Navy Aims to Fast-Track Artificial Intelligence, Machine Learning to Maintain Dominance

This unmanned surface vessel, part of the Strategic Capabilities Office's Ghost Fleet Overlord program, recently made a trip from the Gulf Coast to the coast of California, almost entirely by traveling autonomously. In December, it participated in exercise Dawn Blitz, where it also demonstrated its autonomous capabilities. *Defense Department Strategic Capabilities Office*

Like a bolt from the blue, the Navy has a new modernization priority — Project Overmatch, a campaign to accelerate delivery of artificial intelligence, machine learning and tools needed to allow the fleet to disperse forces, mass fires, integrate unmanned ships and, in the view of service

leaders, maintain maritime dominance in the future.

The project aims to begin delivering the Naval Operational Architecture (NOA), a lackluster name for a breathtaking effort whose results will determine nothing less than the service's future ability to establish and sustain sea control by integrating network infrastructure, data and analytic tools to provide decision-advantage in a fight.

"Beyond recapitalizing our undersea nuclear deterrent, there is no higher developmental priority in the U.S. Navy," Chief of Naval Operations Adm. Mike Gilday wrote in Oct. 1, 2020, memo to Rear Adm. Douglas Small establishing Project Overmatch. "Your goal is to enable a Navy that swarms the sea, delivering synchronized lethal and nonlethal effects from near and far, every axis and every domain."

Small, who in addition to heading Project Overmatch is head of Naval Information Warfare Systems Command, was further tasked by the CNO "to develop the networks, infrastructure, data architecture, tools, and analytics that support the operational and developmental environment that will enable our sustained maritime dominance."

The two-star admiral says he has committed the memo to memory and, for good measure, carries a copy at all times. Why? Gilday likens Project Overmatch to some of the most important Navy engineering and development challenges ever, including adopting nuclear power, developing the Polaris Missile and creating the Aegis Combat System.

Project Overmatch is not only about technical linkages and new software tools, according to a service official, it aims to speed development of concepts of operations for test, evaluation and capability exploitation of long-range fires, helping pave the way for new fleets of large and medium unmanned ships.

Vice Adm. James Kilby, deputy chief of naval operations for

warfighting requirements and capabilities, told an online audience in January that Project Over- match plans to deliver a "minimally viable capability" — including new artificial intelligence and machine learning combat tools — to the Theodore Roosevelt aircraft carrier strike group in 2023.

Rear Adm. Douglas Small, Commander, Naval Information Warfare Systems Command (NAVWAR), discusses NAVWAR's role in Project Overmatch to a virtual audience at the 2021 Surface Navy Association symposium from the systems command's Old Town San Diego complex. *U.S. Navy photo by Rick Naystatt*

Small, speaking at a separate online conference at the end of January, described the effort in broad strokes.

"When you have a project the size of Project Overmatch — connecting everything and bringing [artificial intelligence] and [machine learning] to every- thing — you have to go at it in an agile manner," Small said. "Step one for us was: Let's break this thing down into agile chunks and take a look at what are the things that we're working on currently now that we could take advantage of and grow from there.

"It consists of things like networks that are brought in as part of Overmatch," Small said. "Certain configurations of

networking gear like CANES [Consolidated Afloat Networks and Enterprise Services], certain sets of management aids and planners and things like that. And then defining data structures right for that first increment of capability. So that's, that's the concept behind a minimum viable product … so we'll take some time to develop that and then get it out as it's ready."

Once delivered to the carrier strike group, Project Overmatch aims to accelerate user feedback to developers to refine fielding of new capabilities and ensure functionality as new tools are integrated into the NOA. The effort also includes using live virtual events and training to execute and practice fleet-centered design.

JADC2

Project Overmatch is effectively the naval component of the Defense Department-wide effort to establish a Joint All-Domain Command and Control capability, which aims to network the entire U.S. weapons inventory in a manner similar to the way commercial handheld devices are linked, with each able to access an information cloud.

