Algorithm Transition Process

Presented by

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AIT Overview

• The AIT performs the necessary role of efficient and accurate transfer of scientific information into functional software systems.

• The AIT provides the experience and expertise to eliminate the many pitfalls associated with the transition of scientific software thus enabling a smooth transition of these science software systems to the JPSS Ground Segment.

• The smooth transition of the science software systems to the JPSS Ground Segment enables Raytheon to focus on the operationalization and implementation of the algorithms into the IDPS.
AIT Overview

• The AIT consists of two parts of one team:
  – DPES AIT led by Pat Purcell
  – STAR AIT led by Walter Wolf

• This presentation focuses mostly on the algorithm implementation within ADL.
## DPES JAMs and STAR AIT POC

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Change Process

- Discrepancy Report
- Algorithm improvements/fixes/updates
- Algorithm Change Package Submitted
- G-ADA Testing
- AERB Disposition
Change Process

- Discrepancy Report

- Algorithm improvements/fixes/updates

- Algorithm Change Package Submitted

- G-ADA Testing

- AERB Disposition
Benefit of AIT-Assisted Transition

• Maintain scientific integrity
  – Ensure that the integrated algorithm produces the same result as the offline version of the algorithm

• Meet operational needs
  – Ensure that the algorithm meets the operational requirements; that it is part of the development of the algorithm, not an afterthought

• Consistency in delivered products across teams
  – Ensure that the deliveries contain the same materials with the same details across all algorithm teams
  – Ensure that the algorithm updates do not negatively affect chained algorithms
Mitigation of Transition Issues

• The AIT performs the “behind the scenes grunt work” associated with the delivery of scientific algorithms
  – Integrators work directly with the algorithm team on a daily basis
  – Alignment of science algorithm to transitioned algorithm
    • Same science, same answers
  – Software standards
  – Algorithm package creation and delivery
  – Coordination of input data sets between algorithms
  – Software development and/or maintenance associated with operational data formats
  – Lead the Process Reviews
  – Schedule development support
What STAR AIT Does

- Attend weekly meetings with SDR and EDR teams
- Assist teams with code updates, testing, and deliveries
- Provide technical support and expertise to teams
- Along with DPES AIT, serve as ADL experts
- Provide avenue for effective offline configuration management
- Facilitate a structured test and review process for new algorithms
- Open communication between all the stakeholders
Current Activities – ADL

• Work with the algorithm teams:
  – Maintain algorithms within the ADL
  – Provide software support for ADL modifications and/or surrounding ADL software for the algorithms
  – Provide software support for algorithm testing within the ADL
  – Coordinate algorithm baselines between the algorithm teams and the IDPS
  – Merge offline algorithm modifications with the IDPS baseline algorithm within the ADL
  – Provide day to day software support for all ADL algorithm interfaces
Current Activities – ADL (cont.)

• Work with the algorithm teams:
  – Provide support for code to meet the software requirements
  – Evaluate, examine, and accept deliveries of the product teams and integrate them into the ADL according to the approved schedule
  – Coordinate all the input data required to run the algorithms
  – Conduct the test runs of the algorithms within the ADL
  – Perform V&V for all deliveries
HOW……
Configuration Management

• AIT utilizes a Configuration Management (CM) environment within STAR using IBM ClearCase and ClearQuest.

• CM is vital for implementation, controlled testing, and validation of the JPSS Algorithms.
  – Protects software assets from file corruption, unintentional changes, unauthorized access, and software loss.
  – Provides the ability to reproduce the configuration of the entire development environment.
  – Controls the flow of changes among development branches.
  – Enables algorithm developers to use the most recent algorithm updates provided by other algorithm teams.
How……
Algorithm Management

• MX Builds (from Common CM) and ADL Releases (from Wisconsin) are input into ClearCase

• AIT works on a branch off the baseline

• Algorithm teams work off the AIT branch in a development branch
  – Algorithm updates outside of the ClearCase managed software will be implemented into ClearCase by STAR AIT

• Algorithm deliveries are made to AIT branch
  – STAR AIT tests algorithm changes
  – STAR AIT reviews software for standards compliance and updates software
  – DPES AIT is informed that an algorithm package is coming soon
How……
Algorithm Management

• AIT provides test results to algorithm team
• Algorithm changes submitted to CM baseline
• Algorithm package put together and delivered
• DPES AIT performs G-ADA tests
• STAR AIT performs algorithm chain runs in parallel and provides outputs to both the algorithm team and all algorithm teams down the chain
• New MX Builds and ADL Releases are input into ClearCase and the current working AIT branches are merged into the new software baselines
Chain Scripts and Training

• Chain Scripts make running the ADL easier
  – User specifies the algorithm to be run and the date of the data
  – Scripts will find the correct data, including LUTs within the STAR collaborative environment
  – Run by STAR AIT when each algorithm package is delivered

• Chain Scripts are also maintained within ClearCase

• AIT will provide training for Chain Scripts

• AIT will provide training for STAR CM usage
Algorithm Packages

• The Algorithm Package deliveries will be consistent between products

• All Algorithm Package Deliveries will include all algorithms delivered since the last MX Build has been released

• Therefore, each Algorithm Delivery will contain the most up to date science
Communication

• Communication between the algorithm teams when algorithms are updated
  – Chain run results for algorithms down stream of updated algorithms
• Communication with DPES AIT for incoming deliveries
  – Preparation for G-ADA test runs
• Communication with Raytheon
  – When a CCR is put in place, there should be no surprises
  – Constant communication and passing of information throughout the DR process
  – New development requires reviews that Raytheon will be part of as stakeholders
  – Information on algorithm changes that affect the CGS infrastructure will be provided early in the development process
  – Collaborate with Raytheon on any changes that affect the CGS infrastructure
Raytheon Needs to Know:
Anything to do with the Algorithm Interface with the IDPS

• Input data sets required
  – Ancillary data sets
  – LUTs – New or modified (dimension changes)
• Algorithm interface changes (new inputs to algorithm)
• Processing time and memory usage
• Output file variable changes
• Awareness of algorithm implementation choices
  – Use of currently implemented ancillary datasets is strongly recommended
• Delivery Dates
Summary

• AIT will ensure that there is a smooth transition of algorithms from the algorithm teams to the JPSS Ground Segment

• The AIT will eliminate the transition pitfalls that are generally encountered during an algorithm transition process:
  – Maintaining scientific integrity
  – Meeting the operational needs
  – Consistently between the delivered algorithms