STAR AIT facilitates the J1 Algorithm Review Process

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STAR AIT

The Joint Polar Satellite System (JPSS) is responsible for a series of non-geosynchronous, polar-orbiting, environmental satellites. The first satellite in the series, Suomi-NPP, launched October 28, 2011. The second satellite, JPSS-1, is slated for launch in 2017. JPSS delivers over thirty sensor and environmental data products to the user community. The JPSS Algorithm Integration Team (AIT) brings technical expertise and support to product algorithms, specifically in testing and implementing science algorithms in the pre-operational system.

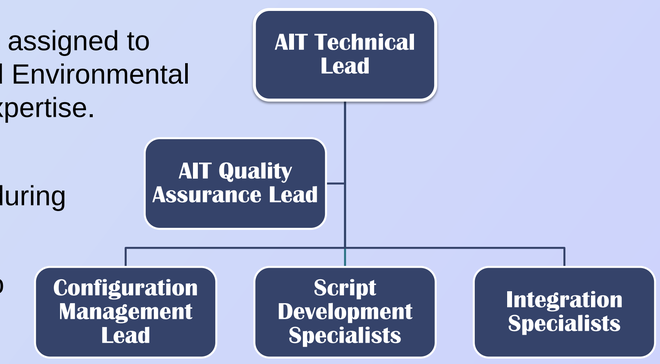
STAR AIT members support algorithm development process by:

- Assisting teams with code updates, testing, and deliveries
- Providing technical support and expertise to teams
- Providing avenue for effective configuration management
- Facilitating a structured test and review process for new algorithms

Integration Specialists

AIT has five integration specialists each assigned to specific Sensor Data Record (SDR) and Environmental Data Record (EDR) teams based on expertise. Integration specialists:

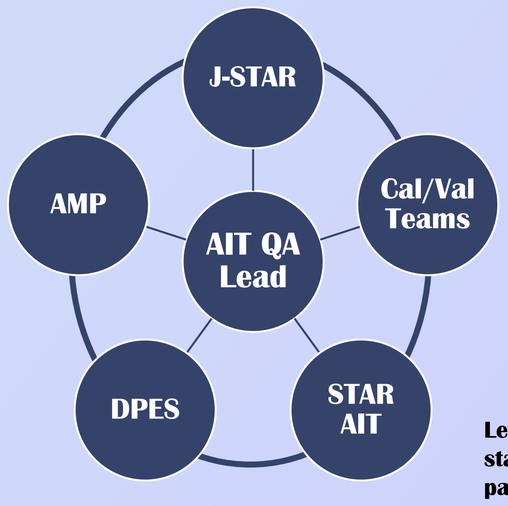
- Interact directly with algorithm teams during development, testing, and integration
- Attend meetings with science teams to keep apprised of algorithm status
- Provide test results to algorithm team
- Provide chain run test results to all affected teams (see poster **2-20** for more about the Chain Run script)
- Prepare and deliver algorithm packages
- Maintain support through review and integration process



Above: STAR AIT members interact directly with algorithm developers and operational engineers to ensure a smooth integration process

Quality Assurance

STAR AIT in conjunction with JPSS STAR Management (J-STAR) has developed a Quality Assurance Plan that describes the QA procedures for the STAR JPSS project. The AIT QA Lead is responsible for maintaining situational awareness of the JPSS project as a whole and coordinating with management and oversight teams.



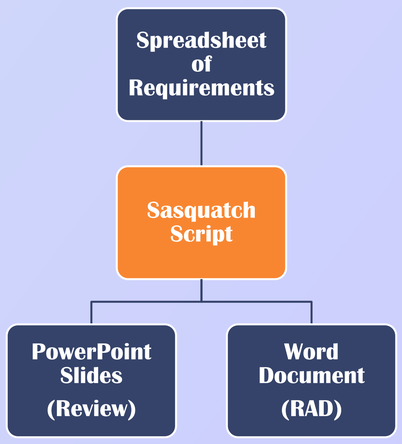
For QA purposes, AIT:

- uses Clearcase/Clearquest for algorithm configuration management
- complies with the Algorithm Change Management procedures put forth by Data Products Engineering & Services (DPES)
- assists algorithm teams in maintaining accurate and up-to-date documentation throughout the development process

Left: The STAR AIT QA Lead maintains communication with multiple stakeholders to ensure algorithms meet requirements and algorithm packages are functional and complete

SASQUATH and Risk-QUATCH

Simplified And Streamlined QUality Assurance Through Coding Help



SASQUATCH

EPL Review documents include both Requirements Allocation Documents (RADs) and Requirements slides with identical content. Additionally, a spreadsheet is provided for review showing requirements tracing to Level 1 and Level 2 requirements. SASQUATCH is a perl script that reads requirements from a spreadsheet and generates both the RAD and Review slides, thus ensuring consistent content and formatting.

