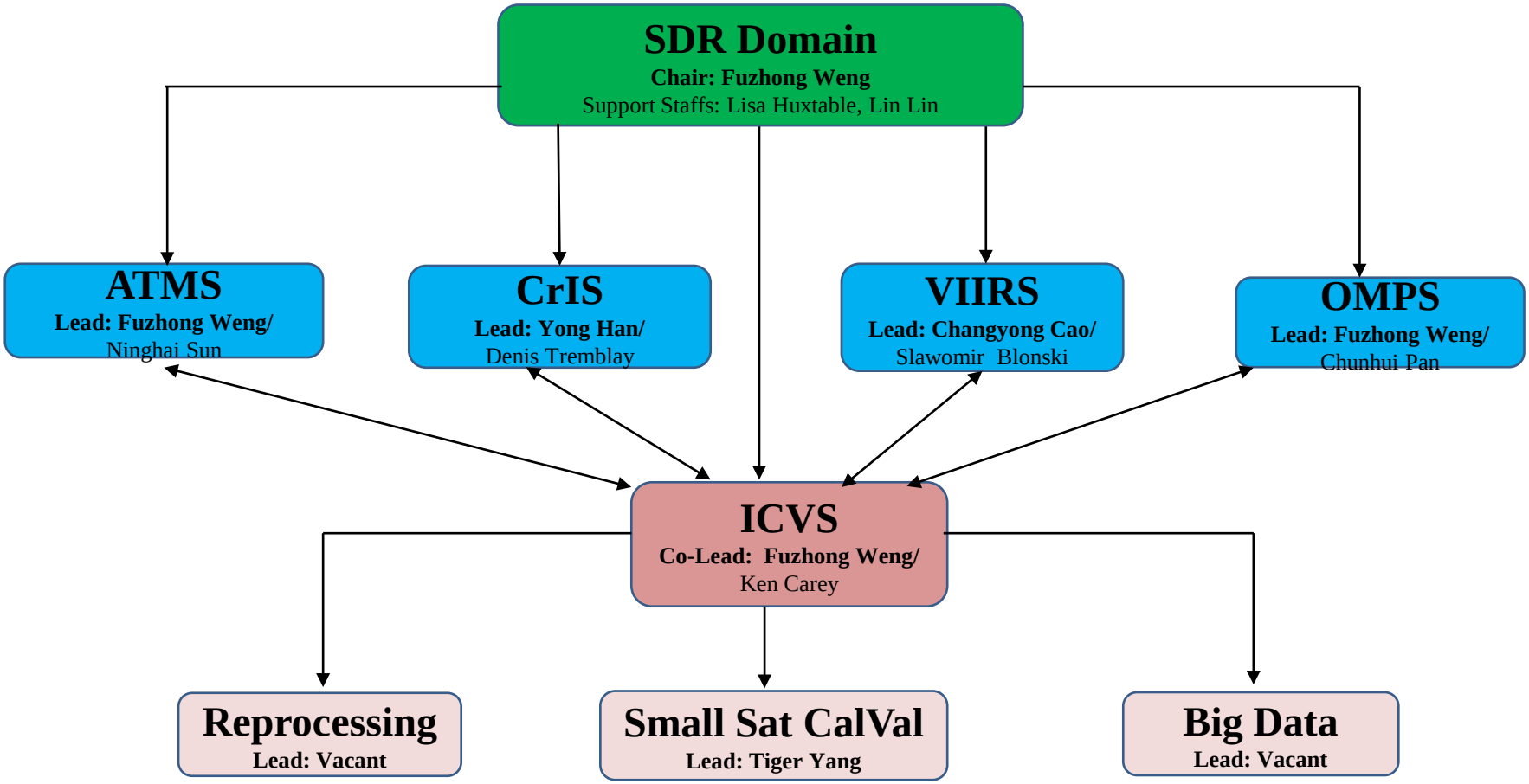
Joint Polar Satellite System (JPSS) SDR Highlights

