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SUOMI-NPP AND JPSS DATA PRODUCTS

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Outline

- Migration to Enterprise Algorithms
- Current Suite of S-NPP Data Products
- Recent science improvements
- JPSS-1 Timeline
- Improvements for JPSS-1
- Data Product Availability
- Summary

What is an Enterprise Algorithm?

Enterprise Algorithm: An algorithm that uses the same scientific methodology and software base to create the same classification of product from differing input data (satellite, in-situ or ancillary)

Advantages:

- Continuity of NOAA products between current and future NOAA operational satellites
- Cost effective processing for NOAA products
- Maintenance of fewer algorithms and systems within operations
- Creates product and verification consistency
- Better meets NOAA Line Office user needs
- Eliminates the need to retrain users for continuity missions
- Streamlines transition to operations for new satellite missions
- One transition of the algorithm service to the Ground Enterprise ARchitecture Services (GEARS) system

Migration to Enterprise Algorithms

The JPSS Proving Ground/Risk Reduction funded the adaptation of GOES-R algorithms to the JPSS/VIIRS sensors.

- Product performance was overall better than the performance of the IDPS algorithms and provided an opportunity to move towards Enterprise Algorithms.

The JPSS Program reallocated product processing responsibilities from the IDPS to NDE through approval of the following CCRs:

- NJO-2013-12, Reallocation of CrIS/ATMS EDRs
- NJO-2013-15, Reallocation of VIIRS SST EDR
- NJO-2014-25, Reallocation of Active Fires
- NJO-2015-18, Reallocation of all Priority 3 and 4 EDRs

Full transition process is outlined on the next slide

Process for Transitioning to Enterprise Algorithms/Processing

Following the approval to reallocate processing to an enterprise processing system (e.g., NDE):

1. **Flow down of Requirements**: The Configuration Managers of the applicable Level 2, 2.5, and 3 boards will confirm that CCRs have been generated in response to the Level 1 CCRs.
2. **Project Planning and Execution:** Satellite Product and Services Review Board (SPSRB) project plans are developed and executed leading to an SPSRB recommendation for operational readiness.
3. **Operationalization:** OSPO, with the applicable ground segment project, confirms reallocated product is operational, and users have been notified of the pending status of the terminated product.
4. **User Notification and Transition:** OSPO and NCEI confirm reallocated product is archived appropriately, and users have been notified of the availability of the new product, and pending status of the terminated product.
5. **Termination of Legacy Product**: After users have been given sufficient time to transition to the new products (estimated 2-4 months), the legacy products will be terminated.

S-NPP Data Products Operational As of July 2017

ATMS		CrIS	OMPS	VIIRS		
SDR	Moisture Profile	SDR	NP SDR	SDR	Cloud Optical Depth	Land Surface Temperature
TDR	Rainfall Rate	Carbon Dioxide	TC SDR	Active Fires	Cloud Particle Size Distribution	Ocean Color
Cloud Liquid Water	Snow Cover	Carbon Monoxide	Nadir Profile EDR	Aerosol Detection	Cloud Phase	Polar Winds
Ice Concentration	Snow Water Equivalent	Methane	Total Column EDR	Aerosol Optical Depth	Cloud Top Pressure	Sea Surface Temperature
Imagery	Temperature Profile	Infrared Ozone Profile		Aerosol Particle Size	Cloud Top Temperature	Snow Cover
Land Surface Emissivity	Total Precipitable Water	Outgoing Longwave Radiation		Albedo (surface)	Green Vegetation Fraction	Surface Reflectance
Land Surface Temperature	Atmospheric Vertical Temperature Profiles			Annual Surface Type	Ice Age/Thickness	Vegetation Health Index Suite
	Atmospheric Vertical Moisture Profiles			Cloud Height (Top & Base)	Ice Concentration	Vegetation Indices
				Cloud cover/layers	Ice Surface Temperature	Volcanic Ash Detection & Height
				Cloud Mask	Imagery	

Planned for Operations:
Trace Gases – Aug 2017
Ozone EDRs - Aug 2017
Land EDRs - Dec 2017

