the JFC and their staffs.

Operational-level assessment evaluates a wide range of data: Quantitative and qualitative, objective and subjective, observed and inferred. Some measures can be expressed empirically (with quantitative measures); others, like [psychological effects](#), may have to be expressed in qualitative or subjective terms. Both rely on extensive data and analysis from [federated](#) intelligence partners, including other US government agencies and multinational partners.

Strategic-level assessment addresses issues at the joint force (“theater strategic,” as in bringing a particular conflict to a favorable conclusion) and national levels (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 [combatant commander](#) or other relevant JFC, so assessment at their levels often shapes the nation’s, or even the world’s, perception of progress in an operation. This places a unique burden on assessors, planners, strategists, and commanders to be accurate, meaningful, and to complete their analysis and communicate results clearly and logically.

The time frames considered by the various assessment types may vary widely, from rather short intervals at the tactical level to longer time horizons at the strategic level, even reaching well beyond the end of an operation, as lessons learned are determined and absorbed. The relationship among the various assessment types is not linear, with outputs from one type often feeding multiple other types and levels.



ANNEX 3-0 OPERATIONS AND PLANNING

ASSESSING STRATEGY

Last Updated: 04 November 2016

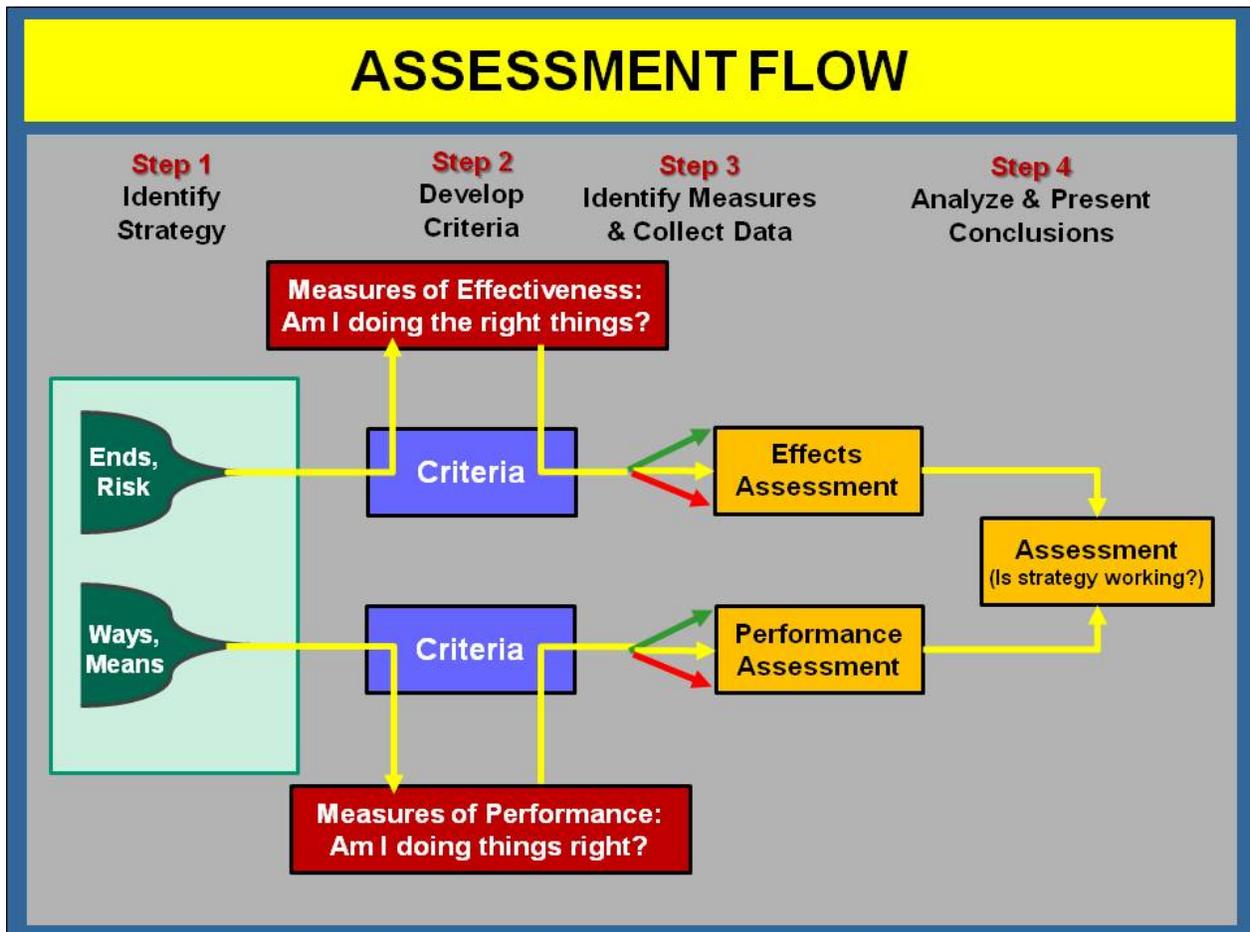
The purpose of assessing [strategy](#) is to give commanders dependable insights into whether their strategy is effective and to measure progress toward the end state the commander is tasked to deliver. This type of [assessment](#) does not just entail assessment at the [strategic level](#), but can be conducted for any commander from the [tactical](#) through the strategic level and should address the four main components of a strategy:

- ✦ **Ends**—The commander’s [end state](#) and the [objectives](#) required to obtain it. These are generally derived from the [commander’s intent](#) statement.
- ✦ **Ways**—The [tasks](#) or [actions](#) undertaken to help create the [effects](#) that achieve the ends, as generated during the detailed planning process.
- ✦ **Means**—The resources put toward accomplishing the ways. The doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) construct is often a useful source for examining and developing the means.
- ✦ **Risk**—The cost and amount of uncertainty and vulnerability the commander is willing to accept in executing the strategy.

It is critical to integrate the assessment process with strategy design and plan development. The assessment process begins with a review and analysis of lessons learned from previous operations, continues through [operational design](#) (where broad assessment criteria are often decided upon), detailed planning (where specific [measures and indicators](#) are usually selected to accompany objectives, effects, and tasks), and extends to evaluation of measures and indicators once tasks have been accomplished. Some forms of assessment continue long after the particular conflict or operation has concluded, supporting, for example, [munitions effectiveness assessment](#) and the lessons learned process.

Assessment considers all these components, with the goal of developing insights into whether a strategy is working and what areas may need to be re-evaluated if that strategy is not working. The figure, “Assessment Flow” depicts this strategy-centric approach to assessment, which applies to operations during steady-state conditions, as well as during contingencies and major operations.

ASSESSMENT FLOW



Assessment Flow

Throughout the assessment process, the assessor's focus should remain on informing the relevant commander's decisions. Even though planners may document various forms of guidance, including commander's intent, the assessment team should work to derive assessable effects from these statements. Often the commander's intent is written in terms of what operations the commander plans to undertake and not in terms of the conditions that they hope will result from these operations. Thus, planning for assessment should begin in dialogue with the commander during the design process. Assessment is also iterative, working to converge on a reasonably assessable commander's end state. In addition, understanding the objectives and tasks of the commander's boss is crucial in forming a comprehensive assessment.

Given the fluid nature of complex military operations involving [higher-order effects](#), judgment should be an intrinsic part of any assessment. Instead of developing criteria or measures that take all judgment out of the process, the goal is to build a framework for the development of logically defensible judgments, which often involve qualitative (unquantifiable) and even subjective elements.



ANNEX 3-0 OPERATIONS AND PLANNING

ASSESSMENT CRITERIA

Last Updated: 04 November 2016

Criteria define the attributes and thresholds for judging progress toward the [end state](#) and accomplishment of required [tasks](#). Development of [assessment](#) criteria is the critical component of the assessment process and should be accomplished before specific measures or data requirements are defined. Developing measures without a clear understanding of how they fit into a judgment of the effectiveness of an overall [strategy](#) often leads to laborious data collection and analysis processes that provide little to no value to decision-makers. Spending additional time to thoroughly consider and develop meaningful and relevant assessment criteria help avoid this pitfall.

Criteria help focus data collection by ensuring that assessment measures relate clearly to the elements of the strategy being assessed. As data are collected, the criteria translate those data into meaningful insights on the commander's strategy, which may be presented in a variety of ways to visually display progress (or lack thereof) to the commander.¹ Criteria should objectively indicate trends of significance and should be things that can be measured by known means. Determining them prior to commencement of operations allows for the establishment of baseline values for friendly and adversary forces and actions, which will facilitate objective reporting of changes, as well as rates of change.

All criteria have strengths and limitations. Which is used will depend in some part on the personality and preferences of the Commander. However, a variety of means should be used to comprehensively display progress toward (or away from) objectives and avoid losing relevant data by artificial form limitations. Criteria should be developed for the ends, ways, and means at each level of assessment. Well-written criteria should adhere to some basic attributes:

- ✦ **Relevant to the [effect](#) or action being assessed.** The criteria should relate directly to the commander's end state, tasks, and success thresholds as outlined in the strategy.
- ✦ **Mutually exclusive across the assessment categories** (e.g., good, marginal, poor) for a given effect or action assessed. This ensures that only one category is appropriate for a given outcome.

¹ These may include a wide variety of presentation formats, as detailed in Air Force Tactics, Techniques, and Procedures (AFTTP) 3-3.AOC, *Operational Employment-Air Operations Center*.

- ★ **Collectively exhaustive across the range of outcomes for a given effect or action.** This helps ensure that most, if not all, potential outcomes are covered by the criteria.
- ★ **Well-defined.** Specific and relevant definitions should be developed for any confusing or ill-defined terms used in the criteria. Planners should attempt to define success thresholds and the boundaries between assessment categories objectively whenever possible (e.g., what are the criteria for transition between the ‘good’ and ‘marginal’ categories?). Nonetheless, judgment is always necessary when assessing the overall strategy.

For example, if the commander’s objective is to gain and maintain [air superiority](#) in a given operational area, criteria for the ends (i.e., objectives and other effects) should directly address to what degree enemy air defenses have interfered with friendly operations. Planners should select criteria that give the commander meaningful insight into the degree of interference and use these criteria to judge progress toward the objective. Similarly, planners should determine meaningful criteria for establishing whether the tasks undertaken to achieve air superiority have been accomplished. In this example, the commander and planners would want to know if enemy air or air defense operations occurred, whether or not they posed risks to friendly air operations, whether or not air bases, surface-to-air missile sites, and radars were manned, operating, communicating, or emitting, or if such forces were moving.

Some additional criteria selection guidelines may help planners:

- ★ The lines between categories are often hard to determine, especially with some commonly used assessment display techniques like “stoplight” charts (for instance, it may be hard to answer, “*when do we go from good [“green”] to marginal [“yellow”]?*”) Planners should set objective and concrete boundaries as much as possible, recognizing that some degree of subjectivity (and hence judgment) will always be necessary.
- ★ Try to select criteria that allow depiction of trend data, which may ultimately be among the most meaningful criteria. (For example, “*effectiveness is still marginal on this [air tasking order](#) (ATO), but the trend is rapidly improving, so we can probably allocate a lower weight of effort to air superiority on future ATOs, despite the current status.*”)
- ★ Try to avoid arbitrary terms like “some,” “prohibitive,” and “significant.” They do not lend themselves to objective definition. (In the example above, for instance, criterion boundaries could hinge on percentages of desired area, mission-capable assets, and desired timeframe.)
- ★ Sliding scales can often be a useful display format, since it helps show relative magnitude of differences. For instance, on a one-to-ten scale, eight may not be much better than seven, but is considerably better than five, even though eight may be “good” or “green” on a stoplight chart, while both five and seven are “marginal” or “yellow.”

When assessing complex military operations, subjective data in the form of subject matter expert (SME) inputs often provide the most meaningful (or only available) data. To avoid personal biases and ensure an adequate level of consistency in the assessment, SME inputs should simply provide the information necessary to address

the relevant measures of effectiveness. For example, when assessing the achievement of air superiority, it is more effective to ask a SME about the degree to which adversary air has interfered with their operations, rather than asking directly whether the Air Force has achieved an appropriate level of air superiority.



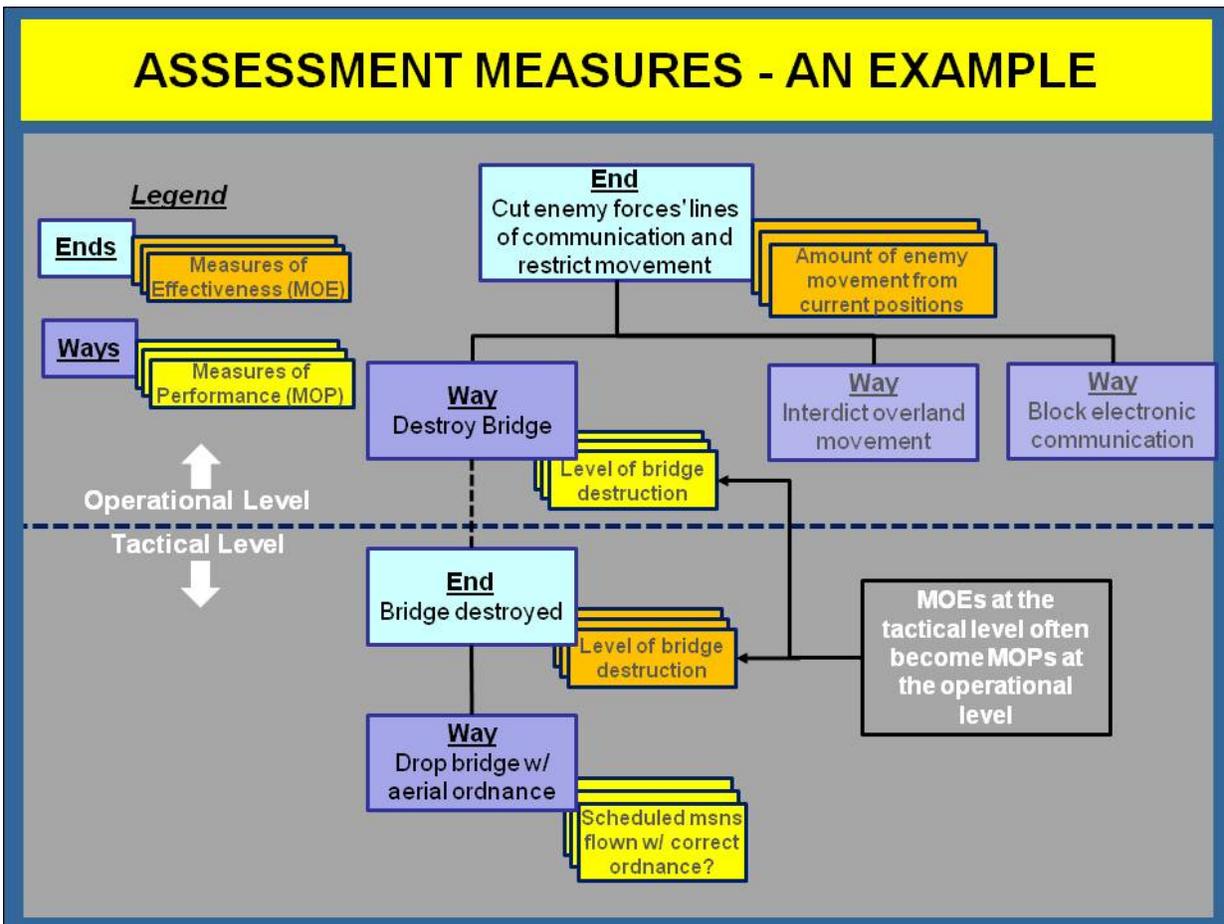
ANNEX 3-0 OPERATIONS AND PLANNING

ASSESSMENT MEASURES

Last Updated: 04 November 2016

Assessment measures are simply the data elements that, via the criteria, provide insight into the effectiveness of the commander's strategy. Assessment measures are commonly divided into two types:

- ✦ **Measure of Performance (MOP)** — A criterion used to assess friendly actions that are tied to measuring task accomplishment.
- ✦ **Measure of Effectiveness (MOE)** — A criterion used to assess changes in system behavior, capability, or operational environment that is tied to measuring the attainment of an end state, achievement of an objective, or creation of an effect.



Assessment Measures — An Example

MOPs address the ways and means employed during execution to help achieve desired effects; they indicate progress toward accomplishing planned [tasks](#) or [actions](#). MOEs assess progress toward creating desired effects and thus achieving the objectives and end state (Simply put, MOPs help tell us if we are doing things right; MOEs help tell us if we are doing the right things).

The distinction between MOEs and MOPs can depend on their context within the commander's strategy. The exact same measure can be an MOP for one commander and an MOE for another, lower echelon commander. The figure, "Assessment Measures—An Example" illustrates a practical application of this delineation.

Developing good measures is an art, though there are some general guidelines that can aid in developing high-quality measures:

★ **Measures should be relevant and necessary.** Measures should relate to the effect or task they are intended to describe and should feed directly into the already-established criteria. Collection of irrelevant measures that do not shed light on the effectiveness of the commander's strategy is a misuse of valuable time and resources. Focusing primarily on collecting the data necessary to apply to the developed criteria should help avoid the creation of superfluous measures.

★ **Measures should represent a scale, not a goal or objective.** Metrics developers may be tempted to write a goal or criterion as a measure. Instead, the goal should be included in the criteria in accordance with the commander's risk tolerance and thresholds. Operators and planners should establish these goals (objectives) in coordination with the assessors. Examples:

★★ *Bad Measure:* no friendly fighter losses.

MOPs versus MOEs

A Simplified Example

A [joint force air component commander](#) (JFACC) working with the ground component attempting to stop a major enemy ground offensive might assess their forces' *performance* by measuring the number of [interdiction](#) sorties successfully flown against a crucial element of enemy follow-on forces. If the forces flew the planned number of sorties or more without loss, the JFACC can assess that forces are "doing things right."

The JFACC might assess *effectiveness* by measuring how many of the targeted enemy forces made contact with friendly forces in coherent platoon-size or larger formations. If that number is small, protecting friendly troops and effectively blunting the enemy offensive, the JFACC may conclude that the forces' efforts were effective—that they "did the right thing."

These are very different types of assessment, requiring different measures, and can lead commanders to very different conclusions. Too often, commanders may focus on MOPs (in part because they are more easily measured and yield empirical answers), and pay inadequate attention to MOEs.

Both are necessary, but conceptually different.

✪✪ *Better Measure*: number of friendly fighters destroyed or damaged by enemy air defenses.¹

✪ **The data satisfying a measure should be observable, or at least inferable.** The measurements can be quantitative (numerical) or qualitative (non-numerical). In general, the more objectively measurable the better, but **commanders and planners should avoid “the numbers trap:” blindly using rates, numbers, and other quantitative metrics, especially in assessing effects, since their seemingly “empirical” and quantified elements may be based on wholly subjective assumptions** and the number may be meaningless—thus they may often lack direct linkages to the objectives or ends outlined in the strategy, while sometimes also imparting an illusion of “scientific validity” merely because they are quantified. Examples:

✪✪ *Bad Measure*: civilian populace attitude toward stability forces.

✪✪ *Better Measure (Quantitative)*: percentage of surveyed civilian population giving “favorable” rating to stability forces; number of riots and civil disturbances in response to friendly force activities; amount of enemy propaganda, graffiti, and the like discovered; and so on.

✪✪ *Bad Measure*: progress towards opening new air base.

✪✪ *Better Measure (Qualitative)*: current phase of air base stand-up (secured land, runway operational, 30-day sustainment capability in place, long-term sustainment capability in place).

✪ *Measures should be clear and concise.* They should be written in plain language so that someone with no prior knowledge of the measures can still understand the data requirements. Examples:

✪✪ *Bad Measure*: status of enemy fighters.

✪✪ *Better Measure*: number or percentage of enemy fighters confirmed destroyed or rendered combat-ineffective.

Measures should be drafted during planning so that associated intelligence collection needs may inform surveillance and reconnaissance requirements. Measures may need to be refined or amended during the [tasking cycle](#) as the operational situation changes. Selection of assessment measures is an iterative, ongoing effort.