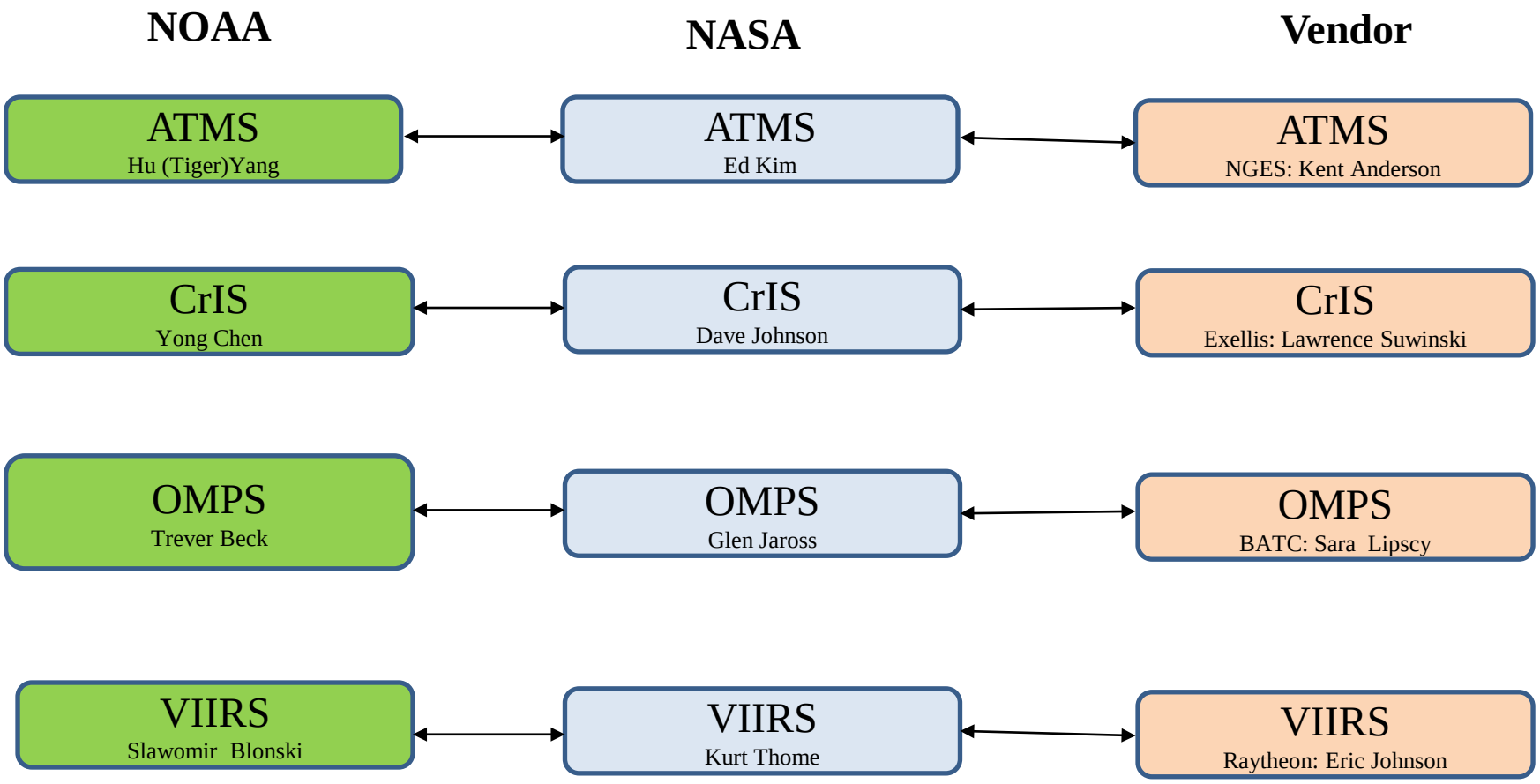
Fuzhong Weng, JPSS SDR Chair
Center for Satellite Applications and Research (STAR)
National Oceanic and Atmospheric Administration (NOAA)

STAR JPSS 2015 Annual Science Team Meeting
August 24-28, 2015
5830 University Research Court, College Park, MD 20740

STAR JPSS SDR Teams/Management Structures



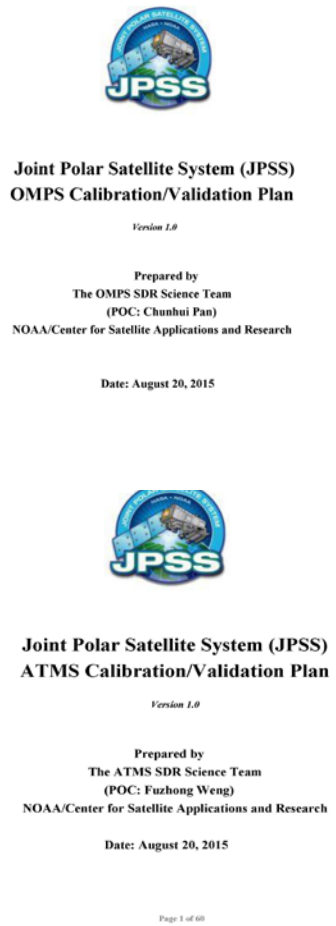
Scientific and Engineering Interactions among NOAA /NASA/Vendor Instrument Scientists

