Report from NASA

16th GSICS Executive Panel, Boulder, 15-16 May 2015

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NASA Update

-Launches since last GSICS EP meeting

Mission	Launch Date	Orbit/destination	Commissioning Status
Orbiting Carbon Observatory-2 (OCO-2)	July 2, 2014	Polar orbit/LTAN=13:30	Data available at http://disc.sci.gsfc.nasa.gov/OCO-2/data-holdings/oco-2-v6. V6r reprocessing to begin in April 2015.
ISS-RapidScat	September 21, 2014	ISS:420km/51.65°	Completed Xcal with QuikSCAT
Cloud-Aerosol Transport System (CATS)	January 10, 2015	ISS:420km/51.65°	Performing on-orbit instrument checkout and optimizing calibration
Soil Moisture Active Passive (SMAP)	January 31, 2015	Polar orbit/LTAN=18:00	Performing on-orbit instrument cal/val
Deep Space Climate Observatory (DSCOVR)	February 11, 2015	L1 point	On way to L1 (June 2015)

-Future launches

- Jason-3: 7/22/2015
- Lightning Imaging Sensor: 2/16
- Geostationary Operational Environmental Satellite-R (GOES-R): 3/16
- Stratospheric Aerosol and Gas Experiment-III (SAGE-III): 3/16
- Cyclone Global Navigation Satellite System (CYGNSS): 10/16
- Joint Polar Satellite System-1 (JPSS-1): 12/16
- Gravity Recovery and Climate Experiment-Follow On (GRACE-FO): 8/17
- Ice, Cloud, and land Elevation Satellite-2 (ICESat-2): 10/17
- Tropospheric Emissions: Monitoring of Pollution (TEMPO): 2018
- ECOsystem Spaceborne Thermal Radiometer Experiment on Space Station (ECOSTRESS): 2018
- Global Ecosystem Dynamics Investigation (GEDI): 2019
- Pre-Aerosol, Clouds, and Ocean Ecosystem (PACE): 2019
- NASA-ISRO Synthetic Aperture Radar (NI-SAR): 2020
- Surface Water Ocean Topography (SWOT): 2020

Participation in EP, GDWG, GRWG

- Points of contacts/meeting participants:
  - EP: James J. Butler (NASA GSFC)/Jack Xiong (NASA GSFC)
  - GRWG: Jack Xiong (NASA GSFC) or Dave Doelling (NASA/GSFC)/Pat Minnis (NASA LaRC), Amit Angal (SSAI), Aisheng Wu (SSAI), Jon Fulbright (SSAI), Gene Eplee (SAIC), Ben Wang (SSAI), and Lawrence Ong (SSAI)
- Main contribution to GRWG actions:
  - Participation in organization of (JX) and discussions held during the GSICS Lunar Calibration Workshop (Jack Xiong, Gene Eplee, Ben Wang, Jon Fulbright, and Lawrence Ong)
  - POC for MODIS Terra and Aqua and their use as GSICS reference instruments in the reflected solar wavelength region (Jack Xiong)
  - GSICS DCC Chair (Dave Doelling)
  - GSICS Visible/Near InfraRed (VIS/NIR) Sub-group Chair (Dave Doelling)
  - «ATBD for DCC Technique of Calibrating GEO Sensors with Aqua MODIS for GSICS» (Dave Doelling)
  - «ATBD for Ray Matching Technique of Calibrating GEO Sensors with Aqua MODIS for GSICS» (Dave Doelling)
  - Articles submitted to GSICS Quarterly (Jack Xiong and Dave Doelling)

