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Initial transionospheric HF observations by the Radio Receiver Instrument (RRI) on the enhanced Polar Outflow Probe (ePOP) satellite mission

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The Cascade Small-Sat and Ionospheric Polar Explorer (CASSIOPE) satellite was successfully launched and began operations in late September of 2013. The suite of 8 scientific instruments on CASSIOPE comprise the enhanced Polar Outflow Probe (ePOP). One instrument is the Radio Receiver Instrument (RRI) which is used to measure radio waves, from 10 Hz to 18 MHz, on two crossed 6-m dipole antennas. The first reception by the RRI of a dedicated ground transmission, at 14.01 MHz, was from the Saskatoon SuperDARN coherent scatter radar on 7 November, 2013. A similar pass on 17 January, 2014 was also successful and such experiments are continuing. The unique eight-pulse sequence transmitted by the Saskatoon SuperDARN radar was clearly observed throughout the passes on both mentioned days. A comparison of signal parameters received by the RRI (e.g., time delay, signal strength, and differential mode delay) and ray tracing simulations of the same parameters shows good agreement. This presentation will present these initial results, as well as additional RRI-SuperDARN experiment configurations and their results as related to radio wave propagation through the ionosphere. It will also included a discussion of the absolute time abilities of the experiment, which are essential for its successful operation.

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