



STAR JPSS Enterprise Algorithms Workshop – Introduction and Meeting Objectives

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Outline



- Welcome & Logistics
- Background
- Current Status
- Workshop Objectives and Outcomes



Welcome & Logistics



- **Dial-in**

Telephone: 866-631-7603

passcode: 6256206

- **Wed March 30, WebEx:**

Event number: 990 357 063

Event password: JPSS

Event address for attendees: <https://star-nesdis-noaa.webex.com/star-nesdis-noaa/onstage/g.php?MTID=e88bbf7a9c51efbbfdcb500f457c450c6>

- **Thurs, March 31, WebEx:**

Event number: 994 129 368

Event password: JPSS

Event address for attendees: <https://star-nesdis-noaa.webex.com/star-nesdis-noaa/onstage/g.php?MTID=e5b64e51baa6d1b4d4dc4b8ab8a17e6d9>

- **BOX LUNCHES:**

Please do not forget to sign up for a box lunch.

<https://kloudcafe.wufoo.com/forms/star-jpss-enterprise-algorithms-workshop/>

- **WEB PAGE:**

We have a conference web page where final presentations and the conference report will be uploaded after the meeting.

http://www.star.nesdis.noaa.gov/star/meeting_SJEA2016.php



Enterprise Algorithms



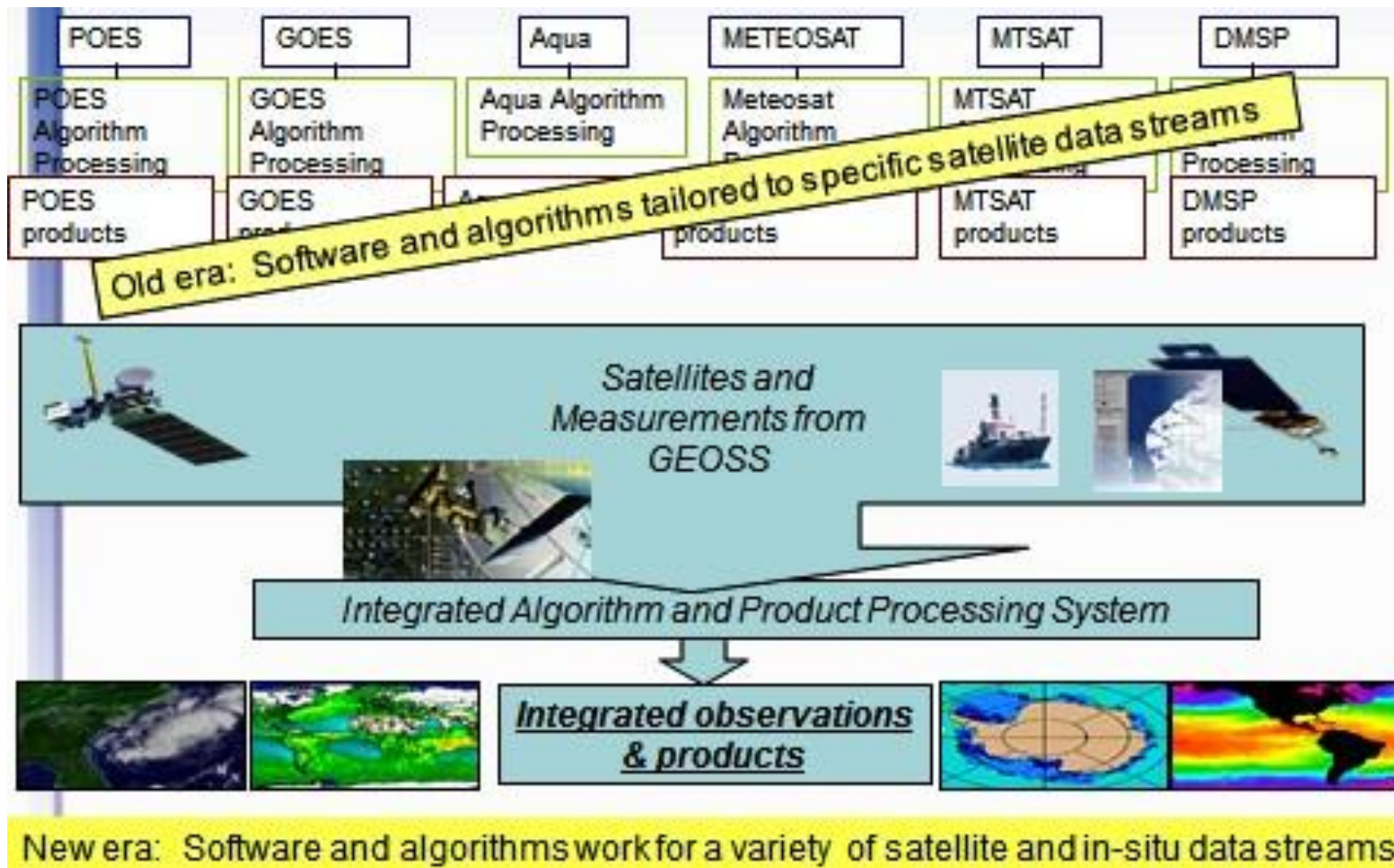
- **What is an Enterprise Algorithm?**

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

- **Benefits**

- **Continuity** of NOAA products between current and future satellites
- Enterprise algorithms will **reduce maintenance costs** for algorithms due to fewer algorithms to maintain
- STAR Algorithm Scientific Software Integration and Transition Team (ASSISTT) **improves coordination** between science teams and operations (reduces 'back-and-forth' between scientists and integrators)
- Combined standard engineering reviews that follow the Satellite Product and Services Review Board (SPSRB) review process thereby **reducing the overall number of reviews**
- Combined requirements within Data Product Spec will **reduces amount of lower level requirements verification**

Satellite Strategies in Transition (Towards JPSS-1 and Beyond)





JPSS Program Direction



- For JPSS Priority 3 and 4 products, JPSS STAR (JSTAR) has been directed by NJO to:
 - Stop working on the NPOESS-heritage algorithms running in IDPS.
