DEPARTMENT OF DEFENSE

March 2022

SUMMARY OF THE JOINT ALL-DOMAIN COMMAND & CONTROL (JADC2) STRATEGY

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FOREWORD

In the current global security environment, the United States military faces agile adversaries who increasingly seek to undermine our strategic and operational strengths by impeding, and, where possible, denying our command and control (C2) capabilities. The ability of the U.S. military to regain and maintain information and decision advantage is one of the Department's top priorities.

This Joint All-Domain Command and Control (JADC2) strategy describes the urgent need for a focused Departmental push on actions to empower our Joint Force Commanders with the capabilities needed to command the Joint Force across all warfighting domains and throughout the electromagnetic spectrum to deter, and, if necessary, defeat any adversary at any time and in any place around the globe.

The JADC2 Strategy provides a vision and an approach for identifying, organizing and delivering improved Joint Force C2 capabilities, and accounts for adversaries who have closed many of the capability and methodology advantages we depend upon for operational success. As an approach, JADC2 supports the development of materiel and non-materiel solution options using innovative technologies coupled with a willingness to modify existing policies, authorities, organizational constructs, and operational procedures to deliver information and decision advantage to Joint Force Commanders.

EXECUTIVE SUMMARY

Rapid changes in the global security environment are presenting significant new challenges to the U.S. military and the ability of the Joint Force to seize, maintain, and protect our information and decision advantage over our adversaries. In addition, we must anticipate that future military operations will be conducted in degraded and contested electromagnetic spectrum environments. These challenges require a coherent and focused Departmental effort to modernize how we develop, implement, and manage our C2 capabilities to prevail in all operational domains, across echelons, and with our mission partners.

JADC2 provides a coherent approach for shaping future Joint Force C2 capabilities and is intended to produce the warfighting capability to sense, make sense, and act at all levels and phases of war, across all domains, and with partners, to deliver information advantage at the speed of relevance. As an approach, JADC2 transcends any single capability, platform, or system; it provides an opportunity to accelerate the implementation of needed technological advancement and doctrinal change in the way the Joint Force conducts C2. JADC2 will enable the Joint Force to use increasing volumes of data, employ automation and AI, rely upon a secure and resilient infrastructure, and act inside an adversary's decision cycle.

Successful implementation of this strategy requires a focused commitment throughout the Department of Defense (DoD). To this end, the JADC2 Strategy articulates three guiding C2 functions of 'sense,' 'make sense,' and 'act,' and an additional five enduring lines of effort (LOEs) to organize and guide actions to deliver materiel and non-materiel JADC2 capabilities. The LOEs are: (1) Establish the JADC2 Data Enterprise; (2) Establish the JADC2 Human Enterprise; (3) Establish the JADC2 Technical Enterprise; (4) Integrate Nuclear C2 and Communications (NC2/NC3) with JADC2; and (5) Modernize Mission Partner Information Sharing.

This strategy is supported by a JADC2 Strategy Implementation Plan that identifies JADC2 end states, key objectives and tasks, and works with and through established Departmental authorities, forums, and processes to synchronize and streamline efforts to prioritize, resource, develop, deliver, and sustain JADC2 capabilities. Existing Service and Agency development and acquisition processes routinely produce domain-specific capabilities unable to meet the operational demands of all-domain C2. The JADC2 approach will overlay these existing processes with the intent to stimulate development of radically improved cross-domain, joint capability.

The strategy provides six guiding principles to promote coherence of effort across the Department in delivering materiel and non-materiel JADC2 improvements. These principles are: (1) Information Sharing capability improvements are designed and scaled at the enterprise level; (2) Joint Force C2 improvements employ layered security features; (3) JADC2 data fabric consists of efficient, evolvable, and broadly applicable common data standards and architectures; (4) Joint Force C2 must be resilient in degraded and contested electromagnetic environments; (5) Department development and implementation processes must be unified to deliver more effective cross-domain capability options; and, (6) Department development and implementation processes must execute at faster speeds.

The JADC2 Strategy concludes that the use of an enterprise-wide, holistic approach for implementing materiel and non-materiel C2 capabilities is urgently needed to ensure the Joint Force Commander's ability to gain and maintain information and decision advantage against global adversaries throughout the competition continuum.

