NOAA Algorithm Scientific Software Integration and System Transition Team (ASSISTT) Collaboration with CSPP GEO and LEO on L2 Product Software

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Outline

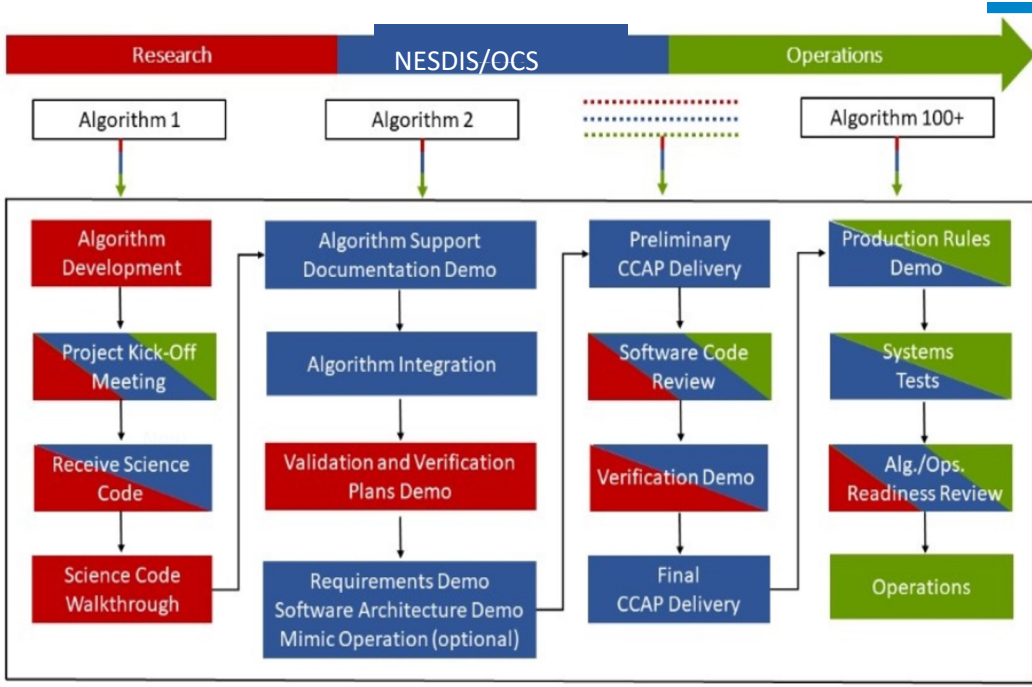
- Introduction
  - Overview of NESDIS/OCS's role in the R2O process
- Deliveries of Geostationary L2 products to CSPP Geo
  - Recent deliveries
  - Transition from Framework "superDAPs" to standalone CCAPs
  - New and upcoming geostationary products
- Deliveries of polar L2 products to CSPP Leo
  - Recent deliveries
  - New and upcoming polar products
- Summary and future directions

Introduction - NESDIS/OCS R2O

- The **NOAA/NESDIS/OCS** facilitates and supports transition of satellite remote sensing algorithms from research to operations.

