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CLARREO PATHFINDER PAYLOAD AND MISSION OVERVIEW

Abstract

The CLARREO (Climate Absolute Radiance and Refractivity Observatory) Pathfinder (CPF) payload will be hosted on the International Space Station (ISS) with a projected launch in 2026 or 2027. The CPF payload has been developed by the U.S. National Aeronautics and Space Administration Langley Research Center and Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado Boulder, with its major elements being the HyperSpectral Imager for Climate Science (HySICS) Reflected Solar (RS) spectrometer and corresponding HySICS Pointing System (HPS).

CPF will provide SI-traceable reflected solar measurements five to ten times more accurate than those of existing systems. This advancement is made possible over the life of the CPF mission by the rigorous pre-flight ground characterization of the HySICS instrument and the planned in-flight direct solar calibration measurements enabled by the HySICS pointing system.

Furthermore, the HySICS Pointing System allows CPF's unprecedented high accuracy to be transferred to other RS instruments in-flight through inter-calibration measurements, where HySICS will be pointed to match the viewing angles of other orbiting instruments crossing the orbit of the ISS. The CPF mission will demonstrate inter-calibration measurements with both CERES (short wave broadband channel) and VIIRS (visible and near-infrared spectral bands).

Overall, the CPF payload will provide a significant improvement in the accuracy of reflected solar measurements and enable the earlier detection of climate changes and trends. Additionally, the successful demonstration of inter-calibration measurements will allow CLARREO Pathfinder to serve as a calibration reference, improving science quality of other RS platforms for as long as it flies.