

An Air and Marine Operations crew aboard a King Air 350, uses the Minotaur, which links sensors, cameras, radar and communications equipment into a single system. Photo by Ozzy Trevino

INNOVATIVE TECH HELPS AMO COMBAT SMUGGLERS

By Paul Koscak

Groundbreaking software developed by the Johns Hopkins University Applied Physics Laboratory is giving Air and Marine Operations agents the edge in combating international smugglers intent on evading law enforcement. Minotaur, as the software is called, links sensors, cameras, radar and communications equipment into a single, more automated system, allowing operators to more efficiently identify and track any suspicious or illegal activity on both land and sea.

By digitally combining the surveillance devices, many redundant, time-consuming, manual tasks—such as turning the cameras to track a suspect—are now automatic. Minotaur can track hundreds of suspects at once. The upgrade makes surveillance far more efficient while giving operators tremendous options to identify suspicious activity, explained Mark Erwin, AMO's Minotaur project manager.

"Before, you had to slew the camera to the subject, which took about four minutes," he said. "Now, it's just four seconds to lock in. That's a big deal."

Minotaur looks and operates like gaming software, driven by multiple windows, a mouse and keyboard. From the air, the operator's monitor can show thousands of dots, each a vessel of some kind on the water. To the right, a vertical band contains symbols for dozens of commands and filters. If the operator enters the speed, direction or the size of a vessel typical of a smuggler, immediately only the dots fitting those requirements remain on the screen. When an operator zooms in on a likely subject, a box pops up with the vessel's information. Click on another symbol and the vessel's image appears. Other symbols allow the operator to give the dot a particular color and shape. Over land, vehicles and people can be viewed the same way

A Super King Air 350ER, flown by Air and Marine Operations, monitors other aircraft, vessels, and vehicles on land. Photo by Alex Zamora



and the software can tell apart people from animals, such as cows on an open range.

Among Minotaur's important features, operators can replay anything on the screen and returning crews can show the next crew exactly what they accomplished and where to continue the reconnaissance. With the current software, that information is lost as soon as the equipment is shut down. Through a satellite link, Minotaur provides text communications, an especially useful feature because of aircraft noise. Unlike radio, the link doesn't require a line-of-sight signal.

Minotaur is installed with minimal effort, since the software is delivered already uploaded on a computer that plugs into the surveillance hardware. For operators, training is just learning the differences between the current system and Minotaur.

Erwin said the advances "free operators to do more law enforcement" and give them more time to assist with the flight. They can look outside to scan for other aircraft or handle communications with the AMOC, CBP's Air and Marine Operations Center in Riverside, California. That support reduces the pilot's workload, making for a safer flight.

Minotaur has been years in the making. In 2006, the Navy approached AMO to help test airborne sensors

that identified vessels. After flying with the software, AMO realized it could be modified to catch smugglers and border crossers. Through the Navy's contract with the Johns Hopkins University Applied Physics Laboratory, AMO directed the laboratory in crafting software with the features needed to supercharge its surveillance abilities.

Without this technology, spotting the bad guys would be more by chance, according to Mike Delaney, a laboratory engineer who helped manage the software project. Minotaur also saves money because it's designed for law enforcement and interdiction, which fit both Department of Defense and Department of Homeland Security missions, so costs can be shared, he said.

So far, AMO has tested the software on DHC-8, P-3 Orion and the unmanned Predator aircraft. Currently, two Minotaur-furnished King Air 350s operate from AMO's Jacksonville, Florida, air branch and plans call for acquiring up to 40 King Airls equipped with the software. For now, data and communications from Jacksonville flights go directly to the AMOC and then to AMO branch locations.

Detection Enforcement Officer Ned Leonard is one of the operators. "I'm impressed by the look and feel of the software," he noted. "You can divide the screen into subpanels. You can overlay images. This