



The Strategic Capabilities Office

PERDIX FACT SHEET

DESCRIPTION

Perdix are autonomous micro-drones capable of low-altitude Intelligence, Surveillance, and Reconnaissance (ISR) and other missions. They can be air-, sea- or ground-launched and operate in both small and large swarms to perform their missions.

HISTORY

Perdix was developed by MIT Lincoln Laboratory in 2013 based on an initial design from MIT's AeroAstro Department. It has been successively upgraded by SCO using all-commercial components, 3D-printing, and agile manufacturing. Over 670 have been flown to date.

WHAT'S IN A NAME?

In Greek mythology, the student Perdix was saved from sure death when Athena transformed him into a small bird after his jealous uncle, Daedalus, pushed him from a tower. Similarly, Perdix must quickly learn to fly after being released from U.S. fighters.

PAST TESTS

In September 2014, Perdix was first air-dropped from F-16 flare canisters by the Air Force Test Pilot School at Edwards Air Force Base.

In September 2015, 90 Perdix missions were flown during U.S. Pacific Command's Northern Edge exercise in Alaska. These included ground and maritime surveillance missions, as well as one of the first swarms containing 20 drones.

SWARMING VICE SYNCHRONIZING

Perdix are not preprogrammed, synchronized individuals. They share a distributed brain for decision-making and adapt to each other, and the environment, much like swarms in nature. Because every Perdix communicates and collaborates with every other Perdix, the swarm has no leader and can gracefully adapt to changes in drone numbers. This allows this team of small inexpensive drones to perform missions once done by large expensive ones.



THE BIG SWARM

In October 2016, SCO, Naval Air Systems Command, and MIT Lincoln Laboratory deployed a swarm of 103 Perdix from three F/A-18 Super Hornets at China Lake, California. This swarm demonstrated advanced behaviors like collective decision-making, adaptive formation flying, and self-healing.



DETAILS

- Propellers: 2.6 in
- Body: 6.5 in
- Wing span: 11.8 in
- Weight: 290 g
- Endurance: >20 min
- Air speed: >40-60 kts

HOW ARE THEY CONTROLLED?

Controlling 100 drones individually would be overwhelming, so much like a sport coach, operators call "plays" (e.g., surveilling a field) and Perdix decides how best to run them. Because Perdix cannot change their plays, operators can predict the swarm's behavior without having to micromanage it.

GENERATION

Perdix software and hardware is successively updated in design generations much like smartphones. The vehicle is currently on its sixth generation, which includes an improved canister and an injection-molded fuselage.

WHAT'S NEXT?

As SCO works transition to the Services, it is also partnering with the Defense Industrial Unit-Experimental (DIUx) to find companies capable of rapidly building 1,000 units this year. SCO is also working on the "Gen 7" design, which will likely include more advanced autonomy.