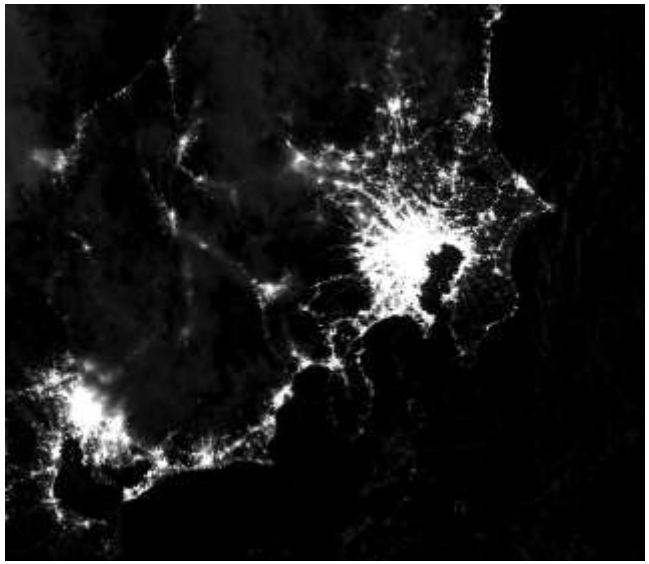
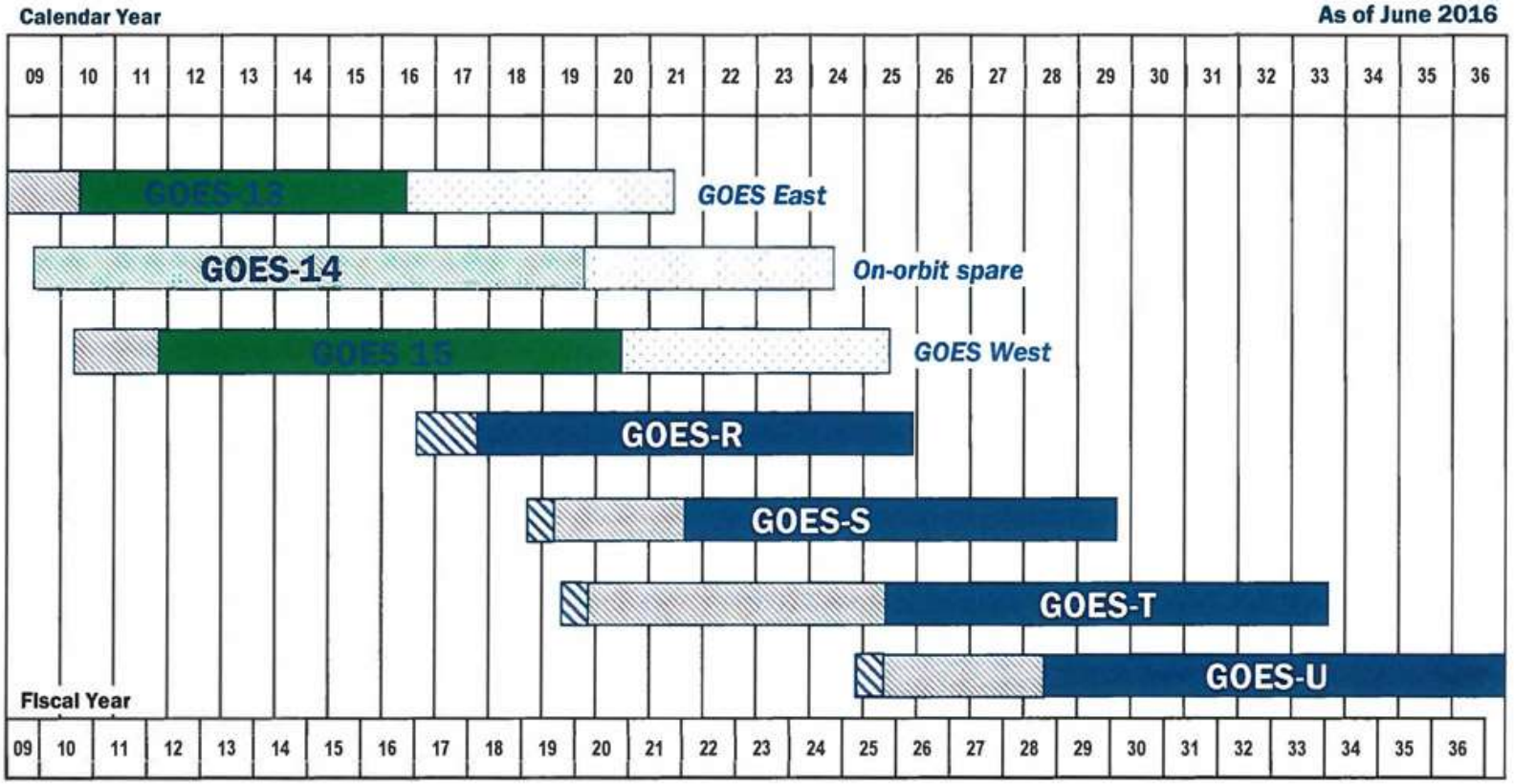


