



Status of OCO-2 and OCO-3

Minutes of the 11/26/2019 Science Team Telecon

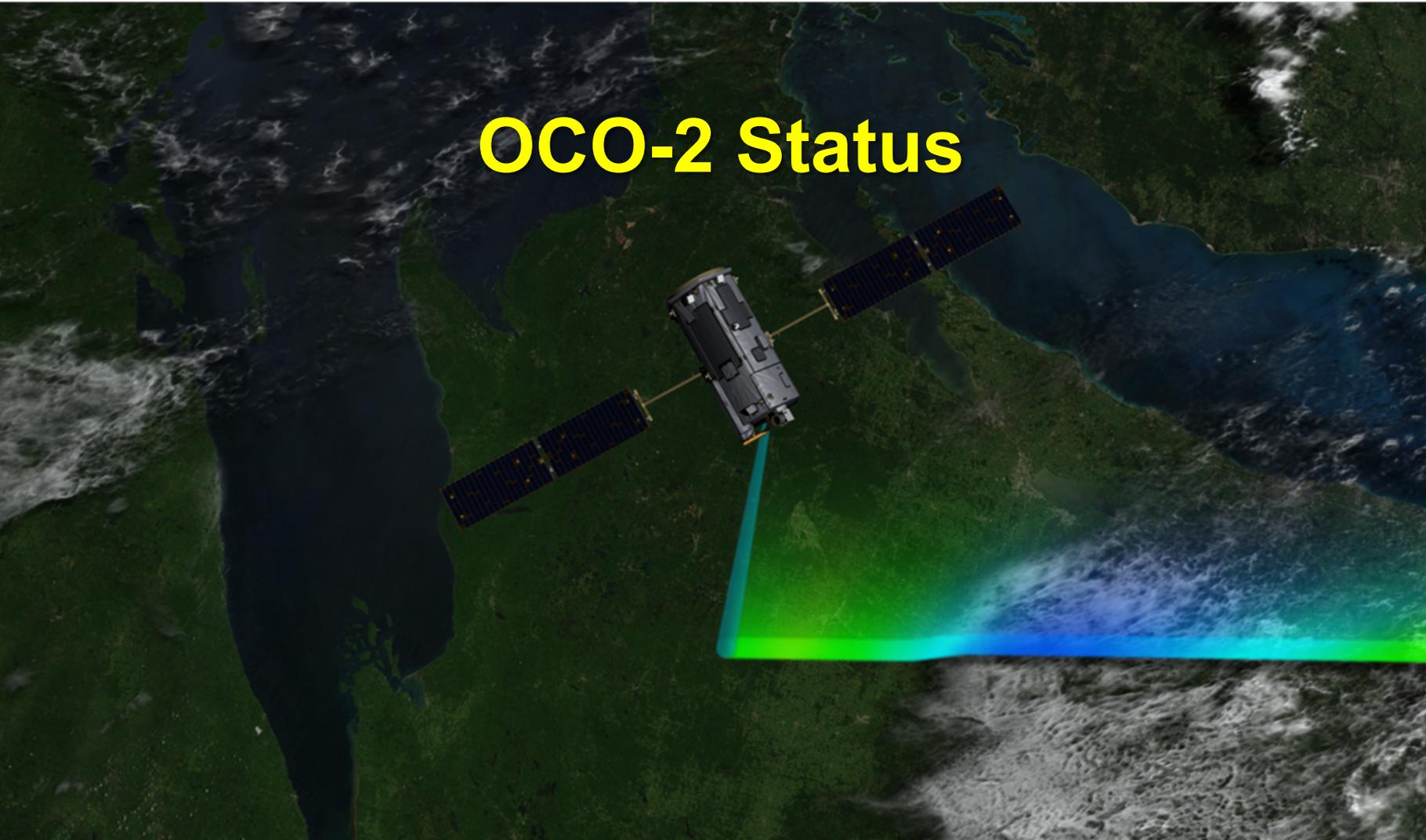
David Crisp and Annmarie Eldering for the
OCO-2 and OCO-3 Teams

