



The OCO-3 Mission: Development Status



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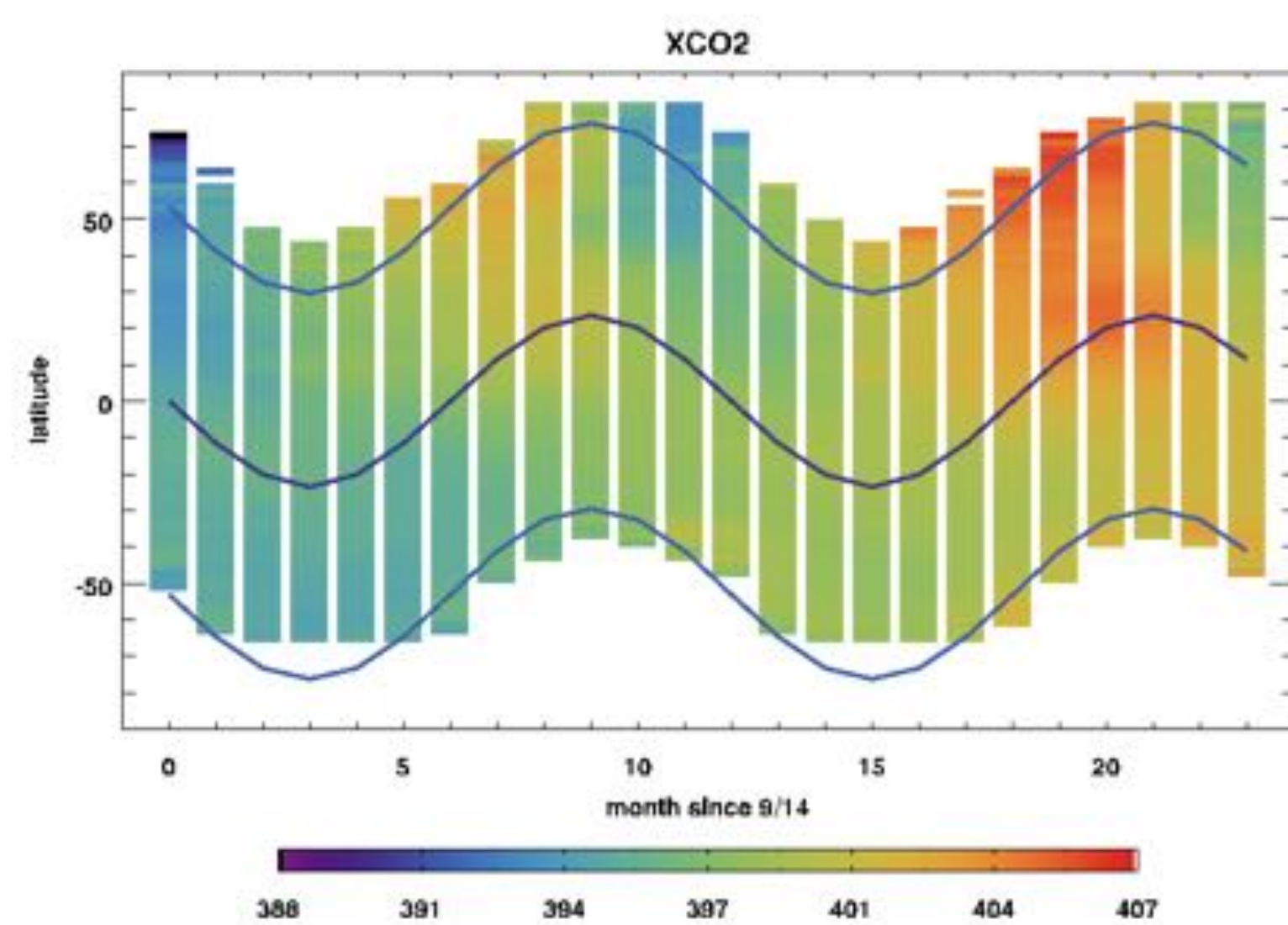
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OCO-3 Science Focus Areas

Continued Global CO₂ Measurements for Flux Estimates

OCO-2 has XCO₂ data record starting in Sept 2014. It will continue, but is past its design life. OCO-3 can continue the measurement record.