NOAA Satellite Cal/Val Progress Update

Changyong Cao & Francis Padula
NOAA/NESDIS/STAR

41th CEOS Working Group on Calibration and Validation Plenary (WGCV-41)
Tokyo, Japan, September 5-7, 2016

NOAA Geostationary Satellite Programs
Continuity of Weather Observations



Approved: _____

Assistant Administrator for Satellite and Information Services

- In orbit, operational
- In orbit, storage
- Fuel-Limited Lifetime Estimate
- Planned On-orbit Storage
- Test & Checkout
- Planned Mission Life

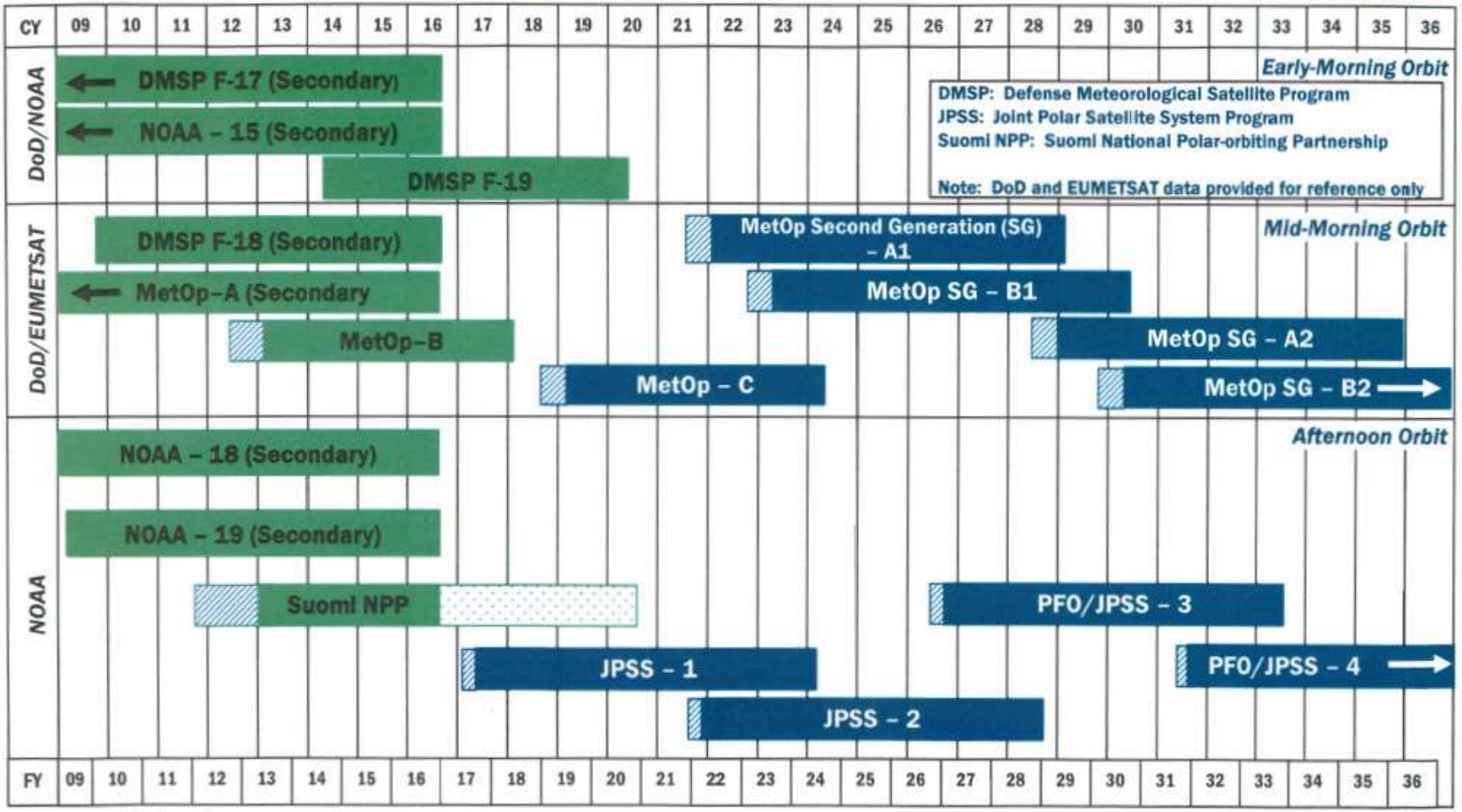
GOES-R

- To be launched on Nov. 4, 2016 at Cape Canaveral Air Force Station, Florida
- Currently the spacecraft has been shipped to Florida
- Cal/Val teams are ready
- The AHI data and collaboration with JMA has been very helpful
- NOAA is looking forward to the successful launch of GOES-R and the fruitful collaboration of CEOS and GSICS to support its mission

