JPSS STAR Science Team Annual Meeting
VIIRS SDR Team

Changyong Cao
VIIRS SDR Lead

May 12-16, 2014

Outline

- Overview
  - Products, Requirements, Team Members, Users, Accomplishments
- SNPP Algorithms Evaluation:
  - Algorithm Description, Validation Approach and Datasets, Performance *vs.* Requirements, Risks/Issues/Challenges, Quality Monitoring, Recommendations
- Future Plans
  - Plan for JPSS-1 Algorithm Updates and Validation Strategies, Schedule and Milestones
- Summary

VIIRS SDR Team

Leads	Organization	Members
Changyong Cao	NOAA/NESDIS/STAR	Slawomir Blonski, Frank Padula, Wenhui Wang, Jason Choi, Sirish Uprety, Sean Shao, Yan Bai, Vicky Lin
Frank Deluccia	The Aerospace Corp.	David Moyer, Kameron Rausch, others
J. Xiong/R. Wolfe	NASA/VCST	Hassan Oudrari, Vincent Chang, Aisheng Wu, John Fulbright, Jeff McIntire, Boriana Efrmova, Ning Lei, Gary Lin, Masahiro Nishihama, others
Lushalan Liao	NGAS	Ronsan Chu, Stephnie Weiss, Tahru Ohnuki, Frank Sun, others
Chris Moeller	U. Wisc.	others

Products:

22 SDRs

Users:

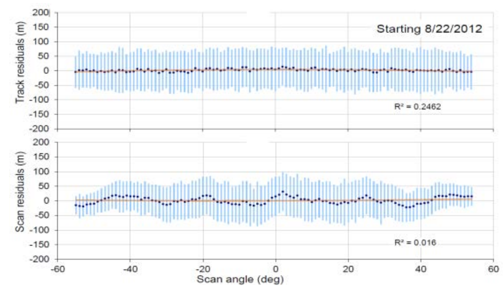
VIIRS EDR with more than 20 products

Major Achievements

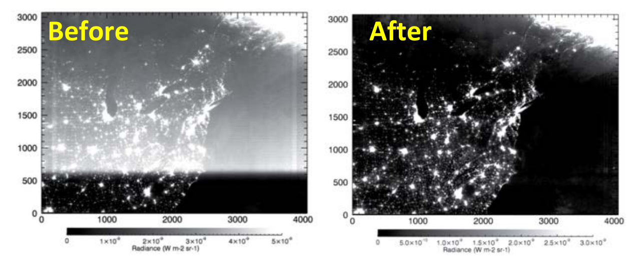
Major Achievements Since Provisional

- VIIRS on-orbit performance is well characterized & meets specifications
- RSBAutoCal being tested and independently validated by NOAA
- VIIRS DNB Straylight Correction implemented (Aug. 2013); tool kit has been evaluated by NOAA
- Geo-location uncertainties for I-/M-bands are ~ 70 m at nadir, meeting specifications at nadir and edge-of-scan (DNB terrain corrected geo-location product is expected in Mx8.3 in March 2014)

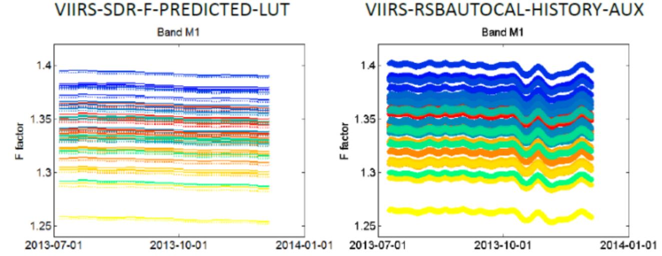
Geo-Location Accuracy



DNB Straylight Correction Implemented



RSBAutoCal Testing



Major Achievements and Events

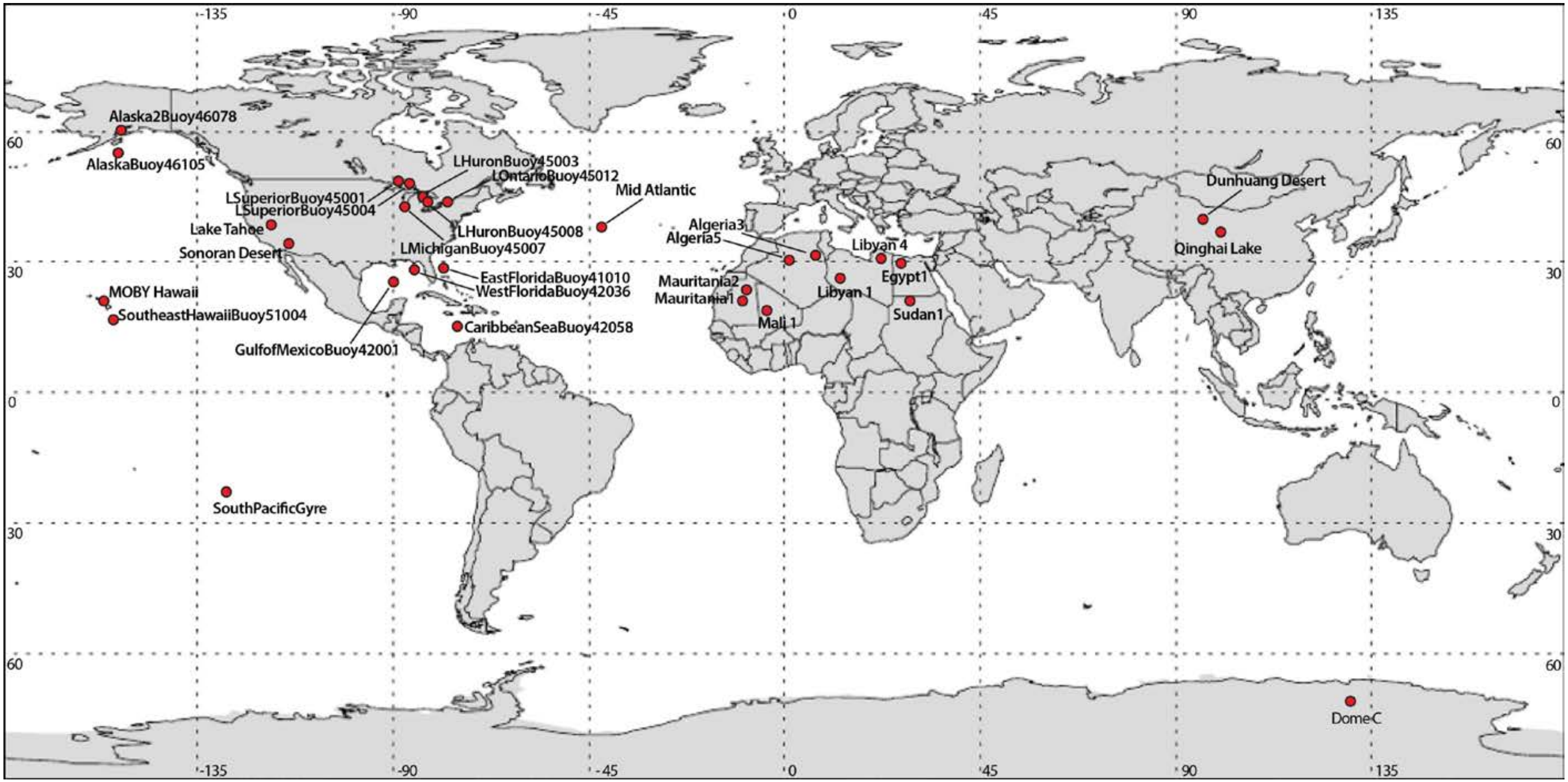
Since the validated maturity workshop in December 2013:

- VIIRS SDR achieved validated maturity
- Validation time series developed for ~30 sites worldwide (W. Wang)
- DCC time series since launch established (W. Wang)
- Lunar band ratio time series developed (S. Shao & J. Choi)
- Calibration coefficient changes (c0=0) implemented (May 2014)
- I3/M10 bias studies (new results from Lunar band ratio analysis, see X. Shao in breakout session)
- Sun vector error findings (NASA)
- DNB terrain corrected geolocation (March 18, 2014 with MX8.4)
- Single Board Computer Lockup(SBC) #6 (or 7), aka “Petulant mode” on Feb. 4, 2014
- Flattening in the degradation shown in H and F factors
- VIIRS J1 polarization studies

On-going work:

- Continued updating the calibration knowledge base, with new events analyzed and documented
- Continued bias time series analysis between VIIRS and MODIS
- Continued longterm trending and monitoring