Measure the entire plan, but do not overdo it. All elements of the strategy should be measured, and there may be multiple measures required to fully address the relevant criteria. However, attempting to assess too many measures can paralyze the assessment effort. Consider the value to the end result before adding more measures. Also consider what measures are readily available through immediate analysis of mission reports and planned collection tasking, rather than addressing new collection requirements. After assessors have built the entire set of measures, they should conduct a final review to identify those measures that have less relative

¹ Note that this is greatly oversimplifies the process, since measures such as that above would probably include friendly sorties forced to jettison ordnance—hence rendered mission-ineffective—due to enemy action, and similar measures.

importance/contribution or take inordinate effort relative to the insight provided, and remove them from the set. In general, assessment teams should prioritize their efforts to best support the commander's decision-making needs.

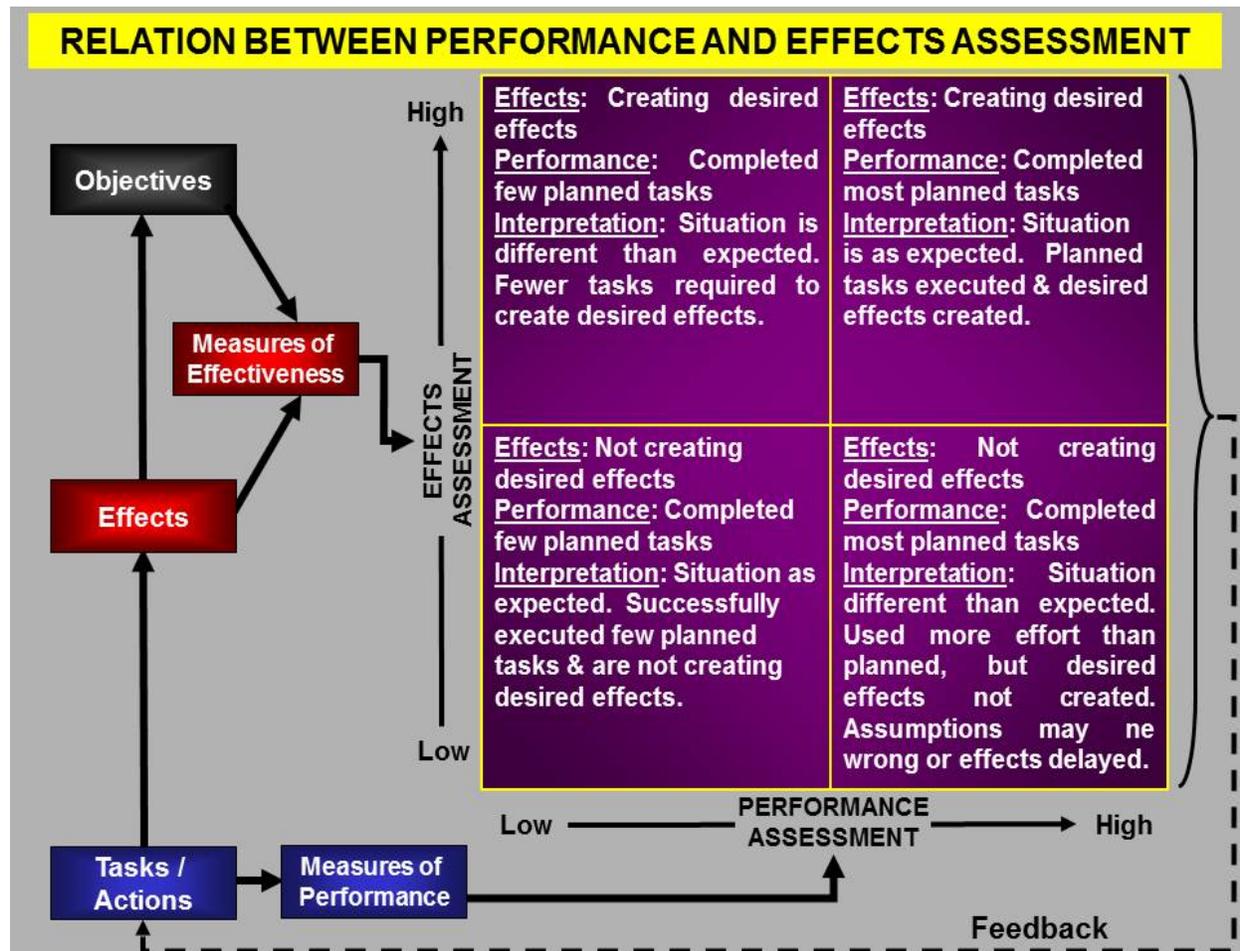


ANNEX 3-0 OPERATIONS AND PLANNING

ASSESSMENT INTERPRETATION

Last Updated: 04 November 2016

The purpose of [assessment](#) is not merely to report on the measures, but rather to provide analytically supported insights into the effectiveness of the commander's [strategy](#) and information with which to make decisions. There are numerous analytic techniques available to summarize data analysis in performing effective assessment. The technique chosen should be tailored to the [operational environment](#), taking into account such factors as the pace of operations, available expertise, and [reachback](#) support capabilities. Assessors should also take into account the level of warfare and the commander's primary concerns. The figure, "Relation Between Performance and Effects Assessment," provides a framework with which to compare the effect and performance assessments when determining the level of objective achievement.



Relation between Performance and Effects Assessment

Overall, assessment interpretation can be broken into two major types: effects and performance assessment. **Effects assessment**, based on [measures of effectiveness](#), should provide the commander with the overall picture of progress toward objective or end state achievement. **Performance assessment**, based on [measures of performance](#), should provide commanders with an overall picture of how well their forces are executing the strategy's ways and means.

The relationship between effects assessment and performance assessment can be characterized in several basic ways. The scores may be similar, the performance assessment may be higher than the effect assessment, or the effects assessment may be higher than the performance assessment.

In the first case, similar effect and performance assessments suggest the operation is proceeding as expected with effects being achieved in proportion to the level of subordinate task completion. This does not necessarily mean the operation is on schedule, and a correlation between effect and performance does not necessarily imply causality. The assessment should continue to be monitored for any changes to the apparent equilibrium.

Disconnects between effect and performance assessments indicate that portions of the plan may require further examination. A high performance assessment paired with a low effect assessment is an indication that the completion of planned tasks is not leading to the desired effects. Numerous issues including data latency, delayed effects, or a misunderstanding of the enemy system may be driving the score mismatches.

Examples of score mismatches include:

- ✦ Having confirmation of successful leaflet drops (high performance) supporting special operations efforts to turn the local population against the adversary, but there has been no change in the number of civilian tip-offs on adversary activity in the area (low effectiveness).
- ✦ Having [battle damage assessment](#) indicating the destruction of national power production (high performance) which was done with the intent of limiting enemy [command and control](#), but the adversary's [integrated air defense system](#) is still operating in a coordinated and timely fashion, showing no apparent degradation (low effectiveness).

In other words, the assumptions about the direct links between the achievement of tasks and the objectives they support may be flawed. In this situation, the primary focus of the assessment should be to identify and highlight these imbalances to the strategists and planners so they can recommend changes to the strategy or plan.

Conversely, when the effect is assessed higher than the performance, desired [effects](#) are being achieved without the expected completion of corresponding tasks. Again, numerous issues including data latency, enemy deception, good fortune, and misunderstanding of the enemy system could lead to this apparent contradiction. For example:

- ✦ Suppression of enemy air defense aircraft found no surface-to-air missile (SAM) sites (performance); however, the adversary has not fired any SAMs during the last five [air tasking order](#) cycles (effectiveness).

- ✪ Missions against enemy fighter bases have not reached those targets (poor performance); however, the adversary is not flying any fighters (high effectiveness).

In these cases, the commander may be able to reallocate resources to another objective. Identifying these opportunities allows the commander to execute operations more effectively and efficiently. However, a high effect assessment paired with a low performance assessment may be temporary if much of the enemy's capability to adversely impact the desired effect remains. In the example above, the enemy could bring its SAMs out of hiding and begin inhibiting friendly air operations, while intact enemy aircraft might be expected to launch as friendly aircraft approach their bases. Capturing such remaining capability helps determine the operational risk commanders would incur if they choose to reallocate resources. If the commander decides the risk is acceptable, assessors should work with the strategists and planners to identify and prioritize those objectives warranting additional resources.

A significant consideration when interpreting effectiveness and performance results is that complex systems often begin internal change without showing outward signs that are measurable to observers. It is thus often necessary for commanders, planners, and strategists to counsel patience in following a particular course of action to allow time for desired changes to work their way through targeted systems and manifest themselves as desired behaviors in the operational environment.



CURTIS E. LEMAY CENTER

FOR DOCTRINE DEVELOPMENT AND EDUCATION



ANNEX 3-0 OPERATIONS AND PLANNING

STEADY-STATE OPERATIONS: GENERAL CONSIDERATIONS

Last Updated: 04 November 2016

Even though fighting and winning the nation's wars is the primary justification for a standing and capable military force, that same force shares in the responsibility to shape the environment for regional and global stability, deter aggression, and prevent conflict. If the US and its allies are unsuccessful in shaping, deterring, and preventing, the Air Force must be ready to respond in any manner directed by national leadership.

The nation's emphasis on shaping and preventing predates the establishment of the Air Force, but significantly expanded with the 1994 *National Security Strategy of Engagement and Enlargement*. The Department of Defense (DOD) implementation of a national engagement strategy accelerated again in 2008 with the publication of new *Guidance for Employment of the Force (GEF)* and *Joint Strategic Capabilities Plan*. In turn, DOD Directive 5100.01, *Functions of the DOD and Its Major Components*, assigned specific functions to the Air Force related to shaping, preventing, and deterring. The 2015 GEF institutionalized the term "steady-state" to concisely describe this portion of the range of military operations.

While many military decision-making processes are common to operations in steady-state and contingency conditions, there are some considerations unique to the steady-state. The Air Force implements steady-state operations, actions, and activities through its Service components to combatant commands, supporting [joint force commander's](#) steady state plans, and through the Secretary of the Air Force's Office of International Affairs.

Just as Airmen should understand the nature and consequences of war, they should understand the nature, significance, and consequences associated with operations during the steady state. As with all military operations, success in the steady state requires Airmen with competence in design, planning, execution, and assessment. Although the core principles of steady-state design, planning, execution, and assessment are similar to those used in crisis situations, Airmen should be attentive and practiced in the differences.



ANNEX 3-0 OPERATIONS AND PLANNING

**STEADY-STATE DESIGN:
SHAPING THE OPERATIONAL ENVIRONMENT**

Last Updated: 04 November 2016

Operational design for the steady state has few differences from operational design for crisis situations. The commander remains the central figure in the entire effort, applying military judgment and experience throughout the process. Commanders should look to steady-state planners to assist in developing the steady-state operational approach. For the commander, Air Force forces (COMAFFOR), steady-state operational design is significantly influenced by the combatant commander, who has likely conducted his or her own operational design effort as part of campaign plan development.

As in any design effort, the commander should define success in the steady state (ends) and allocate forces and resources (means) to achieve the desired ends. The operational approach provides the ways to link steady-state ends and means.

STEADY-STATE DESIGN OBJECTIVES

There are five objectives typically associated with the steady state. These provide a starting point for development of a specific operational approach for the commander and situation.

The first objective of steady-state design and planning, and typically the Air Force's highest priority, is to be **ready to respond immediately and appropriately to crisis situations**. The emphasis here is on force readiness. As an institutional responsibility, force readiness generally falls outside the scope of operational doctrine. Crisis situations are normally unexpected, meaning the readiness of the force at the start of the crisis is the readiness that may apply throughout. Major commands and Headquarters Air Force issue policy and guidance and commit resources to assist operational commanders with force readiness.

A second objective is the need to **plan, execute, and assess steady-state operations that contribute to the deterrence and prevention of conflict**. It is far preferable to deter or prevent conflict rather than to engage in conflict. The Air Force has many tools available to support this objective, from continuous bomber presence, to theater security packages, to shows of force, to multinational exercises, and more. Another significant deterrence and prevention tool is building partner capacity, which leads to the next steady-state objective.

Building partner capacity is another important objective, especially acknowledging that even the most committed approach to deterring and preventing conflict is not

always successful. The steady state should be used to develop international partners with the capability, capacity, and interoperability to respond in crisis with, alongside, or—better yet—instead of the US should deterrence fail. Capable partners can reduce the operational burden on the Air Force in both the short- and long-term.

Theater access is the fourth common objective during the steady state. The ideal time to secure or sustain contingency access is during the steady-state, providing the Air Force with air base access, overflight rights, and host nation and logistics-related agreements vital to the conduct of contingency operations. Strong relationships with partner nation air forces improve the likelihood for theater access exactly where and when Airmen might need it the most.

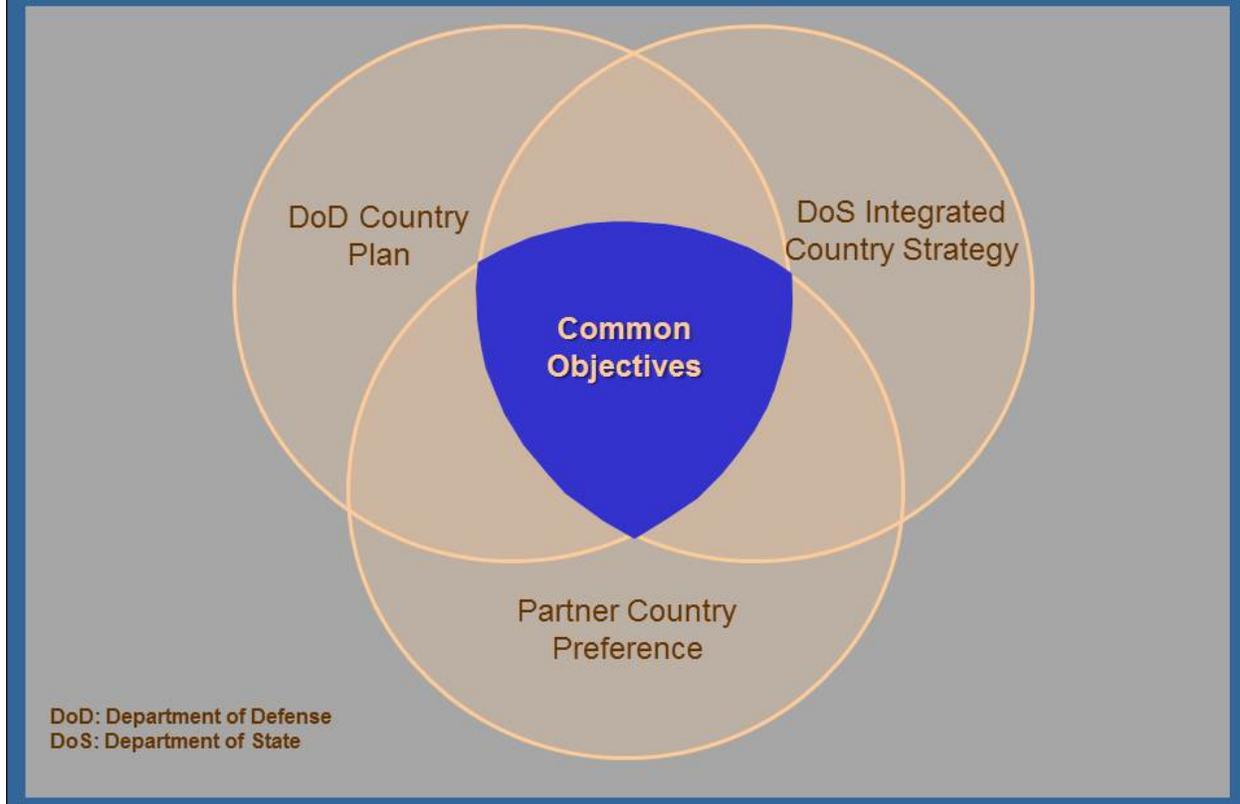
The final objective is vital to the long-term strength of the Air Force. It is the operational commander's responsibility to **participate in Air Force [force development](#) activities**. Force development ensures the required readiness, capabilities, and capacities to respond appropriately in the mid- to long-term. As with force readiness, major commands and Headquarters Air Force provide policy and guidance that influence how operational commanders (i.e., warfighters) participate in force development.

Security Cooperation Considerations

A basic understanding of security cooperation can also assist the commander in designing an operational approach for the steady state. Three security cooperation considerations are worth highlighting.

First, security cooperation always supports US government interests, and Airmen normally define Department of Defense (DOD) interests in steady-state operational plans such as country plans and campaign support plans. Commanders also ensure Department of State (DOS) buy-in for proposed security cooperation activities, as the DOS is the lead federal agency for diplomacy. The third party to security cooperation is the partner nation itself. The partner nation needs to see the benefit of a relationship or security cooperation event with the US. Therefore, the ideal security cooperation activity simultaneously supports the interests of DOD, DOS, and the partner nation. This ideal is often referred to as the security cooperation “sweet spot.” See the figure, “Common Objectives,” for a representation of this.

COMMON OBJECTIVES



Common Objectives

A second security cooperation consideration relates to the establishment of desired partner roles. When considering how partner nations contribute to campaign objectives, early design consideration should be applied to the desired security role for each partner. Commanders and strategists should determine what the US government and US Air Force intend for the partner. In other words, what military role should the partner play to support US interests, such as national sovereignty, regional stability, or global commerce? The establishment of desired roles then leads to an assessment of current capability and the development of specific objectives and activities related to building partner capacity or other security cooperation activities. Just as important, designers may also determine what the US does *not* want the partner to do. From an Airman's perspective, a partner nation can serve many important security roles; for example:

- ✦ Respond to crisis in place of the US Air Force.
- ✦ Respond to crisis alongside the US Air Force.
- ✦ Lead an air force coalition in responding to crisis.
- ✦ Defend its own borders from external air aggression.
- ✦ Host a US cooperative security location, forward operating base, or main operating base.
- ✦ Provide contingency access to US forces.

- ✧ Not allow hostile countries to base forces in their country.
- ✧ Be a supporting partner in regional security framework(s).
- ✧ Deny sanctuary to terrorists, insurgents, criminals, or other hostile transnational elements.
- ✧ Be a partner in developing aerospace technology.
- ✧ Provide intelligence and share information.
- ✧ Help deter a potential state aggressor.
- ✧ Host a regional air training center of excellence.

The designer should recognize these are roles the US desires the partner to play and may or may not reflect the current desires of the partner. Further design and relationship building efforts may be required to convince a partner to pursue these roles, and then help the partners succeed in developing and performing these roles.

Finally, security cooperation provides an opportunity to mitigate operational risk by strengthening partner capabilities in areas where the US Air Force has its own capability gaps and shortfalls. This consideration relates to the force development discussion above, suggesting operational commanders can support institutional responsibilities by focusing building partner capacity efforts into areas where the Air Force is accepting operational risk.



STEADY-STATE PLANNING

Last Updated: 04 November 2016

Steady-state planning operationalizes the [commander, Air Force force's](#) (COMAFFOR's) steady-state strategy. Airmen should employ a process analogous to the [joint operation planning process for air](#) to conduct steady-state planning, ensuring they employ a process that at least includes the important steps of mission analysis, design, and plan development. Steady-state planners should consider the availability of resources in developing the plan, so the plan itself should articulate the need for resources required for plan execution.

Just as the campaign plan is the [combatant commander's](#) (CCDR's) principal steady-state plan, the campaign support plan (CSP) serves the same purpose for the COMAFFOR. Responsibility for planning, execution, and assessment of the COMAFFOR CSP is typically aligned with the AFFOR staff, with the air operations center (AOC) in support. Although elements of the AFFOR staff may take lead for various parts of the planning and execution cycle, the steady state requires coordinated effort by the entire component staff. As in contingency planning, the transition from steady-state planning, typically led by the AFFOR/A5, to steady-state execution, typically led by the AFFOR/A3, should be clearly defined, documented as a key staff process, and closely followed.

The COMAFFOR CSP and country plans are unlike other deliberate plans in that they normally transition into execution. As such, the key constraint on the execution of the plan is the availability of resources—forces, funding, authorities, time, effort, etc. This is arguably the most significant difference between steady-state and contingency planning. Without addressing resource procurement, funding, and so on, steady-state tactical-level operations (and thus the achievement of desired effects) in support of the COMAFFOR CSP are not possible.