Jet Propulsion Laboratory, California Institute of Technology

November 26, 2019



OCO-2 Status





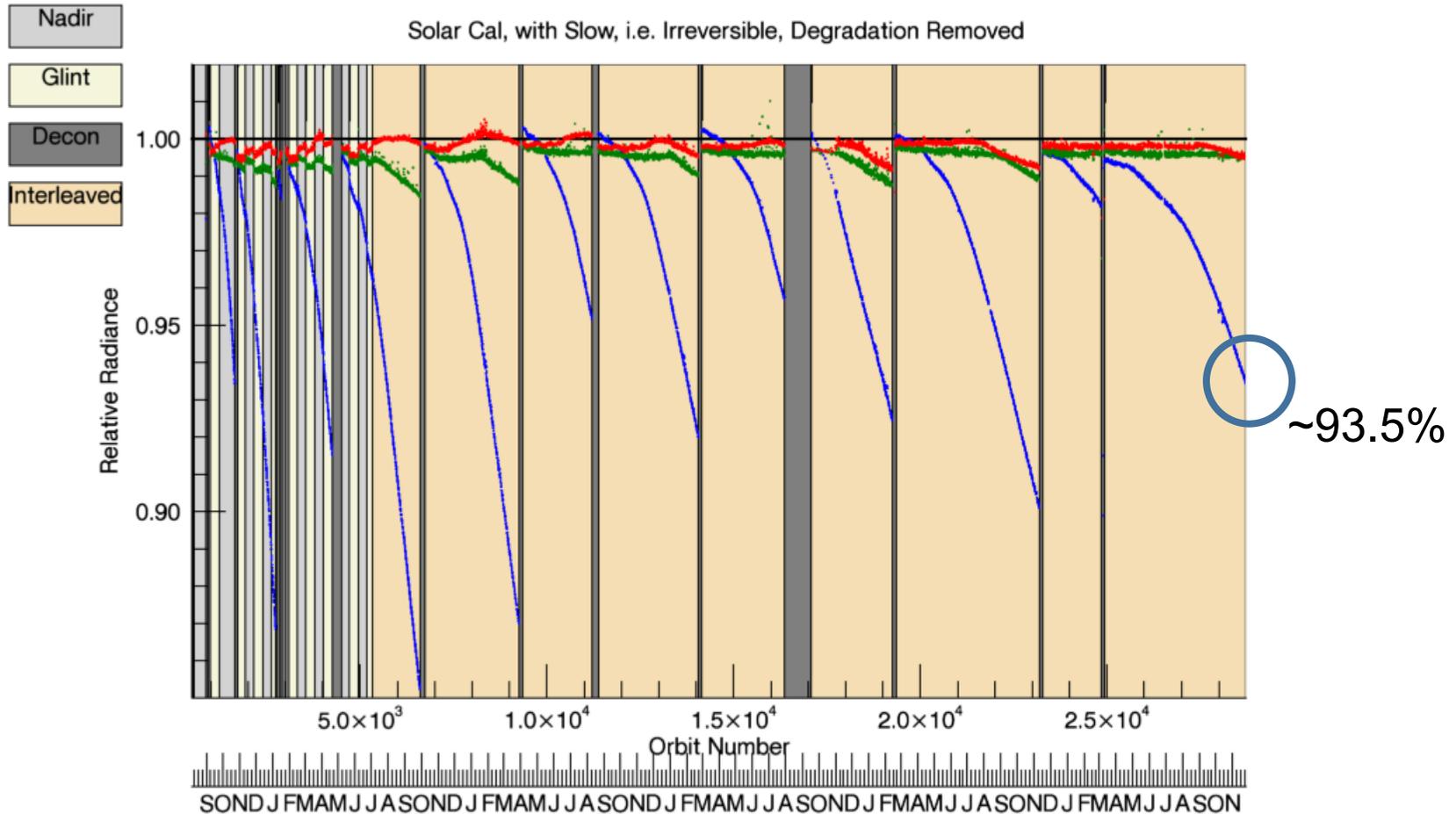
OCO-2 Status Summary

OCO-2 Status

- Observatory Status: **Nominal**
 - The Observatory is operating nominally, collecting science data in gyroless mode with the optimized science operating scheme
- Instrument Status: **Nominal**
 - Next Decon scheduled for week of 13 January 2020
- Science Status: **Nominal**
 - Build 10 (B10) –baseline 7 product processing started (?)
 - ACOS GOSAT v9 – awaiting lite files
- Near-term activities
 - Dec 3-5- A-Train Mission Operations Working Group meeting, Gilbert AZ
 - Dec 9-13 – Downtime to move OCO-2 cluster
 - Dec 9-13 – AGU, SIF workshop, CEOS GHG Roadmap Meeting, Joint GOSAT-OCO Science Team Meeting
 - Jan 13-20 – OCO-2 Instrument Decontamination – no science data



