

Drone Survey Management System Design Challenge

Overview

Drones are revolutionizing how companies inspect, monitor, and map their facilities, offering faster, safer, and more efficient alternatives to traditional methods. In this challenge, you will design a scalable system that enables large organizations to **plan, manage, and monitor** autonomous drone surveys across multiple global sites.

The goal is to create a platform that simplifies key operations like **facility inspections, security patrols, and site mapping** by coordinating drone missions remotely and intelligently. While the actual data capture (such as live video feeds or generating detailed 3D maps) is out of scope, your system will focus on the critical backbone of drone operations: **mission management, real-time monitoring, fleet coordination, and survey reporting**.

We encourage you to **actively use AI-powered development tools** (like Claude Code, Cursor AI, Windsurf, Lovable, Replit, etc.) to assist and accelerate your work. Part of the challenge is not just technical execution, but also demonstrating **how modern AI tools can enhance your development process**.

This assignment is designed to be challenging but achievable within the time frame when leveraging the right tools and smart design practices.

Project Scope

Note: Viewing live video feed, actual collection of survey data (images/videos), and the generation of maps/models is outside the scope of this project. Candidates are expected to host their application.

This assignment focuses exclusively on the mission management and reporting aspects of Drone operations:

Key Functional Requirements

Mission Planning and Configuration System:

- Define survey areas and flight paths
- Configure flight paths, altitudes, and waypoints

- Set data collection parameters (frequency, sensors to use)

Fleet Visualisation and Management Dashboard:

- Display organization-wide drone inventory
- Show real-time status of drones (available, in-mission)
- Display battery levels and other vital statistics

Real-time Mission Monitoring Interface:

- Visualize real-time drone flight paths on a map
- Display mission progress (% complete, estimated time remaining)
- Show mission status updates (starting, in progress, completed, aborted)
- Enable mission control actions (pause, resume, abort)

Survey Reporting and Analytics Portal:

- Present comprehensive survey summaries
- Display individual flight statistics (duration, distance, coverage)
- Display overall org-wide survey statistics (total surveys done, etc)

Technical Considerations

- The system should be scalable to **handle multiple concurrent missions** across different locations
- The system should support **advanced survey mission** patterns like crosshatch and perimeter patterns to optimize data collection efficiency.
- Users should be able to **configure** mission-specific parameters such as flight altitude, overlap percentage, etc., for comprehensive site coverage.

Note:

At FlytBase, we value craftsmanship over mere completion. We encourage you to prioritize building **high-quality, reliable** features over attempting to cover everything superficially. Even if you cannot implement the full scope, focus on delivering a thoughtfully designed, well-engineered solution for the parts you complete. This aligns with our culture of **ownership, excellence, and attention to detail** — traits we believe define outstanding engineers.

Submission Details:

- **Code:**

- Submit your code through a **single** GitHub repository (GitHub provides them free of cost).
- The code should be **modular** and **well-documented**.
- Add **assignments@flytbase.com** as a contributor to the repo.

The repository has to be private with collaborator access to assignments@flytbase.com. No public repository is allowed.

- **A brief write-up summarizing:**

- How did you approach the problem?
- The trade-offs you considered during development.
- Your strategy for ensuring safety and adaptability in the system.

- **Hosting:**

- You must **host your application** using any platform of your choice (e.g., Vercel, Netlify, Render, Railway, etc.)
- Include the **live application link** in your README file and in the write-up.
- Ensure the hosted link is reliably accessible and up-to-date at the time of review.

- **Videos:**

- A demo video showcasing the application in action.
- Ensure that the demo video has your voiceover explaining your application.
- Any additional bonus features implemented?

Evaluation Criteria

Your solution will be evaluated on:

1. Functionality and Capabilities of the Solution (30%)
2. Code Quality and Technical Architecture (20%)
3. User experience design and workflow optimization (20%)
4. Effective use of AI tools to enhance your design process (20%)
5. Quality and clarity of documentation. (10%)