NATO AWACS Proves Interoperability at Operational Event

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HANSCOM AIR FORCE BASE, Mass. -- Late last month, flying at an observation point 100 miles off the coast of Patuxent River Naval Air Station, Md., a NATO AWACS took part in six-hour combat scenarios that demonstrated interoperability between its prototype interrogator and various joint platforms that interrogate in the same mode.

During the July 21-23 multi-service, multi-national Joint Operational Test Approach Operational Assessment, a combined international E-3 AWACS team -- led by Hanscom's 635th Electronic Systems Squadron -- had the opportunity to test the interrogator in a genuine multi-service environment. A team from the 635 ELSS, the Electronic Systems Center team responsible for test and development of the aircraft's Mode 5-capable UPX 40 Interrogator, was among Air Force, Army, Navy and Marine Corps participants there to test their respective interrogators and transponders.

"We were able to demonstrate interoperability with all the players in this exercise, which is one of the reasons why we participate in these JOTA events," said Capt. Will Williams, Next Generation Identification Friend or Foe program manager.

A combined Electronic Systems Center team recently tested the joint interoperability of a prototype interrogator for an E-3 Sentry AWACS, such as the one shown here. (Air Force photo)

The E-3 Sentry Airborne Warning and Control System, or AWACS, is an aircraft with integrated command and control, battle management, surveillance, target detection, and tracking capabilities and provides an accurate, real-time picture of the battlespace to the Joint Air Operations Center.

AWACS' interrogator radiates a waveform, using different modes, to determine information such as aircraft identification and altitude and also determines if aircraft are friends or foes -- known as Identification Friend or Foe capability. The AWACS interrogator enables both military and civilian aircraft to be identified with range, bearing, and elevation information, along with providing platform-specific information.

The new Mode 5 capability is a waveform to which the Defense Department and NATO forces are now transitioning, as outlined by a Joint Requirements Oversight Council mandate.

"You have specifications that are out there, but everyone interprets them differently," Captain Williams said. "Each vendor looks at the specs differently, so it makes it more difficult to know if they will come together and work."

According to the captain, that is why the event was so important -- to determine the gaps and adjust accordingly.

At designated times, a Navy destroyer would push out, the NATO AWACS would launch and Navy F/A-18s and Air Force F-15s would spread to different altitudes to test the surveillance and identification abilities of the ship and AWACS. Later, Army UH-60 and MH-60 helicopters and Marine Corps attack helicopters would take off and follow a similar route.

The intent was to get as many Mode 5 platforms as possible in the area to determine whether it caused Mode 5 transmission interference.

"We were there to prove that the electronic handshakes between interrogators and transponders could use very secure cryptologic code," said Chris Cross, an AWACS international program facilitator. "The AWACS was able to follow each target as it crossed over others without the target displays being blended and lost for any period of time."

Beyond proving interoperability, the event was key in determining if Mode 5 was correctly identifying other participating platforms as friends or foes, Captain Williams said. Codes make the radar secure in order to firmly establish whether a platform is friendly or otherwise, and program managers encountered challenges during initial ground testing transmitting these designators.

With the help of Danny Lopez, a Cryptologic Systems Group member from Lackland AFB, Texas, the codes were able to be modified on the spot for better operations.

"Without that support, it might have taken a while to figure out what was going on," Captain Williams said.

Additionally, the AWACS' U.S. test director, Capt. Mike Williams, a member of the AWACS Joint Test Force in Seattle, worked to develop the aircraft's test plan, understanding key performance parameters and outlining what the AWACS needed to gain out of this exercise.

"The key thing was working with the test directors of NATO, France and the United Kingdom ... so this is truly a multi-national AWACS experience where they could observe a future cooperative radar in development and each provide operator inputs in an operational scenario," Mr. Cross said.

Yet another integral part of the event -- the security of the aircraft itself -- was provided by an eight-member team from Hanscom's 66th Security Forces Squadron who deployed to the location.

"It really shows Security Forces' flexibility to go from a mission where they do base patrols - entry control at the gates for the installation, to deploying to Iraq and doing training, patrols and convoy duty -- and then deploy to Pax River to guard a high-value asset," Captain Williams said. "That's a real tribute to their training and flexibility."

Lessons learned from this event will also provide valuable input and exposure that will contribute to the final production phase of the interrogator's development, he said. Operators will go about changing their air battle concept based on what Mode 5 will ultimately deliver.

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