Another steady-state planning consideration, closely related to resources, is the need to take a multi-year approach to planning, execution, and assessment. By aligning the steady-state planning cycle with Department of Defense (DOD) and Air Force institutional processes for resource allocation (e.g., program objective memorandum development), Air Force planners acknowledge the vital linkage between steady-state operations and resources.

All plans developed in the steady state are considered deliberate plans, only one of which addresses crisis or contingency operations. The Air Force's Service component plan serves this need, summarizing the Air Force component's support to the CCDR's overarching operation plan (OPLAN) or concept plan (CONPLAN). Whereas the

AFFOR/A5 often takes the lead in the development of deliberate Service component plans, expertise from the AOC may be necessary for its development.

Steady-state plans are normally developed using an effects-based approach, ensuring planned steady-state operations support COMAFFOR-established strategy, objectives, effects, and tasks. Geographic or functional objectives at the operational level are the centerpiece of these plans, enabling all subordinate planning and assessment. Objectives should be specific, measurable, achievable, relevant, results-oriented, and time-bound.

The Air Force CSP supports the Service's overall Title 10 responsibility to organize, train, and equip Air Force forces for employment by combatant commands. As such, this plan's primary value is to articulate a steady-state demand signal to sequentially inform institutional force planning, capabilities development, and resource allocation.

Steady-state planning products:

- ✦ COMAFFOR CSP. The COMAFFOR CSP is an operations plan at the theater-strategic level, summarizing steady-state, component-specific operations in support of CCDR campaign plans. The COMAFFOR CSP may include activities related to the component responsibility to organize, train, equip, and sustain Air Force forces. The COMAFFOR CSP operationalizes the COMAFFOR strategy.
- ✦ COMAFFOR Country Plans. The COMAFFOR country plan is a theater security cooperation plan at the operational level that aligns with the CCDR's country plan and nests under the COMAFFOR CSP. Country plans focus on achieving country-specific objectives related to partner relationships, partner capacities and capabilities, access, and interoperability.
- ✦ Air Force Service component plan (deliberate). In the context of the steady state, the COMAFFOR Service component plan (deliberate) is an Air Force component-developed operation plan in support of a CCDR OPLAN or CONPLAN.
- ✦ Air Force CSP. The Air Force CSP is a biennial plan at the national-strategic level, summarizing Air Force steady-state operations in support of CCDR campaign plans. The Air Force CSP assessment informs Air Force force planning, capabilities development, and resource allocation.

For more specific information on how the many processes involved in steady-state planning are conducted and interrelate, see Air Force Instruction 10-421, [Operations Planning for the Steady-State](#).

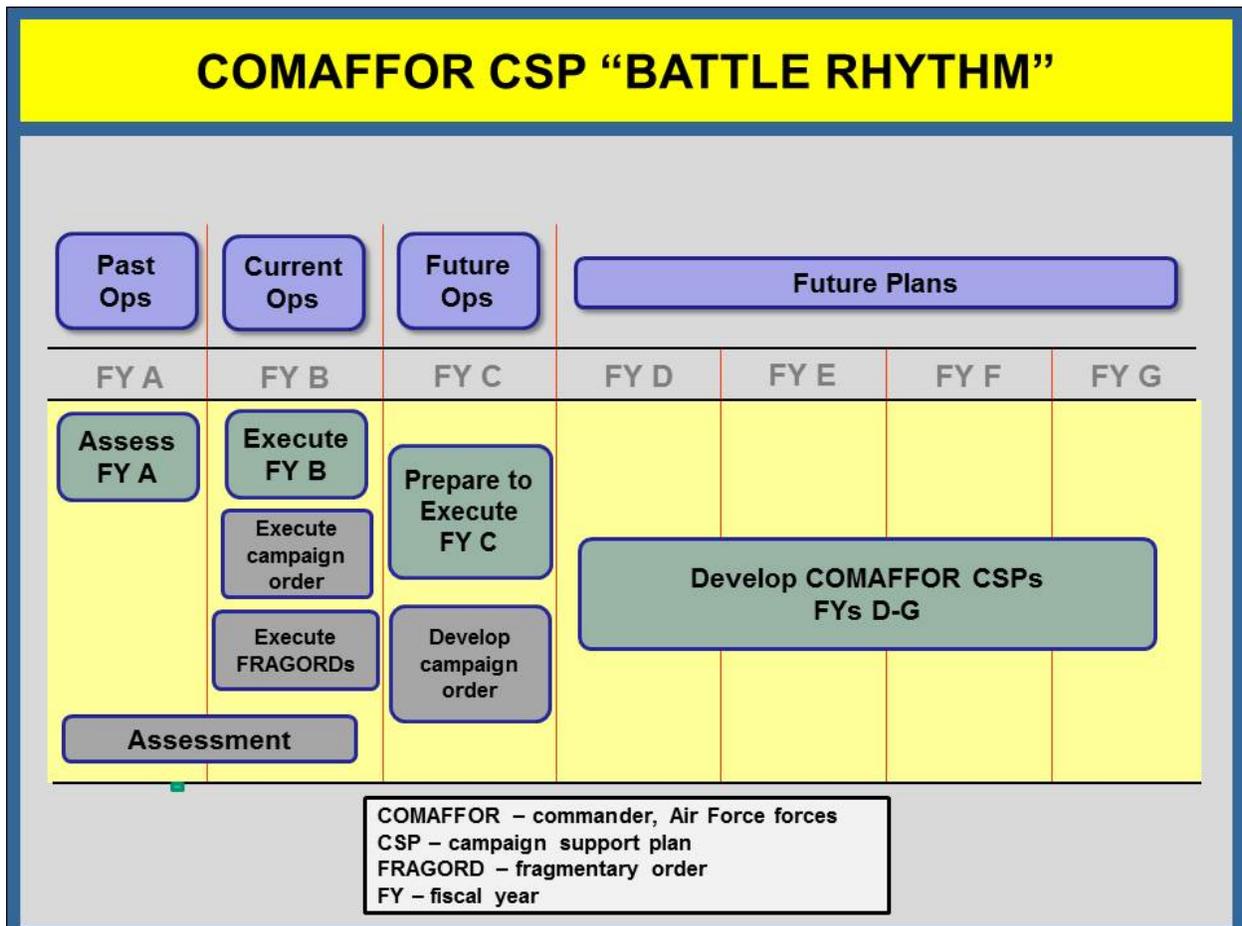


ANNEX 3-0 OPERATIONS AND PLANNING

STEADY-STATE EXECUTION

Last Updated: 04 November 2016

Just as with combatant commanders’ campaigns and country plans, the [commander, Air Force forces’](#) (COMAFFOR’s) campaign support plans (CSPs) and country plans normally transition into execution annually. Because of the multi-year nature of these plans, at least three COMAFFOR CSPs may be in various levels of a life cycle at any given time: one in development, one preparing to execute, and one being executed during the current fiscal year (FY). There may also be one or more past FYs being assessed in order to appropriately adapt COMAFFOR’s strategy. The figure, “COMAFFOR CSP ‘Battle Rhythm’ ” notionally depicts the multi-year sequence of the various steady-state plans and orders.



COMAFFOR CSP “Battle Rhythm”

This is called a “battle rhythm” in this context because it is analogous to the day-to-day battle rhythm managed by the joint force air component commander during combat or contingency operations, even though its cycles are measured in years rather than days or hours.

Execution is normally preceded by preparation activities, facilitating the formal transition from planning led by the Air Force forces (AFFOR)/A5 to execution led by the AFFOR/A3. Since execution of steady-state operations largely consists of tactical-level actions, the prepare stage also defines the interface between operational-level entities (e.g., AFFOR staff) and tactical-level units (e.g., mobility support advisor squadron, air advisors). During preparation, tactical planning occurs for the missions and activities that support the achievement of operational-level effects as defined in the COMAFFOR CSP and COMAFFOR country plans. Units prepare Airmen with training and equipment, and may conduct mission rehearsals when necessary. The final actions in the prepare stage occur at the operational-level. Resources requested in the planning stage must be received and distributed before execution can occur. Finally, the COMAFFOR authorizes mission execution with an execute order (EXORD) or a campaign order (also often known as a theater campaign order). The fragmentary order may be used to modify or amend an EXORD or campaign order.

During execution, the AFFOR/A3 staff or air operations center monitor mission execution in real time.

Steady-state execution products:

- ✦ Situation report. The situation report is a periodic, often daily, weekly, or monthly, report, summarizing tactical-level military operations and activities since the previous report.
 - ✦ Periodic updates to the COMAFFOR. Commanders receive updates on military operations through periodic briefings and reports.
-



ANNEX 3-0 OPERATIONS AND PLANNING

STEADY-STATE ASSESSMENT

Last Updated: 04 November 2016

The [assessment](#) of operations during steady-state conditions informs the commander concerning progress toward closing the gap between the [commander, Air Force forces'](#) (COMAFFOR's) security cooperation and other steady-state objectives and the associated baselines established in planning. This assessment influences COMAFFOR decision making with respect to resource allocation, prioritization, future planning guidance, future strategy revisions, interaction with partner nations, risk management, force protection, and other potential issues involving the commander and senior leadership. Operational-level assessment is informed by tactical-level assessments.

Assessment begins in planning, with the key being the establishment of objectives that adhere to "SMART" criteria (specific, measurable, achievable, relevant and results-oriented, and time-bound) in the steady-state plan. Effects describe the conditions necessary to achieve COMAFFOR objectives. Tasks describe friendly actions to create effects. Measures of effectiveness are used to assess end states (if specified), effects, and objectives. Measures of performance are used to assess the accomplishment of tasks.

Experience has shown that developing an assessment approach after the plan is complete, or while in execution, is ineffective. The development of an assessment annex to the steady-state plan is the preferred technique to support the commander's operation assessment process.

The AFFOR/A5 normally provides the COMAFFOR a comprehensive campaign support plan (CSP) assessment on a periodic basis. As the lead developer of the steady-state plans, the AFFOR/A5 is best qualified to summarize progress toward the achievement of COMAFFOR objectives, effects, and tasks associated with the CSP or country plans. The entire AFFOR staff should support the A5 in this effort.

Steady-state assessment products:

- ✦ After-action report. After-action reports summarize an entire military operation or a steady-state activity following its completion.
- ✦ Periodic operation assessment updates to the COMAFFOR. As steady-state operations are executed, the commander receives periodic updates on mission execution. These updates influence the commander's ongoing informal assessment of steady-state operations.

- ✦ COMAFFOR CSP operation assessment. On a recurring, predictable schedule, the commander requires a formal assessment of plan execution. The AFFOR staff presents its analysis of progress toward the accomplishment of plan objectives; however, only the commander can make the final assessment. The formal assessment results in COMAFFOR decisions related to future steady-state operations.
 - ✦ COMAFFOR country plan operation assessments. Country plans are typically assessed at a level below the COMAFFOR, but these assessments may inform the COMAFFOR CSP assessment.
 - ✦ Tactical-level (mission, event, etc.) operation assessments. Operation assessment, as a bottom-up process, initiates with tactical-level assessments. Mission, events, and activities at the tactical level are assessed conceptually in the same way as operational-level plans. These assessments help determine progress toward the achievement of tactical-level objectives, effects, and tasks. Tactical-level assessments inform operational-level assessments, which, in turn, inform strategic-level assessments.
-



ANNEX 3-0 OPERATIONS AND PLANNING

**OPERATIONS DURING CONTINGENCIES AND CRISES:
GENERAL CONSIDERATIONS**

Last Updated: 04 November 2016

While a common operations framework covers many considerations common to steady-state and contingency conditions, a number of processes are used specifically to design, plan, execute, and assess contingencies, crisis responses, and major operations. These processes address the shorter timeframes and resource constraints associated with contingencies. The processes governing operations during steady-state conditions have evolved comparatively recently; the processes used to plan and execute contingency and crisis operations have been around for quite some time. Nonetheless, it is useful to think of contingencies as logical extensions of and branches to ongoing, steady-state strategies.

In an ideal world, all potential contingencies could be anticipated and branch plans could be developed to deal with them. In the real world, unanticipated events occur and adversaries make unexpected moves, and so military decision-making processes have evolved that deal flexibly with crises, allowing commanders and their staffs to rapidly adapt existing plans to meet unexpected situations.

In general, Air Force personnel design contingency operations using the principles of the common operational framework. They then plan for contingencies using the [joint operation planning process](#); specifically, they use the [joint operation planning process for air](#) to produce an air operations plan for the [commander, Air Force forces](#) (COMAFFOR), who is normally dual-hatted as the [joint force air component commander](#) (JFACC). During execution, the COMAFFOR/JFACC uses a tasking cycle to carry out plans and manage the iterative, ongoing operational tempo and “battle rhythm.” The tasking cycle creates a repeated (often daily) articulation of the overall airpower strategy and planning efforts. The tasking cycle is also the process whereby the commander and planners can connect their plans’ aims to specific tactical-level actions, unit missions, and specific targets. Assessment is conducted both during and after execution. During operations, tactical-level assessment helps evaluate battle damage and generate re-attack recommendations. At the operational level, ongoing assessment uses measures of effectiveness to determine whether desired effects are being created and objectives are being achieved. Broadly speaking, however, assessment concepts and methods are generally applicable and fit within the common operations framework.

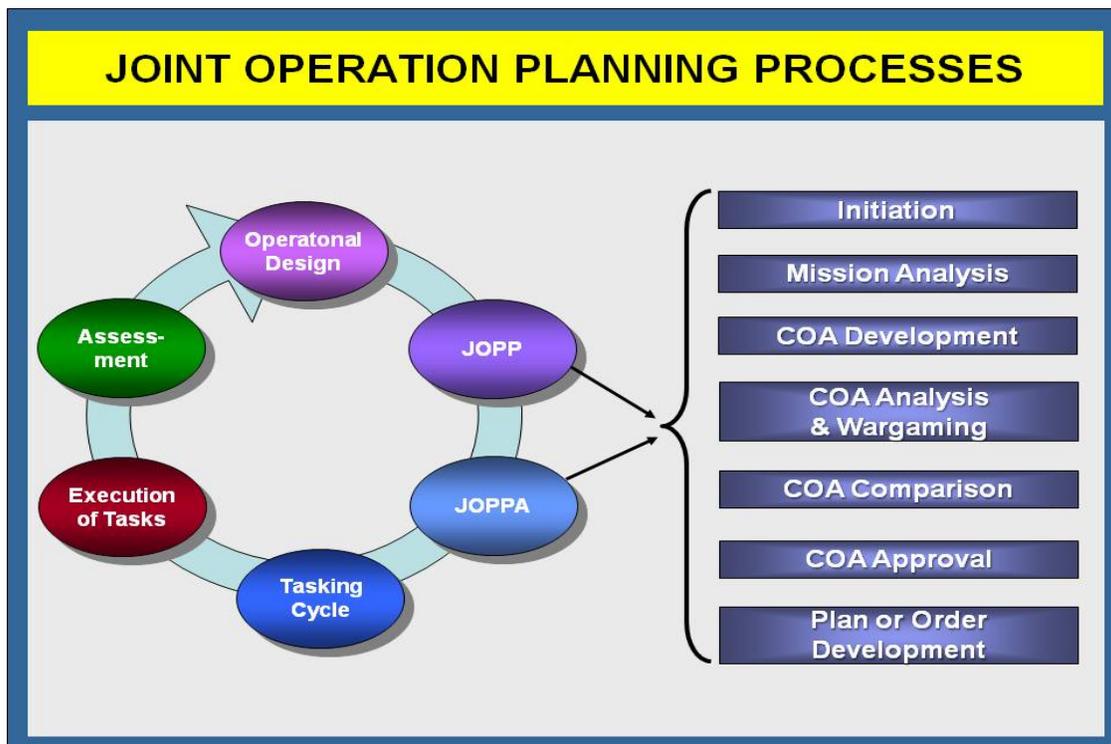


ANNEX 3-0 OPERATIONS AND PLANNING

THE JOINT OPERATION PLANNING PROCESS FOR AIR

Last Updated: 04 November 2016

The Air Force creates plans for contingencies and other operations using the process known as the [joint operation planning process for air](#) (JOPPA). The JOPPA is a seven-step process that essentially recapitulates the [joint operation planning process](#) (JOPP) at the component level. It culminates in the production of the [joint air operations plan](#) (JAOP) or a Service component plan, as well as supporting plans and orders. The JOPPA is the process by which [commanders, Air Force forces](#) (COMAFFORs) and their staffs create the detailed plans they require to effectively employ airpower, including the JAOP, [operation orders](#) (OPORDs), and others. Since the COMAFFOR is normally also the [joint force air component commander](#) (JFACC), the JOPPA is also the joint force air component's equivalent of the [joint force commander's](#) (JFC's) JOPP and can be performed in parallel with it.



Joint Operation Planning Processes

If the COMAFFOR anticipates the need for such planning, he or she may direct preparations before formal tasking is received. The JOPPA produces the JAOP and the COMAFFOR's component plan, and, as part of an ongoing [battle rhythm](#), the guidance

that helps create the [air operations directive](#), which guides the tasking cycle through its iterative execution. The JOPPA may also be used to produce required supporting plans and concepts, such as a long-range phased air targeting scheme (PATS), an [area air defense plan](#), an [airspace control plan](#), operation orders required by the COMAFFOR's staff, and others. The JOPP and JOPPA consist of seven steps each, as depicted in the figure, "Joint Operation Planning Processes." Each of the stages is discussed below.

The component's senior strategists and other select members of the staff should interact frequently with their counterparts on the JFC's staff, to develop mutual professional confidence. These habitual relationships facilitate air strategists being asked to join the JFC's [joint planning group](#) (JPG) (or like body) to help create the JFC's operation plan and operation order (and other plans and orders, as required). They should review currently available forces and determine what, if any, additional forces or capabilities may be required and where all forces should be located. When these strategists return to the [air operations center's](#) (AOC's) strategy division (SRD) and strategy plans team, they should then repeat the process, as the JOPPA, for their component command, producing the JAOP and the COMAFFOR's component plan. If they have secure means prior to departing JFC's JPG, they may also communicate planning requirements directly to appropriately cleared planners at the AOC, in order to begin time-consuming preparations at once. Inside the AOC, the SRD staff often leads operational-level planning, but is supported by other COMAFFOR and AOC staff elements.

INITIATION

Planning begins when an appropriate authority recognizes a potential need to employ military capabilities in response to a probable or actual crisis and initiates [strategy](#) development and [operational design](#). At the strategic level, the initiating authority is national leadership—the President, [Secretary of Defense](#), and Chairman of the Joint Chiefs of Staff. Below the national strategic level, that authority is usually a JFC ([combatant commander](#) [CCDR] or [joint task force](#) commander). Formal tasking is usually communicated through a planning order. At any level, however, a commander may deem it prudent to begin planning for a contingency when, in the commander's judgment, the situation warrants it.

Airpower strategists may have already been through several rounds of concept formation as part of operational design conducted when the JFC initiates formal planning. Operational design may be a precursor to detailed planning and may help determine if military power is a suitable instrument for dealing with the problem or set of problems that national leaders wish solved. Operational design focuses on framing ill-structured problems in general terms, while the JOPP and JOPPA focus on solving medium- to well-structured problems in more specific terms.

It is vital for Airmen to become involved in the planning process at the JFC-level as soon as possible to understand the JFC's design concept and ensure the capabilities of airpower are properly represented, integrated, and employed.

MISSION ANALYSIS

The primary purpose of mission analysis is to understand the problem at hand, the purpose of the operation, and to issue appropriate commander's guidance to focus the

planning process. Mission analysis may already have been accomplished as part of operational design, but there is significant value in conducting an “airminded” mission analysis in dialogue with the commander and AOC strategists, reviewing the products or reiterating the process of framing the problem “the plan” is intended to solve.

At the outset of mission analysis, the planning staff needs to fully understand the situation, what products have been assigned to which organizations to accomplish, all higher level guidance bearing on the problem, the explicit task, to which offices the products will be delivered, the formats expected, resources available, and available time. If any of this information is not available, mission analysis should still proceed using sound judgment until clear answers are available.

