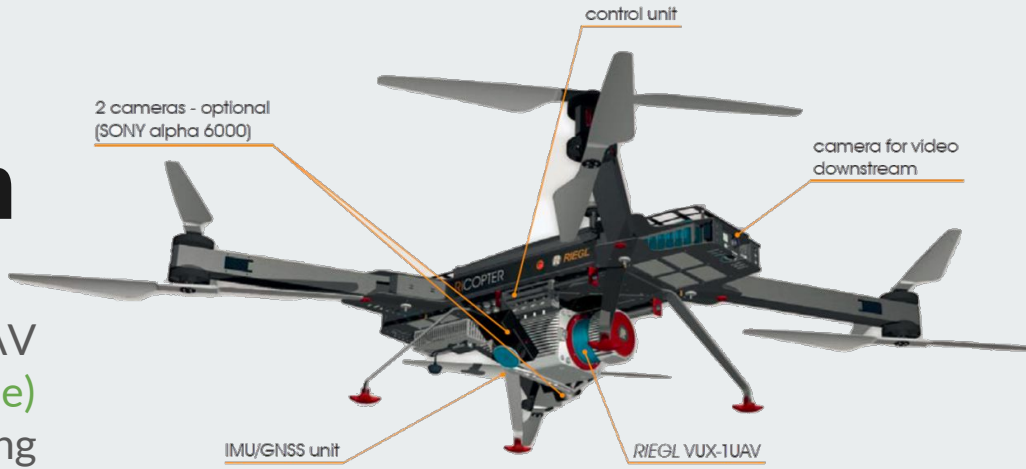
Real Time UAV Synchronization

A simple app to control your UAV (Unmanned Aerial Vehicle) programmatically for general recurring purposes

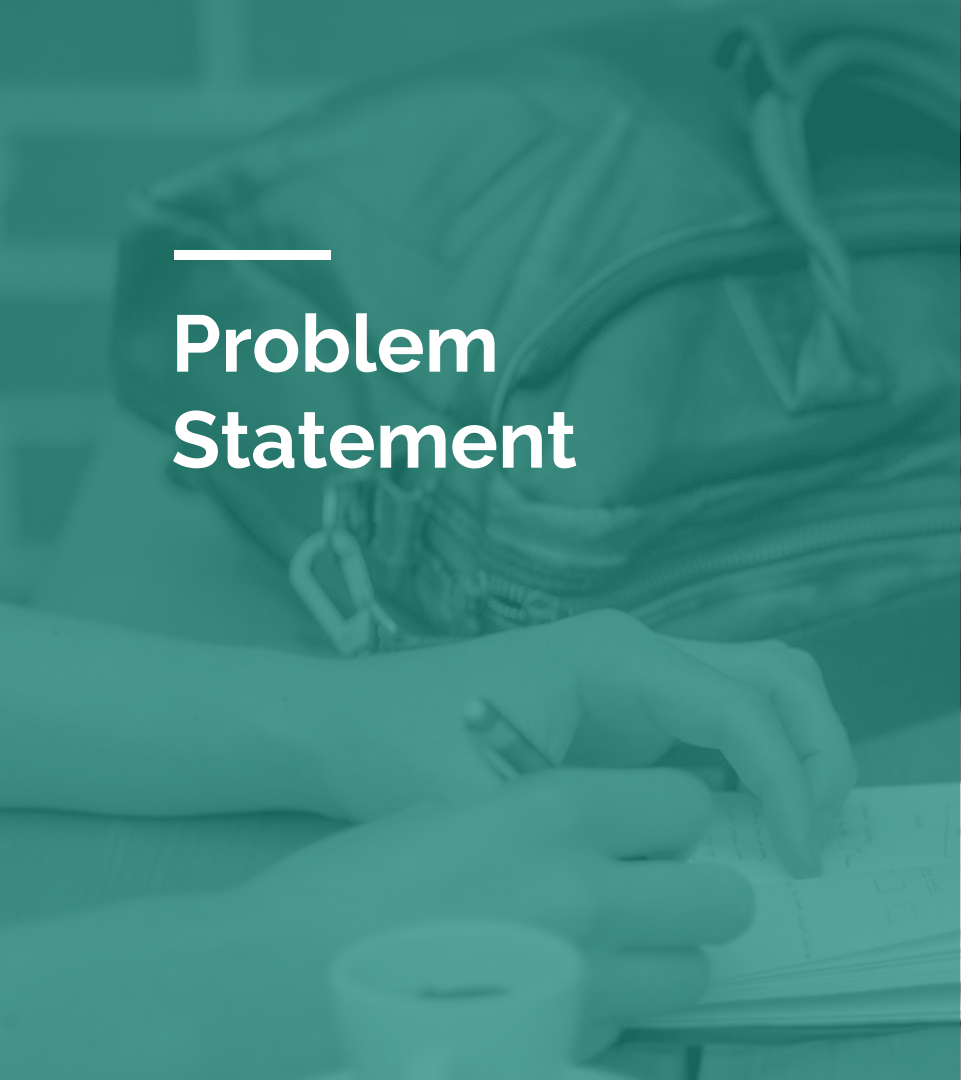


Background

With the world constantly advancing in technology, there is now a higher requirement of unmanned vehicles.