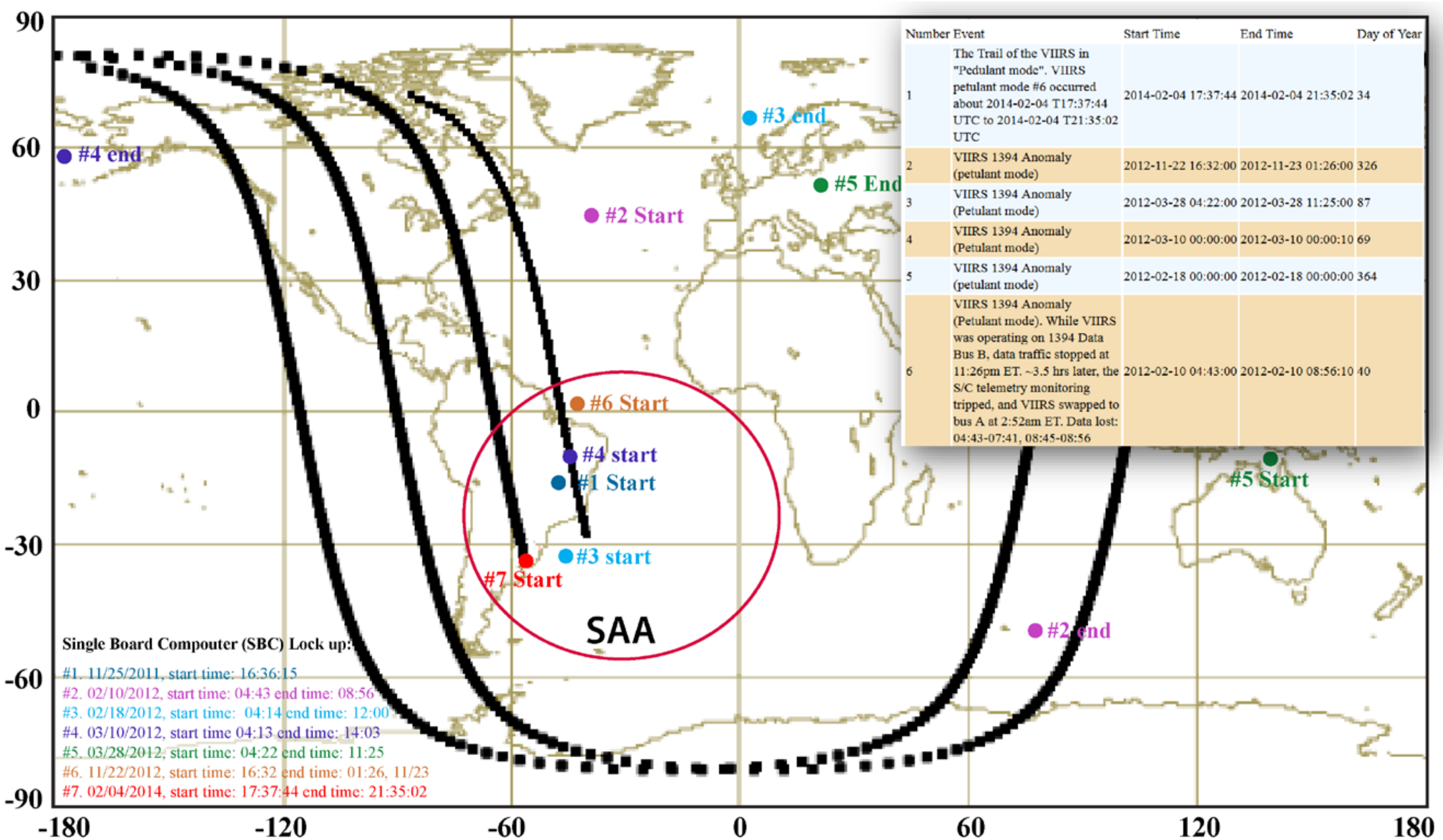
VIIRS Radiometric Validation Time Series at thirty validation sites world-wide



More details will be presented by W. Wang in the VIIRS Breakout session

VIIRS Event Log Database

An important part of the Calibration Knowledge base

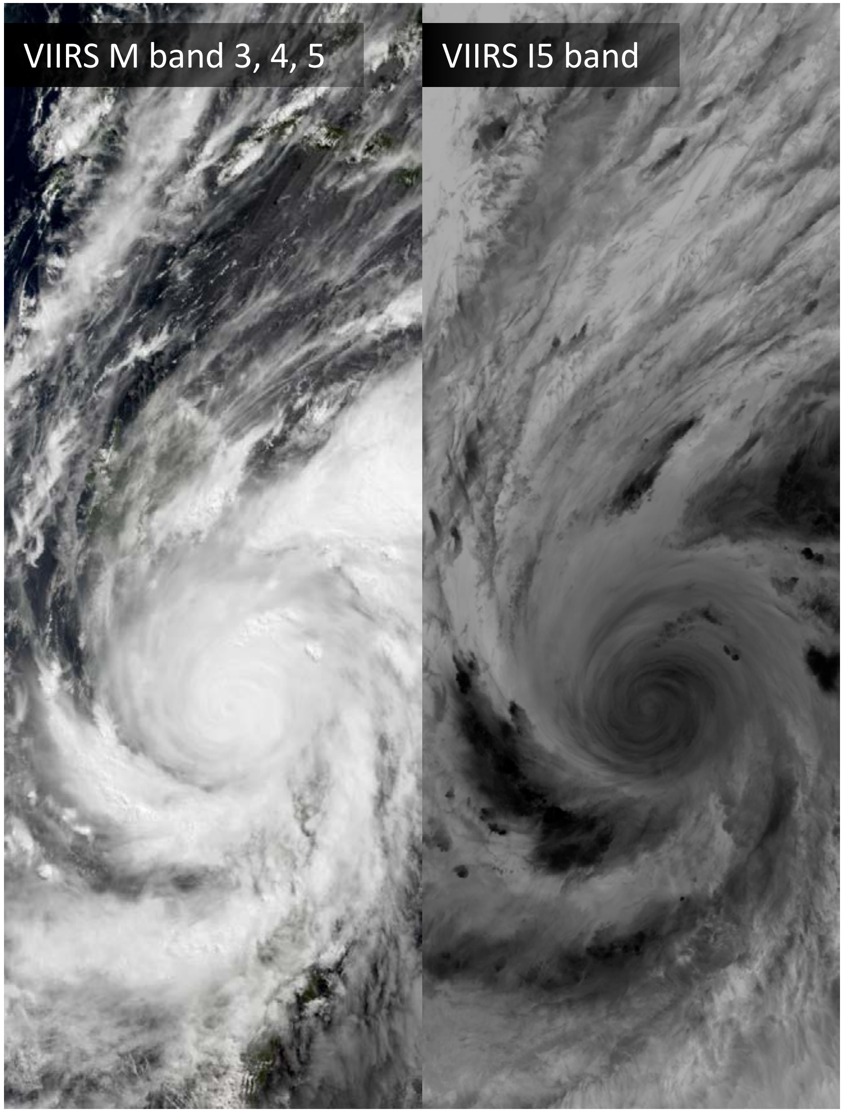


Number	Event	Start Time	End Time	Day of Year
1	The Trail of the VIIRS in "Pedulant mode". VIIRS petulant mode #6 occurred about 2014-02-04 T17:37:44 UTC to 2014-02-04 T21:35:02 UTC	2014-02-04 17:37:44	2014-02-04 21:35:02	34
2	VIIRS 1394 Anomaly (petulant mode)	2012-11-22 16:32:00	2012-11-23 01:26:00	326
3	VIIRS 1394 Anomaly (Petulant mode)	2012-03-28 04:22:00	2012-03-28 11:25:00	87
4	VIIRS 1394 Anomaly (Petulant mode)	2012-03-10 00:00:00	2012-03-10 00:00:10	69
5	VIIRS 1394 Anomaly (petulant mode)	2012-02-18 00:00:00	2012-02-18 00:00:00	364
6	VIIRS 1394 Anomaly (Petulant mode). While VIIRS was operating on 1394 Data Bus B, data traffic stopped at 11:26pm ET. ~3.5 hrs later, the S/C telemetry monitoring tripped, and VIIRS swapped to bus A at 2:52am ET. Data lost: 04:43-07:41, 08:45-08:56	2012-02-10 04:43:00	2012-02-10 08:56:10	40

For more details, see poster by Y. Bai et al.

Suomi NPP VIIRS SDR Validated Maturity

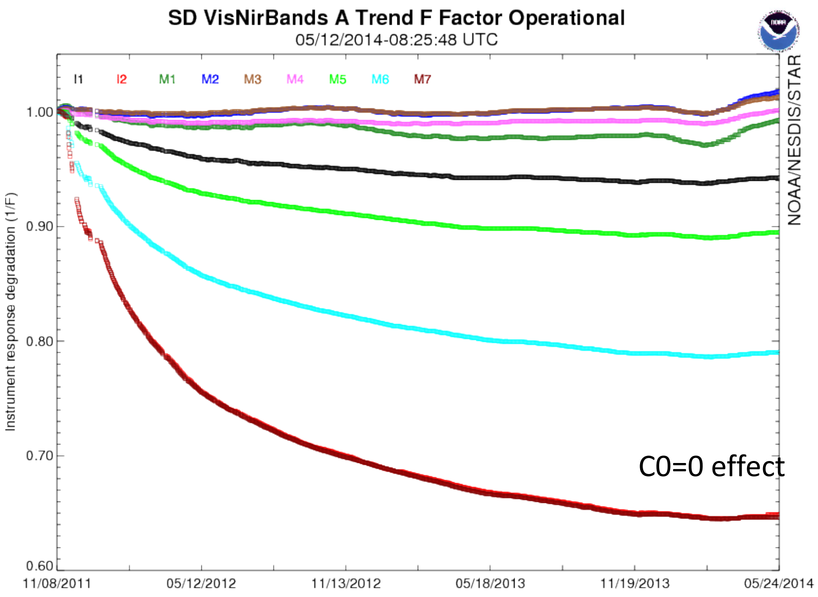
- **Milestone:** Successfully completed the VIIRS SDR Validated Maturity Workshop, and achieved validated status in March 2014.
- **Accomplishments**
  - STAR held a three-day Suomi NPP SDR Science and Validated Product Maturity Review (December 18-20, 2013) at the NOAA NCWCP to assess the readiness of the VIIRS SDR data product maturity
  - The VIIRS SDR team members and EDR users reported on the progress made since the Provisional Maturity Review demonstrating the VIIRS SDR maturity level
  - Concluding the Workshop the review panel members reached consensus that overall the VIIRS SDR product has reached the validated status and therefore is recommended to be approved by the Algorithm Executive Review Board (AERB)
  - The AERB approved the recomemnded validated status in March 2014.
- **Significance: VIIRS SDR has achieved the validated maturity**

