The Navy is one step closer to demonstrating the first carrier-based recoveries and launches of an autonomous, low-observable relevant unmanned aircraft.

Aboard USS Dwight D. Eisenhower (CVN-69) July 2, a team from the Navy Unmanned Combat Air System program office (PMA-268) accomplished the historical first carrier touchdown of an F/A-18D surrogate aircraft emulating an unmanned vehicle using systems developed as part of the Unmanned Combat Air System Carrier Demonstration (UCAS-D) program.

“What we saw here today is cutting edge technology for integrating digital control of autonomous carrier aircraft operations, and most importantly, the capability to automatically land an unmanned air system aboard an aircraft carrier,” said Capt. Jaime Engdahl, N-UCAS Program Manager. “Successfully landing and launching a surrogate aircraft allows us to look forward to demonstrating that a tailless, strike-fighter- sized unmanned system can operate safely in the carrier environment.”

Demonstrating the UCAS-D system with a proven carrier aircraft, the F/A-18D, significantly reduces risk of landing an unmanned system aboard the ship for the first time. The F/A-18 surrogate aircraft, provided by Air Test and Evaluation Squadron (VX) 23, is controlled with actual avionics and software that are being incorporated on X-47B UCAS-D aircraft.

“Surrogate testing allows us to evaluate ship systems, avionics systems, and early versions of the unmanned vehicle software with a pilot in the loop for safety,” said Glenn Colby, team lead for UCAS-D Aviation/Ship Integration. “With this we can verify our interfaces and functionality while minimizing the risk to an unmanned vehicle.”

Along with the F/A-18, the test team employed a King Air surrogate aircraft operated by Air-Tec, Inc. According to Colby, the King Air gives the team a low-cost test bed to evaluate the ability of the UCAS-D avionics and ship systems to properly adhere to existing carrier operations procedures. PMA-268 is using the King Air to test all of the system functionality that does not require actually landing on the ship.

“The most important thing we have done is adapted the ship’s systems to handle a vehicle without a pilot, then seamlessly integrated it into carrier operations,” said Rob Fox, UCAS-D Aviation/Ship Integration deputy team lead. “We’re using both current aircraft carrier hardware and software systems and processes, and introducing new systems and processes to accommodate an unmanned system.”

The vast majority of today’s carrier flight operations are flown manually and visually by Naval Aviators. The pilot gives the ship information about the aircraft over the radio; all air traffic control instructions are by voice and even a good portion of navigation data has to be read over the air by the ship. The purpose of the UCAS-D integration effort is to digitize the communications and navigation information flow to incorporate capabilities required for UAS flight operations aboard a carrier, with minimal impact to existing hardware, training and procedures.

“This test period shows us very clearly that the carrier segment hardware and software, and the Precision Global Positioning System (PGPS) landing technologies are mature and ready to support actual unmanned operations with the X-47B,” said Engdahl.

To support an autonomous vehicle, PMA-268 has modified shipboard equipment so that the UCAS-D X-47B air vehicle, mission operator and ship operators are on the same digital network. For current fleet aircraft, the Landing Signal Officer (LSO), who is charged with safe recovery of aircraft aboard the ship, uses voice commands and visual signals to communicate with a pilot on final approach. Since a UAS cannot reliably respond to voice and vis

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