Remote **A**erial **M**ission **P**lanning **A**nd **R**adio **T**racker

Introduction

- Animal tracking via VHF tags
- Traditionally using handheld receiver
- Used by Biologists and Ecologists

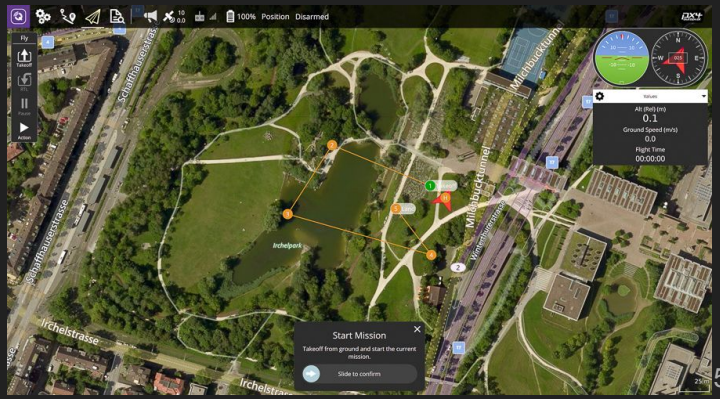
Our Sponsor

- Associate Professor
  - Dynamic and Active Systems Lab
- BS in ME from NAU, 2006
- PHD from Cornell, 2013

Our Client's Current Workflow

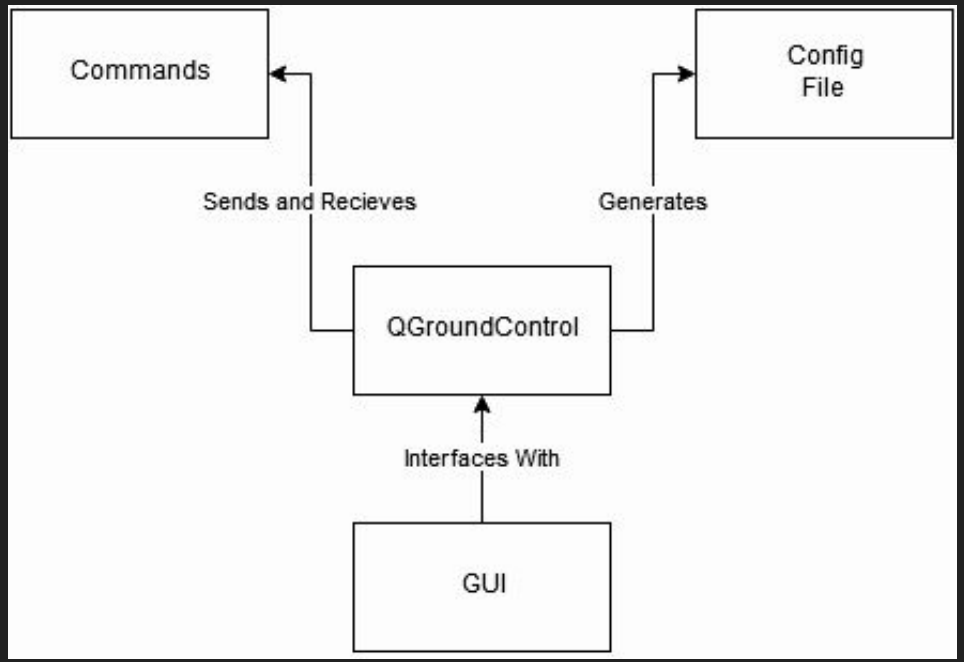
The Problem

- MATLAB
  - Very slow to start
    - 4.3 hours per year
    - ~52 flights lost
  - Necessary for the flight of the drone
  - Currently uses two different programs
    - Matlab + QGroundControl



Solution Overview

- Our own branch of drone flight planning software
  - Implement MATLAB code into QGroundControl
    - Configuration File Generator
    - Terminal display
    - Send/Receive Commands
  - Generate an accessible GUI



Requirements Acquisition

- Project Specification document

- Meetings With Client
  - Weekly
  - Semi-Organized

User-Level Requirements

- Send configuration file to the drone
- Download telemetry data from the drone
- Input configuration Data
- Import preset config data
- Sending start/stop commands

Key Non-Functional Requirements

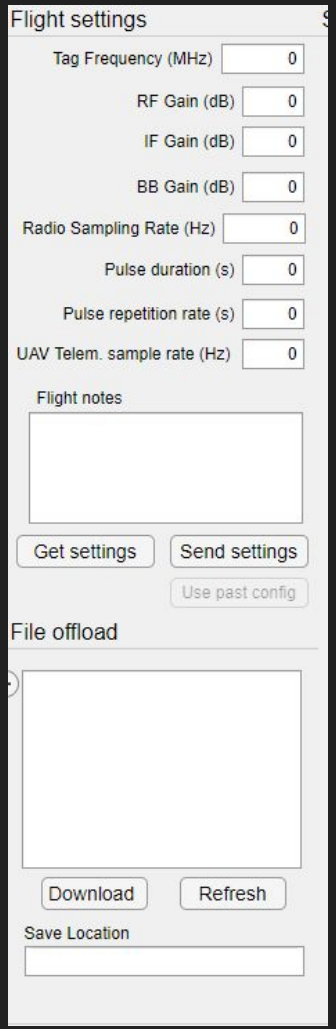
- Program must be reliable
- Well-written documentation
- Readable code, allowing it to be easily changed

Key Environmental Requirements

- The solution must be integrated into a compatible drone flight planner.
- Use the same configuration file format
- Documentation standards should match that of the DASL