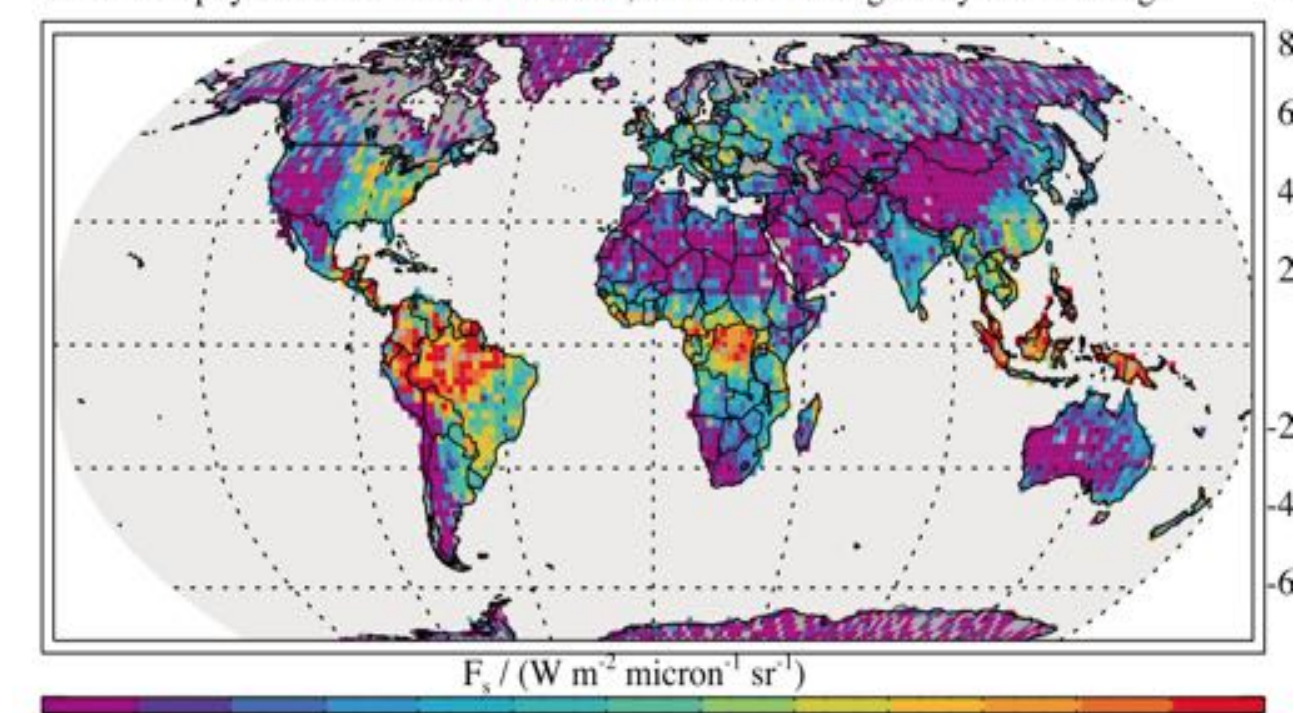
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Terrestrial Carbon Cycle

Process studies enabled by XCO₂ and fluorescence measurements at all sunlit hours

