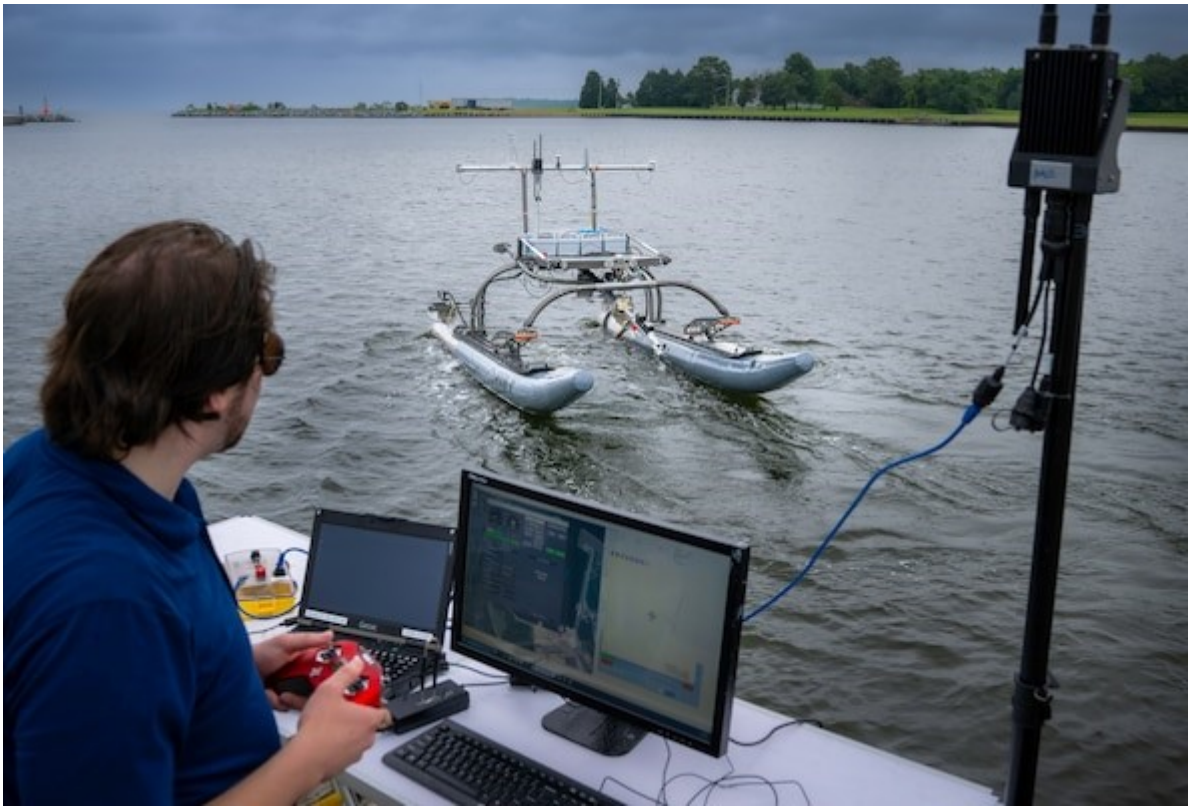
Navy Successfully Demonstrates Swarm Mission Planning Tech



Raymond Koehler, a mechanical engineer at the Naval Air Warfare Center Aircraft Division, demonstrates unmanned swarm mission planning software at Naval Air Station Patuxent River's West Basin Marina in Md. on June 17, 2025. The software helps the Navy plan missions with unmanned systems by simulating drone, sensor, and arrangement combinations to achieve mission goals at sea ultimately providing warfighters faster and more effective decision making. (U.S. Navy photo by Todd Frantom)

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The Naval Air Warfare Center Aircraft Division (NAWCAD) successfully demonstrated innovative mission planning software for swarms and other configurations of unmanned air, surface, and underwater systems at its headquarters.

The new Optimized Cross Domain Swarm Sensing (OCDSS) software

program helps the Navy plan missions using groups of unmanned aircraft. By running thousands of computer simulations, it determines the best combination of drones, sensors, and arrangement to achieve mission goals at sea.

“Autonomy is the decisive edge for maritime dominance,” said NAWCAD Commander Rear Adm. Todd Evans. “This technology is critical to enhancing operations across domains and represents a significant step forward for manned-unmanned teaming.”

OCDSS helps the Navy and Marine Corps get the most out of their unmanned systems while saving time and money. The software uses computer simulations to predict how different drones perform together in various missions, enabling planners to choose the right number and type of vehicles for the job.

“OCDSS quickly runs thousands of simulations to predict how different unmanned systems might perform together,” said NAWCAD Mechanical Engineer Raymond Koehler, OCDSS’ lead software developer. “This software gives warfighters faster and more effective decision making – that’s competitive advantage.”

By providing a virtual testing environment, OCDSS also reduces the cost and time associated with real-world testing in defense acquisition programs, which aligns with industry practices where simulation drives up to 90% of the development process. The technology successfully operated at ANTX Coastal Trident in August 2024, focusing on port security, providing data for future development and deployment.

“OCDSS levels-up how unmanned systems are used in a wide range of missions, and we’re ready to scale this autonomy to operational teams or test programs across the Navy and Marine Corps,” said Koehler.

Operational users and defense programs interested in learning

more about OCDSS should contact NAWCAD tech team lead Derek Alley (derek.m.alley.civ@us.navy.mil) for more information.

Koehler earned the Assistant Secretary of the Navy’s 2025 Dr. Delores M. Etter Top Scientists and Engineers of the Year Award as an Emergent Engineer for his outstanding contributions to swarm autonomy. The team he supports also earned a NAWCAD award for its collaboration on the effort with the Naval Surface Warfare Center Carderock Division.

NAWCAD’s military, civilian, and contract personnel operate test ranges, laboratories, and aircraft in support of test, evaluation, research, development, and sustainment for all Navy and Marine Corps aviation platforms. Based in Patuxent River, Maryland, NAWCAD also has major sites in St. Inigoes, Maryland; Lakehurst, New Jersey; and Orlando, Florida.