

TITLE: Development of a Fixed-Wing UAV with Rapid Payload Reconfiguration

Proposal/Scope

This project proposes the design, development, and testing of a fixed-wing unmanned aerial vehicle (UAV) optimized for a 3 lb payload capacity with a range of 10 miles and full autonomous control. The UAV will feature a modular payload system to allow for mission adaptability. The aircraft will be capable of maintaining precise flight parameters and delivering real-time telemetry data.

Objectives:

- Maintain airspeed within ± 5 mph and altitude within ± 20 ft of set parameters.
- Design a fixed-wing UAV with a 10 mile operational range.
- Achieve a payload capacity of 3 lbs.
- Ensure full autonomous flight capability, including takeoff, navigation, and landing.
- Implement folding wings to facilitate ground transport.
- Develop a modular payload system for quick interchangeability between payload types.
- Attain a minimum flight endurance of 60 minutes while carrying the full payload.
- Integrate telemetry systems for real-time data transmission.

Key Design Requirements:

- Aerostructure: Lightweight and aerodynamically efficient fuselage with retractable/folding wings.
- Propulsion System: Electric or hybrid propulsion optimized for endurance and payload efficiency.
- Avionics and Control System: Autopilot with GPS navigation, IMU, and barometric altitude control.
- Modular Payload System: Quick-swap mounting points for different payload types, including droppable payloads and camera gimbals for surveying applications.
- Telemetry & Communication: Long-range communication for real-time monitoring and mission updates.
- Power System: Sufficient battery capacity or fuel source to meet the 60-minute flight time requirement.

Budget: \$1000