

AEROVEL FLEXROTOR SETS VTOL ENDURANCE MARKBingen, Washington USA
15 October 2017

Long range and endurance are capabilities not often associated with [VTOL aircraft](#). But Aerovel's unmanned [Flexrotor](#), a unique miniature tailsitter, is cut from a different cloth. Last week a *Flexrotor* named for the sea nymph *Actaea* lifted off into a grey and rainy morning with 7.5 kg of fuel onboard. It transitioned from hover to wing-borne flight, and soldiered on through a showery day, a blustery night, and then another day in the breezy and unsettled air behind a cold front. As dusk fell it transitioned back to hover, and dropped gently down onto a 12-foot square helideck underway at 8 kt. Time from launch had been 32 hours and 8 minutes. More than 3 hours' worth of gasoline remained in the tank.



Actaea lifts off into gray and rainy skies at the start of its 32-hr flight. Legs are about to fold for transition to wing-borne flight.

Tad McGeer, Aerovel's president, recounted that "the first day was a little turbulent, and after going through the cold front we had 20-30 kt wind and lots of convection. A sailplane pilot would have used it to good effect, but *Actaea* was holding constant altitude and so gave up a few percent of range fighting the ups and downs. Performance was otherwise right on expectation."

Long endurance is Aerovel's heritage. Dr McGeer's own experience dates back to his



Actaea several hours after launch, as seen from a second *Flexrotor* [flying in formation](#).

[Aerosonde](#) weather-reconnaissance aircraft, which made the [first unmanned transatlantic flight](#) in 1998. Many of Aerovel's team were with him for [Scaneagle](#), which made the [longest ship-based flight](#) in 2004. But *Actaea*'s flight "has been the longest for any of us. It was 5 hours more than the transatlantic *Aerosonde* flight, and at a higher speed. In fact, as far as we know, no VTOL aircraft has even come close in either time or distance." (McGeer recalls that a Royal Air

Force *Harrier* “jump-jet” [flew from central London to New York](#) in 1969, but “it went straight to a tanker 10 minutes after launch”.)

Actaea carried a payload of 1.5 kg, which McGeer says is typical. “Most *Flexrotors* fly with the nose-mounted ‘05’ turret from our colleagues at [Hood Technology](#). Actually we had a second ‘05’ *Flexrotor* flying formation during the first day to take close-ups of *Actaea* in cruise.” Alternate noses can accommodate Hood Technology’s popular “[Super-EO](#)” or [MWIR](#) day/night turrets, [Trillium’s Orion series turrets](#), or data-relay equipment. “We’ve flown an SIGINT nose for the Navy in the Atlantic, and later this month will install a meteorological suite from [PEMDAS](#). Perhaps *Flexrotor* will take us back to our roots in [hurricane reconnaissance](#), which started us off with *Aerosonde* 25 years ago.”

Additional load can be carried in the removable backpack. *Actaea* flew a 3 kg backpack fuel tank; other backpacks provide onboard power and Ethernet for supplementary payloads. The onboard Ethernet links into the ground network, and transmits at video rate over distances exceeding 100 km.

Actaea’s launch weight was 22 kg, so lifting it out of the assembly box and into position for launch was quite manageable for one person. Small footprint and long range make the aircraft especially suited for shipboard use. It has [guided a commercial seiner to yellowfin](#) in the midst of the equatorial pacific, and a giant [anchor-handler to Arctic worksites](#) through the icy labyrinth of the Beaufort. It has even [operated from an unmanned 4-metre skiff](#) near Aerovel’s home on the Columbia river. With its capabilities and accomplishments ever expanding, *Flexrotor* can be expected to pop up, and down, in many another tight and faraway spot over the months and many years to come.

