CLARREO Pathfinder: Mission Overview

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The Climate Absolute Radiance and Refractivity Observatory (CLARREO) Pathfinder mission began in 2016 and will demonstrate essential measurement technologies required for climate observations. The mission includes the flight of a reflected solar (RS) spectrometer that will be installed on the International Space Station (ISS) in the 2023 timeframe. CLARREO Pathfinder will demonstrate the ability to calibrate the spectrometer on orbit to a high accuracy with SI-traceability and to inter-calibrate other orbiting instruments. The spectrometer is based on the University of Colorado/LASP's HyperSpectral Imager for Climate Science (HySICS) instrument and is being designed to have a radiometric uncertainty of 0.3% (1-sigma), providing a 3 to 10 times improvement over existing RS instruments. By measuring spectral reflectance with high accuracy the CPF instrument will serve as an on-orbit radiometric reference for operating Earth-viewing sensors, such as CERES and VIIRS. Two-axis pointing, a spectral range from 350 nm to 2300 nm, and a spectral resolution ≤6 nm enable the CLARREO Pathfinder instrument to provide temporal, spatial, angular, and spectral matching of inter-calibration targets, with sampling sufficient to reduce random errors. The inter-calibration method will refine knowledge of target sensor effective offset, gain, non-linearity, spectral response, and polarization sensitivity (as is relevant). We will present an overview of the CLARREO Pathfinder mission and its current status.