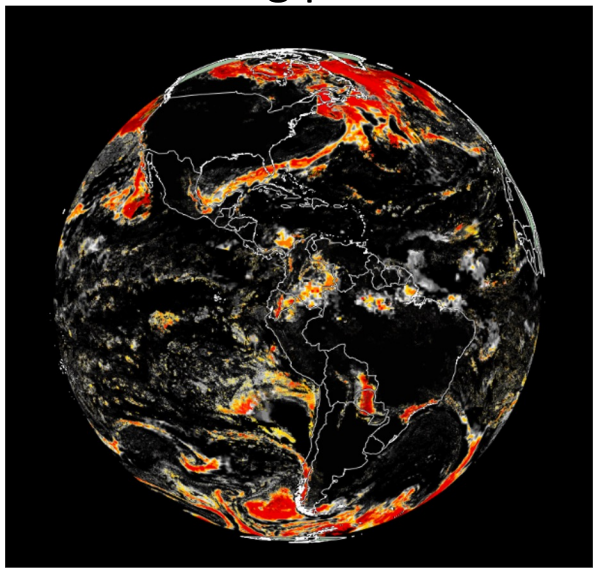
Introduction - R2O process/timeline

- From the time we receive a science algorithm to the time it is running in operations, we typically plan for a ~6 month timeline
- In practice however, this timeline can change for a number of reasons such as:
  - Waiting on missing upstream dependencies
  - Integration difficulties - extensive refactoring, problems encountered when running on the AWS cloud, etc
  - Sometimes events such as new satellite launch delays can cause reprioritization and large schedule shifts
- Once the delivery package has undergone all reviews and it is running in NCCF operations, the algorithm is ready to deliver to CSPP LEO/GEO.



NESDIS Deliveries supporting CSPP Geo

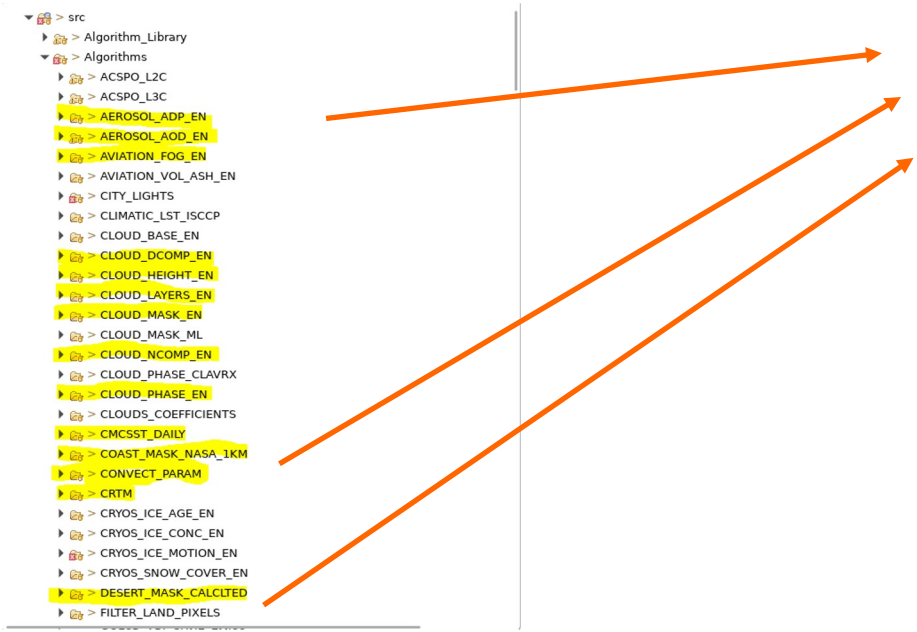
- Previous deliveries have been focused mostly on the GOES ABI products that we deliver to the GOES-R Ground System to run in operations.
- The delivered package is capable of generating the following products
  - Cloud & Moisture Imagery (CMI)
  - Cloud Mask
  - Cloud Phase
  - Cloud Height
  - DCOMP/NCOMP
  - Cloud-Cover Layers (CCL)
  - Land Surface Temperature (LST)
  - Aerosol Detection Product (ADP)
  - Aerosol Optical Depth (AOD)
  - Fog and Low Stratus (FLS)
  - Derived Motion Winds



G19 MVFR Fog Probability, CSPP GeoSphere

CSPP GEO - Previous delivery method

In previous deliveries, all supported algorithms were delivered at once as a “superDAP” within the Algorithm Services Framework (ASF) v2.0