Recent Science Improvements

- Upgrades and updates that Transitioned to Operations (TTO) with the Block 2 system on March 8, 2017
  - ATMS Full radiance calibration to reduce bias in all channels of up to 0.5K
  - CrIS Full spectral SDR – increases the spectral resolution to 2211 channels
  - Top-of-Canopy Normalized Difference Vegetation Index (NDVI)
  - Vegetation Index high quality criteria
  - Adds a new Aerosol Optical Thickness (AOT) quality flag
  - Adds a new VIIRS Cloud Mask quality flag
  - Adds the VIIRS band M11 at night (IDPS capability) – full operations planned for August 2017
  - Operationalizes the new AMSR2 Sea Ice product

JPSS-1 Data Product Timeline

JPSS-1 Data Products Operationalization Plan

ATMS		CrIS	OMPS	VIIRS		
SDR	Moisture Profile	SDR	NP SDR	SDR	Cloud Optical Depth	Land Surface Temperature
TDR	Rainfall Rate	Carbon Dioxide	TC SDR	Active Fires	Cloud Particle Size Distribution	Ocean Color
Cloud Liquid Water	Snow Cover	Carbon Monoxide	Nadir Profile EDR	Aerosol Detection	Cloud Phase	Polar Winds
Ice Concentration	Snow Water Equivalent	Methane	Total Column EDR	Aerosol Optical Depth	Cloud Top Pressure	Sea Surface Temperature
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Land Surface Temperature	Atmospheric Vertical Temperature Profiles			Annual Surface Type	Ice Age/Thickness	Vegetation Health Index Suite
	Atmospheric Vertical Moisture Profiles			Cloud Height (Top & Base)	Ice Concentration	Vegetation Indices
				Cloud cover/layers	Ice Surface Temperature	Volcanic Ash Detection & Height
				Cloud Mask	Imagery	

All Key Performance Parameters and SDRs available to CalVal teams once instruments are turned-on and Operational ~L+90 days

JPSS-1 Cal Val Timeline

All Products follow the NESDIS Satellite Products and Services Review (SPSRB) process to be made Operational to the user community.
EDRs will be made available operationally once they reach Provisional Maturity.