Note: members are in blue

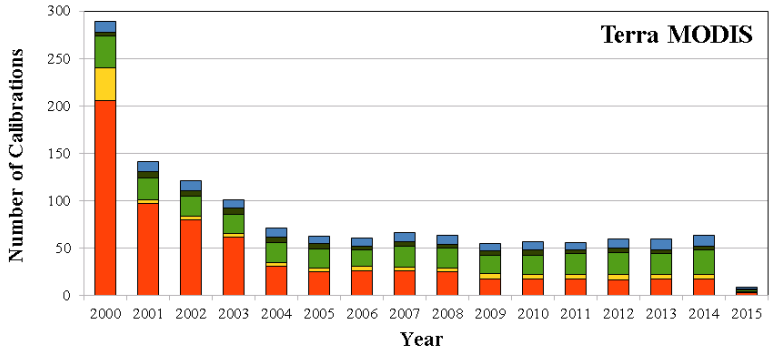
Highlights of NASA calibration activities of interest to the EP

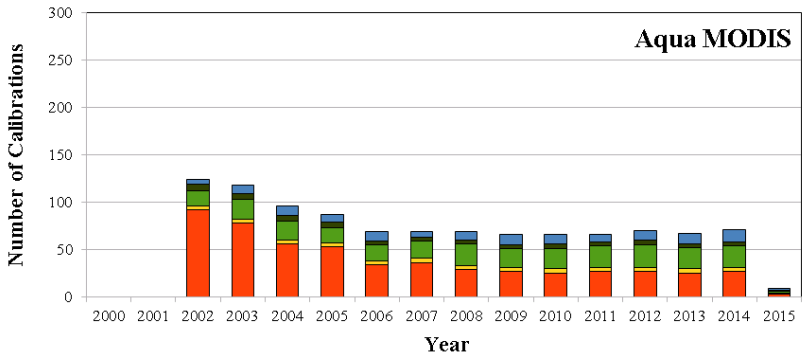
-**EOS instrument status**

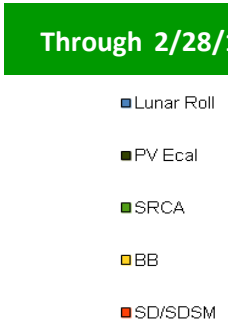
- MODIS Terra and Aqua
  - Terra: Dec. 18, 1999 – Present Aqua: May 04, 2002 – Present

Instrument parameter	Performance status
Instrument operation	*Stable*
On-board calibrators	*Normal*
Blackbody calibrations	*Stable and T controlled*
Solar diffuser degradation	*Larger at smaller λs*
Radiometric responsivity	*Largest changes in VIS and NIR*
Spectral performance	*Small changes in CW and BW*

