

Orbit Fab

An In-Orbit Fuel Supply:
Enabling SmallSats with Extreme Delta-V



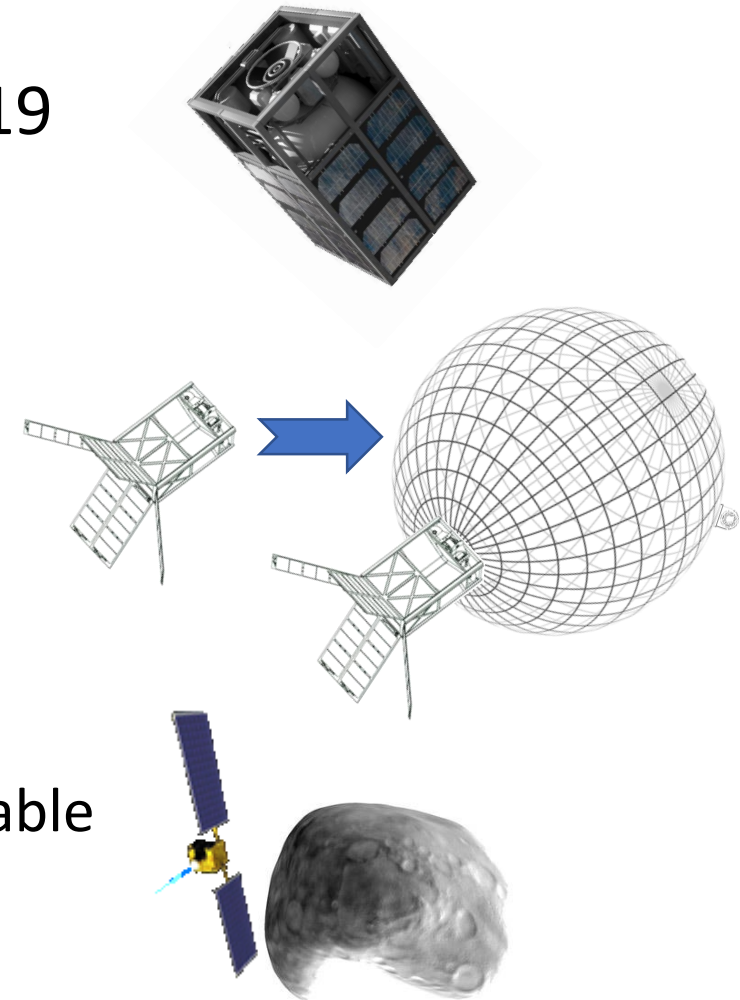
Advantages of in-orbit fuel supply

- Cheaper than launch pricing
 - \$5,000 / kg v. \$50,000 / kg
 - Launch in bulk
 - Launch on cheap (risky?) rockets
- Tank mass
- Tank volume

