**Mercury O.A.K SAT**

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### Function
- Create a multisensory payload to transmit live data to a ground station for immediate analysis
- Collected atmospheric and orientation data of the payload
- Designed to be customizable depending on the user

### Transmission System
- Used RFD900+ modems to relay collected data
  - Operating frequency of 900-928MHz
  - Outdoor LOS range of 40km
  - Data rate speed up to 250kbps
  - Weight of 14.5g
  - Operating temperature of -40 to 85 Celsius
- Multidirectional wheel antenna used inside payload
  - Frequency range within COSGC requirements
  - Easily installed into payload
- High gain Yagi antenna used for ground station
  - Frequency range was compatible with the payload
- Both are easily installed onto RFD900+ modems

### Launch Data
- 45% of data collected was received by ground station
- Average disconnect was 0.6 seconds
- Max altitude reading was 2.2% below EOSS's reading
- Rotational speed at particular point shown 33 deg/s
- Payload was under +/- 30 deg pitch and roll orientations

### Orientation Testing
- Understand how transmission is affected by the antenna orientation
  - Found range angles that transmission succeeded
  - Transmitted at various locations at Horsetooth reservoir
  - Each location has a direct Line of Sight
  - Able to regain connection after transmission was lost

### Future Steps
- Install other atmospheric sensors
- Install on other aircraft systems
- Increase sampling rate of sensors for more accurate orientation measurements
- Create better method for holding/orienting the ground station antenna

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