



CURTIS E. LEMAY CENTER

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USAF ROLE IN JOINT ALL-DOMAIN OPERATIONS

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The reemergence of great power competition during a period of technological advancement and proliferation has eroded the United States' comparative military advantage. Our adversaries have evolved their capabilities and operational approaches to avoid and counter our strengths. To deter and if necessary defeat adversaries, the United States Air Force must contribute to joint all-domain operations (JADO) to rapidly sense, command and control, target, and support actions across all warfighting domains ([National Defense Strategy of the United States of America, 2018](#) [unclassified summary]).

USAF doctrine recognizes the importance of JADO. "The proper application of a coordinated force across multiple domains can produce effects that exceed the contributions of forces employed individually" (Air Force Doctrine Volume 1, [Basic Doctrine](#)). However, recent studies, wargames, and collected observations show a need to provide a clear and comprehensive doctrinal framework for conducting JADO.

This doctrine note guides the development of JADO doctrine for the Air Force. It establishes working definitions and a framework for JADO doctrine development (Chairman of the Joint Chiefs of Staff Manual 5120.01A, [Joint Doctrine Development Process](#)). It includes an overview of evolving doctrine topics and provides the starting point for Airmen to codify best practices across the continuum of conflict. **Air Force Components support JADO by conducting operations principally in, from and through the domains of air, space, cyberspace and the electromagnetic spectrum (EMS) to enable convergence of effects in all domains.**

WORKING DEFINITIONS OF KEY TERMS

Domain: A sphere of activity or influence with common and distinct characteristics in which a force can conduct joint functions.¹

¹ Joint Publication (JP) 3-0, [Joint Operations](#), describes the operational environment as encompassing the physical domains of air, land, maritime, and space; and the information environment, which includes the cyberspace domain; and the electromagnetic spectrum. It also describes the joint functions as related capabilities grouped together to help commanders integrate, synchronize, and direct operations. The

Joint All-Domain Operations (JADO): Comprised of air, land, maritime, cyberspace, and space domains, plus the EMS.² Actions by the joint force in all domains that are integrated in planning and synchronized in execution, at speed and scale needed to gain advantage and accomplish the mission.

Joint All-Domain Command and Control (JADC2): The art and science of decision making to rapidly translate decisions into action, leveraging capabilities across all domains and with mission partners to achieve operational and information advantage in both competition and conflict (Based on *JADC2 Cross-Functional Team Charter/Terms of Reference*).

Information Advantage: The application of information capabilities, including space, cyberspace, EMS, and influence, resulting in comparative advantage to support all-domain operations. It includes intense targeting of adversary command and control and intelligence, surveillance, reconnaissance, and targeting. In the decision cycle, information advantage provides the ability to acquire, process, and present contextually relevant information from across all domains for action faster than an opponent.³

WHY ARE JOINT ALL-DOMAIN OPERATIONS NECESSARY?

Operations in all domains are becoming increasingly interconnected, interdependent and challenged. Anti-access and area denial threats, reduced freedom of maneuver, and rapid proliferation of advanced technologies, challenge the Air Force's ability to operate effectively in the future. The USAF will need to converge integrated effects across multiple domains to present an adversary with dilemmas at a tempo that complicates or negates their response and enables the joint force to operate inside the adversary's decision-making cycle.

Air Force forces currently participate in JADO; however, such operations are primarily conducted in permissive environments and are not subject to the stresses likely to exist in a contested operating environment across the competition continuum. Supporting capabilities are not sufficiently interoperable, and processes are not agile enough to meet the needs of the anticipated future operating environment at the scale and speed which will be required.

WHAT ARE JOINT ALL-DOMAIN OPERATIONS?

USAF contributions to JADO synergize actions within the Service, as well as ensure that the Air Force Components presents capabilities to the joint force in

seven basic groups are C2, information, intelligence, fires, movement and maneuver, protection, and sustainment.

² Joint Warfighting Concept Terminology and Talking Points, obtained from Joint Staff correspondence, 23 Jan 2020.