INTRODUCTION

The JADC2 strategy articulates DoD's approach for advancing Joint Force C2 capabilities necessary to support U.S. national security interests. The National Defense Strategy directs the Joint Force to "gain and maintain information advantage, particularly in cyberspace, space, and the electromagnetic spectrum." The enormous task of moving JADC2 from concept to reality of guiding joint/combined capability development requires a clear vision, an effective strategy, and agile processes. Successful JADC2 implementation will produce improved Joint Force C2 capabilities and will require the accelerated application of technological solutions to C2 capability development, as well as the adaptation of governing policies and operational procedures.

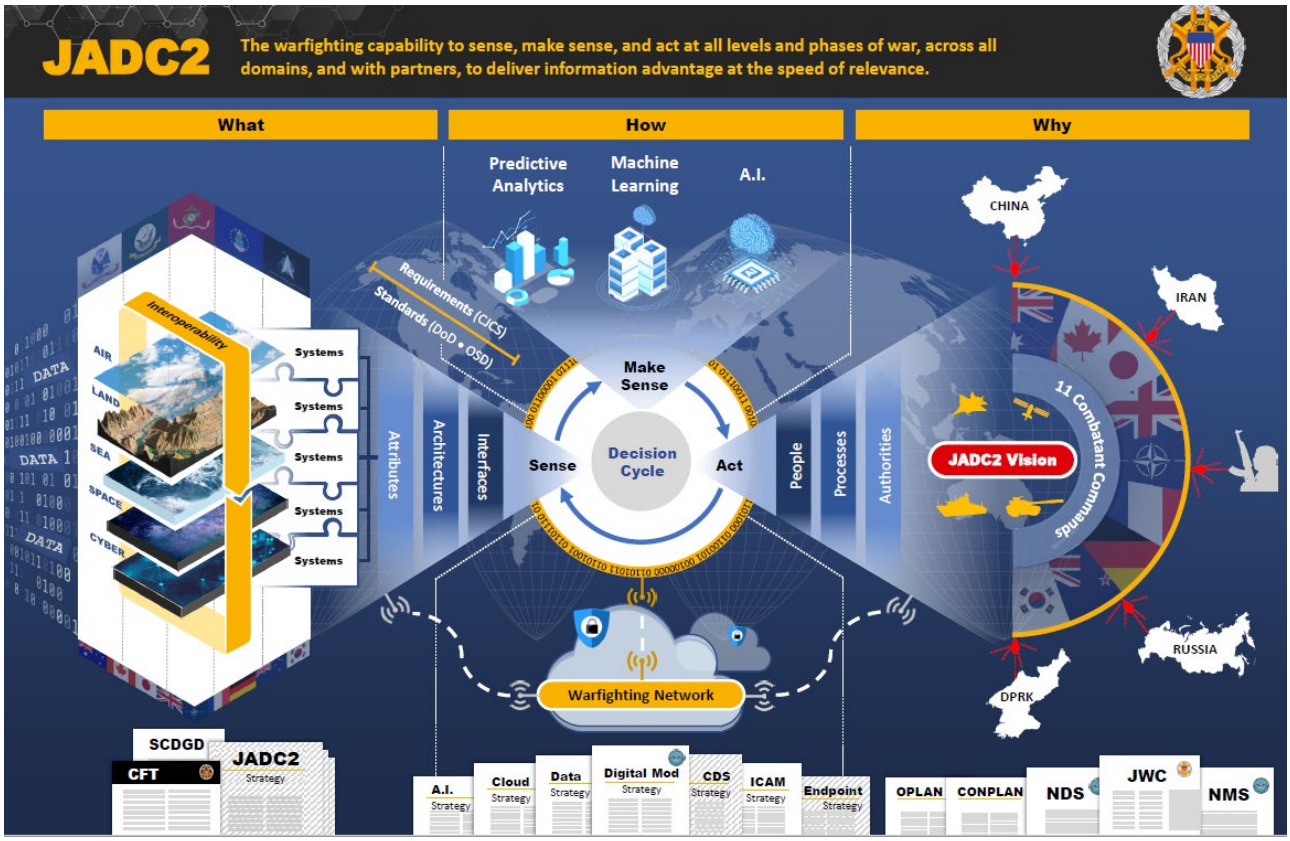

Figure 1 JADC2 Placemat

JADC2 provides an approach for developing the warfighting capability to sense, make sense, and act at all levels and phases of war, across all domains, and with partners, to deliver information advantage at the speed of relevance.