FPA Ice Buildup Trending



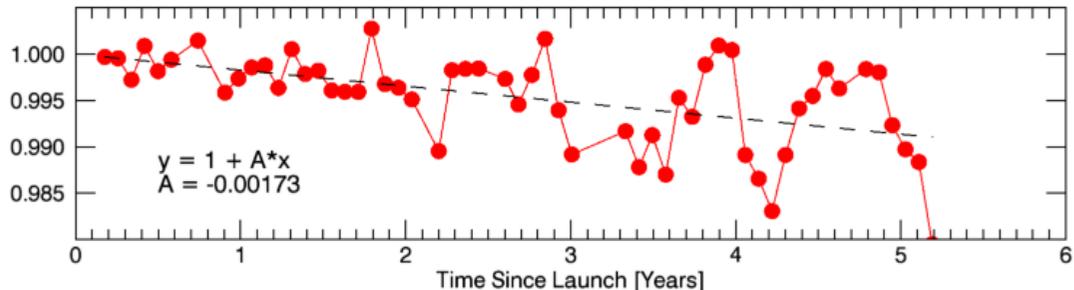
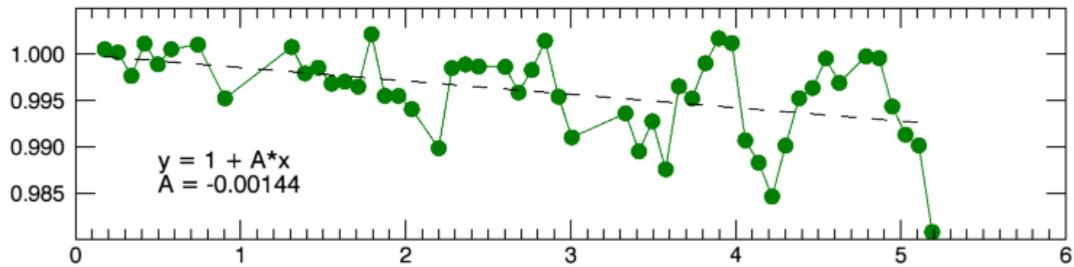
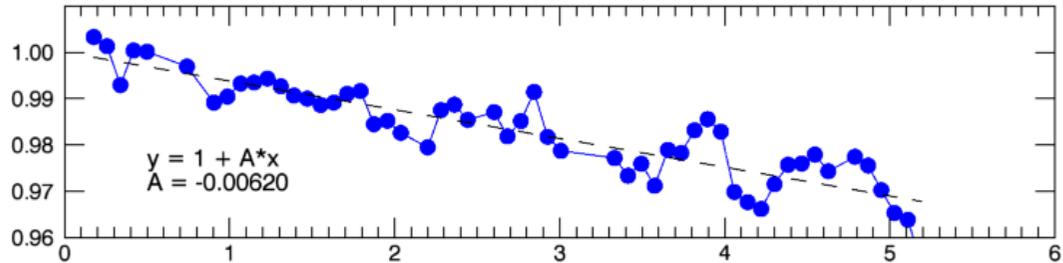
ABO2 throughput (blue) currently just below ~93.5% and the of ice formation continues to decrease. Next Decon – **January 13 - 20, 2020.**





Instrument Throughput – Lunar Calibration

Gibbous Moon Irradiance, Corrected for Scan Rate, Distance, Icing, Phase, Libration & Polarization



