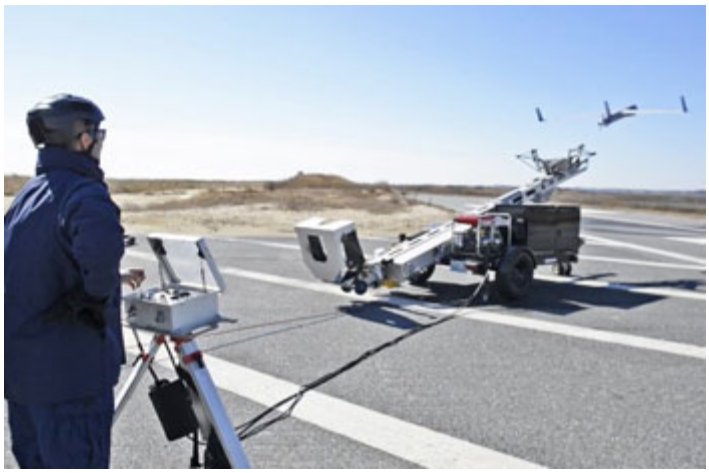
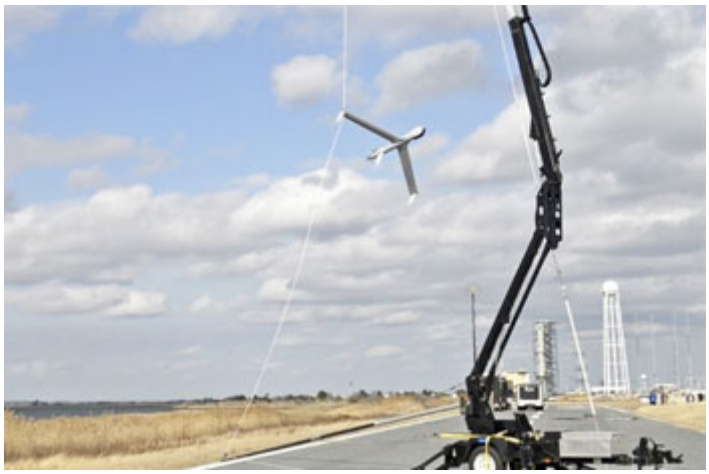


The Insitu ScanEagle “takes off” during the Coast Guard Research and Development Center’s demonstration of a small unmanned aircraft system at Wallops Island, Va., in February. U.S. Coast Guard photo by Petty Officer 2nd Class Luke Clayton.



At the conclusion of its seven-hour sortie, the unmanned aircraft “lands” via a “SkyHook” recovery system. On an earlier demonstration aboard a National Security Cutter, the retrieval arm was located to allow the aircraft to fly beside the cutter to enhance crew safety. U.S. Coast Guard photo by Petty Officer 2nd Class Luke Clayton.

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## Acquisition Update: Coast Guard Concludes Last Phase of Small Unmanned Aircraft System Demonstration

April 11, 2014

*WALLOPS ISLAND, Va. –The sunshine promises warmth, but the wind is brisk and biting. The grounds of the NASA Wallops Flight Facility on Virginia’s Eastern Shore are wet from early morning rain, but there is no sign of the snow that fell on Washington overnight. The weather conditions underscore the importance of the simulated mission: in the frigid water beyond, there are three stationary targets, “victims” in need of Coast Guard assistance.*

*The small unmanned aircraft – an Insitu ScanEagle – is catapulted into the sky and quickly disappears. It loops in and out of sight, a recognizable "airplane" for only a moment before it vanishes again.*

*Minutes pass. Eyes scan the sky, hoping for a glimpse of the elusive aircraft. Then attention goes to the video screen, where a dark spot can be seen amid the churning water. The camera zooms in, revealing an inflatable raft. The aircraft transmits position data to the ground control station – information that in an operational scenario would direct rescue crews to the distress scene.*

**Demonstration Provides Insight into sUAS Capabilities, Needs**

The Coast Guard Research and Development Center (RDC) conducted the third and final demonstration of small unmanned aircraft systems (sUAS) Feb. 10-21. This phase of the exercise focused on physical configuration constraints and operational effectiveness of a representative sUAS under a range of operational scenarios.

