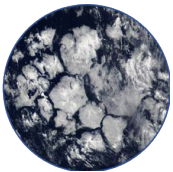


# CLARREO Pathfinder

## *Advancing Science Through Unprecedented Accuracy*

CLARREO Pathfinder (CPF) will take highly accurate measurements of sunlight reflected by Earth and the Moon. These measurements, which will be anchored to international standards, will be five to ten times more accurate than those from existing sensors. CPF will have the unique ability to maintain its high accuracy throughout its lifetime. CPF will also showcase novel techniques in transferring its high accuracy to other sensors monitoring Earth. Higher accuracy means greater certainty in our measurements, which makes it possible to detect changes in Earth's system decades sooner than otherwise possible, and provides the knowledge needed to make informed decisions in response. The CLARREO Pathfinder Mission is led by NASA's Langley Research Center and the payload will be installed on the International Space Station.



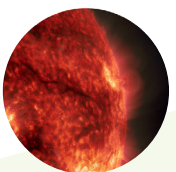
### **Earth is complex and dynamic.**

CPF will take high accuracy measurements of reflected sunlight needed to help us better understand Earth's system.



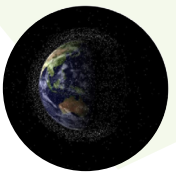
### **The spectral content of reflected sunlight carries information back to space.**

CPF measurements contain a wealth of information about a wide array of several vital atmospheric and surface variables. This information is essential to understand the "why" behind the Earth system's variability.



### **CPF will measure reflected sunlight better than current Earth-viewing sensors.**

CPF will use scans of the Sun and other detailed calibration measurements to achieve unprecedented accuracy that will be 5-10 times better than existing sensors.



### **There is a suite of Earth-observing instruments needed to collectively provide a comprehensive perspective of Earth from space.**

Other instruments need a high accuracy reference to collectively provide more accurate and consistent measurements of Earth. CPF will demonstrate how to transfer its high accuracy, which will be tied to international standards, to other Earth-viewing sensors, increasing the value of existing satellite assets.



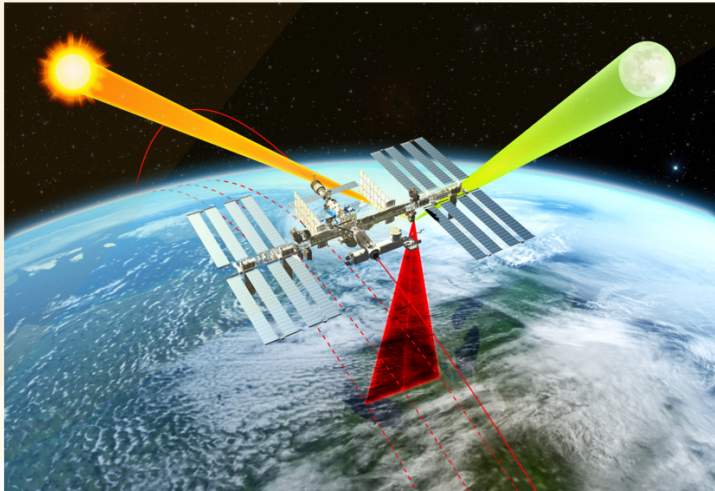
### **CPF will improve the Moon as a calibration standard.**

CPF's measurements will improve the calibration accuracy of the Moon, a stable calibration target, which will also help other past, present, and future instruments.

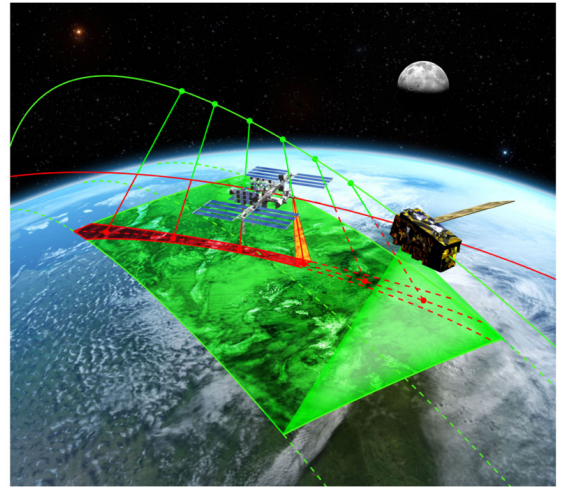
# What Will CLARREO Pathfinder Do?

## CPF has two main mission objectives:

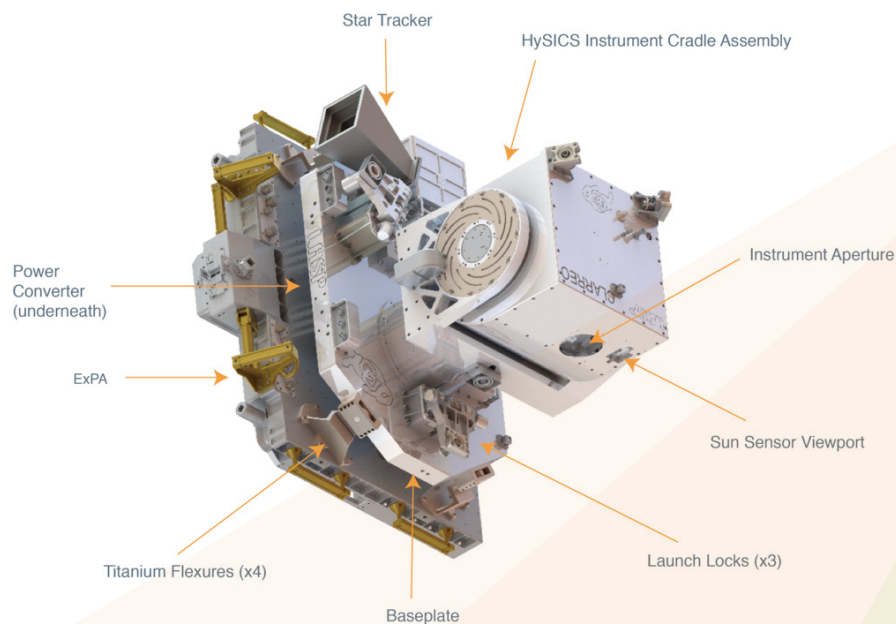
Demonstrate ability to take highly accurate measurements of Earth with on-orbit calibration using the Sun and the Moon.



Demonstrate ability to transfer high accuracy to other Earth-viewing instruments that cross its path in orbit.



The HySICS instrument is the imaging spectrometer that is the heart of the CPF payload. HySICS will take spectral measurements of sunlight reflected by Earth and the Moon. The payload has been developed and built by the University of Colorado at Boulder's Laboratory for Atmospheric and Space Physics (LASP) and is ready to launch. Its design builds on over 10 years of LASP-led science research and technology development.



CLARREO Pathfinder will establish unprecedented boundaries in accuracy (0.3%, 1-sigma) of reflected sunlight measurements of Earth.