Figure 1 depicts the complexity of achieving all-domain C2: The Joint Force Commander relies upon guidance, technologies, procedures, and capabilities that are the result of many years of capability development and implementation in order to employ effective C2 in performing real-world mission tasks. JADC2 seeks to optimize the availability and use of information to ensure that the commander's information and decision cycle operates faster relative to adversary abilities. This holistic view identifies the Joint Force Commander as the primary beneficiary of Service and Agency C2 capability development efforts, and focuses Departmental C2 capability development outputs on delivering joint, all-domain

operational C2 performance and proficiency. To achieve this end, JADC2 will overlay the existing framework of Service- and Agency-based C2 capability development programs that currently deliver domain-centric and often duplicative information and decision management capabilities to the Joint Force. This 'overlay' methodology is a collaborative approach wherein all C2 capability development stakeholders support JADC2 as the unifying approach for optimizing developmental resources and priorities and maximizing the operational outcomes.

JADC2 APPROACH

The JADC2 strategy organizes its approach for improving Joint Force C2 through (1) the need for Joint Force Commanders to 'sense,' 'make sense,' and 'act' in the operational environment, and (2) the use of five functional areas of focus, or LOEs, to guide the development and implementation of improved C2 Joint Force capabilities. In this approach, JADC2 incorporates existing Departmental, Service, Agency, and operational requirements and capabilities development processes to shape the delivery of future materiel and non-materiel C2 capabilities.

Implementation of this strategy is overseen by the JADC2 Cross-Functional Team (CFT), a Deputy Secretary of Defense-chartered body composed of Flag/Senior Executive Service (SES)-level members from across the Combatant Commands, Services, Defense Agencies, Joint Staff, and OSD staff. The primary means for identifying and implementing prioritized C2 improvements is execution of the JADC2 Implementation Plan.

Sense - Integrate Information Across All Domains and the Electromagnetic Spectrum

Steady increases in the amount of data and information in all domains requires implementation of advanced sensing methods and information management technologies to enable improved information collection in the operational environment. JADC2 supports use of innovative data sharing options by the Joint Force and our mission partners through various intelligence sensing and information sharing networks that use federated data 'fabrics.'[1] This data and information sensor ecosystem exploits remote sensors, intelligence assets, and open sources to sense and simultaneously integrate information from and within all domains to enable the Joint Force Commander to achieve information and decision advantage.

"Sense and integrate" is the ability to discover, collect, correlate, aggregate, process, and exploit data from all domains and sources (friendly, adversary, and neutral), and share the information as the basis for understanding and decision-making. The requirements for effective data integration must be considered from the earliest stages of data sharing and security, and applied across the warfighting domains in order to deliver rapid collection, fusion, and customization of data.

Make Sense - Understand the Operational Environment

"Make Sense" refers to analyzing information to better understand and predict the operational environment and the actions and intentions of an adversary, as well as the actions of our own and friendly forces. It is in sense-making that data transforms into information and information transforms into knowledge. Effective

[1] The working definition for "JADC2 data fabric" is: "A DoD federated data environment for sharing information through interfaces and services to discover, understand and exchange data with partners across all domains, echelons and security levels."

sense-making requires the ability to fuse, analyze, and render validated data and information from all domains and the electromagnetic spectrum. This function must execute within a secure information environment while remaining readily accessible to all authorized personnel. Ultimately, it must result in a reliable and sustained real-time understanding of the operational environment that is shared across the Joint Force and with our mission partners.

JADC2 developed capabilities will leverage Artificial Intelligence and Machine Learning to help accelerate the commander's decision cycle. Automatic machine-to-machine transactions will extract, consolidate and process massive amounts of data and information directly from the sensing infrastructure. Such improvements will require the Joint Force to adapt and modernize existing tactical, operational, and strategic C2 processes and capabilities, to include re-thinking how the DoD tests and integrates the Service's C2 capabilities into a larger and more powerful all-domain C2 capability. Equally important, these procedural and technical advances will significantly enhance the Joint Force's ability to operate in a C2 degraded environment.

