

Command and Control of Operations in the Information Environment

Leading with Information in Operational Planning, Execution, and Assessment

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Introduction

A broad range of Department of Defense strategic guidance has highlighted the increasing importance of leveraging information to creating enduring strategic outcomes from joint force tactical and operational successes.¹ Advances in information technology are increasing the reach, speed, and effectiveness with which humans acquire, process, and transfer information. State and nonstate adversaries, increasingly unable to challenge the joint force through conventional military power, are using information to gain an advantage over the joint force and impede the achievement of US strategic objectives. The joint force must develop, operationalize, and institutionalize an effective approach for wielding information in concert with traditional physical military power to compete successfully in this environment.

Recognizing its criticality in Joint operations, the 2018 update to Joint Publication 3-0, *Joint Operations* introduced *information* as the seventh joint function.² Joint functions are related capabilities grouped together to enable joint force commanders (JFC) to integrate, synchronize, and direct joint operations. The information function encompasses the management and application of information and its deliberate integration with other joint functions to change or maintain perceptions, attitudes, and other elements that drive desired behaviors and support human and automated decision-making. Information can be used as an instrument to affect the behavior of *relevant actors*, which may include any individuals, groups, and populations, or any automated systems whose actions have the potential to substantially help or hinder the success of a particular military activity. As described in JP 3-0,³ the specific uses of information to affect perceptions, attitudes, and behaviors include:

1. Informing domestic and international audiences through the release of accurate information to put operations in context
2. Influencing relevant actors (not including US audiences) to change or maintain behaviors
3. Attacking and exploiting information, information networks, and information systems

The Joint Concept for Operations in the Information Environment (JCOIE) argues that the joint force must understand how to manipulate and leverage information and the *inherent informational aspects of activities* to send deliberate messages.⁴ All Joint force actions, written or spoken words, or displayed or related images have informational aspects that communicate some message or intent, which can be leveraged to support the achievement of Joint force objectives. The JCOIE describes the construct of *informational power* as the ability to leverage information to shape perceptions, attitudes, and other elements that drive desired behavior and the course of events. It establishes the imperative to operationalize and institutionalize the integration of information with traditional military physical power.⁵

Figure 1 illustrates the overall context for operations in the information environment (OIE) and the application of information, as discussed above. Advancing US national interests across the diplomatic, information, military, and economic instruments of national power require affecting relevant actor perceptions and behaviors in a structured manner. This impact happens through operations, activities, and investments (OAI) that may be overt, covert, or clandestine in nature. The intent of those OAIs is to shape the operating environment across

the competition continuum. The results of those OAI are evaluated through ongoing feedback and assessment mechanisms, which are used to calibrate and refine strategic approaches.

