# Ground Control Station for Uncrewed Swarms and Teams

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Github: https://github.com/rickyrc123/GUSTv2
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# Project Focus

The end goal of GUST is to have a fully functioning ground control station that

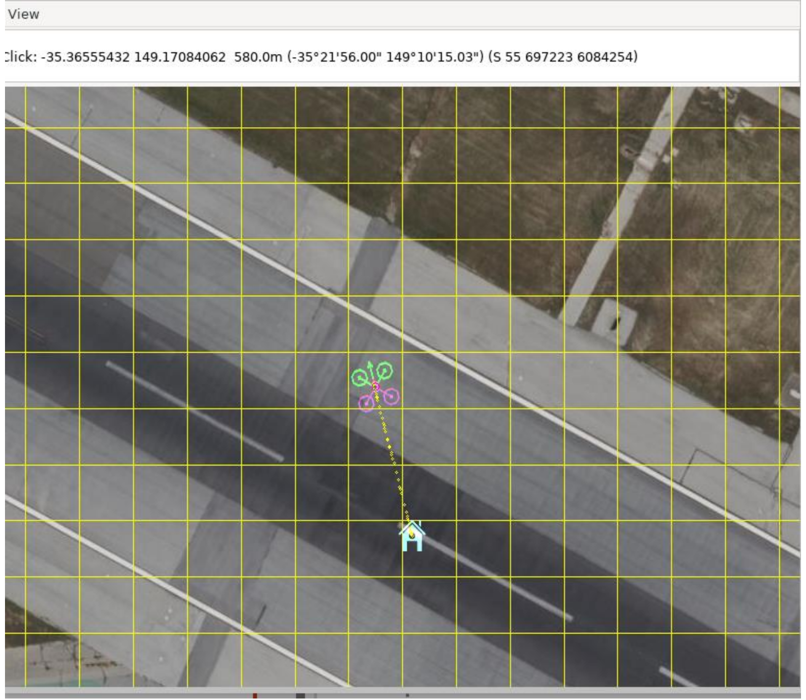
- Can connect to and control multiple vehicles simultaneously
- Can plan and execute maneuvers for single or multiple vehicles
- Live telemetry and sensor readings from vehicles

# Sprint Goals

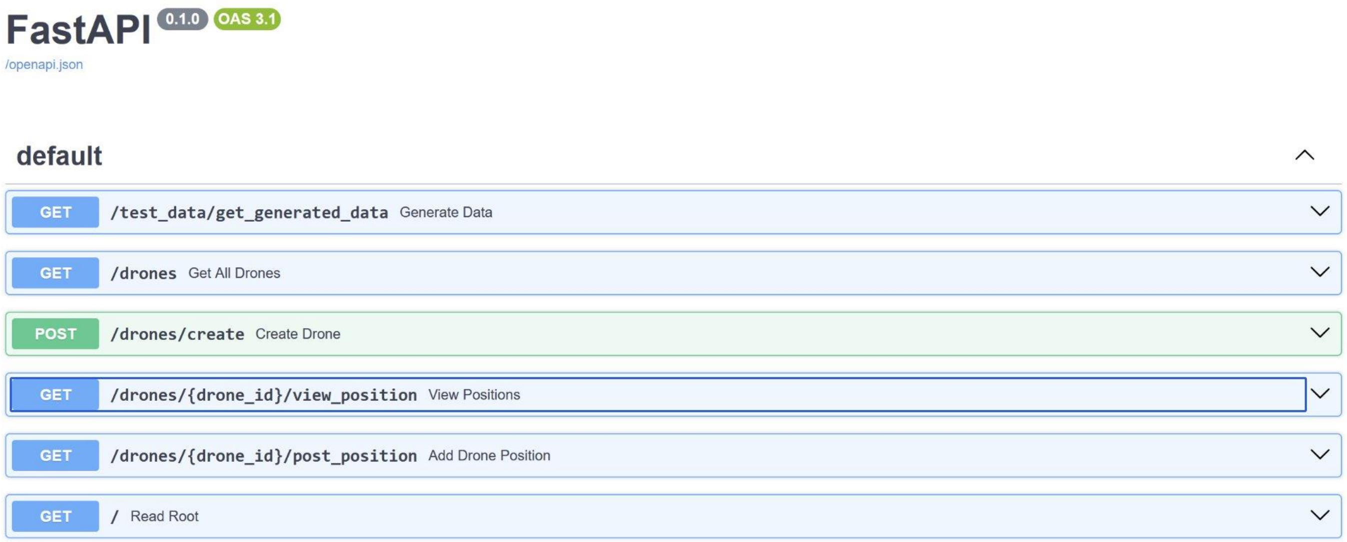
- Design Front End & Implement Telemetry Screen
- Database Design for Telemetry
- Backend Design for Telemetry
- Vehicle Control Verification & Test in Simulation
- Vehicle Control Verification & Test on Hardware