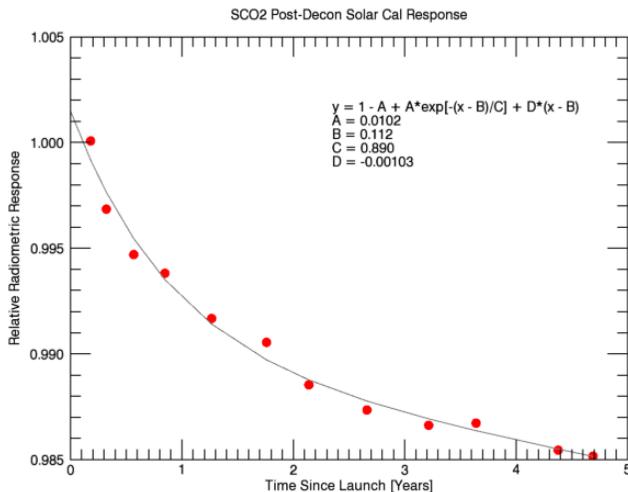
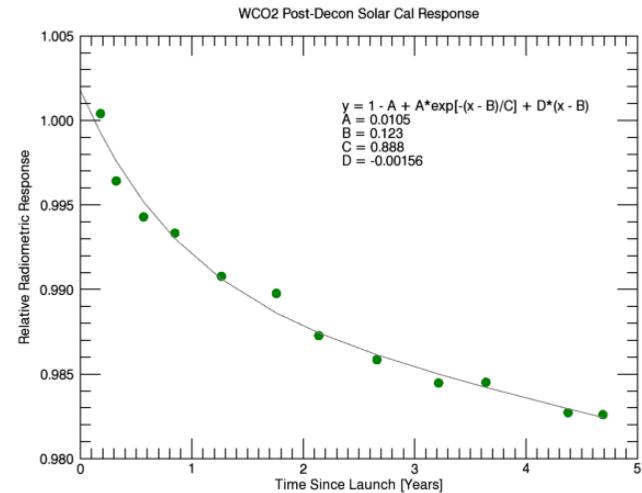
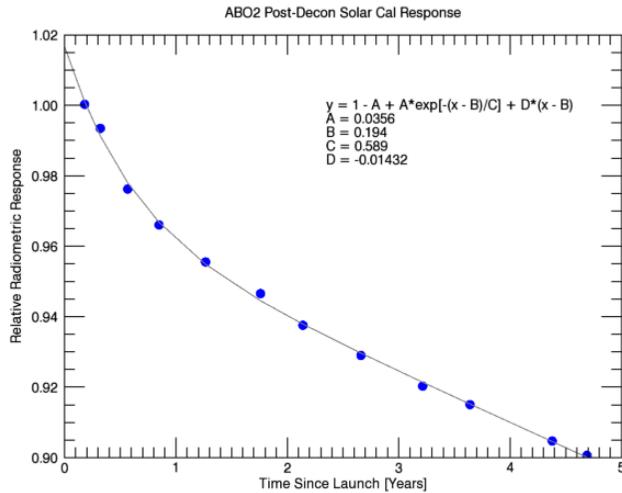
Monthly Lunar observations provide the best means for trending the throughput of the optical system (not including FPAs).

After 5 years

- The throughput of the ABO2 channel is ~97%
- The throughput of the WCO2 and SCO2 channels is ~99%.



Solar Diffuser Throughput



The throughput of the solar diffuser is trended by comparing observations of the sun to lunar observations, which do not use the solar diffuser. The diffuser throughput has decreased to 90% in the ABO2 channel 98.3% in the WCO2 channel and 98.5% in the SCO2 channel

