Geodetic Reference Instrument Transponder for Small Satellites

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The local ties between Satellite Laser Ranging stations and other collocated geodetic stations are an important component of the realization of the International Terrestrial Reference Frame but the survey accuracies are limited due to the inaccessibility of the instrument reference points. The NASA *Geodetic Reference Instrument Transponder for Small Satellites* (GRITSS) technology demonstration mission is designed to overcome this limitation by using a small satellite as a space-based reference point for tying together the measurement points of collocated geodetic stations. The GRITSS instrument upconverts the Global Positioning System (GPS) signals received at the satellite in real-time to S and X band and transmits them to a VLBI Global Observing System (VGOS) antenna ground station. The measurement observables do not require the satellite to be in view of more than one VLBI station at a time. The GRITSS demonstration mission utilizes a 12-UL CubeSat in a Low Earth, Sun Synchronous orbit. Tracking by the global ILRS network throughout the life of the mission is critical to establishing the space-based reference along with the precision orbit determination required by the measurement concept. Due to limitations in spacecraft power and other constraints, the initial phase of the mission will only broadcast the GRITSS VLBI signals twice a day to each of the NASA VGOS stations in Maryland, Hawaii, and Texas, but other international VGOS stations may be added during the second half of the mission. An overview of the GRITSS mission and measurement concept will be presented.