Software Implementation for S-NPP in NDE

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- Overview
- Implementation into NDE
- Current S-NPP algorithms
- JPSS Ozone and Land products
- Transition towards GEARS
- Summary

- S-NPP and JPSS L2 products are being migrated to NDE

- Migration to NDE is part of a move towards implementing enterprise L2 algorithms for S-NPP and J1

- The Delivered Algorithm Package follows the NDE standard

- Three different ways to implement S-NPP L2 products into NDE
  - Implementation of a stand alone algorithm
  - Implementation of an Algorithm Suite – MIRS, STAR Algorithm Processing Framework
  - Globally Gridded implementation

- NDE DAP is created for transition of the algorithm to NDE
  - contains the software and documentation associated with the algorithm

NDE DAP Contents

- The DAP shall contain:
  - Science algorithm source code, including make files and scripts.
  - Test plans, test description, test procedures, and detailed performance testing results.
  - Test input data, temporary files, and expected output data.
  - Coefficient files and/or look-up tables.
  - Quality monitoring information (quality flags, quality flag values).
  - Production rule-set definitions.
  - Product file specifications – layout, content, and size.
  - Data flow diagrams.
  - List of exit codes and their associated messages.
  - List of expected compiler warnings (see bullet 5 below).
  - Estimates of resources required for execution.
  - SPSRB documents – Including: Algorithm Theoretical Basis Documents (ATBDs), System Maintenance Manual (SMM), and External Users Manual (EUM)
  - Delivery Memo.
  - README text file.

NDE DAP Contents

- Delivery memo will contain:
  - Point(s) of contact for questions specific to the algorithm (include name, telephone, e-mail address).
  - List of delivery contents.
  - Purpose of the delivery, e.g. an initial release, modification, etc.
  - Description of problem(s) resolved, if any, and method of resolution.
  - Description of significant changes from previous version, if any.
  - List of documents updated/added/superseded, if any.
  - List of known remaining defects.

- The README text file in the DAP must contain:
  - Location of all required DAP contents.
  - DAP version number.
  - Supporting COTS/Open Source software package requirements.
  - Target configuration for setup (directories and files after setup scripts have been executed). This is understood to be a list of where everything is located once the DAP has been unpacked.
  - Other pertinent information as judged by the algorithm developer(s) (e.g. compiler settings, etc.).

- Algorithms within NDE are kicked off by the NDE scheduling system

- NDE interfaces to the algorithm via Product Control Files (PCF) and Product Status Files (PSF)
  - PCF list the required inputs to the algorithm
  - PCF is updated with the file locations before the algorithm is run
  - PSF lists a successful run or any errors that occurred during the run

- Algorithms are run by scripts that are executed when the PCF file is ready

S-NPP Algorithms in NDE

- S-NPP algorithms have been implemented within the NDE system
  - Active Fire
  - NUCAPS
  - GVF
  - Drought
  - SST
  - MIRS
  - JPSS Risk Reduction – Clouds, Cryosphere, Aerosol and Volcanic Ash
  - Vegetation Health
  - VIIRS Polar Winds
  - Tropical Cyclone Intensity
  - GCOM
- Also have implemented the Reformatting Toolkit

S-NPP Algorithms in NDE

- Algorithms that need to be implemented within NDE:
  - OMPS TC/NP
  - Surface Reflectance
  - Land Surface Temperature
  - Vegetation Indices (NDVI and EVI)
  - Surface Albedo

- OMPS TC has been implemented within the V8TOz package
  - Enterprise algorithm
  - Also used to create ozone products for SBUV/2, GOME-2, OMI and TOMS

- OMPS NP has been/is being implemented into V8Pro
  - Enterprise algorithm
  - Also used to create ozone products for SBUV/2
  - Climate products for BUV and SBUV

Surface Reflectance

- Implemented at the NASA PEATE

- Currently, it is a stand alone algorithm

- To meet the spring 2017 operational time frame, the Surface Reflectance algorithm will be transitioned "as is" to NDE

- Will wrap the algorithm in scripts to meet the NDE DAP standards

- Algorithm will go through the OSPO software review

- Enterprise Algorithm for polar satellites

- Future work: move towards enterprise algorithm for polar and geostationary satellites

- Land Surface Temperature will be implemented within the STAR Algorithm Processing Framework for transition into NDE
  - Framework already implemented into NDE
  - Next delivery of JPSS RR products is in April 2016

- Enterprise algorithm – GOES-R algorithm software will be updated to process JPSS

- LST will become part of the JPSS RR J-1 project plan

VI and Surface Albedo

- Requirements for VI and Surface Albedo are in the process of being update to globally gridded products (from L2 granule based products)

- Will be implemented within the updated GVF gridding algorithm, new enterprise globally gridding scheme

- VI and Surface Albedo algorithm interface into the gridding software will be designed using enterprise algorithms techniques
  - Plug and play style implementation
  - No file I/O within the algorithm software
  - Interface will work for multiple satellites

- Implement algorithms on S-NPP and deliver to NDE for operations

- Update algorithms to create products for J-1

- Migrate towards enterprise algorithms

- Retire heritage operational systems as enterprise algorithms are achieved

- OSGS is moving towards one Ground Enterprise ARchitecture System (GEARS) where the algorithms become services

- Long term plan will see the transition of the enterprise algorithms to the GEARS system

- Transition of the enterprise algorithm into GEARS services

- Consolidate Enterprise Algorithm Suites onto one or two processing system within OSPO

- Conduct regression tests for the enterprise algorithm for all satellite systems

- Remove versionitis by delivering the software package at once for all satellite systems within operations
  - Minimize software deliveries by updating algorithm for multiple satellites at once

- Evaluate algorithm implementation and work with the STAR Algorithm Scientific Software Integration and Transition Team (ASSISTT) to create GEARS like algorithm service interfaces

- Create Enterprise Algorithms

- Implement Enterprise Algorithms into a common system(s)
  - This task and the first bullet can be done at the same time

- Migrate common system Enterprise Algorithms to GEARS system as services

- Enterprise Algorithms have the following advantages for a GEARS implementation:
  - Development cost reduction
  - One transition of the algorithm to the GEARS system
  - Enables easier transition to algorithms-as-a-service
    - Reduction of the number of algorithms and software that will need to be transitioned into GEARS

Summary

- Initial transition of the L2 products into NDE will be implemented into systems that makes sense

- S-NPP algorithms will be migrated towards enterprise algorithms

- Enterprise algorithms will be transitioned to GEARS services