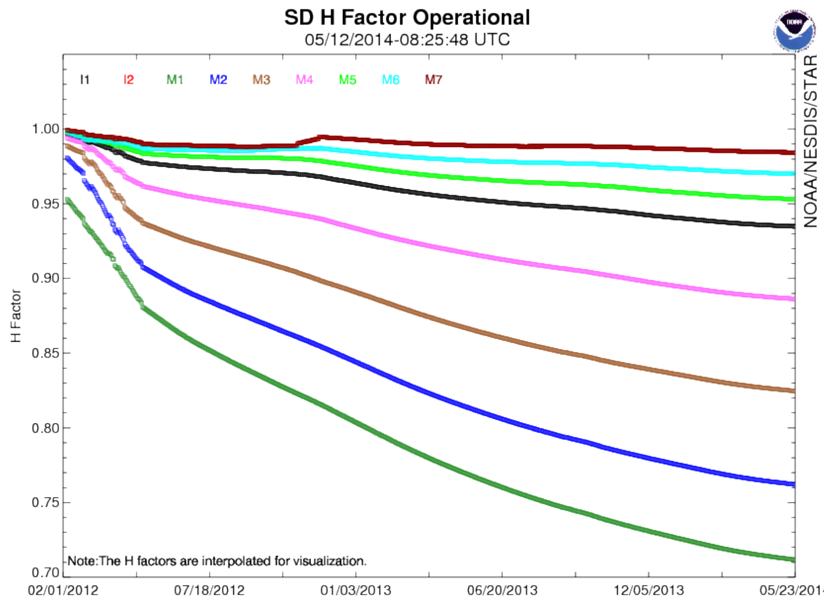


VIIRS SDR Accuracy

	Requirement (absolute uncertainty for uniform scenes)	Prelaunch and onboard calibration	Validation: Relative to MODIS/CrIS/IASI/other thru Inter-comparisons	Note
VIIRS RSB	2% typical reflectance; 0.3% stability; 0.1% desirable for Ocean Color Applications	1.2% for M1-M7; 1.5% for M8&9 1.4% for M10 1.3% for I1&I2 1.6% for I3	2% (±1%) for matching bands	Except bands with very low signal (ex. M11); sub-percent accuracy for OC is very challenging. Geolocation error: expectation is half I-band pixel; achieved better than quarter I-band pixel (1-σ)
VIIRS TEB	M12/M13: 0.7%(0.13K) @270K M14: 0.6% (0.26K) @ 270K M15/M16: 0.4% (0.22K/0.24K) @270K I4: 5% (0.97K) @270K I5: 2.5% (1.5K) @270K	Better than 0.13K for all M bands except M13 (0.14); 0.47K for I4; 0.23K for I5	0.1K based on statistical comparison with MODIS and CrIS ER-2/SHIS Aircraft underflight shows excellent agreement M15 0.4 K bias relative to CrIS at 200K (in spec.)	M15 at 190K requirement is 2.1% radiance or 0.56K Geolocation uncertainty: expectation was half I-band pixel; achieved better than quarter I-band pixel (1-σ)
VIIRS DNB	• 5%, 10%,30% L_{min} (LGS,MGS,HGS)	3.5%, 7.8%, and 11% (LGS, MGS, HGS)	• 4%, 7.7%, 11.8% (LGS, MGS, HGS)	Geolocation error is a ~10th of a pixel (1-σ) on the ellipsoid earth but can exceed 1km (up to 24 km at the edges of scan) without terrain correction

Recent RSB H&F factor trends



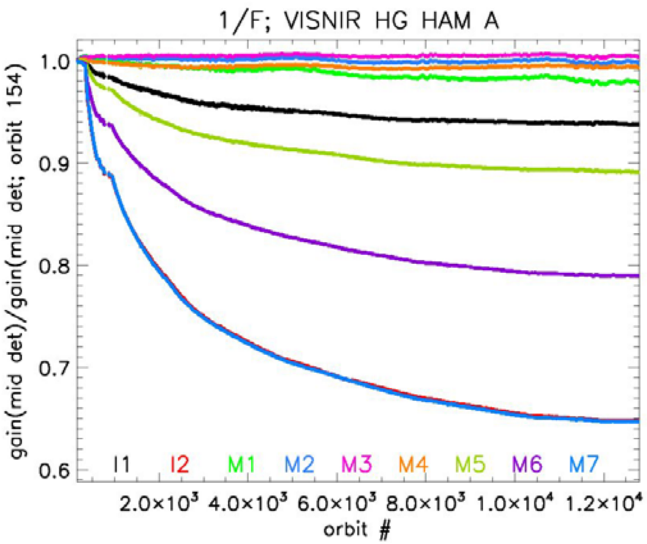


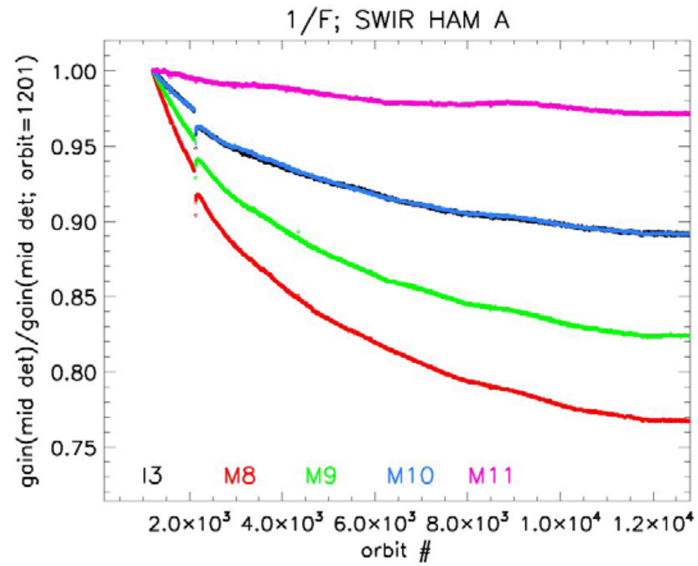
- Recent F-factors show significant trend change which suggests that degradation has stopped or even reversed
- Is this real or artificial?
- How can we tell through validation?
- Is this due to issues in the H-factor calculations?

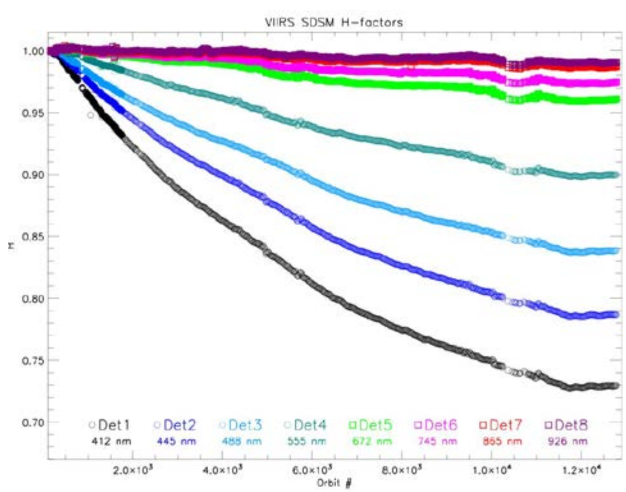
- H-factors in the above plot do not show major recent trend change due to smooth?
- The unsmoothed version does show trend change (such as those produced by Autocal)
- What's the impact on the F-factor calibrations?

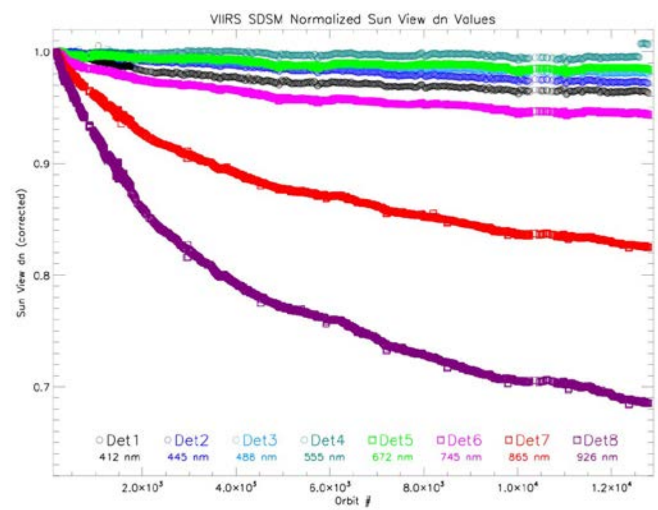
What's the impact on EDR products?

