

Tomorrow's Warplane Is a Mothership Packed With Expendable Drones

The planes of the future will carry fleets of small drones that will be their eyes, ears, and weapons, too.



By David Hambling Feb 29, 2016

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A new breed of air-launched drones is giving pilots a close look at places they would fear to fly, like the heart of a hurricane or inside a zone of heavy anti-aircraft fire. Sometimes called "off-board sensors," these small unmanned vehicles can be simple, expendable camera-carrying drones or far more sophisticated machines. Either way, the ability for an aircraft to become a drone mothership of sorts, sending out eyes and ears in all sorts of directions, could change the game for the Pentagon.

Into the Storm

One of the first such expendables is the [Coyote drone](#), originally designed for the U.S. Navy. The Coyote is fired from the tubes on a P-3 Orion aircraft normally used for dropping sonar buoys. The drone uses a parachute to slow down, then releases it as it unfolds five-foot wings. An electric propeller drives the Coyote for up to 90 minutes at a cruising speed of 60 mph. The drone can be recovered and reused, but it's cheap enough to be expendable.

The National Oceanic and Atmospheric Administration (NOAA) is now using Coyotes for [Hurricane Hunter missions](#). NOAA flies P-3s high above the storm, and previously the only way to see into the cauldron was to drop sensors known as radiosondes, which provide a snapshot of conditions at one point. The Coyote can fly around and explore a wider area over an extended period.

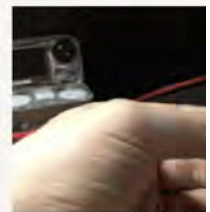


Coyote drone

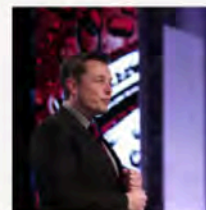
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In a test last month, a Coyote flew with a new thermal camera to measure water temperature inside a storm. That's crucial because heat from the water drives a hurricane, and the rate at which it cools determines whether the hurricane is fading or strengthening. The Coyote also carries sensors for wind speed, pressure, and other variables. During the test it sent back data to its launch aircraft from 50 miles away.

Sub Hunting



The U.S. Navy's newest maritime patrol and reconnaissance test aircraft, P-8A Poseidon flies with a P-3C Orion along side, prior to landing at Naval Air Station Patuxent River, Md., on April 10.

US Navy

The same P-3 that NOAA's using for hurricane science has been a dedicated submarine-hunter for the U.S. Navy. For this job, the Orion carried a Magnetic Anomaly Detector (MAD), which is basically a giant metal detector for finding subs. The P-3's replacement, the P-8 Poseidon, does not have a MAD. This is something of a relief for the crew, as the MAD required them to fly uncomfortably at low altitudes. Instead, the P-8 will launch drones carrying MAD to dip down and scour the seas below.

Last year the defense company BAE Systems scored a Navy contract to make a MAD small enough for an air-launched drone—the awkwardly named [High Altitude ASW Unmanned Targeting Air System](#) (HAASW UTAS). We don't know all the details yet, but the new detector may be more sensitive than previous versions, possibly based on an [Atomic Vapour Magnetometer](#) that the Navy has been developing.

A flock of drones scouring the seas with MAD could overcome one of the traditional problems with this technology: A single aircraft searching a single swath gives it relatively short range compared to sonar. MAD drones, though, could hunt far and wide.

Gunship's Little Helper

Even the fearsome AC-130 gunship is getting some help from expendable drones. The Air Force has long had a requirement, [repeated last year](#) by Lt. General Bradley Heithold, for a tactical off-board sensor when the gunship is flying over heavy clouds. If the AC-130 were to carry its own sensors, they could use the same launch tube as the AGM-176 Griffin mini-munitions carried by some C-130 and would be able to send back sensor data, including video and thermal imaging, from below the clouds to help direct fire and assess the damage.



Tiger Moth

In fact, Special Forces Command already has a drone developed for exactly this mission. Built by RC helicopter makers [Lite Machines Corporation](#) and known as Tiger Moth, it is a curious twin-rotor craft weighing just three pounds. According to the developers, it can provide high-resolution video imagery to the sensor operators of current and future gunships and aircraft systems, and it is "nearly silent."

Tiger Moth's uses do not stop there. "The system can also be configured with explosives to become a tactical smart weapon, with a range of up to 20 miles," its creators say. Such a feature would provide the AC-130

with a precision-strike capability with less potential for collateral damage than the plane's big 105mm cannon. "The Tiger Moth system was designed to be manufactured in high quantities, and could be deployed in a swarm to soften the battlefield in advance of ground troops and can be ground or air launched in large numbers," Lite Machines Corporation says. Tiger Moth does not appear to have gone into production, but it provides further evidence that the concept is practical.

THEY CAN FLY THROUGH HEAVY WINDS AND BE KICKED OUT THE BACK OF A FIGHTER JET MOVING AT MACH 0.9



"Arsenal Planes"

Meanwhile, there are far more shadowy air-launched drones already flying. The Pentagon established something called the Strategic Capabilities Office to exploit new technologies, and one of their projects involves swarms of unmanned vehicles. Little had been disclosed, though, until this month, when Defense Secretary Ash Carter [mentioned this](#) in a briefing on the 2017 budget:

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Carter said the drones were based on commercial, off-the-shelf components rather than the usual custom electronics, and that 3D printing was used to make. This suggests that the Pentagon is starting to leverage this low-cost technology, something we noted recently regarding the military's proposed [build-a-drone workshops](#). Think-tank MITRE [built a "military grade" drone](#) using this very approach, with a 3D printed airframe and Android electronics, and showed that it could be done for under \$2,000 . At that price, a swarm of several hundred drones would cost less than one cruise missile.

In that same speech, Carter described an idea of the aircraft of the future as an "[arsenal plane](#)," launching fleets of scout drones that locate targets and attack drones that take them out, with the big, human-piloted plane carrying the standard missiles and bombs. It's easy to see that world taking shape though this new breed of expendables. And it's a politically astute approach, because it means the human pilots maintain their position at the center of things while the drones are expendable extras, like missiles. Any drone program that threatens to replace human pilots [tends to be cancelled](#).

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