

FUTURE DEFINING

U.S. Coast Guard Deploys Puma™ AE during Operation Deep Freeze

AeroVironment's Puma AE Makes Historical Debut to Assist with Navigation through Icy Waters

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Puma AE made history in 2016! Never before had an unmanned aircraft system been used by the U.S. Coast Guard Cutter *Polar Star* for its annual Deep Freeze mission to Antarctica's McMurdo Sound. Every year, this heavy icebreaker travels to the Sound to open up the shipping lanes needed to resupply the National Science Foundation's McMurdo Station and other facilities on Ross Island.

This year was different. Puma's "eyes in the sky" replaced the previous method of using Coast Guard helicopters to survey the surrounding ice before navigating the safest and most efficient routes.

"Puma provided critical scouting intelligence to help the Coast Guard's *Polar Star* conduct ice-breaking operations in the treacherous waters of the Ross Sea," said AeroVironment Program Manager Sean Colvin. "Using Puma for this task ensured a safe passage without putting pilots and costly helicopters at risk."

AeroVironment sent a team — Colvin, Kris Waters, and Kevin Vollbrecht — to support Operation Deep Freeze for the duration of the mission. The

Coast Guard crew, the AeroVironment team, and another team from the National Oceanic and Atmospheric Administration (NOAA) departed Hobart, Tasmania, Australia, on December 30, 2015, and reached McMurdo Station on January 18, 2016.

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"While Puma provided aerial intelligence for ice cutting, it was also available for scientific tests and for any search and rescue missions, if needed," said Colvin."

One of the tests involved a Beyond Visual Line of Sight for NOAA. During this test, Puma flew out 25 nautical miles or 46.3 km. It is believed to be a first for an unmanned aircraft in Antarctica.

The Coast Guard conducted several tests with Puma during their stay in Antarctica. The imagery



*Kevin Vollbrecht, an engineering development technician with AeroVironment, Inc., launches a Puma AE unmanned aircraft system from the flight deck of Coast Guard Cutter *Polar Star* during Operation Deep Freeze 2016 in the Southern Ocean Jan. 3, 2016. Photo credit: Courtesy of U.S. Coast Guard Petty Officer 2nd Class Grant DeVuyst.*

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fed back to the ship allowed the crew to build two- and three-dimensional maps and mosaics of the ice, and it provided aerial footage that helped scientists onboard better understand ice thickness, age and other conditions.

Operation Deep Freeze is a U.S. military operation in support of the U.S. Antarctic Program (USAP), which is managed by the National Science Foundation. The mission to resupply the Foundation's McMurdo Station is one of the most difficult U.S. military peacetime missions due to the harsh environment. McMurdo Station, established

in December 1955, on Ross Island functions as the logistics and science support hub of the USAP. Research on glaciology, geology, geochemistry, geophysics, astrophysics, biological studies, and long-term ecological research is conducted in and around McMurdo.

In 2019, it was reported that the 42-year-old *Polar Star* was showing signs of age and in need of extended repairs to conduct its annual voyage to Antarctica. To date, it is the nation's only heavy icebreaker still in operation.



The AeroVironment team and an NOAA scientist hold Puma during a stop at an unknown location on the ice Feb. 1, 2016. Left to right: Sean Colvin, Kris Waters, Kevin Vollbrecht, and NOAA scientist.