The commander’s mission and intent statements should be created in this step of the process if they have not already been created during earlier design effort. These statements should include the [military end state](#) and the elements of it that the COMAFFOR/JFACC is tasked to deliver. If the problem the plan is intended to solve is not adequately framed, then the commander responsible for planning (e.g., the JFACC for the JOPPA) should prepare an initial framing of the problem and present this up the chain of command—requesting higher-level leaders, like the JFC or combatant commander, elevate the matter further if necessary, to the level of national leadership to ensure planning products address what is needed.

Key inputs to this step include higher headquarters planning directives and other strategic guidance, initial staff estimates (if they exist), and [joint intelligence preparation of the operational environment](#) (JIPOE). JIPOE should be initiated in this step, if it has not been previously. The value of JIPOE products is directly tied to the intelligence and information needs stated by commanders and their planning staffs. In some cases, JIPOE may require that information, surveillance, and reconnaissance assets be brought into an operational area long in advance of operations, which requires prior coordination and planning. See Joint Publication (JP) 2-01.3, *Joint Intelligence Preparation of the Operational Environment*, for more guidance on JIPOE.

As a result of this step, the commander and staff should be able to:

- ✦ Assemble facts and assumptions about the operation.
- ✦ Analyze higher headquarters [mission](#) and [intent](#).
- ✦ Determine operational limitations.
- ✦ Analyze [centers of gravity](#)¹ (COGs) (adversary and friendly) to determine critical requirements and vulnerabilities.
- ✦ Determine potential [decisive points](#) (DPs) that contribute to affecting the COGs (to the extent possible before detailed planning is conducted).
- ✦ Delineate basic lines of effort (LOEs), as part of the overarching operational approach, if not already accomplished.
- ✦ Establish specified, implied, and essential tasks.

¹ For a detailed discussion of COGs, also see [JP 5-0, Chap. III](#).

- ✦ Conduct initial force structure analysis.
- ✦ Prepare a mission analysis brief and initial staff estimates.
- ✦ Publish the commander's planning guidance.

COURSE OF ACTION DEVELOPMENT

A [course of action](#) (COA) consists of the following information: what type of action should occur; why the action is required; who will take the action; and the expected outcomes. A valid COA is one that is:

- ✦ **Adequate**—Can accomplish (or appropriately support) the JFC's mission within given commanders' guidance.
- ✦ **Feasible**—Can accomplish the mission within the established time, space, and resource limitations.
- ✦ **Acceptable (balanced)**—Should balance cost and risk with the advantage gained and maintained.
- ✦ **Distinguishable**—Should be sufficiently different from other COAs.
- ✦ **Complete**—Should incorporate [objectives](#), [effects](#), and [tasks](#) to be performed; major forces required; concepts for deployment, employment, and sustainment; time estimates for achieving objectives; mission success criteria; and end state. It may also delineate appropriate trigger points for pre-planned branches and sequels.

Normally, strategists and other Airmen should have influenced the JFC's COA selection process. If this is so, both the COMAFFOR's and JFACC's staffs should be well informed to begin mission analysis for required supporting plan(s).

COA ANALYSIS AND [WARGAMING](#)

COA analysis should identify the advantages of each proposed friendly COA on its own merits; COAs are not compared with each other in this step. This analysis should reveal or elaborate upon a number of factors, including (but not limited to):

- ✦ DPs (validating them and showing how they are organized into lines of effort).
- ✦ Required task organization adjustments.
- ✦ Data for use in an appropriate COA comparison and wargaming tools.
- ✦ Identification of plan branches and sequels.
- ✦ Identification of potential high-value, high-payoff, and JFC time-sensitive targets.
- ✦ A risk assessment and potential risk mitigation (including probable opportunity costs).
- ✦ COA advantages and disadvantages.
- ✦ Recommended [commander's critical information requirements](#).

- ✦ Determine additional information requirements.

Wargaming provides a means for the commander and staff to analyze COAs in light of the adversary's possible countermoves, improve their understanding of the operational environment, and obtain insights they may not have otherwise gained. Based on time available, at a minimum, the commander should wargame each COA against the most probable and most dangerous adversary COAs identified through JIPOE. Wargaming is a conscious attempt to consider actions, reactions, and counteractions in order to visualize the flow of an operation. Every effort should be taken to avoid “mirror imaging” the adversary's intentions, capabilities, and decision-making. COA evaluation should be a disciplined and imaginative process based on JIPOE. Wargaming may also highlight plan, information, or resource shortfalls, generating branch and sequel planning requirements, requests for information, requests for forces, and refinements to COAs, time permitting.

Wargaming is part of [operational art](#), not science. It can be as simple as a table-top discussion or a narrative that describes probable actions and counteractions, as well as the assets and time used. It may be as complex as dedicated computer-aided modeling and simulation.² If the commander has determined evaluation criteria, he or she should reveal these to the staff as soon as possible. Wargaming may provide a number of potential COA evaluation criteria that the staff may select from during the subsequent COA comparison stage of planning. Such criteria may also help focus the wargaming effort and provide a framework for data collection by the staff, thus aiding both situational understanding and the COA comparison and selection processes that follow wargaming.³

Commanders should consider establishing a team dedicated to pursuing the adversary's point of view (commonly referred to as “[red teaming](#)”). This “red team” should role-play the adversary commander and staff, developing plausible and most-dangerous enemy courses of action (ECOAs). This requires detailed understanding of the adversary air and air defense practices (usually from tactics analysis team members) and operator expertise. Intelligence analysis usually limits its reporting to observed and reliably reported practices, but red teams should anticipate the actions of an active adversary, committed to fighting effectively, possibly in unforeseen ways. Red teams need isolation from planners to develop initial ECOAs with independent thought. Once ECOAs are developed, their insights during wargaming can provide valuable feedback to the friendly COA development team. The red team, in whole or part, can be delegated to the JFC's JPG or like body to assist the JOPP at the JFC's level. If done properly, this should be a continuous process. The COMAFFOR, JFACC, and their staffs may also find wargaming useful during JOPPA, since air, space, and cyberspace forces may face substantially different obstacles than other elements of the joint force.

COA COMPARISON

COA comparison is a process where wargamed COAs are evaluated and compared against a set of criteria established by the staff and commander. This process should be as objective as possible, but this is art, not science, and some degree of subjectivity is

² See JP 5-0, [Joint Operation Planning, Chapter IV](#), for sample wargaming steps.

³ See [JP 5-0, Chapter IV](#), for a detailed discussion of selecting evaluation criteria. Airmen should note, as they review the JP 5-0 discussion, that some techniques mentioned therein, such as using geographical sketches of maneuvers, may not be well suited for conveying the contributions of airpower and thus will have to be modified—or new methods explored—in order to convey the Airman's perspective.

often unavoidable. Having a “red cell” examine prospective COAs during and after wargaming may help mitigate subjective elements.

The commander and staff should develop and evaluate a set of important criteria or governing factors against which to evaluate COAs. Risks to forces and risks to mission should always be considered as evaluation criteria. Elements of operational design (e.g., integration, synergy, timing, and tempo) operational limits, and principles of joint operations⁴ are good sources of other potential COA comparison criteria. COAs should be weighed against these criteria, advantages and disadvantages should be considered and efforts made to overcome disadvantages, reviews of feasibility and acceptability should be made, and relative merits should be evaluated. This process should yield a COA that supports the JFC’s objectives and:

- ✦ Obtains the highest probability of success and enduring advantage.
- ✦ Minimizes risk to the force and mission.
- ✦ Places the force in the best posture for future operations.
- ✦ Provides the flexibility to meet unexpected threats and opportunities.

COA APPROVAL

The staff should determine the best COA to recommend to the commander. The recommendation should take the form of a commander’s estimate document or briefing. This document or briefing should include the commander’s intent—for the airpower component, the JFC, and US national leadership, including the military and strategic end states. The commander selects a COA or forms an alternate COA based upon staff recommendations and commander’s personal estimate, experience, and judgment. Branches and sequels that the staff considers most likely or most dangerous may be reviewed and approved as part of this process as well. The approved COA is then developed into the appropriate plan or order.

PLAN OR ORDER DEVELOPMENT

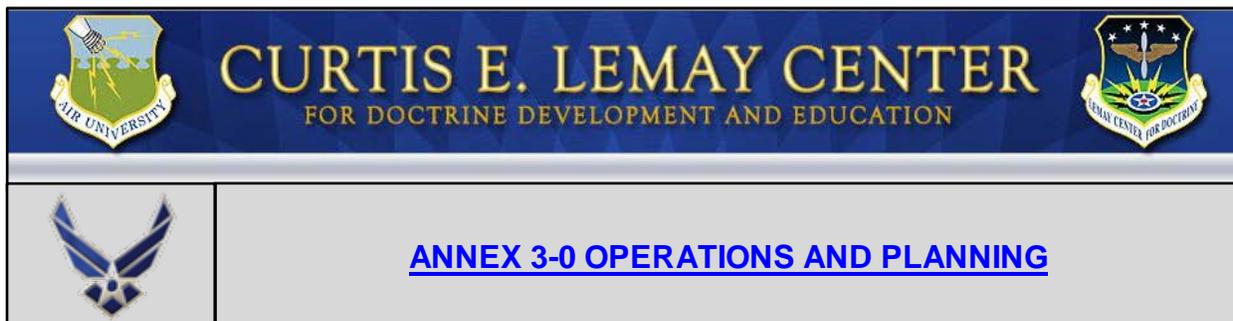
Deliberate planning results in plan development (e.g., an OPLAN, contingency plan, or [commander’s estimate](#)); [crisis action planning](#) typically leads to OPORD development; and the JOPPA yields a JAOP and the COMAFFOR’s component plan, often a long-range PATS, and possibly other products. During plan or order development the commander and staff in collaboration with subordinate and collaborating organizations, expand the approved COA into a detailed plan. The detailed plan:

- ✦ States (or restates) the commander’s mission and intent.
- ✦ Describes the central approach the commander intends to take to accomplish the mission.
- ✦ Provides for the application, integration, sequencing, and synchronization of forces and capabilities in time, space, and purpose (including interagency, multinational, and non-governmental organizations), often through development of LOEs.

⁴ See JP 3-0, [Joint Operations. Appendix A](#).

- ✦ Describes when, where, and under what conditions any supported commander intends to conduct or refuse combat, as required.
- ✦ Focuses on adversary and friendly COGs and their associated critical vulnerabilities.
- ✦ Avoids discernable patterns and makes full use of ambiguity and deception.
- ✦ Provides for controlling the tempo of operations.
- ✦ Visualizes the campaign or operation in terms of the forces and functions involved.
- ✦ Relates the assigned operational objectives, identified tactical objectives and desired tactical effects to the JFC's campaign plan and to other organizations' schemes as necessary; this enables the subsequent development of detailed schemes of maneuver and tactical tasks, and support requests to supporting commanders.

As part of the process, the AOC staff may develop a PATS. This plan is valuable to the JFC, COMAFFOR, JFACC, and other component commanders, enabling them to understand the weight of effort required to accomplish objectives by phase. This information flows from the JOPPA and should be recorded in a standardized plan format.



SERVICE COMPONENT PLANNING DURING CONTINGENCIES

Last Updated: 04 November 2016

There are three types of Service [component](#) plans that concern Air Force commanders and their staffs at the operational- and tactical-levels:

- ✦ Deliberate plans supporting ongoing, steady-state campaigns.
- ✦ Deliberate plans supporting plans for a particular contingency.
- ✦ Crisis action plans and orders supporting an imminent contingency.

The first type is deliberate planning performed in support of the [combatant commander's](#) (CCDR) steady-state campaign plan. Air Force component planners, in turn, develop [campaign support plans](#) (CSP) and country plans that operationalize the [commander, Air Force forces'](#) (COMAFFOR's) theater or functional [strategy](#) in addition to supporting the CCDR's campaign plan. The second type is deliberate planning performed in support of a CCDR's operation plan (OPLAN) or concept plan (CONPLAN) for a contingency. The third type is crisis action planning performed in a contingency in support of a [joint force commander](#) (JFC) and, when applicable, a [joint force air component commander](#) (JFACC). A component-developed Air Force Service component plan is used to support both the second and third plan types. When a JFACC and associated joint air operations center (JAOC) are designated and active, the component-developed Air Force Service component plan supports the JFACC's joint air operations plan. When time available for planning is constrained, crisis action planning may produce an operation order (OPORD) rather than Air Force Service component plan.

How these plans are developed is significantly influenced by two distinct responsibilities of the COMAFFOR: operational and administrative. The operational side reflects the COMAFFOR's role as a Service component commander to a CCDR or other JFC with assigned responsibility to achieve operational objectives, effects, and tasks associated with the JFC's operations plan. This operational responsibility applies to the first plan type (deliberate steady-state), second plan type (deliberate contingency), and may apply for the third plan type (crisis action contingency). When a JFACC and JAOC are designated for crisis action contingency (as is normally the case, but not required), the operational hat is worn by the COMAFFOR in his role as the JFACC. The administrative side reflects the COMAFFOR's Service-specific responsibility to organize, train, equip, and sustain Air Force forces assigned or attached to a CCDR or other JFC. This incorporates the COMAFFOR's administrative control responsibility, and **always** resides with the COMAFFOR.

The Air Force component manages the three plan types differently on behalf of the COMAFFOR. The AFFOR staff (normally led by the A5) has lead planning responsibility for the first and second plan types, producing a single integrated component plan (CSP for steady-state and an Air Force Service component plan for a deliberate contingency). This plan reflects both operational and administrative roles. For the third plan type without a JFACC designated, the AOC (normally led by the strategy division) has lead responsibility for the operational aspects of the plan while the AFFOR staff has lead responsibility for administrative support to the plan. Despite the division of responsibility within the component, a single integrated Air Force Service component plan is developed for the COMAFFOR. For the third plan type with a JFACC designated, the JAOC strategy division has lead responsibility for the operational aspects of the plan and the AFFOR staff still has lead responsibility for administrative support to the plan. In this case, two separate, but integrated, plans are developed. The JAOC develops a joint air operations plan and the AFFOR staff develops an Air Force Service component plan in support. Service component planning, both operational and administrative, should be tightly integrated with planning conducted by the combatant command or joint task force. Once a [course of action](#) (COA) is selected through the [joint operation planning process](#) for a particular planning requirement, the CCDR or other JFC normally develop a campaign plan, OPLAN, CONPLAN, or OPORD that describes the COA and tasks supporting commanders to implement the approved COA effectively. The primary purpose of the CCDR/JFC plan is to articulate commander's intent and an operational approach, and provide guidance and direction to subordinate units. Air Force component planners may deploy to the JFC's staff to provide expertise during the COA development process, in order to help shape the COA from a Service component perspective. In some cases, Air Force component planning will run concurrent with combatant command/joint task force planning, further emphasizing the importance of transparency, clear understanding of commander's intent, and good communications during the planning process.



[ANNEX 3-0 OPERATIONS AND PLANNING](#)

CONTINGENCY AND CRISIS EXECUTION: THE TASKING CYCLE

Last Updated: 04 November 2016

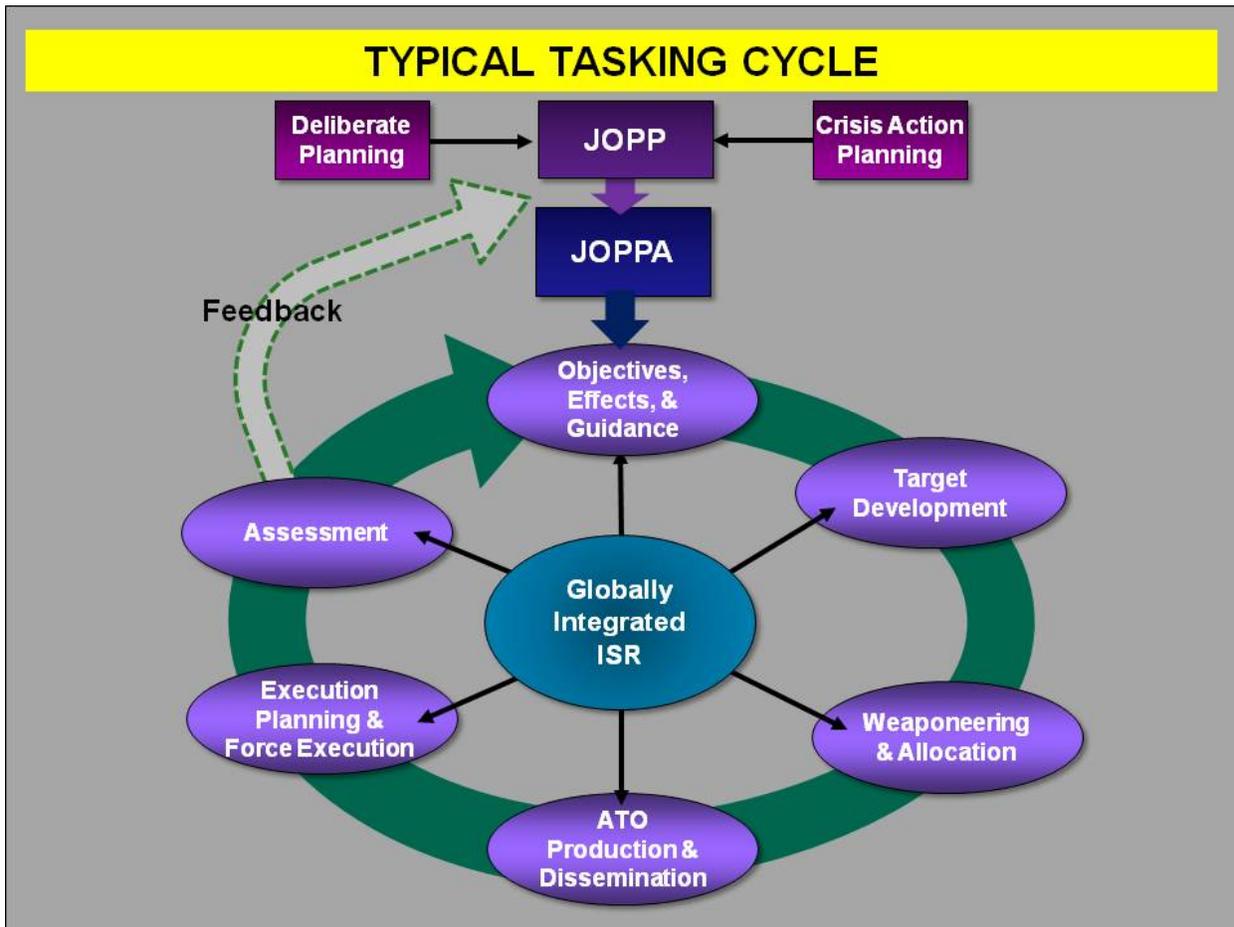
Many Air Force operations are executed by means of a tasking cycle. The cycle is used with some modifications for tasking operations in the air, space, and cyberspace and is the heart of the Air Force commander's [battle rhythm](#). Once execution begins, the commander continues to guide and influence operations through the [air operations directive](#) (and, in some cases, equivalent space and [cyberspace](#) operations directives).

The tasking cycle creates a daily articulation of the overall airpower [strategy](#) and planning efforts. The tasking cycle is the means [Airmen](#) use to accomplish [deliberate](#) and [dynamic targeting](#), among other requirements.¹ The following discussion touches on targeting only as it relates to the tasking cycle and other aspects of an ongoing rhythm of operations. Conceptually, the tasking cycle—its people, processes, and products—forms the connecting link that transitions most airpower planning from the operational to the tactical level.

The tasking cycle develops the products needed to build and execute an [air tasking order](#) (ATO) and related products, and accomplish [assessment](#). Although it is presented below as six separate, sequential stages, in reality **the tasking process is iterative, multidimensional, and sometimes executed in parallel**. It is built on a foundation based on thorough [joint intelligence preparation of the operational environment](#). The cycle typically consists of the following stages performed at various levels of command (illustrated in the figure, "Typical Tasking Cycle"):

- ✦ Assigning [objectives](#), [effects](#), and guidance.
- ✦ [Target development](#).
- ✦ [Weaponeering and allocation](#).
- ✦ ATO production and dissemination.
- ✦ Execution planning and force execution.
- ✦ Assessment.