Source: STAR ICVS









Courtesy of N. Lei, VCST

VIIRS J1 Status Update

VIIRS J1 Status Update

- Ambient testing: Jan. 2014
- Pre-Environment Review (PER): Feb. 3-6, 2014
- Polarization issue (discussed later)
- Electromagnetic Interference (EMI) testing completed May 2014
    - -Sync loss issue resolved for J1
    - -Single Board Computer (SBC) Lockup (aka Petulant Mode) issueresolved for J1 (per Gleason and Raytheon)
- Thermal Vacuum testing: Jun.-Oct. 2014

VIIRS J1 Polarization Studies

- VIIRS J1 polarization sensitivity is significantly out of spec for several bands due to filter coating changes

- The VIIRS SDR team is working closely with the flight and vendor to study mitigation strategies
  - Better characterization through additional prelaunch tests
    - Measure at more scan angles, and T-SIRCUS spectral measrements
  - Better quantification of the polarization phenomenon and VIIRS on-orbit performance
  - Better understanding of impacts on EDR products

- Suomi NPP VIIRS polarization meets the polarization sensitvity specification. VIIRS J2 is expected to meet the specification

Recent Progress in VIIRS Polarization Related Studies

3/17/2014: Initiated working groups to study the impacts of polarization on products, with several actions from the first telecon on March 17 (M. Goldberg).

4/2/2014: VIIRS SDR special telecon on VIIRS J1 detector level polarization study shows large variation across detectors (presentation by J. McIntire, NASA/VCST)

4/16/2014: MODIS Terra/Aqua prelaunch and on-orbit polarization studies show large increase over the life time of the Terra/MODIS instrument (presentation by J. Xiong, NASA/VCST)

4/24/2014: Recommendations for additional prelaunch testing (telecon): More measurement angles, monochromatic characterization using T-SIRCUS.

Other progress:

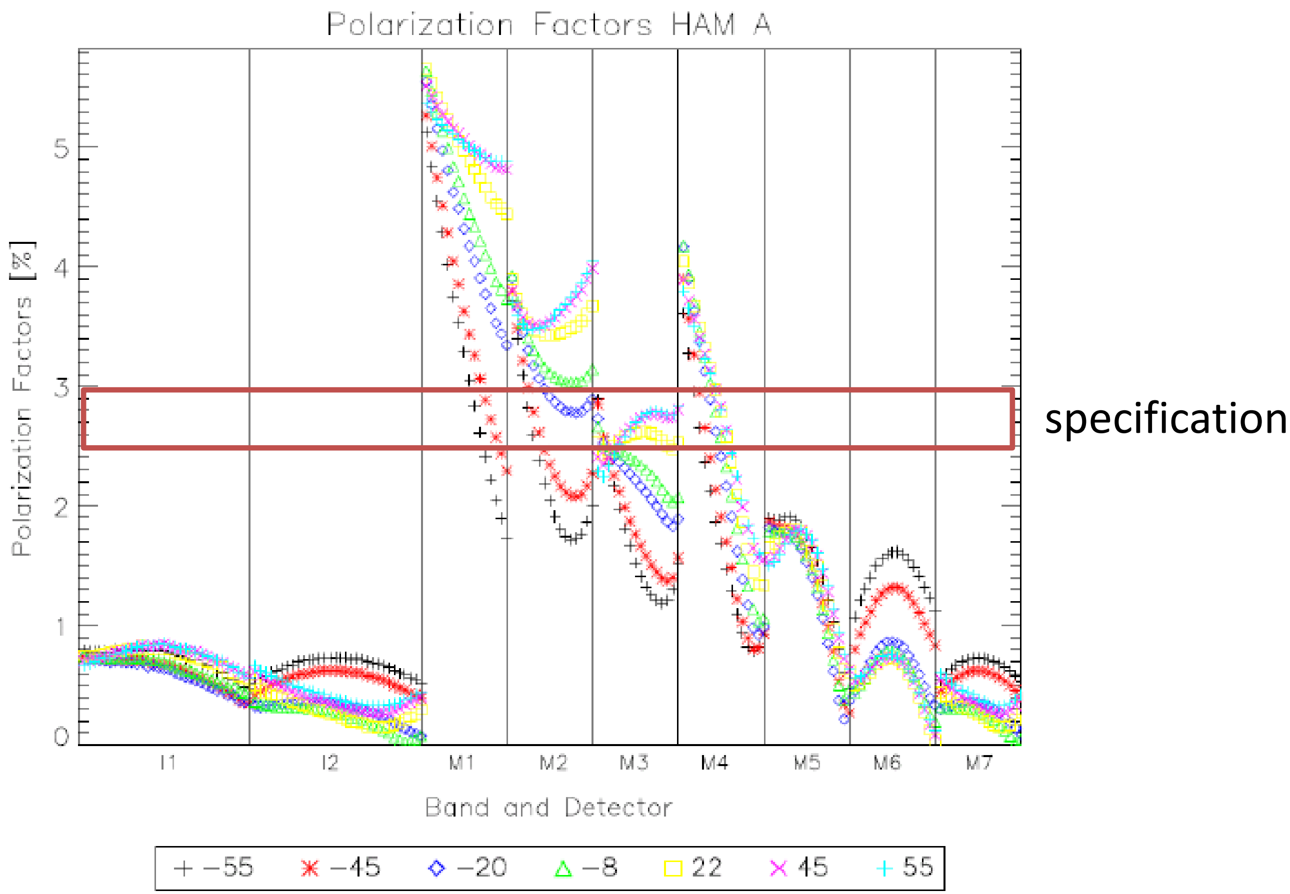
- GOME Polarization Measurement Device (PMD) on MetOp A and B
  - Sample data have been analyzed and a preliminary global map of DoLP map generated.
- Prototype polarization spectroradiometer developed leveraging the ASD spectrometer, with sample in-situ measurements

Final Polarization Factors (HAM A)

Polarization factors (combining all bvonir configurations) – HAM A

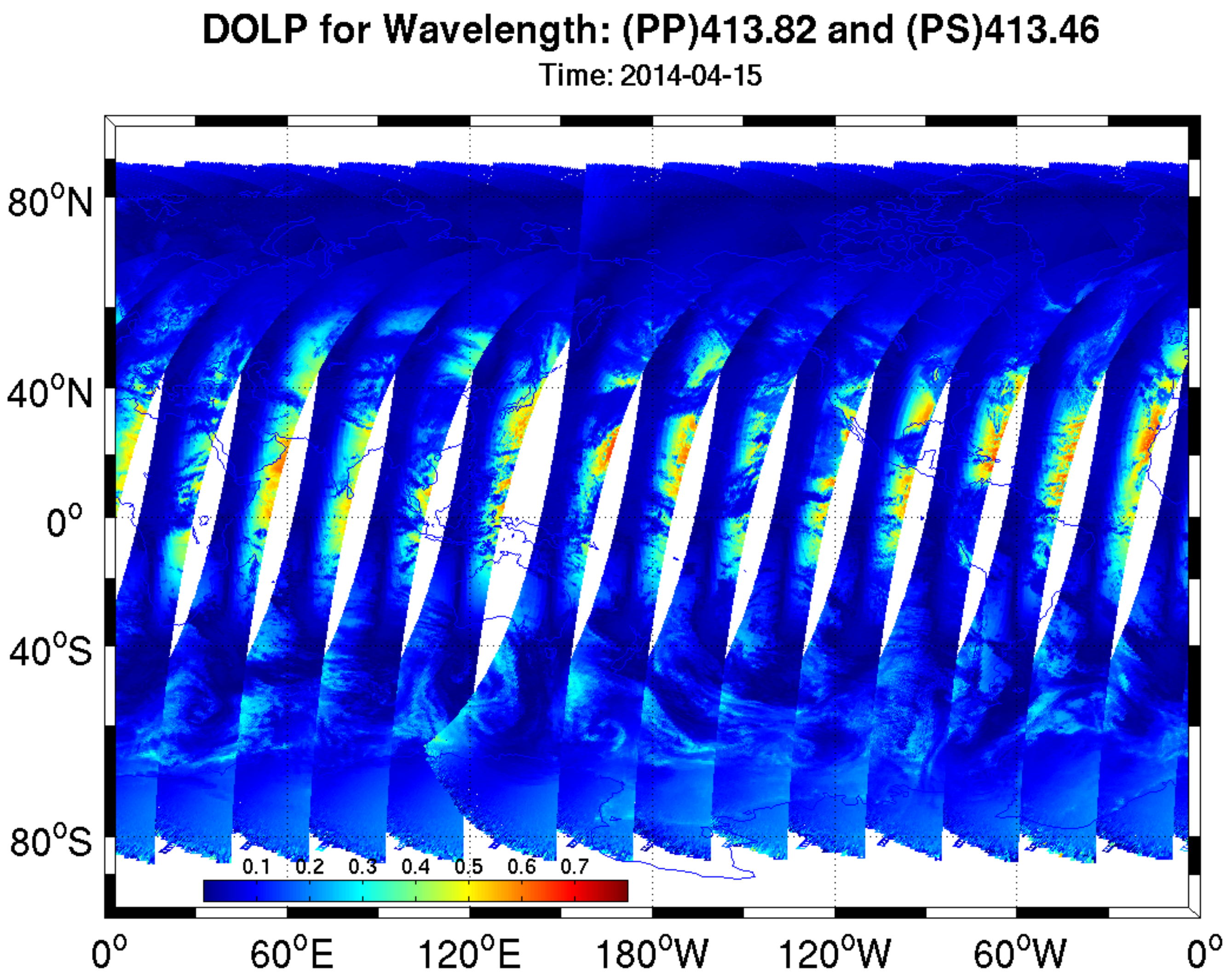
bvonir in: M1-M3; bvonir out: I1-I2, M4-M7

