



An AeroVironment Puma All-Environment small unmanned aircraft system is launched from Coast Guard Cutter Chock as part of the Research and Development Center's Robotic Aircraft for Maritime Public Safety project. U.S. Coast Guard photo by Petty Officer 2nd Class Luke Clayton.

---

## **Acquisition Update: Coast Guard RDC Conducts RAMPS Demonstration**

July 7, 2015

The Coast Guard Research and Development Center conducted the first of five demonstrations June 5-11, 2015, to help develop requirements for and determine the viability of existing small unmanned aircraft systems for the Coast Guard and other maritime first responders.

The demonstrations are part of the RDC's Robotic Aircraft for Maritime Public Safety project, which aims to determine the risks, benefits and limitations of operating commercial off-the-shelf sUAS technology in conjunction with Coast Guard cutters other than the national security cutter. RAMPS was created as a partnership with the Department of Homeland Security Science and Technology Border and Maritime Security division after DHS S&T determined that its efforts could be strengthened by evaluating sUAS in the maritime domain.

“There is a significant difference between technology that works over land and technology that works in a maritime environment,” said Andrew Niccolai, a UAS subject matter expert with the RDC. “These demonstrations help us identify capabilities as well as expose industry to needs that will help the Coast Guard, other maritime first responders and DHS operational components more efficiently complete their maritime missions.”

RAMPS is important to the advancement of the Coast Guard's overall UAS initiative because it helps the service to understand the current commercial off-the-shelf capabilities of this segment of the UAS market; develop requirements, standards and

concepts of operation for integration of these small UAS in the future; and inform any future acquisitions process based upon reliability, performance and capabilities of the UAS being evaluated.

“Thanks to the RDC, DHS S&T and other partners, we are rapidly gaining valuable insight into the many opportunities afforded by these state-of-the-market small unmanned aircraft systems,” said Rear Adm. John P. Nadeau, assistant commandant for capability. “We are eagerly working to complete our work and get this new capability deployed to the field where it can enhance Coast Guard operations and improve mission execution.”

RAMPS’ goal, according to project manager Steve Dunn, “is to create a knowledge resource database much like a Consumer Reports index to guide future platform and sensor developments to meet maritime first responder requirements.”



An AeroVironment Wasp All-Environment small unmanned aircraft system is retrieved after a water landing. U.S. Coast Guard photo by Petty Officer 2nd Class Luke Clayton.

---

Niccolai said the RAMPS project has identified three missions that could be greatly enhanced by sUAS involvement: environmental surveillance, law enforcement, and search and rescue. The demonstrations include realistic maritime security scenarios to see if sUAS platforms can deliver capabilities needed for those missions; for example, during a law enforcement mission the sUAS could allow operators to identify the name of the vessel, provide useful information on the number of people and amount of any hazardous substances on board and maintain contact during any evasive measures by the suspect vessel – all while remaining covert.

The RDC partnered with the Naval Air Warfare Center Aircraft Division’s Unmanned Aircraft Systems Test Directorate in establishing parameters and system specifications for the initial request for information and evaluation of vendor responses and analysis of

the demonstrations. The demonstration was conducted at NAWCAD Patuxent River's Webster Outlying Field in St. Inigoes, Maryland. Coast Guard Cutter Chock, Coast Guard Station St. Inigoes and the Coast Guard Auxiliary participated in the first demonstration.

Each of the five demonstrations will feature a different vendor, with a total of seven systems. The second demonstration will be held this fall, with the remaining three in spring 2016.

During the first demonstration, AeroVironment personnel were on hand to operate the Puma All-Environment and Wasp AE systems under a cooperative research and development agreement with the RDC. CRADAs provide limited funding for specific research and development purposes, in this case, operating the demonstration aircraft.

Each demonstration includes four days of evaluation and provides an opportunity for additional Coast Guard stakeholders and other interested parties to observe the systems in action and discuss the product with the vendor. Representatives from DHS, Customs and Border Protection, the National Oceanic and Atmospheric Administration, and the Maryland Department of Natural Resources and Natural Resources Police attended the demonstration.

To aid in the evaluation, different scenarios were developed to reveal how each sUAS operates in a maritime environment. Safety of flight, basic flying performance and ship integration were the focus during the first two days. "There are certain airworthiness capabilities that must be evaluated for the sUAS platforms," Nicolai said. "And it is very important to see how each system fits with a ship. We want to know how easy it is to stow, how long it takes to set up and how many people are needed to operate it."

*The Coast Guard's thermal Oscar was developed by the RDC to provide a target for use in at-sea sensor testing that has the infrared characteristics of a person in the water. It was designed to be inexpensive, easy to fabricate and rugged enough to sustain open-ocean testing. The name is a combination of the thermal signature it provides and the phonetic alphabet word that corresponds with the signal flag displayed by ships when a person falls overboard.*

Search scenarios were run on the third day, including a simulated search and rescue using a thermal Oscar and an environmental surveillance mission using peat moss and oranges to simulate an oil spill. The final evaluation day concentrated on law enforcement, aided by a response boat-medium from Coast Guard Station St. Inigoes simulating a go-fast vessel.

Industry personnel also demonstrated recovery techniques aboard Coast Guard Cutter Chock, a 65-foot small harbor tug, marking the first autonomous net recovery on a Coast Guard platform. The ability to recover an sUAS using a net capture system allows use by assets that do not have flight decks, including Coast Guard boats. Net capture recoveries also require less operator expertise than drop landings.

Lt. Cmdr. Matthew Matsuoka, acting program manager for the Coast Guard's sUAS for NSC acquisition program, used the demonstration as an opportunity to familiarize himself with this sector of the UAS market. "While RAMPS involves a different platform than those that we are reviewing for the current acquisition program, this is an opportunity for me to see the bigger picture. I can look at what vendors are offering; look at this technology that is growing so quickly."

The sUAS for the NSC acquisition program is in the analyze and select phase. "We are evaluating everything that is available now to see how it matches with our operational requirements and funding," Matsuoka said. "We will be using a phased approach, where we find a system that can meet our most pressing demands now and will be able to grow in the future to meet additional requirements."



AeroVironment demonstrates an autonomous net capture recovery of the Puma onboard Coast Guard Cutter Chock. The Puma can also be recovered via a water landing. U.S. Coast Guard photo by Petty Officer 2nd Class Luke Clayton.

---

DHS recently approved funding for a second phase of the RAMPS project, Niccolai said. "When the project started, we thought we could look at all aspects of the technology at the same time. What we are finding is that as the vendors become more comfortable with the maritime environment; the capabilities that are available are expanding."

The five demonstrations in the initial phase will concentrate on the sUAS platform and basic payloads, Niccolai said, with the second phase concentrating more on specialized payload capabilities that can go beyond intelligence gathering. An exciting addition to the second phase of RAMPS is development of a DHS UAS Rapid Evaluation Facility. This will allow the greater DHS community to evaluate unmanned technologies in a facility tailored to the department's and DHS components' unique missions.

"Future efforts will include evaluating sUAS technologies in different environmental areas with newer sensors and conducting an assessment for a potential DHS evaluation facility for evaluating sUAS technologies," Dunn said.