NOAA
National Satellite and Information Service

June 22nd, 2022

NOAA JPSS Products Update for CSPP Users

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Deputy Manager, Data Product Management & Services (DPMS)

Contributions from Bonnie Reed, S. Kalluri, M. Goldberg, L. Dunlap, A. Young, X. Liu, I. Guch, M. Divakarla, JPSS Data Products and Management Services (DPMS), JSTAR Science Team Leads & Members, are thankfully acknowledged

Outline

- JPSS Products Updates - JPSS-2 Prelaunch Readiness
- JPSS-2 Postlaunch Cal Val Maturity Timeline
- SNPP data flow post JPSS-2 operation
- Status of JPSS Reprocessing
- Lessons learned from SNPP/NOAA-20 applied to JPSS-2
- Summary

Latest Updates on JPSS-2

Satellite during TVAC preparations

Key Program Reviews:

- 05/02-04…JPSS-2 Flight Operation Readiness (FOR) review: The board affirmed readiness to proceed with completely green status across the board; No Requests for Action (RFAs) or advisories were received
- 08/01-04…JPSS-2 Pre-Ship Review (PSR)/Operational Readiness Review (ORR)

Prelaunch Testing - Joint Capability Testing (JCT):

- 05/10-13…JCT3-TVAC Segment 1
- 05/17-19…JCT3-TVAC Segment 2
- 05/25-26…JCT3-TVAC Segment 3
- 06/28 (TBC) … JCT3-TVAC Data System Event

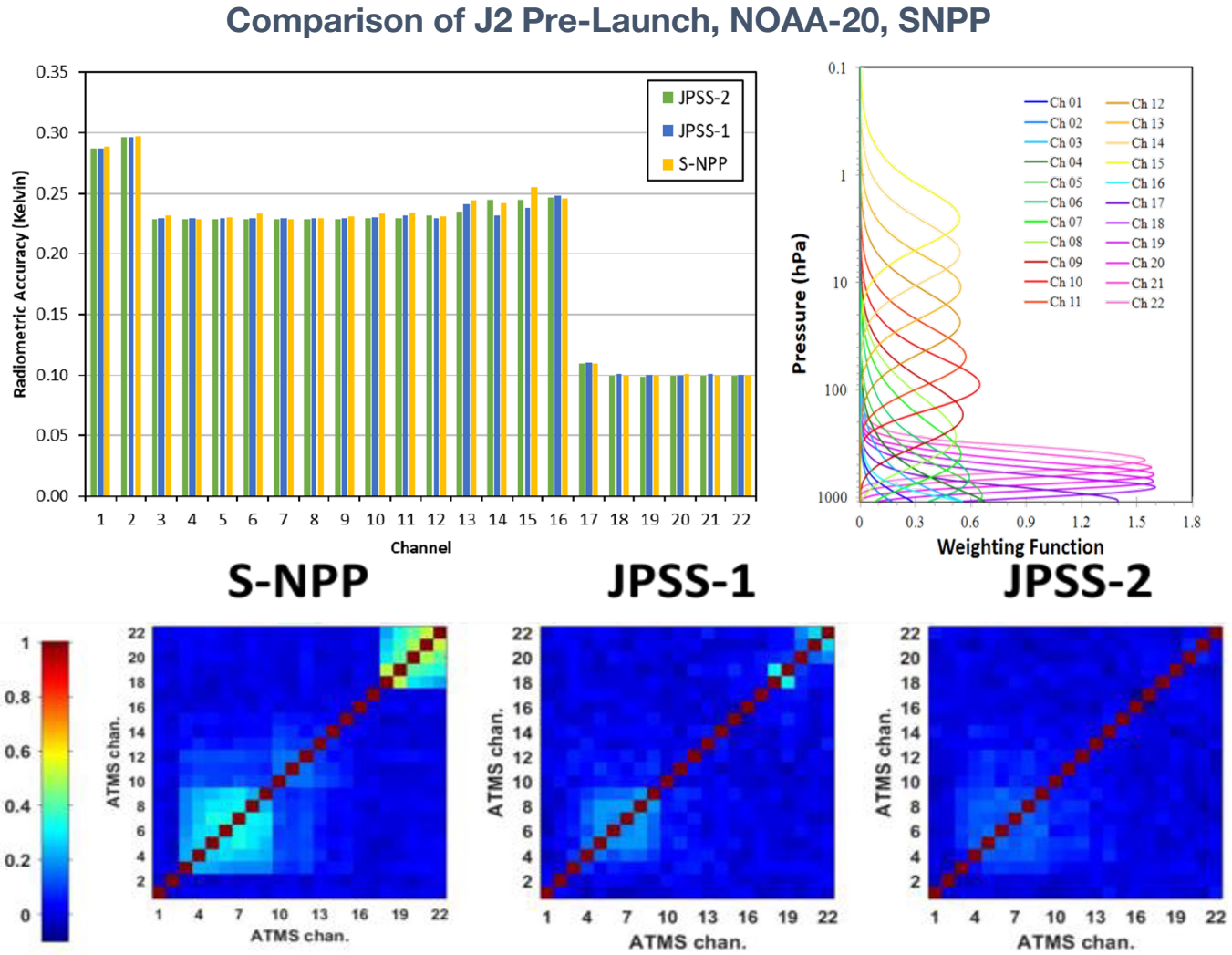
Prelaunch Builds (Mx7):

- 07/18…Mx7 TTO: The VIIRS science team evaluated the VIIRS SDR geolocation products produced with J2 S/C Diary (10 Hz) in regression testing and confirmed the geolocation products look good.

JPSS-2 Launch Readiness Date (LRD): ~11/01

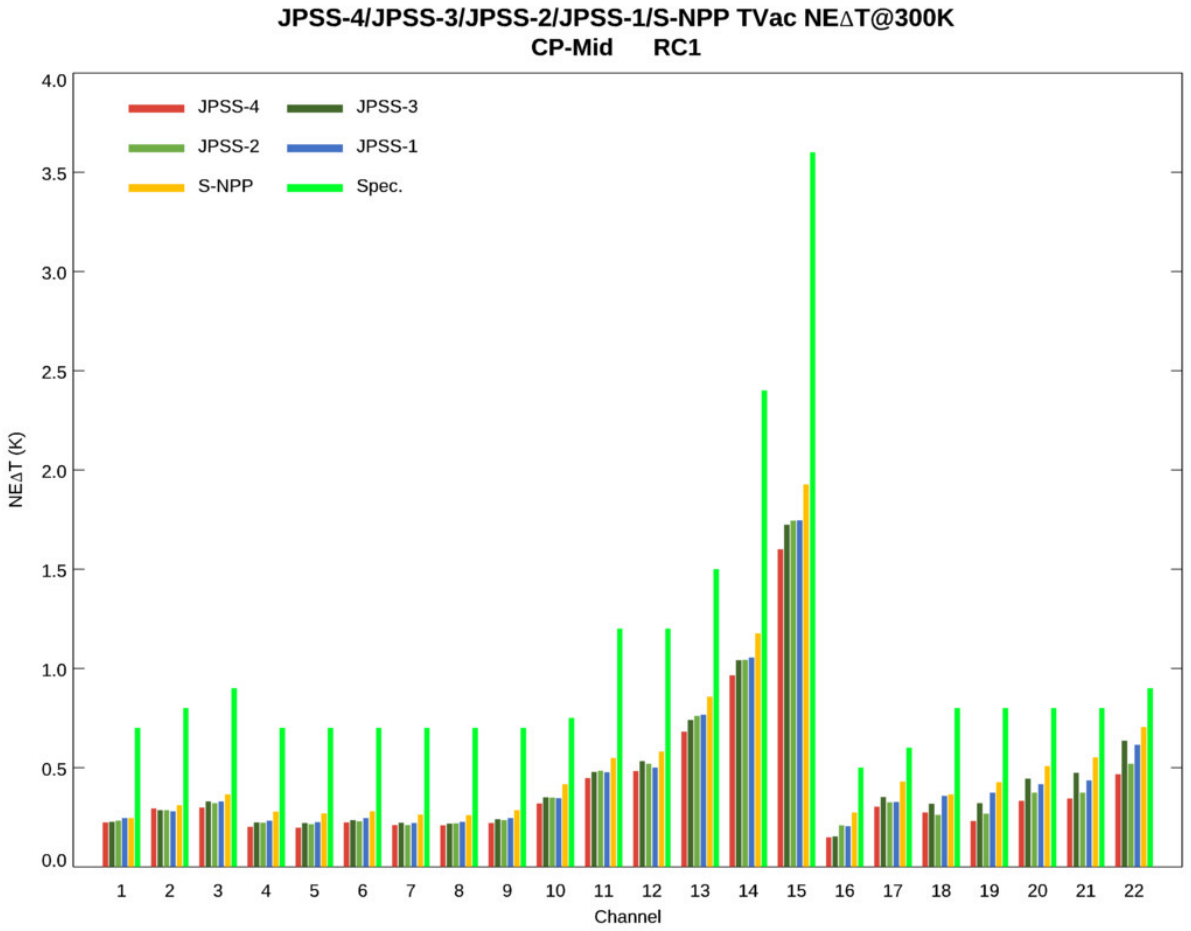
JPSS-2 Updates: Advanced Technology Microwave Sounder (ATMS)

	S-NPP/NOAA-20/JPSS-2 ATMS
Channels	22 channels in bands from 23 GHz through 183 GHz are included
Spatial Resolution	For ch1,2: 74.8 km; Ch3-16: 31.6 km; ch17-22: 15.8 km at Nadir
Operational Products	Global: SDRs, TDRs, Input for MIRS EDRs T(z), q(z), RR, TPW, CLW, SnowC, SWE, SIce, IWP, SEM, LST, RWP etc. & input for NUCAPS for T(z), q(z), cloud
Experimental/ Research	Collocated VIIRS and ATMS data; Using overlapping for better spatial resolution
J2 Updates	• Delivered ATMS antenna reflector emission correction algorithm code and processing coefficients table • Delivered J2 ATMS prelaunch evaluation report for pre-ship review (PSR) • Derived J2 ATMS calibration processing coefficients table (PCT) • Delivered ATMS calibration lunar intrusion mitigation algorithm updated code/PCT for operation • A better accurate and stable NEΔT estimate
POC(s)	Quanhua.Liu@noaaa.gov, ninghai.sun@noaa.gov

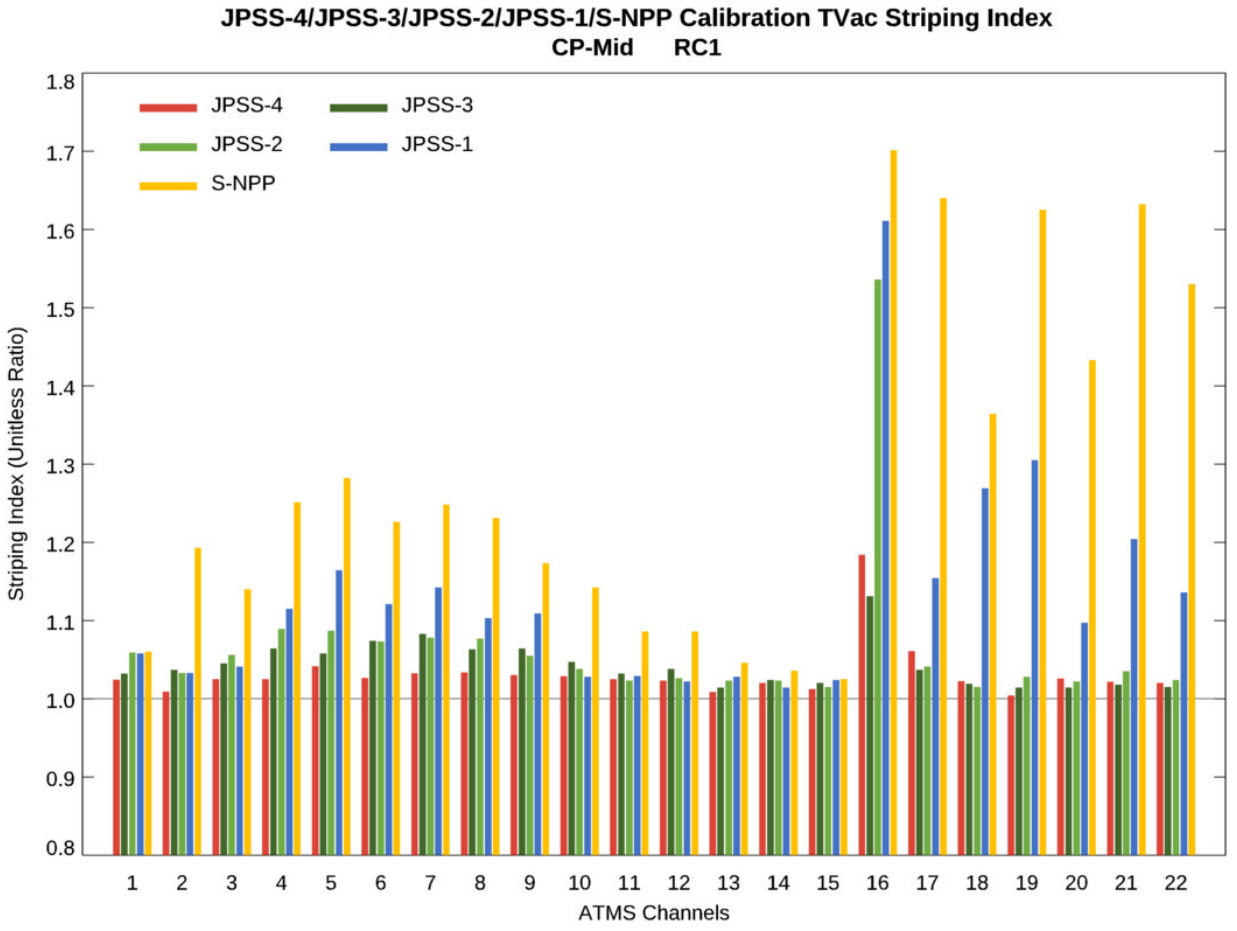


Example of SNPP ATMS analysis showing large channel noise inter-correlation that degrades application performances. NOAA-20 ATMS intercorrelation is reduced. J2 ATMS inter-correlation is further improved, particularly for water vapor channels (Ch. 18 – 22).