- MODIS C6 L1B data can be downloaded from: http://ladsweb.nascom.nasa.gov/





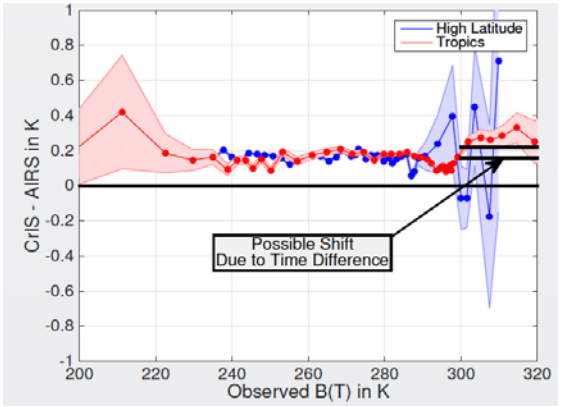


Highlights of NASA calibration activities of interest to the EP

-EOS instrument status

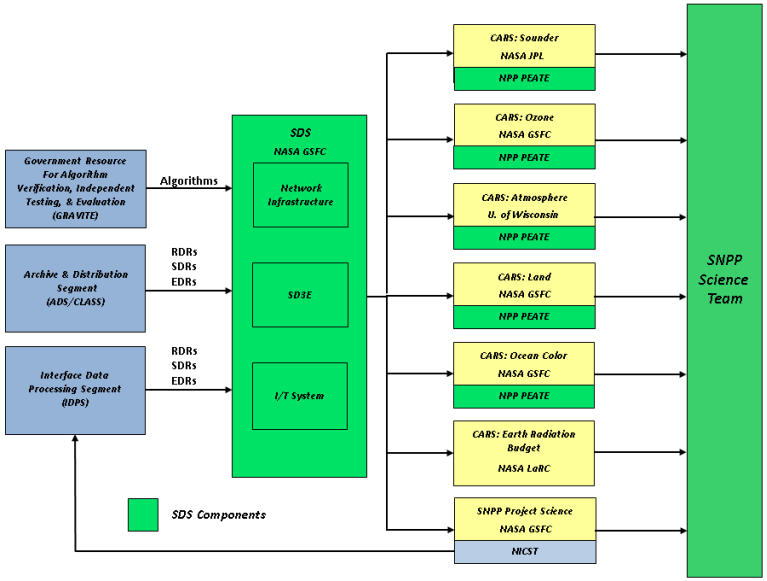
- AIRS
  - -Sensor is in excellent health
  - -All instrument engineering parameters trended vs time are flat or changing slowly
  - -Cooler A suffered an SEU on March 22 2014 that tripped a flag and caused the compressor to stop and as a safety precaution Cooler B was commanded to stop its compressor as well.
  - -Both coolers were restarted on March 25, 2014.
  - -On March 28 2014, Cooler A stopped sending telemetry and stopped accepting commands (but the compressor is still working)
    - The problem is believed to be the same software problem that appeared occasionally during pre-launch testing and during on-orbit checkout in 2002
    - We believe power cycling the cooler will restore normal cooler operation, but have decided to leave the cooler alone for now because *the compressor continues to work and science data quality is unaffected*

  - -Recent AIRS/CrIS comparisons
    - AIRS and CrIS brightness temperatures at 900 cm^{-1} were compared at Dome C for two years of data (April 2012 through March 2014)
      - -CrIS was about 300 mK warmer than AIRS, but the one-sigma uncertainties were 400 mK
    - At the April 2015 AIRS science team meeting, L. Strow reported on a study of all CrIS/AIRS SNO's in 2013—he sees CrIS warmer by 100 to 250 mK depending on scene temperature.

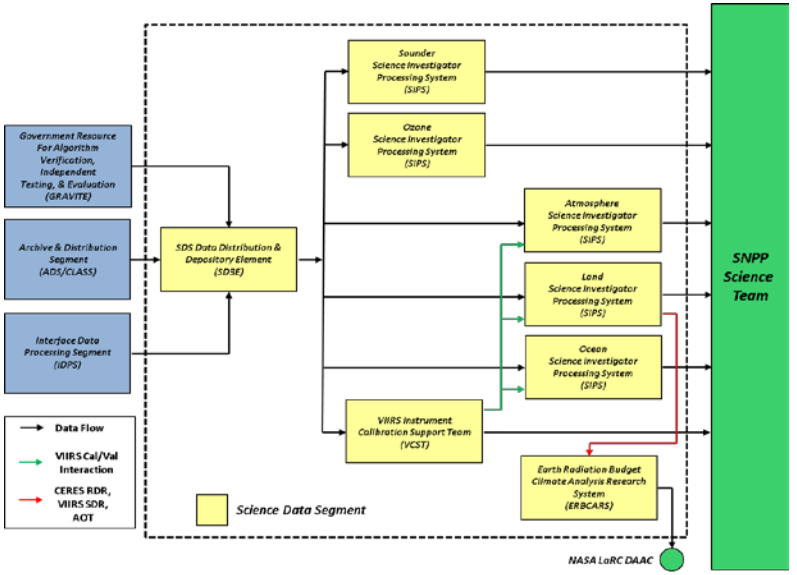


Highlights of NASA calibration activities of interest to the EP

-NASA Suomi NPP Science Team transitioning from data assessment to data production