Act - Decide and Disseminate

To "Act" is to make and disseminate decisions to the Joint Force and its mission partners. It combines the human elements of decision-making with the technical means to perceive, understand, and predict the actions and intentions of adversaries, and take action. This includes accounting for the nuances of how a decision is delivered and how well a Commander's direction is understood and executed. Planning and decision support applications will be employed across the Joint Force and underpinned by advanced, resilient and redundant communication systems, an accessible and comprehensive transport infrastructure, and flexible data formats: All of which ensure the rapid, accurate, and secure dissemination of decisions.

"Act" also means that subordinate commanders at all levels within the Joint Force are properly trained in and empowered with the tenets of Mission Command. Using a Mission Command approach, subordinate commanders are able to act with confidence and authority through understanding a senior commander's operational intent while retaining the ability to act when communications linkages are broken or when the urgency of operations precludes the time necessary to seek guidance. Mission Command provides the Joint Force the agility and trust needed to seize the initiative and maintain information and decision advantage.

JADC2 LINES OF EFFORT (LOE)

The JADC2 strategy organizes around five LOEs to guide Department actions in delivering JADC2 capabilities, as follows: 1) Data Enterprise; 2) Human Enterprise; 3) Technology Enterprise; 4) Integrating with Nuclear C2 and C3; and 5) Modernizing Mission Partner Information Sharing. Each LOE is guided by an Office of Primary Responsibility represented by senior Flag/SES persons who are empowered to raise issues and interact with and support the Joint Requirements Oversight Committee through its Joint Capability Board. Additional JADC2 governance details are described in the JADC2 Strategy Implementation Plan.

LOE 1: Establish the JADC2 Data Enterprise

Data is a strategic asset and must be effectively managed by the Joint Force to enable it to seize, maintain, and protect information and decision advantage. To accelerate decision-making, the Joint Force and our mission partners must be able to discover and access any data and information from all warfighting domains

and at all levels of warfare.[2] The following key data standardization objectives will directly impact the Joint Force Commander's ability to manage and use data:

- Establishment of minimum metadata tagging criteria;
- Adoption and use of standardized data interfaces;
- Implementation of common data availability and access practices;
- Incorporation of data security best practices;
- Establishment of JADC2 conformant Information Technology (IT) standards; and,
- Continued application of data strategic objectives (Visible, Accessible, Understandable, Linked, Trustworthy, Interoperable, Secure).

LOE 2: Establish the JADC2 Human Enterprise

The ever-increasing availability of data and information in the operational environment threatens to overwhelm the Joint Force technical means of collecting and aggregating such information. This problem is compounded by existing organizational structures and decision processes that are being out-paced and require new approaches to ensure the Joint Force Commander's ability to seize opportunities and maintain advantages.

LOE 2 has a specific focus on human performance in C2 capabilities and addresses the use of innovative Artificial Intelligence and Machine Learning tools. Such innovations, in turn, will drive the need to produce predetermined, pre-approved, event-driven, bundled authorities that enable rapid, relevant decision-making from the strategic level to the tactical edge. This may require reforming, realigning, or creating organizations with the structure, agility, and resources to more effectively blend physical and informational power of the Joint Force and its mission partners such that they are capable of exercising effective control of Joint Information Advantage (JIA) operations.

This LOE also addresses the professional development needed to train and educate leaders to be proficient in operations across all warfighting domains. It will guide and support development of JADC2 aspects of policies, concepts of operation (CONOPS), doctrine, and tactics, techniques and procedures (TTPs) to optimize the advantages gained through new JADC2 capabilities. To this end, war-games, experiments, demonstrations, assessments, training, and exercises must be designed to focus on the C2 aspects of operations during competition and conflict. Likewise, the DoD workforce must be proficient in identifying institutional changes to achieve and sustain improved JADC2 capability development processes and products.

LOE 3: Establish the JADC2 Technical Enterprise

This LOE addresses enhanced shared situational awareness, synchronous and asynchronous global collaboration, strategic and operational joint planning, real-time global force visualization and management, predictive force readiness and logistics, real-time synchronization and integration of kinetic and non-kinetic joint and long-range precision fires, and enhanced abilities to assess Joint Force and mission partner performance.

