



JPSS ASSISTT Overview and STAR Enterprise Algorithm Development

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ASSISTT



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- Changed team name from AIT to ASSISTT earlier this year
 - ASSISTT - Algorithm Scientific Software Integration and System Transition Team
 - Name was changed since we do more than algorithm integration
 - AIT is part of ASSISTT



ASSISTT works with science teams and the stakeholders to do the following:



- Conduct a standard set of project reviews
- Generate a standard set of documentation
- Stakeholder interaction
 - Requirements development/refinement
- Risk tracking and mitigation
- Code cleanup for:
 - Coding/Security
 - Configuration Management
 - Software Testing & Product Validation
 - Common data formats and metadata (CF & ISO)
 - Standard languages, tools, and libraries
- Early product distribution for user pre-operational readiness
- Delivered Algorithm Package (DAP) delivery



ASSISTT Role



- ASSISTT supports the JPSS algorithms and product transition to operations
- There has been a migration of the IDPS Algorithms to the Enterprise Algorithms
- This migration has brought about a merging of responsibilities across ASSISTT projects
 - JPSS, NDE, and GOES-R



ASSISTT Project Intersection



- The 3 teams intersect because:
 - 1) JPSS is the mission, project management, funding source, IDPS was where EDRs were generated
 - 2) The GOES-R efforts are where the Enterprise algorithms and the STAR Algorithm Processing Framework (SAPF) have their origin
 - 3) NDE is where all these Enterprise algorithms (using the SAPF) are now starting to be run
- Adoption of NDE S-NPP products and Blended products under the ASSISTT umbrella, as well as migrating the EDRs to NDE, has caused a shift in some staff responsibilities



IDPS ASSISTT



- Project Lead – Bigyani Das
 - OMPS SDR and EDR support, Aerosol EDR Support, Cryosphere EDR Support
- QA – Valerie Mikles
- Algorithm Support – Vipuli Dharmawardane
 - CrIS and ATMS SDR Support
- Algorithm Support – Weizhong Chen
 - VIIRS SDR Support, Imagary Support, Cloud Support, Software Installation
- Algorithm Support – Qiang Zhao
 - Land EDR Support
- Testing Support – Kristina Sprietzer
- Configuration Management – Yunhui Zhao
- Documentation Support – Larisa Koval



IDPS Algorithms



- VIIRS SDR
- ATMS SDR
- OMPS SDR
- CrIS SDR
- VIIRS Imagery
- Remaining IDPS EDR algorithms



NOAA Unique Algorithms in NDE Plus Enterprise JPSS Algorithms



- NOAA Unique Combined Atmospheric Processing System (NUCAPS)
- CrIS Full Resolution
- CrIS Outgoing Longwave Radiation (OLR)
- Microwave Integrated Retrieval System (MiRS)
- Microwave Tropical Cyclone Products (MTCP)
- Green Vegetation Fraction (GVF)
- Vegetation Health (VH)
- VIIRS Polar Winds (VPW)
- AMSR-2 Products
- Ocean Color (OC)
- Sea Surface Temperature – Advanced Clear-Sky Processor for Oceans (ACSP0)
- Active Fires (AF)
- OMPS Total Ozone (V8TOz)
- OMPS Nadir Profile (V8Pro)
- OMPS Limb Profile
- Surface Reflectance (SR)
- Vegetation Index Products (VI)
- JPSS Risk Reduction “Enterprise” Algorithms



Blended and Tailored



- Blended SST
- Blended Biomass Burning
- Blended Snow and Ice Cover
- Blended Ozone
- Reformatter Toolkit
 - CrIS Radiances (BUFR)
 - ATMS Radiances (BUFR)
 - VIIRS Radiances (BUFR)
 - Nadir Profile Ozone (BUFR)
 - Total Column Ozone (BUFR)
 - OMPS Limb Profile (BUFR)
 - Sea Surface Temperature (BUFR)
 - Aerosol Optical Depth (BUFR)
 - VIIRS Polar Winds (BUFR)
 - Green Vegetation Fraction (GRIB2)
 - AMSR2 Radiances (BUFR)
 - AMSR2 SST (BUFR)
 - AMSR2 Sea Ice (GRIB2)



