E1.03 – As Above So Below

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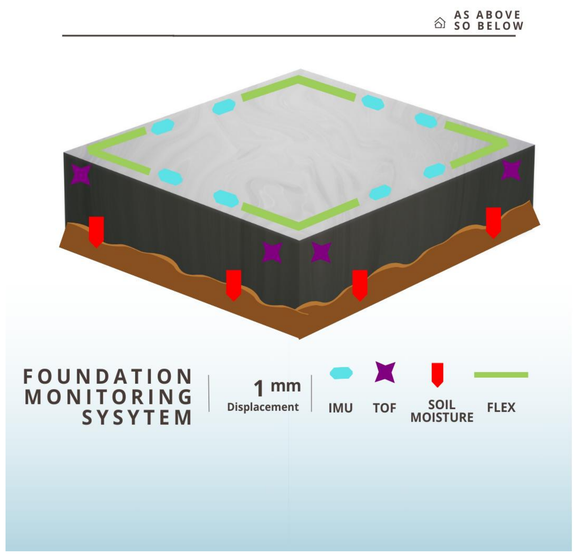
Stable Options LLC, SATOP

Overview

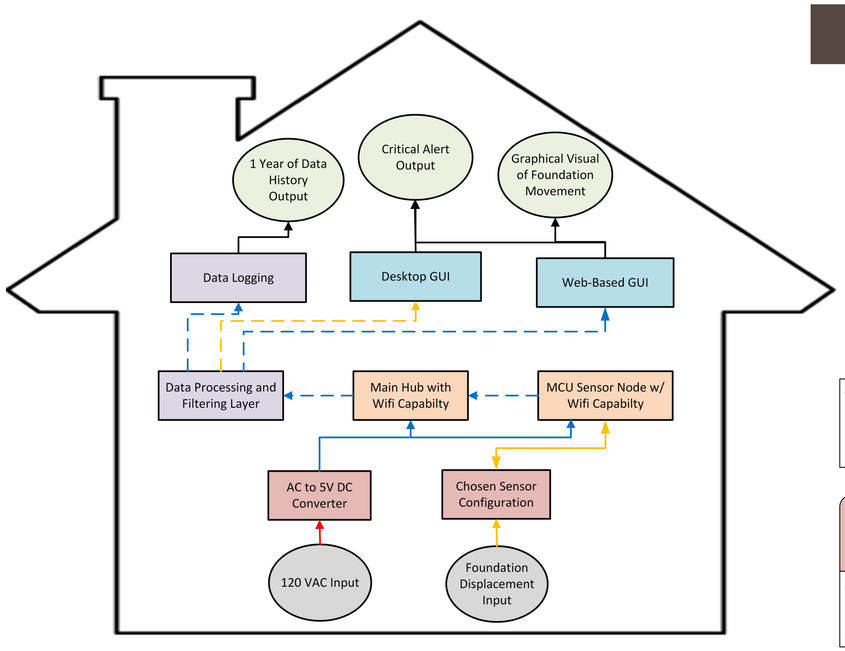


The Foundation Monitoring System enables real-time monitoring of structural movement using precision sensors and data processing. By detecting early shifts, it helps prevent costly damage and supports proactive maintenance; an approach supported by modern structural health monitoring research.

Features

- Central hub aggregates and analyzes sensor data
- Visual alert triggered if movement exceeds 1 mm
- Remote units powered by AC to minimize maintenance
- All units connect wirelessly to the central hub
- Hub includes a dedicated user interface for monitoring

Overall Block Diagram



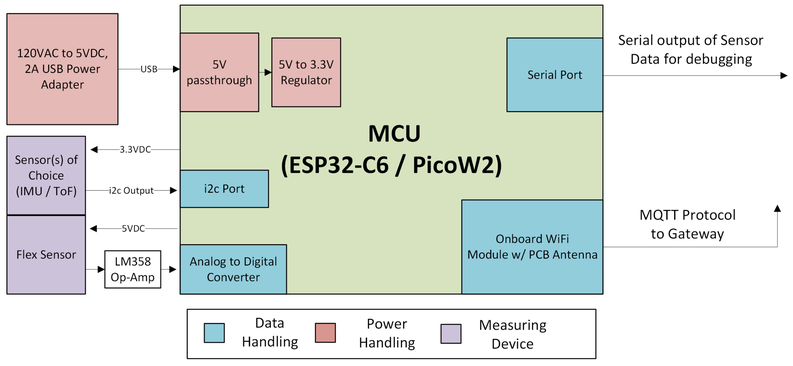
D1 Accomplishments

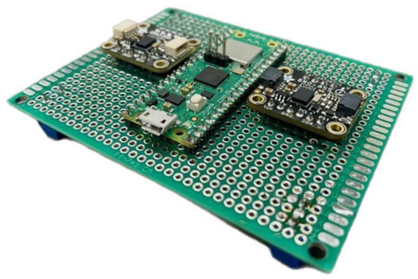
- 7 functioning sensors
- Communication protocol established
- Communication with UI
- IMU filtering & fusion implemented
- Testing platforms functional

AC POWER	HOUSE NETWORK
DC POWER	DISPLAY NETWORK
I/O LINK	OTHER

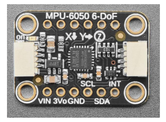
Will Rebenack	Orlando Torres	Sloan Louden-Robins	Cassidy Miskovitz
Sensor Integration & Hardware Development	Data Acquisition & Comunication	Data Processing & Logging	GUI & Test Simulation Development

Hardware

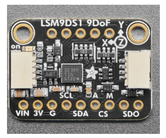




Sensors



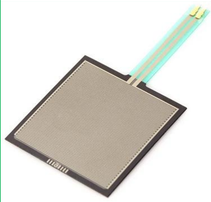
MPU-6050
6DOF



LSM9DS1
9DOF

BNO-055
9DOF

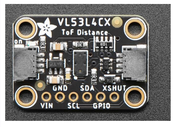
IMU



Strain Gauge

Flex Resistor

Pressure



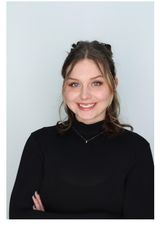
VL53L4CX
Time of Flight

ToF

Soil

Moisture

Meet the Team



Sloan

Orlando

Cassidy

Will

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- SATOP
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- Mentor team E2.06

D2 Plans

- Gateway communication with internal database
- Thorough alternative sensor analysis
- Multiple sensor configurations
- Machine learning algorithms enhancing data interpretation
- Testing on realistic platform
- Working prototype/proof of concept