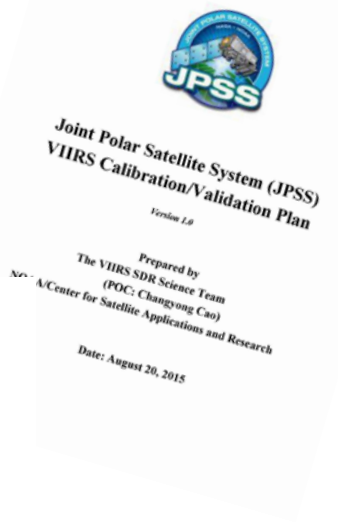


JPSS SDR 2015 Major Accomplishments

1. Completed comprehensive SDR CalVal Plans for JPSS-1. The calval tasks are presented with clear role and responsibility, task objective, expected outcomes, and lessons learned from SNPP
2. Developed an offline CrIS full spectral resolution (FSR) SDR processing system and made the FSR products available to user community
3. Developed ATMS radiance-based radiometric calibration, replacing Rayleigh-Jeans approximation in two-point calibration system
4. Developed J1 VIIRS DNB waiver mitigation and delivered pre-operational software to IDPS program on-time, and implemented the operational straylight correction in DNB band
5. SNPP OMPS earth view SDR products have reached the validated maturity level after updating LUTs of wavelength scale, solar irradiance and earth view radiance coefficients
6. Integrated CalVal System (ICVS) – Lite version was successfully transitioned to GRAVITE for NASA Flight and OSPO operational uses


Joint Polar Satellite System (JPSS)
CrIS Calibration/Validation Plan
Version 1.0
Prepared by
The CrIS SDR Science Team
(POC: Yong Han)
NOAA/Center for Satellite Applicati
Date: Augus


Joint Polar Satellite System (JPSS)
OMPS Calibration/Validation Plan
Version 1.0
Prepared by
The OMPS SDR Science Team
(POC: Chunhui Pan)
NOAA/Center for Satellite Applications and Research
Date: August 20, 2015
Joint Polar Satellite System (JPSS)
ATMS Calibration/Validation Plan
Version 1.0
Prepared by
The ATMS SDR Science Team
(POC: Fuzhong Weng)
NOAA/Center for Satellite Applications and Research
Date: August 20, 2015
Page 1 of 60


Joint Polar Satellite System (JPSS)
VIIRS Calibration/Validation Plan
Version 1.0
Prepared by
The VIIRS SDR Science Team
(POC: Changyong Cao)
NOAA/Center for Satellite Applications and Research
Date: August 20, 2015

2015 NOAA Administrator's Award to CrIS SDR Science Team Lead: Dr. Yong Han

The Administrator's Award is a combination honorary and monetary award designed to recognize NOAA-specific contributions



Citation Title: For developing state-of-the-art processing, calibration, and monitoring of Cross-track Infrared Souder full spectral resolution data for weather and climate applications

" ….Yong had to wade into an existing program at a critical time, and he has done a superlative job. He is a natural at management, although I suspect he denies that. His willingness and ability to delve very deeply into mathematical, instrument, science, and code issues while serving as the team leader is even more impressive and I suspect is the one of the main reasons he is such a good leader!...." – Professor Larrabee Strow, UMBC

Suomi NPP TDR/SDR Algorithm Schedule

Sensor	Beta	Provisional	Validated
CrIS	February 10, 2012	February 6, 2013	March 18, 2014
ATMS	May 2, 2012	February 12, 2013	March 18, 2014
OMPS	March 7, 2012	March 12, 2013	August 20, 2015
VIIRS	May 2, 2012	March 13, 2013	April 16, 2014

Beta

- Early release product.
- Initial calibration applied
- Minimally validated and may still contain significant errors (rapid changes can be expected. Version changes will not be identified as errors are corrected as on-orbit baseline is not established)
- Available to allow users to gain familiarity with data formats and parameters
- Product is not appropriate as the basis for quantitative scientific publications studies and applications

Provisional

- Product quality may not be optimal
- Incremental product improvements are still occurring as calibration parameters are adjusted with sensor on-orbit characterization (versions will be tracked)
- General research community is encouraged to participate in the QA and validation of the product, but need to be aware that product validation and QA are ongoing
- Users are urged to consult the SDR product status document prior to use of the data in publications
- Ready for operational evaluation

Validated

- On-orbit sensor performance characterized and calibration parameters adjusted accordingly
- Ready for use in applications and scientific publications
- There may be later improved versions
- There will be strong versioning with documentation

JPSS-1 SDR Algorithm Schedule

Sensor	Beta	Provisional	Validated
CrIS	L+3M	L+6M	L+12M
ATMS	L+1M	L+3M	L+12M
OMPS	L+3M	L+6M	L+12M
VIIRS	L+3M	L+6M	L+12M

Beta

- Early release product.
- Initial calibration applied
- Minimally validated and may still contain significant errors (rapid changes can be expected. Version changes will not be identified as errors are corrected as on-orbit baseline is not established)
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Backup Slides:
Summary of 2015 Top Five Accomplishments for Five SDR Teams