This is not likely to be a life-limiting item





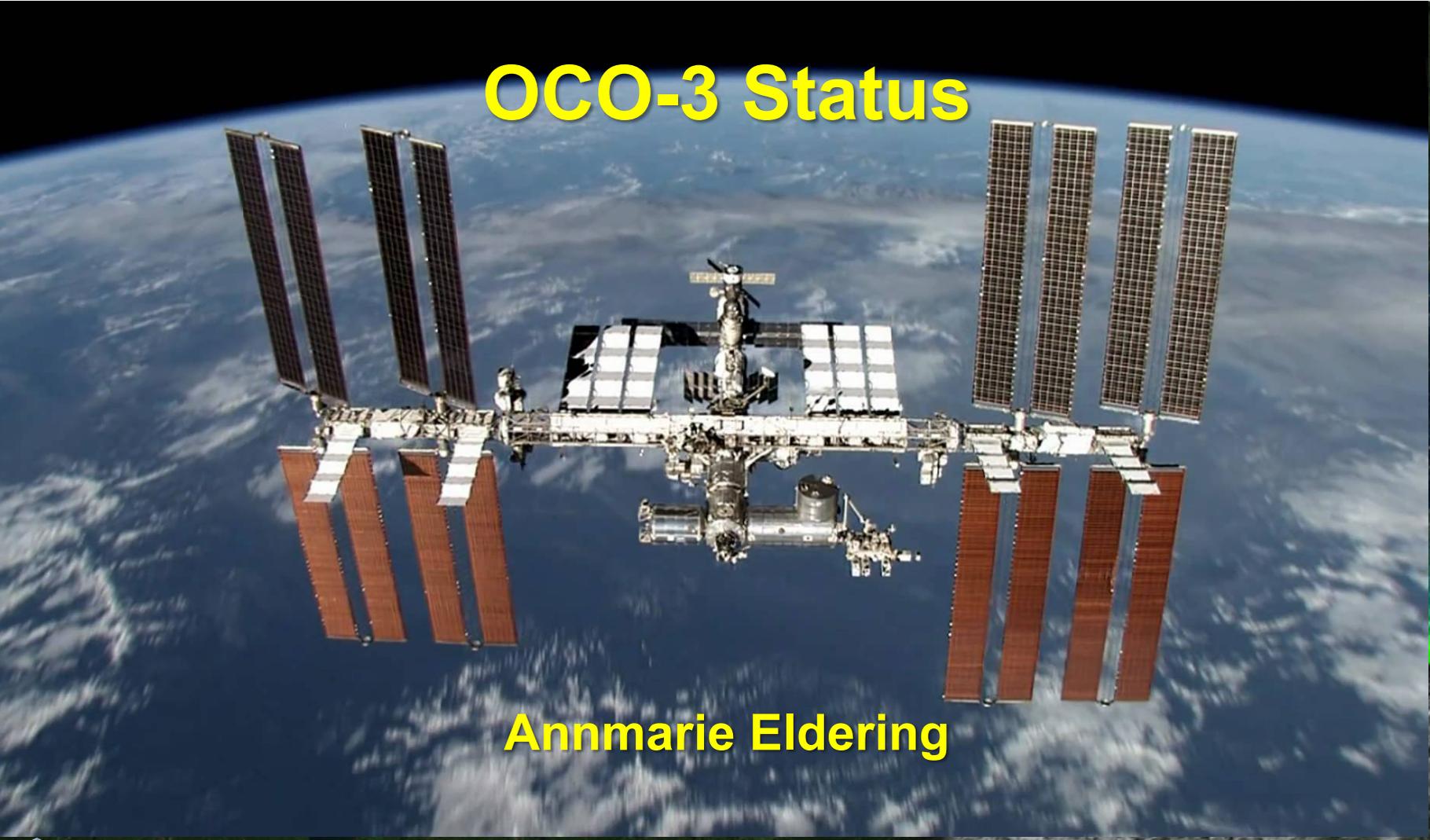
B10 Processing

- B10 L2 processing under way on both Pleiades and Amazon Cloud
 - Chris will cover recent evolution of the product
- V10 Reprocessing Campaign
 - September 2014 to August 2019 (72 months)
 - Level 2 Full Physics processing will be farmed out to Amazon Web Services (AWS) and the High-End Computing Capability (HECC) Facility at NASA AMES
 - The load will be Distributed to meet processing deadline
 - Reserve local cluster to support SCF processing
- Initial Goal:
 - Complete 12 months of L2 Standard production by December 31, 2019 to support publication and provide materials for Senior Review
 - Time period: March 2015 to February 2016
- The subsequent progress on the B10 L2 processing may be disrupted if there is a government shutdown





OCO-3 Status



Annmarie Eldering





Summary of OCO-3 Near-Term Plans

- Much of November has been spent uploading software and performing Pointing Mirror Assembly (PMA) calibration
 - Recalibration campaign for the PMA completed
 - Instrument is currently cooling down in preparation for return to Science
- Other activities being pursued in parallel
 - Manual correction of a few SAMS for presentation at AGU
 - Lots of recent progress by Chris, Rob, Tommy, Matthaeus, Peter...
- The OCO-3 Team (still) plans to deliver its first L1B product to the GES DISC before the end of November
 - Radiometric and spectroscopic calibration looks good
 - Users will be cautioned that the geolocation still has errors