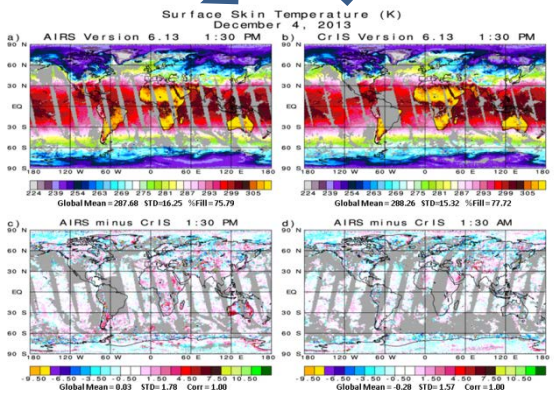
NASA's data distribution system assessed suitability of SNPP operational data records for climate science



NASA's new data distribution system produces data products suitable for NASA Earth Science and applications (i.e. continues the EOS data record)

-New data system enables efficient Implementation of:

- *algorithm improvements*
- *new and/or different algorithm approaches*
- *data reprocessing*



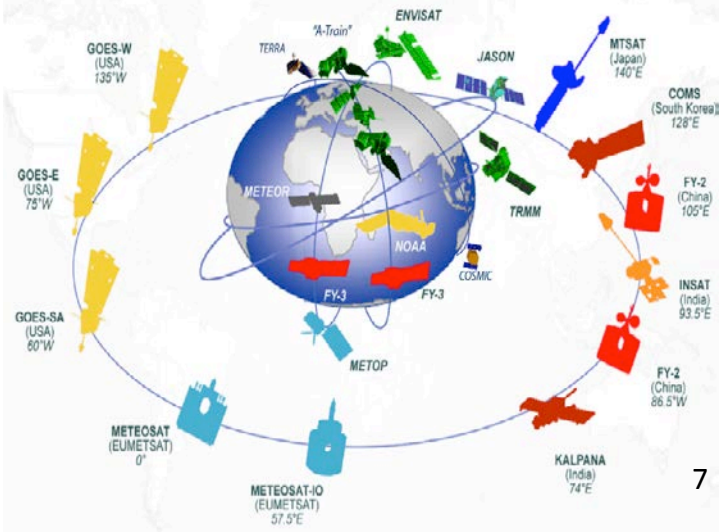
•Assessment example: AIRS/CrIS skin surface T comparison using AIRS Version 6.13 and AIRS-like Version 6.13 algorithms

Highlights of NASA calibration activities of interest to the EP

-**CLARREO Status Update**

- Full mission remains in pre-phase A studies, launch no earlier than 2023
- Work on 2 RS and 2 IR instrument calibration demonstration systems continues (CU-LASP/GSFC for RS, UW/LaRC for IR)
- International collaboration options with UK, Italy, India in study
- 26 journal papers published/in press in 2014 and 10 journal papers currently submitted/in review in 2014
- 105 total journal papers published to date
- ***CLARREO Pathfinder Mission included in the Presidents FY16 proposed budget to Congress***
  - ***-Launch 2019/2020 on ISS***
  - ***-Includes both RS and IR spectrometers***
  - ***-Depends on Congress passing an increase in NASA Earth Science in FY16: may or may not happen: Congressional arguments underway.***

CLARREO provides the opportunity to intercalibrate 30 to 40 instruments in GEO and LEO orbits



Other NASA Items

- The link to NASA Aqua instrument information on the GCC webpage is incorrect
  - For example, the link to the Aqua instrument guide from the instrument information kiosk should be http://aqua.nasa.gov/content/instruments
  - Need to examine other links (Contact for this?)
- NASA JPL AIRS Project participation in GRWG
  - In response to old GSICS EP action EP-10.13
  - AIRS project is enthusiastic about participating in GRWG
  - T. Pagano, the NASA JPL AIRS Project Manager, has agreed to participate
- Goal is to finish, deliver, and formally close the following 2 GSICS EP actions:
  - EP-14.16: NASA to develop a list of data that need to be produced during the pre-launch instrument characterization; this list shall be appended to the guidelines on best practice for pre-launch characterization. (before the end of CY2015)
  - EP-14.08: NASA to present a paper about maturity levels of instrument calibration in support of re-processing, taking MODIS as an example, at the next web meeting of the Executive Panel