JPSS Updates: Advanced Technology Microwave Sounder (ATMS)



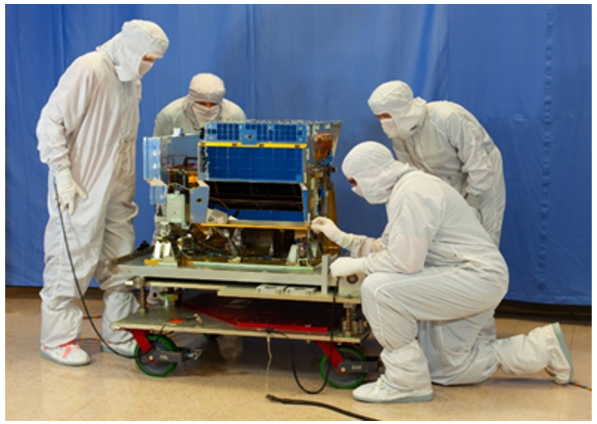
Comparison of 22 channel NEΔT of all JPSS builds indicating all channels meet the design requirement and improved channel sensitivity in future JPSS ATMS builds are expected



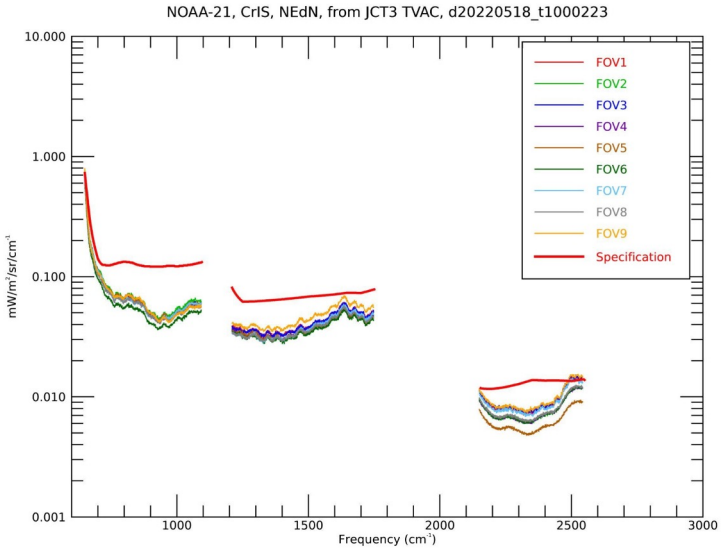
Comparison of 22 channel striping indices of all JPSS builds indicating a reduced channel striping effects in J2/3/4 ATMS

JPSS-2 Updates: Cross-track Infrared Sounder (CrIS)

	S-NPP/NOAA-20/JPSS-2 CrIS
Channels	1305 (normal resolution) or 2211 (full spectral resolution)
Spatial Resolution	14.0 km (CrIS SDRs), 50 km Field of Regard (FOR) EDR products
Operational Products	Global: T(p) (AVTP), q(p) (AVMP), O3(p), CO(p), CH4(p), CO2(p), SO2(p), HNO3(p), N2O(p), OLR, SO2 Flag for Volcanic Activity.
Experimental/ Research	CrIS Principal Component Scores
J2 Updates:	• JPSS-2/CrIS instrument Preship-Review (PSR) performed in April 2020. • Successfully Transitioned the CrIS Polarization Correction into Operations on January 29, 2020. • Reviewed and Analyzed J2 CrIS TVAC data and planned for J2 algorithms updates. Details have been reported during the J2 CrIS Algorithm Update Review on June 16, 2020. • Delivered the J2 CrIS Pre-launch Sensor Characterization Report and the final of J2 CrIS Cal/Val Plan in July and Dec. 2020, respectively. • Joint Compatibility Test (JCT)-3 TVAC successfully completed in May 2022 .
POC(s)	flavio.iturbide@noaa.gov



The JPSS-2/CrIS Instrument. Courtesy of Harris Corporation



JPSS-2 CrIS JCT3 TVAC Noise Performance in May 2022.

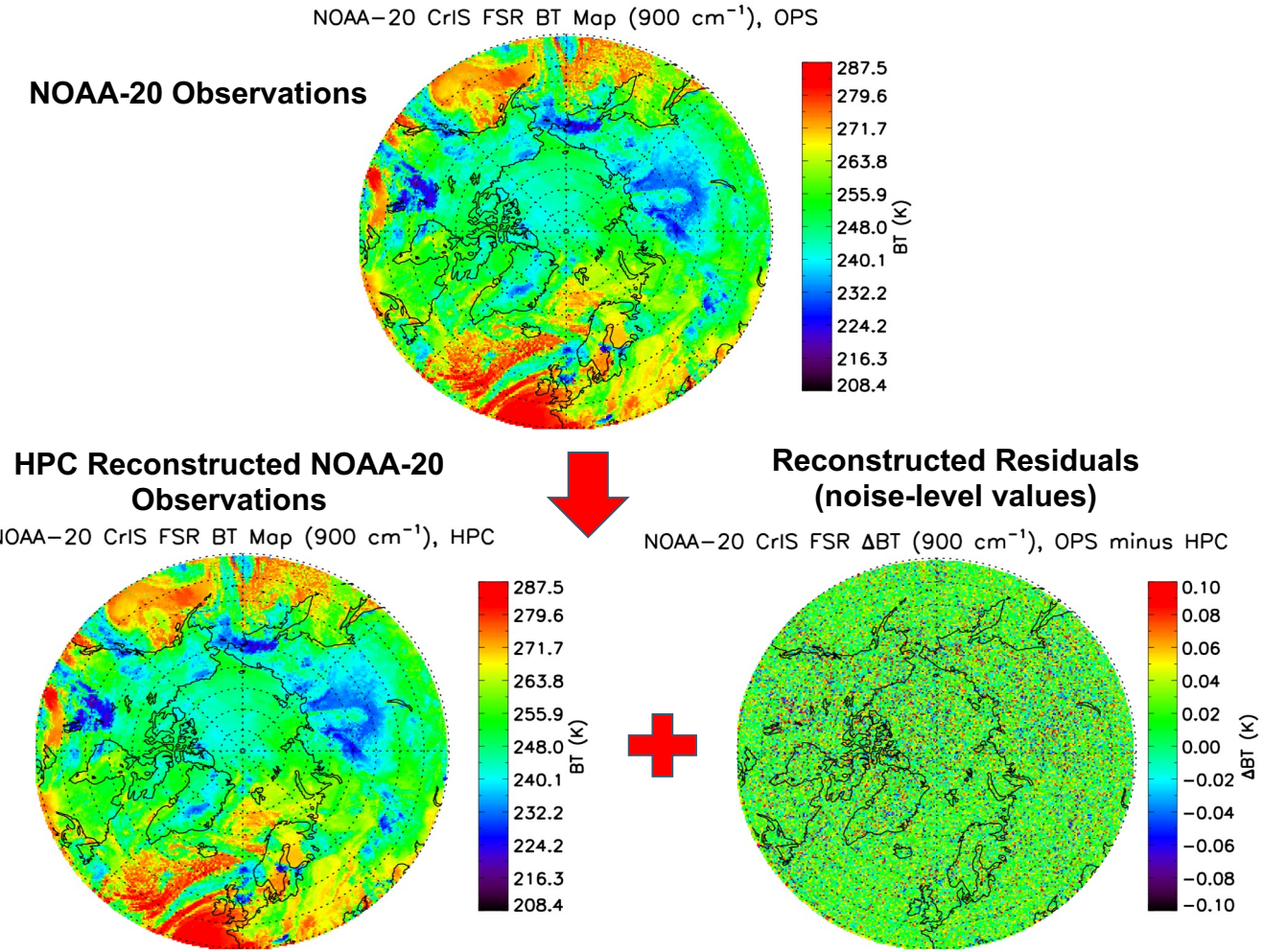
The JPSS-2 CrIS NEdN of the TVAC segment-2 on 18 May 2022 is **nominal and meet requirements**.

Note: NSR CrIS Data terminated on November 2nd, 2020.

The CrIS Principal Component Scores Project

This project aims to demonstrate:

- The application of the Hybrid Principal Component (HPC) compression technique to optimally reduce the data volume and random noise of CrIS radiance spectra.
- Operationalization of the CrIS HPC data in the cloud environment.
- Efficient dissemination and exploitation of the information content of the next generation of NOAA LEO/GEO hyperspectral observations, including the Infrared Sounders from the GoeXO and LEO Program with increased data rates.



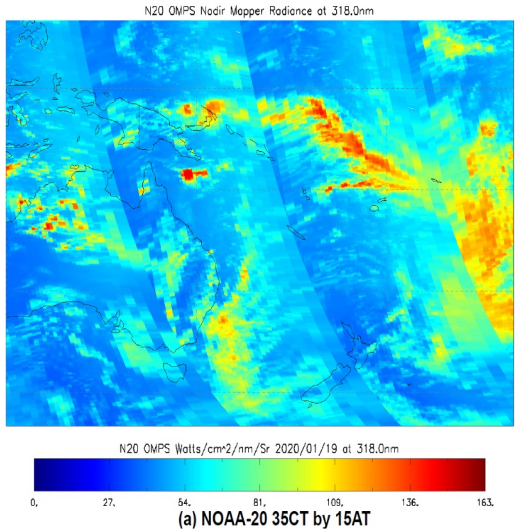
(Top) NOAA-20 CrIS Observations. (Bottom) NOAA-20 CrIS HPC reconstructed observations (Bottom-left) along with reconstructed residuals (Bottom-right) over north pole for 14 Dec 2021. The application of HPC compression is expected to provide significant data compression (more than one order of magnitude).

JPSS-2 Updates: Ozone Mapping & Profiler Suite (OMPS)

	S-NPP/NOAA-20/JPSS-2 OMPS
Channels	NM 300-380nm, 420nm NP 250-310nm
Spatial Resolution	OMPS-TC: (50 x 50 km^2, S-NPP), 17 x 17 km^2, J1); OMPS-NP (250 x 250 km^2, SNPP) 50 km x 250 km,J1)
Operational Products	NM: TO3, UVAI, Total Column SO2; Daily, Global, and Regional ; NP- Ozone Profiles: Global, Daily, Regional; S-NPP LP: ozone limb product, stratospheric aerosol products.
Experimental /Research	NM: Total Column and Tropospheric NO2
J2 Updates	• The return of the Limb Profiler sensor enables more detail about the vertical distribution of ozone in the upper atmosphere • **Nadir Mapper horizontal resolution increase to 10 km x 12 km**
POC(s)	Banghua.Yan@noaa.gov

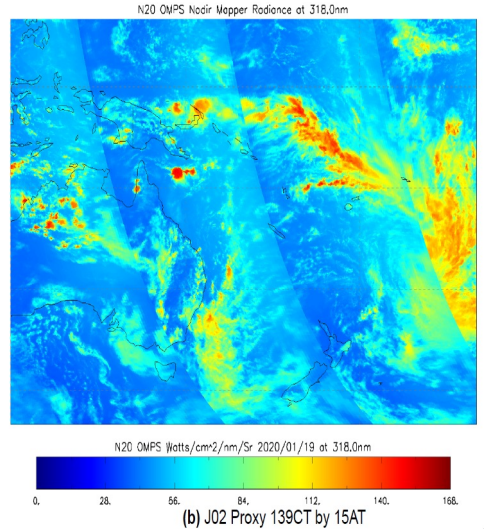
Demonstration of two spatial resolutions for NOAA-20 and J02 (proxy data) NM at 318 nm

(a) 35CT (NOAA-20 50km)



(a) NOAA-20 35CT by 15AT

(b) 139CT (12.6km) (J2 Proxy)

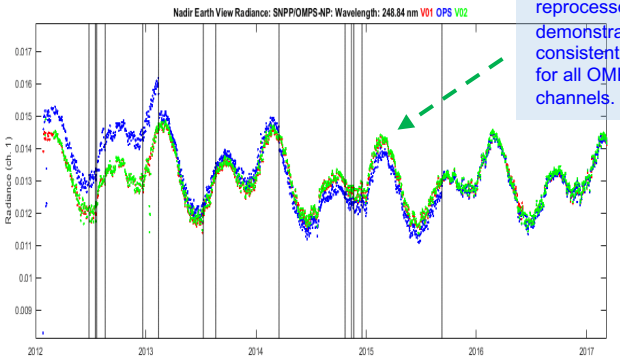


(b) J02 Proxy 139CT by 15AT

Science-quality consistent lifetime SNPP OMPS NM and NP SDR datasets

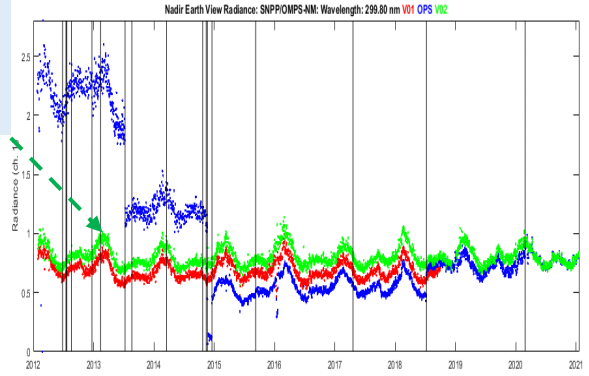
(Data are archived in the CLASS)

(a) LT Time Series of SNPP OMPS NP Nadir Radiance at 147 Channels (Tropical Region; Animated Time Series)



The newly (v02) (green) reprocessed data demonstrate a quality-consistent LT performance for all OMPS NM and NP channels.

