ASSISTT – Accelerating the Transition of Science to Operations; and MSN updates

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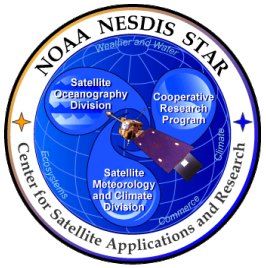
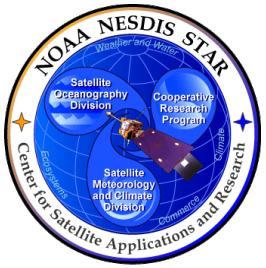
ASSISTT – Algorithm Scientific Software Integration and System Transition Team

Overview



- Algorithms are currently being delivered to operations
- Implementing plans to decrease the time to deliver these products to operations
- Mission Science Network – is there any effect on the scientific algorithm transition to operations process

Status

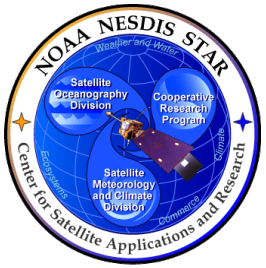


- The STAR Algorithm Scientific Software Integration and System Transition Team (ASSISTT) works with the science teams to deliver their algorithm updates to operations for both S-NPP and NOAA20.

- ASSISTT currently delivers:
  - Sensor Data Record (SDR) algorithms for transition to operations in the Interface Data Processing Segment (IDPS)
  - Environmental Data Record (EDR) enterprise algorithms to operations in NOAA Data Exploitation (NDE)

- All the Level 2 enterprise algorithms for S-NPP have been delivered to NDE for operational implementation.

SDR Algorithms



- The SDR algorithm change process is well established:
  - ASSISTT works with science teams to implement their algorithm updates in the Algorithm Development Library (ADL)
  - ASSISTT tests the algorithms, science teams verifies the updates, and then ASSISTT delivers an algorithm package to the Data Product Engineering (DPE) team
  - DPE tests the updated algorithm on the GRAVITE system and delivers the updated algorithm to Raytheon (after science team verification) for implementation into the Interface Data Processing Segment (IDPS)

EDR Algorithms

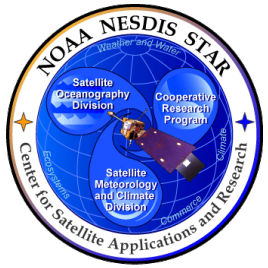
- The EDR algorithm change process is well established:
  - Science teams deliver their algorithm updates to ASSISTT
  - ASSISTT tests the algorithm, science team verifies the updates, and then ASSISTT delivers an algorithm package to the NDE team
  - NDE tests the updated algorithm on the NDE system and after science team verification, they implement the algorithm in operations
  - All the enterprise algorithms for S-NPP have been delivered to NDE and only a few land products are currently not in operations
  - Most of the N20 algorithms have been delivered to NDE recently and are currently in the testing process before transition to operations (pending provisional reviews)

Speeding up the Transition to Operations Process

- The ASSISTT team has been looking to streamline the algorithm update and testing processes to reduce the transition to operations (TTO) time for each algorithm

- The SDR process is well streamlined, so we will focus on the EDR process

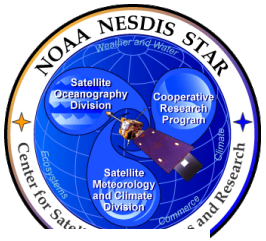
Speeding up the Transition to Operations Process



- Reduce the amount of algorithm testing done before the delivery of algorithms

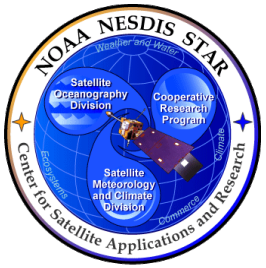
- Improved communications with NDE after algorithm deliveries

Reducing Test Data Sets



- Each year, ASSISTT has two planned deliveries for most EDR products to NDE
- Part of the TTO process includes testing the algorithms on 2.5 months of data
- This end to end TTO process for algorithm updates, algorithm testing and science team validation take approximately 6 months to complete (due to algorithm dependencies). Two months of this work is testing and validation.
- ASSISTT has been working with the science teams to reduce the amount of test data used for algorithm updates to about 7-10 days worth of data
- The reduced data set can be run within 10 days and the testing time can be reduced from 6 weeks down to a maximum of three weeks
- Smaller testing dataset will also enable a quicker turn around on any interim algorithm fixes

