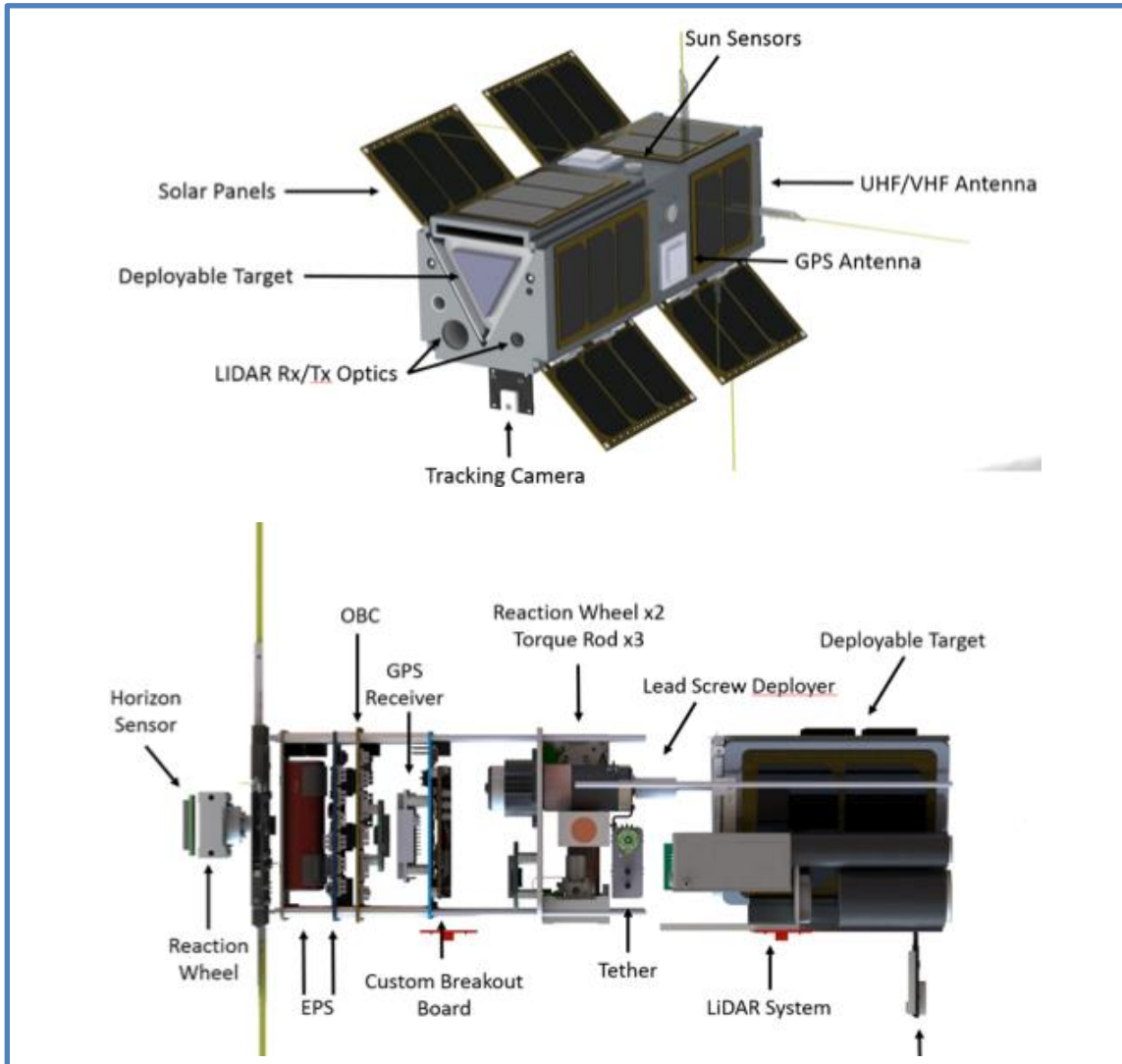


Mission Description

TARGIT

Georgia Institute of Technology
3U



Brief Overview: The Tethering and Ranging mission of the Georgia Institute of Technology (TARGIT) is a 3U CubeSat mission sponsored by NASA's Undergraduate Student Instrument Program (USIP), and which was selected for a launch opportunity as part of the 8th class of the CubeSat Launch Initiative (CSLI). While the primary goal of the project is focused on delivering university students hands-on education in space systems and applications, the investigation also seeks to develop and test on-orbit an imaging LiDAR system capable of cm-level topographic mapping.

A 915 MHz (ISM band) transceiver will serve as a short-range, low-power (0.1 Watt) communication system that the main spacecraft will use to interact with the tethered sub-deployable system. This would include commanding of the inflation system, as well as receiving housekeeping and logged data from the sub-deployable's sensors (IMU, experimental solar panel performance data, etc.).

CONOPS: Once TARGIT is launched into space, it will be commanded to deploy a small inflatable on a 6m tether and create a 3D image of the target using the miniaturized LiDAR imaging camera. Once the inflated, the target will reduce the orbit lifetime of the mission to approximately one month. Just prior to re-entry, the satellite will be commanded to cut the tether and the satellite will use its precise pointing and LiDAR systems to continue tracking the target as it drifts farther and farther from the satellite. This final phase is intended to represent a flyby scenario in a traditional space mission, where the topography of a comet, asteroid, or specific surface location is the desired target.

Hazards: The only hazardous systems on board are the li-ion batteries used by the on-board power system.

Subsystems:

- Attitude Determination and Control System (ADCS)
- Command and Data Handling (C&DH)
- Communications
- Electrical Power System (EPS)
- Guidance Navigation and Control (GNC)
- Imaging
- Tether (includes target deployment system as well)
- LiDAR
- Target (tank and inflatable system)