(b) LT Time Series of SNPP OMPS NM Nadir Radiance at 196 Channels (Tropical Region; Animated Time Series)



JPSS-2 Updates: VIIRS SDR and Imagery EDR

JPSS-2 VIIRS Spectral Response Functions Released

The VIIRS SDR team has been working closely with the NASA JPSS flight project analyzing prelaunch test data and released JPSS-2 spectral response functions (SRF), available at https://ncc.nesdis.noaa.gov/NOAA-21/J2VIIRS_NOAA21_SpectralResponseFunctions.php.

Figures compare J2 and NOAA-20 VIIRS SRFs. They match well overall, except relatively larger differences in bands M9 (cirrus/cloud Cover) and M13 (active fire)

VIIRS SDR lead
Changyong.Cao@noaa.gov

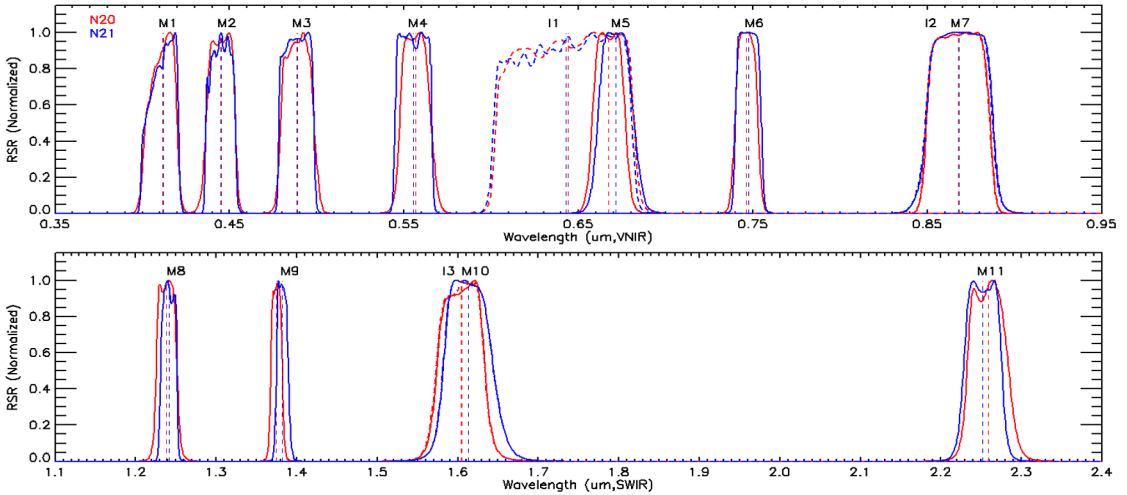
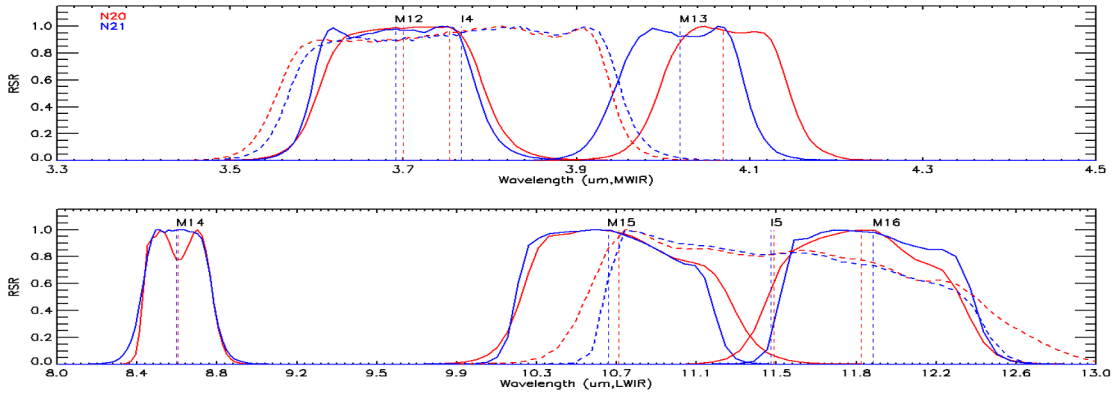
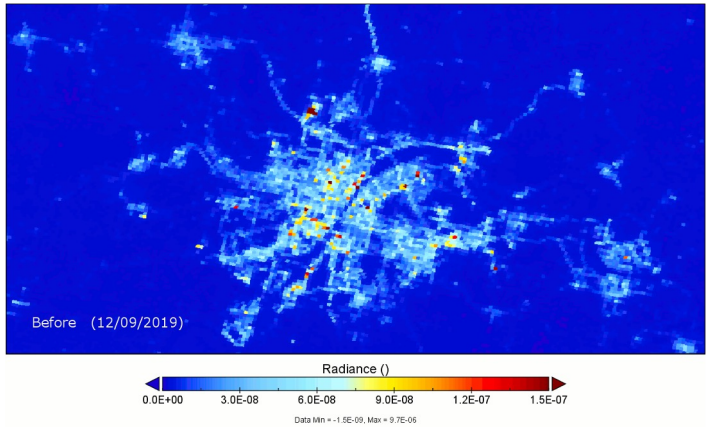


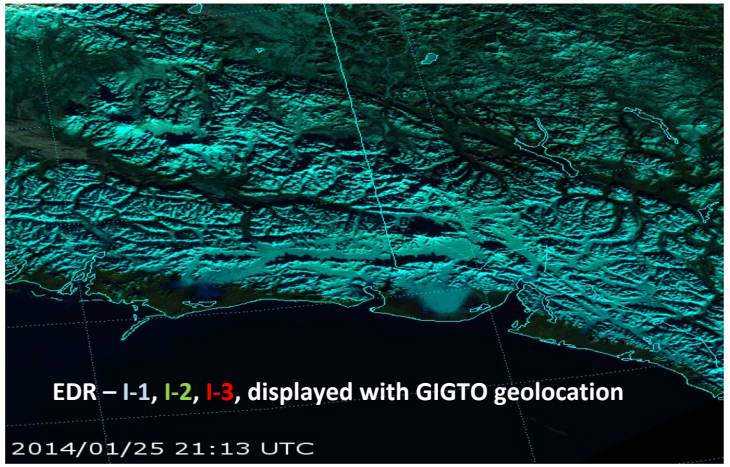
Figure 1. Comparison of NOAA-21 (N21, blue) and NOAA-20 (N20, red) VIIRS solar band Spectral Response functions



Comparison of NOAA-21 (N21, blue) and NOAA-20 (N20, red) VIIRS thermal band Spectral Response functions

COVID-19 Impacts Analysis using VIIRS/DNB (Wuhan lockdown)





Imagery EDRs Terrain Correction (TC) has been implemented in operation
Imagery Lead: Don.Hillger@noaa.gov

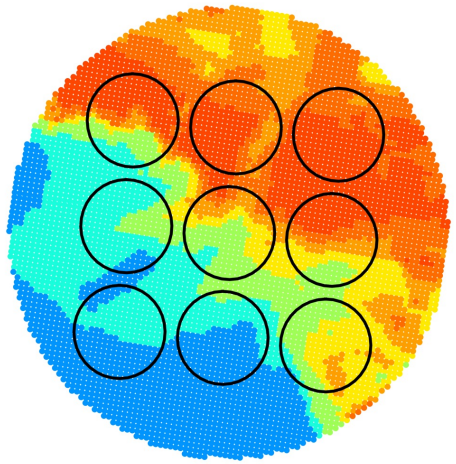
VIIRS Updates for CSPP Users

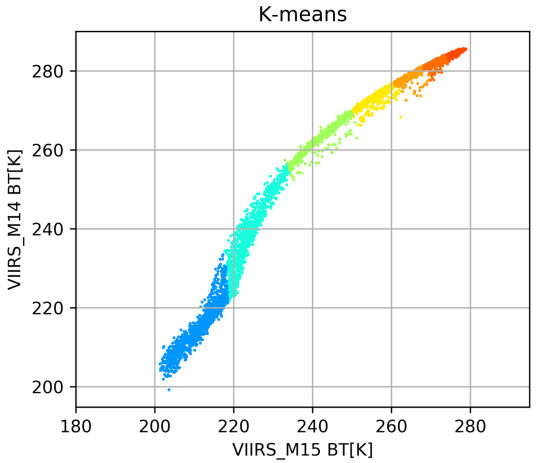
- JPSS-2 VIIRS SDR launch-ready LUTs successfully tested in IDPS and with ADL using the satellite TVAC data
  - DNB stray light not expected: no "poor" quality flagging
  - M6 "rollover" not present: QA-V2 LUT to be updated before launch to avoid unnecessary "out-of-range" flagging
  - Code change planned for Mx8: remove reflective solar bands radiance and reflectance substitution with excessive values for pixels flagged as "saturated”
  - code change "474-CCR-22-5939 VIIRS Verified RDR Algorithm Code Update - ADR 9903" that is currently under review and testing - This code change is mainly for supporting the CSPP users, to address a direct broadcast VIIRS RDR processing anomaly.

VIIRS Radiance Cluster Analysis within CrIS

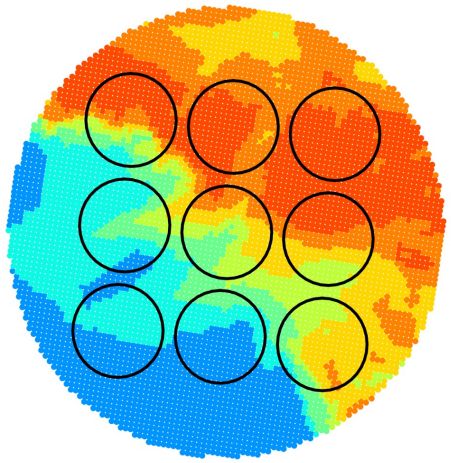
Supporting NWP Data Assimilation

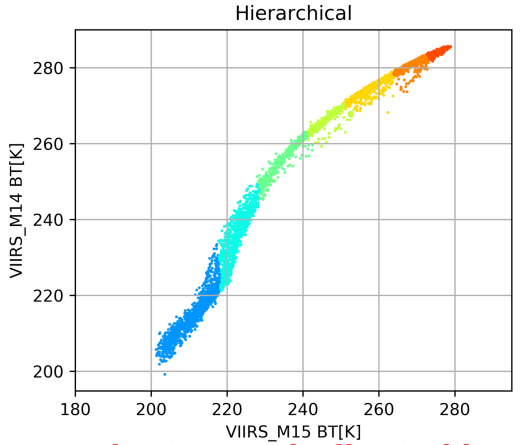
- An accurate and fast collocation method to collocate VIIRS measurements within CrIS FOV directly based on the line-of-sight (LOS) pointing vectors is developed.
- To help NWP model data assimilation, we implemented VIIRS radiance cluster analysis within the CrIS FOV to characterize its scene homogeneity.
- The data are saved as BUFR data and ready to release to the community for testing – one day's worth of test data is sending to users this week





The results are very similar, while details are a little different





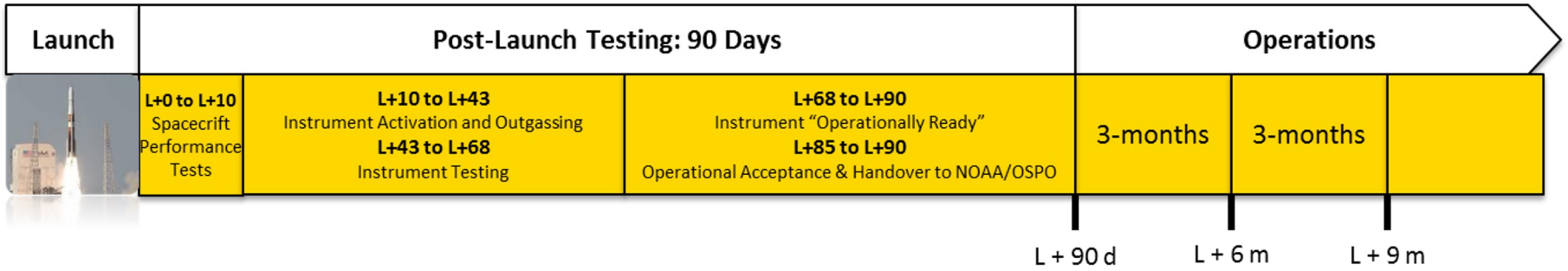
7 clusters, the pixels in the same cluster are indicated by the same color

