

INSIDE DEFENSE

ANG's 'Ghost' Reaper Aims to Transform Hunter-Killer RPA for JADC2 Operations

By Sara Sirota

The Air National Guard's MQ-9 enterprise has been quietly fighting under the radar to show the remotely piloted aircraft has utility in future operations by transforming its hunter-killer counterinsurgency capabilities to better enable joint all-domain command and control under a little-known initiative called the "Ghost Reaper," multiple sources tell *Inside Defense*.

The Ghost Reaper would have advanced networking and intelligence technologies -- and even achieve open-mission standards -- that the ANG's MQ-9 team hopes will prove the shift to data-centric warfare doesn't require abandoning legacy platforms, a common talking point Air Force Chief of Staff Gen. Charles Brown and his predecessor Gen. David Goldfein have stressed.

The Ghost Reaper is more of a concept than a full-fledged program at this point, but tests have already begun. The ANG is using the National Guard and Reserve Equipment Account to fund the effort and MQ-9 manufacturer General Atomics has also contributed its own independent research and development dollars, according to two sources.

General Atomics has released an advertisement for the Ghost Reaper, though the company deferred questions to the ANG.

ANG spokesman Devin Robinson would not confirm the Ghost Reaper concept but provided the following statement to *Inside Defense*: "For many years the MQ-9 Reaper has been a valuable strategic asset for the Guard. Our Guard Airmen are constantly working with our Total Force and industry partners to ensure the long-term viability of the MQ-9 and all of our [unmanned aerial vehicle] programs. Over the past few years the Air National Guard has developed several innovative ways to use UAV assets like the MQ-9 as a part of our wide spectrum of domestic operations capabilities."

According to several sources, the envisioned Ghost Reaper would feature a suite of new technologies -- Ultra Electronics' Rosetta Echo Advanced Payloads (REAP) pod for gateway communications, Northrop Grumman's Freedom pod for fourth-to-fifth-generation aircraft networking, SRC's Agile Condor embedded computing architecture for autonomous intelligence and sensing and Terma's pylon survivability system for self-defense.

The ANG held an initial operational assessment of the REAP pod a few weeks ago at Syracuse Hancock International Airport, NY, and more tests with the other technologies are expected to follow, though nothing is solidified yet.

During the demonstration in Syracuse in late August, the REAP pod flew on a 174th Attack Wing MQ-9, enabling voice communications over a mobile ad hoc network (MANET) at extended distances and relaying full-motion video from the RPA over 110 miles. The system also bridged surveillance imagery video from Raytheon's Coyote drone to command-and-control assets on the ground, according to a news release published on Ultra's website.

Jeff Lloyd-Jones, Ultra's vice president for strategic development, confirmed in an email to *Inside Defense* today the demonstration was intended to test the Ghost Reaper configuration.

He said in an interview last week that an earlier version of the REAP pod had been developed in response to a joint urgent operational need for U.S. Central Command, which used it to facilitate transfers of full-motion video on targets -- "fast moving patrol boats" that interfered with shipping -- in the Arabian Gulf.

But the Navy and Air Force decided to abandon the system, leading the ANG to adopt it in 2017 for domestic operations, particularly in California to reestablish communication paths when a natural disaster would damage civilian infrastructure.

Lloyd-Jones said the REAP pod contains radios from Persistent Systems, Silvus Technologies and TrellisWare -- systems that allow larger data transfers and at faster speeds than the legacy Link 16 technology. These kinds of radios are key to enabling networked missiles or drones like with the Coyote, a source explained.

In addition to the Ghost Reaper demonstration in New York, Lloyd-Jones said the REAP pod flew on a long-wing MQ-9 capital asset from General Atomics at White Sands Missile Range, NM, during the second Advanced Battle Management System on-ramp held earlier this month. The pod facilitated data exchange over Silvus' radio network, which the first ABMS on-ramp in December 2019 was unable to accomplish, he said.

Ultra doesn't currently have one of the many indefinite-delivery, indefinite-quantity contracts to support the ABMS program, the Air Force's flagship effort to achieve JADC2, but it has submitted a proposal for an award, according to Lloyd-Jones. He said the company was offered a spot to participate in an upcoming on-ramp in Australia next year.

Beyond the REAP system, the ANG is planning to test Northrop's Freedom pod with the Ghost Reaper, Colin Phan, business development director for the company's information systems unit, told *Inside Defense* Wednesday. He said Northrop has a contract with the ANG directly to build the system that dates back a few years before the new MQ-9 configuration was conceptualized.

The Freedom pod uses a variant of the same radio Northrop is presenting for the ABMS program's gatewayONE capability, according to Roshan Roeder, vice president of the company's communications, airborne sensors and networks division, who also participated in the interview.

Air Force acquisition executive Will Roper has expressed interest in using gatewayONE to facilitate communications between fifth-generation fighter jets during an ABMS on-ramp, stating he'd like to fly the capability in Kratos and AFRL's XQ-58A Valkyrie, a possible contender for the service's Skyborg program.

One source said the Ghost Reaper isn't necessarily a competitor to the Valkyrie but complementary to the experimental vehicle. The ANG envisions the new aircraft similarly aligning with the goals of ABMS, Skyborg and other future programs focused on next-generation mission sets, the source said.

The Ghost Reaper would also eventually use AFRL and SRC's Agile Condor, according to two sources. This system is a high-performance embedded computing architecture that allows its host aircraft to quickly and in real-time process large amounts of sensor data for intelligence analysis at the edge.

General Atomics revealed in a press release earlier this month it flew an MQ-9 with Agile Condor for the first time at its test center in Grand Forks, ND, though the announcement didn't include any reference to the Ghost Reaper.

The Defense Department [plans to hold further demonstrations](#) of the system over the next year, Army Col. Brad Boyd, director of joint warfighting at the Pentagon's Joint Artificial Intelligence Center, said during a press briefing last week.

He described Agile Condor as a "critical capability" for persistent and autonomous intelligence operations in degraded environments and said it's a key component of DOD's Project Maven and JAIC's Smart Sensor -- a little-known AI prototype for video processing.

Beyond communications and computing capabilities for AI-enabled operations, two sources said the Ghost Reaper is intended to employ a pylon-based self-defense capability for increased survivability. One source said there's particular interest in using the pylon integrated dispensing system made by Terma for F-16 fighter jets.

The ANG MQ-9 enterprise's campaign to modernize the MQ-9 for JADC2 under the Ghost Reaper concept coincides with the Air Force's push to end the production line early, a decision the service revealed in its fiscal year 2021 budget proposal, much to the concern of several lawmakers worried about combatant commanders' demands for more intelligence, surveillance and reconnaissance capabilities.

Lloyd-Jones said he sees the Ghost Reaper initiative as an effort to prove the MQ-9 "has some legs still in its life and this is just one of the ways to make it attractive to the Air Force to keep it around."

"I think there's a certain faction within both the Air Force and the Guard that see utility in keeping the MQ-9 around, especially with . . . [a U.S. Pacific Command] led conflict, that there's utility in having [attributable] aircraft that have certain sensors and characteristics and ways to communicate information back, that if they are lost . . . obviously it's not a manned aircraft so that it's not as critical as losing American manned aircraft," he said.

The commandONE software should be cloud-based to ensure survivability and widespread access, deployable to various nodes to support distributed operations, capable of continuous development and integration and compliant with data exchange standards to achieve interoperability with sensors and other systems.

The component will support legacy platforms -- including the E-3 Airborne Warning and Control System, E-8 Joint Surveillance Target Attack Radar System and Control and Reporting Center.

Responses to the RFI are due Sept. 30.