¹ For further details on the targeting process, see Annex 3-60, [Targeting](#), and Joint Publication (JP) 3-60, *Joint Targeting*.



Typical Tasking Cycle

*Targeting and ATO production are essential to the tasking cycle. The tasking cycle encompasses the entire process of taking [commanders' intent](#) and guidance, determining when and where to apply force or other actions to fulfill that intent. It matches available capabilities and forces with targets (integrating this effort with the ongoing targeting cycle); puts this information into an integrated, synchronized, and coordinated order; distributes that order to all users; monitors execution of the order to adapt to changes in the operational environment; and assesses the results of that execution. The cycle is built around finite time periods that are required to plan, integrate and coordinate, prepare for, conduct, and assess operations in air, space, and cyberspace. These time periods may vary from theater to theater and much targeting effort may not be bound specifically to the cycle's timeframe, but *the tasking cycle and its constituent processes drive the [air operations center's](#) (AOC's) battle rhythm and thus help determine deadlines and milestones for related processes, including targeting.**

A principal purpose of the tasking cycle is to produce orders and supporting documentation that places an effective array of capabilities in a position to create desired effects in support of joint force objectives. This cycle is driven by the constraints of time and distance. For example, it takes time for ground crews to prepare aircraft for flight, for aircrews to plan missions, and for those crews to fly to the immediate area of operations from distant airfields. 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 that allows commanders to plan for upcoming operations.

The ATO (usually 24 hours in duration) and the process that develops it (usually 44-96 hours in duration) are a direct consequence of these physical constraints.

The ATO articulates tasking for joint air, space, and cyberspace operations (unless there are separate space and cyberspace tasking orders) for a specific period, 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 actual length of the tasking cycle may vary from theater to theater. Length should be based upon [joint force commander](#) (JFC) guidance, the [commander, Air Force forces'](#) (COMAFFOR's) direction, and theater needs. The length should be specified in theater standard operating procedures or other directives. If the length is modified for a particular [contingency](#), this should be specified in the JFC's [operation plan](#) or [operation order](#), in the [joint air operations plan](#), or the COMAFFOR's component plan. The key to both the flexibility and versatility of the tasking process (and both deliberate and dynamic targeting and collection) is a shared understanding among the functional components of anticipated operations in all domains during the period the relevant orders and directives cover. Misperceptions may arise because other components may not have visibility on the wide variety of missions tasked to the COMAFFOR in support of the JFC's objectives and because airpower assets are often tasked to simultaneously conduct missions supporting overlapping operational phases. This shared understanding is largely accomplished by ensuring component liaisons are properly positioned during planning and execution.²

In contrast to the misperception that tasking requests must be provided to the (AOC) 72-96 hours in advance to allow targets to be struck by air assets, targets can actually be struck in minutes from when information is made available as part of the dynamic targeting process. Dynamic targeting takes place during the execution planning and force execution stage of the tasking cycle, which commonly corresponds to the mission planning and execution stage of the joint targeting process. Dynamic targeting uses the same basic six steps that apply to all targeting: Find, fix, track, target, engage, and assess (often referred to as F2T2EA), but it occurs in a much more compressed timeline. In dynamic targeting, F2T2EA provides a proven method of directing appropriate action against targets that are in some nature fleeting, emerging, or otherwise "time-sensitive." Dynamic targeting engagements transition from receipt of intelligence ("trigger events"), through target resolution, to action against the target.³ Additionally, [intelligence, surveillance, and reconnaissance](#) (ISR) assets can collect against *ad hoc* targets via the dynamic collection process through coordination with the senior intelligence duty officer and the ISR division in the AOC.

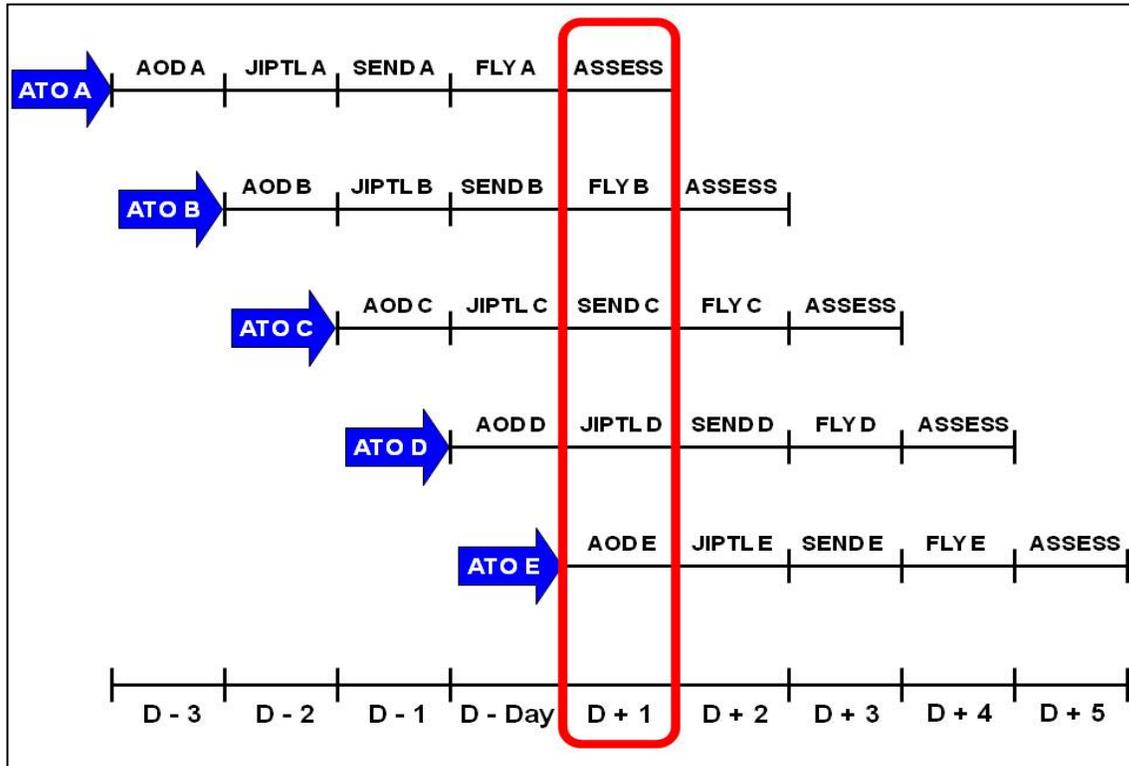
The net result of the tasking cycle is that there are usually at least five ATOs in various stages of progress at any one time (illustrated in the figure, "Notional AOC Battle Rhythm with Multiple ATOs").

- ✪ At least one ATO undergoing assessment at various levels—Note: due to time lags in gathering and interpreting data from multiple sources, assessment of a given ATO usually occurs over many days.

² See Air Force Tactics, Techniques, and Procedures (AFTTP) 3-3.AOC, *Operational Employment-Air Operations Center*, for descriptions of the AOC's other Service and functional component liaisons.

³ See [Annex 3-60](#) and JP 3-60, for additional information on deliberate and dynamic targeting, and their relation to the larger context of the tasking cycle.

- ★ One currently being executed.
- ★ One in production.
- ★ One in detailed planning (target development and weaponeering).
- ★ One in the strategy development (objectives and guidance) stage.



Notional AOC Battle Rhythm with Multiple ATOs

Some assets may not operate within the established cycle. These include most space assets, which are tasked via the space tasking order, although some theater-specific space operations will probably be included in the daily ATO for the sake of situational awareness/understanding, integration, and synchronization. Special operations most often operate within the dynamic targeting process. Many [information operations](#) (IO), cyberspace, and intertheater air mobility assets operate within a different cycle as well, and it is critical for AOC planners to include [special operations forces](#), IO, cyberspace, and mobility personnel who can assist with targeting and tasking these capabilities. 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 slices of time. Also, dynamic targeting and collection take place within a much more time-constrained framework.

The AOC's combat planners work closely with the [air mobility division](#) to integrate intertheater mobility into the ATO. Some long-range combat assets based outside the [area of responsibility](#), but operating within the [joint operations area](#), may be airborne on a tasked mission before the ATO that covers their weapons' times over target is published. These assets require the most current draft ATO information and all updates that affect their missions. Other missions that are not under the COMAFFOR's control

may be included in the ATO to provide visibility and assist coordination and deconfliction.

The tasking cycle supports every part of the [joint operation planning process](#) and the [JOPP for air](#), as well as the joint targeting cycle, and is interwoven throughout these other processes up to and including execution planning and force execution. Effective management of the tasking cycle comes at a high cost in terms of the volume and flow of information. Targeting and adversary (or “red”) assessment, which are integrally related, impose a very large collection burden the joint force carries—to support deliberate targeting efforts before, dynamic targeting efforts during, and assessment during and after force execution. Successful execution requires in-depth information on such things as enemy force posture, capabilities, and movement; target vulnerability; enemy leadership’s intentions, habits, and movement practices, and the patterns of enemy behavior. Assessment of friendly capabilities is also critical, and includes feedback on Air Force, joint, and coalition component efforts and capabilities needed for tasking cycle planning and decision-making. The process also takes into account such things as friendly objectives, [concept of operations](#), [rules of engagement](#), target time constraints, and friendly force capabilities.



ANNEX 3-0 OPERATIONS AND PLANNING

**CONTINGENCY AND CRISIS EXECUTION:
TASKING CYCLE STAGES**

Last Updated: 04 November 2016

OBJECTIVES, EFFECTS, AND GUIDANCE

Purpose. This stage starts with guidance from the [joint force commander](#) (JFC) to the joint force [components](#). The JFC consults with the component commanders, decides on modifications to their schemes of maneuver, and issues guidance and intent. The overarching purpose of this stage is to *integrate* (not just synchronize and coordinate) component efforts at the [operational](#), scheme-of-maneuver level.

During this stage, the [joint force air component commander](#) (JFACC) also issues further guidance on the specific scheme of maneuver. Other broad guidance that may direct operations include the [rules of engagement](#) (ROE) (determined or reviewed as part of [strategy](#) creation or mission analysis), standing rules for the use of force (the equivalent of ROE often used in homeland operations), and the [special instructions](#) (SPINS) issued with individual tasking and control orders.

This is also the stage during which the JFACC recommends the apportionment of total expected effort that should be devoted to the various airpower operations for a given period of time (often expressed by priority of objectives). Once the JFC approves this recommendation, this apportionment decision is translated to the [air operations center](#) (AOC) by means of the [air operations directive](#) (AOD).

The JFC should delegate authority to conduct execution planning, coordination, and deconfliction associated with joint air operations to the JFACC and should ensure this process is a joint effort. The [commander, Air Force forces](#) (COMAFFOR), normally also the JFACC, should possess a sufficient [command and control](#) (C2) infrastructure, adequate facilities, readily available joint planning expertise, and a mechanism for accomplishing [targeting](#), [weaponneering](#), and [assessment](#). The AOC provides the COMAFFOR with these capabilities.

This stage is also where effects and their accompanying assessment [measures and indicators](#) are determined during planning. The AOC strategy division (SRD) works closely with the targeting effects team (TET), (formerly known as the guidance, apportionment, and targeting team) and the [intelligence, surveillance, and reconnaissance](#) (ISR) division to determine effects that achieve the stated objectives, select appropriate measures, and indicators for assessment, if not already accomplished, and determine ISR requirements to collect against them. Other

components also contribute [allocation](#) requests. Results of this effort may be published as lists of tasks or desired effects in the AOD.

Integration of the air component's scheme of maneuver with those of other components is often done through the efforts of a [joint targeting coordination board](#) (JTCB), which is a forum where all components can articulate strategies and priorities for future operations to ensure that they are integrated and synchronized. The JTCB is not part of the tasking cycle *per se*, but is a concurrent process closely related to the tasking cycle's opening stages. It begins during the objectives, effects, and guidance phase by reviewing operational-level guidance and assessing progress toward objectives, but may continue through the [target development](#) stage, since part of its charter is to review and submit coordinated [joint integrated prioritized target list](#) (JIPTL), as well as integrated and prioritized [intelligence collection](#) requirements.¹ The JTCB's operational-level "front-end" functions may be performed by a joint coordination board (JCB), or like body, which handles [operational](#), scheme-of-maneuver-level issues and usually delegates [tactical-level](#) targeting decisions to the JTCB. If a JCB is formed, it may take the place of the JTCB in the earlier stages of the tasking cycle and the JTCB will concentrate on reviewing and approving the draft JIPTL. The JTCB or JCB should also work in concert with the [joint collection management board](#) to develop and monitor intelligence collection requirements for the joint force and synchronize the collection plan with targeteers and operations personnel during the given tasking cycle's period of coverage.

Product: The Air Operations Directive. The AOD (along with the space and [cyberspace](#) operations directives, where appropriate) is the primary vehicle for communicating desired effects to target developers and others involved in the tasking process. The AOC SRD drafts the AOD for JFACC approval. In a normal [battle rhythm](#), this is done on a daily basis.

TARGET DEVELOPMENT

Purpose. In this stage, the [deliberate targeting](#) process is used to relate specific targets to objectives, desired effects, and accompanying actions. Targeteers and other planners take the effects determined during the previous stage and analyze which targets should be affected to create them. The purpose of the target development process is to relate target development to tasking. There are no absolutes in target development or its relation to the tasking cycle. All the stages of the tasking process are interwoven. 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. Target development involves five distinct functions:

- ✪ [Target analysis](#) takes the desired effects determined during planning and matches them to specific targets. It determines the necessary type, breadth, and duration of action that should be exerted on each target to create desired effects.

¹ For details on the duties and functions of the JTCB, see [Joint Publication \(JP\) 3-60, Joint Targeting](#).

- ✦ **Target [vetting](#)** leverages the expertise of the national intelligence community to verify the accuracy and fidelity of the intelligence and analysis used to develop targets.
- ✦ **Target [validation](#)** ensures all vetted targets create the effects outlined in commander's guidance and are coordinated and deconflicted with agencies and activities that might present conflicts with proposed actions. It also determines whether a target remains a viable element of its [target system](#). During the development effort, it may be necessary to further screen the targets based on the sensitive target approval and review process, coordinated through the JFC to national authorities. The validation process also starts the integration and coordination of actions against the target with other operations. This continues even after the [air tasking order](#) (ATO) is produced. Many offices and agencies should be coordinated with to prevent fratricide, [collateral damage](#), or propaganda leverage for the enemy.
- ✦ **Target Nomination.** Once targets are identified and validated, they are nominated through proper channels for approval. Historically, this has often required detailed consideration by a high-level coordinating body such as a JTCB or joint fires element, but evolving best practice suggests that detailed targeting functions should be delegated to components (as joint doctrine permits), leaving commanders free to concentrate on integrating the joint force scheme of maneuver in the JTCB and like bodies.
- ✦ **Determining collection and [exploitation](#) requirements.** This stage begins with target analysis and runs parallel to the other stages. Intelligence collection and exploitation 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 and pre-strike and post-strike requirements are integrated into the collection plan. This stage attempts to answer the question, "how will we know we've achieved the desired effects?" by establishing requirements for each nominated target. Targeteers and collection managers should also monitor changes that occur throughout the tasking cycle in order to modify assessment requirements.

Once all of the components, allied, and agency target nominations for a given ATO are received, the TET prioritizes the nominated targets and places them in a [target nomination list](#) (TNL) based on the commander's objectives. The TET then vets the 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 created. The following products are derived from the TNL, once fully vetted.

Products:

- ✦ **The JIPTL** is a prioritized list of targets and associated data approved by the JFC or designated representative. An approved JIPTL is the central product of the target development stage.
- ✦ **The [joint integrated prioritized collection list](#) (JIPCL)** is a prioritized list of intelligence collection and exploitation requirements needed to support indications

and warning, analysis, future target development, and to measure whether desired effects and objectives are being achieved.

- ★ **The [no-strike list \(NSL\)](#)** is a list of objects characterized as protected from the effects of military operations under international law or ROE. Attacking these may violate LOAC or ROE, or interfere with friendly relations with indigenous personnel or governments. Striking targets on this list normally requires approval from Secretary of Defense or Presidential level.
- ★ **The [restricted target list \(RTL\)](#)** is a list of targets that have specific restrictions imposed upon them. Actions on restricted targets are prohibited until coordinated and approved by the establishing authority. 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. The RTL is nominated by elements of the joint force and approved by the JFC. Targets on this list may only be struck with JFC or higher approval. Actions taken by an opponent may remove a target from the RTL.

WEAPONNEERING AND ALLOCATION

Purpose. Weaponneering is the part of the tasking cycle that estimates the quantity and types of lethal and nonlethal weapons needed to create desired effects against specific targets. Allocation, in the broadest sense, is the distribution of limited resources among competing requirements for employment. This has two aspects that are relevant to the tasking cycle: allocation of targets and allocation of forces. Weaponneering and allocation function together to produce the master air attack plan (MAAP). These efforts commence before the JIPTL is approved and continue past MAAP production into execution planning. They are integral to all of targeting.

Weaponneering. Targeteers and other planners quantify the expected results of lethal and nonlethal weapons employment against prioritized targets to create desired effects. This does not predict the outcome of every munitions delivery, but represents statistical averages based on modeling, weapons tests, and real-world experience over many uses. While modern precision and near-precision weapons increase delivery accuracy to historically unprecedented levels, collateral damage and probability of destruction calculations still must be considered due to potential weapons, fusing, or delivery system malfunctions; the effects of weather and terrain; potential enemy jamming, concealment, and deception; as well as the unknowns involved in attacking deeply buried targets.

Commanders and planners take considerable precautions to avoid or minimize civilian casualties and damage to civilian infrastructure. The danger of collateral damage varies with the type of target, terrain, weapons used, weather, and the proximity of civilians and their structures. According to the [law of armed conflict \(LOAC\)](#), incidental damage to civilian objects must not be excessive in relation to the expected military advantage to be gained. If an attack is directed against dual-use objects that might be legitimate military targets, but also serve a legitimate civilian need (e.g., electrical power or telecommunications), then this factor should be carefully balanced against military benefits when making a weapon selection, as should end state considerations, such as reconstruction and stabilization. Established ROE and LOAC also address collateral damage concerns. For example, it may sometimes be necessary to strike a target more precisely than might otherwise be necessary in order to avoid unwanted civilian damage

(an undesired effect). Certain levels of collateral damage estimation require expertise that lies beyond the JFACC's—or even JFC's—control and should be coordinated via [federated](#) and [reachback](#) relationships. These relationships may also help understand cultural patterns such as daily and weekly peaks and lulls in activity that can affect risks to civilians.

Allocation. After the JFC approves the apportionment decision, planners begin to decide upon allocation, which is the distribution for employment of limited resources and forces among competing requirements. There are two types of allocation relevant to the tasking cycle. The first is “allocation of effort” and it starts early in the tasking processes. In line with guidance and apportionment decisions and other components' allocation requests, the SRD's strategy plans team manages the broad allocation of effort over time within the AOD process (more than just the [master air attack plan's](#) (MAAP's) specific allocation of aircraft and weapon systems). The TET should work closely with the SRD and the MAAP team to ensure the prioritized list supports the [joint air operations plan](#) (JAOP) and AOD appropriately. The TET then collects target nominations from other sources and works allocation of targets that have been planned against the effects and objectives to build the JIPTL for the ATO's duration. Approaching JIPTL construction in this way helps avoid an ad hoc target-servicing approach.

The second type of allocation is “force allocation.” Having refined the prioritization and allocation of effort down to the tactical task level within the AOD, the TET decides, based on the AOD's allocation of effort, which targets will be struck (in accordance with the targeting scheme they have developed) and the MAAP allocates weapon systems to that targeting scheme and decides how to best package and route them. The MAAP allocates airpower by melding available capabilities and resources with the TET's weaponeering recommendations. The result of both types of allocation, ultimately, is a translation of the total weight of air effort into the total number or sorties or missions required to create desired effects.

Although not complete until the MAAP is produced, force allocation also starts early in the cycle. The MAAP team determines an overall sortie flow for the ATO period and determines how that flow should be divided into “packages”—discrete sets of missions and sorties designed to complement each other or provide required support (for example, tankers and electronic warfare assets “packaged” with the strike assets they are supporting). Packages are arranged in sequence and used to determine a timeline and resource requirements for the ATO period. Each package should be sequenced and deconflicted in time, space, and effect. A vital part of allocation is creation of an assessment plan. ISR assets should be carefully orchestrated to ensure optimal coverage of the operational environment.