 - Defer implementation of the algorithm change packages related to priority 3 and 4 products; only with exceptions with the changes that will impacts the current operational users of those products.
 - Continue work on **enterprise science algorithms** for all the JPSS 3 and 4 EDR products.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL ENVIRONMENTAL SATELLITE, DATA,
AND INFORMATION SERVICE
Silver Spring, Maryland 20910
Joint Polar Satellite System Office

Memorandum for: Distribution
 From: Harry A. Cilliers, Director
 Subject: Deferral of Algorithm Integration Activities and Standards for Priority 3 and 4 Environmental Data Records and Termination of Listed NPOESS Heritage Algorithms
 OCT 06 2014

This memorandum provides programmatic guidance and direction to defer the algorithm integration and transition to operations for priority 3 and 4 algorithms until after Block 2.0 is successfully fielded. This memorandum also establishes expected standards for algorithm science verification scope of the Priority 3 and 4 Environmental Data Records (EDRs), effective through FY 2017 and directs the termination of further development on NPOESS heritage algorithms that are planned to be replaced by enterprise algorithms. The direction applies to scope allocated to the NASA JPSS Ground Project, the NESDIS Center for Satellite Applications and Research (STAR), and the JPSS Program System Engineering (PSE) team.

To ensure readiness of the critical data products, consistent with gap mitigation efforts, all Key Performance Parameter (KPP / Priority 1) data products for JPSS-1 must be ready for operational use the day following successful commissioning review and hand over of the JPSS-1 spacecraft for NOAA OSPO operations. Accordingly, updates and verification of the Priority 1 data products must be completed prior to the launch of JPSS-1. To allow adequate schedule and resources to accomplish this, the Ground Project and STAR will defer algorithm changes associated with Priority 3 and 4 EDRs performance until an appropriate interval (i.e., when most time- and cost-efficient) following IDPS Block 2.0 transition to operations (see Table 1). Reactive maintenance¹ of priority 3 and 4 EDRs shall be conducted to maintain current levels of product maturity and to avoid major impacts to operational users.