³ Ibid.

ways that can be effectively integrated across all domains. JADC2 is conceptually equivalent to C2 of a single-Service component, while providing the framework, connectivity and infrastructure for C2 in all domains. This doctrine note will use JADC2 to refer to the C2 of JADO.

Joint connotes activities, operations, organizations, etc., in which elements of two or more Military Departments participate (JP 1, [Doctrine for the Armed Forces of the United States](#)). Joint operations are led by a joint force commander (JFC). Historically, each Service has developed expertise and forces to operate in a primary domain. In current doctrine, a single commander is normally designated for each domain (air, land, maritime, and, increasingly, space and cyberspace) to oversee the creation of effects in, from, and through that domain. This ensures unity of command and unity of effort within each domain, but also tends to stovepipe operations within the domains' subordinate command nodes. This leads commanders and staffs to focus primarily on their designated domain. Currently, the Services provide expertise in the domain central to their operations to a JFC. JFCs are typically selected from the component with the preponderance of forces in the primary projected operating domain and they develop an operational approach to create and maintain the conditions for joint force success, informed by their domain expertise. The components under the JFC's direction then develop integrated plans to support the JFC's campaign based on their respective domain expertise. This initial stovepiping can delay integration, which limits synergies between activities in separate domains, creates vulnerabilities, and reduces the capacity for dynamic exploitation of opportunities.

JADO requires an approach that evolves continuously to take advantage of opportunities as they arise and present a flexible, responsive defense.

Commanders should consider all domains from the beginning of the planning process and be empowered to coordinate dynamic all-domain retasking throughout execution. This requires a planning and execution paradigm shift. **Regardless of Service or domain affiliation, commanders should effectively leverage forces and capabilities from all domains.**

Domain integration shortfalls are also apparent in component planning and operations. The Air Force has historically employed air forces primarily through the air domain with space and cyberspace capabilities in a supporting role. Successful USAF contributions to JADO depend upon an all-domain employment of integrated airpower – “the ability to project military power or influence through the control and exploitation of air, space, and cyberspace to achieve strategic, operational, or tactical objectives” ([Volume 1](#)).

The USAF provides synergistic effects in air, space, cyberspace, and the electromagnetic spectrum that the joint force uses against adversaries. This capability must be scalable to confront a peer adversary. JADO should enable the engagement of thousands of targets in hundreds of hours.

JADO AND AIRPOWER THEORY



“Victory in future combat will depend less on individual capabilities and more on the integrated strengths of a connected network available for coalition leaders to employ....

What I’m talking about is a fully networked force where each platform’s sensors and operators are connected.

The goal [is to combine to] produce multiple dilemmas for our adversaries in a way that will overwhelm them.... An even better outcome... is to refine [JADO] to the point where it produces so many dilemmas for our adversaries that they choose not to take us on in the first place.”

--Air Force Chief of Staff Gen David Goldfein
Remarks to the Air Force Association,
17 September 2019

Successful JADO requires the ability to adapt more effectively than an adversary, while reducing the adversary’s ability to adapt. The OODA loop (observe, orient, decide, act) was originally conceived by airpower theorist John Boyd as a thought process for winning in aerial combat. Boyd’s theoretical insights focus on how physical and cognitive elements can create advantage against thinking, adapting adversaries in war. The OODA loop describes manipulating the tempo of the cognition and action processes, and correctly choosing the appropriate action at the most opportune moment to defeat an adversary. This idea of adaptive feedback loops is integral to JADO, and while increasing the pace of adaptation and action is

important, increased speed is not the only goal. **A central challenge of JADO is turning large amounts of multi-source data into actionable intelligence, enabling leaders to drive operations by observing, orienting, deciding, and acting correctly based on that information.**

Sensing Grid (Observe and Orient)

In JADO, sensing (observing) is a continuous effort that feeds multiple decision loops. The current process does not adequately integrate across all domain sensing activities. Cross-cueing and fusing collection activities between domains will enable construction of an integrated picture of the operating environment. For example, intelligence gathered from the air domain can be used to shape cyberspace collection activities, or vice versa. The ability to sense the battlespace across all domains currently relies on a relatively small number of expensive, high-tech, purpose-built systems. The Air Force should leverage a wider array of collection platforms and methods to improve the intelligence picture. A network of networks, coupled with good theoretical underpinnings

for collection and management of data and systems, will be the basis of a JADC2 system.

