Algorithm Architecture and Engineering Approach

Key Algorithm Science Implementation Gates

1. Algorithm Packages are complete, detailed and address all requirements
2. Algorithm functional implementation understood
3. Algorithm functional implementation finalized
4. Reproducibility and functional requirements verified

Algorithm Framework and Data Model Concept

Features & Benefits

- Standard Design Protocols—structured methods for algorithm design and implementation
  - Speeds up development and migration
  - Allows for algorithm "buy-back"
  - Data Model Interface—standard APIs for sensor and meta-data access
  - Ensures algorithm from underlying data formats and operational environments
  - Standalone software class(s) that can be incorporated into PG design as well
  - Secondary Test Data Source: Government Algorithm Packages (ATBDs) to functional software that meet functional reproducibility requirements (Get the Science Right)
  - Performance: 24/7/365 operations that meet latency and refresh requirements while preserving functionality (Make it Fast and Robust)
  - Test Database: Common configuration controlled environment provides all levels of pre-operational test support from Computer Software Unit (CSU) testing to Final Integration and Test (FIT) prior to launch

Approach

- Provide two stage integrated software development, test and integration environment.
- Use common test data to in all phases of development to insure reproducibility requirement are met and maintained through out the development process.
- Government data provided as part of algorithm packages is primary source of test data, and used to verify algorithm performance requirements
- Supplemental data for extended end-to-end functional testing, and evaluation of system specific PG requirements and anomalous conditions, e.g. error handling

Development Environment Components

- Algorithm Engineering Environment: Transition Government Algorithm Packages (ATBDs) to functional software that meet functional reproducibility requirements (Get the Science Right)
- PG Operations Environment: Transition functional software to 24/7/365 operations that meet latency and refresh requirements while preserving functionality (Make it Fast and Robust)
- Test Database: Common configuration controlled environment provides all levels of pre-operational test support from Computer Software Unit (CSU) testing to Final Integration and Test (FIT) prior to launch

Accomplishments

- Developed rigorous software requirements and completed design of Product Generation Infrastructure Management (PGIM), Algorithm Framework and operational DMIs
- Incorporated standardize methods in DMIs for: Algorithm Level 0/1/2+ auxiliary and ancillary I/O and meta-data generation
- Developed, tested and deployed baseline version of Algorithm Engineering Test environment: Algorithm Test Tools (ATT)
- Currently in process of testing essential part of GOES-R GS PGIM, Algorithm Framework and DMIs

Algorithms

1. Completed algorithm analysis and audits for GOES-R ABI and SEISS Level 1B algorithms and Level 2 science algorithms.
2. Developed rigorous software requirements and preliminary design for ABI and SEISS Level 1B and all Level 2 algorithms
3. Completed Detail Design and Code and Unit Tests for a sub-set ABI Level 1B and Level 2 algorithm
4. In process of integration testing of Algorithm Engineering infrastructure including DMI and common Algorithm Framework with initial Level 2 science algorithms