Unmanned Aircraft System (UAS)
Remotely Deployed Payload with Integrated Controls

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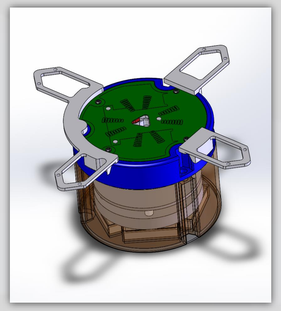
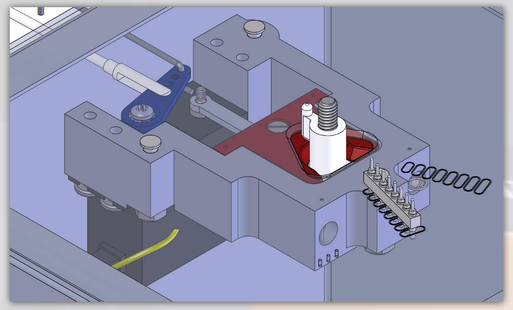
Introduction

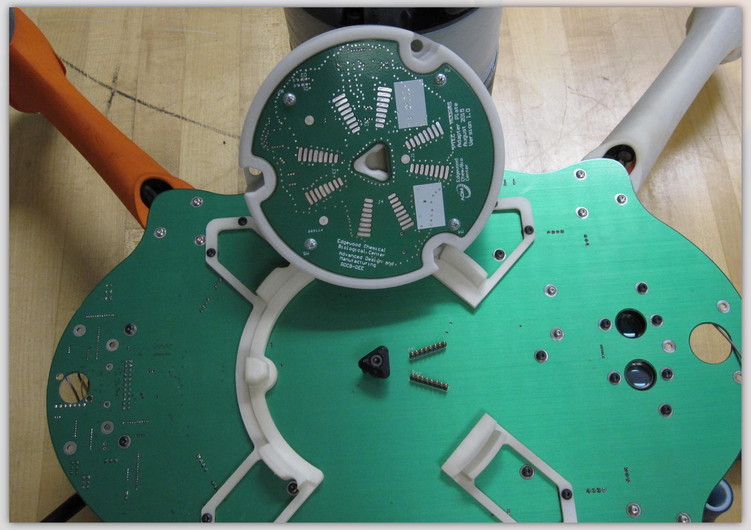
To support a customer requirement for remote drop-off, the Advanced Design & Manufacturing Division developed a Payload Transport and Emplacement Carriage (PTEC). The PTEC employs a custom electro-mechanical interface, optimized for use on an Unmanned Aircraft System (UAS).





Approach

The deployable payload and UAS platform include a locking mechanical interface, and several spring-loaded electrical contacts. This interface provides power and control connections for a hobby servo motor which drives the release mechanism. ADM expanded the this interface to support the Section 219 Array Configurable of Remote Network Sensors (ACORNS) effort.



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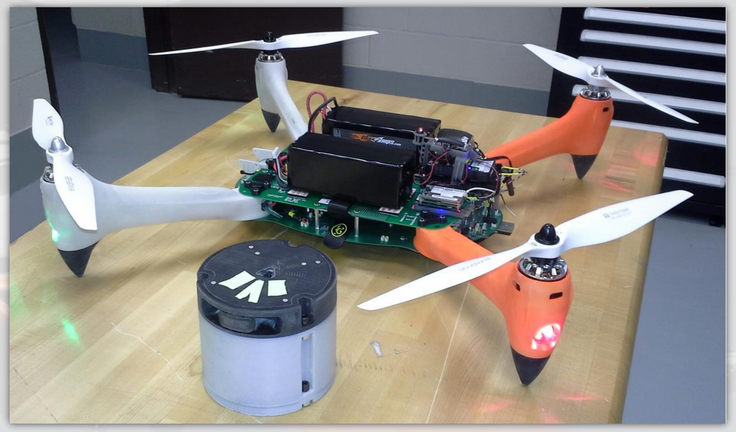
Key Parameters

- Spring-loaded payload connections offer Power, Communications (RS232 serial, Ethernet), GPS, and other on-board sensor data to the payload system.
- The UAS includes precision autonomous payload emplacement capabilities using onboard cameras and vision processing
- The in-house developed quad-rotor UAS has been operated with several wireless transmitters, offering ranges of 1km, 5km, and 10+ km
- Current payloads range from 3-5 pounds; the current UAS payload capacity is up to 10 lbs
- Flight durations of 20-30 minutes, depending on total weight



Relevance

This payload interface allows the UAS to serve as a transportation, communication, and power source for payloads including Chemical, Biological, Radiological, and Nuclear (CBRN) detection, identification, and collection. In addition to operating these payloads during flight, payloads can be precisely delivered or deployed in manual or fully autonomous flight profiles.

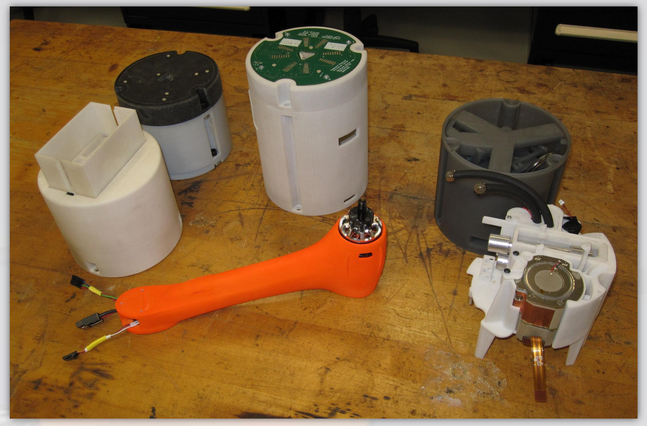
Potential for Transition

The interface mechanism developed by ECBC to support the novel sensor array capability could be adopted as a standardized interface to support limitless applications requiring remote sensors, collection devices, including suspended and releasable payloads. Possible transition partners include the Warfighter, DHS, FDA, NOAA, EPA, DoE, and various other national and local entities.

Results

The initial PTEC was demonstrated in the first quarter of FY 2015, and current refinements have allowed for power and communication with payloads in flight (additional demonstrations and evaluation events are scheduled for the first half of FY 2016).

During support of a Rapid Equipping Force demonstration, ADM engineers obtained the SolidWorks design files, locally manufactured the release mechanism using additive manufacturing (3D Printing), and successfully demonstrated the remote deployment capabilities offered by the PTEC.



Future Directions

ADM seeks to expand the capabilities of the UAS by developing additional ACORNS sensing capabilities such as: Chemical, Biological, Radiological, Camera Arrays (Still/Video), Collection, Smoke Generator, Explosive Detection.

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