Factors above specification for M1-M4



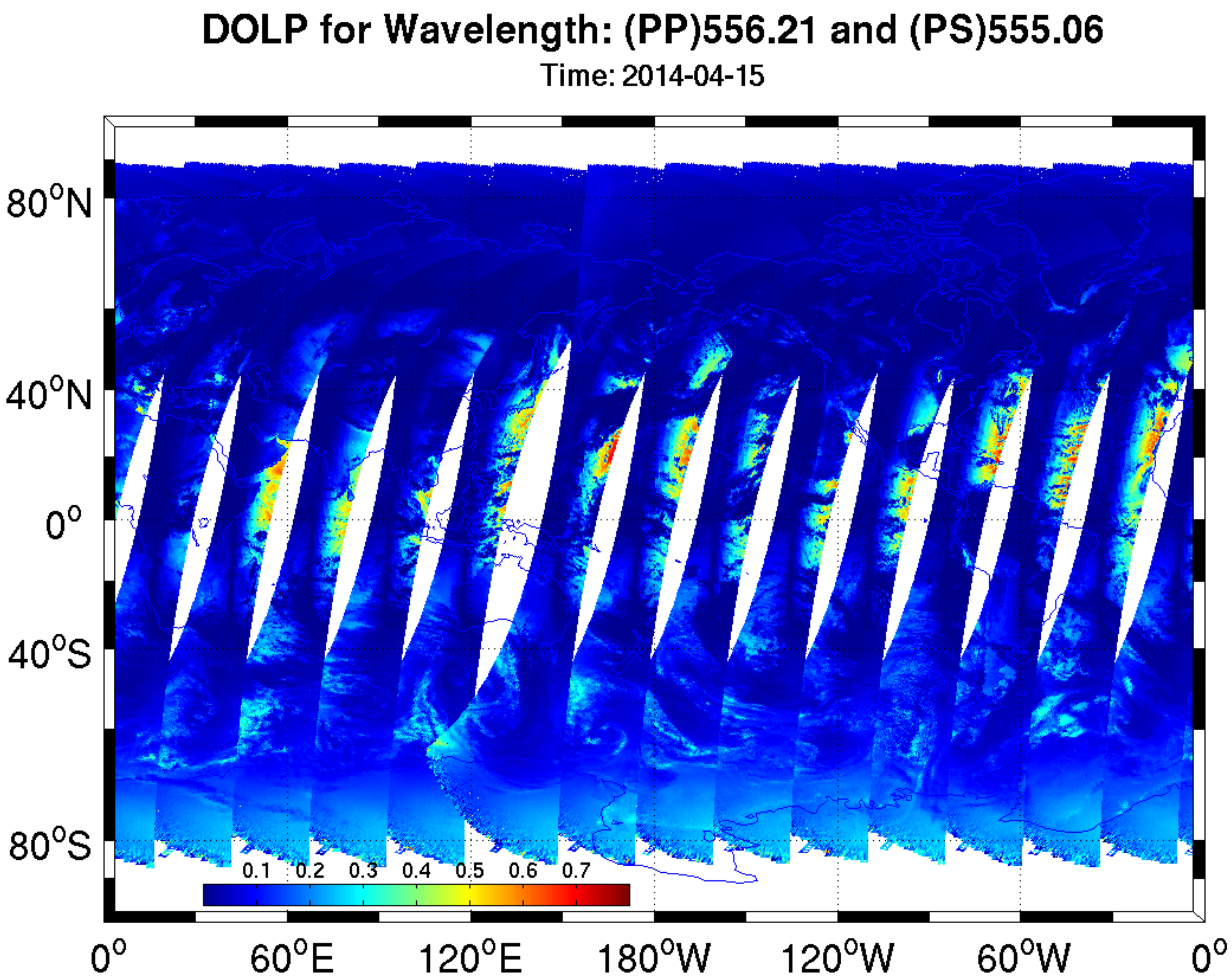
Courtesy of J. McIntire

Global Polarization Measurements from GOME PMD on MetOp B



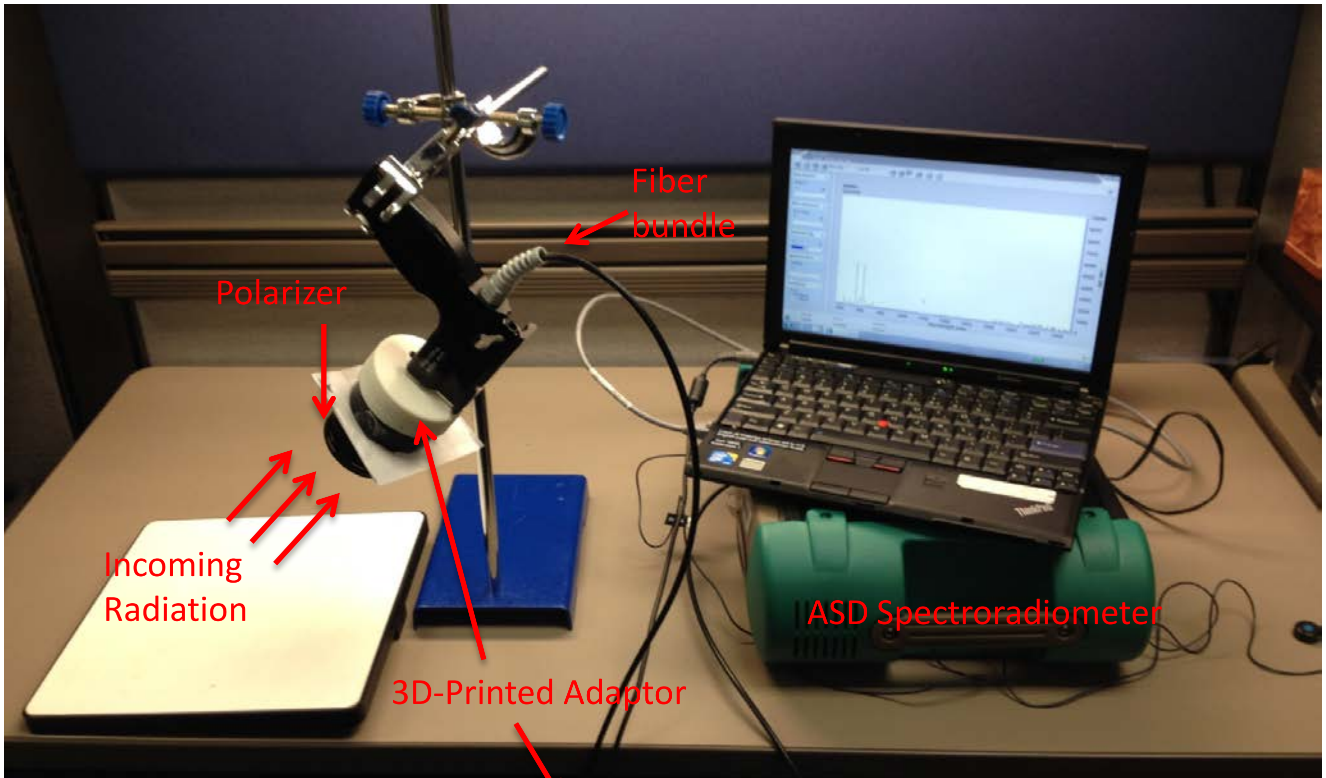
preliminary

Global Polarization Measurements from GOME on MetOp B



preliminary

Ground-Based Polarization Spectroradiometer for Validating VIIRS Polarization Sensitivity (Prototype)



(Protractor will be replaced with 3D- printed piece)

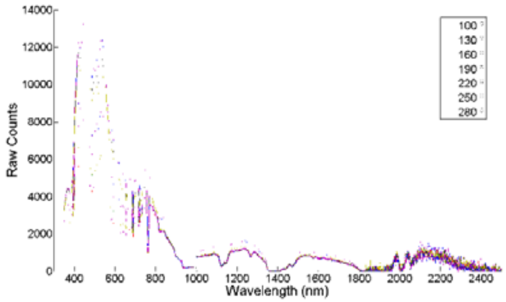
See poster by A. Pearlman et al for details

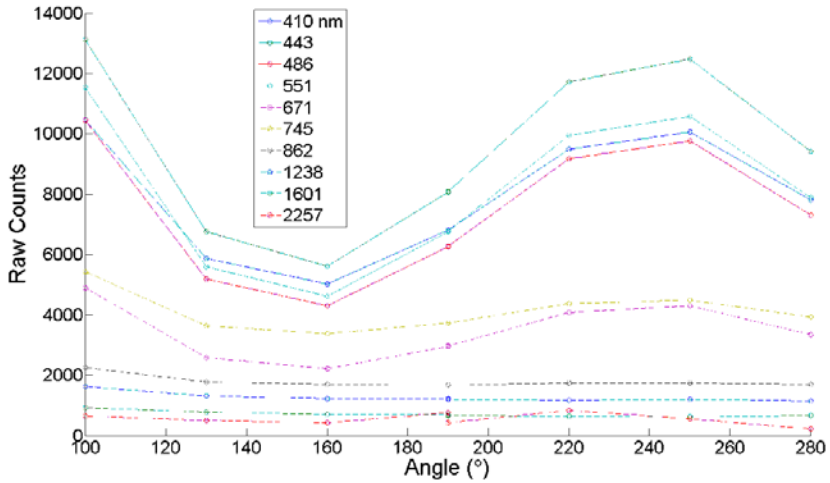
Preliminary Measurement Results

Location: M Square parking lot at 5:38 to 6:00pm (April 17, 2014)

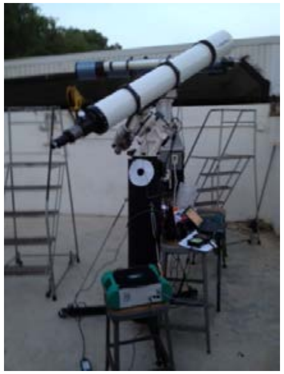
Took measurements of a highly polarized sky:

