



*Gen3 Swarm Flying wing, avionics core, and conceptual swarm multi-copter*

## How

- The Gen3 design is nearly complete, with a flying, radio-controlled prototype. Final design alterations will be made, and a fleet of at least twenty Gen3 aircraft will be built and evaluated in swarm events at Camp Roberts..
- A small form-factor, ruggedized, swarm-capable, avionics core will be developed that includes:
  - a micro autopilot, running the ArduPilot or PX4 software stack
  - A low SWaP microprocessor suitable for handling swarm computations
  - Local or remote WiFi
  - Local or remote Telemetry (optional)
- Develop a suite of small-number swarm fleets to use the swarm core.

## What / Deliverables

- Maintain NPS Swarm research prowess by advancing swarm-fleet capabilities.
  - Complete the development for the Gen3 replacement airframe for the aging swarm fleet
  - Build out a fleet of twenty Gen3 airframes.
  - Develop new modular *Swarm-Avionics-Core* to enable electronic commonality amongst vastly different airframe topologies.
  - Build out twenty swarm cores.
  - Develop new airframes utilizing the modular swarm avionics:
    - Large and small fixed-wing with a variety of topologies and flight characteristics.
    - Medium-endurance, high-speed multi-copter.

## Why / Objective

- The NPS ARSENL research team is currently at the leading edge of Swarm research internationally, in particular for swarm-versus-swarm and counter-swarm tactics, but the current fleet of Gen2 aircraft are dwindling due to attrition and property transfer to the Academies and other collaboration partners. Further, the existing hardware is approaching technological obsolescence. The proposed effort intends to bring to completion the Gen3 direct replacement design to the existing Gen2 fleet, and build out a small flock of the new airframes. Additionally, we will develop a new modular design capability that allows for a common swarm-capable avionics module to be used in a variety of airframes, to include conventional tailed fixed-wing aircraft, mini flying-wing aircraft, and multi-rotor VTOL aircraft. This will allow us to branch into mixed platform research significantly advancing the state of the art.



**FY18 Call for Proposals**

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