Images Courtesy: http://www.goes-r.gov/multimedia/roadToLaunch.html

NOAA & Partner Polar Satellite Programs
Continuity of Weather Observations

As of January 2016



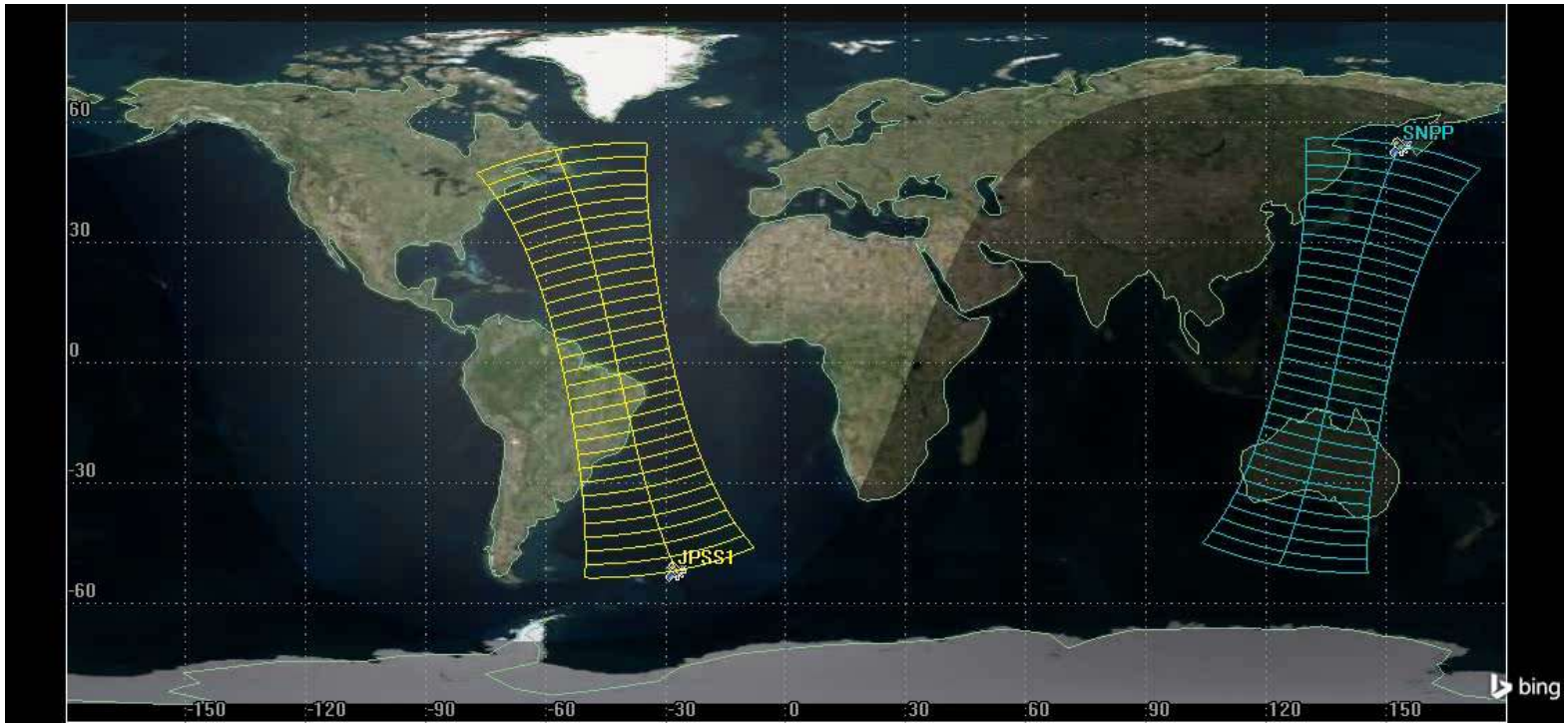
Approved: Stephen Volz

Assistant Administrator for Satellite and Information Services

Note: Extended operations are reflected through the current FY, based on current operating health.

- In orbit
- Post Launch Test
- Fuel-Limited Lifetime Estimate
- Planned Mission Life, from Launch Readiness Date
- Launched before Oct 2008
- Operational beyond Dec 2036