# Major Achievements

- Multiple waypoint flights in simulation
- Database setup for telemetry
- Backend setup to feed telemetry data
- Front end map and vehicle select implemented



Click: -35.36555432 149.17084062 580.0m (-35°21'56.00" 149°10'15.03") (S 55 697223 6084254)



FastAPI 0.1.0 OAS 3.1

/openapi.json

default

GET /test_data/get_generated_data Generate Data

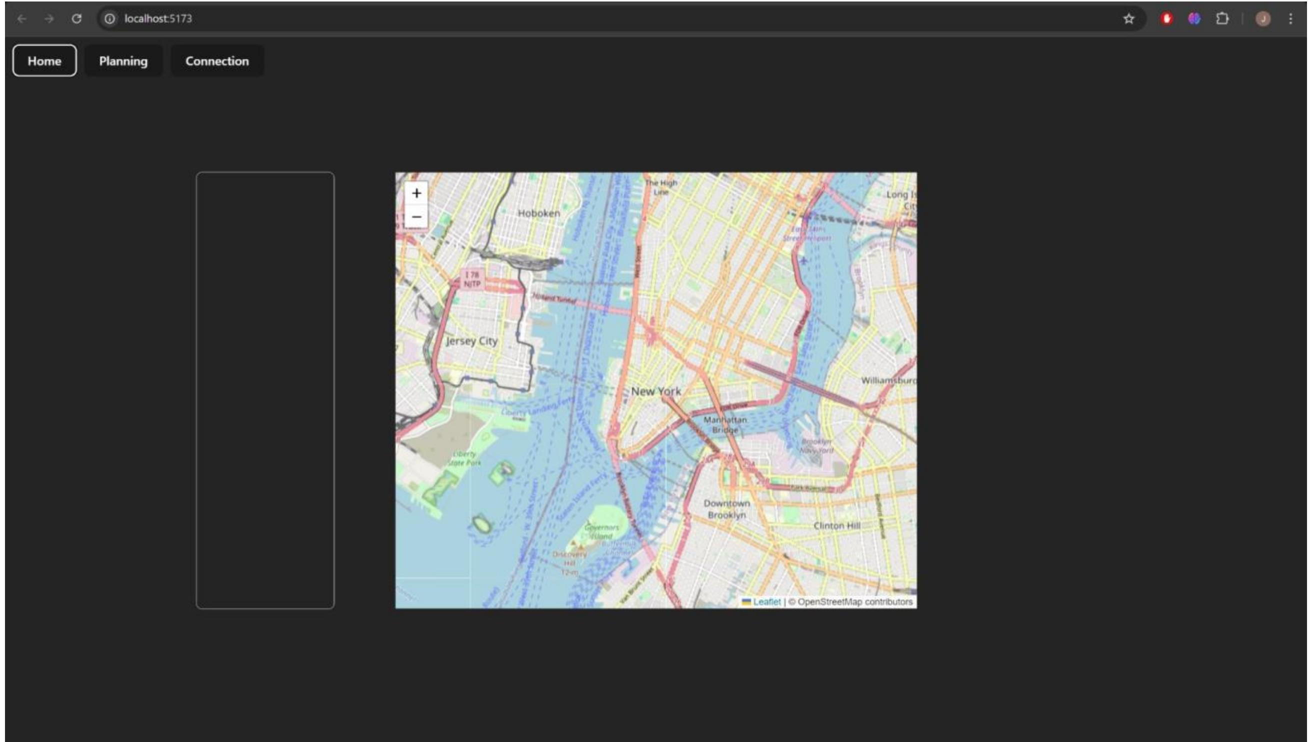
GET /drones Get All Drones

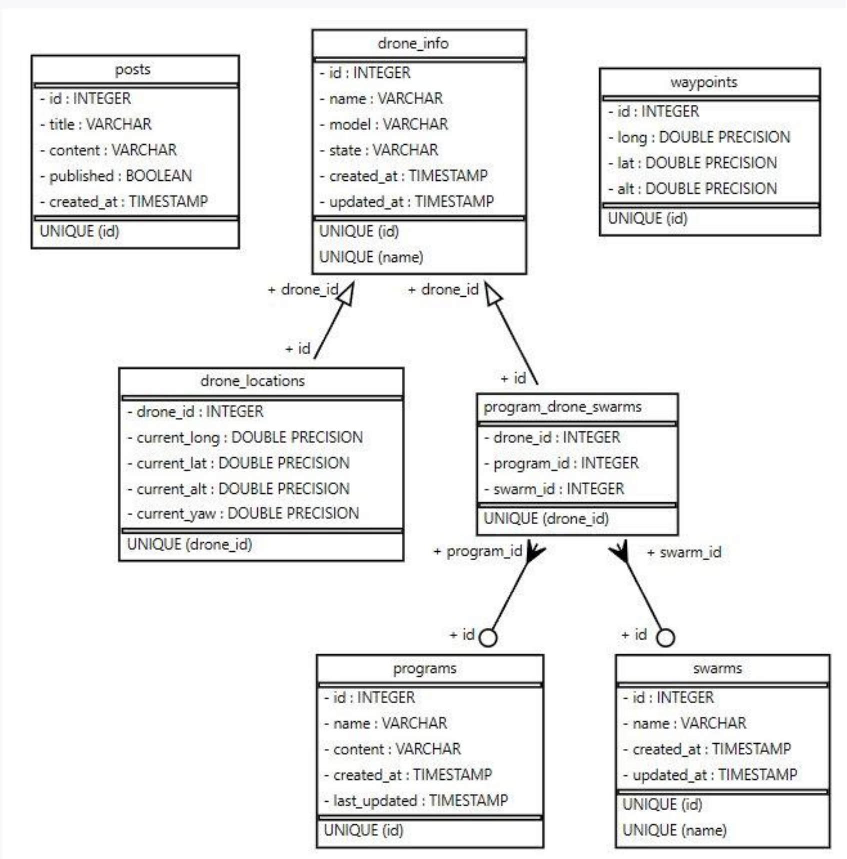
POST /drones/create Create Drone

GET /drones/{drone_id}/view_position View Positions

GET /drones/{drone_id}/post_position Add Drone Position

GET / Read Root





posts
- id : INTEGER
- title : VARCHAR
- content : VARCHAR
- published : BOOLEAN
- created_at : TIMESTAMP
UNIQUE (id)

drone_info
- id : INTEGER
- name : VARCHAR
- model : VARCHAR
- state : VARCHAR
- created_at : TIMESTAMP
- updated_at : TIMESTAMP
UNIQUE (id)
UNIQUE (name)

waypoints
- id : INTEGER
- long : DOUBLE PRECISION
- lat : DOUBLE PRECISION
- alt : DOUBLE PRECISION
UNIQUE (id)

drone_locations
- drone_id : INTEGER
- current_long : DOUBLE PRECISION
- current_lat : DOUBLE PRECISION
- current_alt : DOUBLE PRECISION
- current_yaw : DOUBLE PRECISION
UNIQUE (drone_id)

program_drone_swarms
- drone_id : INTEGER
- program_id : INTEGER
- swarm_id : INTEGER
UNIQUE (drone_id)

programs
- id : INTEGER
- name : VARCHAR
- content : VARCHAR
- created_at : TIMESTAMP
- last_updated : TIMESTAMP
UNIQUE (id)

swarms
- id : INTEGER
- name : VARCHAR