In conjunction with this deferral, my standard for the algorithm science performance requirements verification for Priority 3 and 4 EDRs will be continuity of performance represented by the current maturity of associated S-NPP EDRs. I will accept artifacts used to support S-NPP validated maturity declaration as applicable to JPSS-1 pre-launch science algorithm verification as appropriate. JPSS-1 Ground Segment pre-launch testing of these EDRs will be limited to ensuring continuity of the science and functional performance of the supporting algorithms within the new processing environments. Work involving required upgrades to algorithm science performance will continue to be performed by STAR in order to support integration activities after transition to Block 2.0 operations.

Please implement the following guidance:

STAR – Place highest priority on assuring KPP (Priority 1) data product algorithms are ready for operational use the day after commissioning JPSS-1. Stop all development work on the NPOESS-heritage data product algorithms identified to be discontinued in Table 1 below. Continue the algorithm

¹ Reactive maintenance refers to those activities, based on product trending and long-term monitoring, needed to maintain the current level of product maturity to ensure there is no degradation of product quality with time.

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JPSS-FY14-09-LTR-D-74

Notes:

1. Reactive maintenance will be maintained until the NOAA enterprise risk reduction cloud, cryosphere and aerosol algorithms are operationalized (planned spring 2016).
2. These products are not included in the enterprise risk reduction project and therefore these products are candidates for offline development by STAR. An implementation trade will be done as to where the algorithms will be processed.
3. CCR is seek to propose removal of product requirement from LIRD and move into Level 3 requirements where STAR would provide this product as ancillary data.
4. The IDPS Ocean Color product will be replaced by the NOAA enterprise Ocean Color product and implemented in the NOAA/ESPC legacy system Oceanica on a best-effort basis.
5. The Active Fires algorithm is currently implemented in IDPS, but an Analysis of Alternatives is underway to determine the implementation for the new/updated algorithm.
6. Reactive maintenance should start following the implementation (in process) of the v5 algorithms.



Future JPSS Product Processing



Mission Unique	Enterprise		
AMSR RDR	Active Fires (VIIRS)	Green Vegetation Fraction (VIIRS)	Sea Ice Concentration (ATMS)
ATMS AP/RDR/SDR/TDR	Aerosol Optical Thickness (VIIRS)	Ice Surface Temperature (VIIRS)	Sea Surface Temperature (AMSR-2/3)
CrIS AP/RDR/SDR	Aerosol Particle Size Parameter (VIIRS)	Imagery (AMSR-2/3)	Sea Surface Temperature (VIIRS)
VIIRS AP/RDR/SDR	Albedo (Surface) (VIIRS)	Imagery (ATMS)	Sea Surface Wind Speed (AMSR-2/3)
CERES AP	AMSR Calibrated Sensor Data (AMSR)-2/3)	Infrared Ozone Profile (CrIS)	Snow Cover/Depth (AMSR-2/3)
OMPS-N AP/RDR/SDR	Atmospheric Vertical Moisture Profile (CrIS/ATMS)	Land Surface Emissivity (ATMS)	Snow Cover (ATMS)
OMPS-L AP/RDR/SDR	Atmospheric Vertical Temperature Profile (CrIS/ATMS)	Land Surface Temperature (VIIRS, ATMS)	Snow Cover (VIIRS)
VIIRS Imagery EDR	Carbon Monoxide (CO) (CrIS)	Methane (CH ₄) (CrIS)	Snow Water Equivalent (ATMS, AMSR-2)
<p>Associated Intermediate, Ancillary, and Auxiliary products would follow the appropriate mission-unique or enterprise product.</p> <p>JPSS also supports inclusion of JPSS data into blended and derived satellite products (not listed here).</p>	Carbon Dioxide (CO ₂) (CrIS)	Moisture Profile (ATMS)	Soil Moisture (AMSR-2/3)
	Cloud Base Height (VIIRS)	Ocean Color/Chlorophyll (VIIRS)	Surface Type (AMSR-2/3)
	Cloud Coverage/Layers (VIIRS)	Outgoing Longwave Radiation (CrIS)	Surface Type (VIIRS)
	Cloud Effective Particle Size (VIIRS)	Ozone Nadir Profile (OMPS-N)	Suspended Matter (VIIRS)
	Cloud Liquid Water (AMSR-2/3)	Ozone Total Column (OMPS-N)	Temperature Profile (ATMS)
	Cloud Liquid Water (ATMS)	Polar Winds (VIIRS)	Total Precipitable Water (AMSR-2/3)
	Cloud Mask (VIIRS)	Precipitation (Type/Rate)(AMSR-2/3)	Total Precipitable Water (ATMS)
	Cloud Optical Thickness (VIIRS)	Quarterly Surface Type (VIIRS)	Vegetation Indices (VIIRS)
	Cloud Top Height (VIIRS)	Rainfall Rate (ATMS)	Vegetation Health Index Suite (VIIRS)
	Cloud Top Pressure (VIIRS)	Sea Ice Characterization (AMSR-2/3)	
	Cloud Top Temperature (VIIRS)	Sea Ice Characterization (VIIRS)	