Getting Ready for J1



- Both J1 and SNPP on the same orbital plane
- Both have the same orbital equator crossing (~1:30 pm LTAN)
- ~50.75 mins separation: one is observing in day while the other is at night
- Ground track repeating cycle is 16 days for each, and 8 days when combined
- Improved temporal coverage (~50 mins interval around 1:30pm)

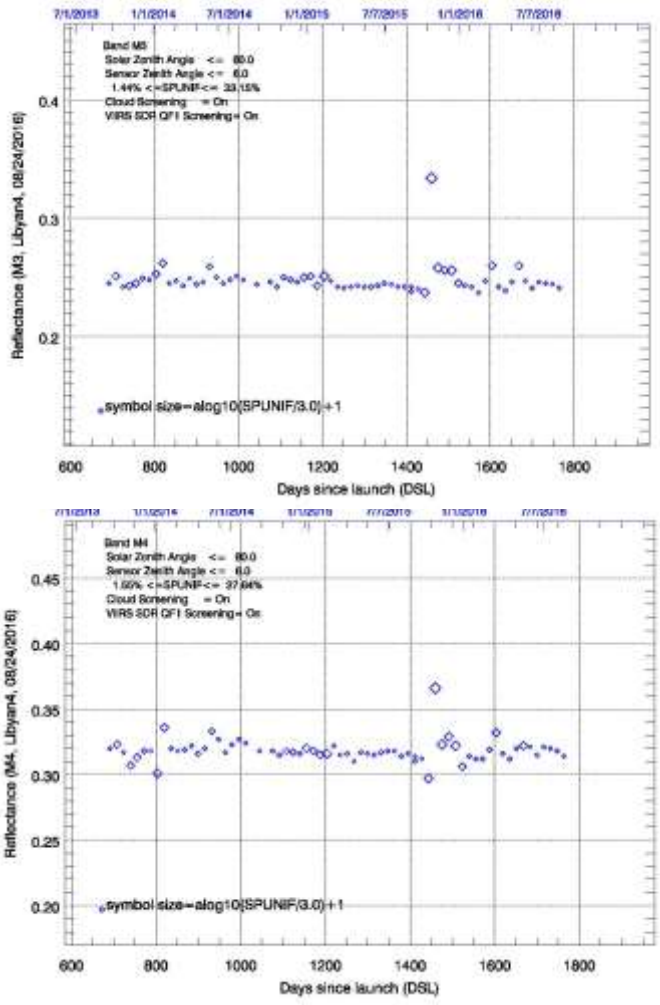
Support to WGCV PICS initiative

Actions:

1. Questionnaire: Action assigned to Sirish.Uprety@noaa.gov, will complete by the deadline (picscar@magellium.fr before September 20th, 2016)