- CrIS uses **K-means clustering**
  - centroid-based clustering
  - Need a fixed number (k) of the cluster
  - Fast
- IASI uses **Hierarchical clustering**
  - Connectivity-based clustering
  - Need to build hierarchical tree structures
  - Slow

Many Thanks to the JSTAR Science Teams

JPSS-2/NOAA-21 Post Launch Cal Val Tasks & Timeline (first 90 days)

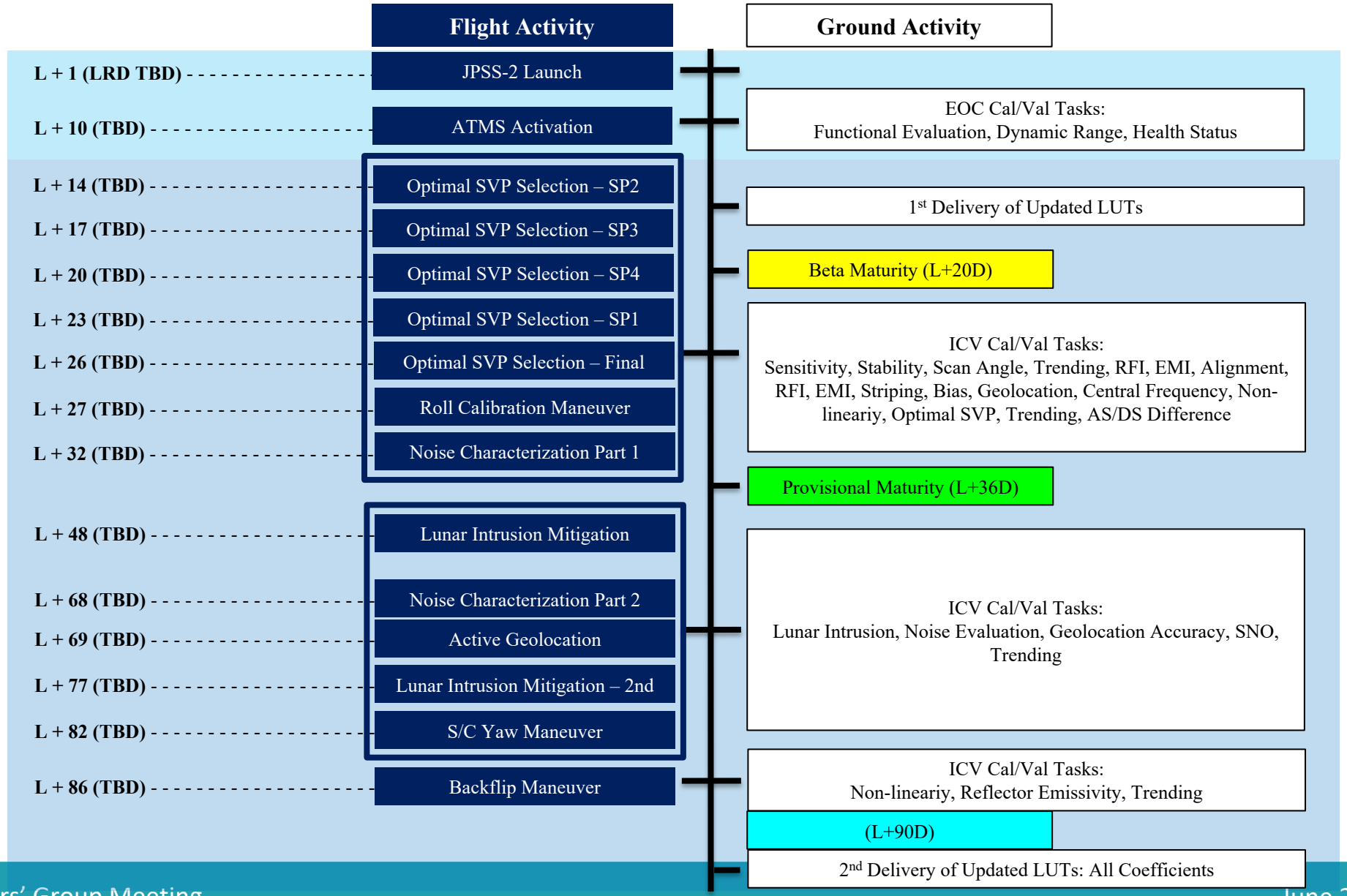
JPSS-2 KPPs Cal/Val Timeline



ATMS	L+11: Initial Power-On	**L+20: Beta** RDR/SDR Check	**L+36: Provisional** TDR to SDR Conversion; TDR/SDR Bias Char; Geo Accuracy Eval; PCT update as needed	**L+6M Validated**
CrIS	L+12: Initial Power-On L+12 to L+43: Outgassing L+43: Door Deploy	**L+68: Beta** RDR/SDR Check; Upload EngPkg	**L+90: Provisional** Data Pattern Verify; Geo Check; Noise Char; Uncertainty Upload EngPkg	**L+9M Validated**
VIIRS	L+10: Initial Power-On L+10 to L+43: Outgassing L+24: Nadir Door Open; L+45: Cryoradiator Door Open	**L+60: Beta** RDR/SDR Check; DNB aggregation mode Verify; Geo Accuracy; Noise and SNR analy	**L+90: Provisional** Lunar Cal; LUTs update	**L+6M Validated**
OMPS	L+10: Initial Power-On L+10 to L+44: Outgassing L+44: Diffuser Wheel Open	**L+68: Beta** RDR/SDR Check; Dark Cals; Solar Cals; EV Co-location Tests; Noise Char	**L+90: Provisional** Weekly Dark Cals; Bi-Weekly Soloar Cals; LUTs update	**L+9M Validated**
Imagery	L+10: Initial Power-On L+10 to L+43: Outgassing L+24: Nadir Door Open; L+45: Cryoradiator Door Open	**L+70: Beta** Verify requirement; Verify spatial resolution;	**L+90: Provisional** Analyze Imagery quality; Determine striping, banding, noise	**L+9M Validated**

Pre-Beta Beta Provisional Validated

JPSS-2 ATMS SDR Cal/Val Timeline



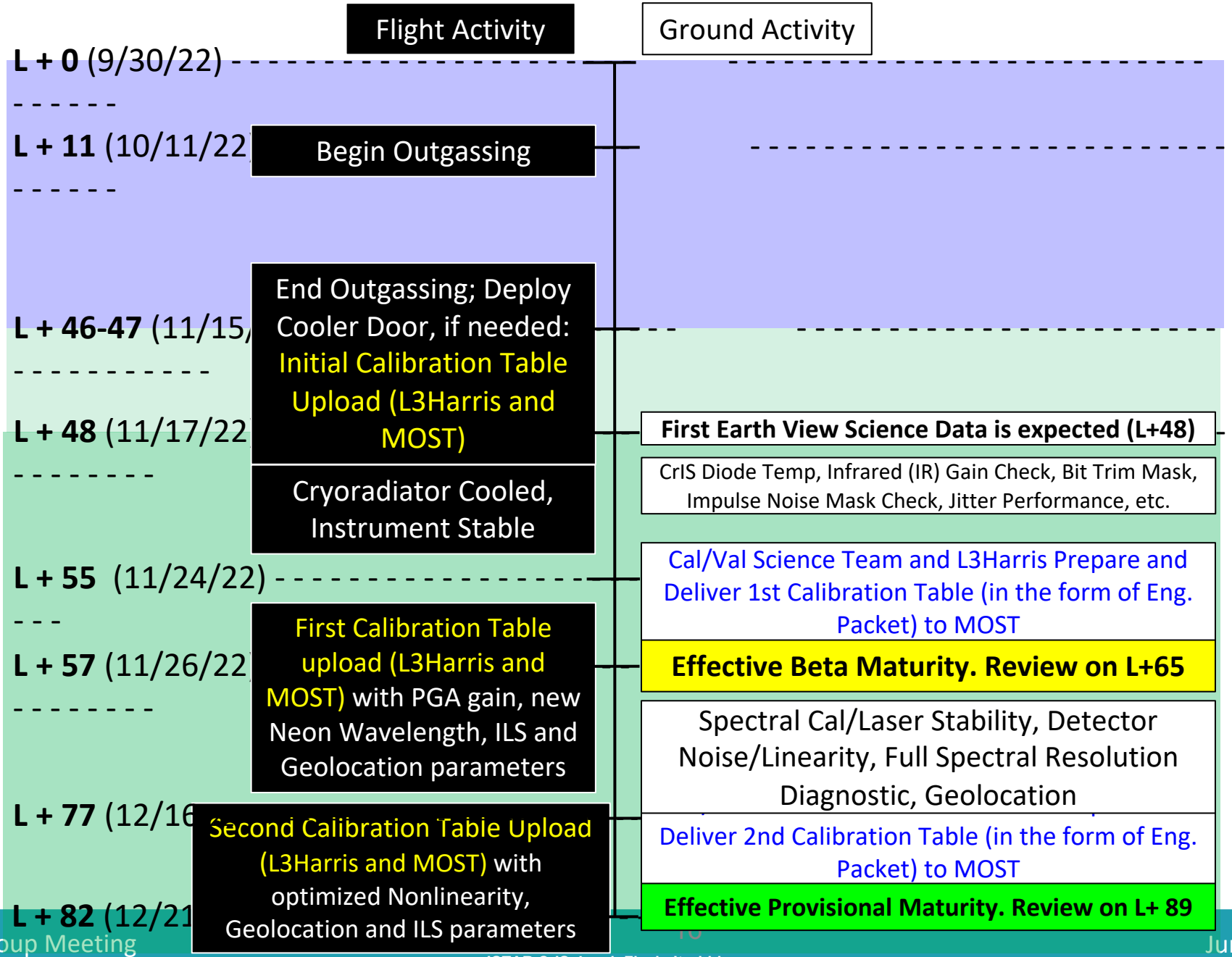
JPSS Updates: Advanced Technology Microwave Sounder (ATMS)

JPSS-2 ATMS Post-launch Cal/Val Tasks

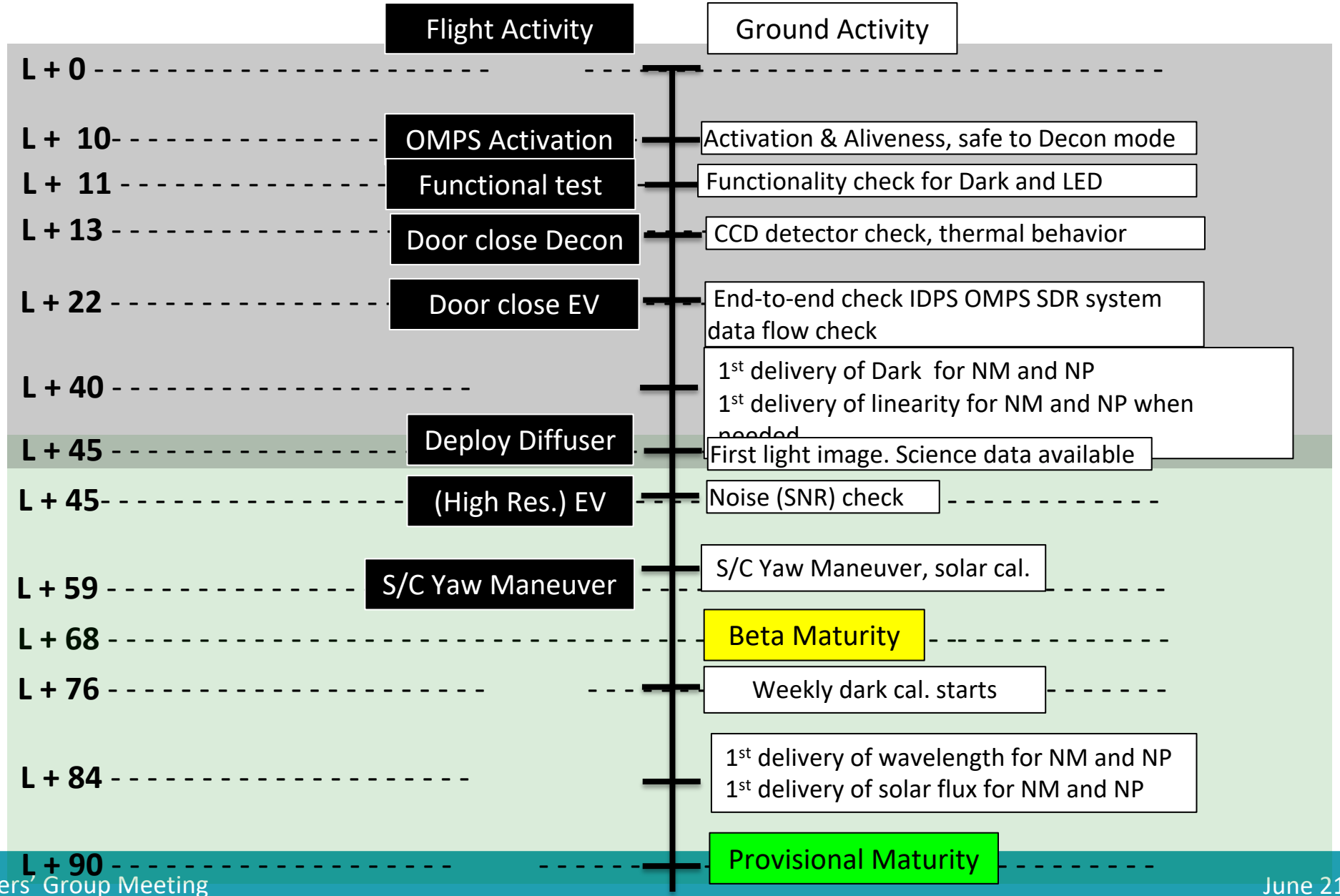
Task #	Title	Task #	Title	Task #	Title
1*	Proxy Instrument Data	12	Spatial Resampling Assessments	23	Central Frequency Stability Assessment
2*	Independent Analysis of TVAC Data	13	Optimal Space View Selection	24	Point and Stare Data for Gain Fluctuation Assessment
3*	Analysis of Antenna Pattern Data	14	Temperature Stabilization	25	Pitch Maneuver Analysis
4*	Analysis of Spectral Response Function	15	Radiometric Sensitivity Evaluation	26	TDR to SDR Conversion Analysis
5	Parameter Trending	16	Striping Analysis and Noise Evaluation	27	Terrestrial and Direct TV Sources RFI Detection
6	Functional Evaluation	17	GPS-RO Bias Characterization	28	Effective Field of View
7	Dynamic Range Evaluation	18	NWP Bias Characterization	29	SDR Validation
8	EMI From Spacecraft Transmitter	19	SNO Bias Characterization	30	Polarization Response Angle
9	Digitization Artifacts	20	Lunar Intrusion Evaluation	31	Warm Load and Space View Bias
10	Scan Angle Evaluation	21	Geolocation Verification and Correction	32	NUCAPS/MiRS Convergence
11	Continuous Sampling Mode	22	Instrument to Spacecraft Alignment		