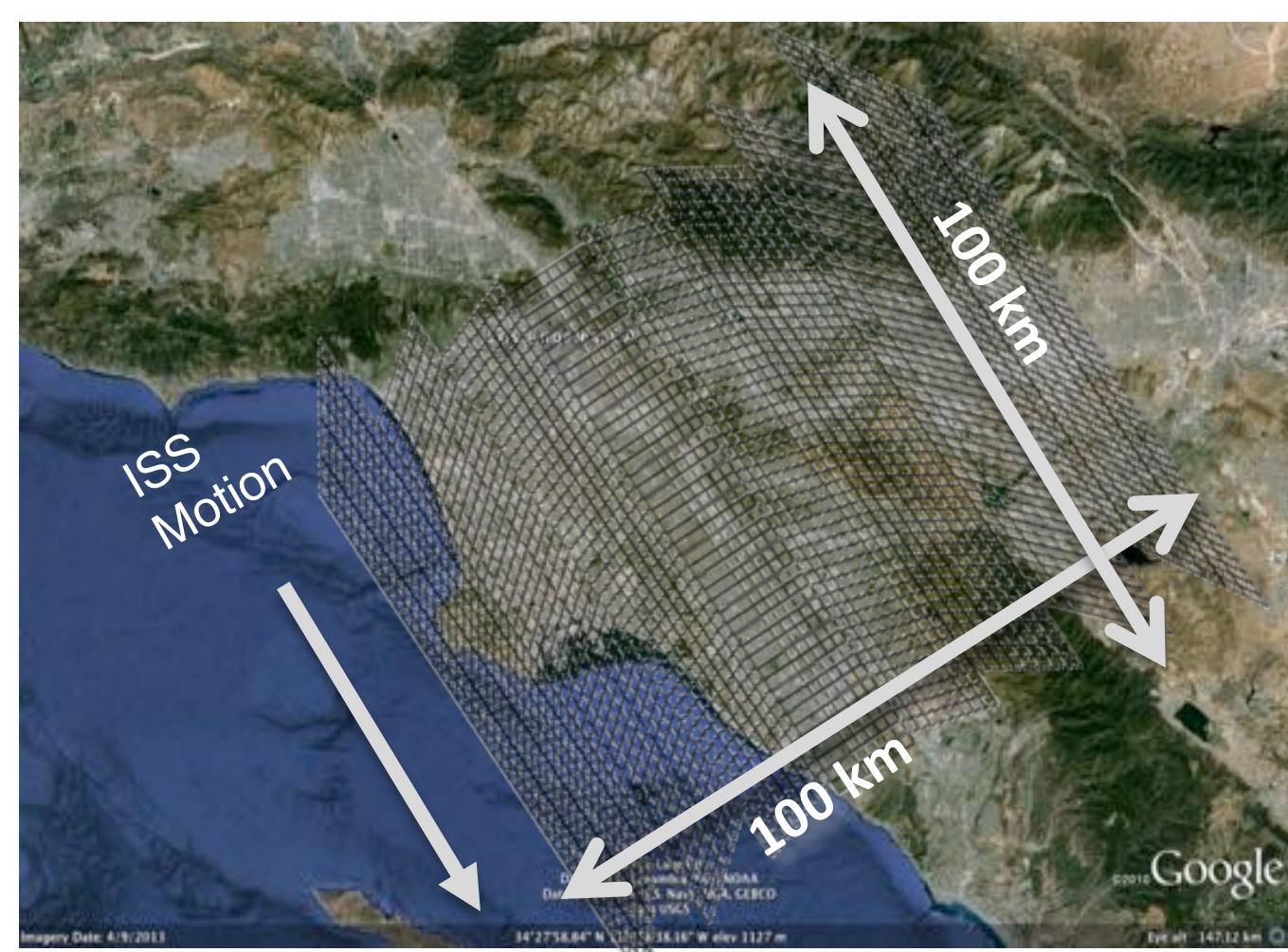
A Chlorophyll a fluorescence at 755 nm, June 2009 through May 2010 average