Products

- ★ **The MAAP** is the JFACC's time-phased air, space, and (often) cyberspace scheme of maneuver for a given ATO period, synthesizing commander's guidance, desired effects, supported components' schemes of maneuver, friendly capabilities, and likely enemy courses of action. It shows allocation of friendly resources against approved targets.
- ★ **The sortie allotment** (SORTIEALOT), if produced, is a means by which the JFC can allot sorties to meet requirements of subordinate commanders that are

expressed in their air employment and allocation plans. In many real-world situations, the JFC seldom directly allocates sorties. This responsibility is usually delegated to the JFACC. The SORTIEALOT message is often used as a means for the JFACC to communicate back to other joint force components how their allocation requests were fulfilled and other results of the force allocation process.

ATO PRODUCTION AND DISSEMINATION

Purpose. This stage finalizes the ATO and associated orders, physically produces them, and disseminates them to units. It is based on commanders' guidance (as detailed in 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 [airspace control order](#) (ACO) and the SPINS. These directions should enable combat operations without undue restrictions, balancing combat effectiveness with the safe, orderly, and expeditious use of airspace. Components may submit critical changes to target requests and asset availability during this stage of the cycle.

Products:

- ★ **The ATO** is the medium by which specific missions are tasked and disseminated to components, subordinate units, and C2 agencies. 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 these may be published as separate orders.
- ★ **SPINS** are a set of instructions that provides information not otherwise available in the ATO, but is necessary for its implementation. This may include such information as commanders' guidance (often including the AOD itself), the C2 battle management plan, combat search and rescue procedures, the communications plan, and general instructions for inter- and intratheater airlift.
- ★ **ROE** are rules issued by higher authority, (e.g., the JFC or the President), establishing "imperatives"—constraints and restraints—that the joint force must observe. They should be published separately, versus being buried in the SPINS or another document.
- ★ **The ACO** provides direction to integrate, coordinate, and deconflict the use of airspace within the operational area.
- ★ **The reconnaissance, surveillance, and target acquisition (RSTA) annex** is produced during this stage by the AOC's ISR Division. 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 nodes/architecture), as well as other assets tasked to perform ISR tasks. This product outlines the entire JFACC ISR plan for a given ATO, possibly at multiple classification levels.

EXECUTION PLANNING AND FORCE EXECUTION

Purpose. Execution planning includes the preparation necessary for combat units to accomplish decentralized execution of the ATO. It generally consists of the 12 hours immediately prior to the start of a given day's ATO execution period. Force execution refers to the 24-hour period in which a particular ATO is executed by units in the field. The AOC aids by preparing input for, supporting, and monitoring execution. The JFC usually delegates the authority to redirect assets using established priorities. The JFACC also coordinates redirection of sorties that were previously allocated to support component operations with the affected component commanders. Under the Air Force doctrine of centralized control and decentralized execution, unit commanders have the freedom and flexibility to plan missions and delivery tactics as long as they fall within timing requirements, ROE, commander's intent, and create desired effects.

During execution, the AOC is the central agency for revising the tasking of forces. It is also responsible for coordinating and deconflicting any changes with appropriate agencies or components. It may or may not have authority to redirect use of space or cyberspace capabilities supporting theater efforts, depending upon the asset and command relationships.

Due to the dynamics of the operational environment, the JFACC may be required to make changes to planned operations during execution. The AOC should be flexible and responsive to changes required during execution of the ATO. Forces not apportioned for joint or combined operations, but included on the ATO for coordination purposes, can be redirected only with the approval of the commander who has operational control over them. During execution, the JFACC is also responsible for retargeting assets to respond to emerging targets or changing priorities. This is the stage of operations during which dynamic targeting and dynamic intelligence collection take place. The commander may delegate the authority to redirect missions to C2 mission commanders as necessary, but they should still notify the AOC of all redirected missions.

Combat Identification (CID). The rational use of force relies on the capability to identify adversary entities as a precursor to taking action against them, especially if doing so entails the use of force. CID of *all* battlespace entities is thus a critical enabling capability in any use, or potential use, of military force. Identifying adversary or enemy entities is essential, but so is identifying friendly and neutral entities. "Blue force tracking" (BFT) is a core function of CID. BFT is the employment of techniques to identify and track US, allied, and coalition forces for the purpose of providing commanders with enhanced situational awareness and reducing fratricide.

Results and Products. This is the stage in which targets are actually struck (or otherwise acted upon) and direct effects are created. Other products include physical damage assessments and mission reports used in helping make physical damage and other assessments.

ASSESSMENT

Purpose. Effective planning and execution require continuing evaluation of the effectiveness of friendly and enemy action. Consequently, assessment is much more than traditional "battle damage" or "combat assessment." Planning for it begins prior to commencement of operations, takes place throughout planning and execution, and

continues after conflict is over. Each level of assessment feeds the levels above it and provides a basis for broader-based evaluation of progress.

Products. Products include various tactical and operational assessment products, along with recommendations for future action.



ANNEX 3-0 OPERATIONS AND PLANNING

OPERATION ASSESSMENT DURING CONTINGENCIES AND CRISES

Last Updated: 04 November 2016

Assessment is a vital part of any operation. Commanders, assisted by their staffs, and subordinate commanders, interagency and multinational partners, and other stakeholders, should continuously monitor the operational environment and assess the progress of ongoing operations toward the desired end state.

Operation assessment is a continuous process that supports decision making by measuring the progress toward accomplishing tasks, creating desired effects, and achieving objectives. It supports judicious allocation of resources in order to make operations more effective. It also analyzes risks, opportunities, gaps, and trends in ongoing operations. In general, any operations assessment framework should organize intelligence and operational data, analyze that data, and communicate recommendations to a decision maker.

The operation assessment process helps to frame the clear definition of tasks, desired effects, objectives, and end states, and gives the commander's staff a method for selecting the information and intelligence requirements (including commander's critical information requirements) that best support decision making.

The process consists of the following steps:

- ★ **Identify information and intelligence requirements.** During planning, acquiring a baseline understanding assists in setting objectives and determining thresholds for success and failure.
- ★ **Develop or modify the assessment plan,** which should link information and intelligence requirements to appropriate measures and indicators, and contain a collection plan to gather appropriate data.
- ★ **Collect Information and intelligence.** During execution, forces use the collection plan and defined reporting procedures to gather information about the environment and ongoing operations.
- ★ **Conduct periodic or event-based assessment.** Commanders and their staffs normally conduct assessment based on events or at specified intervals in the course of an operation.
- ★ **Conduct change reporting.** Commanders are especially interested in learning how either friendly or adversary behavior has changed from expectations or norms established earlier in this or other operations. While many initial reports may prove

false or are regarded as outliers, once a pattern of change is reliably perceived or discerned by assessment, it should be highlighted for commanders' attention.

- ★ **Provide feedback and recommendations.** Assessment reports inform the commander and other stakeholders about current conditions and communicate progress toward desired objectives and end states.

For more in-depth information on this emerging area of joint doctrine, see [Joint Doctrine Note 1-15, Operation Assessment \(15 January 2015\)](#).



APPENDIX A: CENTER OF GRAVITY ANALYSIS METHODS

Last Updated: 04 November 2016

A [center of gravity](#) (COG) is a source of power that provides moral or physical strength, freedom of action, or will to act.¹ Analyzing COGs provides a means of focusing friendly efforts, both offensively and defensively. There are a number of tools and techniques available to identify and analyze COGs. Joint doctrine (JP 5-0, Chapter IV) presents one model, but there are others, each with its own assumptions, strengths, and weaknesses. All, however, attempt to *relate what is critical to what is vulnerable in some useful way*—to identify and prioritize critical, targetable vulnerabilities. Each of the common methods is examined below, with a short summary discussing the strengths and weaknesses of each.

Caution. In the same sentence in which he first described a “center of gravity” Clausewitz made it clear that it was only a metaphor, a picture to help understand the “main thing.” The techniques of center of gravity analysis—even the practice of using COG as an acronym, highlight the extent to which military planning can uncritically employ shortcuts. The process of COG analysis may also lead to a mental image of a static adversary. The best correctives to this oversimplification are to study the adversary thoroughly, respect the adversary as capable and willing to fight wherever and whenever possible, and accept that the adversary could be employing a strategy which we may find hard to understand. Addressing these challenges can be aided by the use of red teams.

One thing all models have in common is that any COG a commander chooses to affect should always be linked to one or more [objectives](#). If the objective changes, the COG may also change. At the [strategic level](#), a COG could be one or a set of leaders (political or military), an alliance, a military force, a set of critical functions, or national will. At the [operational level](#), a COG is often associated with an adversary’s military capabilities, such as a powerful element of the armed forces, but could also include other capabilities in the [operational environment](#). COGs can emerge or change over time, due to the interplay of friendly, adversary, and other forces in the operational environment. They may be based on the end state, mission, and objectives as well as the adversary’s strategy.

COG analysis takes place as part of [joint intelligence preparation of the operational environment](#), [mission analysis](#), or both. Commanders should consider not only the adversary’s COGs, but also identify and protect their own COGs. An [effects-based approach to operations](#) should orient on creating [effects](#) in time and space that decisively affect a COG.

¹ Joint Publication (JP) 5-0, [Joint Operation Planning](#).

THE JOINT MODEL

The model endorsed in joint doctrine ([JP 5-0](#)) is also known as the Marine Corps model, the “[CG-CC-CR-CV](#)” Model, and the “Strange Model,” for its developer, Dr. Joe Strange of the Marine Corps War College.² This model is depicted in the figure, “Joint COG Model” and an example of its application is given in the figure, “Joint COG Model Example (World War II).”

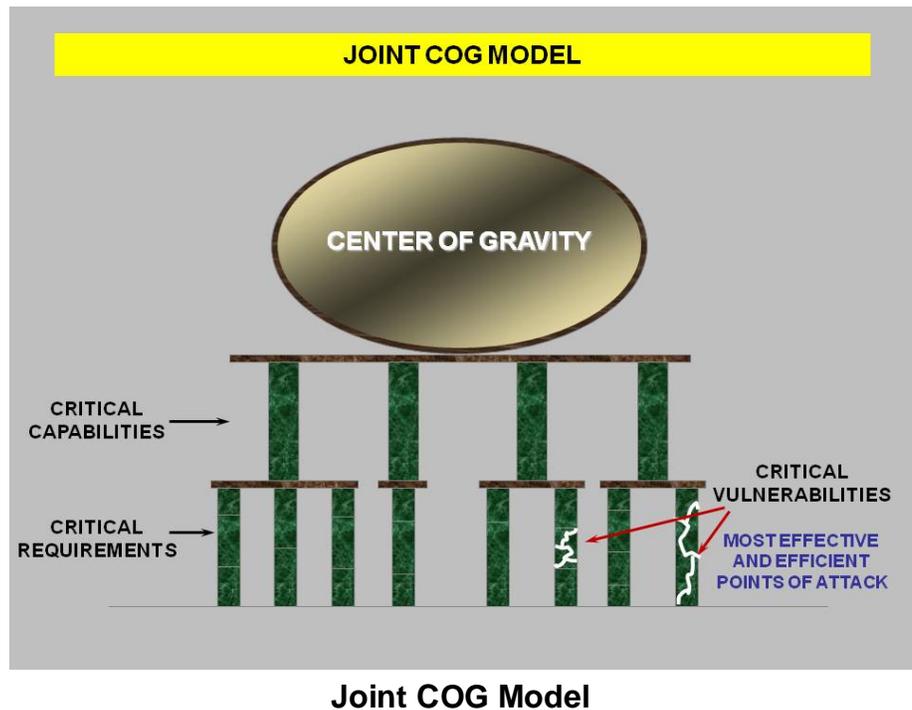
Description. This model starts with the joint definition of a COG as a source of strength, freedom of action, or will to act. It then analyzes the COG to determine, (in order) its:

- ★ **Critical capabilities (CCs):** those means that are considered crucial enablers for a COG to function as such (and are essential to the accomplishment of the specified or implied objectives).

- ★ **Critical requirements (CRs):** essential conditions, resources, or means for a CC to be fully operational.

- ★ **Critical vulnerabilities:** CRs, or components thereof, that are deficient or vulnerable to attack (or other effect) that will create decisive or significant effects on the COG.

COGs are nouns—tangible or intangible sources of power. CC can be thought of as verbs—things a COG *does*. CRs are nouns—those *things* a critical capability needs to function as such. CVs are those critical requirements that are vulnerable.



² Note that this model uses the abbreviation “CG” for center of gravity. For all purposes, “CG” and “COG” should be considered synonymous. See Dr Joseph Strange, *Centers of Gravity and Critical Vulnerabilities: Building on the Clausewitzian Foundation So That We Can All Speak the Same Language*.

JOINT COG MODEL EXAMPLE (WORLD WAR II)

COG: Industrial base supporting German war effort
CC: Obtain essential materials
Transport essential materials to factories
Process essential materials in factories
Transport finished products to fronts
CR: Organic & intermediate essential materials
Financial means
Transportation system
Electrical power
Fuel for power (petroleum, oil, & lubricants)
Factories
Skilled labor
CV: Ball bearings (intermediate essential material)
POL
Rail yards & rolling stock (transportation system)

Joint COG Model Example (World War II)

Advantages. This is an intellectually complete manner of analyzing COGs. It clearly relates critical elements to vulnerabilities via a logical causal chain. It has been endorsed in joint doctrine and is taught in some form in most, if not all, Service schools.

Disadvantages. This method can be difficult to “operationalize”—to work through intellectually in such a manner that it yields actionable tasks and targets. Effective application of this approach requires a

comprehensive and detailed understanding of adversary systems. Doing it properly thus takes time. This model has significant power, but analysts may sometimes find it difficult to derive valid critical capabilities or properly determine vulnerabilities from requirements. (Experience has shown that these are the most common points at which the model “breaks down.”) Analysts should use care and have a very thorough understanding of the system they are analyzing. This method also tends to be more labor and information intensive than other models.

THE STRATEGIC RING MODEL

This model is also known as the “five-rings model” and as “Warden’s Rings,” after its developer, Col (Ret) John A. Warden III.

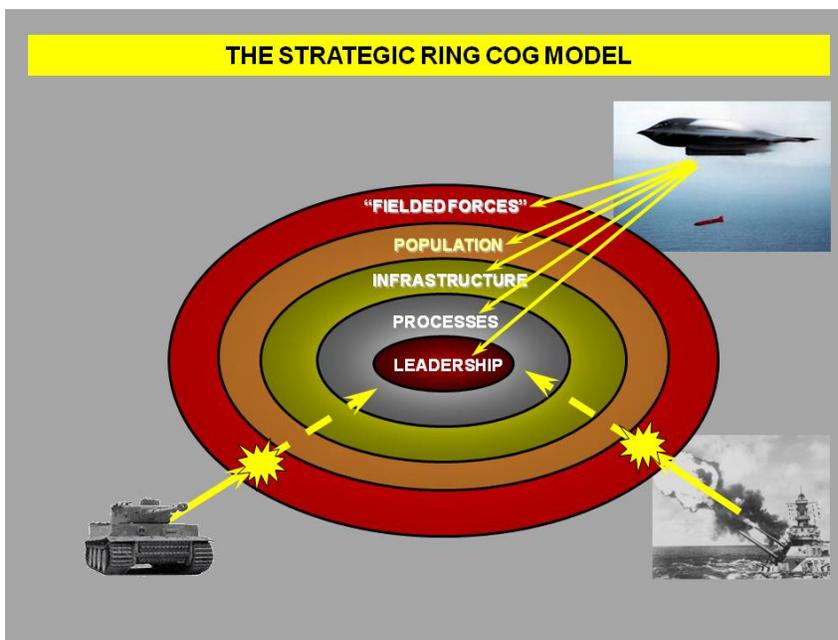
Description. The basic structure of this model is not of COGs, per se, but of characteristics common to all living organisms. This is depicted in “The Strategic Ring COG Model.” It posits that there are one or more COGs within each ring of the systems; it is thus really a very simple systems analysis tool as much as it is a tool for COG analysis.

The model maintains that there are certain functions necessary for every system to function:

- ★ A [command and control](#) (C2) and information processing system, such as the leadership and C2 apparatus within a military or the central nervous system of a human body.
- ★ The processes necessary for the survival of the system, such as communications, food production and distribution, financing, and manufacturing in a state, or respiration and blood circulation in a living body.

- ★ A system of infrastructure, like the electrical power distribution or transportation systems of a nation, or the bone and vascular systems of a body.
- ★ A population, such as the aggregate of individuals within a nation or armed force or the cells within a body.
- ★ A fighting or defense mechanism, such as the fielded armed forces of a nation or the immune system of a body. (Note that Col [Ret.] Warden chooses to call this ring, “fielded forces.”)

Advantages. This model shows the central value of leadership as a COG—it helps demonstrate the value of shock and dislocation on all rings through effects on leadership. It also shows that airpower does not have to fight its way through enemy fighting mechanisms (fielded forces) to affect the critical adversary systems defended by them, as other forms of military power often do.



The Strategic Ring COG Model

Disadvantages. This model makes no distinction between what is critical and what is vulnerable; in fact, it confuses the two. If applied blindly (“we’ve drawn our five rings and those are our COGs”), it can encourage mirror imaging of the adversary’s system and lead to a mechanistic and reductionist inputs-based approach to targeting. (Experience has shown that some teams using only this method will list the five categories as *the* COGs and immediately

begin listing “customary” target sets below them. This is the antithesis of effects-based targeting.) Finally, this model considers the subject system in isolation, ignoring its connectivity to external systems and other aspects of the operational environment. This is the antithesis of a systems approach to COG analysis.

THE NATIONAL ELEMENTS OF VALUE MODEL

This is also known as the NEV model and Barlow’s Model, after its originator, Col (Ret) Jason Barlow.

Description. This model is generically similar to the strategic rings model, but seeks to show a greater degree of interconnectivity as well as connectivity to external systems. The national elements of value include:

- ★ *Leadership:* The political and military decision-makers within the government.

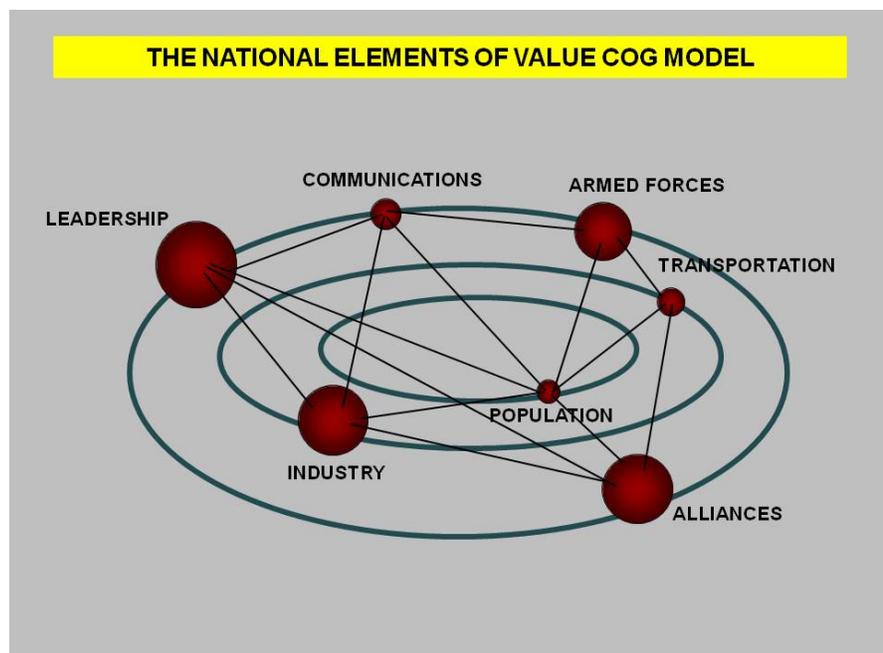
- ✦ *Industry:* All of a country's manufacturing, agriculture, research and technical enterprises as well as those parts necessary to support them, such as power production, water supply, and raw materials.
- ✦ *Armed forces:* Self explanatory.
- ✦ *Population:* A country's ubiquitous features that are important, but hard to categorize and quantify; e.g., nationalism, morale, the will of the people, esprit de corps, ethnocentrism, ability to endure hardship, and religious conviction or fervor.
- ✦ *Transportation:* All modes.
- ✦ *Communications:* The physical means thereof.
- ✦ *Alliances:* The friends, trading partners, and neighbors, from which a country receives support for continuing the conflict.