- Pointed sensor at ~90º to sun
- Mostly clear with cirrus clouds covering ~75% of sky
- Measurement time: 5 minutes





Future plan: Lunar polarization measurements at UMD observatory



Issues and Challenges

- **Achieving better calibration accuracy for Ocean Color applications**
- **Further improve onboard calibration**
  - **RSB autocal, solar vector, etc.**
- **Enhance vicarious monitoring capability to ensure high accuracy**

•Striping in both SST bands and RSB

•Detector level RSR performance issues

•Polarization effects

•Single Board Computer Lockup (SBC), aka “Petulant mode”

•Sync loss

•J1 VIIRS support

Summary

- VIIRS SDR has achieved calibrated/validated Maturity Status in both radiometry and geolocation
- Continue improving the radiometric accuracy to meet Ocean Color application needs
  - Fine tune calibration coefficients (e.g.: c0=0)
  - RSB autocal
  - Closely monitoring trend changes
  - Lunar band ratio analysis
- Future work focus on:
  - J1 calibration support, such as polarization studies (observations and RTM)
  - Further enhancements in instrument performance through research (such as striping, detector level processing, improved accuracy, etc)
  - Long term monitoring

Backup slides

VIIRS On-orbit Performance Table

- SDRs = L1b = calibrated, geolocated radiance, reflectance and brightness temperature
- 22 types of SDRs
  - –16 moderate resolution (MOD),
- 11 Reflective Solar Bands (RSB)
- 5 Thermal Emissive Bands (TEB)
  - –5 imaging resolution (IMG),
- 3 RSB; 2 TEB
  - –1 Day Night Band (DNB) imaging, broadband
- 6 non-gridded geolocation products
  - –DNB, IMG, IMG terrain corrected, MOD, MOD terrain corrected, MOD unaggregated
- 2 gridded geolocation products
  - –MOD, IMG

		Specification									Prelaunch	On Orbit	
		Band No.	Driving EDR(s)	Spectral Range (um)	Horiz Sample Interval (km) (track x Scan) Nadir	Horiz Sample Interval (km) (track x Scan) End of Scan	Band Gain	Ltyp or Ttyp (Spec)	Lmax or Tmax	Spec SNR or NEdT (K)	Measured SNR or NEdT (K) (2)	Measured SNR or NEdT (K) (1)	Measured SNR or NEdT (K) (2)
Reflective Bands	VisNIR	M1	Ocean Color Aerosol	0.402 - 0.422	0.742 - 0.259	1.60 x 1.58	High	44.9	135	352	616.8	578	588.9
							Low	155	615	316	1092	974	1045.78
		M2	Ocean Color Aerosol	0.436 - 0.454	0.742 - 0.259	1.60 x 1.58	High	40	127	380	622.4	564	572.02
							Low	146	687	409	1118	975	1010.76
		M3	Ocean Color Aerosol	0.478 - 0.498	0.742 - 0.259	1.60 x 1.58	High	32	107	416	690	611	628.46
							Low	123	702	414	1111	1003	988.54
		M4	Ocean Color Aerosol	0.545 -0.565	0.742 - 0.259	1.60 x 1.58	High	21	78	362	581.1	522	534.96
							Low	90	667	315	963.2	846	856.51
		I1	Imagery EDR	0.600 - 0.680	0.371 - 0.387	0.80 x 0.789	Single	22	718	119	240.7	215	214.07
		M5	Ocean Color Aerosol	0.662 - 0.682	0.742 - 0.259	1.60 x 1.58	High	10	59	242	366.6	321	336.13
							Low	68	651	360	827.9	673	631.26
		M6	Atmosph. Correct.	0.739 - 0.754	0.742 - 0.776	1.60 x 1.58	Single	9.6	41	199	415.2	355	368.4
		I2	NDVI	0.846 - 0.885	0.371 - 0.387	0.80 x 0.789	Single	25	349	150	304.1	251	264.01
		M7	Ocean Color Aerosol	0.846 - 0.885	0.742 - 0.259	1.60 x 1.58	High	6.4	29	215	519.8	435	457.54
							Low	33.4	349	340	845.6	636	631.24
	S/MWIR	M8	Cloud Particle Size	1.230 - 1.250	0.742 x 0.776	1.60 x 1.58	Single	5.4	165	74	273	233	221
		M9	Cirrius/Cloud Cover	1.371 - 1.386	0.742 x 0.776	1.60 x 1.58	Single	6	77.1	83	253	231	227
		I3	Binary Snow Map	1.580 - 1.640	0.371 x 0.387	0.80 x 0.789	Single	7.3	72.5	6	172	149	149
		M10	Snow Fraction	1.580 - 1.640	0.742 x 0.776	1.60 x 1.58	Single	7.3	71.2	342	714	550	586
		M11	Clouds	2.225 - 2.275	0.742 x 0.776	1.60 x 1.58	Single	0.12	31.8	10	25	21.8	22
Emissive Bands		I4	Imagery Clouds	3.550 - 3.930	0.371 x 0.387	0.80 x 0.789	Single	270	353	2.5	0.4	0.4	0.4
		M12	SST	3.660 - 3.840	0.742 x 0.776	1.60 x 1.58	Single	270	353	0.396	0.13	0.13	0.13
		M13	SST Fires	3.973 - 4.128	0.742 x 0.259	1.60 x 1.58	High	300	343	0.107	0.04	0.042	0.04
							Low	380	634	0.423			
	LWIR	M14	Cloud Top Properties	8.400 - 8.700	0.742 x 0.776	1.60 x 1.58	Single	270	336	0.091	0.06	0.06	0.05
		M15	SST	10.263 - 11.263	0.742 x 0.776	1.60 x 1.58	Single	300	343	0.07	0.03	0.03	0.03
		I5	Cloud Imagery	10.500 - 12.400	0.371 x 0.387	0.80 x 0.789	Single	210	340	1.5	0.4	0.4	0.4
		M16	SST	11.538 - 12.488	0.742 x 0.776	1.60 x 1.58	Single	300	340	0.072	0.04	0.03	0.03

(1) The Aerospace Corporation (2) NASA NICSE

HSI uses 3 in-scan pixels aggregation at Nadir

Source: VIIRS user's guide. On orbit values (last two columns for March 8, 2012) are updated based on the Murphy table for RSB, provided by Aerospace; TEB values are provided by STAR and NASA.

Updated 05/01/2012

VIIRS Sensor Specification
- RSB sensitivity

Table: 3.1.5.6.1-1 Sensitivity requirements for VIIRS Sensor reflective bands

Band	Center Wavelength (nm)	Gain Type	Single Gain		Dual Gain			
.	.	.	.	.	High Gain		Low Gain	
.	.	.	Ltyp	SNR	Ltyp	SNR	Ltyp	SNR
M1	412	Dual	-	-	44.9	352	155	316
M2	445	Dual	-	-	40	380	146	409
M3	488	Dual	-	-	32	416	123	414
M4	555	Dual	-	-	21	362	90	315
M5	672	Dual	-	-	10	242	68	360
M6	746	Single	9.6	199	-	-	-	-
M7	865	Dual	-	-	6.4	215	33.4	340
M8	1240	Single	5.4	74	-	-	-	-
M9	1378	Single	6	83	-	-	-	-
M10	1610	Single	7.3	342	-	-	-	-
M11	2250	Single	0.12	10	-	-	-	-
I1	640	Single	22	119	-	-	-	-
I2	865	Single	25	150	-	-	-	-
I3	1610	Single	7.3	6	-	-	-	-

Notes:
The units of spectral radiance for Ltyp are watt m^{-2} sr^{-1} μm^{-1}.
The SNR column shows the minimum required (worst-case) SNR that applies at the end-of-scan. Elsewhere in the scan, aggregation will yield a larger SNR.
Within the same gain setting, at radiances larger than Ltyp, the SNR will be larger than what is specified in this table.

Absolute radiometric calibration uncertainty for uniform scenes: < 2%

Source: JPSS VIIRS Performance Requirement Document
Code 472 472-00124

VIIRS Sensor Specification

- TEB sensitivity

Table: 3.1.5.6.2-1 Sensitivity requirements for VIIRS Sensor emissive bands

Band	Center Wavelength (nm)	Gain Type	Single Gain		Dual Gain			
.	.	.	.	.	High Gain		Low Gain	
.	.	.	Ttyp	NEdT	Ttyp	NEdT	Ttyp	NEdT
M12	3700	Single	270	0.396	-	-	-	-
M13	4050	Dual	-	-	300	0.107	380	0.423
M14	8550	Single	270	0.091	-	-	-	-
M15	10763	Single	300	0.070	-	-	-	-
M16	12013	Single	300	0.072	-	-	-	-
I4	3740	Single	270	2.500	-	-	-	-
I5	11450	Single	210	1.500	-	-	-	-

Notes:
The NEdT column corresponds to the minimum required (worst-case) SNR that applies at the end-of-scan. Elsewhere in the scan, aggregation will yield a larger SNR.
Within the same gain setting, at scene temperatures larger than Ttyp, the SNR will be larger than at Ttyp.
For reference, the NEdT values in Table 15 are related to the noise equivalent spectral radiance (NEdL) by the following formula:

Source: JPSS VIIRS Performance Requirement Document
Code 472 472-00124

VIIRS Sensor Specification

- TEB Uncertainty

Table: 3.1.5.9.2.3-1 Absolute radiometric calibration uncertainty of spectral radiance for moderate resolution emissive bands