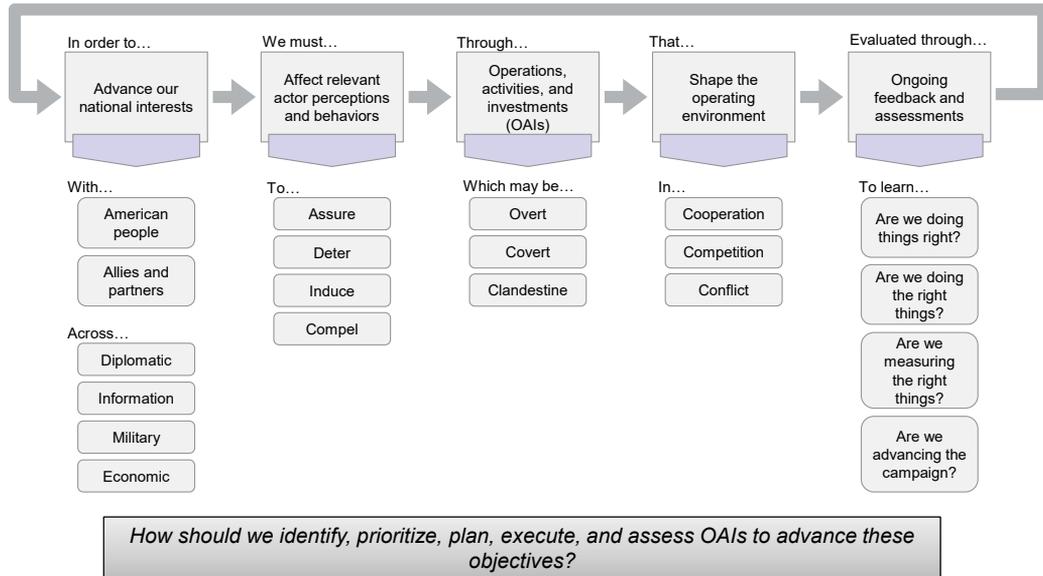


Figure 1. Context for operations in the information environment

The Department of the Air Force has recognized the challenges and opportunities associated with gaining and maintaining information advantage, particularly through the Sixteenth Air Force (AF) standup as an Information Warfare Numbered Air Force. A challenge within the Air Force is that existing constructs for operational-level command and control (C2) (planning, execution, and assessment) do not directly place shaping perceptions and behaviors at the forefront of component activities. This procedure often relegates informational considerations to the end of planners’ checklists or treating “information operations” as the realm of specialty teams rather than something central to commander’s business. Existing force structures, training programs, and associated command relationships are not designed to facilitate the effective integration of informational power considerations into operational-level C2, which is oriented to the air tasking cycle for combat operations. This approach described in this article seeks to address these challenges by defining approaches to placing information at the forefront of air and space component operational planning, execution, and assessment processes and approaches. It complements the approach described by General Reynolds to develop an organizational structure for information warfare at Sixteenth AF.⁶

Conceptual framework

Figure 2 below presents the overall C2OIE conceptual framework, the purpose of which is to establish how to incorporate the joint function of information into operational-level planning, execution, and assessment processes.⁷

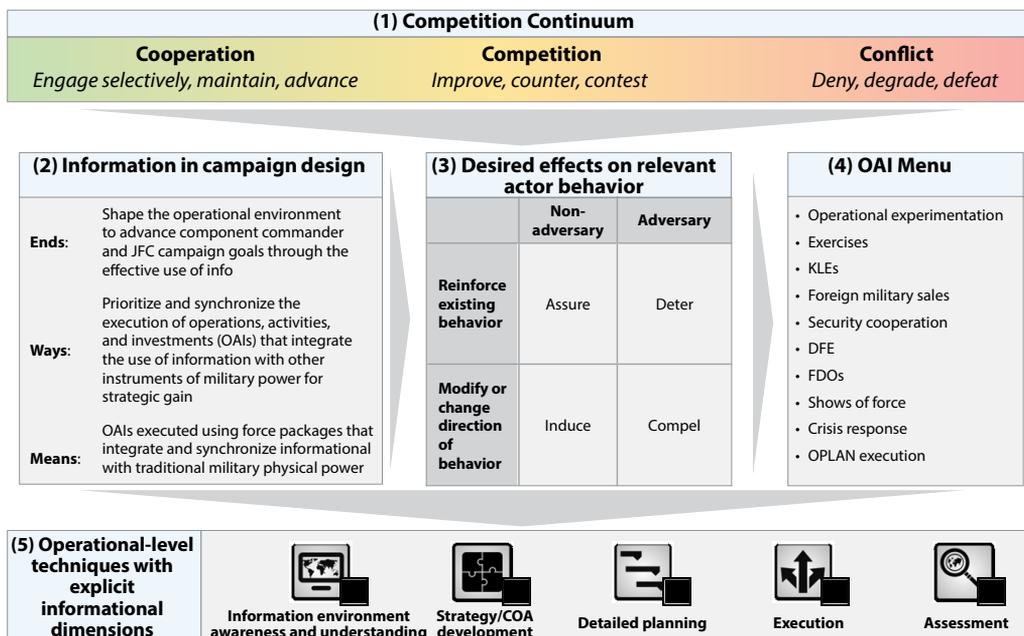


Figure 2. C2OIE conceptual framework

Each of the elements in figure 2 is described further below.