*** Pre-launch analysis tasks**

JPSS-2 CrIS Cal/Val Timeline



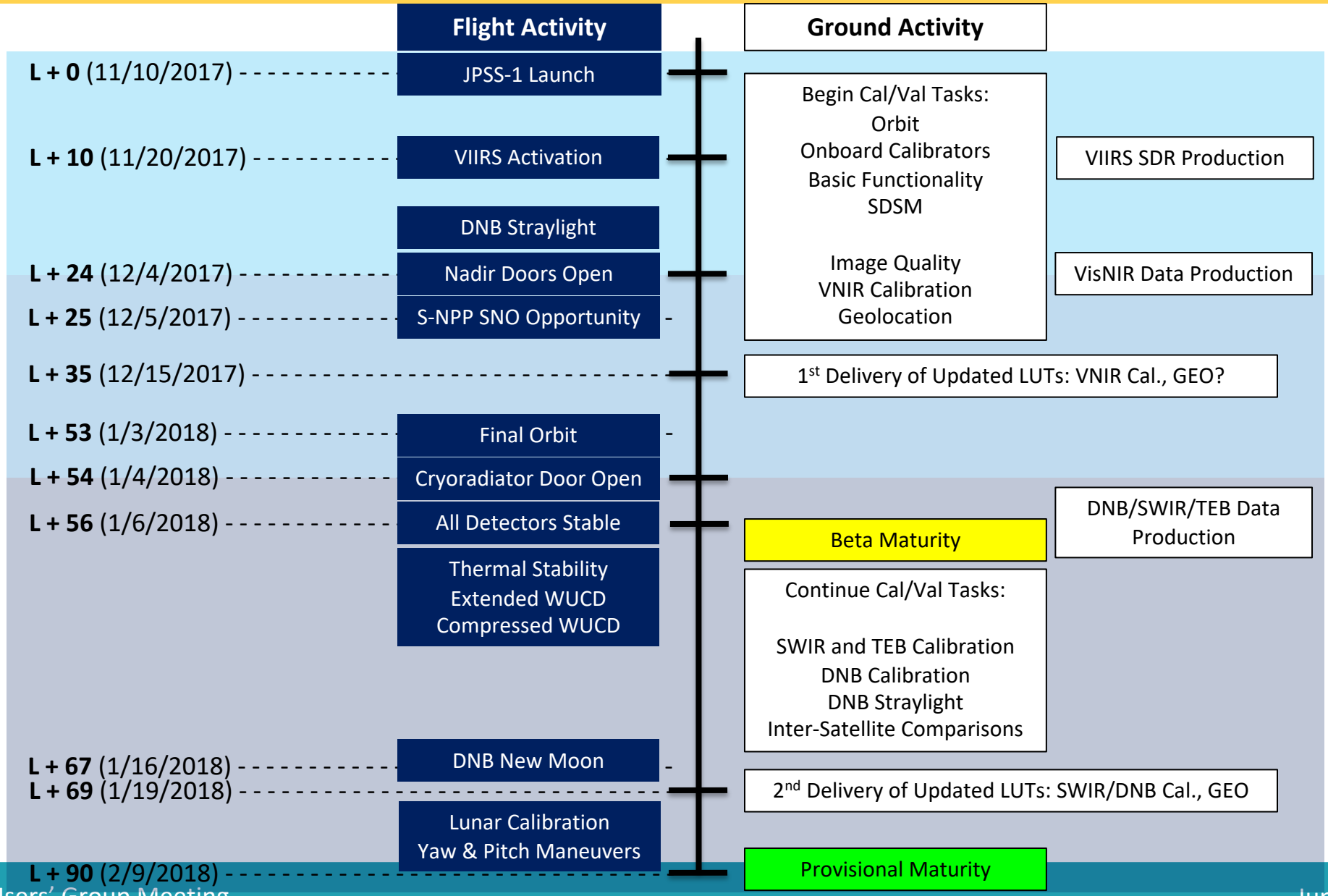
JPSS-2 OMPS PLT Timeline*



* PLT schedules are subject to changes of the J2 NASA OMPS PLT schedules

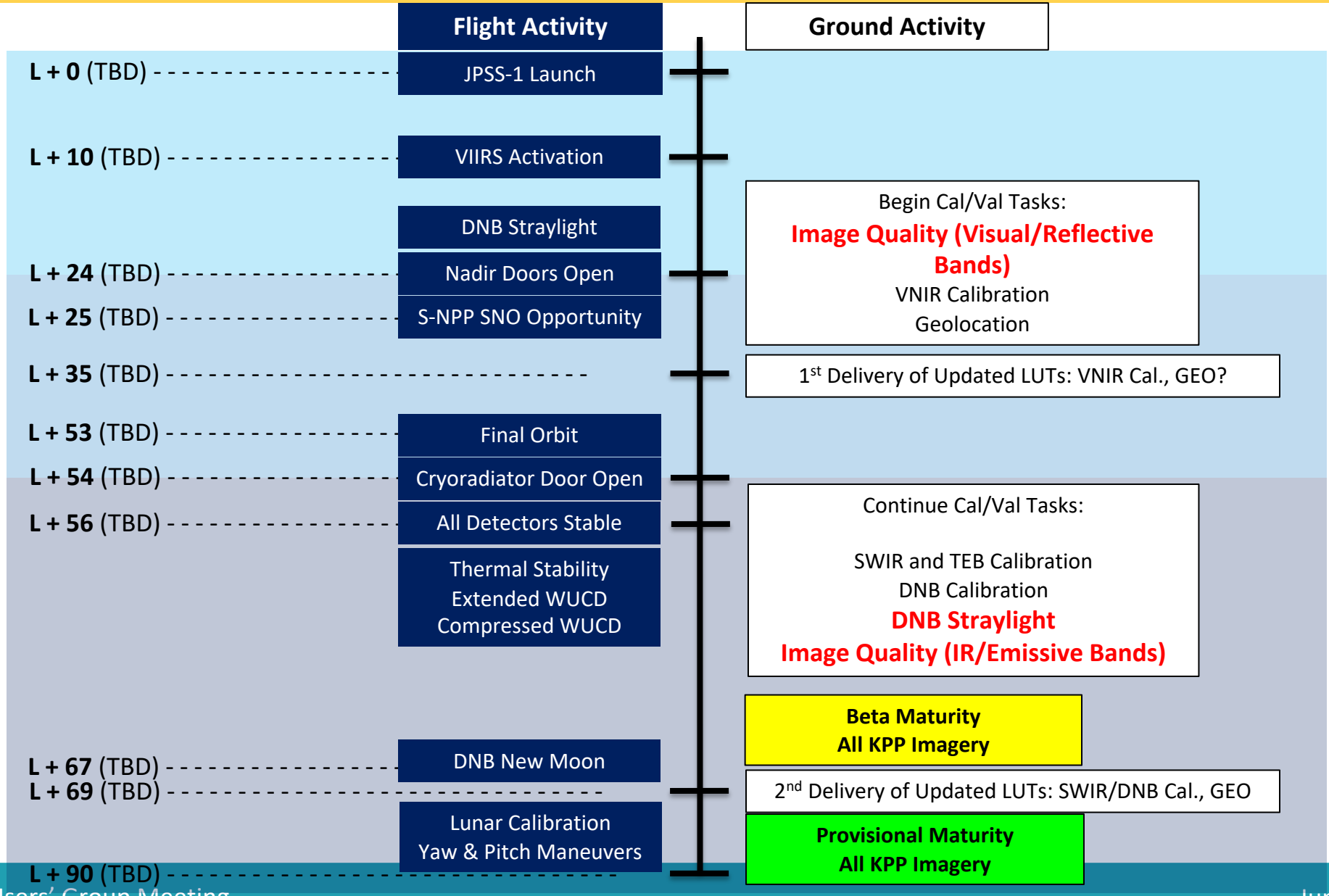
JPSS-1 VIIRS SDR Cal/Val Timeline

updating for JPSS-2 - expect to complete by Jun 30, 2022



JPSS-1 VIIRS Imagery Cal/Val Timeline

updating for JPSS-2 - expect to complete by Jun 30, 2022



JPSS-2 Cal/Val Plans and Notional Schedule

- **Pre-Launch:**
  - ✓ Pre-launch sensor characterization reports - Completed Aug. 2020
  - ✓ JPSS-2 specific algorithm updates based on pre-launch test data and other changes:
    - ✓ JPSS-2 OMPS Nadir Mapper High Resolution Code Change and LUT update) - Implemented in Block 2.3 Mx4 (Oct. 2021)
    - ✓ Mounting Matrix updates based on pre-dynamics data - Mar. 2022
    - ✓ Final pre-launch LUTs expected by July 2022 (after receiving mounting measurement reports from flight)
    - ✓ Initial JPSS-2 ready DAP to NDE Dec 2021
      - Final JPSS-2 ready DAP to NDE Jun 2022

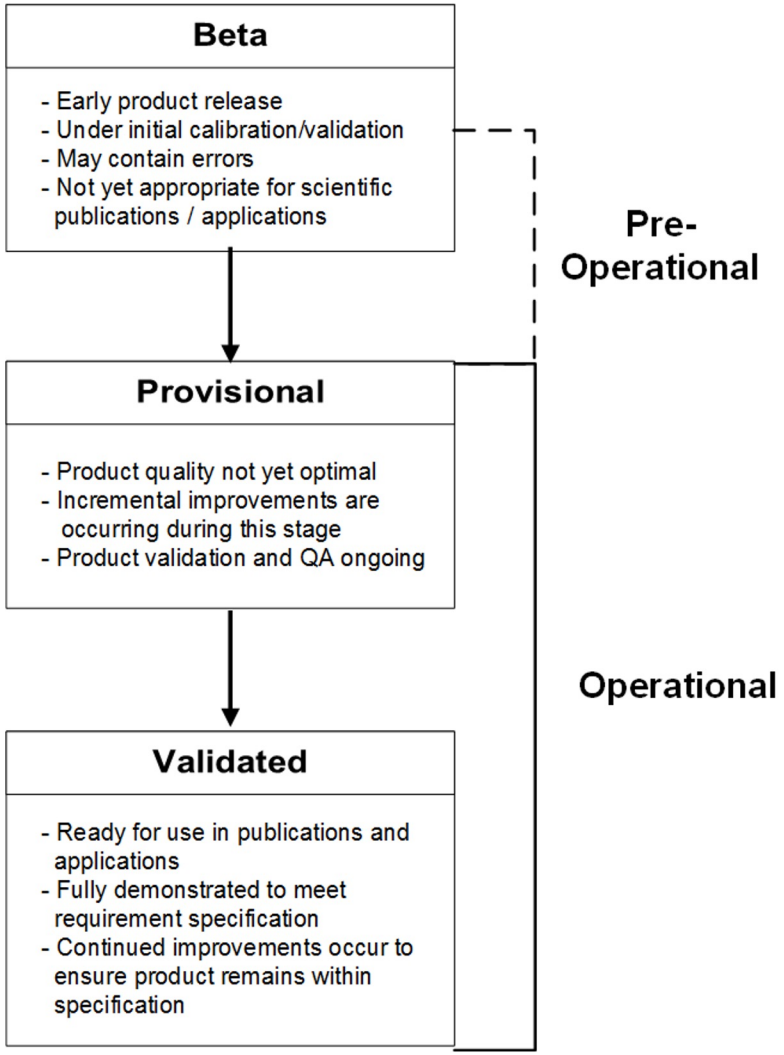
- **Post-Launch:**
  - Cal/Val Maturity (KPPs)
    - Provisional Maturity Jan. 2022 (L+ 3m)
    - Validated Maturity July 2023(L + 9m)
  - Updated Delivery Algorithm Packages (DAPs) based on the on-orbit observations
  - Working with cloud teams to ensure the transition to clouds supporting the J2 products operation schedules
  - JPSS Enterprise Cal Val Plans: https://drive.google.com/drive/u/0/folders/1qr6XF6JbOdl7ushJH8veYSzRgfvPdiIY

