

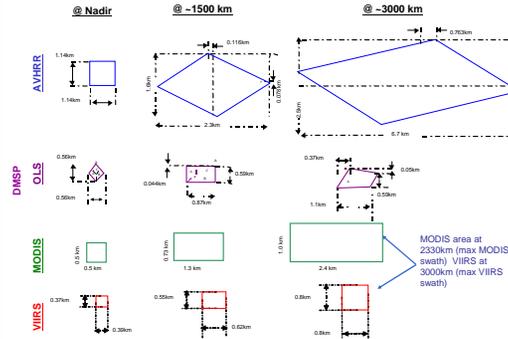
VIIRS Sensor and EDR Performance Summary and Comparisons to Heritage

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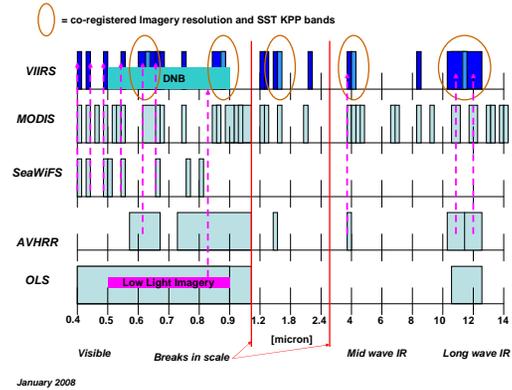
VIIRS Provides Superior Spatial Resolution Across Swath



Poster Topics Summary

- VIIRS Spatial Comparisons with Heritage Systems
- VIIRS Spectral Comparisons with Heritage Systems
- VIIRS Design Features Heritage
- VIIRS Sensor Delivery Schedule and Status
- VIIRS Design Capabilities Compared to Heritage Systems
- NPOESS VIIRS Provides Improved Spatial Resolution
- NPOESS VIIRS Supports Cloud Characterization
- VIIRS EDR Quality and Latency Performance

VIIRS Bands Combine Key Heritage Capabilities and NPOESS EDR Requirements



VIIRS Incorporates Key Features From and Improves Upon Previous Operational and R&D Sensors

Operational Sensors

OLS

- High-spatial resolution
- Day/night band
- Minimize resolution growth over scan

AVHRR

- Radiometric accuracy
- SST band continuity

VIIRS

- 74 kg
- 2 bands

R&D Sensors

MODIS

- Band selection/continuity
- Thin Cirrus band
- Solar diffuser
- Earthshine lessons learned

SeaWiFS

- Ocean color bands
- Rotating telescope

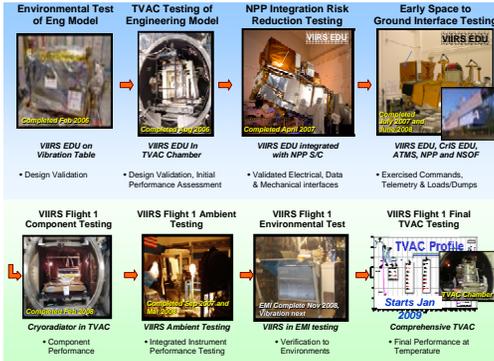
VIIRS

- 275 kg
- 22 bands

EM

- 45 kg
- 8 bands

VIIRS Flight 1 Instrument has Progressed to Final Full-up Environmental Testing Phase – Delivery in Summer 2009



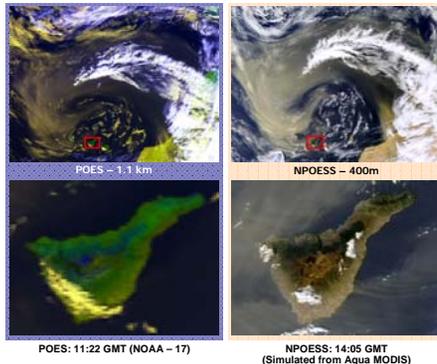
VIIRS Comparison to Heritage Sensors

Item	AVHRR (POES)	OLS (DMSP)	MODIS (Terra/Aqua)	VIIRS (NPP/NPOESS)	VIIRS Benefits
Sensor type	Operational	Operational	R&D	Operational	Operational + EDRs
Number of bands	5	2	36	22	Significant advance from DMSP/POES
VIS/NIR - SW/MIR - LWIR	(2 - 1 - 2)	(1 - 0 - 1)	(17 - 9 - 10)	(10 - 8 - 4)	Improved imagery
Imagery	Multi Color Low Res	Panchromatic + LWIR	Multi color Medium res	Multi color Medium res	Operational military applications
Special low-light, day-night band (DNB)	No	Yes	No	Yes	Better cloud mask
Thin Cirrus Band (DNB)	No	No	Yes	Yes	Better cloud mask
Resolution nadir/edge of scan	1.1km / >6 km	560 m / 1.1 km	250m, 500m, & 1 km - 246 km	375m & 750m & 1.6km	Finer resolution over more bands
Swath width	2800km	3000km	2330km	3000km	Coverage advantage
Improved edge of scan resolution	No	Yes	No	Yes	Better resolution across swath
Gray levels of DNB	1024	64 DNB/256 IR	N/A	16,284	Improves cloud and particle detection
Quantization/dynamic range	10 bit	8 bit	12 bit	12 bit and Dual gain	Comparable to Modis in performance
Bowtie deletion/Mapping projection	No	No	No	Yes	User-friendly Imagery baselined

VIIRS provides significant across the board benefits compared to heritage

NPOESS Provides Improved Spatial Resolution

Tenerife Island, Canary Islands
February 19, 2004



NPOESS/VIIRS Supports Excellent AFWA Cloud Forecasting

• 22 spectral bands

• Co-registered multi-spectral imagery

• Cloud & aerosol detection bands

• Thin cirrus & dual-gain bands

• Cloud top height, cloud top base, cloud cover layer, & opt. properties

Better CFLOS

• Superior cloud detection/discrimination

• Improves cloud-free line of sight (CFLOS) determination.

Better Detection

• 412nm dual-gain band gives superior contrast over desert and improved detection of smoke, dust, and haze

Aerosol Detection

• Excellent Aerosol detection (dust, smoke, pollution)

AFWA Cloud Forecast Models

VIIRS/NPOESS Provides:

- 3D gridded cloud product, near uniform cell size
- CTH, CTB, CCL, COP and EPS products
- Feeds directly into AFWA high resolution cloud forecast models

• Improved cloud analyses for AFWA forecast models

• Enhanced aerosol cloud discrimination procedures

• Increased knowledge of CFLOS to support missions

• Higher quality products for military applications

VIIRS Sensor Supports State of Science EDR Quality and Latency Performance at Launch

- 25 NPOESS Environmental Data Records (EDRs) are specified by 449 individual performance attributes (in addition to latency)
- 425 attributes currently expected to meet the Integrated Operational Requirements Document (IORD) requirements, with some algorithm updates in work.
- 18 currently non-compliant EDR attributes are EDR-specific mapping uncertainty parameters associated with VIIRS line-of-sight stability errors (which are extremely degraded in the terminator orbit).
- 3 stressing performance attributes: Land Surface Temperature precision, Sea Ice Classification, Snow Cover Fraction will implement new science as available.
- Ocean Color/Chlorophyll (OC/C) performance predicted to be comparable to Modis. OC/C precision spec outage errors driven by known baseline algorithm deficiencies. Characterization of optical crosstalk artifact on NPP has been performed. Spectral out of band measurements improve predicted OC/C performance. An improved filter assembly is being built for NPOESS to greatly reduce optical crosstalk
- NPP System latency expected to meet spec required performance of 140 min
- Work in place to meet NPOESS