(1) Joint force activities occur across the continuum of cooperation, competition, and armed conflict,⁸ each with specific policy objectives. The effective application of informational power is of central importance for creating an advantage and attaining enduring strategic outcomes in each part of the continuum.

(2) Deliberate, long-term campaigns are a key means to shape relevant actor perceptions and behaviors across the continuum, by capitalizing on the cumulative and reinforcing effects of multiple, coordinated OAIs. Air and space component level efforts support the achievement of JFC strategic outcomes through the design and execution of nested campaigns and OAIs that integrate the employment of informational power and physical power in coordination with the rest of the joint force.

(3) The goals for individual activities that comprise the overall campaign are expressed in terms of the desired effects on relevant actor behavior. For simplicity, relevant actors are either adversaries or nonadversaries, and the desired effects

on their behavior may be to reinforce existing behaviors or bring about a change in behavior.

(4) Forces and capabilities that wield informational power and physical power are integrated into component OAI selected and designed to create the desired effects on relevant actor behavior.

(5) A set of practical techniques provide a structure for incorporating the information joint function into overall OAI planning, execution, and assessment.

OIE across the Competition Continuum

Joint Doctrine Note 1-19 introduces the competition continuum as a way of describing a comprehensive and flexible spectrum of strategic interactions, engagements, and relations between the United States and other actors.⁹ Rather than the binary classifications of peace and war, the competition continuum describes a world of enduring competition conducted through a mixture of cooperation, competition below armed conflict, and armed conflict. These descriptors refer to the relationship between the US and another strategic actor (state or nonstate) in relation to a set of specific policy objectives. The competition continuum describes the environment in which the US government applies the instruments of national power. Key points on the continuum are:

Cooperation: mutually beneficial relationships between strategic actors with similar or compatible interests

Competition: relationships between actors with incompatible interests—none of whom seek to escalate to armed conflict

Armed conflict: a situation in which the use of violence is the primary means by which an actor seeks to satisfy its interests

Crises can occur anywhere along the continuum, and the term *confrontation* can be used to describe conditions between competition and conflict. The United States may be in different parts of the continuum in its interaction with a single actor in relation to different interests. OIE play a key role across the entirety of the continuum to support creating, maintaining, and exploiting overall joint force advantage, as illustrated below in figure 3.

The figure shows representative OIE activities across the competition continuum that can be used to create and leverage *information advantage*—conditions in the IE favorable to achieving the commander's overall objectives—through campaign activities that are integrated and coordinated in purpose.

