Spring 2021 Senior Design 2 Expo

Situational Awareness Sensor Deployment for Special Operations Forces

UNCC_AFRL3 Team: Michael Andrews, Umeed Bhandary, Grant Caskey, Michael Dawson, Tyler Dollberg
Maegan Edwards, Destin Silvestri, Steven Wall, Bennett Watson, Caleb Younger
Mentor and Supporters: Dr. Aidan Browne, Major Puett, Major Morton

Project Overview

A robotic system designed to enhance the situational awareness of military personnel using a U.G.V, two U.A.Vs, and an array of deployable sensors.

Design Requirements

- This system will have to operate in different dynamic environments such as land, water, air, urban, and denied areas.
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- The system will be user controlled from at least 150 feet and expand situational awareness.
- The system shall place the sensors on a variety of surfaces to include brick, walls, light posts

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Future Plans

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- An improved UAV frame that allows for lower wind resistance
- A single track UGV design that:
  - reduces track jams
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Unmanned Aerial Vehicle (UAV)

- Quadcopter design
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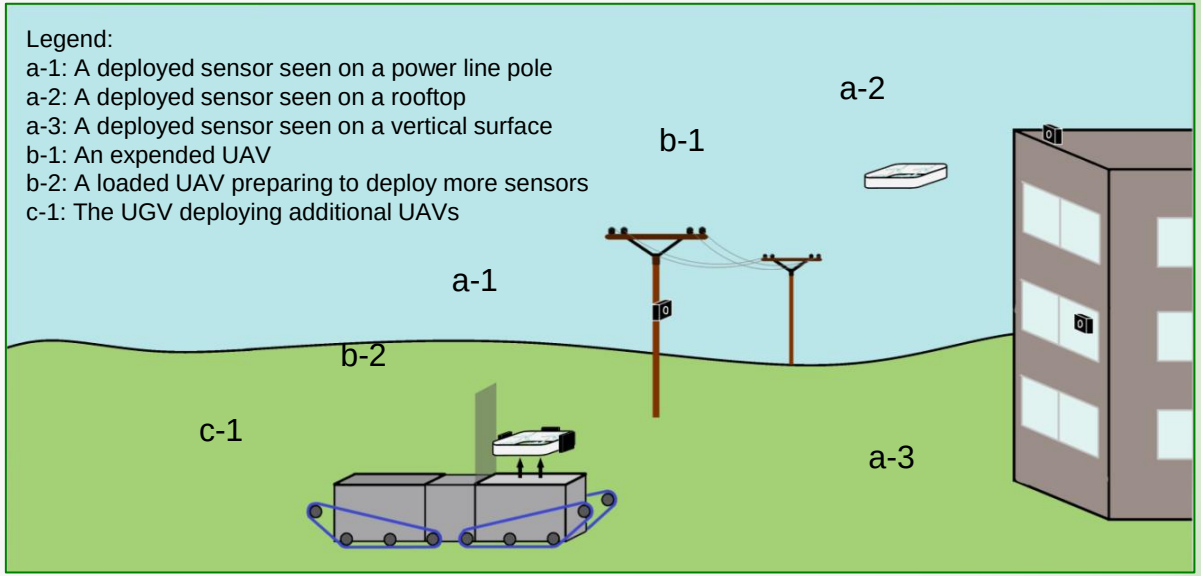

Concepts of Operations. The Razorback and P.I.G.S. supports the AFRL's requirement to be strategically responsive across the Range of Military Operations (ROMO) to include: Homeland Security, Special Operations, Stability and Support Operations, and Small Scale Contingencies. The system enhances the AFRL's ability to support the warfighter by enhancing situational awareness prior to forced entry operations (hostage rescue, High Value Target takedown, ect.) The system provides enhanced safety and situational awareness by conducting Battle Damage Assessment (BDA) of damaged infrastructure while additionally placing sensors for remote observation. The system provides the means to improve Situational Awareness (SA) capabilities by establishing remote sensor locations monitoring critical infrastructure and/or other locations. The High Level Operational Concept graphic, OV-1, which is in Figure 1 below, depicts the system's mission environment. OV-1 provides a description of the interactions between the system and its operational environment and highlights the importance and complexity of interoperability for successful employment.

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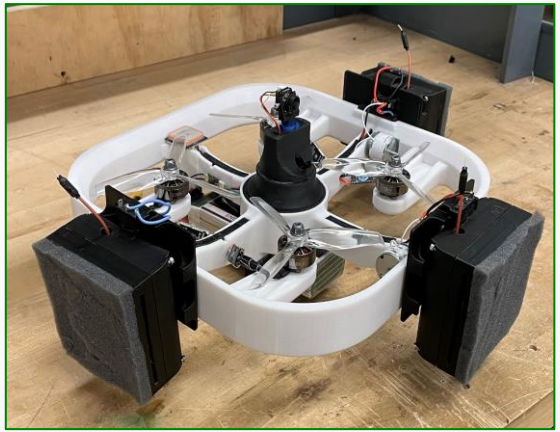

