

Project Description:

ARMADILLO is a 3U CubeSat with dimensions 10cm x 10cm x 34cm for a volume of 0.0034 cubic meters. The spacecraft has a mass of 4 kg and nominally draws 10 W orbit average power.

Piezoelectric Dust Detector is primary payload aboard ARMADILLO and will measure the sub-mm space debris environment. The payload is being developed by Baylor University and fits within ½ U of our CubeSat and has a mass less than 400 grams. A prototype unit was flown on a sounding rocket in fall 2012 resulting in a successful test of the instrument. The flight unit has been delivered, and final software integration is underway.

When a particle interacts with the PDD, it will first go through a grounded grid, then through a negatively charged second grid. Afterwards, it strikes the piezoplate and electrodes. Between the second grid and electrode measurements, the PDD determines the number of impacts and voltage waveform for each impact which results in learning the particle energy and direction of travel. As the orbit decays naturally, ARMADILLO will be able to gather data as a function of altitude. These output values help scientists determine whether the particle was man-made space debris or cosmic dust. These parameters are then entered into debris environment models for more analysis.

The FOTON dual-frequency GPS receiver is the secondary payload aboard ARMADILLO. This payload has been developed by the Radio Navigation Lab at The University of Texas at Austin under Dr. Todd Humphreys. The FOTON fits within ½ U and has a mass of approximately 365 grams. FOTON flight units are at the ready, and software integration is complete.

JSpOC Collaboration Notice:

The ARMADILLO operations team at Georgia Tech will work with JSpOC and other spacecraft operators in the event a conjunction warning is activated. POC's for the operations team are given below. These POC's will work closely with JSpOC and other spacecraft operators to provide on-board GPS ephemerides to aid in analyzing the actual risk posed on other space vehicles. In the event the conjunction alert is provided with enough time advance, operators may attempt to utilize differential drag effects to reduce the risk posed to other space vehicles. ARMADILLO has no propulsion system.

ARMADILLO Operations POCs:

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