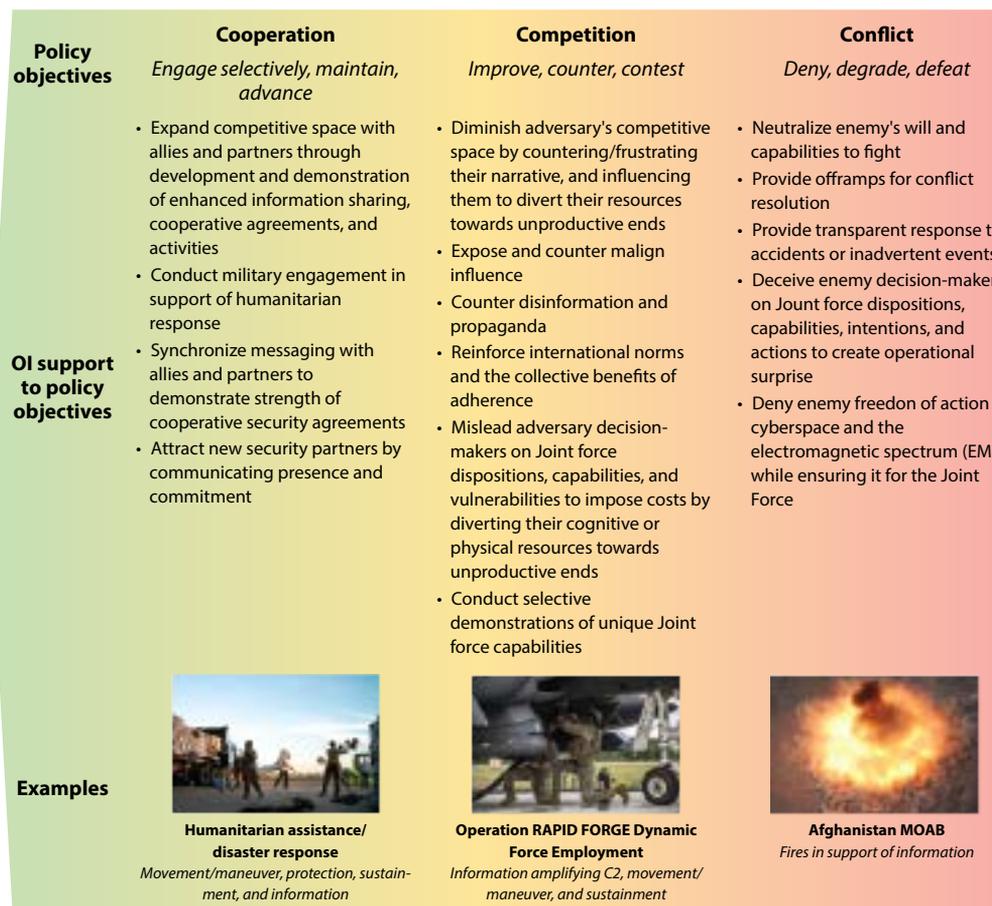


Figure 3. OIE across the competition continuum

Campaign Design

Campaign activities focus on a command's day-to-day activities to create such effects through the conduct of operations, military engagement, security cooperation, deterrence, and other shaping or preventive activities.¹⁰ They are a *series* of related OAI's aimed at accomplishing strategic and operational objectives within a given time and space. Campaigns comprehensively and coherently link all steady-state activities and contingency operations within a unifying framework. Air and space component campaigns nest underneath combatant command campaign plans and global campaign plans.¹¹ The table proposes component campaign ends, ways, and means from an informational perspective.

Table. Campaign-level informational ends, ways, and means

Ends	<ul style="list-style-type: none"> • Shape the operational environment to advance component commander and JFC campaign goals through the effective use of information to affect relevant actor perceptions and behaviors • Increased understanding and trust with domestic and international audiences in the purpose of and approach to component activities • Erosion of adversary confidence in their capabilities, strategies, and relationships • Diminished enemy ability to sense, understand, decide, and act effectively
Ways	<ul style="list-style-type: none"> • Prioritize and synchronize the execution of OAls that integrate the use of information with other instruments of military power for strategic gain • Establish overall component narrative and key themes, and allocate resources in accordance with and in support of them • Align component-level OAls with a common and consistent narrative • Synchronize efforts across components and AORs with mission partners • Continually reinforce the component narrative through sustained presence and engagement in the IE, proactively and in response to emergent events across the competition continuum • Assess effects in support of JFC campaign objectives and refine campaign approach
Means	<ul style="list-style-type: none"> • OAls executed using responsive force packages that integrate and synchronize informational power with traditional military physical power

Effects on Relevant Actor Behavior

The purpose of campaign activities is to shape the attitudes, perceptions, and behaviors of applicable relevant actors in a manner beneficial to U.S. interests. Figure 2 above presents a 2x2 model for describing desired effects on relevant actor behaviors. Drawing from Barry Blechman and Stephen S. Kaplan,¹² relevant actors are categorized as either *adversaries* or *nonadversaries*, for simplicity. Non-adversaries include a broad range of actors, who may be allies, partners, or neutral third parties. Using the language of coercive diplomacy, the purpose of using military forces and capabilities may be to *reinforce* existing behavior or to *modify or change* the direction of behavior. These axes combine to describe four possible modes for the use of military forces and capabilities to affect relevant actor behavior in support of campaign-level ends:

