

NAVY SBIR TRANSITION PROGRAM SPOTLIGHT

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Surface Optics' SBIR-funded hyperspectral imaging solution delivers new small UAV detection capability

As the use of unmanned aerial vehicles (UAVs) has grown in recent years, the Navy has explored a range of approaches to mitigate the threat they pose. With Navy SBIR funding, Surface Optics Corporation has developed a system that leverages the company's expertise in hyperspectral imaging to detect small UAVs (under a meter in size). This category of UAV poses significant security threats not only because military and civilian operators can easily acquire and use them, but also because drones this small are difficult to detect and track using traditional military surveillance methods.

"It's very difficult to reliably detect a small UAV at long range using standard techniques such as radar," explains Mark Dombrowski, president of Surface Optics. "Small UAVs have very low cross sections, making them very hard to detect. If you drop your detection thresholds low enough to see them, you may start confusing them with airborne objects like birds or even blowing debris. Our technology allows you to identify the component materials that make up the UAV and uniquely identify it as a UAV."

Surface Optics' Spectral imaging UAV Detection Sensor (SUADS) can detect small UAVs at distances of up to 10 kilometers, giving Navy forces several minutes to track the drone



Mark Dombrowski and the Surface Optics team tested SUADS at sea at Coastal Trident 25.

and deploy countermeasures. The technology operates across the short-wave through long-wave infrared to detect the unique spectral signatures of UAV component materials. As a result, it can function day or night and in all weather conditions. A UAV can be detected even if it occupies less than a single pixel in the spectral image.

The SUADS system pairs a compact rugged spectral imager with Surface Optics' real-time hyperspectral data processor. Detection is enabled by the company's proprietary algorithms, including existing algorithms adapted for the UAV application and new algorithms developed under the current SBIR contract. At the end of the SBIR Phase II, Surface Optics reports that SUADS's probability of detection is 90% or better, with a false alarm rate below 10%.

While performing work under the SBIR Phase II contract, Surface Optics had the opportunity to test and refine SUADS by participating in two large-scale naval experimentation exercises in 2025 with support from the Department of the Navy SBIR Experimentation Cell (DoN-SEC).

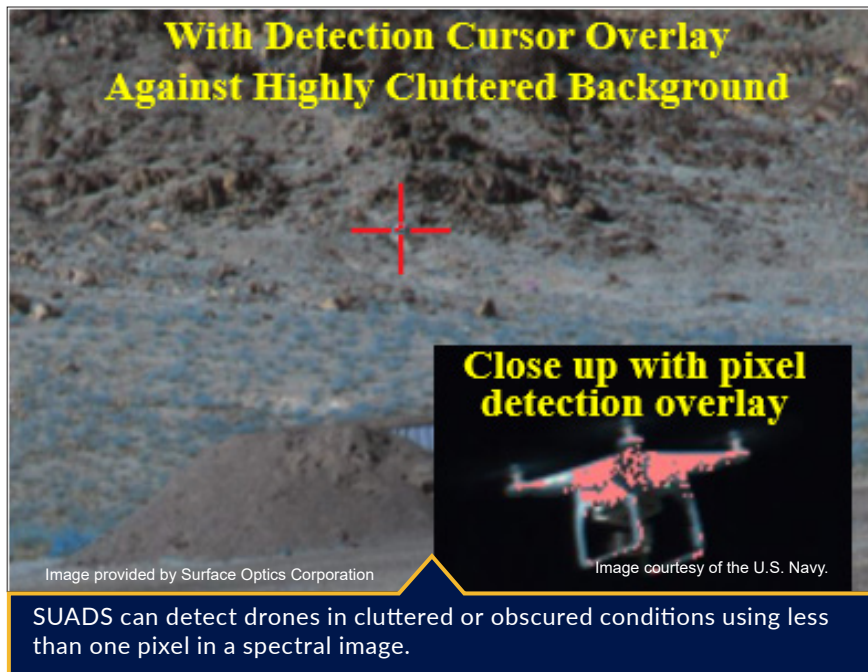
DoN-SEC is a program within the Office of Naval Research designed to connect small businesses performing Navy and Marine Corps SBIR projects with the DoN experimentation ecosystem.

The DoN-SEC team offers

facilitation, mentoring and training across all aspects of experimentation, providing end-to-end support to help small businesses participate in large scale defense training and experimentation events.

The exercises Surface Optics participated in were part of Coastal Trident, an annual series of technical demonstrations, field experiments, discussion-based and operations-based exercises organized by Naval Surface Warfare Center Port Hueneme Division. Established in 2007, Coastal Trident is part of the Naval Research and Development Establishment

(NRDE) Advanced Naval Technology Exercises (ANTX) program. Coastal Trident exercises focus on Naval operational needs in the port and maritime domain while providing participants with access to scenario-based operationally relevant environments and military platforms that are not typically available to small businesses like Surface Optics.



The first event, designated "November" by the organizers, gave Surface Optics its first opportunity to perform at-sea testing with its drone detection system. The event utilized the U.S. Navy research vessel M/V

Independence, an ocean-going research ship homeported at the Naval Construction Battalion Center in Port Hueneme. A variety of UAVs supplied by event organizers and other participating small businesses were flown from the ship, allowing Surface Optics to observe them at long range.

"It was a unique opportunity," says Dombrowski. "It's difficult to get all the resources together to do what we wanted to do. We could have done it ourselves, but it would have been a lot of work and a lot of money that we didn't have to spend since the Navy was gracious enough to

organize the test for us.”

The experiment provided valuable information that demonstrated that Surface Optics’ approach to UAV detection was viable, says Dombrowski, although it was not without real-world mishaps. One of the UAVs flown by event organizers from Fathomwerx, the collaborative public-private laboratory based at Port Hueneme, experienced technical difficulties during testing. “As that UAV was flying away from the ship, it decided to make an unscheduled landing,” Dombrowski recounts. “It took a plunge and is resting now somewhere on the bottom of the ocean, but while it was airborne we were able to get some good data.”

Surface Optics next brought SUADS to the Coastal Trident event designated “Sierra,” held at Naval Air Weapons Station China Lake. The mountainous desert landscape of the China Lake test ranges was vastly different from the maritime environment of the first event, allowing Surface Optics to expand its library of UAV data. “The type of data we were able to collect and the capabilities we were able to explore were very unique in those two situations. At China Lake there were also many more UAVs that we were able to image. There were many small companies there testing different types of UAVs and applications, so we got a lot of good data.”

While engaging with naval experimentation activities, Surface Optics also participated in the Navy SBIR Transition Program (Navy STP) to assist in marketing and promoting SUADS to

the wider defense community. The technology was featured in the Navy STP Showcase at Sea-Air-Space 2026. While exhibiting at the event provided a great opportunity to develop new business relationships, Dombrowski reports that potential customers have also contacted the company after discovering the marketing materials Surface Optics developed through Navy STP, which are showcased permanently online on the [Navy STP Virtual Transition Marketplace](#). “This could lead to some significant business for us. That one simple thing has been extremely helpful.”

Surface Optics is an established leader in optical properties characterization. Founded in 1977 to provide optical property measurement services, the company began developing spectral imaging systems in the early 1990s. Today Surface Optics specializes in advanced imaging systems, scientific instruments and thin film vacuum coatings for surface engineering, creating innovative solutions for customers in the research, aerospace, defense, semiconductor, automotive, and energy sectors. For more information, visit www.surfaceoptics.com.



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