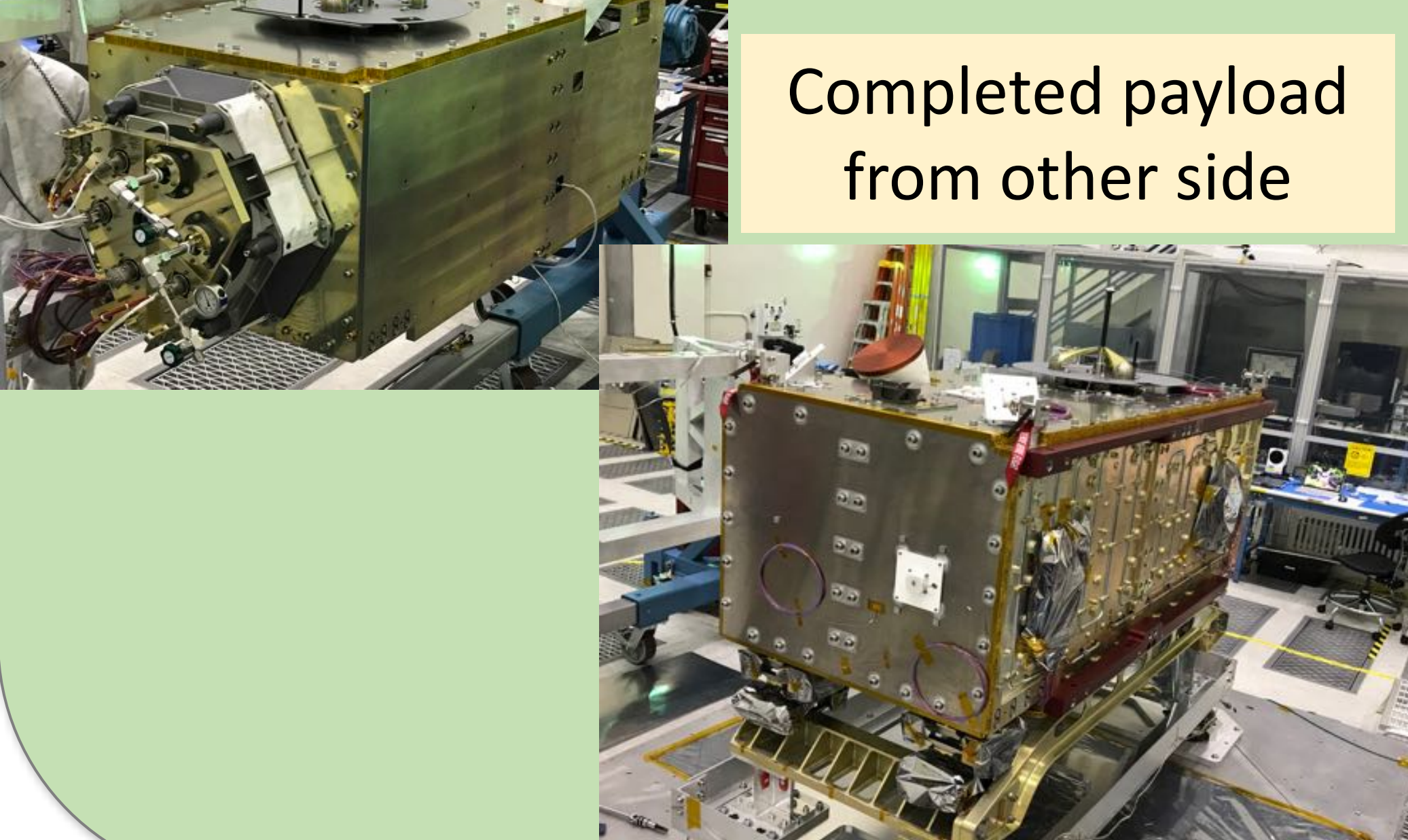
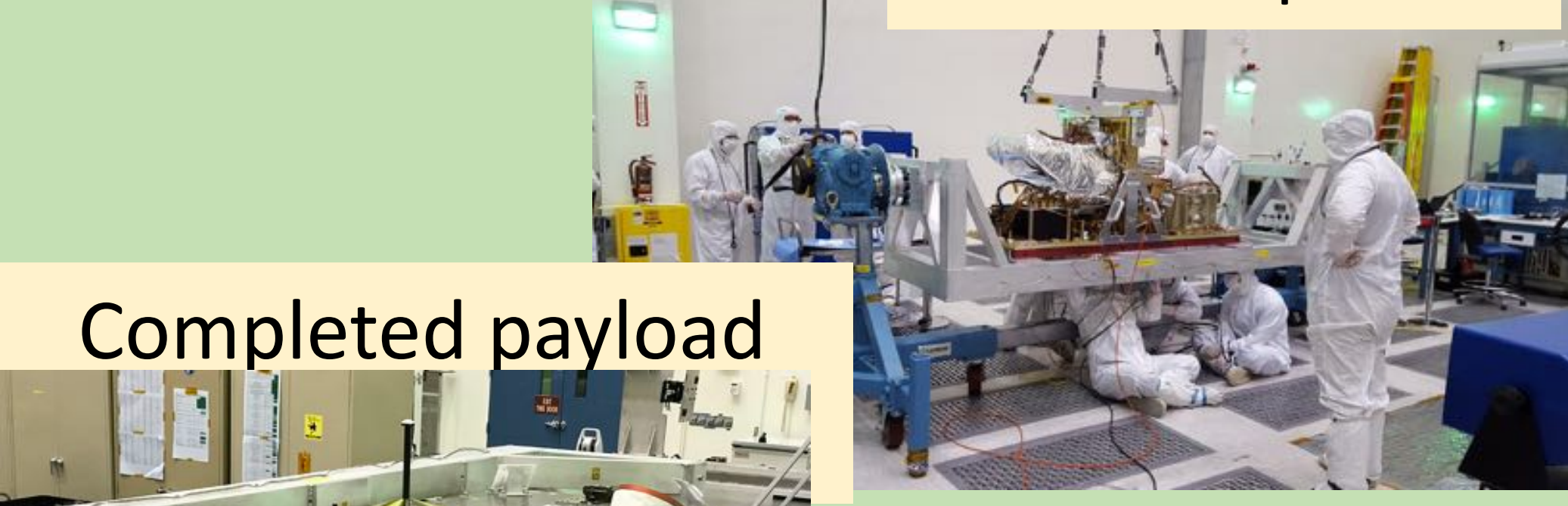