Key Functional Requirements

- Generate files based on GUI input
- Perform data transfers with drone



Deep Dive: Perform Data Transfers

- Visualize status messages issued by the companion computer for the user
- Display confirmation messages for a successful config file upload
- Allow for retransmission of config files as needed
- Send start and stop commands to the drone’s radio systems

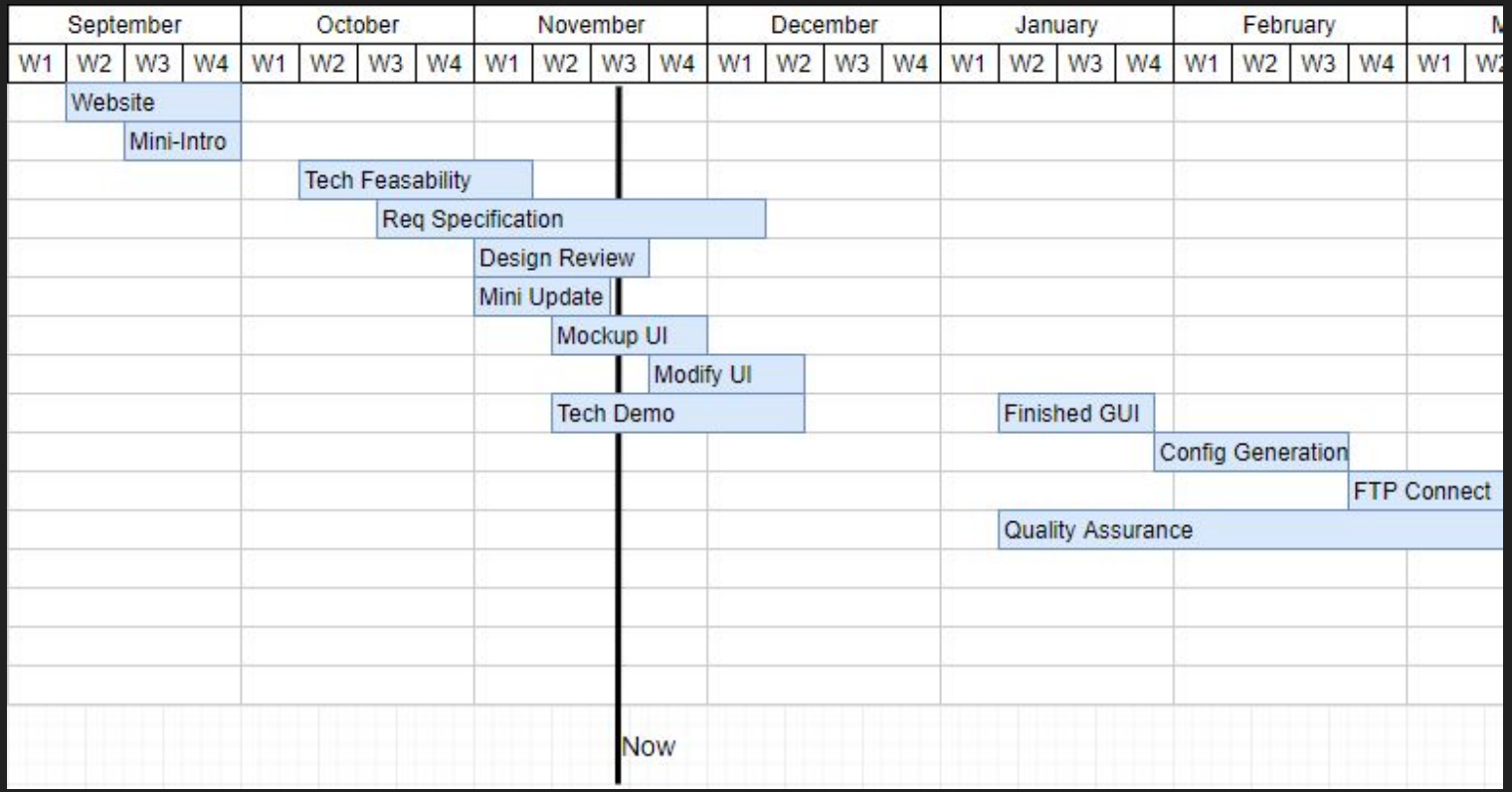
Technical Risks

Risk	Concern Level	Likelihood	Plan
Physical crashes	High	Low	• Create crash report
Data not downloaded wirelessly	Low	Medium	• Wired connection
Data is incorrect	Medium	Medium	• Confirm configuration

Social and Market Risks

Risk	Concern Level	Likelihood	Plan
Group disagreements	High	Low	• Majority rules • Confer with Mahsa
Obsolete through integration	High	Low	• Licenses
Wildlife Drones	Medium	Low	• U.S. utility patent

Schedule


September
October
November
December
January
February
W1 W2 W3 W4 W1 W2 W3 W4 W1 W2 W3 W4 W1 W2 W3 W4 W1 W2 W3 W4 W1 W2 W3 W4
Website
Mini-Intro
Tech Feasability
Req Specification
Design Review
Mini Update
Mockup UI
Modify UI
Tech Demo
Finished GUI
Config Generation
FTP Connect
Quality Assurance
Now

Conclusion

- VHF tags for tracking wildlife behavior
- Client must wait for MATLAB to load
- Integrate his MATLAB program into flight planning software
  - UDP Heartbeat and Terminal Messages
  - Configuration Generator
  - FTP System
- Requirements Document Draft and GUI mockup