1. *Assuring* nonadversaries so that they will continue or abstain from a behavior relative to US interests. The emphasis here is on easing the concerns of allies and partners so that they will continue behaviors beneficial (or abstain from behaviors detrimental) to US interests.
2. *Detering* adversaries from behavior that is detrimental to US interests. The goal of deterrence is to prevent an action through a credible threat of unacceptable counteraction and/or belief that the cost of an action will outweigh its perceived benefits, combined with ensuring the availability of off-ramps to allow the adversary to de-escalate the situation.
3. *Inducing* nonadversaries to initiate beneficial actions or halt actions contrary to US interests.

4. *Compelling* adversaries to act in a manner or stop acting in a manner contrary to US interests, through the credible threat or actual use of force.

Application of Information Power in Air and Space Component OAI

Campaigns are executed through a series of OAIs, spanning day-to-day operations through crisis response. From an OIE perspective, critical to the selection and design of each OAI is its ability to shape the IE to advance component or combatant command objectives as discussed above, using capabilities and approaches appropriate to the circumstance. Categories of OAIs include:

- **Operational tests and experimentation.** Demonstration and evaluation of new military capabilities or approaches, potentially with the ability to affect the status quo between actors
- **Exercises.** Military maneuvers or simulated wartime operations involving planning, preparation, and execution, carried out for the purpose of building, improving, maintaining, and evaluating proficiency at key mission areas
- **Force posture.** Forces rotationally deployed as well as permanently stationed abroad, together with the facilities and supporting infrastructure that make up the US military footprint and the agreements that enable this presence
- **Key leader engagements.** Engagements by a commander with principal local and regional leaders in the operational environment
- **Foreign military sales.** Transferring defense articles, services, and training to US international partners and international organizations.
- **Security cooperation.** Interactions with foreign security establishments to build security relationships that promote specific US security interests, develop allied and partner nation military and security capabilities for self-defense and multinational operations, and provide US forces with peacetime and contingency access to allied and partner nations
- **Dynamic force employment.** Strategically predictable but operationally unpredictable use of the force executed to exploit emergent or anticipated strategic opportunities
- **Flexible deterrent options.** A planning construct that provides a wide range of interrelated responses that begin with deterrent-oriented actions carefully tailored to produce a desired effect¹³

- **Shows of force.** The demonstration of resolve involving increased visibility of deployed forces in an attempt to defuse a situation that, if allowed to continue, may be detrimental to US interests or objectives¹⁴

- **Crisis response.** The execution of a response to an incident or situation involving a threat to the United States, its citizens, military forces, or vital interests that develops rapidly and creates a condition of such diplomatic, economic, or military importance that commitment of military forces and resources is contemplated to achieve national objectives¹⁵

- **Operations plan execution.** The execution of a complete and detailed plan for a contingency, containing a full description of the concept of operations, all annexes applicable to the plan, and a time-phased force and deployment list

Each of these categories of OAI have inherent informational aspects that can be shaped and leveraged to assure, induce, deter, or compel relevant actors of interest. Operations in the information environment can directly enable, support, and reinforce them as described earlier in the table. Combining informational power with physical power in individual OAI creates reinforcing effects by maximizing the value of each through appropriate relative timing, tempo, scope, and purpose. In so doing, it maximizes their combined ability to create advantage for the Joint force. Individual OAI are part of an overall campaign of activities, per the table above. Figure 4 illustrates the potential linkages between physical power and informational power actions from a temporal perspective—before, during, and after the employment of military physical power. Before a physical power action, informational power may be used in an enabling capacity:

- To create physical conditions for success (e.g., electronic warfare activities and offensive cyberspace operations)
- To impose costs by drawing or diverting an actor's attention from the true purpose and nature of joint force actions (e.g., military deception)
- To shape relevant actor expectations through overt/covert messaging to support assurance and deterrence, while mitigating an adversary's ability to mislead or misinform audiences

During the employment of physical force, informational power can act in a supporting and enhancing way. Alternatively, the physical power action may be simply to demonstrate the will behind a comprehensive set of OIE. Finally, following the employment of physical force, informational power can be used to reinforce impressions and interpretations of what has occurred and condition relevant actor expectations for what might happen next. Such a coordinated approach enables joint force commanders to take the initiative in the information environment, rather than being reactive to adversary actions.