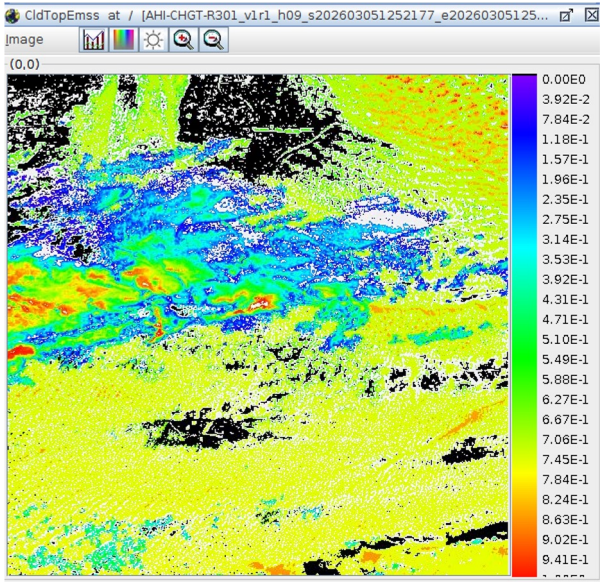
CSPP Geo Framework Subset

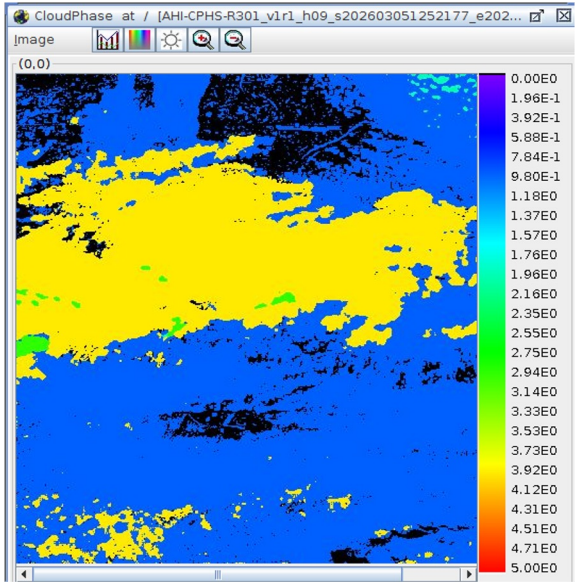
Wrap static executable in Python scripts, create test cases

Deliver DAP (inc. source code, test cases, and documentation) to CSPP Geo

CSPP GEO - Recent deliveries

- September 2024 - superDAP to enable GOES-19 support
- March 2026 - superDAP patch containing Himawari Clouds and Winds with new feature enabling the processing of AHI Target region L1Bs