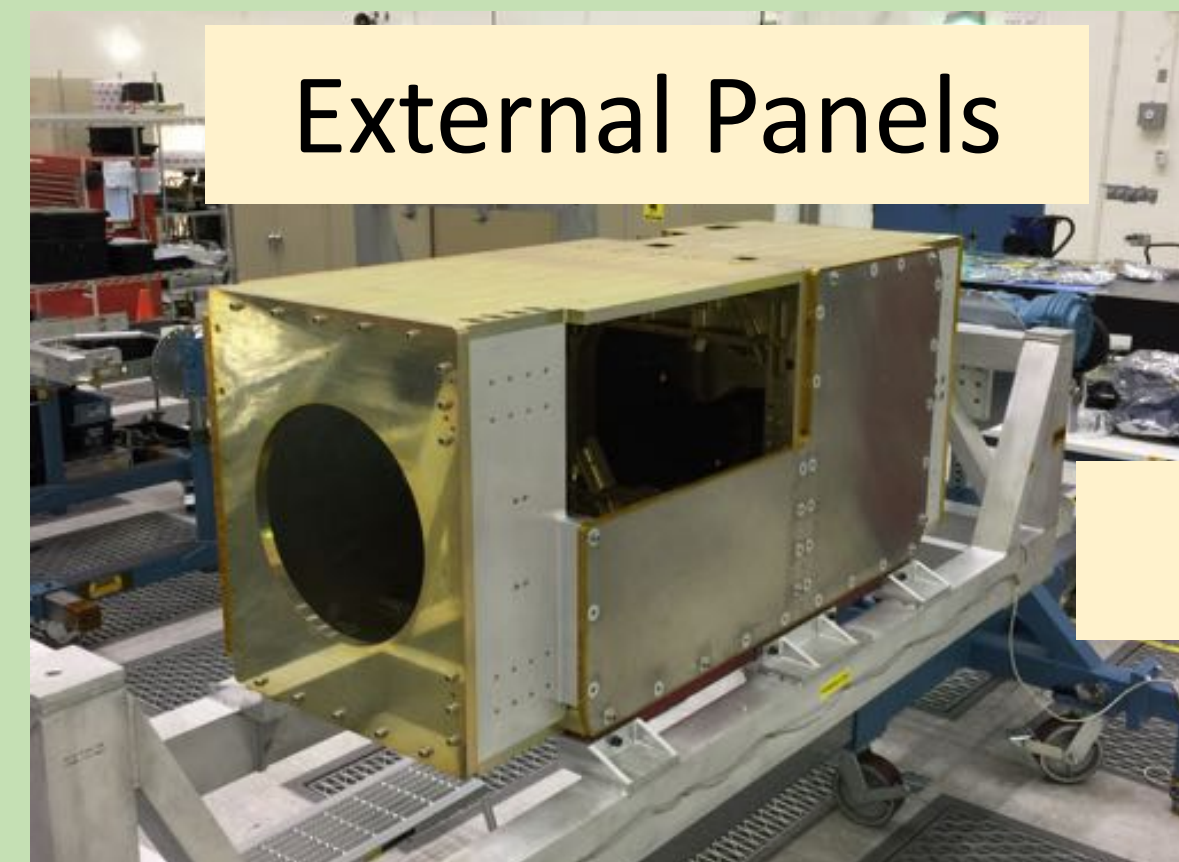
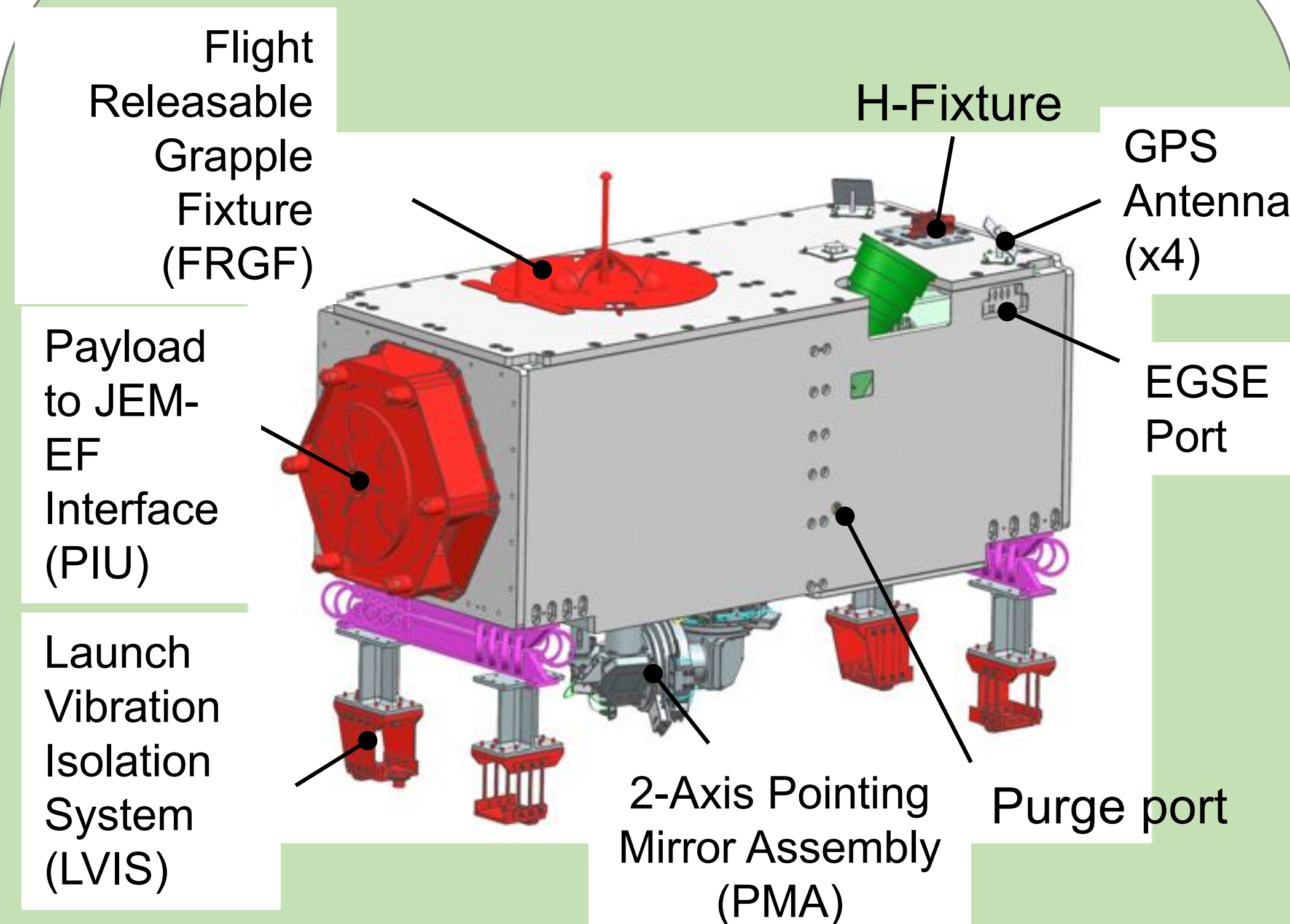
Chlorophyll Induced Fluorescence
From Frankenberg et al., 2011

