

Get your rotor runnin': Flexrotor program takes off for next phase (w/ Video)

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Part helicopter, part airplane, the Office of Naval Research (ONR)-sponsored Flexrotor vertical takeoff and landing unmanned aerial vehicle (UAV) enters the next development phase April 30 in delivering improved maritime surveillance capability.

The contract awarded today is for the flight controls component. During this phase, Aerovel Corp. will advance Flexrotor's capability with an upgraded [propulsion system](#) to transition from vertical to cruising flight and to land in crosswinds and high winds. The aircraft's first major milestone was in August 2011, when it successfully transitioned from horizontal to [vertical flight](#) and back again.

The small UAV features a unique design. It has an oversized propeller with helicopter-like controls for vertical takeoff and landing and the wings of a conventional aircraft. The goal is that it will take off vertically, cruise efficiently horizontally and then land vertically.

"With Flexrotor, the two biggest benefits to Sailors and Marines would be the ability to do extended maritime surveillance from a ship, and to do so with a small footprint," said John Kinzer, ONR program officer for Air Vehicle Technology.

Taking up less than one-half the space needed by other UAVs, Flexrotor would give Sailors compact, ship-launched, eye-in-the-sky capability. Additionally, it could stay airborne for a longer period of time. Thus, Flexrotor could help meet the Navy's perpetual need for more and better

maritime surveillance.

A vertical takeoff/landing craft requires a complex propulsion and [flight control system](#). The propeller needs to be big enough to provide sufficient lift to take off vertically, yet small enough to be efficient while in horizontal flight. The flight controls must provide powerful and precise control in vertical takeoffs and landings and efficient, low-drag control in forward flight. Perfecting both the rotor and other flight capabilities requires a constant balancing act among power, efficiency and weight, and this is what Tadd McGeer, Flexrotor's inventor, is working out during phase II.

Since test flights to date have occurred with light winds, AeroVel will begin testing in windy conditions, gradually increasing the aircraft's operating envelope.

Another aspect of the program, sponsored by the Naval Air Warfare Center Aircraft Division, is to develop an autonomous servicing capability. AeroVel is creating an Automatic Servicing Platform that would serve as launch and landing pad, as well as maintenance bay. This could be useful when deploying the Flexrotor to remote areas, as the aircraft could use this all-in-one hub without needing human assistance.

The platform could be beneficial for a special operations application of remotely siting a UAV. "[The special ops personnel] like the idea of not exposing where they are when they need to launch and recover one," Kinzer said. "They could put it on a mountaintop somewhere and just leave it to do surveillance." There are also potential applications to Arctic surveillance and weather reporting for the Navy and other organizations, such as National Oceanic and Atmospheric Administration.

Provided by Office of Naval Research

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