Joint Force Commanders require secure, worldwide communications networks with sufficient speed and bandwidth to meet National Command Authority and Combatant Command warfighting needs. LOE 3 addresses the transport infrastructure of the JADC2 ecosystem, and provides the essential minimum features

[2] Joint Force data and information collection and use to be pursuant with U.S. law and DoD policy.

necessary to ensure continuous C2 capability, including communications system resiliency and diversity, multi-level security, and elimination of single points of failure. These cyber-hardened, advanced technologies will significantly improve the commander's ability to organize, understand, plan, decide, direct, and monitor all Joint Force and mission partner actions across all domains, and throughout periods of degraded and contested electromagnetic spectrum use.

LOE 4: Integrate NC2/NC3 with JADC2

Where appropriate, the JADC2 approach will collaborate and integrate with Nuclear C2 and Communications.

LOE 5: Modernize Mission Partner Information Sharing

The Joint Force Commander continuously strives to establish and maintain a common understanding of the operational environment through shared situational awareness with mission partners. Ideal mission partner system integration is realized when data from each partner's C2 systems can be accessed, viewed, and acted upon by every other approved partner. However, emerging missions, large coalitions, and evolving technologies present ongoing obstacles to achieving this goal. Ultimately, JADC2 system interoperability is foundational for conducting combined and partnered operations with speed, precision, relevance, and security. This LOE strives to broaden and improve the Joint Force's ability to exchange information and coordinate actions and effects in all types of combined operations.

JADC2 CAPABILITY GUIDING PRINCIPLES

The implementation of the JADC2 approach is guided by the following overarching principles.

Enterprise Designed and Scaled Information Sharing

Universal and continuous information sharing must be designed and operated at an enterprise level. JADC2 applications and processes will depend on multiple enterprise nodes and supporting communications networks to provide global connectivity with the bandwidth, functionality, and security needed to bring vital information to the Joint Force Commander.

Secure

Joint Force C2 must employ a layered defense spearheaded by a strong cyber defense to deter malicious activity that would threaten enterprise operations. The Joint Force must have clear policy guidance, sufficient authorities, adequate training, timely intelligence, and the technology necessary to conduct secure C2 in a globally contested environment. The Department must adopt a wartime mindset during day-to-day operations --- e.g., train as we fight --- and develop knowledgeable leaders and staffs trained to employ the tools and authorities at their disposal.

Data and Interoperability Standards-Driven

The Joint Force data fabric must consist of efficient, evolvable, and broadly applicable common data standards and architectures, with standardized key interfaces and services to access, aggregate, manage, store, process, and share data across a large environment with a wide variety of partners and operational uses.

Resilient in a Degraded Environment

The Joint Force must be able to operate with minimum guidance within a degraded or contested C2 environment, and commanders and staffs must train aggressively in conditions where sensing and communications are severely impacted or completely disabled, and where adversary intentions are ambiguous.

Unity of Effort in Capability Development

The Department must improve its C2 capability development and implementation processes to more readily adopt cross-domain priorities and solution options. The JADC2 CFT is the venue through which Department capability developers discuss, identify, collaborate, and recommend opportunities to improve C2 information sharing and interoperability within the Service and warfighting domains.

Delivering JADC2 Capabilities with Speed

The Department must continue to evolve its current approach to C2 development and acquisition, and adapt existing methodologies to more rapidly produce needed capabilities.

CONCLUSION

Changes in the global security environment, to include rising malign actions against the United States and wide-ranging advances in information technology, present urgent challenges and opportunities for the Joint Force. The JADC2 Strategy addresses these challenges and opportunities by advancing an interconnected and enterprise-wide approach for delivering materiel and non-materiel capabilities that support globally integrated operations. These capabilities will directly and dramatically improve a commander's ability to gain and maintain information and decision advantage.

The JADC2 Strategy articulates an enterprise approach for improving C2 of the Joint Force across all warfighting domains and throughout the electromagnetic spectrum. It addresses the unique aspects of human decision-making and seeks new opportunities to enhance the cognitive aspects of C2. The Strategy identifies the key C2 functions of sense, make sense, and act, along with five lines of effort to organize and guide the development and implementation of improved C2 capabilities.

Central to the success of the JADC2 approach is the JADC2 CFT. This body will collaboratively drive measurable positive change across the Department to achieve the capabilities, capacities, endurance and global reach required for all-domain C2.

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JOINT ALL-DOMAIN COMMAND & CONTROL
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