Orienting in the operational environment involves processing data into actionable intelligence, to enable information advantage. A JADC2 system will significantly improve both the sensing and orienting phases, by enabling decision-makers to understand interrelationships between data from different domains and their impact on joint force activities. However, the ability to orient requires more than a technical solution. Airmen will need to leverage current systems to process data rapidly into information and flatten information distribution. Fighting in an integrated, yet distributed, manner requires robust, resilient communications structures. Traditional communications structures rely on highly centralized communications nodes that also act as command and control nodes. Modern communications structures rely on multiple simultaneous paths. This distributed nature makes them more robust and resilient in the face of attack, but could be in tension with traditional military hierarchical decision-making and communications. **JADO requires access to information at all levels.** Dynamic all-domain adaptation is only possible when leaders can determine which actions are appropriate for the operational and strategic goals of the campaign, and can detect when contextual changes invalidate assumptions that underpin commander's intent.

Command and Control (Decide)

Centralized control and decentralized execution is a key tenet of Air Force doctrine ([Volume 1](#)), and of command and control (C2) for joint air operations (JP 3-30, [Joint Air Operations](#)). It is how joint air forces execute mission command⁴ through mission-type orders⁵ and is similar to command by negotiation.⁶ In recent operations, centralized control has been emphasized at the expense of decentralized execution. Two decades of relatively uncontested superiority and increasing communication capability has led to a situation where most Air Force forces have little experience with decentralized operations. Even a robust JADC2 system will not guarantee continual reachback in a contested environment. JADO require greater decentralized execution, a higher degree of delegated authority, and less dependence on central planning and direction of missions.

⁴ Mission command is the conduct of military operations through decentralized execution based upon mission-type orders (Joint Publication [JP] 3-31, [Joint Land Operations](#)).

⁵ Mission-type orders are those issued to lower units that include the accomplishment of the total mission assigned to the higher headquarters and orders units to perform the mission without specifying how it is to be accomplished (JP 3-50, [Personnel Recovery](#) [common access card required]).

⁶ Command by negotiation enables command of distributed and dispersed forces by pre-planning delegation of authority to subordinate commanders. Once functions are delegated, the subordinate commander takes required action without delay (JP 3-32, [Joint Maritime Operations](#)).

"It is a given in future conflicts that the joint force will be conducting operations in a contested environment. We must be prepared to execute in a degraded C2 environment where clearly delineated and forward thinking commander's intent will be a requirement. It is imperative senior leaders provide our commanders with conditions-based authorities delegated to the lowest capable and competent level, and empower command by negation to accept the appropriate level of risk, all while working toward moments of clear C2."

**--- General CQ Brown, Jr.,
Commander, Pacific Air Forces**

One tool enabling decentralized execution is a conditional authority matrix in which the conditions necessary to delegate authority to lower echelons are designated prior to the operation. The conditional authority matrix includes considerations such as priority of effort, duration, and resources. Conditional authority enables the command and control process to function under contested and degraded conditions. However, even the most robust conditional authority matrix cannot cover every possible situation. **To achieve decentralized execution, commanders must**

clearly convey intent and subordinates should be empowered to act on that intent absent further guidance. Mission command, mission type orders, and command by negation are effective strategies for executing JADC2.

In JADO, supporting/supported relationships may shift rapidly between forces and across domains during a single engagement. Current doctrinal understandings of relatively static supporting/supported relationships may be inadequate to enable future operations. The current practice of embedding liaison elements between components and domains has not enabled the speed or scope of operations necessary for JADO. In JADO, forces should contribute permanent members to a joint all-domain operations center. This will facilitate rapid transitions between supporting/supported roles among forces from various domains.