OCO-3 Status Update

- Since we saw you at the science team meeting.....
- Updated flight software (to FSW4.2)
 - Addressed some timing errors (related to GPS and ISS data streams)
 - Addressed an issue with the pointing control system when it has to flip the AZ actuator (this was impacting SAMs and targets)
 - Collected a few orbits of science data
- Most of the month of November was spend with PMA Cal
 - This is an activity to collect images with the internal camera that are compared to Landsat images
 - This let's us develop correction terms for the pointing mechanism (by seeing how different our image positions are from the Landsat images)
 - We are in the final phase of analysis of the image data information and development of a correction table



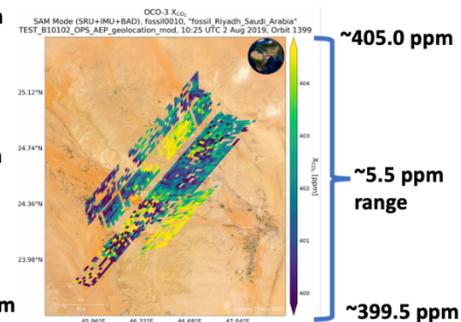
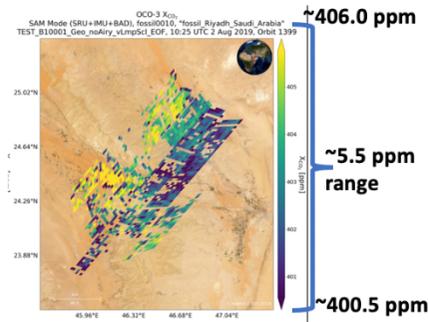
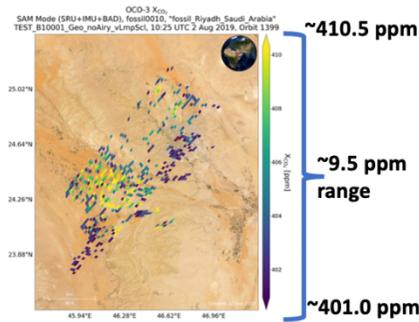
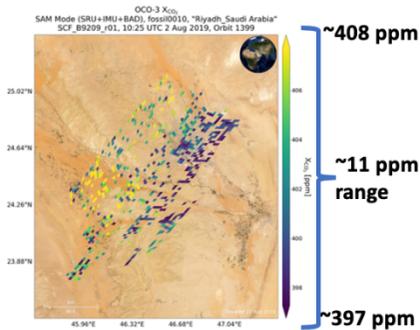
OCO-3 Status Update

- This week
 - We are cooling the instrument to return to science data collection
 - We will have science sequences uploaded to start in Wed, Nov 27th.
 - The calibration team reviews the data to determine when we were thermally stable and when the science data is useful
- Looking ahead
 - next week: continue evaluation of pointing corrections
 - Week of AGU – move computer cluster at JPL
 - Week of Dec 16th
 - upload the PMA cal based pointing correction table
 - Deliver updated software to ops
 - This will be used for first delivery of L1b to Ops
 - End of December – continue science data collection
 - And work on process to use pointing correction on past data



OCO-3 status in pictures (from Tommy Taylor)

Riyadh :: orbit 1399 :: 20190802



- **SCF_B9209_r01**
- This is the more or less "at launch" version of the L2FP.
- Very few soundings converging in L2FP.
- Appears to be a strong geometry dependent xco2.

- **TEST_B10001_Geo_noAiry_vLmpSci**
- **Without EOFs in the L2FP**
- This test version includes the polarization correction.
- Reduced range in xco2.
- But still very few soundings converging in L2FP.

- **TEST_B10001_Geo_noAiry_vLmpSci**
- **With EOFs in the L2FP**
- This test version includes the polarization correction.
- Much higher L2FP convergence rate.
- Drastic reduction in xco2 range.

- **TEST_B10102_OPS_AEP_geolocation_mod**
- This test version includes the off-line CSU geolocation correction.
- About the same range in xco2, although the low/high bias is reversed.
- There still seems to be geometry dependence.
- Seems like we are still struggling at most of the desert sites (surface/aerosol/BRDF interaction retrieval issue?)