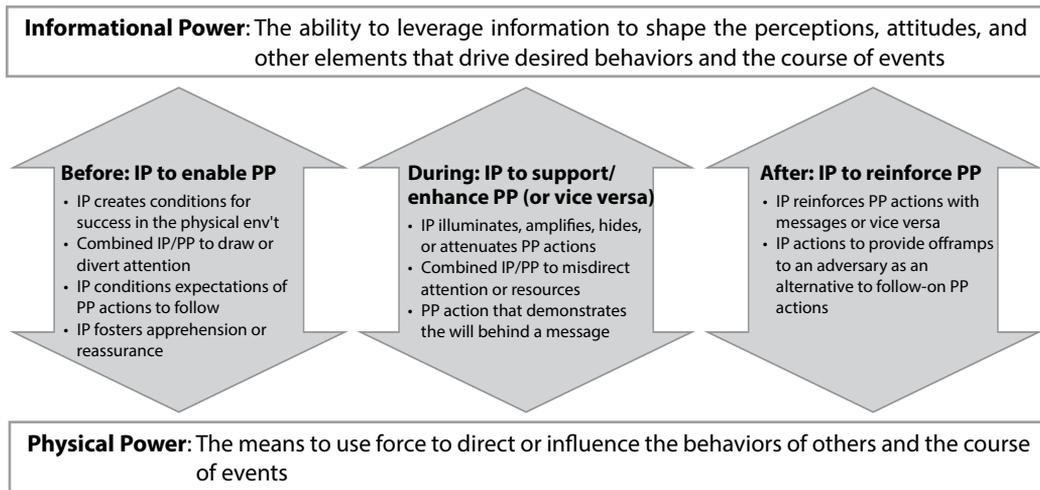


Figure 4. Integration of informational power and physical power

Such combined actions require both *integration* and *synchronization*—integration in planning requires choosing an effective combination of informational and physical effects to drive the desired relevant actor behavior, predicated upon an understanding of the operational environment. Synchronization in execution converges those effects with the right timing, tempo, scope, and intensity. It should be noted that different OAI may call for different degrees and weights of informational power and physical power. For example, military engagement or security cooperation activities focused purely on exposing and countering malign influence or disinformation may have little to no physical power element and rely principally on OIE to affect relevant actor perceptions and behaviors.

Operational-Level Techniques

The final portion of the model is a set of information-focused approaches to OAI planning, execution, and assessment to be used as part of overall joint planning process efforts,¹⁶ summarized as follows:

- **Information environment awareness and understanding** focuses on developing and maintaining an integrated understanding of the information aspects of the operational environment spanning geographic, functional, domain, classification, and organizational boundaries. Understanding the information environment is an element of understanding the operational environment as a whole.

- **Strategy and course-of-action development** focuses on the establishment of the operational approach to shape relevant actor behavior and perceptions

through integration of information with other instruments of military power, leveraging the inherent informational aspects of activities.

- **Detailed planning** focuses on building integrated, executable force packages to create desired effects using informational and physical power wielded through assigned, attached, and supporting forces and capabilities.

- **Execution** synchronizes the creation of integrated effects using informational and physical power and adapting the approach as commander's guidance and evolving circumstances require.

- **Assessment** centers on evaluating effects created or occurring against relevant actor perceptions, behavior, and capabilities and on identifying new opportunities to advance overall JFC objectives.

Well-established component-level tactics, techniques, and procedures (TTP) exist for each of these activities. The emphasis in this new Department of the Air Force framework is on bringing the information joint function to the forefront and placing the focus in each set of activities on shaping relevant actor perceptions, attitudes, and behaviors. The depth to which each of these steps must be pursued will be a function of the complexity of the OAI, whether it is an extension of an ongoing activity, the availability of "off-the-shelf" plans, and other related considerations.