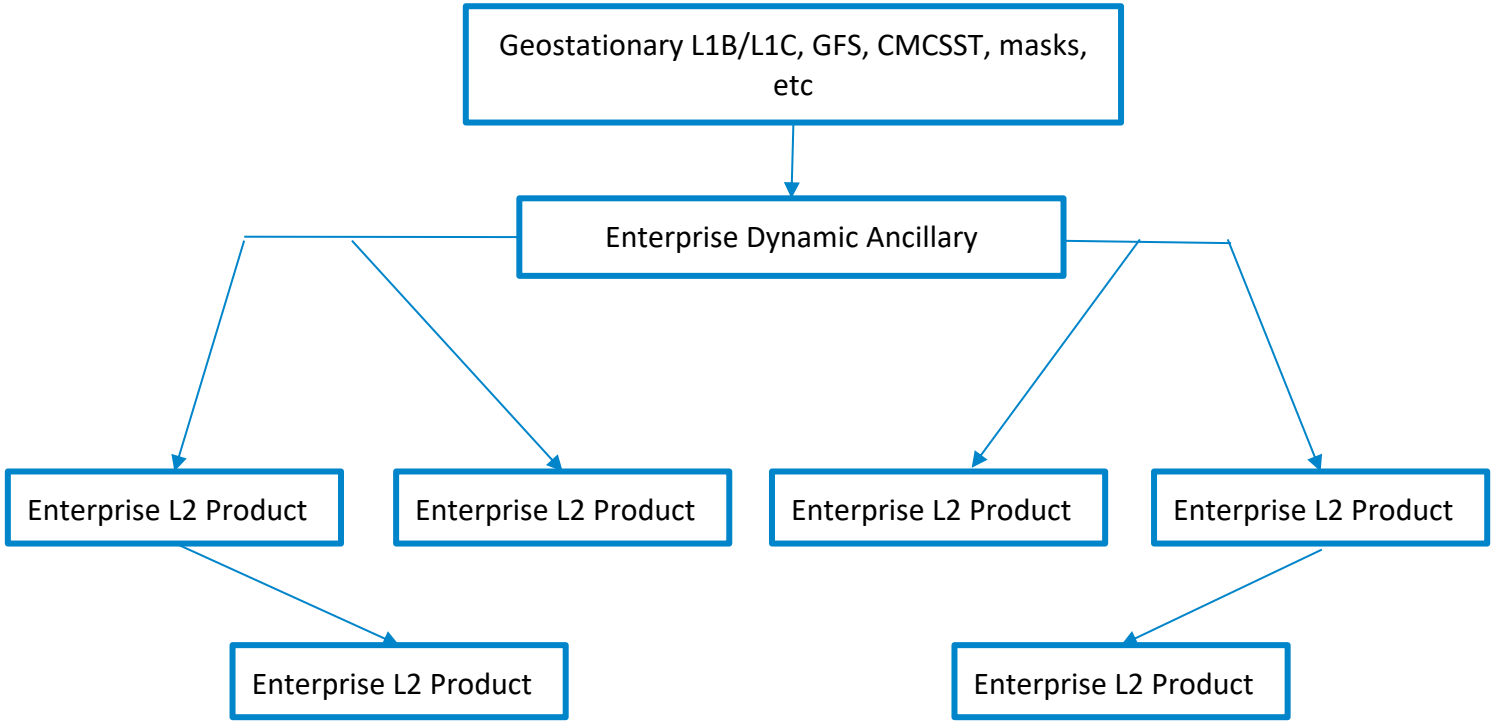




CSPP GEO - New delivery method

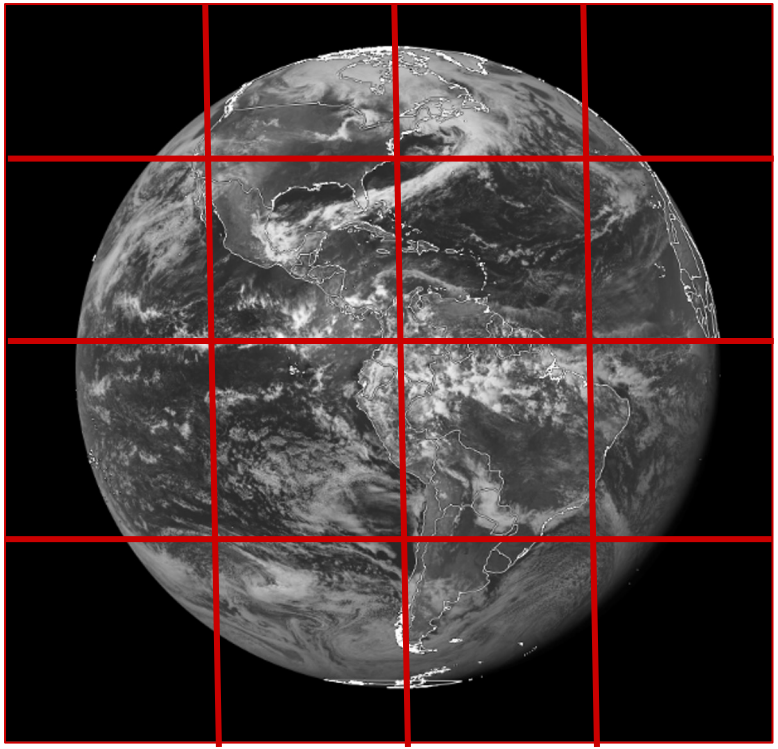
- Future deliveries will be handled similarly to the deliveries we make to CSPP Leo and the NESDIS Common Cloud Framework (NCCF). Once the product becomes operational, the delivery to CSPP will be made.
- Deliveries will be Cloud Containerized Algorithm Packages (**CCAPs**)
- Each algorithm will be wrapped with the same interface written in python and configured with yaml files. The interface also standardizes how the algorithm is run within the Docker container
- All CCAPs will need to be executed individually in order, replicating what the Framework's task scheduler did automatically in previous deliveries
    - In addition to the L2 product CCAPs, we also have a Dynamic Ancillary CCAP that is upstream of all the products converted out of the Framework/CSPP Geo SuperDAP
        - Also applies to the individual Framework CCAPs to CSPP LEO

