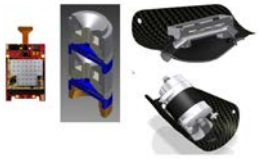
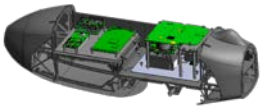
Unmanned Vehicle Development Laboratory

Outdoor Netted Enclosure



Custom Payload and Communication Systems

Custom Airframes



Payload and Flight Control Integration

Description

The Unmanned Vehicle Development Laboratory (UVDL) develops remote autonomous ground and air systems to enhance national security, support nonproliferation, and serve other unique support needs within the US government. The staff has a breadth of expertise spanning sensor development, software, communication systems, electronics, aviation systems, and mechanical engineering.

In addition to science and engineering expertise, the UVDL facility provides access to the FAA-approved unmanned flight areas on the Oak Ridge Reservation, a large outdoor netted flight enclosure, and trained pilots compliant with DOE regulations 14 CFR Part 61 and 14 CFR Part 107.

Example Case

To provide a reliable, long-range communication system for unmanned aerial systems (UAS), the UVDL staff created a multi-modal (point-to-point radio, Iridium, and cellular) communication package called the Archangel Modular Communication Stack.

This hardware/software solution provides seamless fall-forward and fall-back between available communication systems, always prioritizing the link with the most bandwidth and the lowest latency.

Using the Iridium satellite network, command and control of the UAS platform are available anywhere in the world using web-based ground control software developed by the UVDL team. Advanced communication models including multi-vehicle control and ground troop communication relay are supported.

Date: April 2017

Modular Communication Stack and the Archangel Web-Based Ground Control Software

UVDL Information	
Laboratory Space	1300 sq ft. Dry Laboratory 15,000 sq ft. Outdoor Netted Enclosure
Staff Expertise	Autonomous Navigation Sensor Design Payload Integration Mechanical Design Rapid Prototyping User Interface Software Communication Systems Performance Testing
R&D Focus Areas	Smart Sampling Plume Dispersion Modeling Autonomous Sampling Custom Payloads Vehicle Development Ground System Software Data Visualization Autonomous Control Swarming Noise Reduction Flight Time Improvements

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