Summary

This article has presented a preliminary approach for bringing information to the forefront of air and space component operational-level planning, execution, and assessment. This approach entails designing component operations directly around shaping the perceptions and behaviors of relevant actors and target audiences of interest, rather than the incorporation of information operations as an afterthought to kinetically focused planning methods. Concepts in this article will continue to evolve through their application in ongoing and future air component campaigns and OAIs to enable their validation and refinement. Specific areas for refinement and evolution include:

- Practical measures of effectiveness (MOE) and MOE indicators
- Elements of effective narratives
- Intelligence collection and analysis requirements
- OIE assessment methodologies
- Command relationships and authorities for responsive OIE
- Materiel solution enablers
- War-gaming approaches
- Integration with a wide range of mission partners

Insights from these efforts will enable evolving the preliminary planning, execution, and assessment techniques in this document into comprehensive and authoritative air and space component TTPs that drive air and space force operational practice and training curricula. ✪

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Dr. Mulgund (BASC, University of Toronto; PhD, Princeton University) is a highly qualified expert senior advisor to the Deputy Chief of Staff for Operations (AF/A3). He is leading the A3's efforts to evolve air component approaches to operational-level planning, execution, and assessment to more effectively incorporate operations in the information environment as part of the Air Force's overall approaches for joint all-domain operations.

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General Kelly (BA, Southwest Texas State University; MMAS, Air Command and Staff College; MS, National War College) is the commander, Air Combat Command, Joint Base Langley-Eustis, Virginia. As the commander, he is responsible for organizing, training, equipping, and maintaining combat-ready air, space, cyber, and intelligence forces for rapid deployment and employment while ensuring strategic air defense forces are ready to meet the challenges of peacetime air sovereignty and wartime defense.

Notes

1. Joint Concept for Operating in the Information Environment (JCOIE), <https://www.jcs.mil/>, July 2018; Department of Defense (DOD), *Department of Defense Strategy for Operations in the Information Environment*, <https://dod.defense.gov/>, June 2016; DOD, *Summary of the 2018 National Defense Strategy of the United States of America*, 2018, <https://dod.defense.gov/>; and DOD, *Department of Defense Strategy for Operations in the Information Environment*, <https://dod.defense.gov/>, June 2016.

2. Joint Publication (JP) 3-0, *Joint Operations*, <https://www.jcs.mil/>, October 2018.

3. JP 3-0, *Joint Operations*.

4. DOD, *Department of Defense Strategy for Operations in the Information Environment*.

5. JCOIE, July 2018.

6. Brig Gen George M. Reynolds, USAF, "Achieving Convergence in the Information Environment," *Air & Space Power Journal (ASPJ)* 34, no. 3, <https://www.airuniversity.af.edu/ASPJ/>.

7. JP 3-0, *Joint Operations*.

8. Joint Chiefs of Staff (JCS), Joint Doctrine Note 1-19, "Competition Continuum," June 2019, <https://www.jcs.mil/>.

9. JCS, Joint Doctrine Note 1-19.

10. JP 5-0, *Joint Planning*, June 2017, <https://www.jcs.mil/>.

11. Chairman of the Joint Chiefs of Staff Instruction 3100.01D, *Joint Strategic Planning System*, <https://www.jcs.mil/>, July 2018.

12. Barry Blechman and Stephen S. Kaplan, *Force Without War: U.S. Armed Forces as a Political Instrument* (Washington, DC: Brookings Institution, 1978).

13. JP 5-0, *Joint Planning*.

14. Blechman and Kaplan, *Force Without War: U.S. Armed Forces as a Political Instrument* (Washington, DC: Brookings Institution, 1978).

15. *Department of Defense Dictionary of Military and Associated Terms*, <https://www.jcs.mil/>.

16. JP 5-0, *Joint Planning*.