J2 Cal Val Maturity Timeline (Nominal)

(05032022)

JPSS-2 Algorithm Cal/Val Timeline (Launch + Months)																																		
Team	Product	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
SDR	ATMS TDR/SDR		B	P				V																											
	CrIS SDR				B/P						V																								
	VIIRS SDR			B	P			V																											
	OMPS SDR (NP & TC)				B/P						V																								
Imagery	KPP Imagery EDRs			B	P			V																											
	non-KPP Imagery EDRs				B	P				V																									
Clouds	Cloud Mask						B				P					V																			
	Cloud Phase/Type									B	P					V																			
	Cloud Top Property and Cloud Cover Layer									B	P					V																			
	Cloud Base Height									B	P					V																			
	DCOMP and NCOMP									B	P					V																			
Aerosol	Aerosol Optical Depth and Aerosol Particle Size						B					P									V														
	Aerosol Detection						B				P								V																
Volcanic Ash	Volcanic Ash									B	P					V																			
Cryosphere	Ice Surface Temperature and Ice Concentration							B			P			V																					
	Sea Ice Thickness/Age							B			P			V																					
	Binary Snow Cover							B			P									V															
	Fractional Snow Cover							B						P						V															
Land	Active Fires							B			P									V															
	Land Surface Temperature							B						P												V									
	Surface Albedo							B						P						V															
	Global Surface Type																	B		P		V													
	Surface Reflectance							B						P												V									
	Green Vegetation Fraction								B					P												V									
	Vegetation Index								B						P												V								
	Vegetation Health										B						P											V							
OCC	Ocean Color												B				P														V			
SST	Sea Surface Temperature						B			P												V													
VPW	Polar Winds											B		P		V																			
NUCAPS	AVTP, AVMP, Ozone, OLR							B						P			V																		
	CO, CO2, CH4							B									P			V															
MiRS	MiRS Products						B					P												V											
SFR	Snow Fall Rate (SFR)								B						P																	V			
OMPS EDR	OMPS Ozone EDRs (V8Pro & V8TOz)					B/P						V																							
	OMPS LP (SDR & EDR)					B								P								V													

JPSS-2 Operational Product Path

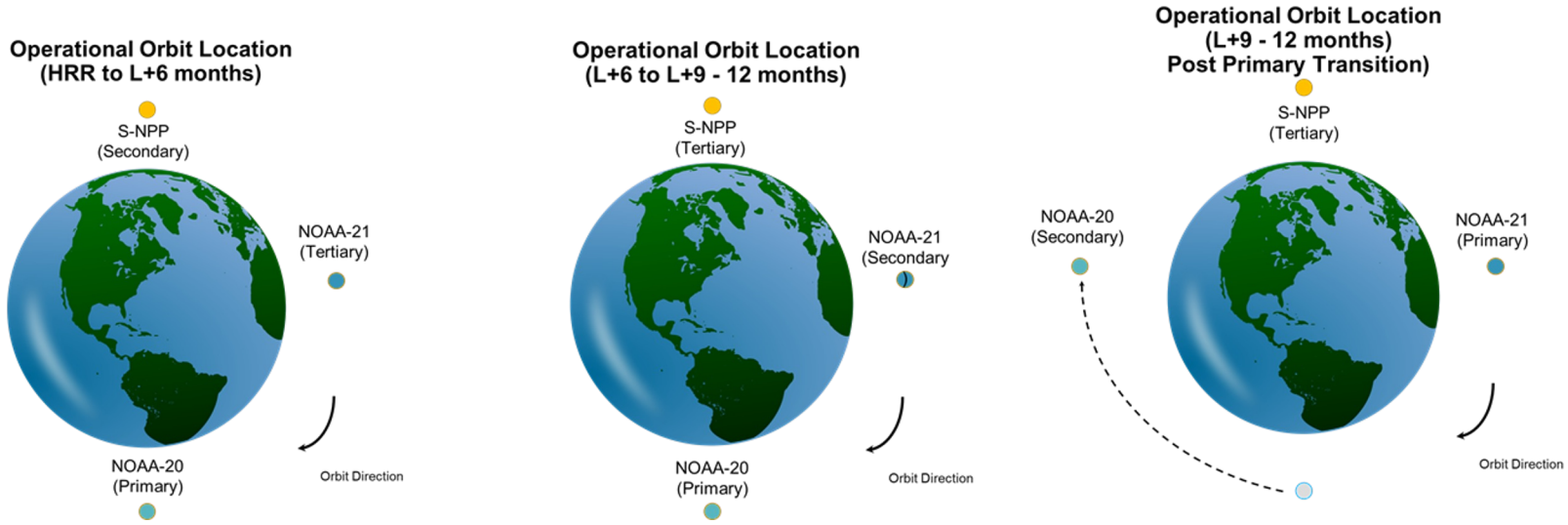


- As the calibration / validation process progresses after L + 90 (or earlier), JPSS-2 data is made available to NWS – defined as “Pre-Operational”
- The Satellite Product and Services Review Board (SPSRB) reviews the product’s status and they determine the operational readiness based on cal/val progress, user readiness and other factors
- OSPO only promotes products to “operational” status based on the SPSRB’s approval/recommendation
- The cal/val process and the science led SDR/EDR maturity gate reviews are vital inputs into the operational promotion process

S-NPP Data Flow Post J2 Operation

[JPSS-2 (NOAA-21) Product Operations Plan (POP)]

L+3 mon: to hold the NOAA-21 Handover Readiness Review (HRR)	**L+6 mon** (NCEP is ready to assimilate the NOAA-21 then NOAA-21 is declared operational:	**L+9 to12 mon**: NOAA-21 is designate as the primary operational satellite
Primary: NOAA-20	Primary: NOAA-20	Primary: NOAA-21
Secondary: S-NPP	Secondary: NOAA-21	Secondary: NOAA-20
Tertiary: NOAA-21	Tertiary: S-NPP	Tertiary: S-NPP



SNPP data flow post J2 Operation

Updates since the FOR (Jim McNitt), JPSS DOM

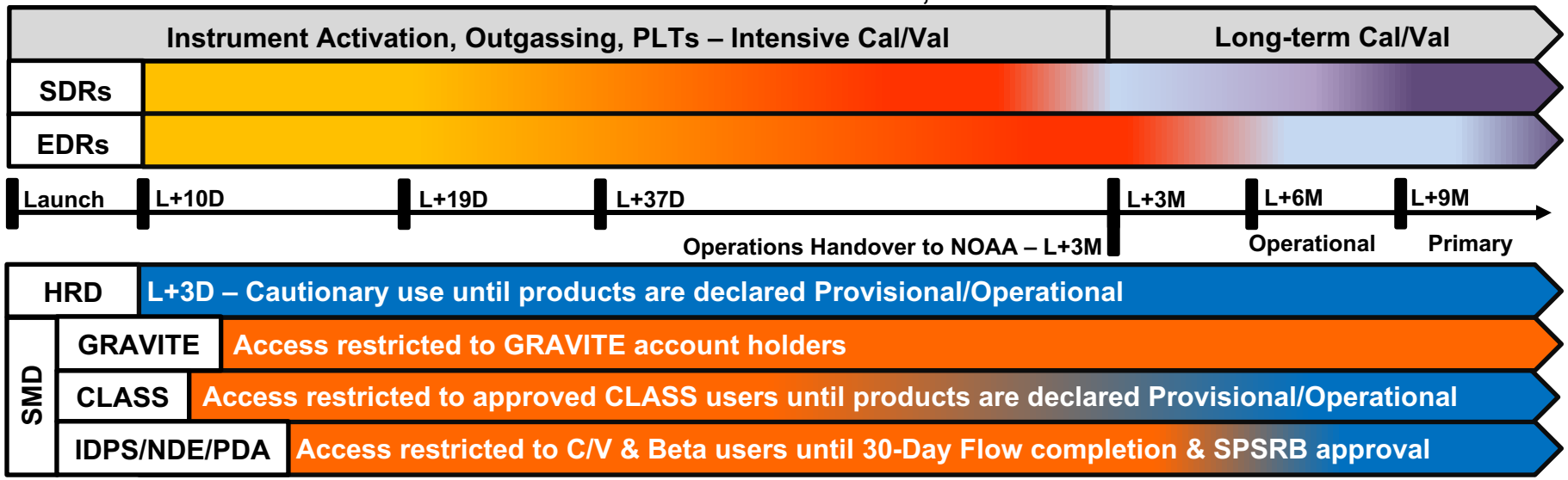
- IDPS will process data for all three satellites: NOAA-21, NOAA-20, and S-NPP
- ESPC system regression testing using a peak loading profile indicates that existing NDE/PDA system margin can support up to three [3] JPSS satellites. Results were briefed during the ESPC Sustainment Meeting on May 16, 2022
- JPSS-2 JCT3 TVAC test segments completed during May 10 – 26, 2022. End-to-end testing included flowing data products to NDE I&T
- OSPO advised the NESDIS EC on June 8, 2022, that:
  - 3 JPSS series satellite processing on existing NDE/PDA system is viable in order to support product transition over to JPSS-2 given user readiness concerns
  - Exceeds requirements, but safety margins can be adequately maintained
  - Workload concerns persist, especially with resources allocated to other priorities like Cloud/NCCF
- NESDIS Office Directors are working on recommendations for a NESDIS decision on S-NPP in September 2022

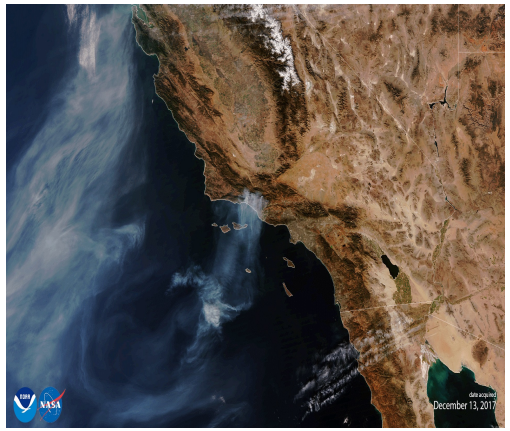
Lessons Learned applied to JPSS-2

Number	Type	NOAA-20 Lesson Learned	JPSS-2/3/4 Implementation
1	Interactions Improvement	Science teams were not aware some of the sensor information till very late before launch and may delay some of the calibration validation effort	Instrument information/flight coordination: Early access to potential instrument performance waivers and sensor-specific information for ground codes/tables updates.
2	Process Improvement	Prior to NOAA-20 launch, all Sensor Data Records (SDRs) and Imagery Environmental Data Records (EDRs) (Mission Unique Products – MUPs) were implemented for NOAA-20 and went through the pre-launch testing events. The EDRs algorithms for NOAA-20 were implemented only post launch and takes longer time for the post launch cal/val of the operational EDR products	Staging the algorithms: "JPSS-2 ready" SDR and EDR algorithms was staged on operational strings in time for JPSS-2 testing
3	Process Improvement	The pre-launch data were not flowed to the HRD users and we suggest to do it for JPSS-2 and after, to improve the HRD user's readiness	Flow pre-launch HRD test data to the HRD user community such as University of Wisconsin and Direct Readout Lab (DRL)

JPSS-2 Data Release Plan

Launch Date: Nov 1st, 2022





N-20 VIIRS First Light – 12/13/17

Approximate Times for JPSS-2 First Public Images

Advanced Technology Microwave Sounder	L+12 Days
Visible Infrared Imaging Radiometer Suite (VIS/NIR, DNB Day)	L+26 Days
Cross-track Infrared Sounder	L+48 Days
Visible Infrared Imaging Radiometer Suite (IR, DNB Night)	L+48 Days
Ozone Mapping Profiler Suite	L+48 Days

Phasing	Outgassing	Validated Maturity
Orbit Raising	Initial Checkout	External Distribution
Final Orbit	Provisional Maturity	Internal Distribution

Updated: Lihang Zhou (JPSS DPMS); 06/20/2022 **DRAFT**

Reprocessing of S-NPP SDRs

- NOAA/STAR has reprocessed S-NPP SDRs for each JPSS/S-NPP instruments, including ATMS, CrIS, OMPS, and VIIRS through their life cycle
- Used the most recently updated, unified calibration algorithms to generate consistent and high quality of SDRs.
- Calibration accuracy achieves those from the latest operational calibration algorithm and SDRs products show high radiometric stability for CDR development and climate change monitoring
- Reprocessed S-NPP SDRs have been transitioning to NOAA CLASS for permanent archiving and operational distribution for user applications
- Data transition of ATMS, CrIS, and OMPS completed. VIIRS transition is expect to be completed October 2023 due to large data volume
- ATMS, CrIS, and OMPS data can be ordered directly through the CLASS search website: https://www.avl.class.noaa.gov/saa/products/welcome
- Reprocessing of NOAA-20 SDRs is ongoing
- Next steps: Reformat the data as users' needs; made the codes/documents more readily available to the uses – Feedback from CSPP users?

