UNITED SENSORS

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BACKGROUND

Drones are prone to single points of failure. Our project focuses on a **redundant sensor board** that ensures critical flight parameters remain online. This will lead to increased **fault tolerance** when any of the main sensors when the drone experiences failure.

OVERVIEW

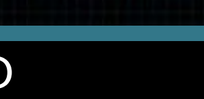
United Sensors aims to consolidate multiple iterations of crucial components into a single circuit board. This is ready-to-use with open-source software **Ardupilot** and can remotely connect to ground control stations.

COMPONENTS

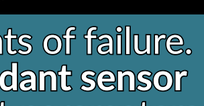
Microcontroller - STM32H7ZI2
Digital & Analog Processing

Magnetometer - LIS3MDLTR
3D Axis Orientation

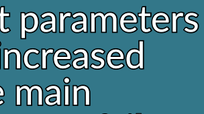
IMU - BMI088
Inertial Measurements



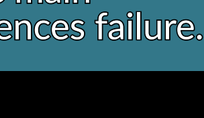
Barometer - DPS310
Atmospheric Pressure



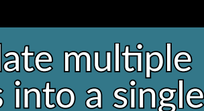
GPS - Neo 6M
Latitude & Longitude



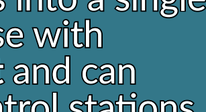
Optical Flow - Matek 3901-L0X
Relative Motion



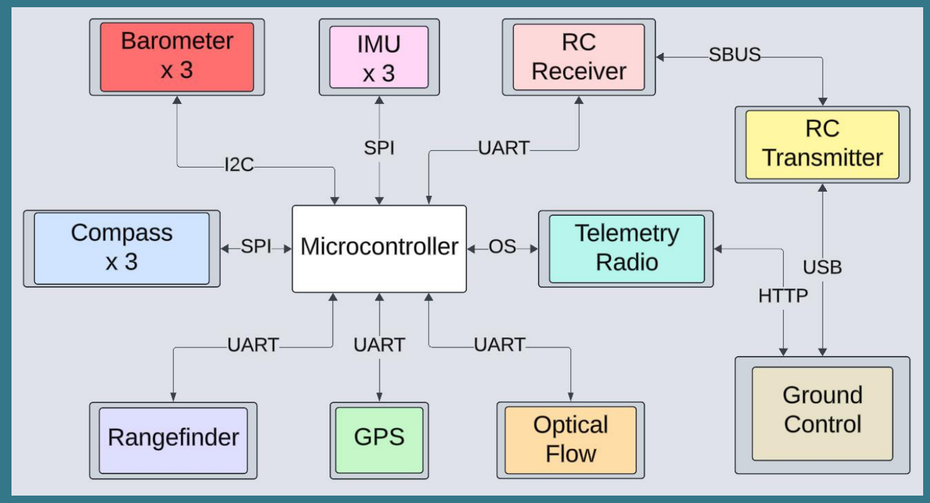
RangeFinder - TF miniS
Distance Determination



