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### APART

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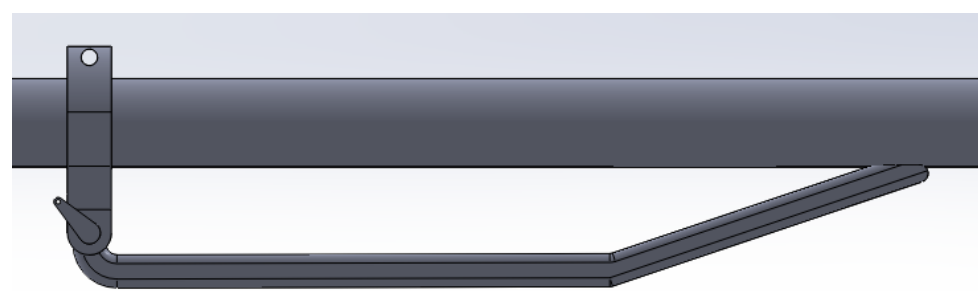
# APART

Charles Berry, Arturo Malagon, Jose Sanchez, Jeancarlo Pestana, Omesh Singh, Jainaba Faal,  
Thomas Hollahan

Faculty Advisor: Markus Wilde, Dept of Aerospace Engineering, Florida Institute of Technology

## Mission & Objectives:

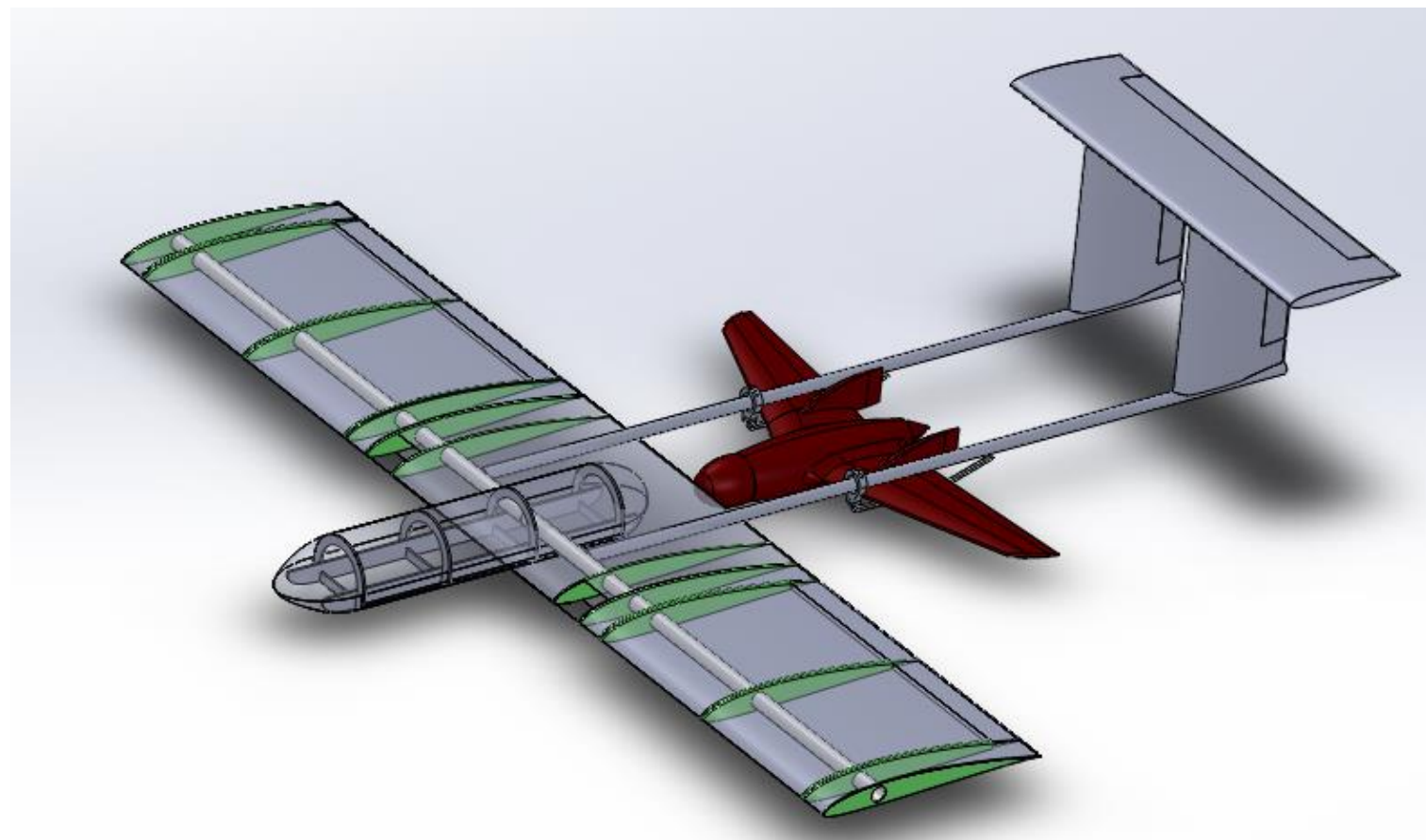
- APART (Aerial Platform for Aircraft Refueling and Transport) is a proof of concept for the docking and recharging of two UASs (Unmanned Aerial systems)
- UAS's are one of the fastest growing fields in engineering, but never before have two vehicles been docked mid-flight.
- The larger aircraft (mothership) will recharge the smaller aircraft (parasite), effectively extending the flight and potential mission envelope and capability of the entire system.