CSPP GEO - New processing method



Geostationary Processing Optimization

- Algorithms converted from Framework to standalones no longer have the ability to split up the Full Disk scene into segments/chunks
- EN-DynamicAncil has been optimized to only generate the outputs the downstream algorithms need
  - Static navigation data only produced once for each satellite
  - Unused channels/resolutions disabled
- Geostationary Chunking project is being developed to enable parallel processing of chunks
  - Chunk L1B first, chunks processed through EN-DynamicAncil and all downstream algorithms
  - Chunks are stitched together for each final product once all chunks have been processed



G19 Band 02, CSPP GeoSphere

New/upcoming Geostationary Product Implementations

- MTG Reader
  - CCAP processing raw FCI L1C data
    - Delivered to NCCF July 1, 2024
    - Next phase (Jan 2027) will add it to Enterprise-DynamicAncil CCAP
- Volcat (new product)
  - Volcanic event detection (GOES-East, GOES-West, Himawari 9, Meteosat-9/11, MTG (future phase))
    - Phase 1 targeting October 1, 2026
- NGFS (new product)
  - Next Generation Fire System (GOES-East, GOES-West) delivery targeting September 2026
- Enterprise Rainfall Estimates
  - Delivery adding MTG capability delivered March 31, 2025
- Surface PM 2.5 (new product)
  - TEMPO delivery targeting October 2026
  - GOES-East, GOES-West delivery targeting February 2027
- Geostationary Shortwave Irradiance Product (GSIP)
  - Delivery adding MTG capability delivered April 2025
- Stereo Winds (new product)
  - GOES-East/GOES-West, Himawari 9 Delivery targeting October 2026

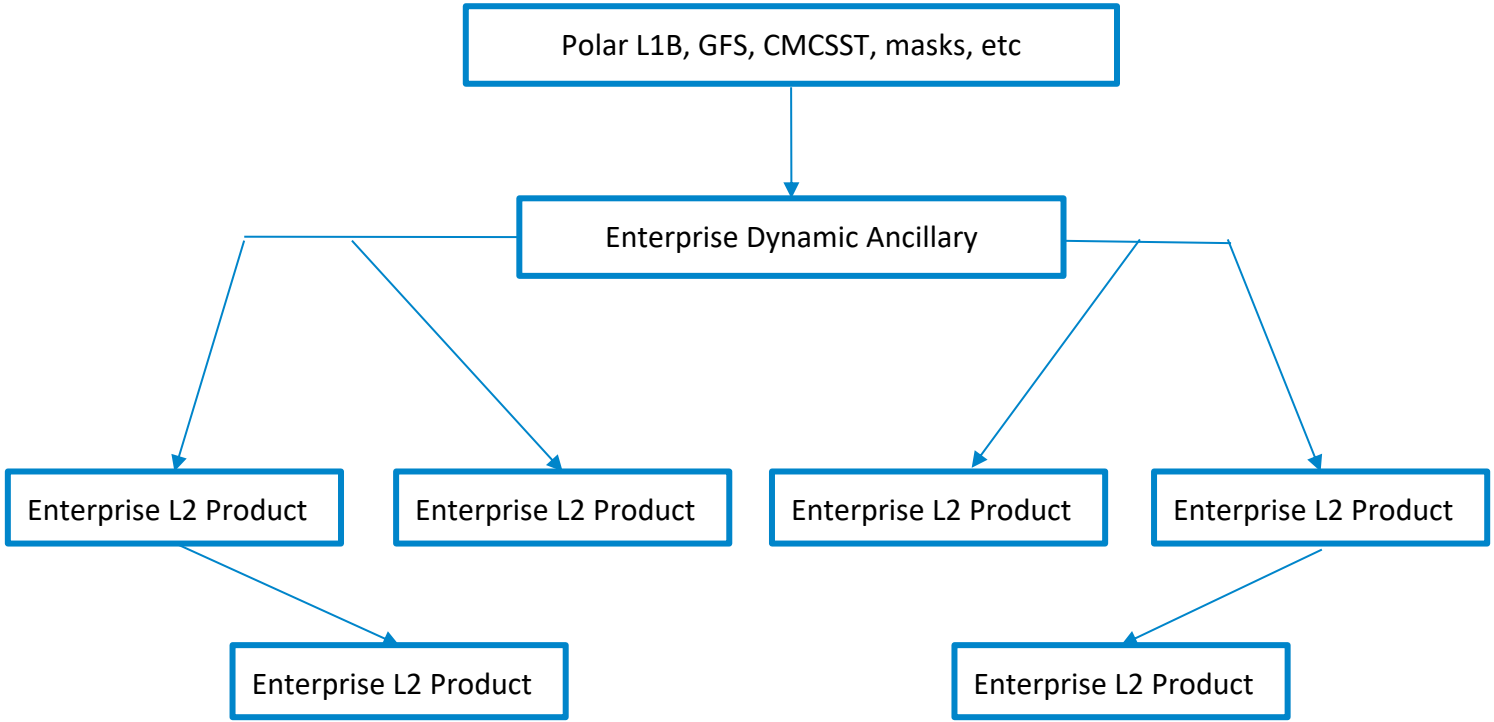
NESDIS/OCS Deliveries supporting CSPP LEO

