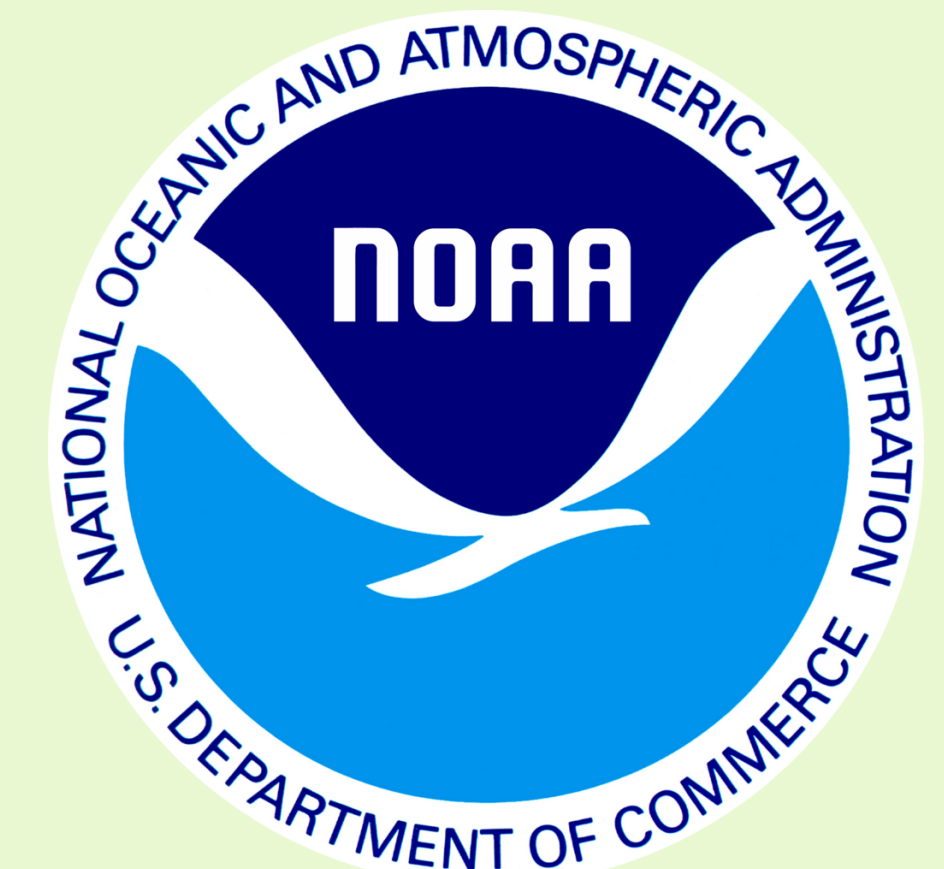


The Joint Polar Satellite System (JPSS) Program's Algorithm Change Process (ACP): Past, Present and Future

