

Development and Testing of the Cubesat Radiometer Radio Frequency Interference Technology Validation (CubeRRT) System

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The CubeSat Radiometer Radio Frequency Interference Technology Validation (CubeRRT) mission is developing a 6U CubeSat system to demonstrate on-orbit radio frequency interference (RFI) detection and mitigation technologies for future microwave radiometer remote sensing missions. Passive remote sensing measurements below 40 GHz have shown an increase in man-made RFI, having a degenerative impact on important geophysical retrievals, including soil moisture, atmospheric water vapor, sea surface temperature, sea surface winds, and many others. Due to current shared spectrum allocations and the accelerating demand for bands to be open for general commercial use, microwave radiometers must co-exist with terrestrial RFI sources. As these RFI sources expand over larger areas and occupy additional spectrum, it will be increasingly difficult to perform radiometry without an RFI mitigation capability. RFI processing on the ground is not possible because the data volumes for raw signals are prohibitive for downlink, therefore real-time on-board RFI processing is an important technology needed for future missions. Selected under NASA ESTO's In-space Validation of Earth Science Technologies (InVEST) program, CubeRRT will perform observations of Earth brightness temperatures at frequencies from 6-40 GHz using a 1 GHz bandwidth, 128 channel, digital spectrometer and will demonstrate on-board real-time RFI mitigation processing. The CubeRRT payload and spacecraft are currently under development, with an expected launch date in March 2018 followed by a one year period of on-orbit operations. This presentation will focus on the development, integration, and testing of the flight model hardware and software and our progress toward meeting mission requirements.