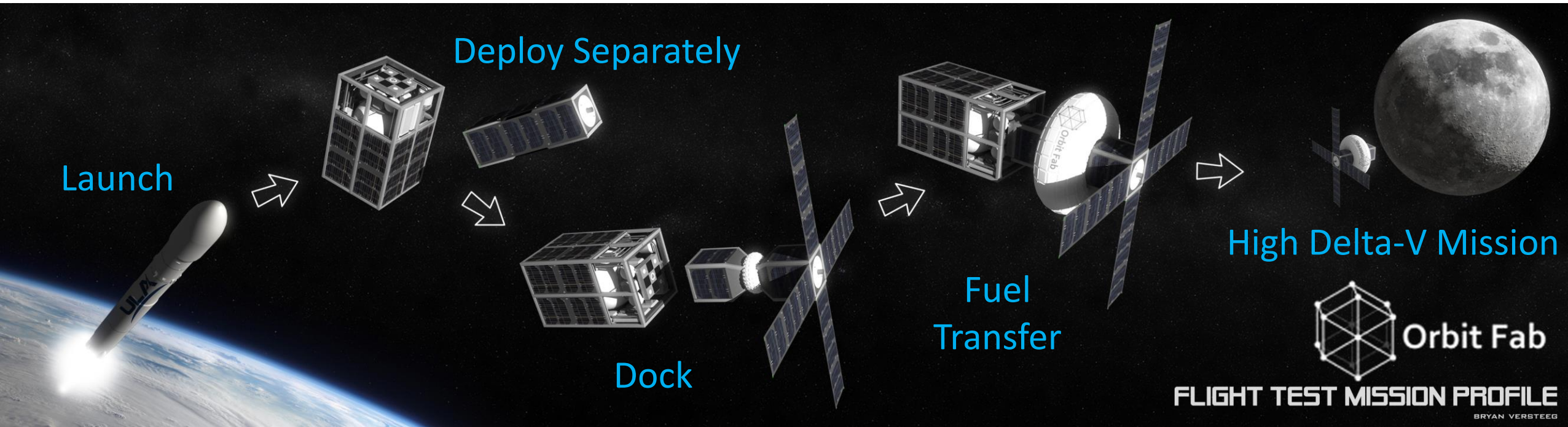


Enabling Small Sat Missions

- Propellant stockpiled on orbit, beginning 2019
 - NASA / government
 - Commercial
- “Flex Tank”
 - Launch light and compact
 - Allows fuel fractions >90%
- Hall thruster
 - Low pressure, storable propellant is highly desirable
 - Tests planned with Propane
 - Life testing possible 2018/2019