Docking Arm

## Docking Subsystem

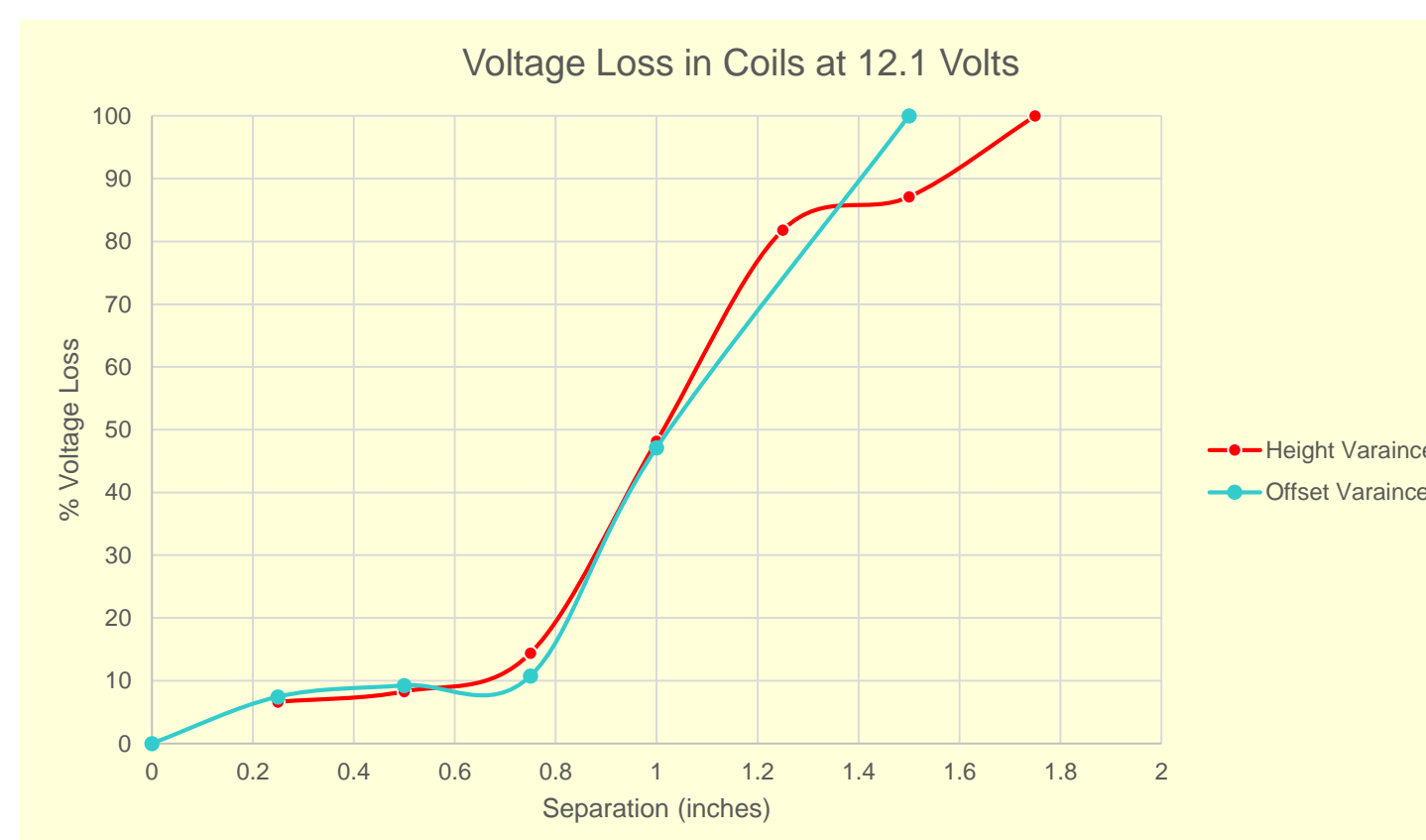
- 3D Printed arms on each boom swing open to accept the parasite aircraft
- A 10 lb draw electromagnet holds the booms closed during docked flight
- A programmable autopilot with adjustable gain will allow the parasite to navigate within the aerodynamic wake of the mothership