2. Data collection:
   - NOAA collects VIIRS RSB band over Libya 4 regularly. However, earlier data after launch had artifacts due to calibration changes
   - Reprocessing will produce a more consistent time series over Libya 4; Reprocessing using Ocean Color (with lunar) LUTs may further improve stability
   - Preliminary comparisons with other VIIRS processing (such as NASA LandSIPS) was also done
   - Action assigned to Sirish.Uprety@noaa.gov and Wenhui.Wang@noaa.gov

3. NOAA will provide the Libya 4 data collection, and hope to get feedback through collaboration



http://ncc.nesdis.noaa.gov/VIIRS/VSTS.php

JPSS Annual Meeting Held at College Park, MD, Aug. 8-12, 2016

STAR JPSS 2016 Science Meeting
List of Sessions

	Monday August 8	Tuesday August 9			Wednesday August 10			Thursday August 11				Friday August 23
		Session 3:	Session 4:	Session 5:	Session 6:	Session 7:	Session 8:	Session 9:	Session 10:	Session 11:	Session 12:	
830 - 1000		VIIRS SDR (Aud)	ATMS + CrIS (Conf)	OMPS + Ozone (ESSIC)	Soundings (Aud)	Ocean Color (Conf)	Atmosphere (Aerosols, Clouds, Imagery) (ESSIC)	Land + Cryo (Aud)	SST (Conf)	Trace Gases (Sounders + OMPS) (Rm 2552)	GSICS (ESSIC)	Session 13: Users' Impacts (Aud)
			Break			Break			Break			Break
1030 - 1200		VIIRS SDR (Aud)	ATMS + CrIS (Conf)	OMPS + Ozone (ESSIC)	Soundings (Aud)	Ocean Color (Conf)	Atmosphere (ESSIC)	Land + Cryo (Aud)	SST (Conf)	Trace Gases (Sounders + OMPS) (Rm 2552)	GSICS (ESSIC)	Session 14: Wrap Up (Aud)
1200 - 1315			Lunch			Lunch			Lunch			
1315 - 1445	Session 1: Welcome & Opening Remarks (Aud)	VIIRS SDR (Aud)	ATMS + CrIS (Conf)	OMPS + Ozone (ESSIC)	Soundings (Aud)	Ocean Color (Conf)	Atmosphere (ESSIC)	Land + Cryo (Aud)	SST (Conf)	Trace Gases (Sounders + OMPS) (Rm 2552)	GSICS (ESSIC)	
1445 - 1530	Break		Poster 1			Poster 2			Poster 3			
1530 - 1700	Session 2: J1 Readiness (Aud)	VIIRS SDR (Aud)	ATMS + CrIS (Conf)	OMPS + Ozone (ESSIC)	Soundings (Aud)	Ocean Color (Conf)	Atmosphere (ESSIC)	Land + Cryo (Aud)	SST (Conf)	Trace Gases (Sounders + OMPS) (Rm 2552)	GSICS (ESSIC)	

Aud = NCWCP Auditorium **Rm 2552** = NCWCP Conference Room 2552-2553 (inside security perimeter) **Conf** = NCWCP Conference Center **ESSIC** = 5825 University Research Ct., Rm. 4102

VIIRS SDR reprocessing at NOAA

- Reprocessing is planned for all SNPP instruments; first priority is for the ATMS and CrIS sounders, then VIIRS and OMPS. Led by Fuzhong Weng