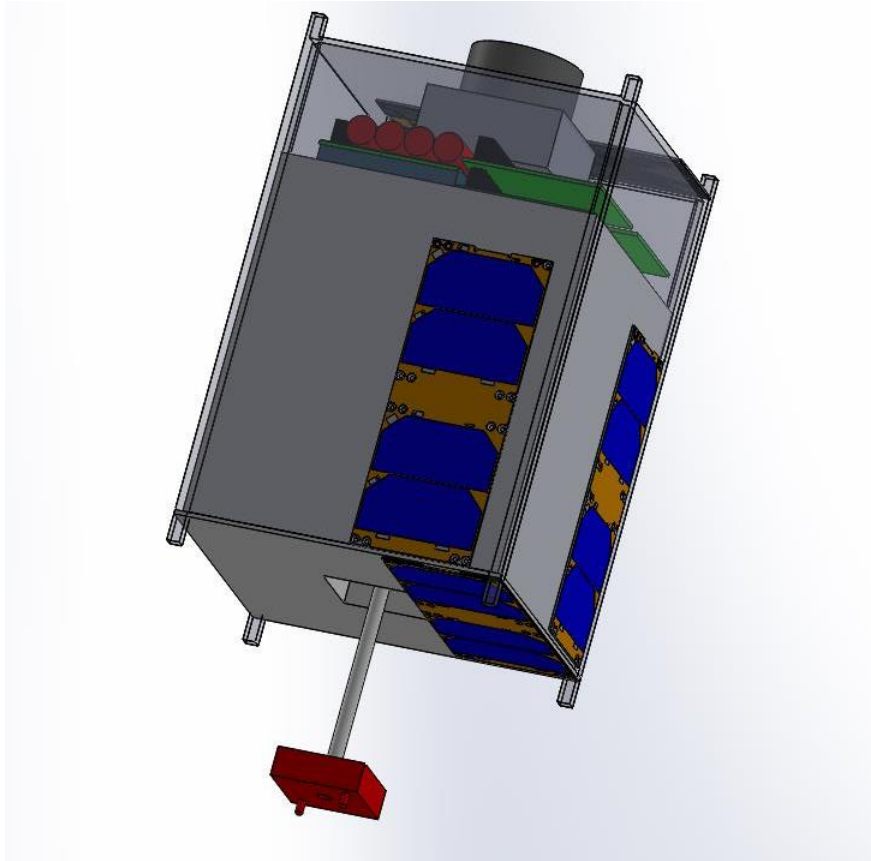


Demonstration Fuel Supply Mission

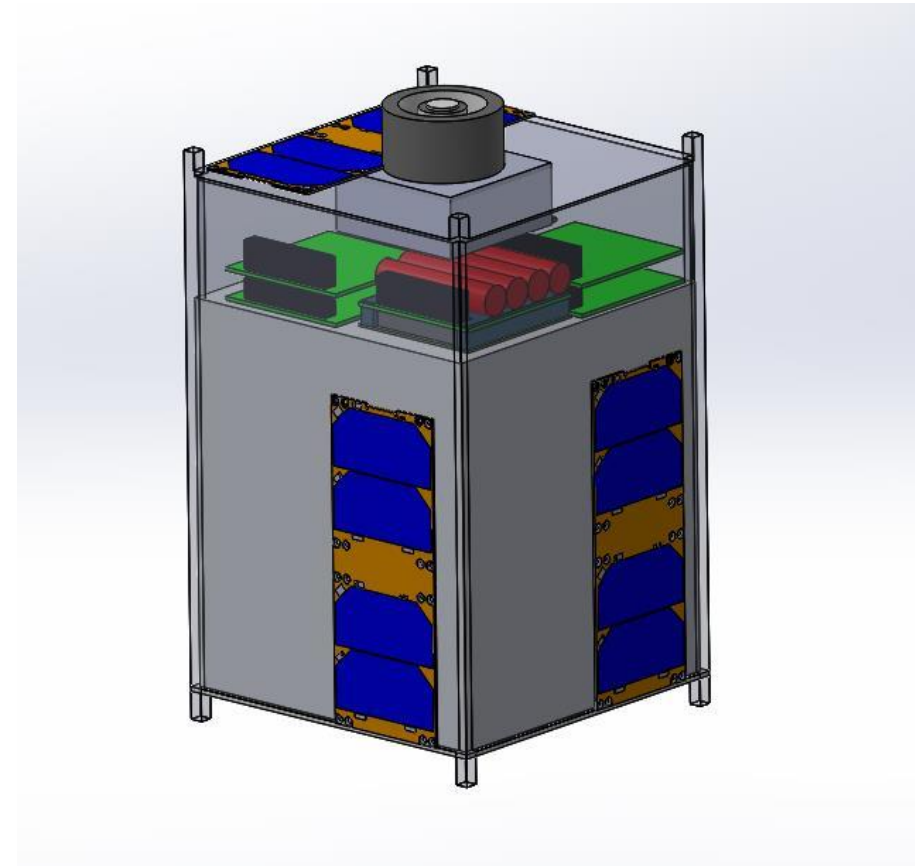


- Departing LEO