UAVs are controlled remotely or via a program. However, they are not yet truly autonomous.

In order to achieve this, we require smart programs to control the paths of these UAVs, in a synchronized manner.



Problem Statement

We aim to provide an application to control domestic licensed UAVs programmatically, with real time path prediction and ground mapping, to achieve general tasks it has been licensed for.

This will allow us extending the applications of UAVs to many more fields, such as agriculture and product delivery.

Existing Solutions to UAV Synchronization

There are majorly two fully explored approaches to UAV path synchronization

1. Swarming
2. Flocking

Real time path synchronization however is yet to be fully explored..

Implementation Strategy

We have created an app which allows users to register their UAVs with all the specifications, such as maximum and minimum UAV speed, maximum and minimum height, etc. and we create a base path for the UAV to follow with all the time constraints satisfied.

The path is made to be allowed to change in real time based on the conditions of the UAV and the surroundings using our complex algorithms.

Implementation Strategy

This involves complex algorithms to minimize energy consumption and optimize paths. We also require to verify the UAV state, such as necessary amount of battery/fuel, as well as the weather conditions prior to the flight.

We also map the surrounding area that the UAV covers in real time, considering all the buildings/aerial blockages, and no-enter zones. The path we choose for the UAV should cover all constraints and yet optimize it sufficiently.

Challenges

With great power, comes great responsibility

The path we decide should be flexible enough so that in case the UAV observes any incoming hinderance, such as birds, we should be able to immediately change the trajectory. For this, the UAV must be equipped with adequate sensors to detect such aerial motions.

There might unlicensed UAVs in the air during the time of the flight. This must be detected from the UAV itself, and if possible also be reported

Project Team

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Tester

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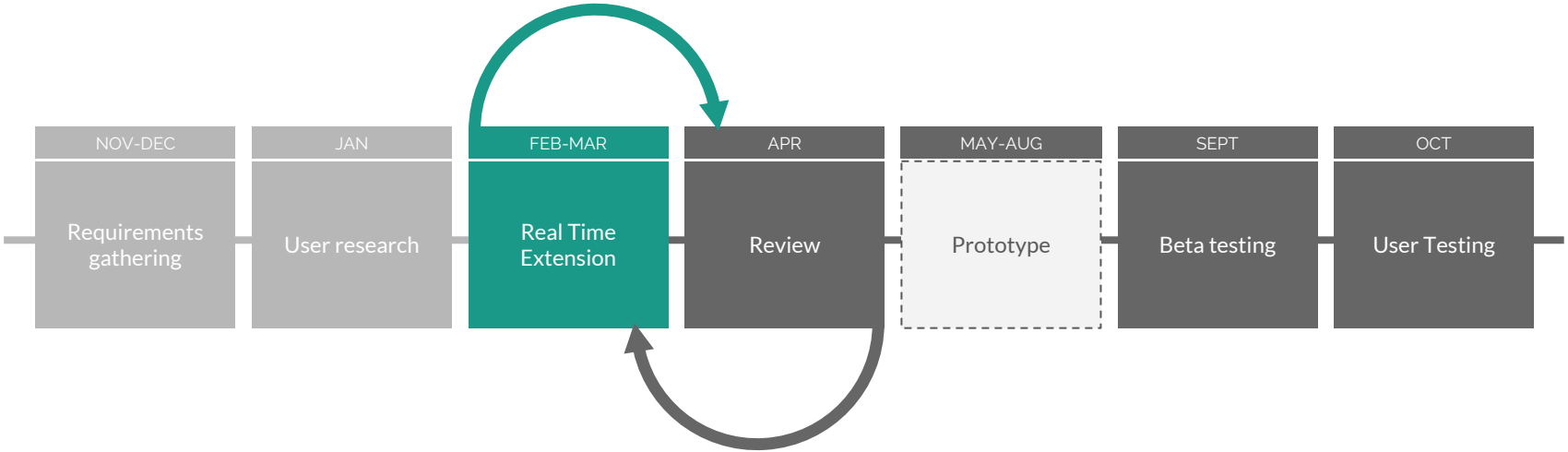
App Developer

Project Expected Cost

One year requirement for the project can be estimated as -

- App Extensions - 5,00,000 -/
- User Base Research - 2,00,000 -/
- App Testing (Simulations) - 8,00,000 -/
- App Testing (IRL) - 100,00,000 -/

Timeline


NOV-DEC
Requirements gathering
JAN
User research
FEB-MAR
Real Time Extension
APR
Review
MAY-AUG
Prototype
SEPT
Beta testing
OCT
User Testing

What we have achieved?

- ➔ An app to register and maneuver UAVs on all desktop platforms and Android platform
- ➔ An algorithm to create dynamic and optimal paths which can change with the course of the flight
- ➔ Real time 3D mapping of the surroundings, and smart path prediction
- ➔ Algorithm tested on simulations, with multiple obstacles both static and moving

What's next?

- ➔ Allowing an automated system to verify UAV licensing
- ➔ Programming Decentralized Decision Codes in UAVs for offline path analysis
- ➔ Extending the app API to allow general purpose tasks other than maneuvering the UAV
- ➔ Conquer the world

To learn more, visit:

https://www.uavsynch.com

Thank You!!