NEVs are interdependent and self-compensating. They are a critical means of system adaptation, redistribution, and recuperation. The lines connecting NEVs (depicted in the figure, "The National Elements of Value Model") are constantly varying in size and texture, as they represent the strength and direction of influence, both formal and informal, and the various lines of command, control, and authority inherent among the elements.

Although the NEVs are the same for every country, they vary in importance from country to country and from day to day within a given country. In general, it can be assumed that commanders make rational decisions concerning their NEVs.

Advantages. This model provides a somewhat more sophisticated analysis of the elements of a nation state than does the strategic ring model. It also accounts for connectivity between elements and to entities external to the system.

Disadvantages. The NEV model is designed to evaluate national systems and thus may be of limited value in analyzing non-state actors. Further, like the strategic ring model, it does not really provide a means of analyzing individual elements as systems, and thus may have the same disadvantages the strategic ring model does: oversimplification, a cookie-cutter approach, and a tendency to fit preconceived



The National Elements of Value COG Model

targeting information to the model, rather than letting the model drive targeting decisions.

THE “CARVER” METHOD

This is a model used in the special forces world to assist mission planning and targeting and may have some validity in evaluating COGs.

Description. “CARVER” stands for “criticality, accessibility, recuperability, vulnerability, effect, and recognizability.” Its elements are used to conduct a comparative assessment of previously identified critical elements, according to the following criteria:

- ★ *Criticality:* How essential is this element to the successful functioning of its parent component, complex, or system?
- ★ *Accessibility:* How susceptible is this element to attack given its defenses and friendly offensive capabilities?
- ★ *Recuperability:* How quickly and easily can this element recover from inflicted damage or destruction?
- ★ *Vulnerability:* How susceptible is this element to neutralization, damage, or destruction given friendly offensive capabilities?
- ★ *Effect:* What is the confidence that successfully prosecuting this element as planned will create the overall desired effect of the mission?
- ★ *Recognizability:* How easily recognizable is this element (i.e., differentiated from surrounding nodes) considering sensor capabilities, employment conditions (weather, etc.) and time available to analyze the situation and take action?

The CARVER method is really a means to help analyze which COG to act against, given determination by other methods. One should rate each of the prospective COGs (or their critical vulnerabilities) as objectively as possible according to the six criteria above, and then total the scores to give some indication of which element might be the most lucrative for attack or other action.

Advantages. This method can offer useful insights, more on which CR is vulnerable or which CV to attack than on what constitutes a COG and how it relates to the rest of the adversary’s system.

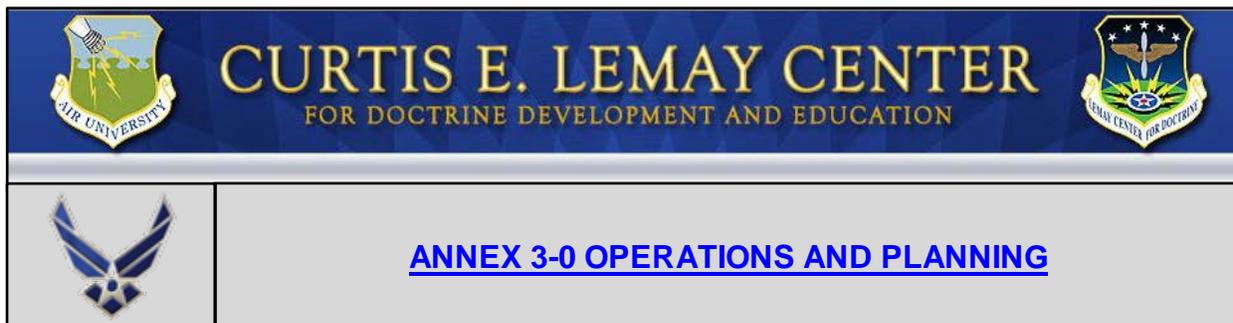
Disadvantages. This is only a partial COG analysis tool and should be used in conjunction with other methods to assist in determining the most lucrative elements for targeting.

SYNTHESIS

Time and manpower permitting, one of the best methods of analyzing COGs is to synthesize the methods described above. One notional means of doing so is to:

- ★ Identify adversary COGs.
 - ★★ Begin with the strategic rings model because of its simplicity.

- ☆☆ Apply Barlow's NEV model for greater detail and functional nuance.
 - ☆ Identify critical vulnerabilities.
 - ☆☆ Employ the joint (Strange) model (CG-CC-CR-CV) to determine CVs.
 - ☆ Validate and prioritize the identified CVs.
 - ☆☆ Apply the CARVER method to rank CVs as subjects for action.
 - ☆ Re-accomplish the first three steps for friendly COGs. Reassess periodically through COA wargaming and during each iteration of design and planning.
-



APPENDIX B: SPECIALIZED PLANNING PERSPECTIVES

Last Updated: 04 November 2016

The information below describes planning considerations that are specifically applicable to various operations the Air Force conducts in and from the air, space, and [cyberspace domains](#). Commanders and planners should be aware that each function and operation has specialized planning considerations.

SPACE OPERATIONS PLANNING

Space operations should be integrated into the [joint force commander's](#) (JFC's) planning processes to magnify joint force effectiveness. Global space forces support multiple theater and national [objectives](#) and are controlled by the commander, United States Strategic Command (CDRUSSTRATCOM). Most space planning is thus done by United States Strategic Command (USSTRATCOM). Space planners participate in day-to-day global and functional intertheater operations through the joint functional component command for space (JFCC SPACE); supported by 14th Air Force and the [Joint Space Operations Center](#) (via the 614th [Air Operations Center](#) [AOC]), at the direction of CDRUSSTRATCOM. Planning for use of space assets should be integrated throughout the plans developed and executed by all [combatant commanders](#) (CCDRs), whether geographic or functional.

Space Integration Considerations

Integration of theater space requirements should consider both a global and a theater perspective. Global integration is the responsibility of CDRUSSTRATCOM. Theater integration is the responsibility of the geographic CCDR and the component commander designated as the space coordinating authority (if the CCDR does not retain this authority). During conflicts including Operation DESERT STORM, Operation ALLIED FORCE, Operation ENDURING FREEDOM, and Operation IRAQI FREEDOM, several space-related considerations surfaced that may have directly impacted US military success. Planners should take the following actions when developing [courses of action](#) (COAs):

- ✦ Determine theater requirements in terms of desired [effects](#), not specific tactics or assets.
- ✦ Consider theater missile warning requirements, such as timeliness, tolerance of false reports, coverage, and data distribution.
- ✦ Identify accuracy requirements so positioning, navigation, and timing assets can be better deployed and employed.

- ✦ Consider increasing bandwidth needs (voice, data, imagery, and video communication) through arrangements with communications experts (A6 or J6), the local or regional frequency manager(s), and the space integration experts who are liaisons to USSTRATCOM's JFCC SPACE, the regional satellite communications support center, or the global satellite communications support center.
- ✦ Account for space-based [intelligence, surveillance, and reconnaissance](#) (ISR) and assessment requirements.
- ✦ Make use of military and consider availability of civilian space-borne meteorological support assets.
- ✦ Gain understanding of the [operational environment](#), including full knowledge of threats (both man-made and natural) to friendly space operations.
- ✦ Consider integrating [nonkinetic](#) space control capabilities into the operation plan, if appropriate.
- ✦ Consider strikes on adversary space control capabilities and alternatives for possible loss of friendly space capabilities.
- ✦ Consider the potential benefits of permitting an adversary unrestricted use of space assets to allow for friendly exploitation of adversary information.

CYBERSPACE OPERATIONS PLANNING

Planning for Ongoing Operations

The speed of operations in cyberspace compresses traditional decision cycles. Nonetheless, the [observe-orient-decide-act](#) (OODA) loop remains a valid construct for decision-making in cyberspace despite the greatly accelerated speed of operations. In cyberspace, actions and responses can take fractions of a second, so prior planning and preemptive actions are necessary—both offensively and defensively—to ensure friendly freedom of action. Cyberspace planners participate in day-to-day global and functional intertheater operations through Air Force Space Command (via 24th Air Force) and the 624th Operations Center at the direction of the commander, United States Cyber Command (USCYBERCOM). General planning considerations for the continuous, cyclic, and iterative nature of ongoing operations in cyberspace are:

- ✦ Strategic plans should include all [instruments of power](#) (IOPs) in order to prepare for possible simultaneous effects across all levels of warfare and multiple domains.
- ✦ Planning should include protection from adversary operations that may be targeting across multiple domains.
- ✦ Planners should interface with appropriate ISR and operational organizations to prepare for the possible effects from cyberspace operations, to include effects on the plans themselves.
- ✦ Planners should integrate cyberspace capabilities into the overall operation plan, as appropriate.

- ✦ Theater requirements should be determined in terms of desired effects, not specific tactics or assets.
- ✦ Planners should consider the potential benefits of permitting an adversary wide, or even unrestricted, use of cyberspace assets, to allow for friendly exploitation of intelligence information.

Planning For Major Operations and Campaigns

In addition to day-to-day ongoing missions, operations in cyberspace can be planned as part of major operations and campaigns. In these cases, planning should be fully integrated into the [joint operation planning process](#) (JOPP) at the JFC level and the [joint operation planning process for air](#) (JOPPA) at the component level. This kind of operational planning does not significantly differ from planning for operations in other domains in terms of processes.

During the execution stage of [major operations and campaigns](#), cyberspace operators should work in conjunction with the [joint force air component commander's](#) (JFACC's) time-phased air, space, and cyberspace scheme of maneuver for a given tasking period, synthesizing commander's guidance, desired effects, supported components' schemes of maneuver, friendly capabilities, and likely enemy courses of action, and allocating friendly resources against approved targets.¹

INFORMATION OPERATIONS PLANNING

[Information operations](#) (IO) remain a key enabler for joint force operations. One of the JFC's priorities in any conflict should be achieving decision superiority over the adversary. This entails gaining and maintaining information superiority as well as controlling the [information environment](#). Much of this can be accomplished through IO capabilities within the cyberspace domain.

IO can create strategic effects (both desired and undesired), even when employed at the joint force component level (as by the joint force air component commander [JFACC]).

The specific activities of IO should support the commander's objectives by:

- ✦ Conveying selected information and indicators to target audiences.
- ✦ Helping shape the perceptions of targeted decision-makers.
- ✦ Helping to secure friendly information (particularly in cyberspace).
- ✦ Protecting against espionage.
- ✦ Protecting against sabotage and other adversary intelligence gathering activities.
- ✦ Communicating desired unclassified information about friendly activities.

¹ For more information, see Annex 3-12, [Cyberspace Operations](#).

In terms of strategy, operational design, and planning, IO should be explicitly integrated into COA selection and planning efforts as early as possible. In fact, Joint Publication (JP) 5-0, [Joint Operation Planning](#), identifies “informational flexible deterrent operations,” which can be implemented by the President or Secretary of Defense (SecDef). The informational IOP should be integrated into planning as early and at the highest levels possible. Examples of [operational-level](#) effects that influence operations functions can contribute include:

- ★ Hindering an adversary’s ability to strike by creating confusion in the operational environment.
- ★ Slowing or ceasing an adversary’s operational tempo by causing hesitation, confusion, and misdirection.
- ★ Reducing an adversary’s [command and control](#) (C2) capability while easing the task of the war-to-peace transition.
- ★ Using IO capabilities instead of physical destruction to prevent or lessen reconstruction costs during the war-to-peace transition.
- ★ Influencing adversary and neutral perceptions of leaders, military forces, and populations, away from adversary objectives to US objectives.
- ★ Disrupting adversary plans, thereby enhancing US plans and operations.
- ★ Negatively impacting an adversary’s ability to lead by affecting their communications or understanding of the operational environment.
- ★ Disrupting the adversary commander’s ability to focus combat power.
- ★ Influencing the adversary [commander’s estimate](#) of the situation.
- ★ Conducting IO actions that reduce friendly vulnerabilities to physical and cyberspace attacks.
- ★ Protecting forces during humanitarian operations from [asymmetric](#) and insurgent threats.

ELECTRONIC WARFARE PLANNING

[Electronic warfare](#) (EW), in the form of electronic attack, electronic protection, and EW support, is waged to secure freedom of action in portions of the [electromagnetic spectrum](#) (EMS). EW is conducted to secure and maintain freedom of action for friendly forces in the electromagnetic operational environment and to deny the same to adversaries. It can create significant standalone effects, as well as support military operations by generating various levels of control, denial, detection, exploitation, and related effects through the EMS. EW is a vital part of all phases of operations and campaigns. The JFC commonly empowers the JFACC to organize, execute, and oversee the conduct of EW through a joint electronic warfare cell (EWC) in the AOC. The EWC coordinates with other planning and [targeting](#) activities to develop and monitor EW plans and operations in support of the JFC. The EWC should be able to plan EW in order to support air, space and cyberspace efforts as well as provide EW support to ground, maritime, and special operations. In response to the [air tasking order](#)

(ATO), wing and unit staffs and individual aircrews conduct detailed tactical planning for specific EW missions. The EWC is usually represented throughout the tasking cycle as well as having a small plans element operating outside the cycle. The representatives in the different divisions and teams (strategy, [targeting effects team](#), etc.) concentrate on the basic components of a given tasking cycle day, while the plans element ensures continuity with the EWC's overall EW planning.

EW planning requires a broad understanding of enemy and friendly capabilities, tactics, and objectives. Employment of EW assets should be closely integrated into, and supportive of, the commander's overall planning effort. This planning requires a multidiscipline approach with expertise from operations (ground, air, space, cyberspace, and information), intelligence, logistics, and weather.

The EWC should incorporate EW into the [air operations directive](#). They should also work with the AOC's strategy plans team to develop EW annexes to [operations plans](#) (OPLANs), as well as branch and [sequel](#) plans. Finally, the EW representative should work with the strategy assessment team to assess the effects created by EW.

NUCLEAR OPERATIONS PLANNING

The commander, United States Strategic Command (USSTRATCOM) and JFCs plan for the employment of nuclear weapons by US forces in a manner consistent with national policy and strategic guidance. Conditions leading to US employment of nuclear weapons may not necessarily lead to an all-out exchange of [weapons of mass destruction](#). However, the employment of nuclear weapons *is always a Presidential decision*. As with all military actions, nuclear targeting and attack functions are accomplished in accordance with our obligations under international law, international agreements and conventions, and the [rules of engagement](#) (ROE) approved by the President and the SecDef.

USSTRATCOM is tasked through the [Unified Command Plan](#) and the [Joint Strategic Capabilities Plan](#) (JSCP) to provide nuclear planning. The JSCP's nuclear supplement establishes parameters and constraints that are the basis for nuclear targeting. It defines the threat to be countered, provides the projected threat environment, and levies requirements on the targeteers in terms of the desired effects, including such considerations as probability of damage. Additional guidance is also provided by geographic CCDRs' OPLANs and [Chairman, Joint Chiefs of Staff](#) emergency action procedures. Nuclear operations planning should be integrated into operation plans to create effects needed to achieve the supported CCDR's desired objectives.

Since the fundamental role of nuclear weapons is to deter nuclear attack and defend the vital interests of the United States and its partners, advance planning is critical to the effective use of these weapons. Targeting guidance and plans should be current, tied to national and theater intelligence assessments, and satisfy specified objectives. However, as stated before, their use is always a Presidential decision. Complete destruction of enemy forces may not be required to create the desired effects; rather, containment and a demonstrated will to employ additional nuclear weapons may suffice to achieve national objectives. Other considerations for [nuclear operations](#) include:

- ✦ **Preplanned Options.** Preplanned options are a means of maintaining centralized control while minimizing the impact on response time.

- ★ **Emerging Targets.** Requirements may arise to strike follow on and newly emerging targets in support of the desired national [end state](#).
- ★ **Adaptability.** Adaptive plans provide the increased flexibility to strike newly discovered targets as expeditiously as possible, but do increase risk.

IRREGULAR WARFARE PLANNING

Irregular warfare (IW) is defined as “violent struggle among state and non-state actors for legitimacy and influence over the relevant population(s) (JP 1, *Doctrine for the Armed Forces of the United States*). IW favors indirect and asymmetric approaches, though it may employ the full range of military and other capabilities in order to erode an adversary’s power, influence, and will. The term evolved from efforts to define those conflicts that manifest in violent (and sometimes non-violent) adversarial actions, but typically lack traditional nation-state force-on-force confrontations. While IW has been a common aspect of conflict throughout history, it is becoming more prevalent for several reasons. First, various global trends enable non-state actors to effectively use irregular means to challenge the legitimacy of nation states internally, resulting in failed or weakly governed nations that are vulnerable and exploited to challenge regional stability and US strategic interests. Second, the demonstrated technological superiority of advanced militaries such as the United States’ and the prohibitive costs of obtaining or maintaining such advanced capabilities force many, including some nation states, to adopt asymmetric strategies to challenge US interests—often combining both traditional and IW strategies and capabilities. Planners should fully understand IW and be prepared to simultaneously conduct both IW and traditional warfare in many situations.

According to the *IW Joint Operating Concept*, the IW problem is that adaptive adversaries, such as terrorists, insurgents, and transnational criminal networks, present asymmetric threats to partner nations that cannot readily countered by traditional military means alone. These threats:

- ★ Compete with partner nations for legitimacy and influence over relevant populations.
- ★ Are enmeshed in the population of partner nations.
- ★ Extend their reach and impact regionally and globally through use of communications, cyberspace, technology, and personal relationships fostered by providing services in underserved areas.
- ★ Require long-term efforts to address.

As a result, these challenges compound the IW planning problem for the joint force:

- ★ Complex political, cultural, religious, and historic factors, as well as the diverse populations involved are difficult to understand in sufficient depth.
- ★ The use of direct military force can backfire by rallying opposition.
- ★ The non-military nature of many aspects of these conflicts fall outside the sole competence of the military instrument.

- ✪ Many irregular actors are proficient in waging the battle of the narrative.²
- ✪ The protracted nature of IW tests US staying power.
- ✪ Partner nations often cannot meet the needs of their society, which in turn affects their political legitimacy and strengthens the appeal of internal irregular threats.

Planning for conducting warfare in an irregular environment, therefore, involves some unique considerations. Unlike most traditional force-on-force state conflicts, success in IW usually requires a partner nation to achieve legitimacy and influence in the eyes of its population by addressing the conflict's root causes and providing security, good governance, and economic development. The Department of Defense's (DOD's) primary means of supporting this effort is to provide security cooperation to assist partner nations strengthen internal security, defend against external aggression, and act as trusted participants in regional security structures. Partner nations can then help prevent persistent or growing problems from turning into crises that may ultimately require costly US intervention.

The speed, range, flexibility, versatility, and persistence of airpower can enable a partner nation to secure and sustain legitimacy and support of its population, keys to IW success. Broadly speaking, airpower extends a nation's reach and brings rapid response (and improved situational awareness. These in turn can help partner nations establish the physical and virtual infrastructures essential for internal growth and well-being. Airpower can bolster all instruments of national power and provides visible, practical, and effective means to consolidate governance and provide for the populace.

In addition to how airpower contributes to operational and tactical success in particular IW situations, it is also important to emphasize how important developing the aviation enterprise of partner nations is to the United States from a strategic perspective. While the Air Force does not lead US government efforts and decisions concerning global aviation enterprise development, it has a huge stake in those decisions, in terms of enabling partner nations to effectively address mutual national interests and in gaining the US access in support of US strategic interests. Therefore, when Airmen plan and execute strategy and operations related to IW, they should keep this strategic viewpoint in mind and, as appropriate, advocate this perspective to ensure that:

- ✪ Partner nations have the aviation resources to achieve internal security and contribute to regional stability.
- ✪ The international community can effectively respond to crises anywhere in the world.
- ✪ The global aviation enterprise (both military and civilian) is safely operated, secure, and well-supported.
- ✪ The United States becomes the aviation security partner of choice.

