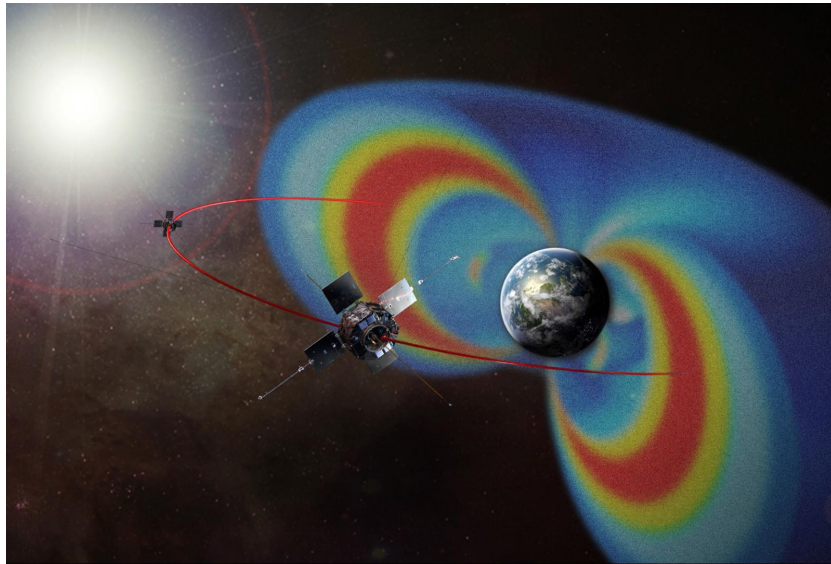


## Exhibit 1 REAL CubeSat Mission Description

Dartmouth College is a non-profit educational institution located in Hanover, NH, and is the lead-institution on the Relativistic Electron Atmospheric Loss (REAL) CubeSat research program. REAL is funded by NASA Heliophysics Division within the Science Mission Directorate (SMD). The REAL team is led by Dartmouth Professor of Physics and Astronomy, Robyn Millan, and includes five co-investigators who are professors or scientists from Montana State University, Boston University, and Johns Hopkins Applied Physics Lab (APL). APL is building the science instrument and will support science data downlink, data processing and dissemination to the broader scientific community. The team also includes both undergraduate (12) and graduate students (4), participating in hardware development and testing, software development, and modeling.

The primary focus of the six-month REAL mission is to collect scientific data on the physical mechanisms responsible for scattering radiation belt electrons into the Earth's atmosphere and to validate a particle instrument design.

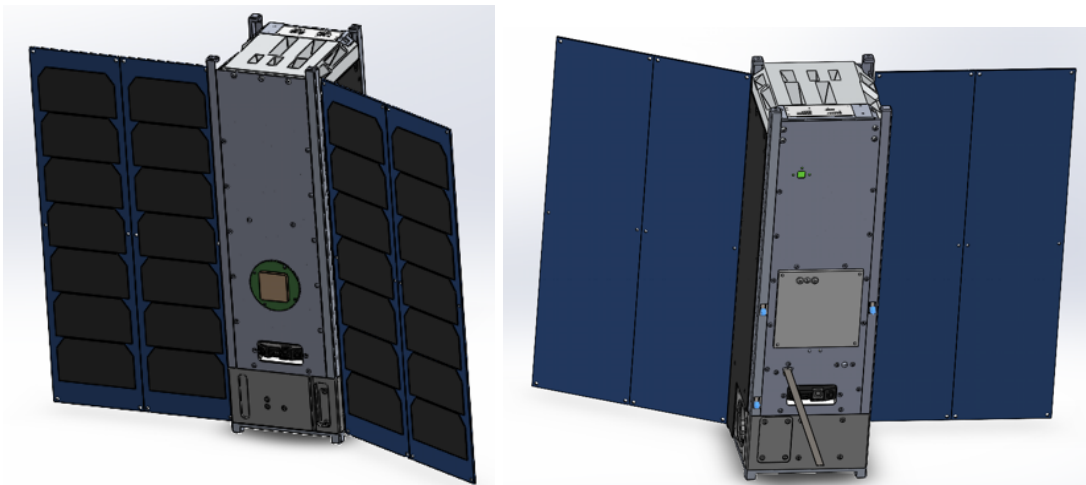


**Figure 1:** Schematic of Earth's Van Allen Radiation Belts. The REAL mission will improve our understanding of this region of space that is filled with high energy particles and poses a major hazard to spacecraft. *Credit: Johns Hopkins University Applied Physics Laboratory.*

Dartmouth requests FCC STA authorization for use of 50 MHz of UHF spectrum to transmit telemetry from the 3U REAL Cubesat in the space-to-Earth direction, and for use of 50 MHz of UHF spectrum to uplink telecommand in the Earth-to-space direction. Both the uplink and downlink channels will be centered at 450 MHz. Additionally, Dartmouth is requesting to downlink scientific data to John Hopkins University Applied Physics Laboratory (APL)'s ES using the space-to-Earth downlink frequency band of 2200-2204 MHz on a non-interference basis.

The results from REAL will improve predictive models of Earth's radiation belts, addressing NASA strategic goals, and will advance our understanding of space weather, a national priority as outlined in the National Space Weather Strategy and Action Plan<sup>1</sup>.

To achieve its scientific objectives, REAL is designed as a 3-axis stabilized 3U CubeSat carrying an energetic particle instrument. From its vantage point in low earth orbit (LEO), REAL will point its instrument along Earth's magnetic field to measure radiation belt particles as they enter the atmosphere. The <5 kg REAL CubeSat will orbit at 550 km altitude, 90 degrees inclination. REAL also includes support for both graduate and undergraduate students, who will assist with the design and test of REAL, and the analysis of REAL data. Currently, 3 doctoral students, 7 undergraduates, and 2 recent graduates are working on REAL. The REAL CubeSat is not subject to regulation by NOAA under Title 51 of the U.S. Code.



**Figure 2:** The REAL CubeSat.