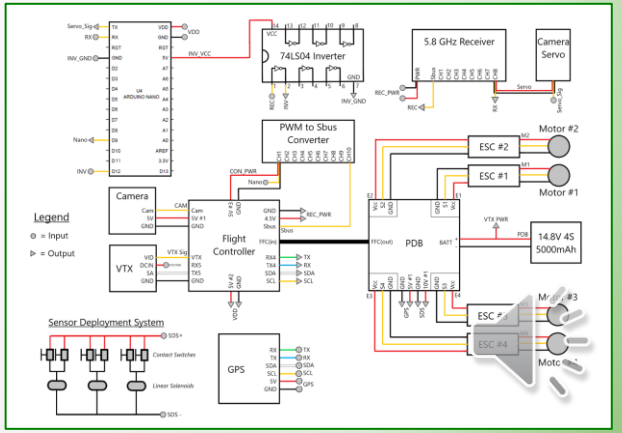

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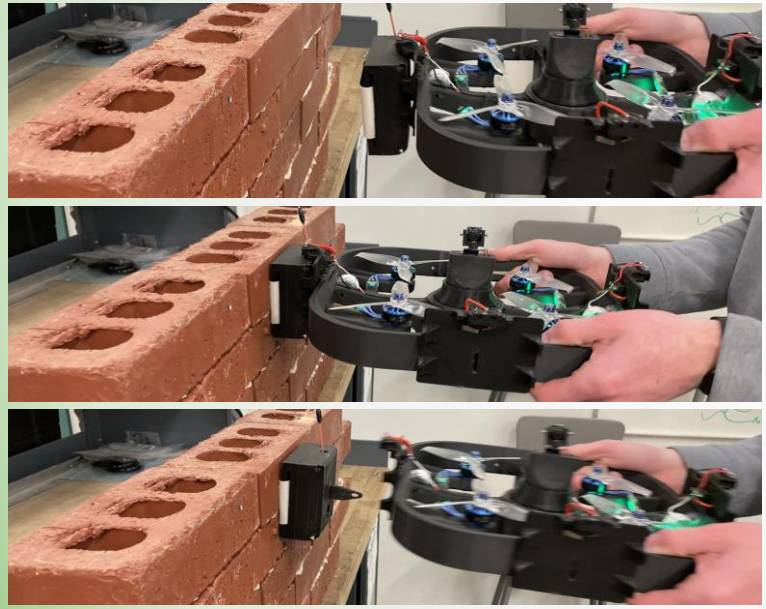
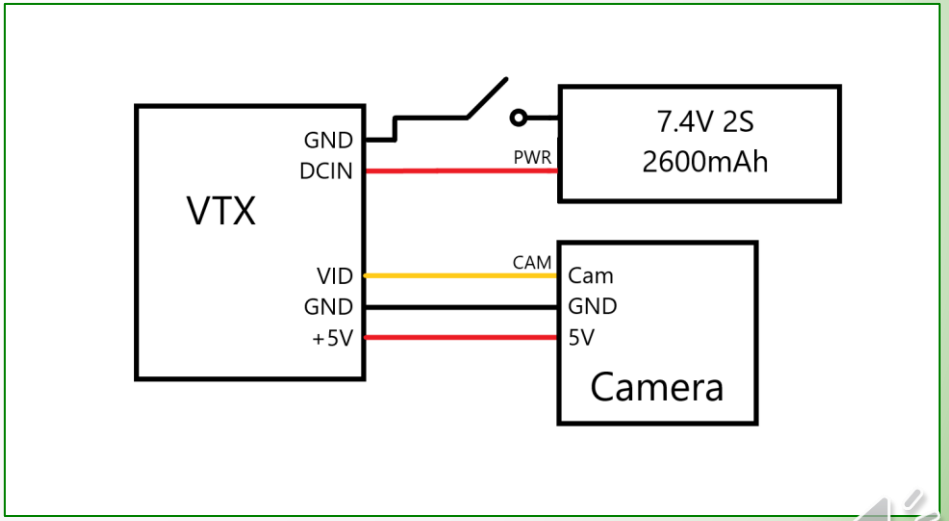


Isolated Sensor Deployment Testing



Wiring Schematic for deployed sensors, BMS circuit omitted

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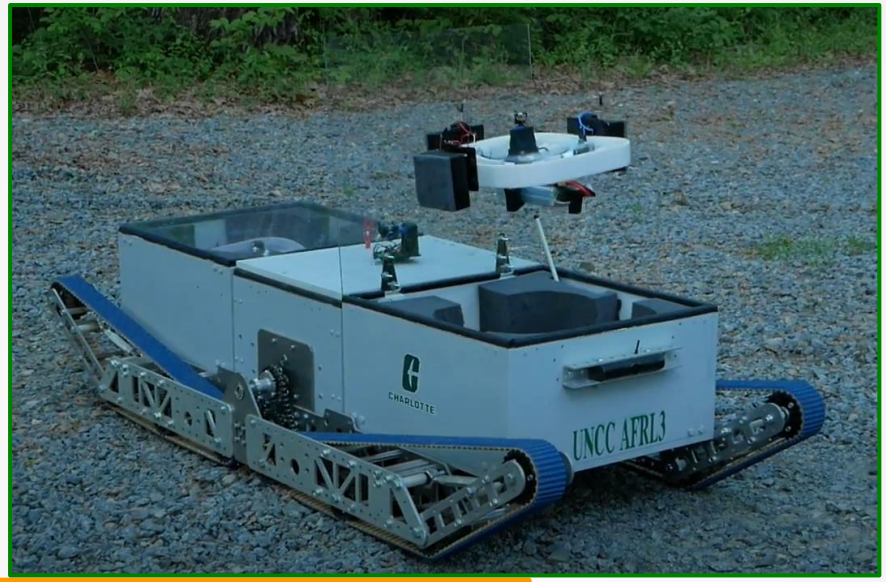

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