ATMS SDR Team 2015 Top Five Accomplishments

1. Developed the radiometric two-point calibration in radiance, instead of brightness temperature which is based on Rayleigh-Jeans approximation. The full radiance calibration algorithm will be in IDPS MX8.12 and IDPS Block 2

2. Standardized NEdT calculation for ATMS and other microwave sounding instruments using Allan Deviation. The new algorithm has resulted in much stable noise trending and is SI traceable

3. Optimized the ATMS de-striping algorithm for the earth scene brightness temperatures and generated 45 days of ATMS TDR data for NWP user community to experiment the impacts of ATMS on global forecast skills

4. Developed a physically based model for correcting the radiation from ATMS reflector emission contributed to the earth scene brightness temperature

5. Updated ATMS processing coefficient tables (e.g. nonlinearity coefficients, threshold for calibration counts)

CrIS SDR Team 2015 Top Five Accomplishments

1. Developed an offline CrIS full spectral resolution (FSR) SDR processing system and made available to user community the FSR SDR product since December 4, 2015

2. Completed and delivered J1 CrIS SDR software with backward compatibility for S-NPP data processing

3. Characterized J1 CrIS instrument performances and derived calibration LUTs from pre-launch test data

4. Significantly improved CrIS SDR calibration algorithm to reduce radiance ringing artifacts by a factor 3 in certain unapodized spectral regions

5. Developed and delivered a new Fringe Count Error detection and correction SDR software module

VIIRS SDR Team 2015 Top Five Accomplishments

1. Developed J1 VIIRS DNB waiver mitigation and delivered pre-operational software to the program on-time, which greatly reduced program schedule and cost risks, in addition to operational straylight correction

2. Prepared all 47 J1 VIIRS LUTs (ver1.0) based on analysis of prelaunch test data, tested using ADL and simulated J1 data, and delivered to the program

3. Developed and demonstrated VIIRS DNB radiometric and geolocation monitoring/characterization capabilities using nightlight point sources, which is critically needed for J1 postlaunch validation of the waivers

4. Expanded validation time series with the 30+ validation sites worldwide, with added capabilities in the SWIR bands, as well as comparing with GOSAT FTS hyperspectral observations

5. Generated recalibration coefficients since launch with the latest corrections and RSB Autocal

OMPS SDR Team 2015 Top Five Accomplishments

1. LUTs of wavelength, day one solar and radiance coefficients were updated for both NP (CCR 15-2548) and NM (CCR 15-2547). These LUTs reduced NM radiance error in the cross-track direction. The SDR products now meet the requirement of wavelength dependent albedo (normalized radiance) <2.0%. Additional improvements have been made for the NM and NP consistency in 300-310 nm by 2-10%.
2. Completed NM SDR J1upper modifications. 1) Implemented NM decompression algorithms to process/convert compressed RDR input and aggregation algorithm to convert RDR to the required resolution. Enhanced NM SDR algorithms to process medium-resolution 17x17 km, sparse-spectral RDR products, provide data with current NM SDR product content (CCR 15-2283) 2) performed algorithm validation test using J1 proxy data (CCR 15-2432).
3. Completed NP SDR medium resolution code updates. 1) Implemented NP decompression algorithms to process/convert compressed RDR input. Enhance NP SDR algorithms to process medium-resolution 50x50 km RDR products, provide data with current NP SDR product content (CCR 15-2388) and 2) performed algorithm validation test using J1 proxy data (CCR 15-2469).
   J1 proxy data: use SNPP earth view data processed by J1 MEB (Main Electronic Box) with J1 timing pattern and sample tables.
4. Updated NM stray light LUT (CCR 14-2100) and added the NM out of band response from 417 nm to the stray light correction.
5. Evaluated, converted and formatted OMPS SCDBs contents to J1 algorithm LUTs for both NM and NP.
   - Spectrometric LUTs: Spectral Response, Spectral Registration, Wavelengths
   - Radiometric LUTS: Calibration Coefficients, CF-Earth(contains radiometric calibration factors for the Earth scene spatial cells) , Darks, Linearity, Stray Light, Solar Irradiance, Observed Solar, Predicted Solar
   - Geolocation LUT: Mounting Matrix and Field Angle Map

ICVS Team 2015 Top Five Accomplishments

1. Transitioned ICVS-Lite to GRAVITE for OSPO operational uses. The ICVS-Lite is running at GRAVITE and is being used by OSPO engineers.

2. Detected 3 major ATMS scan motor current anomalies with timely reports to NASA flight and NOAA JPSS senior managements

3. Standardized ICVS codes and eliminated the IDL language in graphics and optimized software structures through version control and central repository

4. Upgraded ICVS storage through OSGS ground system fund for storing the metadata from all the instrument house keeping and anomaly events

5. Began a prototype design of ICVS Big Data structure for more applications of ICVS data