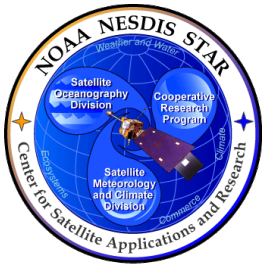
Improve Communications with NDE



- Working with the Algorithm Management Project (AMP) to improve communications with NDE
  - AMP tracks status of algorithms
  - https://docs.google.com/spreadsheets/d/131J_UBrisKPTYmRBlwYRbliHxxyd6RVLbau31BtRwD4/edit?usp=sharing
- AMP has worked with NDE on short term schedules on when algorithms are being delivered and the dates when they will be implemented
- Need to work with the PALs more closely on tracking the NDE transition to operations schedule
- Note that there is the "ESPDS Product Generation IPT" meeting every other Tuesday at 11 am ET

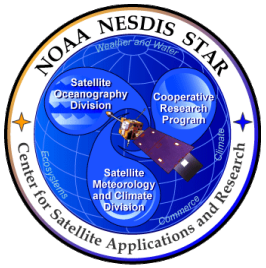
Breakout Sessions

- Two ASSISTT breakout session are schedule to discuss these issues with the science teams:
  - ASSISTT Framework Algorithms Breakout in the Conference Center at 11 am on Wednesday
  - ASSISTT Stand Alone Algorithm Breakout in the Conference Center at 2 pm on Wednesday



Mission Science Network (MSN)

Mission Science Network

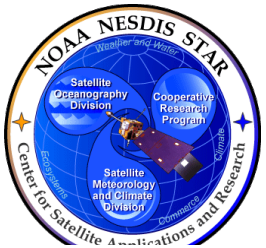


- The Mission Science Network (MSN) is an IT platform that will provide enterprise services to:
  - Deliver cost-effective, secure, cloud capable infrastructure to support research to operations
  - Enable research and development of scientific data and applications
  - Support operational availability for product generation
  - Manage data through its full lifecycle from creation to preservation
  - Provide access to NOAA's data, information and services

MSN Phases

- MSN is being implemented in two phases
  - Phase 1: Put the STAR and NCEI infrastructure within one security boundary
  - Phase 2: Develop agile, scalable and secure architecture for future science mission(s)

MSN Phase 1



- Phase 1: Put the STAR and NCEI infrastructure within one security boundary
  - Stand-up nascent Mission Science Network (MSN)
    - Connect existing systems between STAR and NCEI
    - Exploit existing N-Wave connectivity
  - Consolidate systems in order to obtain efficiencies of scale and long-term cost savings
    - Migrate data and applications, and shutdown systems in NCEI-MD and NCEI-MS
    - Consolidate existing systems into Condor Server/Storage Cluster at STAR
  - Deploy IT services that support entire science enterprise
    - Determine best-of-breed capabilities between NCEI and STAR
    - Leverage open source applications wherever possible
- Phase 1 will be complete by October 2019

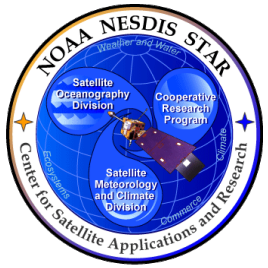
MSN Phase 2

- Phase 2: Develop agile, scalable and secure architecture for future science mission(s)
  - Architecture for the MSN will be updated
  - Infrastructure will be common for both NCEI and STAR
  - Migration plans will be put in place for the transition of the current capabilities to use the new infrastructure
- Phase two will be completed in the Fall of 2021

Effect on TTO

- ASSISTT is currently running the algorithms in the HTCondor cluster within STAR for testing
- ASSISTT is implementing a kubernetes cluster where the algorithms will be run on the cluster using Docker containers
- The kubernetes cluster will be an offline representation of a cloud based infrastructure

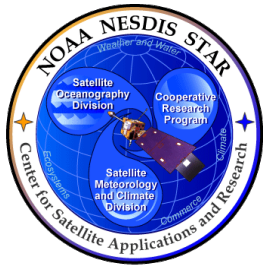
Effect on Algorithms



- ASSISTT is currently testing the implementation of some algorithms on the new cluster

- Expect full implementation into the kubernetes cluster before MSN Phase II is complete

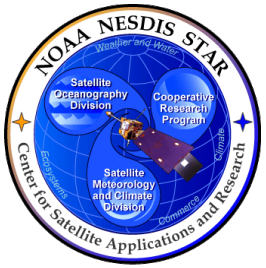
Effect on Algorithms



- Migration plans to the new infrastructure will be put in place before the end of Phase 2

- ASSISTT will work with the MSN team to minimize the effect of the new infrastructure on the science algorithm development

Summary



- To improve the transition to operations process, ASSISTT will:
  - Reduce the amount of test data used for algorithm testing before delivery of the algorithms
  - Improve communications with NDE after algorithm deliveries
- MSN will be implemented in two phases
  - ASSISTT will be working with the algorithms and science teams to be ready for Phase 2 completion
  - Migration plans will be put in place for the transition of the current capabilities to use the new infrastructure