APART, in the docked configuration

## Charging Subsystem

- Inductive coils located on each aircraft, allow for wireless power transfer after docking has been completed.
- Tests were conducted, evaluating the voltage loss and efficiency of the coils at different distances.



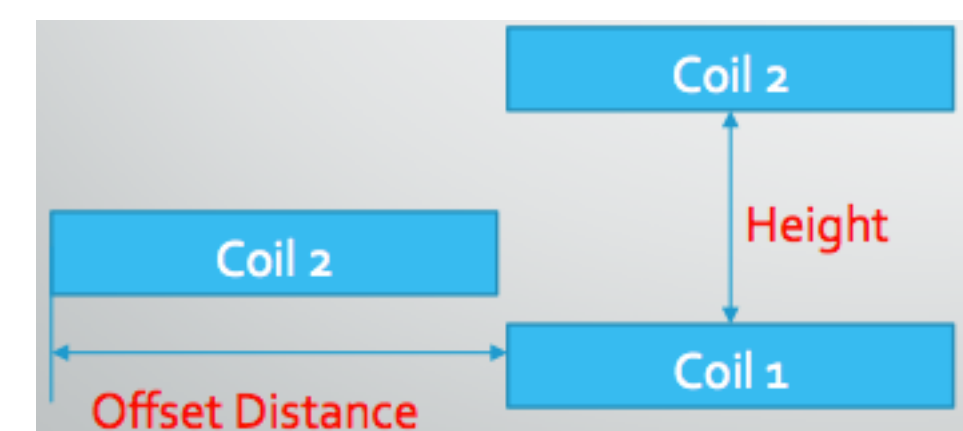
Inductive Charging Test Results

## Mothership Aircraft:

The mothership was specifically designed to capture and charge the parasite aircraft. The twin boom configuration, however, allows the mothership to accept a multitude of airframe configurations. The aircraft is powered by two 85 cc, two stroke gas engines, with counter rotating propellers. The mothership was manufactured at Rud Aerospace who also donated the required carbon fiber and tooling.

## Parasite Aircraft:

The parasite is a flying wing powered by two 5000 mAh batteries which are linked to a complete avionics and flight control suite which relays video feed to a ground station. The airframe for the parasite is the RVJET, which was donated by Range Video.



Inductive Coil Test Setup

**NORTHROP GRUMMAN**



Engineering & Science  
Student Design Showcase  
at Florida Institute of Technology