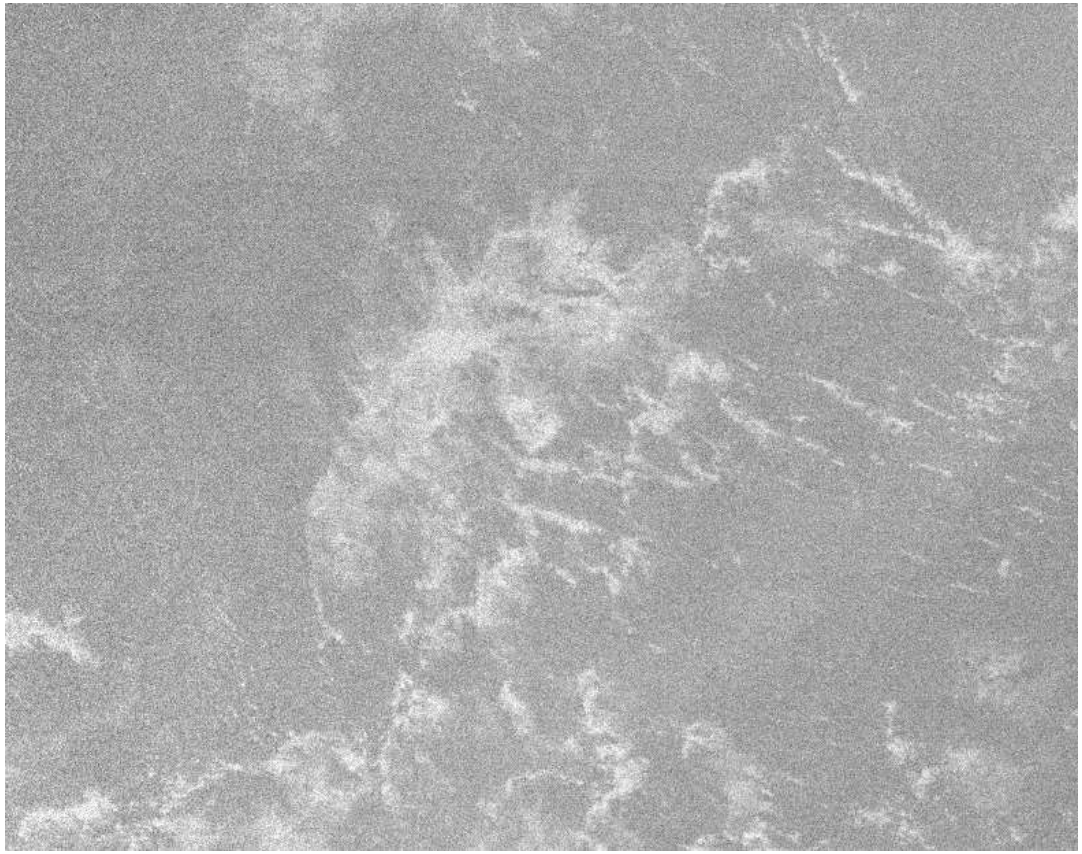
- For VIIRS, the initial one year of SNPP VIIRS SDR will be reprocessed by end of 2016

Improvement highlights in the reprocessing

- RSB band improvements
  - » The reprocessing LUTs will correct up to 1.5% sudden changes caused by sudden H-factor updates, C0=0 update, and F-fast track to RSBAutoCal LUT transition.
  - » The unstable initial calibration LUTs will be updated.
  - » Ocean Color group RSB F-factor LUTs with Lunar correction will be tested for their 0.1~0.3% radiometric uncertainty.
- TEB band improvements.
  - » SST bias and TEB F-factor changes during the blackbody Warm-Up Cool-Down (WUCD) will be resolved for the reprocessing.
- DNB band improvements
  - » Reprocessing LUTs will correct radiometric calibration errors up to 5%.
    - Caused by the initial calibration changes, RSR update, and lunar eclipse anomaly.
  - » The new bias (DN0) LUTs will improve bias errors.
    - Using the VIIRS Recommended Operation Procedure (VROP) 702.
  - » The new stray light correction LUTs will correct the contaminated scenes before August 2013.
  - » Terrain correction in geolocation will be applied to data before 2014.