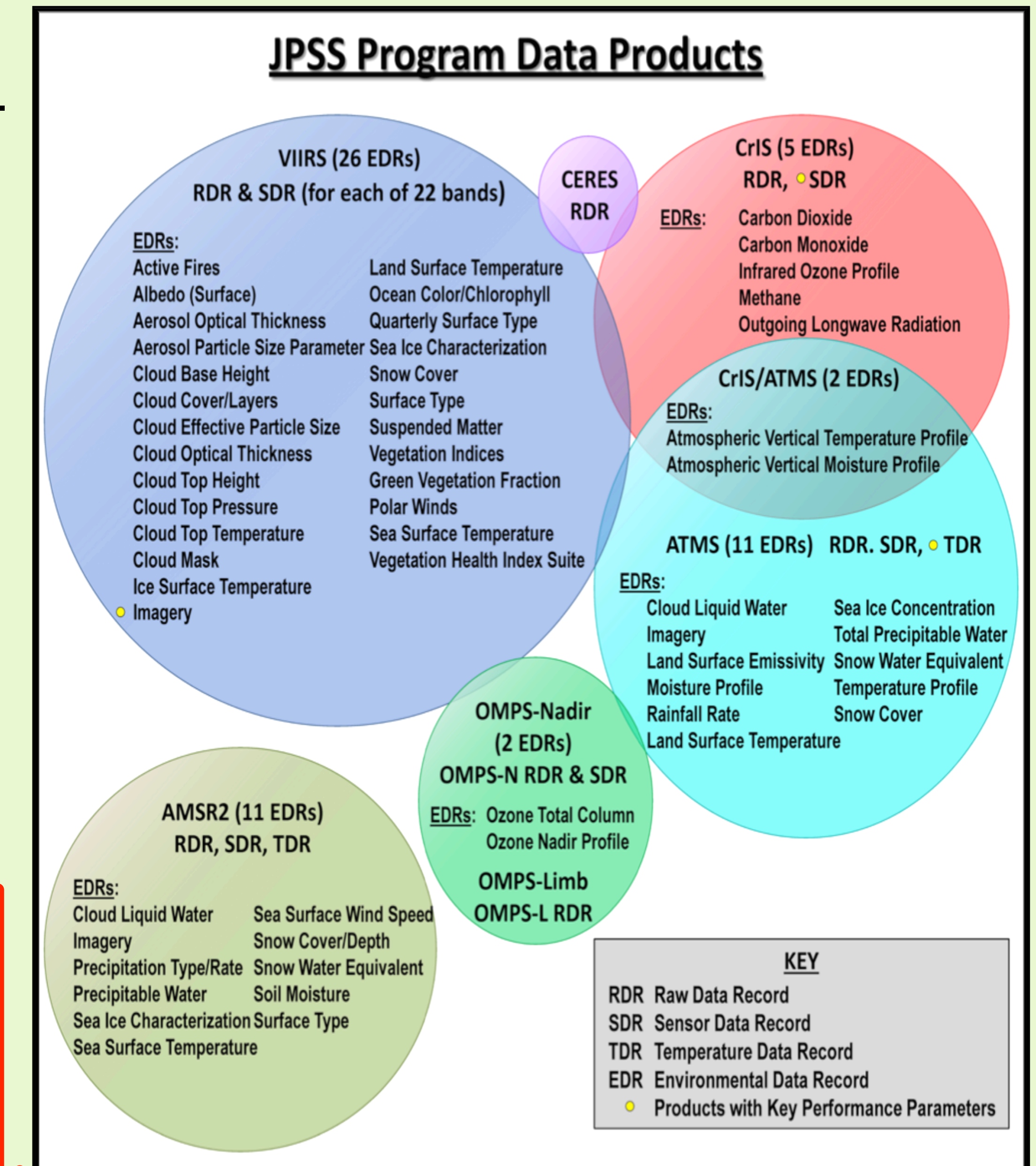


Ashley Griffin: Arctic Slope Regional Corporation (ASRC),
JPSS Data Products, Engineering and Services (DPES) Algorithm Integration Team (AIT)