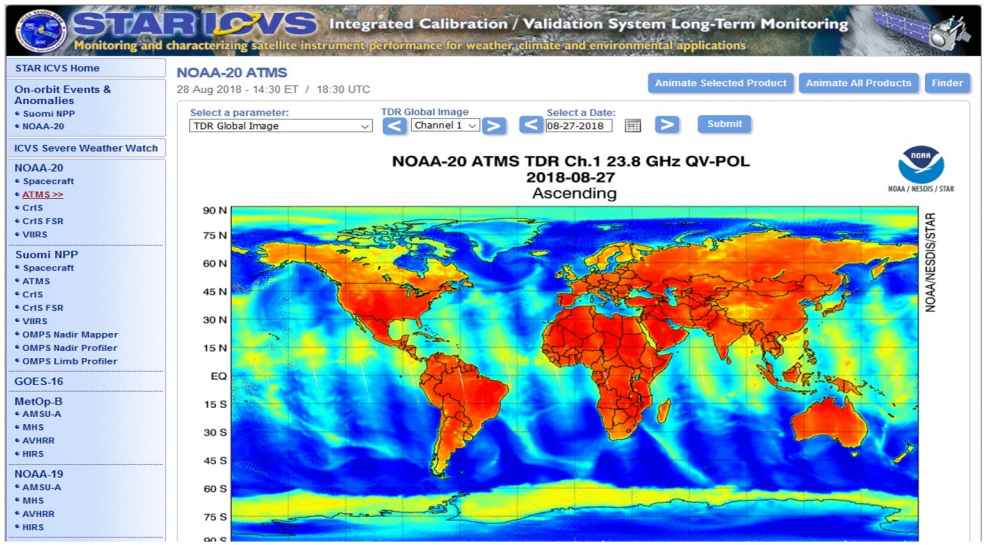
Detailed Information on Reprocessed S-NPP SDRs

Sensor	Data Type (name)	Period	Notes	Volume (Tb)	Transition to CLAAA Status
ATMS	TDR (TATMS)	2011-11-08 to 2019-10-15	V2	0.406	Completed on Dec. 19, 2021
	SDR (SATMS)	2011-11-08 to 2019-10-15	V2	0.431	
	GEO (GATMO)	2011-11-08 to 2019-10-15	V2	0.420	
ATMS	TDR (TATMS)	2011-11-08 to 2017-03-08	V1	0.273	Completed on Dec. 30, 2021
	SDR (SATMS)	2011-11-08 to 2017-03-08	V1	0.289	
	GEO (GATMO)	2011-11-08 to 2017-03-08	V1	0.283	
CrIS	GCRSO	2012-02-20 to 2020-01-29	V2	0.369	Completed on Feb. 25, 2022
	SCRIS	2012-02-20 to 2020-01-29	V2	67.994	
	SCRIF	2014-12-04 to 2020-01-29	V2	74.455	
OMPS	TC (SOMTC, GOTCO)	2012-01-30 to 2018-09-30	V1	1.139	Completed on Mar. 4, 2022
	NP (SOMPS, GONPO)	2012-01-25 to 2017-03-08	V1	0.097	
OMPS	NP (SOMPS, GONPO)	2012-01-25 to 2021-06-30	V2	0.191	Completed on Mar. 9, 2022
	TC (SOMTC, GOTCO)	2012-01-30 to 2021-06-30	V2	1.649	
VIIRS	VIIRS ALL SDR	2012-01-02 to 2020-04-30	V2	1615	Will be completed on Oct. 2023
Total	---	---	---	1764.65	

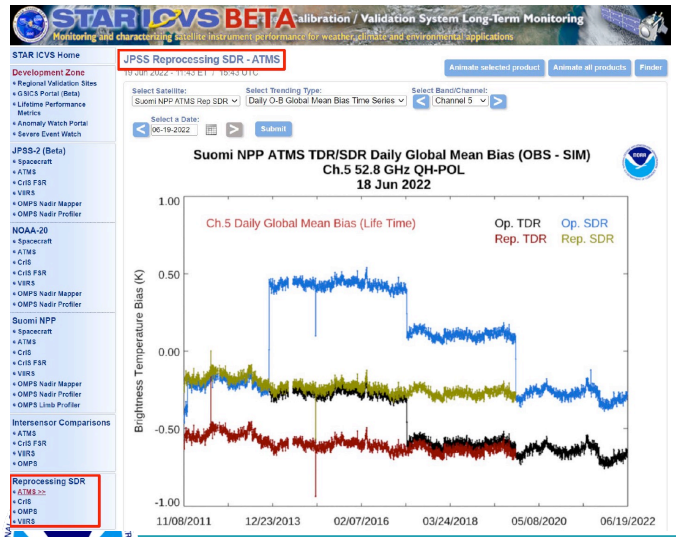
Integrated Calibration and Validation System (ICVS)

- **Mission**: Long-term Calibration and Validation Monitoring System of POES Instruments
- **Satellites**: SNPP, NOAA-20, JPSS-2, NOAA-15 to 19 and Metop-A/B/C
  - **Instruments:** ATMS, VIIRS, CrIS, OMPS, AMSU-A, AVHRR, and MHS
  - **Our tasks** (NOAA/NESDIS/STAR): Provide real-time monitoring of satellites instrument and data parameters performance (> 5000); provide long-term TDR/SDR data quality analysis including inter-sensor comparison, reprocessing, validation, and monitoring; 3) develop common practices and (AI) applications for Earth observation data.
  - **Customers**: OSPO, STAR, NWP centers (NCEP, ECMWF, UKMO, etc.), NASA, and a broad satellite products (e.g., NUCAPS, MiRS) community

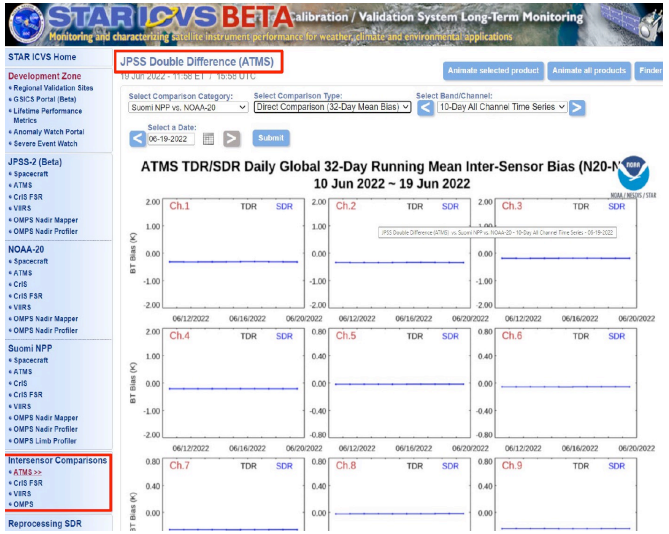
ICVS Long-Term Monitoring (LTM) Website



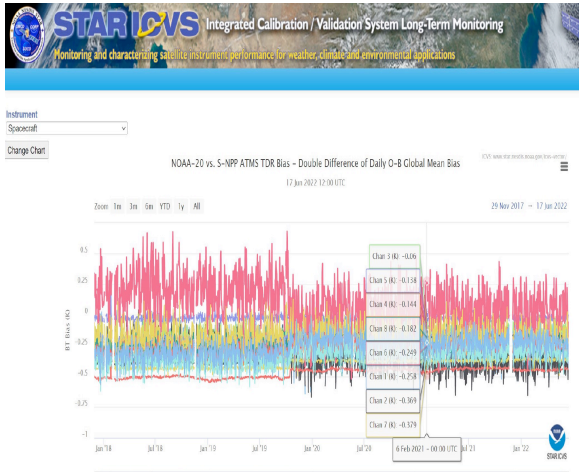
New Feature # 1:
JPSS Reprocessed SDR Monitoring*



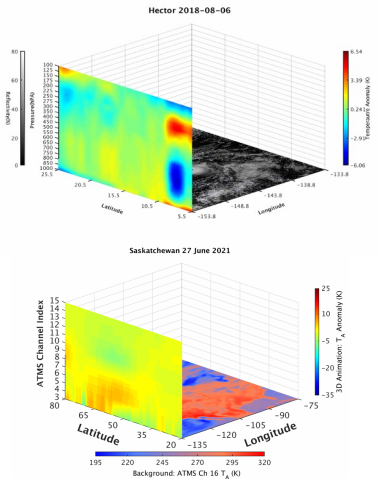
New Feature # 2:
JPSS SDR Inter-Sensor Radiance Bias Monitoring*



New Feature #3: Dynamically Visual Tool* (Interactive)



New Feature #4: Severe Weather Events from JPSS ATMS Observations



(a) Hurricane Hector Warm Core 3D Animation from ATMS (08/06/2018)

(b) Western North America Heat Wave from ATMS (06/27/2021)

POC: Banghua.Yan@noaa.gov;

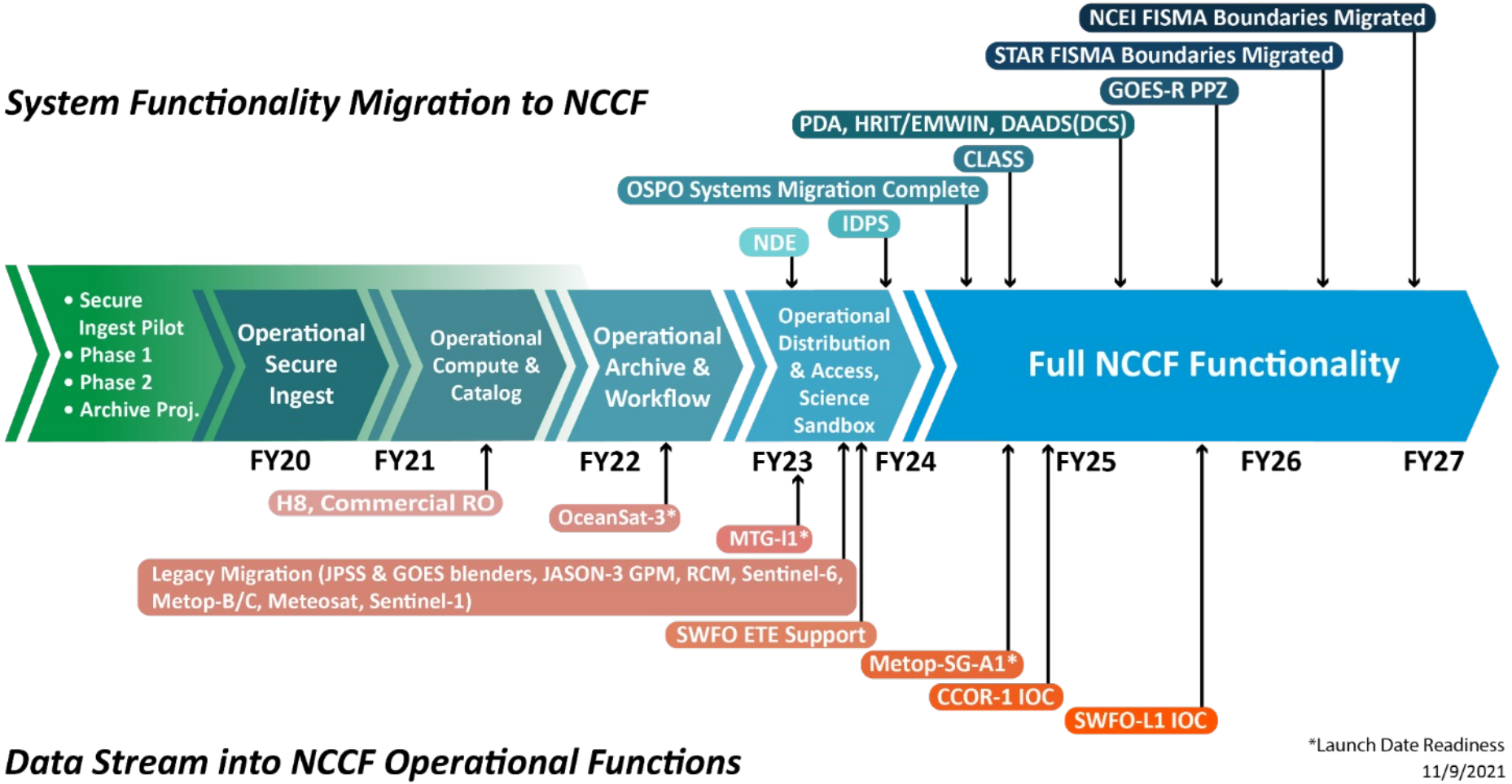
* Features # 1 to # 3: NOAA email address and password required

Summary

- JPSS will continue to support the end-to-end product lifecycle for the missions
- The past year has seen real success in completing all the planned algorithms deliveries and cal val activities for the JPSS products
- For FY 22 -23, the work activities will be focused on
  - **JPSS-2/EPS-SG Readiness** - build on the successes of N20 and SNPP Cal/Val
  - Maintaining N20 and S-NPP including science reprocessing
  - **R2O:** work with NESDIS Product Portfolio Management (PPM) team and Enterprise Product team - Bringing the new products to operations in a timely manner
  - **Cloud Transition:** coordinate the priorities of NDE algorithms migrating to NCCF schedule; work with JPSS STAR and the NESDIS cloud teams to transition science dev. to clouds; making JPSS data available on the NOAA Big Data Project (BDP).
  - **User Engagement:** work with Program Science and the NESDIS Proving Ground program for user readiness activities and optimization of the user applications of LEO products