- created_at : TIMESTAMP
- updated_at : TIMESTAMP
UNIQUE (id)
UNIQUE (name)

# Sponsor Feed Back

- Polygon coverage planning
- Mobile NTRIP Server communication for gps time sync
- Integration with GEODNET

# Sprint Backlog

- Database setup and installed on docker container [done, ~2hrs]
- Database designed and implemented [done, ~6hrs]
- FastAPI installed and tested [done, ~3hrs]
- FastAPI backend for telemetry designed [done, ~3hrs]
- FastAPI backend for telemetry implemented [done, ~2hrs]
- Backend and db integrated [In Progress, ~3hrs]
- Front end design [done, ~2hrs]
- Telemetry screen fully implemented [In Progress, ~6hrs]
- Front end integrated with backend and DB [In Progress, ~6hrs]
- MavLink proof of concept and flight in sim [done, ~6hrs]
- MavLink test on hardware [In Progress, ~6hrs]

# Project Backlog

- Screen 2 implementation [backlog, ~12hrs]
- Planning screen backend [backlog, ~10hrs]
- Planning screen DB support [backlog, ~8hrs]
- MavLink backend integration [backlog, ~8hrs]
- Vehicle connection screen [backlog, ~8hrs]
- Vehicle connection backend [backlog, ~6hrs]

# What was not completed

- Telemetry screen not fully implemented
- Integration between front end, back end, and DB
- Hardware testing

# Lessons Learned

- The development of each component was very insulated
  - Each person worked on their own stuff and not much else
- This led to integration issues
- In the future, we plan to have every member at least somewhat involved in every part to ease integration