Band	λc (μm)	Scene Temperature				
.	.	190K	230K	270K	310K	340K
M12	3.7	N/A	7.0%	0.7%	0.7%	0.7%
M13	4.05	N/A	5.7%	0.7%	0.7%	0.7%
M14	8.55	12.3%	2.4%	0.6%	0.4%	0.5%
M15	10.763	2.1%	0.6%	0.4%	0.4%	0.4%
M16	12.013	1.6%	0.6%	0.4%	0.4%	0.4%

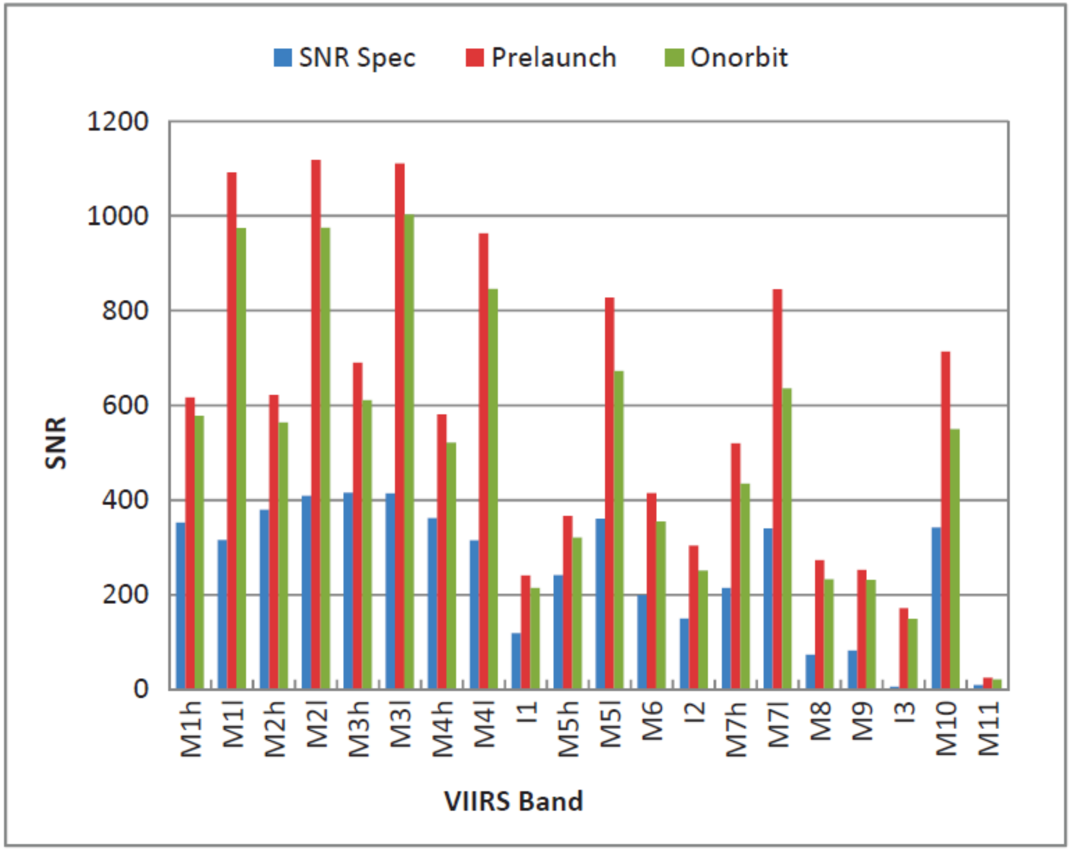
Table: 3.1.5.9.2.4-1 Radiometric calibration uncertainty for imaging emissive bands

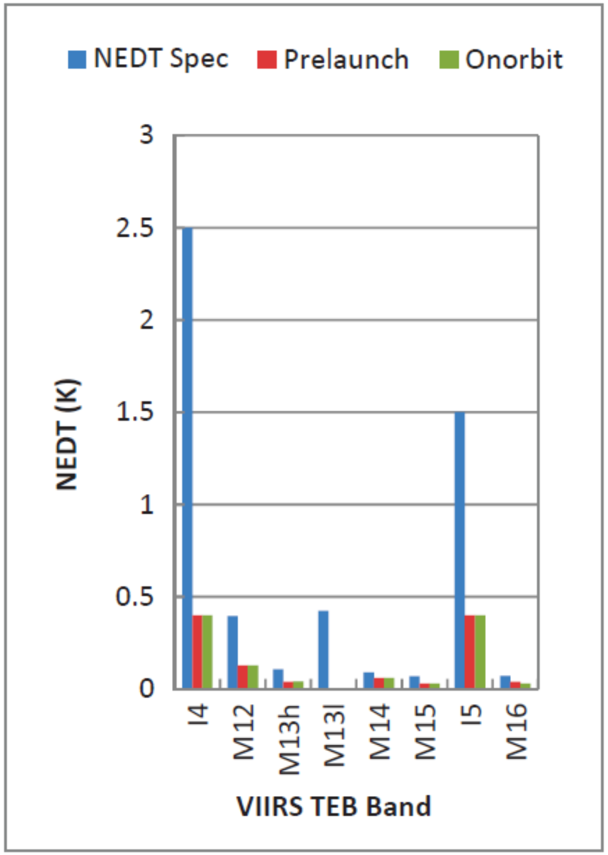
Band	Center Wavelength (nm)	Calibration Uncertainty
I4	3740	5.0%
I5	11450	2.5%

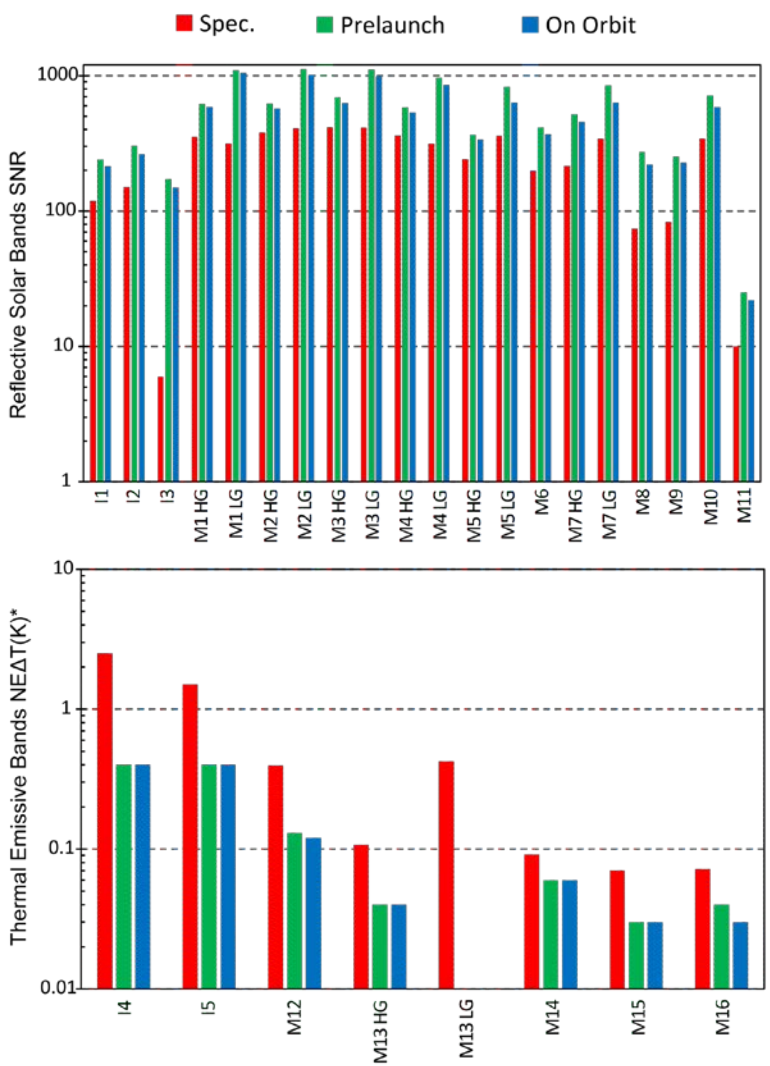
Source: JPSS VIIRS Performance Requirement Document
Code 472 472-00124

VIIRS On-orbit Performance

-SNR and NEDT



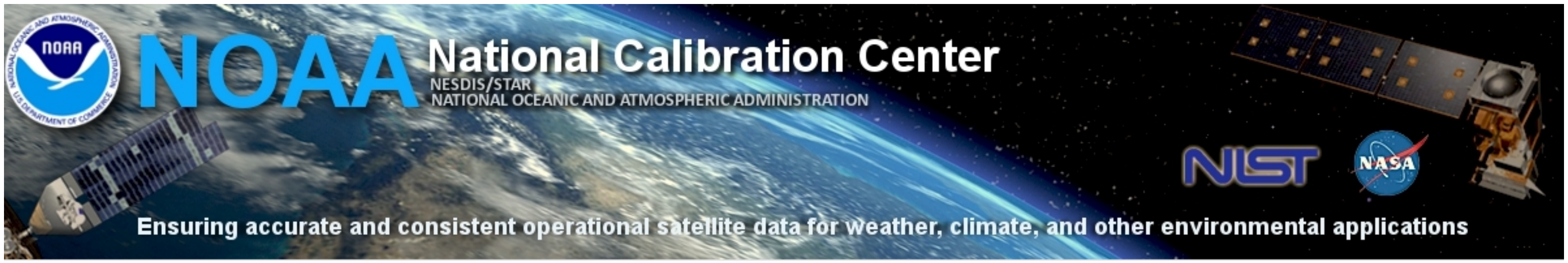




*Note NEΔT(K) is at specific temperatures (see Table 2).