Status of Migration to Enterprise Algorithms



- **Many JPSS data products are already generated or in process implemented in operations using enterprise algorithms**
 - Advanced Clear-Sky Processor for Oceans (ACSPO) for Sea Surface Temperature, Microwave Integrated Retrieval System (MIRS) for the microwave products, Clouds, Aerosols, Cryosphere, Polar Winds, SST, Ocean Color, OMPS V8, NUCAPS, Vegetation Health, Vegetation Fraction, Active Fire
- **Remaining land products to be transitioned are under development.**
 - Surface Reflectance, Land Surface Temperature, Vegetation Indices, Land Albedo
 - Surface type: Annual Surface Type (AST) is generated in STAR
 - Draft project plans will be available by March 2016 that will guide their implementation for S-NPP/J1.
- **AMP/STAR will continue to work with PSE, OSGS, JPSS on the implementation of the enterprise algorithm for all Level 2+ products for all JPSS missions (i.e., implementation of the DPN study and Segment 3).**



Workshop Objectives and Outcomes



Objectives:

- Present successful stories, lessons learned of the algorithms already implemented in NDE
- Algorithm design of Land Products Suite, including global composite products
- Initial IDPS Fly-out plan
- Issues/risks (format/content difference, dependencies)
- Actions and path forward

Outcomes:

- Report that captures the current status and future plans for JPSS EDR Enterprise Algorithms
- Updated project plans with schedules, milestones of DAPs and NDE implementation of the Ozone and Land Algorithms



Agenda



DAY 1

- 9:00 Opening Remarks Mike Kalb/Lihang Zhou
- 9:15 Overview of STAR Enterprise Algorithm Development Walter Wolf
- 9:30 NUCAPS Mark Liu
- 9:45 MIRS Chris Grassotti
- 10:00 OMPS V8 TC/ NP Larry Flynn
- 10:25 **BREAK**
- 10:40 Sea Surface Temperature Alex Ignatov
- 10:55 Ocean Color Menghua Wang
- 11:10 JRR Cloud Products Andy Heidinger
- 12:00 **LUNCH**
- 1:00 JRR Aerosol Products Shobha Kondragunta/ Istvan Laszlo
- 1:45 JRR Cryosphere Products Jeff Key
- 2:30 **BREAK**
- 2:45 Surface Reflectance Eric Vermote
- 3:30 GVF/ Vegetation Index Marco Vargas
- 4:15 Vegetation Health Felix Kogan
- 4:45 *Discussion/ Final Remarks*
- 5:00 **ADJOURN**

DAY 2

- 9:00 Welcome/Logistics
- 9:05 Refresh Discussion Items from yesterday
- 9:15 Albedo Bob Yu
- 9:45 LST Bob Yu
- 10:45 **BREAK**
- 11:00 Active Fire Ivan Csiszar
- 11:30 Surface Type Jerry Zhan
- 12:00 **LUNCH**
- 1:00 Gridding Product Marina Tsidulko
- 1:30 Software Implementation Bigyani Das
- 2:00 IDPS Fly-out plan Lihang Zhou
- 2:30 *Discussion Session*
- ✓ Identify risks, actions
 - ✓ Discuss path forward
 - ✓ Path forward, next steps
- 4:15 **END**