- Delta-V up to 10km/s
- Seeking mission partners

Demonstration Tanker

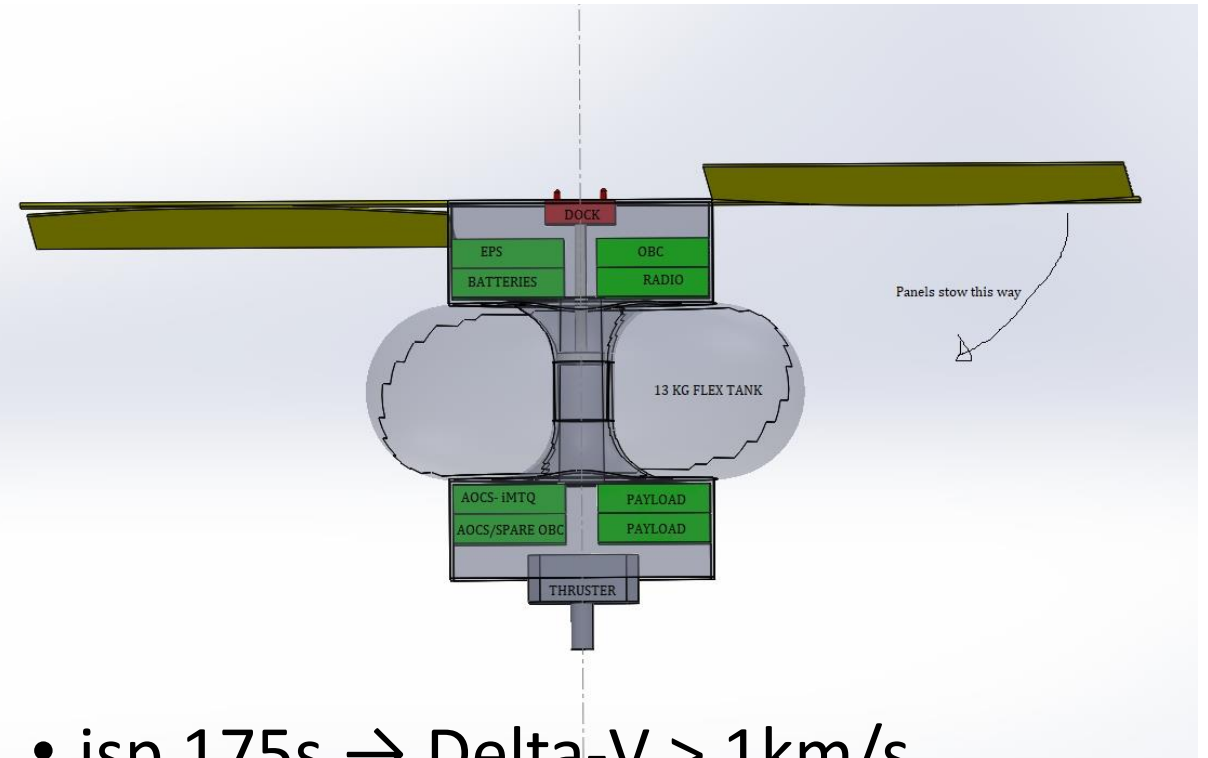
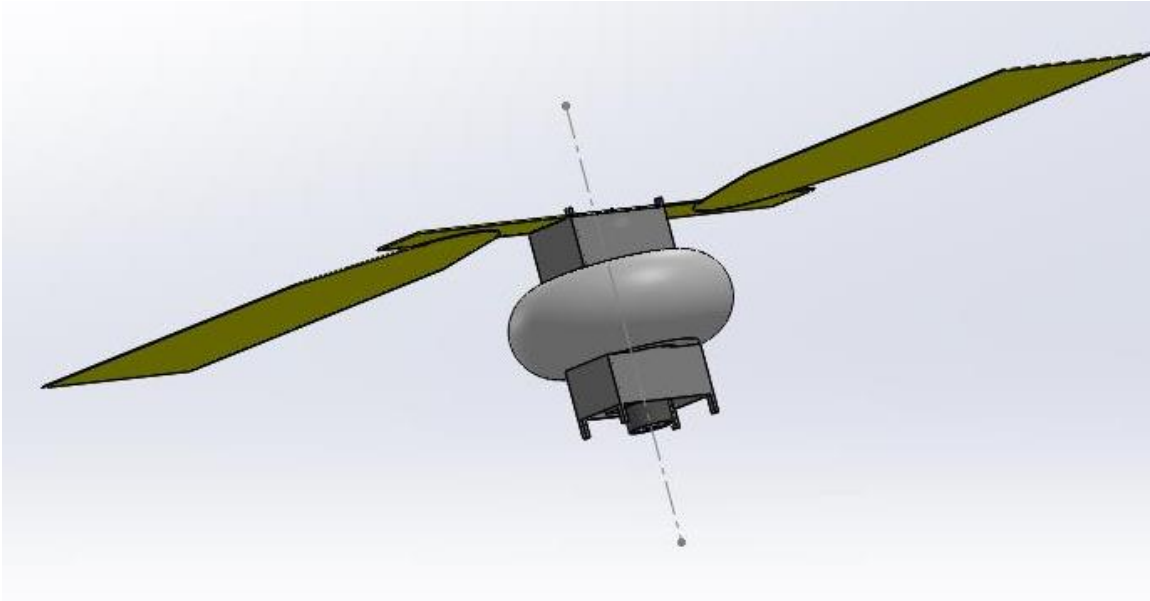