In addition to conducting IW indirectly "by, with, and through" partner nations in this way, the US military also conducts IW directly through a combination of counterterrorism,

² In enduring interventions, there can be a continuing struggle to define the national and international discussion and debate in terms favorable to one side, causing a clash between competing narratives of the actors involved; this is often referred to as the "battle of the narrative." For more guidance, see Joint Doctrine Note 2-13, *Commander's Communication Synchronization*, 16 Dec 13.

unconventional warfare, foreign internal defense, counterinsurgency, and stability operations—usually when an irregular challenge that affects US strategic interests grows beyond a partner nation’s ability to handle by itself despite US assistance. Planners for direct IW operations should carefully balance population and threat-focused action and will require extensive collaboration with non-DOD agencies, multinational partners, and partner nations as well as continuous, coordinated cyberspace operations and messaging. They also require an in-depth understanding of the relevant operational environment (including history, culture, causes of conflict, and partner nation capabilities). When feasible, plans for air, space, and cyberspace operations within an IW environment should:

- ✦ Focus the commander’s estimate on understanding the environment and the challenges and problems it presents.
- ✦ Encourage and support partner nations’ solutions to their problems of subversion, lawlessness, insurgency, terrorism, and other threats to internal security.
- ✦ Place emphasis on efforts to develop and sustain self-sufficiency.
- ✦ Be developed in close coordination with the other component commanders’ processes to effectively exploit the air component’s capabilities and limitations.
- ✦ Be coordinated closely with other joint, US government, and partner nation organizations.
- ✦ Determine a sustainable operations tempo as well as appropriate force requirements.
- ✦ Consider the effect of sustained operations on assets and personnel.
- ✦ Continually rely on feedback and assessment in order to shape operations and modify existing plans.
- ✦ Provide for effective C2, awareness of the operational environment, and knowledge of efforts needed to build partners’ capabilities to ensure effectiveness of IW plans.

See Annex 3-2, [Irregular Warfare](#), for more information.

SUPPORT PLANNING

The JOPP and the JOPPA involve detailed planning for the placement and support of friendly forces. The JOPP and JOPPA are the processes through which the COMAFFOR and staff accomplish support planning. The COMAFFOR and staff should be able to maintain awareness of the status of forces, recognize what support capabilities are needed where, and direct resources to minimize operational constraints and the potential for unplanned operational pauses. Air Force resources are limited and are designed to serve the needs of a wide variety of commanders and their personnel in dispersed areas around the world. [Combat support](#) (CS) personnel at the operational level should understand the total commitment of CS resources necessary to support the entire theater, as well as the impact this has across the entire Air Force. *Centralized control and decentralized execution, coupled with effective [reachback](#) and distributed operations, are critical to maintaining the balance between the supply and adequacy of*

Air Force combat support resources necessary for combat operations in new or existing theater locations.

In permissive environments, early negotiations with the partner's authorities conducted through the US Embassy are essential for effective base support and expeditionary site planning. Issues to be negotiated in various agreements include access rights, status of US forces in country, rights to carry arms, rights to use of real property and disposition of property upon mission completion, tax concerns, host nation support to forces, the role of the host nation security or police forces in providing base defense and security for US military forces, and other issues determined by the JFACC. Throughout every step of this process, the staff judge advocate general should provide legal counsel and the negotiated settlements may be documented in a memorandum of understanding (MOU).

Threats to an airbase may exist in all environments, but more so in uncertain and hostile environments. The Air Force uses a "threat continuum" to describe them, and commanders should recognize that any given threat may be present at any point along the continuum. Commanders should consider the effects that might be produced by the threat, not just the nature of the threat itself. A threat can be small in execution, but produce large-scale effects. These threats can undermine mission capability as severely as they can sabotage engagement with enemy forces.³

Commanders should prepare for a variety of [chemical, biological, radiological, and nuclear](#) (CBRN) environments using CS capabilities to support continued operations, regardless of the CBRN environment.⁴

Base Support and Expeditionary Site Planning

Base support and expeditionary site planning are foundations of Air Force expeditionary operations. Base support and expeditionary site planning govern the process of expeditionary site surveying that provides the focus, guidance, integration, and prioritization of the actions of site survey teams. Site surveying provides the capability to rapidly assess potential operating locations through the effective collection, storage, and use of extensive site data to support warfighter decision-making. Expeditionary site surveys should be conducted pre-conflict when possible. The initial site survey team collects data on the site characteristics ("what's there?") and determines the site's potential use in supporting operations. The objective of the first series of actions is to begin developing the common installation picture ("can we do it?"). Planners can identify operating locations and develop recommendations for the theater's aircraft beddown plan ("does it make sense?"). Follow-on site survey teams (usually composed of unit level personnel) collect additional data and determine the site's capability to support and sustain specific operations. An initial site survey, at a minimum, should include an airfield survey (pavement survey, available ramp space, fuel capabilities, etc.), a threat assessment, and a beddown assessment.

³ For further information, see Annex 3-10, [Force Protection](#), and Air Force Tactics, Techniques, and Procedures (AFTTP) 3-10.1, *Integrated Base Defense*.

⁴ For further information, see Annex 3-40, [Counter-Chemical, Biological, Radiological, and Nuclear Operations](#).

Operational planners armed with accurate and detailed location information can make informed deployment decisions. During Operation ALLIED FORCE, Operation ENDURING FREEDOM, and Operation IRAQI FREEDOM, operational planners were challenged to make the most of the limited resources on hand such as time, airlift, equipment, and personnel to maximize military operational effectiveness. In response to a natural disaster (volcano, tsunami, etc.), US forces may mobilize to support humanitarian relief operations. Although not usually opposed by the local sovereign governments, local insurgent considerations and diplomatic or political constraints and restraints might make the security of the airfields used less certain. The COMAFFOR's staff should accomplish extensive planning to ensure that facilities, personnel, and materiel that will be on the ground for such an operation are moved in as quickly as possible, adequately protected and sustained during operations, and effectively recovered as soon as possible after mission objectives are achieved.

In accordance with base support and expeditionary site planning principles, effective beddown and sustainment planning permits the Air Force to maximize the effects of force application while operating with limited resources. During the planning process, it is essential for planners to oversee CS capabilities and their resource requirements for the entire theater and understand the impacts at all levels of war. Impacts should be rapidly coordinated with theater movement planners and Air Force depots to ensure the location is programmed into necessary support systems.⁵

HEALTH AND MEDICAL PLANNING

In today's environment, detailed planning to support all aspects of force health protection and surveillance of intentional use of biological and chemical warfare is essential throughout all aspects of operations planning. It is vital this process begins early with comprehensive review of medical intelligence, early public health evaluation of environmental health threats, and comprehensive prevention and protection measures throughout support areas and forward deployed locations. Commanders should be prepared to support the requirement of their medical staff to provide necessary health data to medical surveillance and information systems.⁶

AIR MOBILITY OPERATIONS PLANNING

[Air mobility](#) plans should ensure the orderly deployment, sustainment, employment, and redeployment of forces and equipment. Air mobility operations also require integration and synchronization across the Air Force's functional and geographic AOCs, and simultaneous integration with US civil and military assets in addition to any coalition force and international partner assets. While transport by air may afford the most expedient means of transporting limited amounts of persons and cargo, transportation via US Navy Military Sealift Command ships could result in not only a more cost-effective means, but one that is more expedient overall in delivering larger quantities of equipment and supplies.

User requirements, such as the overarching strategy, order of arrival, and duration of air mobility operations, drive air mobility operations. Once planners identify requirements, they can be prioritized, validated, allocated, and tasked. Most deliberate planning relies

⁵ For more information, see Annex 4-0, [Combat Support](#).

⁶ For more information, see Annex 4-02, [Medical Operations](#).

on standing OPLANs and [time-phased force and deployment data](#) products. The air mobility forces and capabilities available for tasking affect deliberate planning. Air mobility planners participate in day-to-day global, functional intertheater operations through 18th Air Force and the 618 AOC (Tanker Airlift Control Center [TACC]) at the direction of United States Transportation Command.

The methods used to fulfill requirements for air mobility operations depend on a number of factors:

- ★ **Threats and Integrated Defense.** Planners should integrate intelligence information on the threat lay-down, consider the area air defense plan, consider aircraft vulnerability, and determine the most appropriate assets and employment strategy.
- ★★ **CBRN Threats.** Planners should take into account the logistical and asset transportation needs for maintaining individual protective equipment levels (protective suits and masks, medical countermeasures, decontamination kits, etc.).
- ★ **Cargo and Personnel.** The type of cargo, number of personnel, time constraint, and desired effect determine the asset and method of air mobility.
- ★ **Receiver Air Refueling Requirements.** Due to the diversity of air refueling missions, air mobility planners should consider how much fuel will be offloaded, where the refueling will take place, when rendezvous will occur, and the type of receiver (boom or drogue) and any partner nation caveats or limitations.
- ★ **Access.** Successful air mobility operations depend on a network of facilities, diplomatic clearances, airspace rules and restrictions around the globe, air refueling tracks, and usable destinations including airfields and drop zones.
- ★ **Basing and Airfield Suitability.** Planners should consider runway and taxiway width, runway length and surface conditions, runway orientation relative to surface weather effects, ramp considerations, pavement weight-bearing requirements, fuel capability, contingency and working [maximum on ground](#) (MOG) capacity, availability of aircraft servicing and loading equipment, and many other factors.
- ★★ **MOG Considerations.** Planners should be most concerned with “working MOG,” the highest number of specific type aircraft able to operate in and out of an airfield or allowed on the ground during a given span of time, based on simultaneous support. This is different from the parking MOG, which is the number of aircraft that can fit, or be parked, on the ramp.
- ★ **[Host-Nation Support](#).** Legal advisors should be consulted to determine what agreements already exist and whether status of forces agreements (SOFAs) or acquisition support agreements are in effect. SOFAs normally include such factors as status of personnel, operating rights and responsibilities, landing fees, duties, taxes, etc.
- ★ **[Airspace Control](#).** Air mobility planners should consider air mobility operations in domestic, international, and military controlled airspace. For mobility operations in military controlled airspace, air mobility planners should request and coordinate the use of military controlled airspace. Once approved, planners should follow the airspace control plan and airspace control order (ACO).

- ★ **Communications.** Air mobility planners should understand and consider secure and non-secure voice and data link communications capabilities and limitations with airlift and tanker assets in planning air mobility operations. Planners should consider that communications with airlift and tanker assets should be maintained in order to maintain flexible use of these assets.
- ★ **Emission Control (EMCON)**. Planners should consider the use of EMCON procedures to reduce the amount of information regarding combat or politically sensitive missions that enemy forces could gather.
- ★ **Weather**. Planners need accurate, relevant, and timely weather information in order to adjust aircraft flow, loads, and timing to ensure effective, efficient, and safe task accomplishment. Weather personnel integrated into air mobility planning processes provide tailored data and information to exploit or mitigate weather effects.

SPECIAL OPERATIONS PLANNING

Special operations (SO) missions are often high-risk operations, with limited windows of execution, and often require first-time success. Given the limited size and sustainability of [special operations forces \(SOF\)](#), adequate support is vital to the success of the mission and should be properly planned. When employed, SOF are presented with their own intact C2 structure, which facilitates their integration into joint force plans, helps them retain cohesion, provides control mechanisms to address specific SO concerns, and helps coordinate their activities their activities with other components and supporting commands. The following are some common SOF planning considerations:

- ★ **C2 of SOF** is executed within a SOF chain of command. The commander, Air Force Special Operations Air Component (COMAFSOAC) is the senior SOF Airman and presents AFSOF to a JFC. As with the COMAFFOR, the COMAFSOAC is the single Airman in charge of AFSOF issues. The C2 structure for SOF depends on objectives, security requirements, and the operational environment. In complex environments SOF have found supporting to supported command relationships are extremely agile and beneficial to both SOF and conventional forces.
- ★ **Mission Rehearsal** is often a critical element of special operations mission preparation. Often, rehearsal of certain mission elements is necessary because of the inherent complexity and high risk associated with these missions. However, due to mission requirements, rehearsals may not always be feasible. SOF also operate within dynamic tasking cycles that meet the JFC's needs, thus it may be challenging when SOF are not operating with the JFACC's forces and normal JFACC ATO timeline constraints.
- ★ **Security.** Operations security, communications security, and physical security are vitally important to SOF. SOF habitually operates from secure training sites and employment bases, in order to shield the small, tailored forces from the attention of hostile intelligence collectors.
- ★ **Intelligence.** Special operations planning and execution are intelligence-intensive, requiring timely and accurate intelligence information. Tailored, all-source intelligence, surveillance, and reconnaissance information is vital in support of SOF. All-source intelligence should be broad in scope, yet adequately detailed.

- ✦ **Communications.** C2 communications should enable SOF operators to rapidly deploy and dynamically operate on a global scale with assured connectivity and security in all environments. Tactical communications are carried by SOF airborne and supporting or supported ground forces to communicate with command elements and other SOF in operational missions to locate, capture, strike, or kill enemy forces. Interoperability between tactical communications and C2 networks is critical.
- ✦ **Planning and Execution Coordination.** The special operations component deconflicts and coordinates all special operations with the JFACC via the special operations liaison element (SOLE). The SOLE is fully integrated into the AOC in order to integrate, coordinate, and deconflict special operations planning and execution (all operations, not just SOF air), with the JFACC.

AFSOF limitations. Years of operational experience have led to understanding key AFSOF limitations. Commanders should understand:

- ✦ AFSOF cannot be quickly reconstituted or rapidly expanded, due to the lengthy time required to recruit, train, and educate AFSOF operators. Improper employment of these forces runs the risk of rapidly depleting their capabilities.
- ✦ AFSOF are not a substitute for conventional forces. In most cases AFSOF are not organized, trained, sized, or equipped to conduct sustained conventional combat operations. Using AFSOF to conduct or support conventional operations may inhibit their ability to conduct SO.
- ✦ Most AFSOF missions require non-SOF support. AFSOF are not structured with robust logistic and sustainment capabilities. Therefore, AFSOF frequently rely on external support. Limited SOF logistical capacity frequently requires support from conventional force structures supplemented by HN or contracted support.
- ✦ AFSOF operations in non-combat areas could have additional restrictions placed upon them by the Ambassador or Chief of Diplomatic Mission, which may limit access or otherwise affect operations.⁷

UNMANNED AIRCRAFT SYSTEM (UAS) PLANNING

[Remotely piloted aircraft](#) (RPA)⁸ and other UAS bring capabilities such as persistence, flexibility, autonomy, and efficiency to the JFC. However, there are some unique issues commanders and planners should consider when employing these systems.

- ✦ **Allocation and Tasking.** The JFC's process for determining component UAS allocation and tasking is no different than for manned aircraft. However, long endurance, theater-ranging RPA may allow transferring tasking and support to multiple users during a single mission. If an RPA is retasked to support another commander's objectives during a mission, close coordination among all parties is required.

⁷ For additional information, see [JP 3-05, Special Operations](#), and [Annex 3-05, Special Operations](#).

⁸ When referring to Air Force category four and five unmanned aircraft operated by a pilot, it is an RPA. (Annex 3-52, [Airspace Control](#).)

- ✦ **Command and Control.** UAS generally rely on a nearly continuous stream of communications for both flight and payload control. Communications availability, frequency deconfliction, and bandwidth protection, are important considerations. Some UAS have a beyond-line-of-sight control capability and may conduct remote split operations (launch/recover site not collocated with mission control site), which can add flexibility but present unique basing and C2 challenges.
- ✦ **Mission Planning.** UAS should be included in the development of the ACO, ATO, and [special instructions](#), and should follow all planning guidance and procedures. Except for smaller UAS that will not likely conflict with other airborne operations, all UAS should be included on the ATO for deconfliction. Note: Inclusion of UAS on the ATO does not imply any change in command relationships or tasking authority. Detailed planning for lost link, loss of positioning data, and other emergency procedures and recoveries is required due to UAS dependence on information and control data links.

GLOBAL INTEGRATED ISR PLANNING

The AOC is the best location to integrate the JFC's theater-wide airborne ISR capabilities, to include [reachback](#) and distributed ISR support. JP 3-30, [Command and Control for Joint Air Operations](#), also states the responsibilities of the JFACC include "planning, coordinating, allocating, and tasking assigned airborne ISR assets to accomplish and fulfill JFC tasks and requirements." Subtasks of this responsibility include:

- ✦ Identifying and managing JFACC ISR requirements.
- ✦ Managing JFC (theater-level) requirements in conjunction with other Service components and with validation from the JFC.
- ✦ Tasking theater airborne ISR assets to satisfy the JFC's and JFACC's requirements.

Experience has shown that centralized control of ISR capabilities under the JFACC provides joint components with the most capability in the most efficient manner, since the JFACC's AOC staff is manned and trained to best allocate and employ these capabilities in accordance with the JFC's priorities.

Joint Intelligence Preparation of the Operational Environment

Joint intelligence preparation of the operational environment (JIPOE) is a systematic continuous process of analyzing the threat and environment to provide the commander with the situational awareness and understanding necessary for decision-making. JIPOE is an effective analytical process used during peacetime and during hostilities at all levels of command, from the JFACC in support of JOPPA to the JFC in support of the JOPP.

JIPOE focuses intelligence for the commander and the commander's supporting C2 elements. JIPOE facilitates getting "inside" the enemy's decision-making cycle. Specifically, JIPOE focuses on the interrelationship between the threat and environment and the effect of that interaction on both friendly and enemy courses of action. JIPOE results in the production of adversary courses of action, named areas of interest, and

high-value targets, which are inputs to the JFC and JFACC planning, intelligence collection, and targeting processes.

Air Force intelligence entities at all levels, in cooperation with federated US national-level and international partners, should use JIPOE principles, focusing on environmental and threat characteristics and activities, which significantly enhance Air Force operations.⁹

WEATHER PLANNING

Air Force weather operations are critical to a commander's battlespace awareness across the range of military operations. Few military endeavors, including those of adversaries, are immune to the effects of the environment. Neglected or ignored, weather can adversely affect even the most carefully planned and executed campaigns and operations.

Anticipation of weather's effects should be an integral part of planning, Air Force weather operations help anticipate when the natural environment will affect friendly and enemy air, space, and surface operations, possibly offering friendly force commanders an exploitable asymmetric advantage. Air Force weather operators constantly monitor, assess, and report the state of the natural environment. To be relevant to decision-makers, Air Force weather experts should know the past, current, and future state of the atmosphere and space environment and then translate these into impacts on operations. In essence, weather operations provide two distinct yet related basic functions: 1) describing past, current, and future environmental conditions, and 2) enabling the exploitation of environmental information at key decision points through expert weather planning.¹⁰

HOMELAND OPERATIONS PLANNING

AOCs provide a full spectrum of planning for airpower operations in support of operations in the homeland. The Air Force Northern (AFNORTH) AOC provides support for homeland operations in the continental United States (CONUS) North American Aerospace Defense Command (NORAD) region and United States Northern Command for planning within the CONUS, Puerto Rico, and the US Virgin Islands. The Pacific Air Force's AOC supports United States Pacific Command for planning within Hawaii, Guam and other US Pacific territories and atolls. The 618 AOC (TACC) supports homeland operations through effective use of air mobility capabilities to achieve combatant commander requirements.

Memoranda of agreement (MOA) or MOUs with CONUS communities, and Hawaii and US Pacific territories, as well as standing OPLANS and execute orders with homeland-based military units normally assigned to other combatant commands, can clarify such issues as response procedures and capabilities, and reimbursement of costs. MOAs and MOUs provide a means to answer numerous questions from other government agencies and [nongovernmental organizations](#) before a disaster or accident occurs, and

⁹ For more information on intelligence operations in general and ISR, see Annex 2-0, [Global Integrated Intelligence, Surveillance, and Reconnaissance Operations](#).

¹⁰ For more information on weather considerations, see Annex 3-59, [Weather Operations](#).

allow for planning how military units respond, what local authorities expect of them, and what they are allowed to do.¹¹

¹¹ For more information, see Annex 3-27, [Homeland Operations](#).