Anthropogenic Emissions

Enabled by area snapshot mode using pointing mirror assembly



OCO-3 has the capability to collect map like data over regions on the order of 100km by 100km. This can be used to focus on emissions hotspots or coordinated with field measurement campaigns.



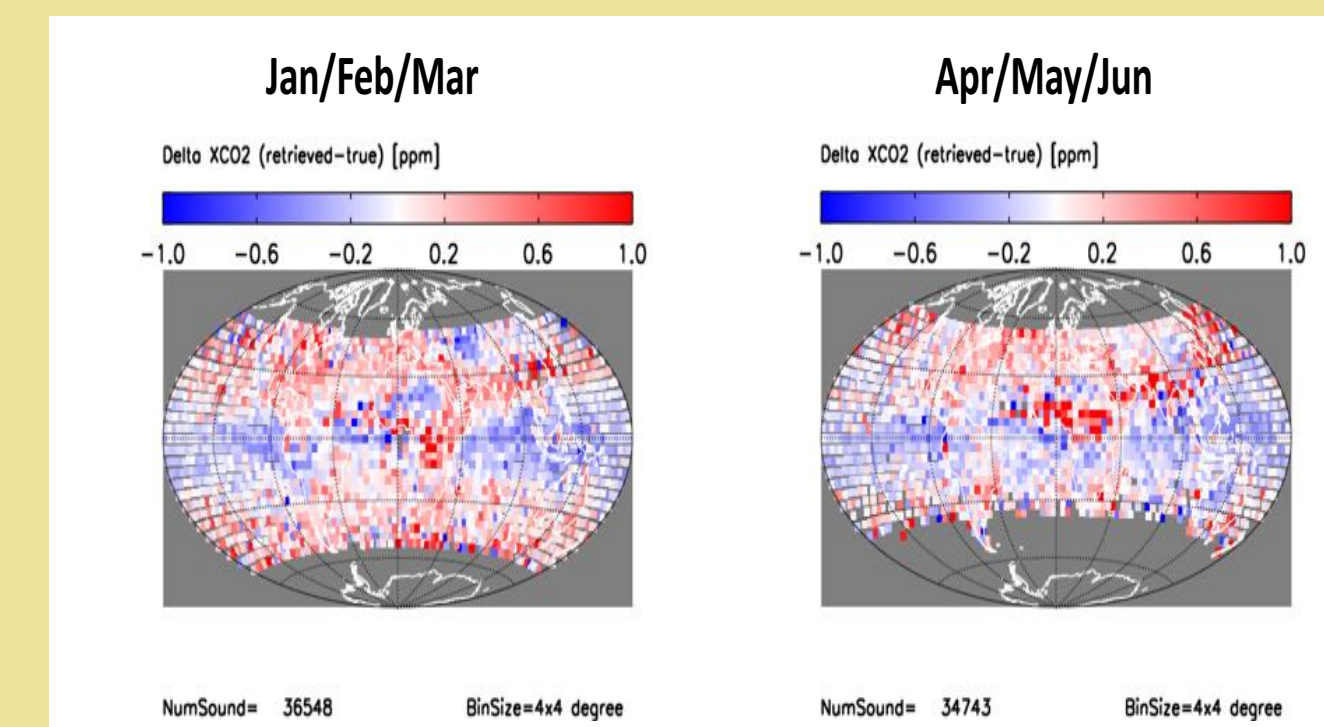
Simulation of Science Data (XCO₂)

Overview

- A year long set of simulated radiances were created, in collaboration with CSU, using the ephemeris data of the ISS (from 2015) and the pointing/ sampling strategy planned for OCO-3.
- The simulated radiances were then processed through the prescreeners to identify cloudy scenes, and clear scenes were processed through L2.
- A filtering process and bias correction similar to the OCO-2 process was applied

