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Data: The Future of Warfare.

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Image credits:Joint All-Domain Command, Control Framework Belongs to Warfighters > U.S. Department of Defense > Defense Department News

Over the last twenty years, the importance of the latest weapons in modern warfare has been called into question. Indeed, it has been largely debated that victory in future high-intensity conflicts may no longer be contingent on who possesses the best warships, planes, and tanks (i.e., the best equipment) but rather on who can better handle information to act faster and more effectively than their adversary (Work & Fabian, Breaking Defense, 2021). Future wars are expected to be short, precise, and decisive. This new kind of warfare may require decisions to be made within hours, minutes or potentially seconds, compared with the current multi-day process to analyse the operating environment and issue commands. That is the reason why last May, Defense Secretary Lloyd Austin approved the strategy document for the Defense Department's Joint All-Domain Command and Control, paving the way to implement technology that shares data between the services to improve the quality and speed of tactical decision-making (Jasper, NextGov, 2021).

Joint All-Domain Command and Control (JADC2) is a Pentagon-wide concept to efficiently share streams of battlefield information from a myriad of systems to provide commanders with an unprecedented amount of data on which to base their decisions (Eversden, Breaking Defense, 2021). Not only does it focus on transmitting information securely, it also focuses on executing data and information processing, organisation, analysis, and data fusion. It can be simply described as information-driven warfare due to the efforts to connect dissociated combat platforms or nodes in real-time, be they fighter jets, bombers, tanks, drones, or ground control centres. To do this, a vast amount of sensor data needs to be gathered and properly processed and analysed, so the most pressing and relevant details are identified and transmitted across the force according to the mission's needs and changing threats. This explains why so much of JADC2 is being improved through the application of AI-empowered algorithms, computers, and databases (Osborn, The National Interest, 2021). The concept's efforts aim at connecting sensors from all military services – Air Force, Army, Marine Corps, Navy, and Space Force – into a single network.

Historically, each military service has developed its tactical network that was incompatible with those of other services – the Army networks were not able to communicate with Navy or Air Force networks and vice versa. This ability to handle, process, and transmit data in the shortest amount of time will be crucial for future conflicts against peer competitors China and Russia. To keep potential adversaries at bay, the JADC2 attempts to provide a cloud-like environment for the joint force to share intelligence, surveillance, and reconnaissance data, transmitting across many communications networks, to enable faster decision making (Congressional Research Service, July 2021). It will also gather all sensor information and connect all warfighters, favouring the decision-making process. By way of example, an Air Force unmanned aerial vehicle often detects a potential threat, but the best weapon against it could be a Navy missile fired from offshore. A call for fire from an infantry battalion could be answered by tube artillery, rocket artillery, naval gunfire, or close-air support from any service, for instance (Garamone, U.S. Department of Defense, 2020). To better describe the overall goal of the JACD-2, we can draw an analogy to Uber, which combines two different apps, one for riders and another for drivers. Uber's algorithm determines the optimal match based on several factors – travel, distance, and passengers. The application then seamlessly provides directions for the driver to follow, delivering the passengers to their destinations. In doing so, Uber relies on cellular and wi-fi networks to transmit data to match riders and provide driving instructions. So far, to match the progress made at the theoretical level, the Department of Defense (DoD) has held at least two major JADC2 exercises.

The first exercise took place in Florida in December 2019 and focused on a simulated cruise missile threat. The exercise represented the first demonstration of the Advanced Battle Management System (ABMS), an Air Force network intended to provide data to pass information across all domains. The Air Force and Navy both participated, using 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 able to collect, analyse, and share data in real-time to provide a broader picture of the operating environment. One year later, in July 2020, the DoD carried out a second test within the JADC2 framework. During this test, Air Force aircrafts connected with naval vessels positioned in the Black Sea, along with special operations forces and eight other NATO nations, to counter a potential Russian threat in a simulated environment.

However, despite this step forward, a few obstacles along the way have brought overall progress to a grinding halt. Although over the past few years the DoD has spent a vast amount of resources on developing Command Control, Communications, Computers, and Information (C4I) – which is undeniably a good thing – the biggest share has been concentrated on major service programmes, such as the Amy's Integrated Air and Missile Defense Battle Command System (IBCS), and the Navy's Consolidated Afloat Network and Enterprise Services (CANES) (Work & Fabian, 2021). The problem is that these services were not necessarily designed with joint interoperability in mind and, given the number of expenditures, it would be highly complicated – if not impossible – for the Department to simply scrap these systems and start over with a singular joint solution (Work & Fabian, 2021).

This problem automatically leads to another one. Each service is developing its own network, which is a positive step. The Air Force is working on ABMS, the Army is working on Project Convergence, and the Navy is working on Project Overmatch. However, these three programmes should bring each service closer and eventually connect them, primarily in cooperation rather than interoperability. Last but not least, the remaining concerns are about the bureaucracy and authority. JADC2 remains an ambitious yet complicated initiative since it involves separate development projects in each of the major military branches with their own technological and bureaucratic complexities (Eversden, Breaking Defense, 2021). As stated by David Markowitz, Chief Data Officer of the US Army, the US Army is the biggest in the world, and it is simply impossible to modernise everything at once. It will take time to achieve all the goals of the JADC2, but interoperability will be achieved along that way (Markowitz, Innovation Connect, 2021). The issue of authority is just as important as that of bureaucracy. According to some military analysts, the question of decision-making authority across domains will represent a problem, considering that, traditionally, command authorities are delegated in each domain rather than from an overall campaign (Congressional Research Service, July 2021).

In conclusion, JADC2 represents one of the most far-reaching initiatives ever undertaken by the Department of Defence. Despite all the obstacles, if achieved, it will give the US and its Allies a strategic advantage over their peer competitors. And still, despite all the issues, the JADC2 seems to be a step in the right direction, given that China has also embarked on this path, trying to match and copy the US's efforts (Osborn, The National Interest, 2021). Furthermore, an unclassified document is ready to be approved and will give more details of current and future conditions of data-driven warfare.

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