

Unmanned Aerial Radio Tracking System for Monitoring Small Wildlife Species (Drone Project)



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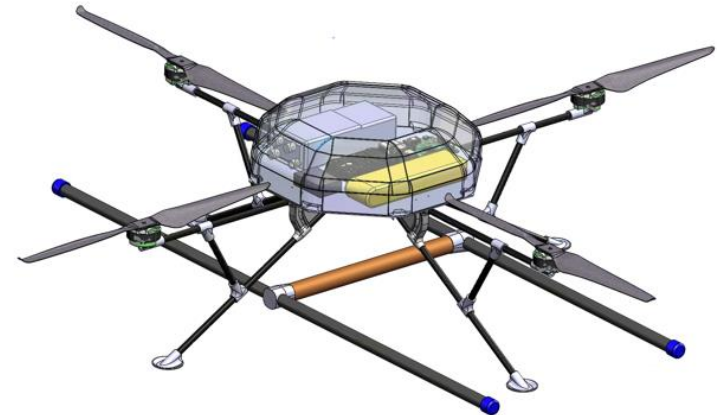
Project Description

Offer an efficient way to assist radio telemetry studies of bats in remote and difficult terrain in northern Arizona.

- Primary objective- design and produce a new collapsible frame design while maintaining structural integrity and ease of build
- Secondary objective- perform flight and signal reception tests

Sponsor/Client: Dr. Michael Shafer

Sponsor/Client Interest: Dr. Shafer has been conducting research in radio tracking systems.



Benchmarking

- DJI Phantom and Inspire
 - Expensive!
 - Small
- 3DRobotics Quad
 - Wrong form factor
 - Not Collapsible
- Home built Multirotor - Wood
 - Low Durability
 - Kits are too small



Background

- 3 iterations
 - Metal plate to Carbon Fiber Arrows
 - 3rd currently in construction to fix rigidity issues
 - 11 lbs of lifting power
- QuadCopter experience
 - Summer Work



Customer Requirements

- Customer requested an unmanned mobile areal platform with receiver and data processing system with ability to localize position of Very High Frequency (VHF) telemetry tags. Additionally, it should be able to:
 - Reach 500 ft. altitude above operators position
 - Make a 0.5 mile radius flight around operator
 - Be easily carried on treks to data collection site
 - Sustain minimal damage during crash
 - Have parts easily and cheaply replaced
 - Be stable during flight
 - Appear professional and marketable

Customer Requirements Cont.

- Based on the customer requests the following customer requirements and weightings were generated, out of 250 total points.
 - Lightweight (80)
 - Rigid/Strong (80)
 - Collapsible (50)
 - Low CG (30)
 - Aesthetics (10)

Schedule

Date	Agenda
Sept 11	DASL meeting
Sept 14	Decide group rolls
Sept 18	DASL meeting
Sept 19	Meet to work on team charter
Sept 21	Team Charter due
Sept 25	DASL meeting Establish customer requirements
Sept 28	Staff meeting
Oct 2	DASL meeting
Oct 5	Presentation 1: Customer Needs and background
Oct 6	Presentation at High Country Conferene Center (3:30)
Oct 7	Background report and peer evals done by 3:30

Date	Agenda
Oct 10	DASL meeting
Oct 16	ER's, targets, and tolerances completed DASL meeting
Oct 23	Preliminary design options finalized DASL meeting
Oct 24-25	Quadcopter build and flight lessons
Oct 30	DASL meeting
Nov 2	Presentation 2: Concept Generation and Evaluation
Nov 4	Preliminary Report and Peer Eval 2 done by 3:30

Date	Agenda
Nov 6	DASL meeting
Nov 13	DASL meeting
Nov 16	Staff meetings
Nov 20	DASL Meeting
Nov 27	HoQ finalized (testing plan and design links) DASL meeting
Dec 4	DASL meeting
Dec 7	Final presentation and project proposal
Dec 10	Final report and peer eval 3 done by 3:30

Budget

- Currently budget is unknown due to client waiting on research grant
- If grant is not obtained, design will require minimal cost using the carbon arrows
- Arrow connector brackets will be printed by NAU
- Electronics from the existing design will be reused
- Projected cost is expected to be approximately \$50