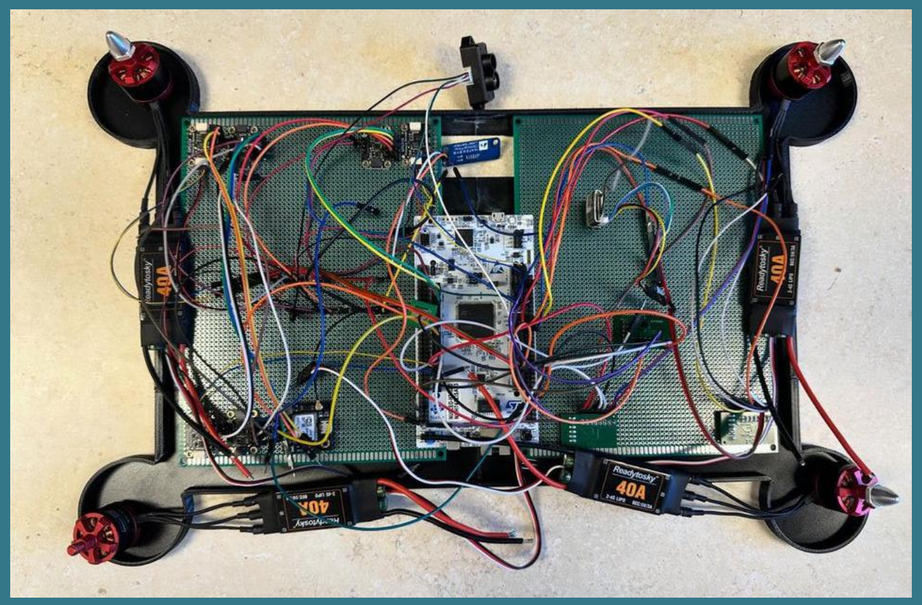
Receiver - FR SKY RX6R
Ground Station Comms



BLOCK DIAGRAM

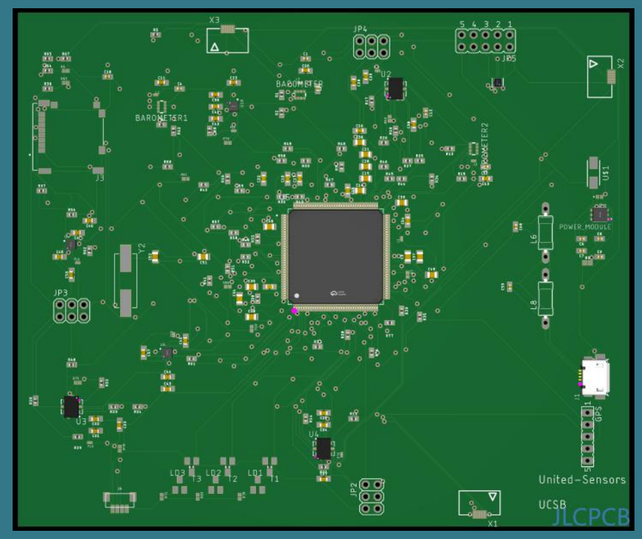


HARDWARE SIMBOARD

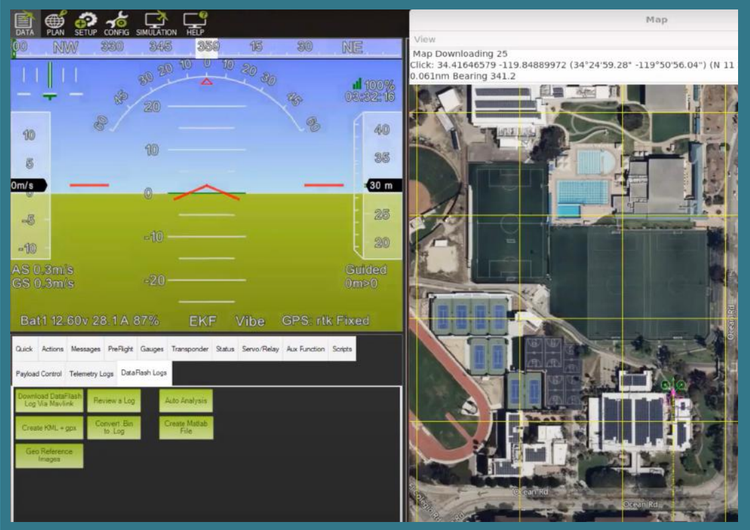


The board can be used to test hardware without needing to launch the drone. This is used for running driver code before adding sensors to the board. The board features a Motor System to simulate flight.

PCB DESIGN



GROUND CONTROL



Data packets will be sent via TCP to a **ground control station** that will read and process sensor data in realtime. Functions include creating flight plans, switching primary sensors, and satellite view via GPS.

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