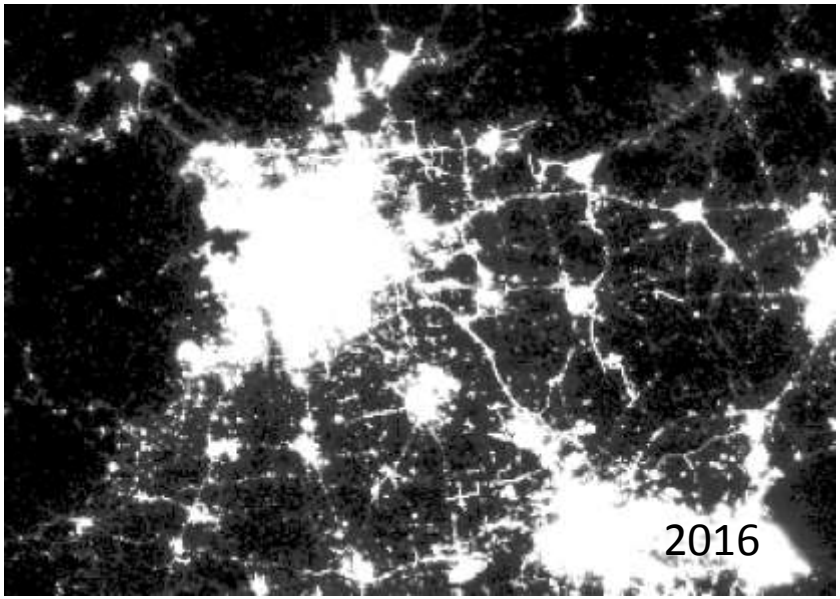
Dark Pacific Ocean for DNB calibration: How dark is dark?

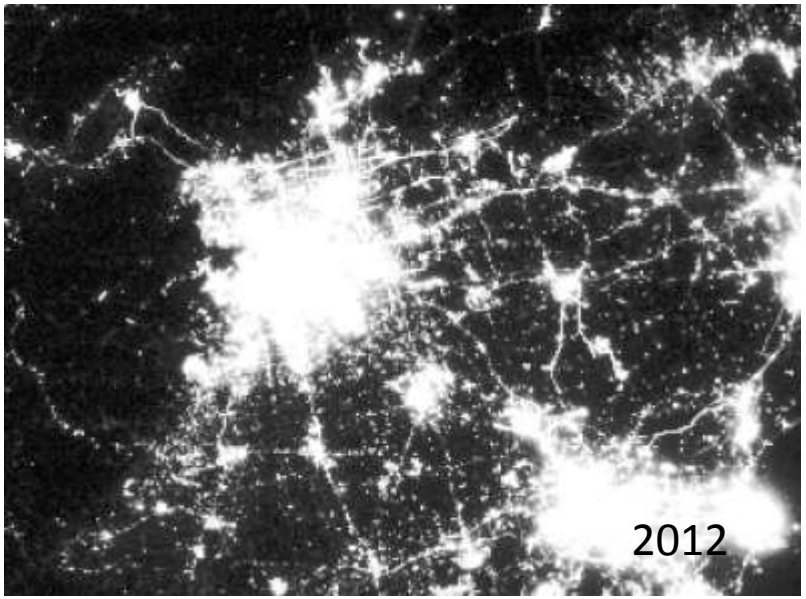
- VIIRS DNB dark offset is difficult to determine
- Even the darkest part of the ocean during new moon is not dark enough for DNB offset because of airglow
- Alternatives include using Blackbody but with increased complexity due to aggregation zones

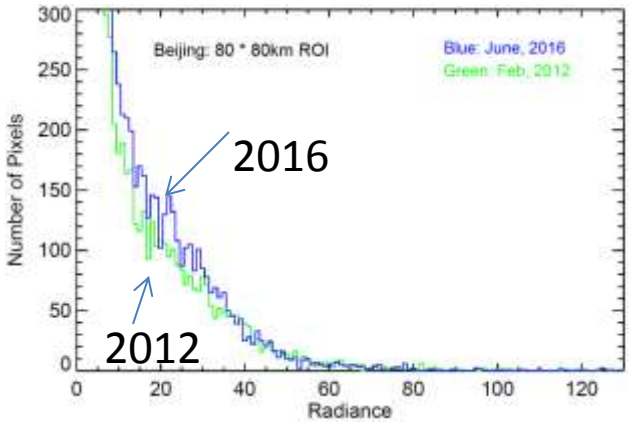


Hunting for the darkest place on earth.