Deployed



Stowed

Demonstration “Mission Spacecraft”

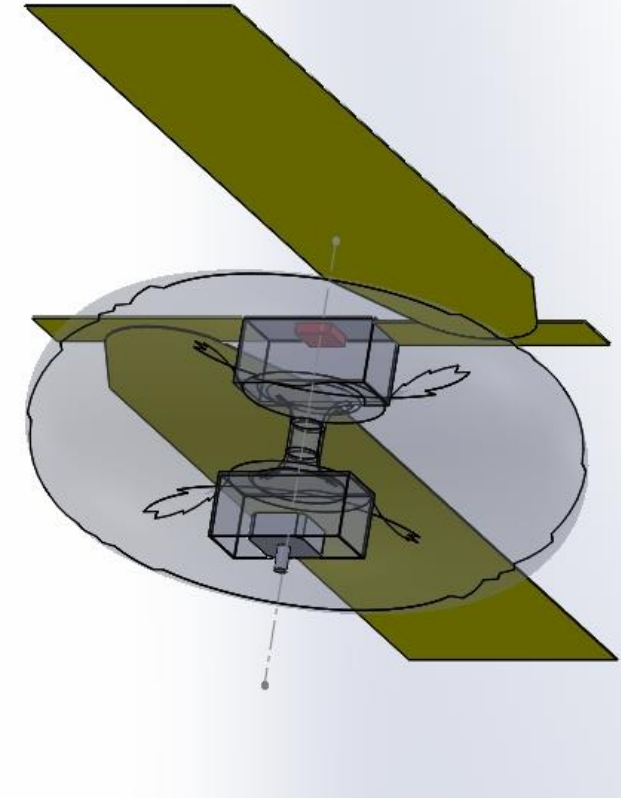
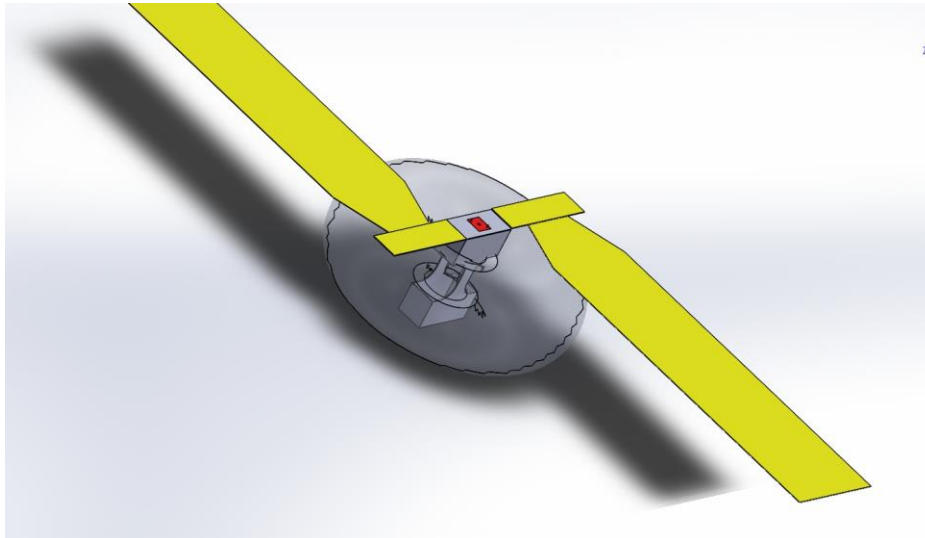


