Air Force Intel Pros Use Web-Based Remotely Piloted Aircraft Application

Mon, 06/29/2015 - 9:29am
Master Sgt. Amaani Lyle, Secretary of the Air Force Command Information

Using existing technology, a team of Air Force intelligence experts have developed a new Web-based program that saves lives and money, while enhancing the "eyes in the sky," the centerpiece of the $80 billion remotely piloted aircraft industry.

On June 24, the innovators received the U.S. Geospatial Intelligence Foundation Achievement Award for developing the Surveillance Intelligence Reconnaissance Information System (SIRIS), a scalable, revolutionary approach to reshaping RPA collaboration among ground, air and intelligence users in friendly and enemy battlespace.

Affordable web-based solution and leveraging existing technology

"We chose a Web-based solution that does not require a costly retrofit of the platform, and we created rapid innovation that was non-compartmentalized," said Stephen Coffey, the Web innovations deputy director, Intelligence, Surveillance and Reconnaissance Innovations Directorate, Headquarters Air Force, Pentagon. The same technology behind remotely piloted aircraft deployed high above Afghanistan's mountainous terrain would have been critically valuable to first responders at the Boston Marathon bombing in 2013, and in other large-scale events or incidents, Coffey and his colleagues said.

But the expansion and interoperability of RPA deployment has ascended to the forefront of industry, first responder and military discussions -- with good reason, Coffey and his team assert.
"I was trying to find a way to leverage industry, government-owned solutions and do it for no cost," the former squadron-level intelligence professional said. Requiring only a Web browser and Google Earth access, (SIRIS) data encompasses imagery, full-motion video, mission planning files, aircraft locations, sensor points, signals intelligence and even weather, which can make the system of import to everyone from farmers to firefighters to law enforcement.

But the "eyes" began to get legs in March 2015, following an incident downrange, which heightened the urgency to refine and swiftly field the technology, said Chris McDonald, assigned to the Intelligence, Surveillance and Reconnaissance Innovations Directorate, Headquarters Air Force, Pentagon.

Originally designed to surveil in a permissive environment, a deployed MQ-1 was shot down over Syria, prompting intelligence officials to collaborate online and in Nevada with subject matter experts to develop a decisive threat warning that could integrate existing technology.

"We modified our technologies within the squadron operations center, which is part of the weapons system," McDonald said. "But if you've got an airplane flying overseas and an (operations) center stateside, there's a disconnect."

Soon, analysts realized SIRIS's provision of essential data, such as when or where a shooter might attack an aircraft, gives the remote pilot a greater opportunity to navigate the RPA away from troublesome airspace.

To set the groundwork for SIRIS, the intel team had the Air Force Research Lab's Human Factors Development team create the Internet Coordinate Extractor, which monitors RPA chats and plots them in Google Earth.

But constantly monitoring 30-35 different chat rooms and trying to swiftly filter only pertinent information proved to be daunting.

“It’s really hard to focus on multiple screens at one time; you lose things and that could cost lives and money,” Coffey said. “So (ICE) allowed us to focus on Google Earth in the moment, so instead of looking at two windows, I’d look at one.”

With government-owned code and specifically-designed human factors, the intelligence team, in just four days, built on the ICE concept to display data succinctly in a format familiar to pilots.

But understanding how to apply and how to train people to apply the technology is what Coffey and his team call “disruptive,” particularly under the lens of manpower.

“Each of us bring a different perspective to an innovative thought,” Coffey said. “Applying technology without the skill craft … had atrophied for us, since RPAs had not been shot at for 20 years. Time was not our friend in this particular case, so it’s important that we had early adoption of the technology.”

Whether in facilitating communication among Airmen or even among other countries, such as NATO allies, some of whom have recently acquired Global Hawk Block 40, the intel team sustains efforts to make data transferable and accessible.

“We found out young Airmen and even the pilots didn’t know how to talk to each other or what to expect from each other,” said Col. Frances Deutch, Ph.D., Intelligence Innovation Programs director. “So if SIRIS and similar programs are how we’re already doing business, why don’t we make these applications better interact as a suite? Data should be agnostic.”

SIRIS beyond the battlespace

In August 2013, a GPS-guided MQ-1 Predator relayed infrared images to California National Guard firefighters, who battled a raging Rim Fire that blazed across more than 160,000 acres -- leaving much of Yosemite National Park and its surroundings silted in ash and dense with smoke.

“Because of the SIRIS tool, I literally was in my apartment drawing, circling and dropping points for the California wildfire chief in the middle of his firefighting,” Coffey said.

The plane significantly improved responders’ abilities to predict the fire’s direction and determine the sources of greatest intensity.

Once the fire ended, Coffey and his team arrived to California for a debriefing with the fire chief.

“The chief literally started crying and told me, ‘you have no idea the lives you saved because of that,’” he said.

Evolution of a technology revolution

In 2012, AFRL scientists and engineers partnered not only with in-service labs, but actually linked with joint service labs including Washington-based U.S. Naval Research Lab, the Unmanned Aircraft Systems Project Office, Huntsville, Alabama; Air Force Research Laboratories at Wright-Patterson, Ohio; and Rome, New York; and U.S. Naval Air Weapons Stations at Patuxent River, Maryland; and China Lake, California.

Linking the labs, Coffey said, enabled him to employ niche skill sets of each facility.

“We found that collage of people to actually vet the technologies we defined through (joint urgent operational needs) and common sense,” he said. “We would try to find the best of breed, but we let the doctors in the labs analyze that for us and then pick the best of breed -- and they did that on their own

dime."

The team then worked with industry to ensure they released the projects as government-owned without the need for proprietary rights or licensing.

"Because we've partnered with these industries, they often come to bear and allow us to use technology that we had not considered in one realm (but proves effective) in another," Coffey said.

Writing unclassified code was another cornerstone of the project, Coffey said, since it ensured the technology was transferable across multiple interfaces.

Way ahead for RPAs, SIRIS

Ultimately, RPAs will do a lot more than provide ISR and close air support as threat awareness and threat detection emerge on a more sustainable platform, according to McDonald.

"We're trying to get the user in front of the technology, then they can tell us in a more succinct and specific manner what information they need," he said.

The familiar social media formatting for this data will only expedite early adoption of the technology by millennials, the team contends.

"By creating a sandbox, we were trying to create a place where Airmen can develop the code and park it there then our developers can pick through it and help them write it," Coffey said. "So now they feel enabled and it's empowered them to be innovative."