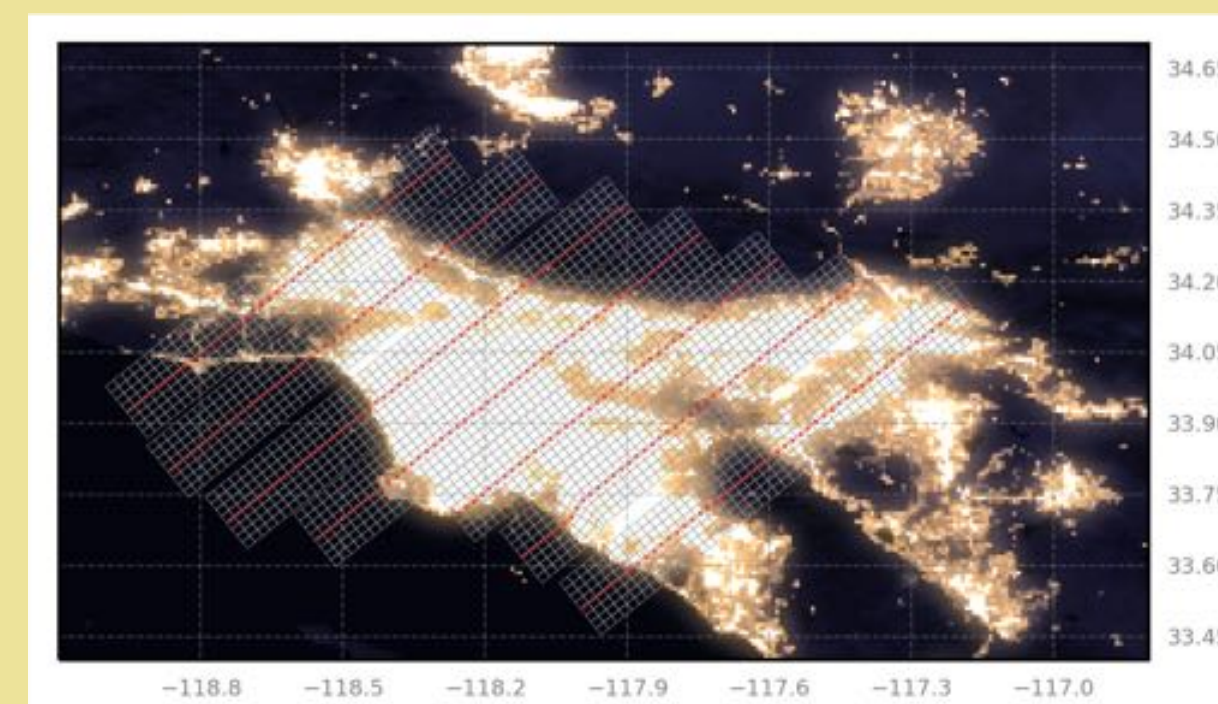
OCO-3 Data Quality Expected to Meet or Exceed Requirements

The signal to noise (SNR) is a strong driver of the expected quality of the science data (XCO₂ and SIF). OCO-3 will have SNR similar to OCO-2. When the simulated data was filtered and bias corrected, we saw similar characteristics to OCO-2 observations – variables such as dP and aerosol optical depth were correlated with error. The fraction of data filtered is consistent with OCO-2 simulations and operational experience



Snapshot Map Simulation

Snapshot maps are being simulated using the software that will be used in flight to control the pointing system. We are also developing the software that will select the snapshot maps based on our prioritization scheme. We can collect up to 100 snapshot maps each day.



The simulation of a snapshot maps has been drawn over a nightlight image for LA. Some details, such as the rotation of footprints, is not yet included in these simulations.

OCO-3 development

OCO-3 has been in development since before the launch of OCO-2. The hardware has been assembled and is undergoing testing. The data processing, calibration, and science code will leverage heavily off of the existing OCO-2 code and staff.

Progress and Key Dates

- The OCO-3 mission will install a spare build of the OCO-2 instrument on the International Space Station.
- Thermal vacuum testing in underway.
- After testing, there will be a brief period of instrument storage
- The payload will be delivered to SpaceX at Cape Canaveral in Florida in November, to get integrated on the rocket