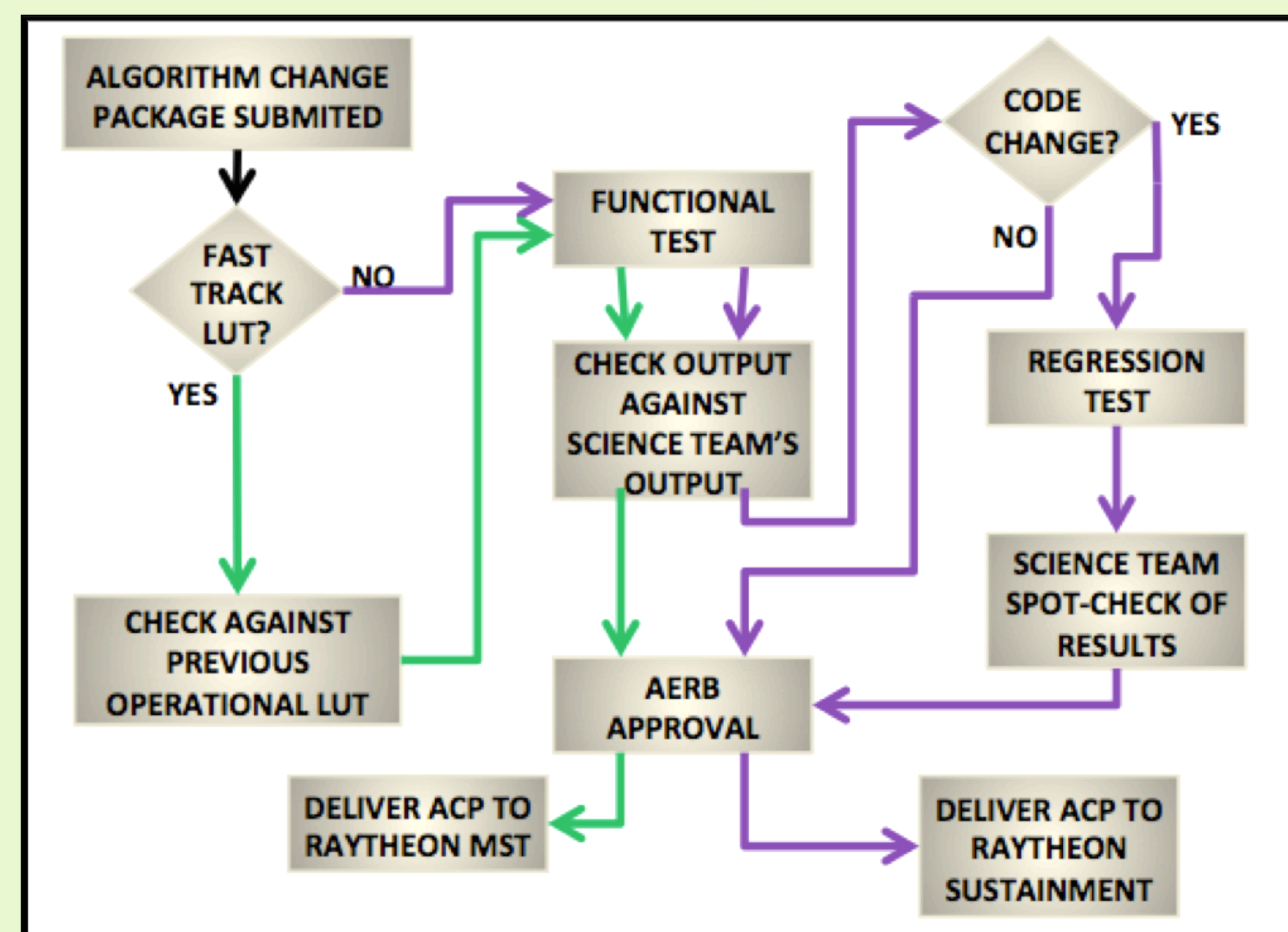
The Suomi National Polar Orbiting Partnership (S-NPP) satellite was successfully put into orbit in 2011 and the Joint Polar Satellite System (JPSS)-1 (JPSS-1) Satellite is set to launch no later than 4th quarter of fiscal year 2017. Both S-NPP and JPSS-1 carry the following sensors: VIIRS, CrIS, ATMS, OMPS, and CERES that produce over 50 data products that study the Earth's weather, oceans, and atmosphere. A team of scientists and engineers from all over the United States document, monitor and fix errors in software code and supporting documentation using the Algorithm Change Process (ACP) to ensure the success of the JPSS mission by making sure that the best data products are being provided to users.

Algorithm Change Process (ACP)

1. An error, improvement, or enhancement that needs correcting is discovered and an Algorithm Discrepancy Report (ADR) is submitted to document the issue.
2. A team of scientists and engineers meet at the Discrepancy Report Action Team (DRAT) meetings to discuss the ADR, which is either accepted to authorize work on fixing the issue, deferred to the correct subject matter experts for further clarification, or rejected.
3. A fix is developed by the Satellite Applications and Research (STAR) science teams and an algorithm change package is submitted for DPES functional and regression testing.
4. The Algorithm Engineering Review Board (AERB) reviews the proposed fix and the board members approve or reject the suggested change.
5. The code fix is implemented into the next available software build cycle and any accompanying documentation is updated accordingly.



Nominal DPES Testing Process Flow



Functional Test- The DPES Engineers use the G-ADA to ingest test data inputs (Raw Data Records (RDRs) and Look Up Tables (LUTs)) supplied by the STAR science team to independently reproduce outputs. These G-ADA outputs are then compared to the provided STAR science team outputs and if the two match within a designated amount of difference, the ACP has passed testing.

Regression Test- The proposed code changes are run in reference to the current operational build for orbits chosen by the science team to verify that the code change performs as expected. The science team then spot-checks granules from the test to determine if it was successful.

Fast Track LUTs - Any look-up table that has gone through the entire ACP twice can go through a shortened version of the ACP.

Pre-Operational Testing with DPES Testing Group!