Targeting as Convergence of Effects (Act)

The goal of JADO is to achieve convergence of effects across all domains for continuing advantage. This presents the adversary with multiple dilemmas (situations where, no matter what choice they make, we will gain). JADO targeting should utilize kinetic and non-kinetic capabilities to converge lethal and non-lethal effects at key points in time and space. The functional components (air, land, maritime) currently synchronize their targeting cycles at the JFC level while space and cyberspace forces operate their own, independent targeting cycles. JADO will require convergence of planning cycles to integrate and synchronize sensing, targeting, and execution across domains. To maintain tempo, staffs must have operational flexibility to observe and orient on new opportunities, quickly decide, and then enable action across all domains.

AGILE SUPPORT

To enable JADO, Air Force forces must have support processes to sustain operations in a contested battlespace as part of globally integrated operations.

All-Domain Protection

Physical protection of friendly forces will continue to become more difficult as adversaries gain access to enhanced sensing capabilities and the ability to launch strikes against any fixed position. This includes a range of threats from sophisticated capabilities like hypersonic weapons to relatively unsophisticated weapons like kamikaze drones.

It will be increasingly difficult to disguise the physical and digital signatures of forces on the battlefield. Even unsophisticated adversaries will be able to leverage ubiquitous sensing (through individually held cellphones, distributed networks of sensors, commercial communications networks, and social media reporting). Threat systems, including long-range missiles and unmanned systems, are increasingly capable of putting forward-based assets at risk. These challenges require a re-imagining of the classic practices of camouflage, concealment, military deception, and extension of these principles across all warfighting domains.

Agile basing is a critical protection capability. Future conflict requires air and space forces to begin from a distributed force laydown, marshal, mass when needed and then disperse for reconstitution, rearming, and repair. The Air Force currently operates in this way from a limited number of fixed bases. Increasing dispersal options without limiting asset effectiveness is a critical enabler of JADO.

Cyberspace and electromagnetic warfare protection remain critical enablers. The loss of confidentiality, integrity, and availability of data will hinder JADO. Physical protection, and cyberspace and electromagnetic hardening of JADO assets must be planned in advance of an operation and may require dedicated protection capabilities.

Resilient Sustainment and Logistics

Another challenge to JADO is the ability to sustain a force to conduct operations at a scale and scope sufficient to continually present the enemy with dilemmas. Airpower must be able to rapidly engage at an adversary's point of weakness and exploit opportunities. With limited ability to forecast where opportunities may occur, logistical flexibility must mirror operational flexibility.

JADO capabilities should function with less intensive sustainment processes and resources. Systems need to be simple, modular, and maintainable in a forward position. JADO require a shift from the current dependence on static infrastructure, centrally controlled efficient logistics, highly specialized maintenance equipment and materials, and a large contractor and support manpower footprint. Air Force forces need the

capability to provide sustainment from range with minimal dependence on large, fixed infrastructure.

Effectiveness must be prioritized over efficiency to generate adaptive capability that is not dependent on centralized logistics. Distributed operations require redundancy in supply distribution and deliberately planned level of slack in the logistics chain that enables operations independent from central logistics chains and hubs. Current models of sustainment, maintenance, and logistics that depend on contractor-specific proprietary solutions will not be viable in contested conditions. Development and employment of agile, responsive, and quickly deployable maneuver logistics is key. Sustained operations will require pre-delivered, forward-based caches of critical supplies and the basic infrastructure needed to move and replenish them within the operational area. Local freedom of action will require local access to logistics.

Finally, efforts to integrate all-domain planning from inception are limited by linear logistical realities. As a result, execution will always depend on the positioning of logistics. This will include giving commanders time to understand competing priorities and make apportionment decisions between multiple simultaneous operations with limited assets to support them.

CONCLUSION

JADO requires changing how the United States Air Force thinks about and conducts operations. This doctrine note will inform relevant and forward-looking JADO doctrine and provide a mechanism to quickly evolve Service doctrine to the changing security environment.



David L. Goldfein
General, USAF
Chief of Staff