STAR Algorithm Processing Framework Support for Enterprise Algorithms



- Project Lead – Shanna Sampson
- Integration Lead – Aiwu Li
- QA – Veena Jose
- Algorithm Support – Ruiyue Chen
 - Clouds, Aerosols
- Algorithm Support – Brian Helgans
 - Winds, SST
- Algorithm Support – Qiang Zhao
 - Land
- Algorithm Support – Anil Kapahi
 - Cryosphere
- Framework Developer – Alexander Ken
- Configuration Management – Yunhui Zhao
- Documentation Support – Larisa Koval



JPSS Algorithms in the STAR Algorithm Processing Framework



- Cloud Mask
- Cloud Top Phase
- Cloud Type
- Cloud Top Height
- Cloud Top Temperature
- Cloud Top Pressure
- Cloud Optical Depth
- Cloud Particle Size Distribution
- Cloud Liquid Water
- Cloud Ice Water Path
- Aerosol Detection – Smoke & Dust
- Aerosol Optical Depth
- Aerosol Particle Size
- Volcanic Ash Mass Loading
- Volcanic Ash Height
- Ice Concentration and Cover
- Ice Surface Temperature
- Ice Thickness/Age
- Snow Cover
- Fractional Snow Cover
- Land Surface Temperature
- Surface Albedo
- Cloud Base Height
- VIIRS Polar Winds (VPW)



ASSISTT Goals



- Support teams through the change process for the SDR and EDR algorithms for algorithm updates, bug fixes and LUT updates
 - Extended data processing when needed
 - Guide teams through transition process
 - Prepare Delivered Algorithm Packages
- To be ready to process J1 data using the SDR and EDR algorithms when the J1 data is available
- To run the S-NPP and J1 algorithms in near real-time for validation purposes and support user readiness
- Eventually, to support reprocessing using the EDR algorithms



Life Cycle Processes



- Lifecycle process and change process for IDPS and NDE algorithms are different:
 - JPSS Lifecycle Process
 - Based upon the NASA 7120 and 7150 processes
 - SPSRB Process for algorithms going into NDE
 - http://projects.osd.noaa.gov/SPSRB/design_review_guidance.htm
- Documentation for each process is different



Algorithm Change Steps Are the Same



- Science Teams update their algorithms
- Algorithms are implemented into the offline version of the operational system
- Algorithms are unit tested
- Algorithms are tested on extended data (currently 6 weeks to 3 months)
- Algorithms are tested in near real-time
- Algorithm delivered for operational implementation



Algorithm Testing



- Implemented an HTCondor cluster within STAR to support the algorithm change process and algorithm testing
- Cluster will be used for algorithms testing on extended data (currently 6 weeks to 3 months)
- When the algorithm team gives the go ahead from the extended testing results, then the algorithms will be promoted to near real-time processing on the cluster



More on Cluster Processing



- Will purchase more cores in FY17 to support NRT J1 processing
- Intend to process both S-NPP and J1 algorithms in NRT as well as to support the extended data runs
 - Also running AHI and ABI algorithms in NRT
- Large scale reprocessing is currently not within the cluster capabilities
 - Storage is the limiting factor



Summary



- The main goal is to support the transition to operations of the S-NPP and J1 algorithms
 - Change process
 - Algorithm integration
 - Unit tests
 - Extended runs
 - Near real-time processing of pre-operational algorithm for thorough testing and user support
 - DAP development and support
- Will continue to merge the responsibilities across the ASSISTT
- By working with the Science Teams, ASSISTT will be ready to make J1 algorithm updates ASAP after launch