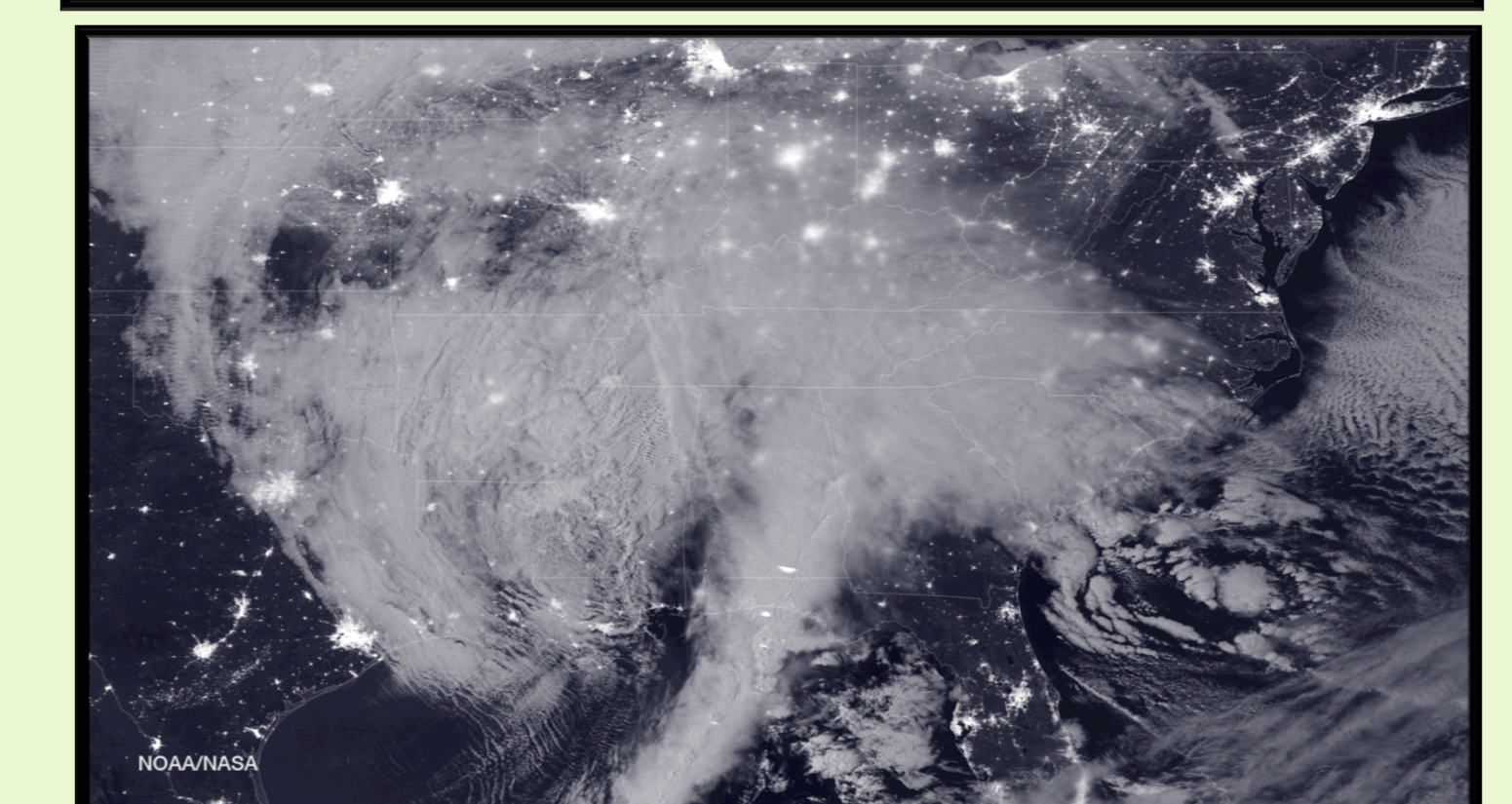
Code changes are submitted to DPES to be tested on the GRAVITE Algorithm Development Area (G-ADA). The G-ADA is a copy of the Interface Data Processing Segment (IDPS) that includes the same software basis and compatible hardware such that results of DPES testing match IDPS. The successful completion of this step in the ACP is required for a code change to pass AERB review and testing provides risk reduction to ensure that the proposed fix will not disrupt any other related downstream code.

The DPES Testing Group Members are Rob Williamson, Ashley Griffin, Tim Dorman and Luis Hung and managed by AIT Lead Gilberto Vicente.

DPES Testing Helps Ensure Operational Success!

DPES testing is an integral part of the ACP, which helps ensure that the best data products are provided to the JPSS program's essential users.

The S-NPP (and soon JPSS-1) satellite's products provide critical, high-resolution data to answer climate questions and improve weather forecasts. Various military and civilian organizations from the National Weather Service (NWS) to colleges and universities access and benefit from S-NPP's data products for scientific and educational applications.



Top: Tropical storm Sarika and Super Typhoon Haima in west Pacific ocean October 17, 2016.
Bottom: Image of the east coast blizzard taken by VIIRS DNB January 22, 2016. Both images are from VIIRS.