VIIRS Calibration Knowledge Base Updated

One stop shop for VIIRS SDR information



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Visible Infrared Imaging Radiometer Suite (VIIRS)

The Visible Infrared Imaging Radiometer Suite (VIIRS) is one of the key instruments onboard the Suomi National Polar-Orbiting Partnership (Suomi NPP) spacecraft, which was opened on November 21, 2011, which enables a new generation of operational moderate resolution-imaging capabilities following the legacy of the AVHRR on NOAA an operational environmental monitoring and numerical weather forecasting, with 22 imaging and radiometric bands covering wavelengths from 0.41 to 12.5 microns, providing t records including clouds, sea surface temperature, ocean color, polar wind, vegetation fraction, aerosol, fire, snow and ice, vegetation, , and other applications. Results from calibration and validation have shown that VIIRS is performing very well. **VIIRS paper:** Cao, C., F. DeLuccia, X. Xiong, R. Wolfe, F. Weng, Early On-orbit Performance of the

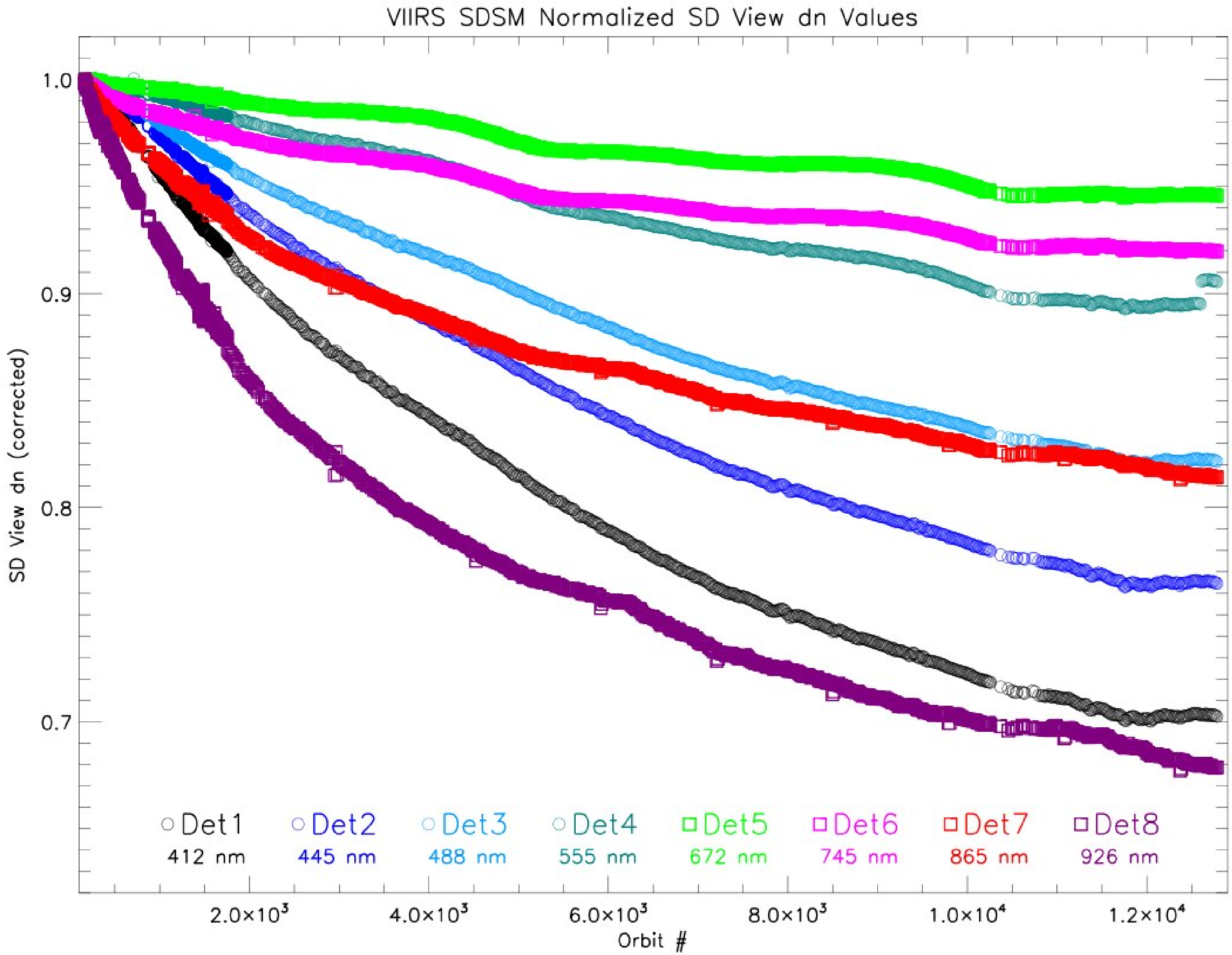
News and Documents	VIIRS Performance and Monitoring	Data and Software
News	VIIRS Longterm Monitoring	VIIRS Image Gallery
Publication Database	VIIRS On-orbit Performance Table	VIIRS data on CLASS
VIIRS Users Guide	Standardized Calibration Parameters	VIIRS data on ftp site (90 days)
VIIRS Calibration ATBD	VIIRS Spectral Response Functions	Data on GRAVITE
Conference Presentations	VIIRS Event Log Database (experimental)	VIIRS Software Tools
VIIRS Novel Applications	NPP/AQUA SNO Predictions	Planck Calculator for Infrared Remote Sensing
VIIRS SDR Data Format	Radiometric Intercomparison with MODIS	VIIRS Line Spread Function along scan
VIIRS SDR Meetings	VIIRS at Cal/Val Sites	VIIRS Cloud Mask (VCM)
VIIRS FAQ	Lunar Calendar for DNB	SDR/EDR Team
About VIIRS	Moon in Space View Events	Standard Radiometric Test Scenes

Google “NOAA NCC”

VIIRS SDR Peer Reviewed Publications

- Cao, C., F. Deluccia, X. Xiong, R. Wolfe, and F. Weng, 2013a, Early On-orbit Performance of the Visible Infrared Imaging Radiometer Suite (VIIRS) onboard the Suomi National Polar-orbiting Partnership (Suomi-NPP) Satellite, IEEE Transaction on Geoscience and Remote Sensing, DOI:10.1109/ TGRS.2013.2247768, in press (available online at IEEEXplore).
- Cao, C., X. Xiong, S. Blonski, Q. Liu, S. Uprety, X. Shao, Y. Bai, F. Weng, 2013, Suomi NPP VIIRS sensor data record verification, validation, and long-term performance monitoring, Journal of Geophysical Research: Atmospheres, DOI: 10.1002/2013JD020418
- Cao, C., X. Shao, S. Uprety, (2013b), Detecting Light Outages After Severe Storms Using the Suomi-NPP/VIIRS Day Night Band Radiances, IEEE Geoscience and Remote Sensing Letters, DOI: 10.1109/LGRS.2013.2262258, in press.
- Liu, Q., C. Cao, and F. Weng, 2013, Assessment of Suomi National Polar-Orbiting Partnership VIIRS Emissive Band Calibration and Inter-Sensor Comparisons, IEEE JSTAR, 10.1109/JSTARS.2013.2263197.
- Liao. L.B., S. Weiss, S. Mills, B. Hauss (2013), Suomi NPP VIIRS Day-Night-Band (DNB) On-Orbit Performance, Journal of Geophysical Research-Atmosphere, DOI: 10.1002/2013JD020475

- Wolfe, R., G. Lin, M. Nishihama, K. P. Tewari, J. C. Tilton, A. R. Isaacman et al., 2013, Suomi NPP VIIRS prelaunch and on-orbit geometric calibration and characterization, DOI: 10.1002/jgrd.50873, JGR special issue , in press.
- Rausch, K. et al., VIIRS RSB Autocal, JGR special issue , in press.
- Xiong, X., J. Butler, K. Chiang, B. Efremova, J. Fulbright, N. Lei, J. McIntire, H. Oudrari, J. Sun, Z. Wang, A. Wu (2013), VIIRS On-orbit Calibration Methodology and Performance, Journal of Geophysical Research-Atmosphere, DOI: 10.1002/2013JD020423.
- Uprety, S., C. Cao, X. Xiong, S. Blonski, A. Wu, and X. Shao, 2013, Radiometric Inter-comparison between Suomi NPP VIIRS and Aqua MODIS Reflective Solar Bands using Simultaneous Nadir Overpass in the Low Latitudes, JTech , doi: http://dx.doi.org/10.1175/JTECH-D-13-00071.1.



Courtesy of N. Lei, VCST

Algorithm Evaluations

- In the case of IDPS algorithms, we want the algorithm leads to provide 1 of 3 recommendations:

  1. NPOESS algorithm has evolved into the NOAA-endorsed JPSS algorithm and any needed improvements should continue.
  2. NPOESS (or evolved) algorithm will not meet requirements or effort is too large, replace with NOAA-endorsed JPSS algorithm
  3. NOAA-endorsed algorithm should be used even if NPOESS (or evolved) algorithm meets performance because of legacy, enterprise, blended products, and other considerations.

- For 2 or 3, present the alternative algorithm methodology description, algorithm performance against the level 2 supplement specification and any user assessments.