

required (where U.S. forces would use ground, air, naval, space, and cyber forces to challenge an adversary's targeting calculus). The Joint All-Domain Operations concept, thus, provides commanders access to information to allow for simultaneous and sequential operations using surprise and the rapid and continuous integration of capabilities across all domains—to try to gain physical and psychological advantages and influence and control over the operational environment.

DOD argues that current C2 programs, like the Air and Space Operation Centers, E-8C Joint Surveillance and Target Attack Radar System, and E-3 Airborne Warning and Control System are not optimized for the speed, complexity, and lethality of future conflict; that the decades-old platforms cannot adequately leverage new technology; and that the supporting structures to enable future C2 either do not exist or require maturation. Air Force officials have argued that a JADC2 architecture would enable commanders to (1) rapidly understand the battlespace, (2) direct forces faster than the enemy, and (3) deliver synchronized combat effects across all domains.

DOD Lines of Effort

DOD. DOD is leading a Joint Cross-Functional Team to explore JADC2 as the concept evolves. The team includes representatives from the offices of the DOD Chief Information Officer (CIO), the Under Secretary of Defense for Research and Engineering, and the Under Secretary of Defense for Acquisition and Sustainment. The DOD CIO has stated it plans to use 5G technologies to enable JADC2.

Joint Staff. The Joint Staff is leading efforts to move JADC2 from a concept to policies, doctrine, and requirements, and has designated the Air Force as the executive agent for JADC2 technology development. According to press reports, JADC2 is a component of the upcoming released Joint Warfighting Concept.

Air Force. To implement JADC2, the Air Force is developing the Advanced Battle Management System (ABMS). ABMS is a network intended to provide data to pass information across all domains. Air Force leaders stated that ABMS has been used to help facilitate DOD support during the COVID-19 pandemic. Throughout FY2020, the Air Force has held at least three ABMS demonstrations, connecting Army and Navy systems.

Army. The Army's modernization strategy identified network modernization to enable multidomain operations. Army Futures Command is the service representative developing the JADC2 concept. As part of an exercise called Project Convergence, it has conducted a series of experiments demonstrating the service's ability to provide access to joint and coalition networks. The Army tested several concepts transmitting targeting information using nontraditional methods in September 2020 in Project Convergence's first demonstration.

Navy. On October 1, 2020, the Navy announced it would start Project Overmatch, which it plans to integrate into the overall JADC2 concept. The Navy states that Project Overmatch is intended to develop a new fleet architecture using artificial intelligence and manned/unmanned teaming to enable Distributed Maritime Operations. The Navy has stated one of its primary focus to support the JADC2 effort

is to remove proprietary network standards, thus enabling interoperability with the other services. According to recent press coverage, the Navy has focused on its own networks but plans to integrate with the Army and Air Force.

JADC2 Experimentation

DOD has held at least two major JADC2 exercises. The first, held in Florida in December 2019, focused on a simulated cruise missile threat. The exercise represented the first demonstration of ABMS. Air Force and Navy aircraft (including F-22 and F-35 fighter jets), a Navy destroyer, an Army Sentinel radar system, a mobile artillery system, plus commercial space and ground sensors demonstrated being able to collect, analyze, and share data in real-time to provide a fuller picture of the operating environment.

DOD performed a second test of JADC2 in July 2020. During this test, Air Force aircraft connected with naval vessels positioned in the Black Sea, along with special operations forces and eight other NATO nations, in a simulated environment to counter a potential Russian threat.

JADC2 FY2021 Request and Authorization Funding Levels

The Administration's FY2021 budget request combined the Multidomain Command and Control and the ABMS into a single program. DOD requested \$302.3 million for ABMS in FY2021. The Senate (S. 4049) would authorize \$302.3 million for the program. The House (H.R. 6395) would reduce the requested amount to \$216.3 million (an \$85 million decrease) due to unjustified growth. The House Appropriations Subcommittee on Defense (H.R. 7617) recommended reducing the ABMS program by \$50 million; the Senate Appropriations Subcommittee on Defense recommended reducing ABMS by \$93 million.

Potential Questions for Congress

- What is the relative priority for JADC2 compared with other major DOD programs?
- Have all of the military services embraced the JADC2 concept, or is there some resistance within DOD?
- What personnel, equipment, facilities, and training resources would be required to achieve JADC2?
- What is the estimated cost for force-wide implementation and lifecycle upkeep of JADC2? When could the network become operational?
- What role would AI have in JADC2 development?
- How much human-in-the-loop is necessary if sensors are linked to shooters in real-time?

CRS Products

CRS Report R46564, *Overview of Department of Defense Use of the Electromagnetic Spectrum*, by John R. Hoehn, Jill C. Gallagher, and Kelley M. Saylor
 CRS In Focus IFI1654, *The Army's Project Convergence*, by Andrew Feickert

This report was originally written by Nishawn S. Smagh during his military fellowship with CRS.

John R. Hoehn, Analyst in Military Capabilities and Programs

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