

AVIATION WEEK

& SPACE TECHNOLOGY

DEFENSE

Stop and Look

A 'hover-and-stare' unmanned aircraft is finding expanded missions in Afghanistan

GRAHAM WARWICK/WASHINGTON



RQ-16 T-Hawk ducted-fan MAVs have effectively countered improvised explosive devices in Iraq.

U.S. ARMY

In the fight against roadside bombs, a "hover-and-stare" unmanned aircraft that has proved valuable in Iraq is being fielded in Afghanistan as manufacturer Honeywell works quickly to expand capabilities, overcome limitations and avoid exposing operators to insurgent attacks.

Deliveries of the latest Block 3 version of the RQ-16 T-Hawk vertical-take-off-and-landing micro air vehicle (MAV) begin in July. One hundred earlier sys-

tems have been delivered to Iraq and 50 to Afghanistan, for explosive ordnance disposal missions.

Each system includes two small ducted-fan air vehicles and a portable ground station. The 20-lb. T-Hawk provides about 40 min. of flight, carrying interchangeable electro-optical or infrared cameras. A stabilized, gimballed sensor was introduced with Block 2 and Block 3 adds an encrypted digital data link for command and control and video.

The T-Hawk, which the U.S. Army also calls the gMAV (gasoline-powered micro air vehicle), was fielded to inspect and identify improvised explosive devices and act as an "eye in the sky" to coordinate unmanned and human ordnance disposal teams. As U.S. forces have become familiar with the aircraft, other uses have emerged.

The original operating concept was to launch the MAV upon seeing a suspicious object, such as a tire on the road,

sending the vehicle up to look for other indicators of an imminent attack, such as a spotter, "trigger man" or insurgent with a cell phone or camera. The T-Hawk is also part of route clearance packages that patrol the roads used by convoys to detect and tag IEDs for disposal.

New uses that have emerged include deterrence and deception, says Prabha Gopinath, director of strategic campaigns for unmanned aircraft systems at Honeywell. Deterrence involves buzzing roads and using the MAV's noisy presence to prevent insurgents from planting roadside bombs. Deception involves flying air vehicles along roads that are not then used by convoys.

T-Hawks are also being used for force protection. In urban combat, the MAVs are used to look down side streets and block access, preventing forces being outflanked, he says. France has completed an evaluation of the system that included a perimeter security mission, with air vehicles being launched when unattended ground sensors detect intruders to confirm a threat and call in fire support.

The IED detection and disposal mission is different in Afghanistan, says Gopinath. In Iraq, roadside bombs are made from unexploded ordnance containing metal that is relatively easy to detect. In Afghanistan all the leftover Soviet ordnance been used up, he says,

and bombs are made from ammonium nitrate and potassium chloride fertilizer.

The biggest threat is from bombs as large as 2,000 lb. inside culverts under the roads. These are large enough to destroy an armored vehicle, and can take weeks of packing, but are hard to detect because compared with the flat terrain of Iraq, the mountain roads of Afghanistan can have a rock face on one side and a sheer drop on the other.

"Unmanned ground vehicles fall off the cliff and fixed-wing UAVs cannot circle," says Gopinath. "You need to be able to hover and stare." The U.S. has developed tactics to hover the MAV so it can look sideways into a culvert, he says, and use the downdraft from its ducted fan to blow away any brush blocking the entrance.


Use of the T-Hawk has highlighted some limitations. Early versions required operators to get out of their armored vehicle twice, once to start the MAV and again to launch it; the second exposure could prove fatal. Block 2 reduced the launch procedure to a single step, and in Iraq MAVs are launched from within a four-vehicle protective box. But in Afghanistan, where there are culverts every 200 meters (656 ft.), the roads are not wide enough.

Now Honeywell is developing a way to launch the MAV from within an armored vehicle, eliminating the need to get out. "There are a ton of design challenges"

he says, but the launch under armor capability is planned to be available by the end of this year.

The company is also looking at a new sensor integrating day electro-optical (EO) and night infrared (IR) with a laser pointer. IR would be able to see through dust obscuring the EO sensor and the laser would be used to indicate targets, the spot being visible using night-vision goggles. The MAV's engine, meanwhile, is being converted to burn heavy fuel as avgas is not readily available. Development of the injection modification is to be completed by year-end.

There are two limitations Honeywell cannot change—endurance and noise. The man-portable MAV was conceived to be small and light, so endurance is limited to 50 min. and, because of the small duct height, noise is 65 dB. at 100 meters. "Endurance and noise define the missions it can be used for," says Gopinath. "It can't do persistent surveillance or stealth, but it excels in stopping and inspecting stuff."

In addition to the U.S. Army and Navy, the T-Hawk is used by U.K. forces in Afghanistan. Poland has placed an order for use in that theater, and France is "working [on] the paperwork," he says. The Block 3 system is also part of the U.S. Army's Brigade Combat Team Modernization Increment 1, with plans to field the UAV with nine brigades if testing is successful. 

Honeywell

Find out more about T-Hawk

Sales 1.612.801.8203

Technical Sales 1.505.828.5492

Europe & Middle East Sales:

+44 (0)1935 446512

Visit us at www.thawkmav.com

email us at missionready@honeywell.com