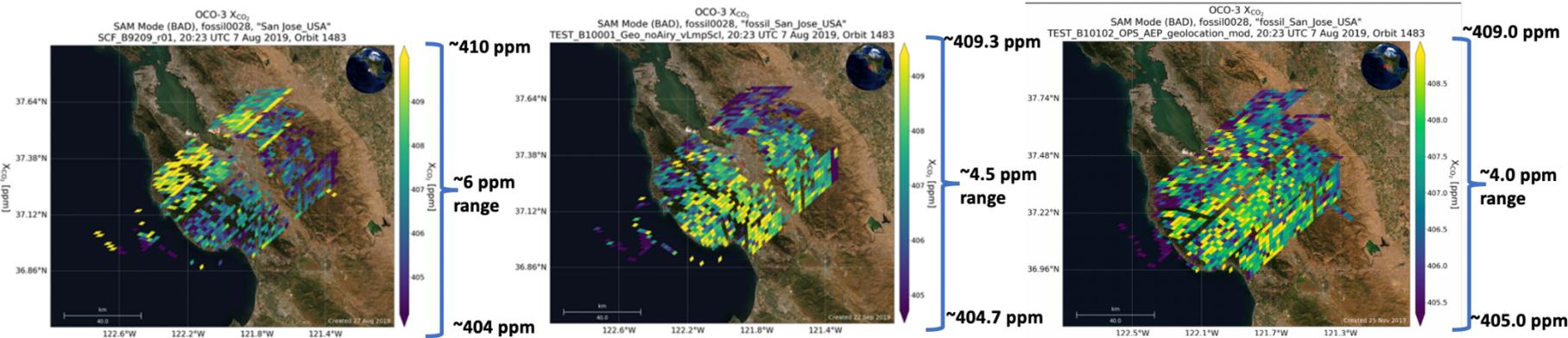
- Visualizations courtesy of Rob Nelson, caltech.edu/JPL.





OCO-3 status in pictures (from Tommy Taylor)

San Jose :: orbit 1483 :: 20190807



- SCF_B9209_r01
- This is the more or less "at launch" version of the L2FP.
- Strong geometry dependent xco2.
- Lots of topography effects due to pointing errors.

- TEST_B10001_Geo_noAiry_vLmpSci
- This test version includes the polarization correction.
- Reduced range in xco2.
- Direction of the xco2 "gradient" reversed.
- Still contains large pointing errors.

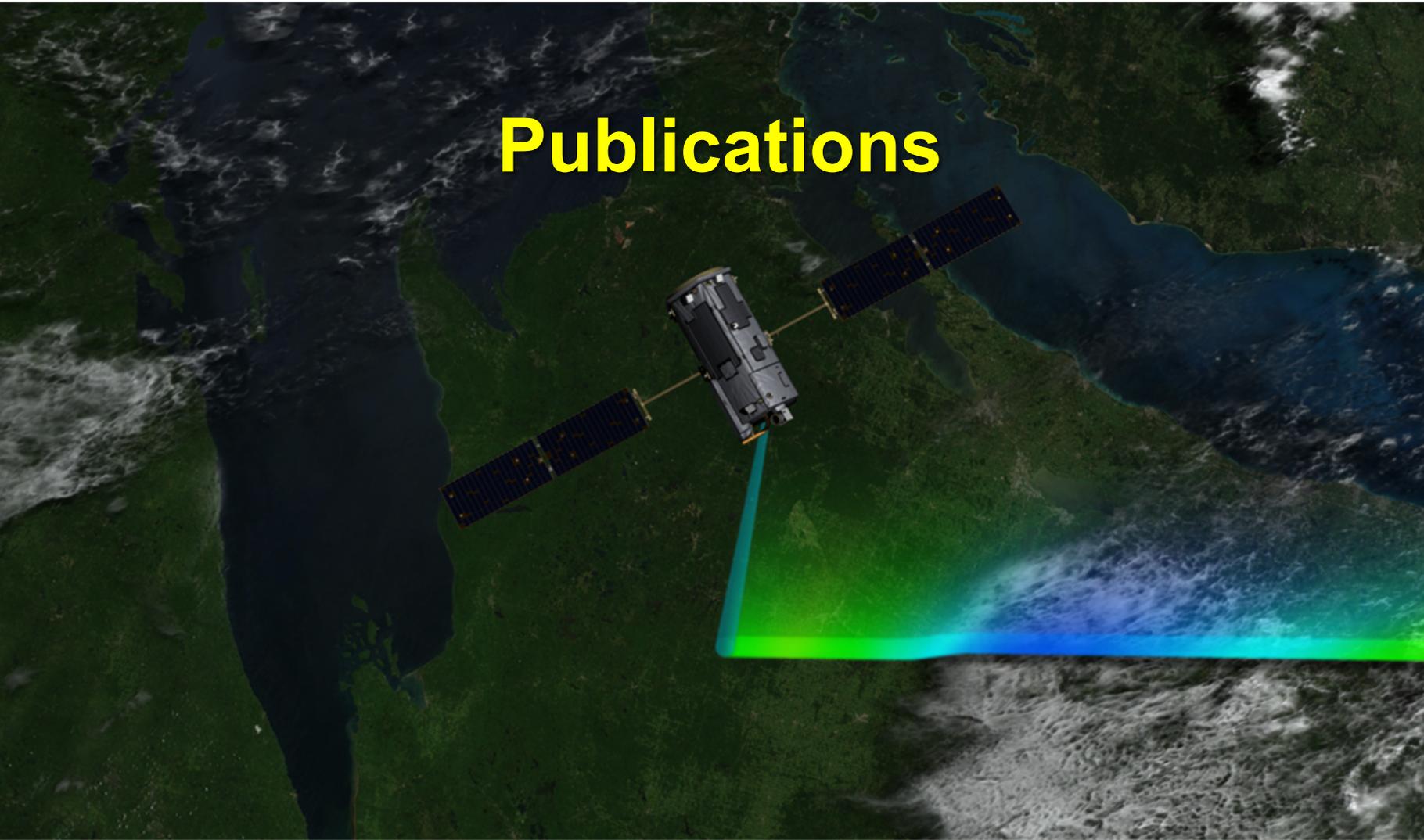
- TEST_B10102_OPS_AEP_geolocation_mod
- This test version includes the off-line CSU geolocation correction.
- Slightly reduced range in xco2.
- No more topography effects.
- Inter-swath gradient mitigated.