- Previous deliveries have included support for products with polar (JPSS, Metop-b/c) satellite capabilities
- Products that have been delivered previously to CSPP Leo include (bold indicates previous deliveries were made in the Framework):
  - **Enterprise Clouds (Mask/Phase/Height/CCL/DCOMP/CBH/CCL)**
  - JPSS/Metop ACSPO SST
    - ACSPO L3S
  - **Aerosols (ADP + AOD)**
  - EN-Fires
  - EN-Flood
  - Enterprise Total Ozone (EN-TOz)
  - GAASP products (Pre-processor, Ocean, Precip, SeaIce, Snow)
  - GRAC
  - HEAP
  - **Ice Age/Thickness and Ice Concentration**
  - **LSA, LST**
  - MiRS
  - Ocean Color
  - OMPS-NP
  - SFR
  - Surface Reflectance
  - BUFR Toolkit
  - V8 TOz
  - VIIRS Radiance Cluster
  - VIIRS FSC (delivered April 2026)

NESDIS/OCS Deliveries supporting CSPP LEO

- CCAPs to CSPP LEO are made after the individual product has become operational in NCCF
- For CCAPs based on the Framework, the Enterprise DynamicAncil CCAP will be a new upstream input
  - Training for CSPP developers and science teams for running this CCAP is being planned
- Otherwise, any future deliveries will utilize the same method as previous deliveries
- There are no current planned deliveries to CSPP for Metop-SG/MetImage products, but this can be discussed if there is user interest

CSPP LEO deliveries (Former Framework Algorithms only)



New/upcoming LEO Product Implementations

- Polar ACSPO SST
  - VIIRS, AVHRR ACSPO SST deliveries targeting November 2026
  - L3S delivery targeting February 2027
  - Metop-SG-A1/MetImage ACSPO SST delivery is in planning
- Blended Ice Motion (new product)
  - AMSR2/3, VIIRS, Metop-SG-A1/MetImage delivery targeting April 2027
- JRR superDAP products (Clouds/Aerosols/LST/LSA/Winds) delivery adding Metop-SG-A1, J4 capabilities in development/planning
- EN-TOz, MiRS, SFR deliveries adding Metop-SG-A1 capabilities in development/planning
- VOLCAT, NGFS deliveries adding Metop-SG-A1 capabilities in development/planning
- GAASP product deliveries adding Metop-SG-B1 capabilities in development/planning

Standalone MTG and MetImage Readers

- For geostationary and polar products with MTG/MetImage capabilities without their own L1B reader, the standalone readers can process the L1B and provide its output to downstream products.
- These readers will be added to the Enterprise DynamicAncil CCAP
- All products that were previously delivered in the Framework and have or will have a MTG/MetImage capability will utilize this output

MTG, EUMETSAT

Metop-SG, EUMETSAT

Summary and future directions

- NESDIS/OCS is continuing to help transition many scientific algorithms from research to operations, including several new products and adapting existing ones for new satellites (Metop-SG, MTG, etc)
- NESDIS/OCS will continue to collaborate with the CSPP LEO and GEO teams to deliver products of interest to help support the CSPP userbase, and provide support as needed to help the teams transition to our new delivery procedures

Questions?