BACKUP Slides

NESDIS Common Cloud Framework Roadmap

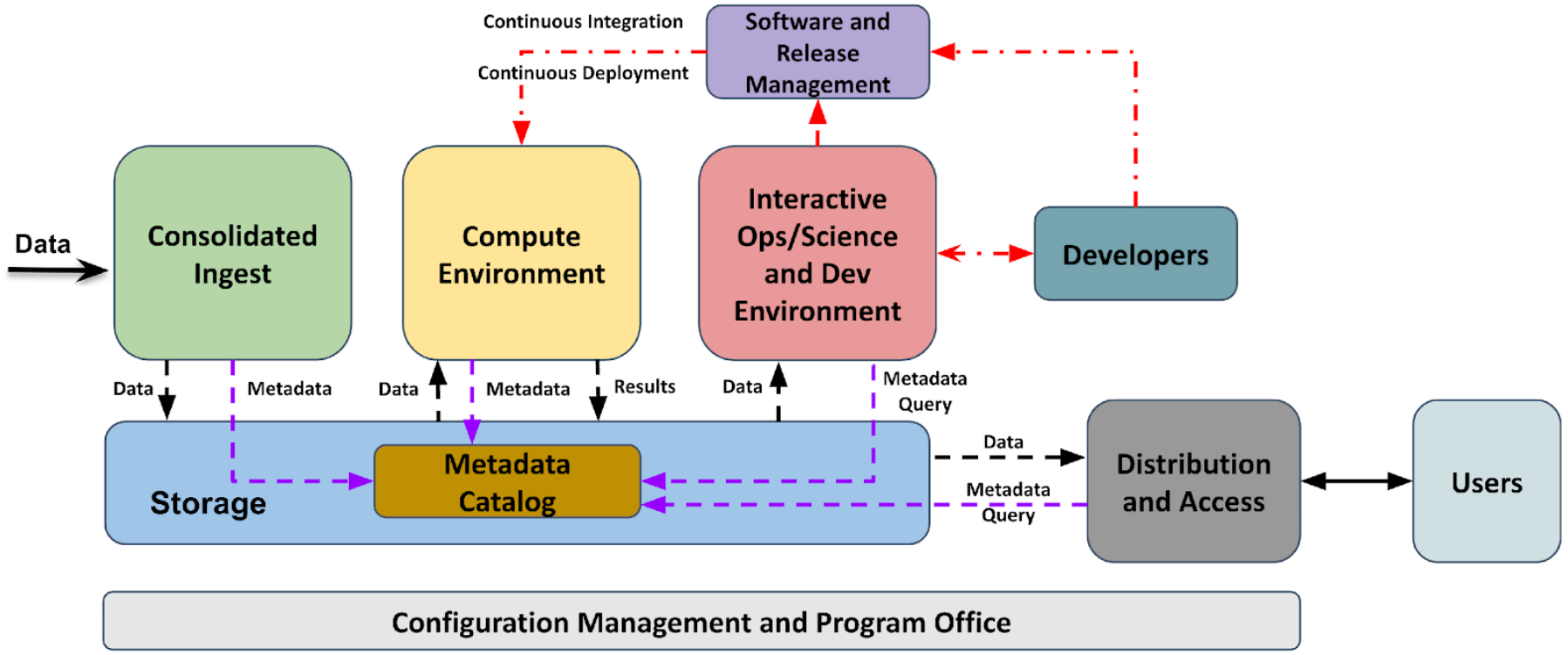


NESDIS Common Cloud Framework

OSGS is leading the migration of Product Generation (PG) and Product Distribution (PD) to the NESDIS Common Cloud Framework (NCCF) AWS FedRamp Environment

Initial IDPS Data Flows enabled to NCCF for verification activities in CY22

Product migration decisions will occur throughout the transition period



Data Access Level During the Cal/Val Process

Group 1 can get everything	Group 2 can get once beta	Group 3 will only get data once provisional (everyone not specifically in group 1 or 2 is in group 3)
NCEP_EMC	NCEP_SPC	NCMRWF (India) International
NCF-SBN	NCEP_SWPC	TWC (Commercial)
NCEP_IDP (NCO)	NCEP_NHC	Accuweather (Commercial)
NCEP_WCOSS (NCO)	NCEP_AWC	Barons (Commercial)
ESPC_SFS	NCF-DD	Blue Sky (Commercial)
ESPC_SAB	EUMETSAT	Roffers (Commercial)
NOAA_STAR	CANADA_MC	KOREA MA
NOAA_NCEI_CO_SPADES	BIG_DATA	BRAZIL_CPTEC
ESPC_HRIT	NAVY_FNMOC	**All other users**
ESPC_WEB	JAPAN_JMA	
NASA_MSFC_GLM	AF_AFWA (557th, but getting G16 via GRB)	
OSPO_GNC-A	NAVY_NAVO	
NOAA_CLASS		
ESPC_NIC		
ESPC_IMS		
NASA_GSFC		
Other ESPC Internals		

- Users have been identified from the PDA distribution list obtained on July 8, 2021 from Donna Mcnamara (donna.mcnamara@noaa.gov).
- These access level groups have been coordinated between JPSS and GOESS.

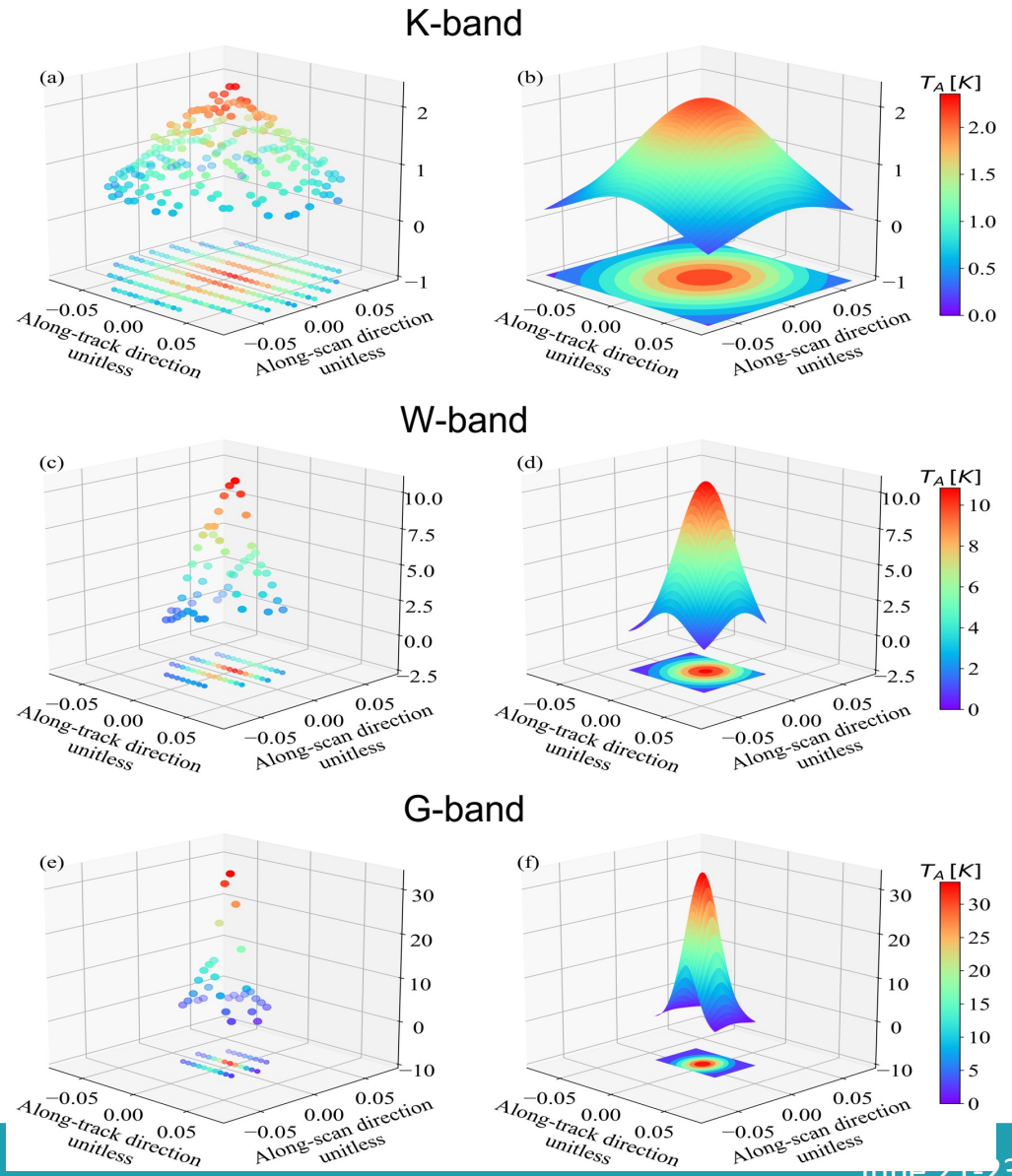
Microwave Lunar Calibration Model Development by Using ATMS Moon Observations

ATMS instrument drifting evaluation is important for climate study by using long-term ATMS Earth observations

The Moon is an ideal target to monitor the microwave instrument stability. The ATMS Moon observations can help to greatly improve the accuracy of lunar calibration model

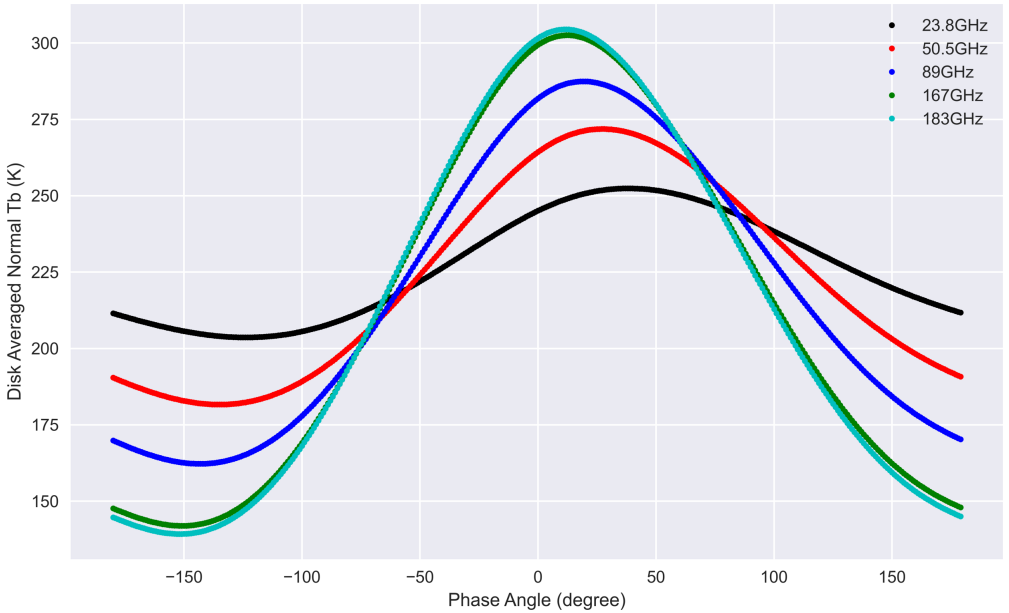
ATMS Moon observations can also help to evaluate the antenna beam pointing accuracy. Especially for High-V and G band, where the atmosphere is opaque

NOAA-20 ATMS Moon Observations

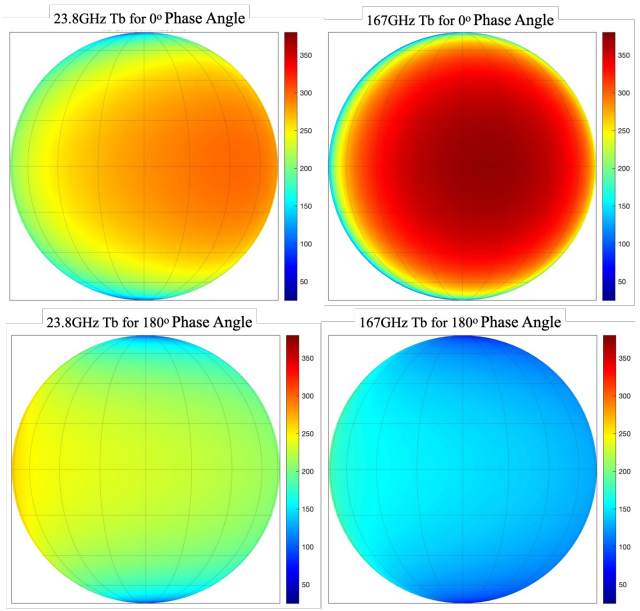


Microwave Lunar Calibration Model Development by Using ATMS Moon Observations

- The Lunar RTM model is critical for microwave lunar calibration. By using NOAA-20 ATMS observations, the accuracy of lunar model can be improved for as large as 10K



Lunar MW Model Integrated Disk Tb vs Phase Angle



Lunar MW Model 1° x1° Tb vs Phase Angle

36

Geolocation Accuracy Evaluation Results

Lunar radiation collected by ATMS antenna is very sensitive to the beam pointing accuracy. A slight beam pointing offset can cause the peak of the antenna responses shifting away from the center

By checking the shifting angle of antenna responses from the center, the beam pointing error can be identified

During NOAA-20 post-launch test, a back-flip maneuver of satellite platform was carried and 2-D lunar observation samples were collected. Based on which the beam pointing error for NOAA-ATMS can be identified.