Above left: SASQUATCH process flow diagram
Below Right: Risk-quatch process flow diagram

Risk-QUATCH

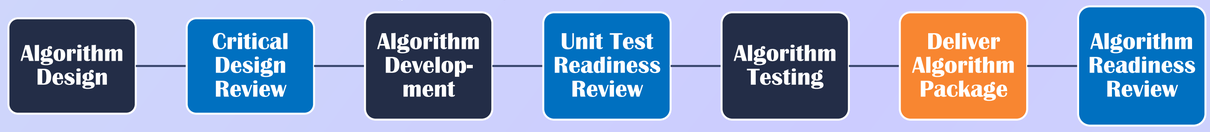
EPL Review documents include a Review Item Disposition (RID) spreadsheet that tracks all risks and review items. For each review, the review items in the RID are presented. Building on the capability of SASQUATCH, Risk-QUATCH converts the RID spreadsheet into properly formatted presentation slides for the review.

See poster **3-49** for additional information about the capabilities and development plan for SASQUATCH

Algorithm Review Process

New algorithms developed for J1 are subject to the STAR Enterprise Lifecycle Review Process (EPL)

- consistent with the Satellite Product and Services Review Board (SPSRB) review process
- adds value to product development
- generates standard documentation covering
  - Requirements and Risks
  - Algorithm Theoretical Basis
  - Implementation Plan
  - Software Architecture
  - Quality Assurance
- process tailored based on implementation timescale and development progress
- tailored reviews mitigate risk by eliminating overhead of preparing multiple reviews
- technical risk is low because Level 1 and Level 2 requirements are handled by a separate review board and are already developed



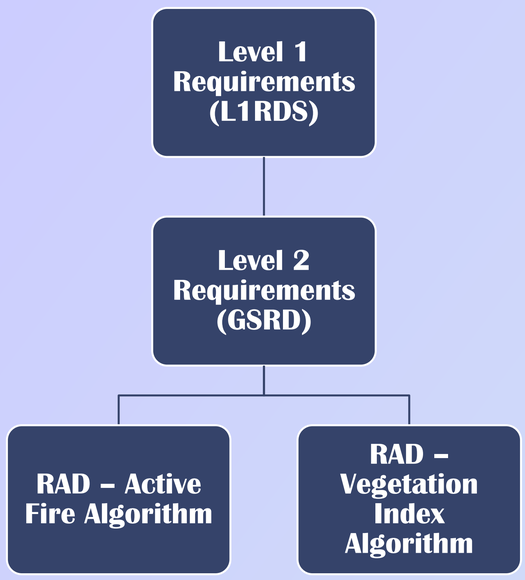
Above: review process followed by the Top of Canopy Normalized Difference Vegetation Index (TOC NDVI)

Requirements Tracking

The RAD

- STAR AIT compiles Requirements Allocation Documents (RAD) for J1 Algorithms undergoing a review process.
- The RAD contains Level 3 and 4 requirements allocated to STAR.
- The RAD operates in parallel with the NASA Software Requirement Specification documents
- Requirements in the RAD are traced to Level 1 and Level 2 requirements documents
- The RAD is a standard deliverable and is made available at each review. Requirements and changes to requirements are discussed at each review.

Right: Sample hierarchy of documents. RADs have been developed for all J1 algorithms undergoing product review.



Requirements Management

AIT utilizes an IBM Rational Dynamic Object Oriented Requirements System (DOORS) database to track and maintain algorithm requirements allocated to the STAR AIT. DOORS is a standard requirements tracking system used by NOAA JPSS Office to track Level 1 and Level 2 requirements. The AIT DOORS Database is currently in the development stage.

AIT is also researching the use of Sharepoint for document management and requirements tracking. Sharepoint is used by AMP and other NOAA offices.

Algorithm Development and Review

STAR AIT is currently assisting four teams through the algorithm development and review process.

Product	Task Name	2014 Q2 M	J	Q3 J	A	S	Q4 O	N	D	2015 Q1 J	F	M	Q2 A	M	J
CrIS SDR	Critical Design Review					●									
	AIT Delivery to DPES											●			
	Algorithm Readiness Review												●		
OMPS SDR	Critical Design Review						●								
	AIT Delivery to DPES											●			
	Algorithm Readiness Review														●
Top of Canopy NDVI EDR	Critical Design Review	●													
	Test Readiness Review							●							
	AIT Delivery to DPES											●			
	Algorithm Readiness Review												●		
Active Fires EDR	Critical Design Review								●						
	AIT Delivery to NDE												●		
	System Readiness Review													●	
	Algorithm Readiness Review												●		

AIT QA Lead coordinates meetings between AIT and the algorithm science team in preparation for the review.
AIT also coordinates with Raytheon in the event that a Technical Interchange Meeting is required to streamline and clarify implementation plans.

AIT delivers packages to DPES or Suomi-NPP Data Exploitation (NDE) as indicated in the algorithm implementation plan. AIT follows the receiver-supplied specifications for algorithm packages.

AIT Integration specialists continue iterating with product transition engineers during the integration testing phase

Algorithm Reviews give all stakeholders a chance to weigh in on the requirements, risks, implementation plan, software architecture, etc.

See AIT posters **2-11**, **2-19**, **2-49** regarding our work with the OMPS, NDVI, and CrIS algorithm science teams