The U.S. military wants combat capabilities akin to Uber, Amazon and Facebook in their ability to scale and serve unique needs of different military users.

JADC2 was spearheaded by the Air Force in 2019; in 2020 the Army announced a similar campaign called Project Convergence. Last fall, the two services signed a joint memorandum of agreement to explore close integration.

While the Navy has not inked any formal agreements with the Army and Air Force, service leaders stress they are collaborating. The Navy, for instance, participated in Air Force-sponsored JADC2 events — contributing a DDG-51 Arleigh Burke-class destroyer and an aircraft carrier capable F-35C Joint Strike Fighter to a January 2020 all-service experiment

that focused on defending the United States against a cruise missile attack. Navy leaders were present during the Army's initial Project Convergence event last fall. And now projects Overmatch and Convergence are eyeing a collaborative event this summer.

Meantime, the Joint Staff is working to establish a framework to coordinate efforts of the three military departments. Gen. John Hyten, the No. 2 military officer and chairman of the Joint Requirements Oversight Council, estimates that by late spring the Pentagon will issue a new Joint Warfighting Concept to provide an overarching blueprint for JADC2 as well as three other key areas: joint glob- al fires, contested logistics and information advantage.

Members of the 6th Special Operations Squadron use a tablet to upload coordinates during an exercise showcasing the capabilities of the Advanced Battle Management System at Duke Field, Florida, Dec. 17, 2019. During the first demonstration of the ABMS, operators across the Air Force, Army, Navy and industry tested multiple real-time data sharing tools and technology in a homeland defense-based scenario enacted by

U.S. Northern Command and enabled by Air Force senior leaders.
U.S. Air Force / Tech. Sgt. Joshua J. Garcia

Building on Experience

"We're not starting this journey from a cold start," Kilby said of the complex effort to create new technical linkages across platforms. "We've been working toward it for some time."

For instance, the Navy has developed Naval Integrated Fire Control-Counter Air, an "any sensor, any shooter" capability that extends the air and missile defense battlespace to the maximum kinematic range of weapons for air, surface and strike warfare missions. NIFC-CA allows aircraft and surface ships to pass data that enable shooters to attack targets beyond their organic detection range.

Similarly, the Cooperative Engagement Capability — through connecting sensors and communications tools — makes possible the ability for multiple surface ships and aircrafts to form an air defense network for the pur- pose of sharing radar target measurements in real-time.

The adoption of commercial-off-the-shelf hardware into the Aegis Combat System and the introduction of a common source library now allows the Navy to scale the power of the air and missile defense system across ship classes and land- based systems.

Project Overmatch seeks to replicate these sorts of integrations, but on a much larger scale.

"Our end state: We have to pass the best sensing to the best kinetic or non-kinetic platforms to create the tactical battle network, where the whole system fights as one regardless of how many units are in," said Kilby. "Great power competition demands that we deliver distributed, networked and lethal naval force. Time is of the essence."

On Dec. 15, Small hosted a classified conference on the West Coast for defense contractors to explain Project Overmatch. Interest was high: Representatives from 150 companies attended.

"I laid out basically everything that we're doing, the why of everything that we're doing, and made specific asks for help," Small said in January. "One of the specific things that I asked for is imagination.

"We think we understand where we're headed in terms of the future and the things that you can unleash from a connected Navy," Small said, but noted that sometimes a new technology's utility — he mentioned the introduction of the iPad — is not always obvious.

"There's no user when presented with an iPad back in the day that would have said, 'Oh my gosh, yes I need this large cell phone that's between my laptop and my cell phone.' It would have never hit the market," Small said. "But the fact is by watching people and understanding the state of technology and what could be needed, the iPad is now this ubiquitous device."

Small said he is hoping for industry's help identifying potential in new technologies — waveforms, machine learning algorithms and such — for Project Overmatch.

"This is not something the Navy is at a standstill on," said Small. "We've done some incredible things tying various networks and sensors together. So, we're taking that to the next level and beyond."