- Visualizations courtesy of Rob Nelson, [CalTech/JPL](#).





Publications





ACOS/OCO-2/OCO-3 Publications Statistics

- 2014: OCO-2: 7 refereed papers, 1 book chapter
- 2015: OCO-2: 8 refereed papers
- 2015: ACOS: 3 refereed papers, 1 book chapter
- 2016: OCO-2: 18 refereed papers
- 2016: ACOS: 12 refereed papers
- 2017: OCO-2: 48 refereed papers
- 2017: ACOS: 2 refereed papers
- 2018: OCO-2: 38 refereed papers
- 2018: ACOS: 5 refereed papers
- 2019: OCO-2: 45 refereed papers
- 2019: ACOS: 2 refereed papers

Blue text indicates items that have been updated since the last report

Source: <http://www.isiknowledge.com> (key word: OCO-2 OR Orbiting Carbon Observatory-2 OR Atmospheric CO2 Observations from Space OR ACOS)





Key Near Term Activities

Planned Date	Activity Description
Dec (TBD)	OCO-3 L1b Product Deliveries Start, GES-DISC
3-5 Dec	A-Train Mission Operations Working Group meeting, Gilbert AZ
8 Dec	2020 Senior Review Kickoff, San Francisco, CA
9-13 Dec	2019 Fall AGU Meeting, San Francisco, CA
10 Dec	SIF Workshop @ AGU, San Francisco, CA
11 Dec	CEOS Greenhouse Gas Roadmap Meeting @ AGU 8:00-11:00 AM
11 Dec	GOSAT – OCO Joint Science Team Meeting @ AGU - 1:30-4:00 PM
12-16 Jan 2020	100 th AMS Annual Meeting, Boston, MA
Feb 2020	OCO-2/OCO-3 Flux Mini Meeting
6 Mar 2020	OCO-2 Senior Review Proposal Due
23-27 Mar 2020	OCO-2 Theme Group Meetings, Caltech, Pasadena, CA
Apr 2020	OCO-3 L2 Product Deliveries Start, GES-DISC
15-17 Apr 2020	19th Global Emissions Initiative (GEIA) Conference, Santiago, Chile
24-28 May 2020	JpGU – AGU Joint Meeting, Chiba, Japan
2-6 June 2020	IWGGMS-16, Darmstadt, Germany