Why Calibration Reanalysis is important? (Example of urban growth)



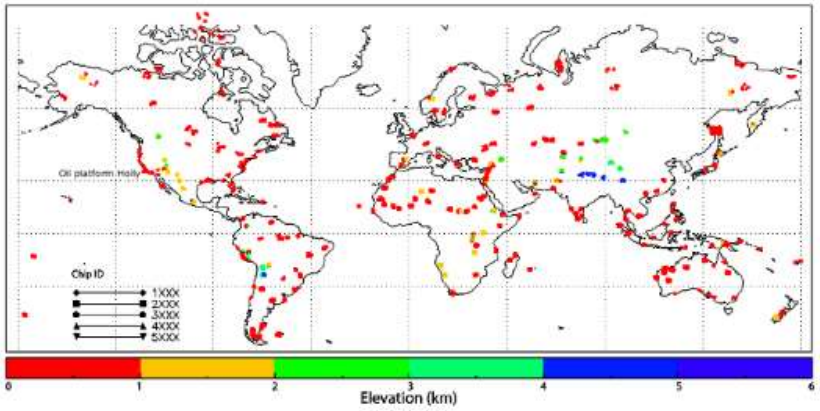


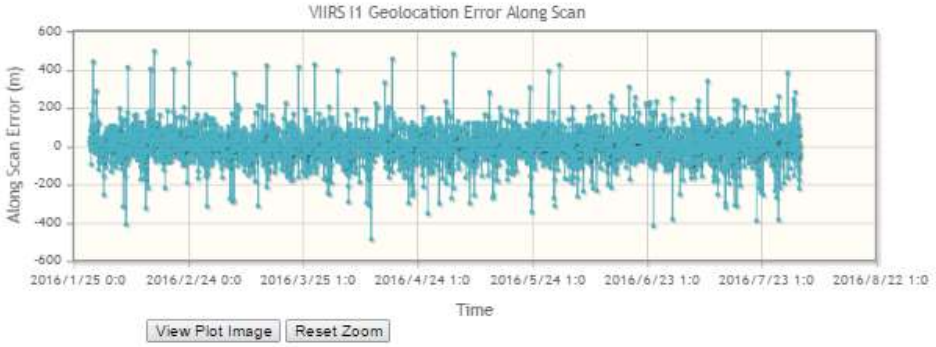


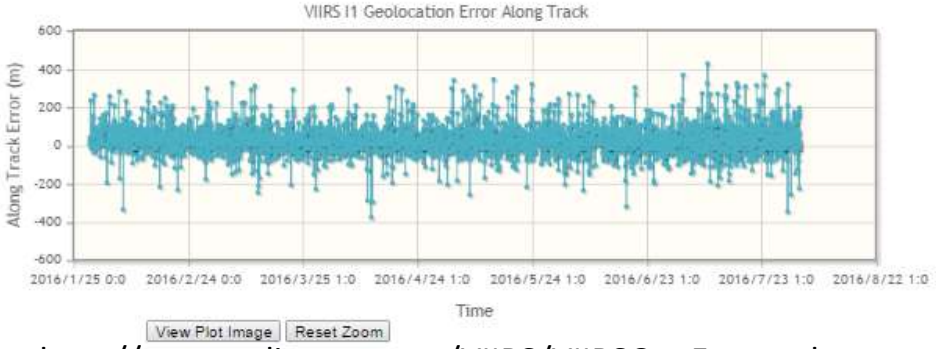
- Beijing metropolitan area growth can be studied using the VIIRS Day/Night Band
- Major changes in suburb areas are observed
- Overall the light is > 9% brighter than four years ago
- Major changes are at radiance levels about 20 nW/cm^2-sr
- However, the results highly relies on the calibration accuracy and consistency

Geolocation monitoring on the web

- Transitioned NASA Control Point Matching (CPM) capability
  - » Landmark based geolocation monitoring
  - » Landsat chips
  - » Running on STAR server
  - » Results automatically pushed to the web
- Added web interface and dynamic plotting
- Back-end DBMS support under testing







http://ncc.nesdis.noaa.gov/VIIRS/VIIRSGeoErrors.php

Summary

- GOES-R launch readiness
- VIIRS Reprocessing
  - » Calibration improvements in both RSB and TEB
  - » Scientists continue to explore the new capabilities of the DNB
- J1 ground process software testing in progress
- NOAA is supporting CEOS/WGCV PICS initiative
- Continue collaborating with GSICS
- S-NPP instruments are monitored in near real-time.
  - » NOAA Integrated Cal/Val System (ICVS) site at http://www.star.nesdis.noaa.gov/icvs/status_NPP_VIIRS.php
  - » Calibration information available at: http://ncc.nesdis.noaa.gov/VIIRS/index.php