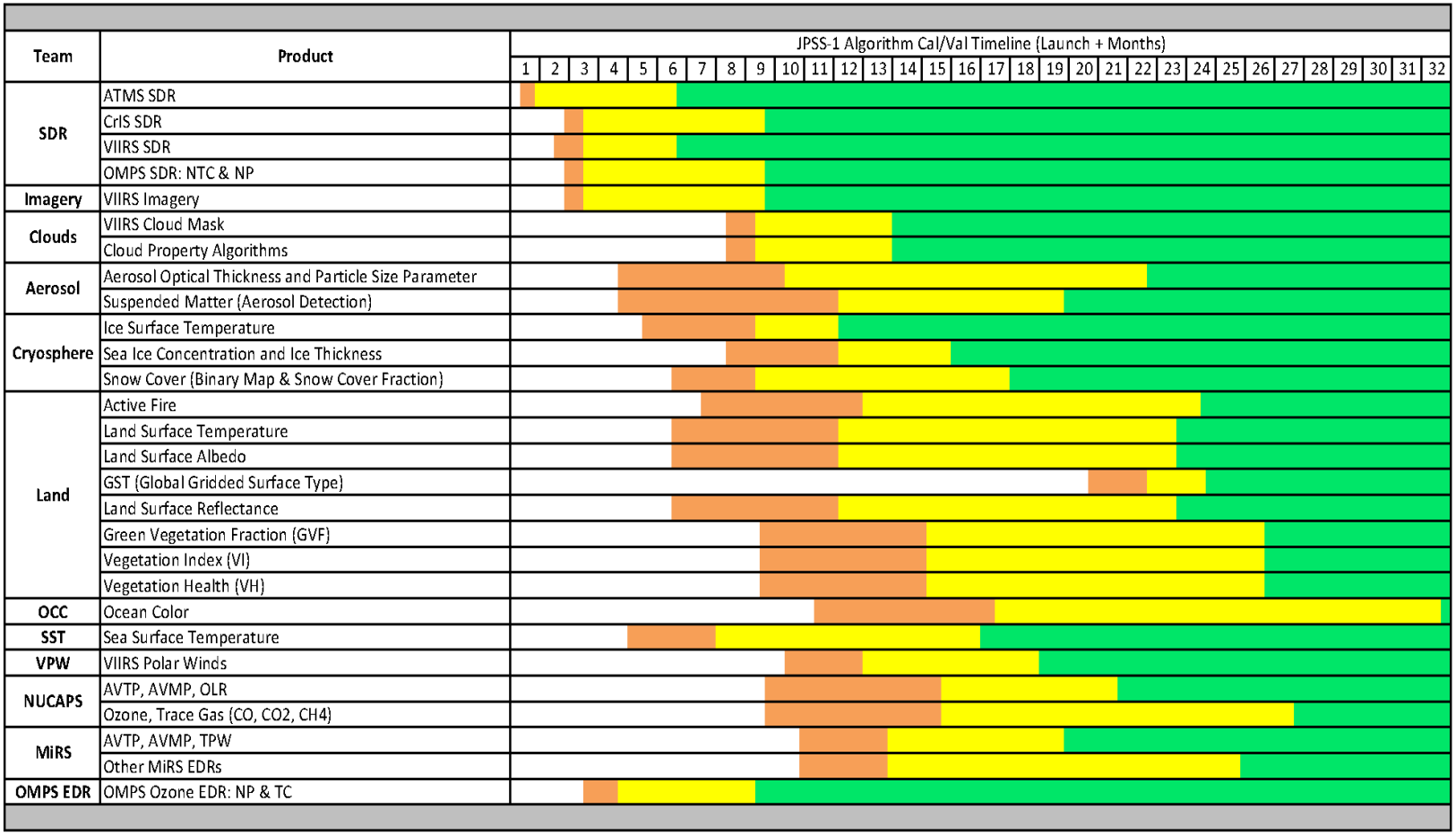

Figure courtesy of NESDIS/STAR

Some changes for JPSS-1 Data Products

- CrIS Full Spectral SDR
  - NESDIS will only generate the 2311 channel and ~450 channel subset products based on the JPSS-1 CrIS Full Spectral Data set.
    - S-NPP FS CrIS products are expected to be available in August 2017
  - NESDIS will be working with the user community to discontinue production of the S-NPP Truncated Spectral products (1305 channel and 399 channel subset) following the Satellite Products and Services Review Board (SPSRB) product termination process
- OMPS Improved Spatial Resolution
  - JPSS-1 OMPS will produce Nadir Profiler (NP) products at 50x50km compared to S-NPP OMPS NP, which is at 250x250km resolution

Data Product Access

- NESDIS Operational Distribution System – Product Distribution and Access (PDA)
  - Latency is ~140min for S-NPP and ~96min for JPSS-1
  - Serves real-time, operational users
  - Data available in netcdf4 and other formats (GRIB2, geotiff, BUFR)
- Archive system – CLASS
  - Up to 6 hour latency
  - Easy-access FTP site for last ~80 days of data products
  - Subscription and request form archive access to full mission data
- Direct Readout
  - Latency can be as low as 15 min
  - Subset of products available using the JPSS CSPP software (from CIMSS)
  - Requires a direct readout antenna or access to an existing one
  - In Alaska, GINA is a key component to the data access.
- Government Resources for Algorithm Verification, Independent Test & Evaluation (GRAVITE)
  - Access for CalVal teams to RDRs, SDRs from “Day 1”
  - Latency is near real-time
- Test & Experimental Products
  - Some products available in near-real time in multiple formats
  - Available from NESDIS/STAR websites as well as Cooperative Institutes (CIRA, CIMSS, CICS) and NASA/SPORT

Summary

- For S-NPP, the data products are meeting performance requirements, and we expect to complete the transition to enterprise algorithms by the end of 2017
- For JPSS-1, Product Lifecycle and CalVal planning is complete and ready for Launch.
  - Expectation is that JPSS-1 will meet or exceed all performance requirements for data products
  - Planning for JPSS-1 data products to mature and reach operations faster than with S-NPP.
    - CrIS SDR, ATMS TDR, and VIIRS Imagery EDRs for Alaska are planned to be available to key users by L+90 days and fully operational soon thereafter.
    - Remaining products will become operational after they reach Provisional Maturity, approximately 5-18 months after launch (depending on the data product)
- Potential new products
  - Working with users, STAR, and the JPSS Program Scientist on the addition of new products to the JPSS requirements list, including:
    - ATMS Snowfall Rate
    - Blended Arctic and Antarctic Imagery
    - Global gridded and composited Land Surface Temperature and Land Surface Albedo products