Earlier phases of the demonstration plan were conducted on board Coast Guard Cutters Stratton and Bertholf. The initial shipboard demonstration on Bertholf was designed specifically to see how daily operation of an sUAS could be integrated with NSC crew routines, said Cmdr. Al Antaran, Aviation Domain lead with the Office of Research, Development, Test and Evaluation. "The demonstration really showed how little of an impact operation of the sUAS system had on the other work the crew had to do on the ship."

The demonstration also highlighted another benefit of the sUAS versus manned flight time. "With a helicopter, you are using hundreds and hundreds of gallons of fuel," Lt. Cmdr. Jeff Vajda, sUAS sponsor representative, said. Comparatively, the ScanEagle can generally complete a 12-hour flight on a single gallon.

The demonstration at Wallops Island was conducted to get a better picture of "the efficacy of capabilities the industry can provide to the Coast Guard for missions over a maritime environment," Antaran said. "Industry is mainly concerned with the land-based UAS. We are concerned mainly with new technologies to provide detection capabilities over sea." The NASA facility provided the necessary maritime environment without the limitations of actually being at sea. "We didn't have to take time away from any of our Coast Guard missions to do this testing," he said.

One of the newest technologies being demonstrated is an auto detection capability for the surveillance video provided by the sUAS. "When the system detects a pixel that is an anomaly, it alerts the crew," Vajda said.

The key to the auto detection system's usefulness is in selecting the right camera for the sUAS, Vajda said. "It is very dependent on the quality of the camera. You need a certain

level in order to be able to identify what you are looking at. But if the quality of the camera is too good, it will pick up too many anomalies, which negates the benefit."

The just-concluded phase of the demonstration included both stationary and moving targets with different payload configurations. Rain, a low cloud ceiling and wind all restricted the sUAS's functionality.

The RDC is planning to submit a final report encompassing all three phases of the demonstration to the project sponsor, CG-7, in August 2014.

**Moving Forward to the Acquisition Phase**

While the ScanEagle was used for each phase of the demonstration, the Coast Guard currently is reviewing proposals that might fit its strategy for unmanned surveillance from the National Security Cutter (NSC) class.

Maritime air surveillance is a critical component to Coast Guard cutters' capabilities to secure, safeguard and provide effective stewardship of activities in the maritime domain. Studies have documented significant gaps in the Coast Guard's ability to meet air surveillance targets, and embarked air assets are critical to extend cutters' information, surveillance, reconnaissance and communication capabilities.

The NSC project's Operational Requirements Document and Acquisition Program Baseline include a key performance parameter of 12 hours of unmanned flight time. "Unmanned flight really cuts to the heart of the issue," Vajda said. "It is imperative that we provide air surveillance, but it should be accomplished at minimal impact on the (NSC) crew. That is impossible to do with a manned aircraft."

The sUAS also can be flown in conjunction with manned helicopter flights, Vajda said. "You can dismantle it and get it into the hangar in around 15 minutes, to make room for the helicopter. In a real emergency situation, you could push it over the side. That is one of the benefits of it being unmanned, you are never putting personnel at risk."

The first milestone of the sUAS for the NSC project was reached Aug. 27, 2013, when it was designated a non-major acquisition and moved to the analyze-and-select phase, said Steve Kellogg, UAS project manager. The next milestone will come when alternatives are identified and the Acquisition Directorate moves to acquire an initial system for testing, he said.

The sUAS will address the NSC's immediate need for a persistent airborne surveillance capability, said Vajda. The sUAS will support all missions, including search and rescue, defense readiness, drug interdiction and other law enforcement, migrant interdiction and marine environmental protection.

The sUAS procurement involves nine complete systems, Vajda said, one for each of the eight NSCs and one for the shore-side support center. A system consists of the unmanned

aircraft, a ground control station, launch and recovery equipment, associated link equipment and a support kit. Cost and performance tradeoffs of having one versus two aircraft per system are being evaluated.

Commonality with existing DHS and DoD systems is one of the key acquisition requirements, Vajda said. Other requirements include ability to remain airborne for at least 12 hours, operation by a single pilot seated at a single-person ground control station and a payload consisting of an electro-optical moving video sensor, infrared moving video sensor, aeronautical transponder, VHF/UHF communications relay, non-visible infrared marker and a 50 percent growth margin.

The Coast Guard recently conducted market research through a Request for Information for UAS capabilities that could meet the above requirements. Numerous responses were received, and initial evaluations are being conducted.