- 10L FlexTank™
- 6U Bus

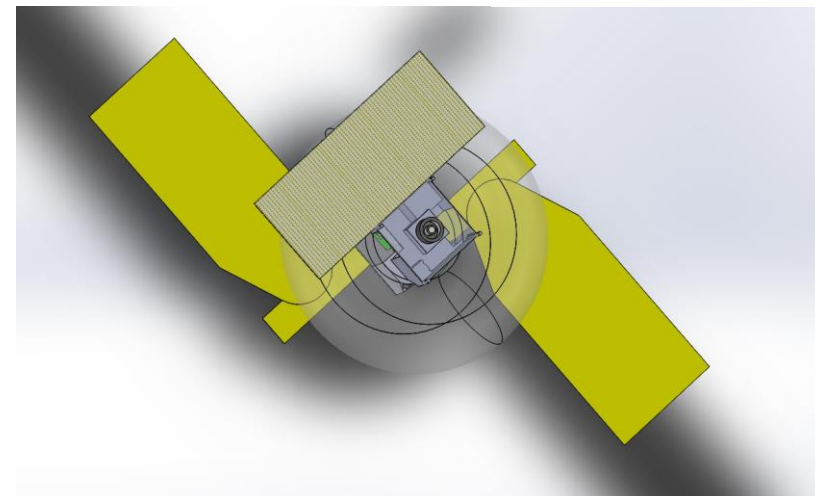
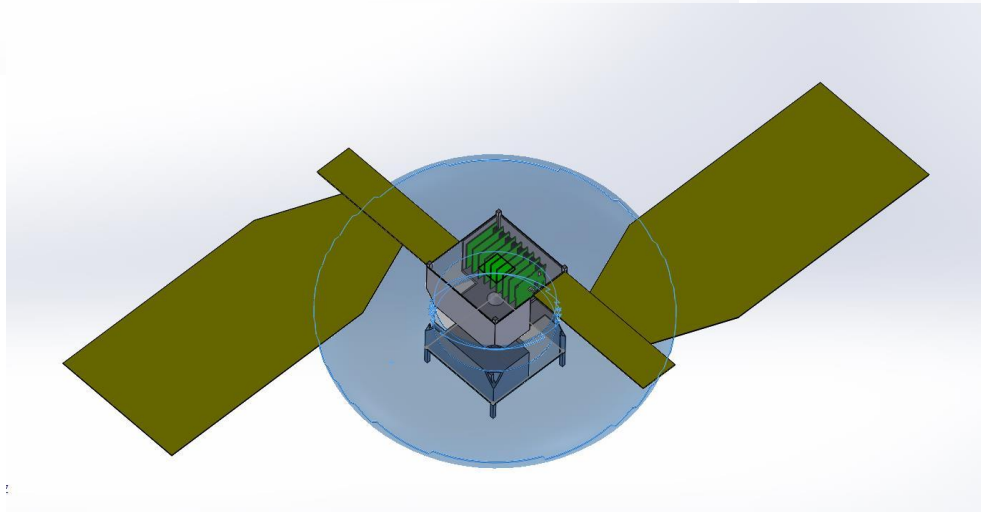
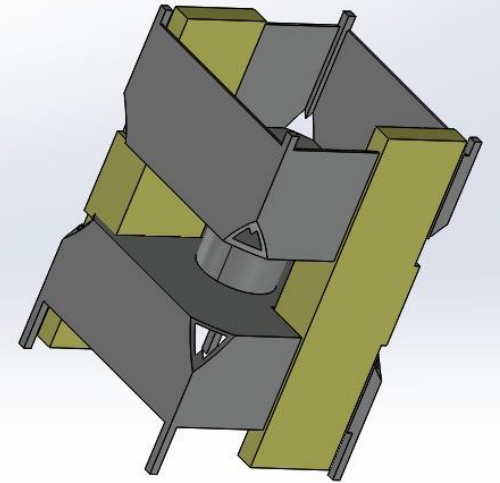
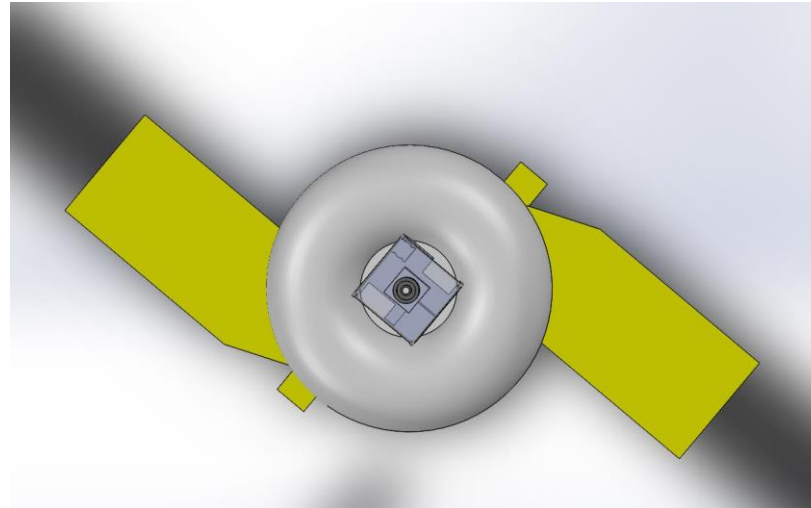
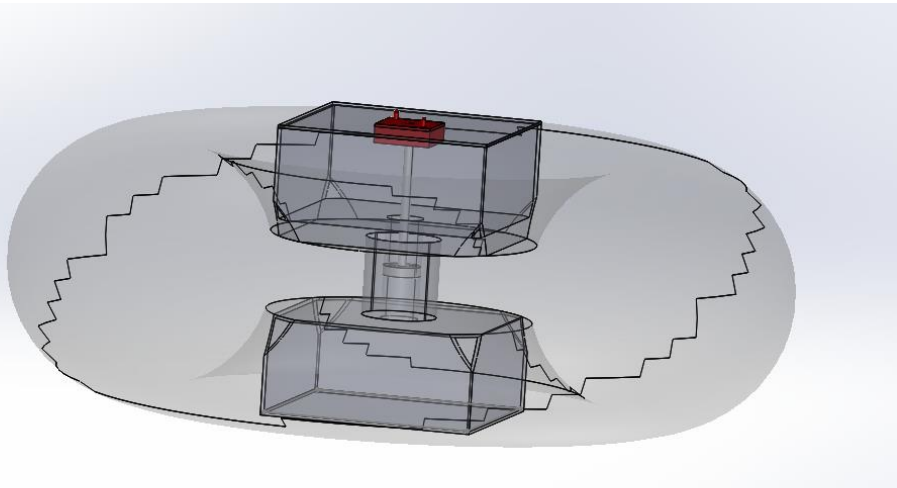
- isp 175s → Delta-V > 1km/s
- isp 2000s → Delta-V > 12km/s

100L FlexTank™, 6U Bus

- Would provide >50 km/s
- Can't fit subsystems
 - 4U to fit avionics + solar arrays + antennas



100L FlexTank™, 12U Bus



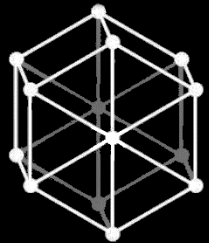
Capabilities

- 100L fuel
- 8U for available avionics & payload
- Wet : dry mass ratio = 10:1
- isp 175s → Delta-V > 4km/s
- isp 2000s → Delta-V > 46km/s

Investigations Ongoing

- Subsystem flight tests commence Q4 2018
- Design studies
 - ISS “out-and-back” sample return
 - Moon, Mars, Venus, Mercury, Main Asteroids Belt
 - Upper atmospheric
- Hall thruster running on low pressure, storable propellant

- Looking for demo mission partners
- Looking for mission study partners



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