

NESDIS OCS Annual End of Year Report 2023



Strategic Vision

In August 2023, the name of the NESDIS Office of Satellite Ground Services (OSGS) changed to the Office of Common Services (OCS) as part of the NESDIS transition from a mission-focused organization to a user-focused organization providing a fully integrated digital understanding of our Earth environment. In tandem with the name change OCS announced a new vision, mission and revised its mission areas of focus;

Vision: Transform environmental observations into intelligence for the future

OBSERVATIONS INTO INFORMATION

Mission: To provide enterprise technologies and solutions for satellite ground systems and data archives that deliver environmental intelligence to make informed decisions and enable innovative science

Software Engineering

We provide software engineering expertise to allow for NESDIS to run and build out all their software needs to bring science teams closer and faster to the data

Product Portfolio Management

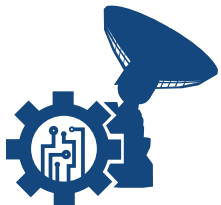
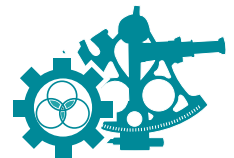
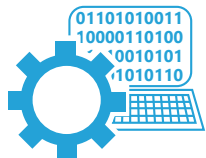
We lead the development of information (data products and science applications) that is responsive to the NOAA mission

Emerging Technologies

We research emerging and new technologies to be adapted and utilized to expand our technological offerings to the NESDIS enterprise mission

Systems & Infrastructure

We provide systems, infrastructure and services to move the NESDIS enterprise forward (both NCCF and on-prem)



Strategic Vision *continued*

OCS will leverage enterprise technologies and processes to build an agile infrastructure architecture. This will help evolve, develop and expedite NESDIS ground services and data processing and archive capabilities to meet changing user expectations in how data is obtained and used.

OCS continues to support the sustainment of legacy satellite data acquisition, processing, and archive systems. Development of emerging technologies and enterprise common services will consolidate activities across NESDIS to maximize access and use of data for NOAA and our external partners. Cloud computing technology is being used to enable many of these enterprise services. OCS collaborates across NOAA to provide the NESDIS Common Cloud Framework (NCCF), an enterprise cloud platform that allows partners to provision, instantiate, run, and manage software and applications to meet their mission needs. NCCF streamlines the complexity of building and maintaining the infrastructure and operating system. Users have access to scalable services and enhanced tools while managing their own workload and data hosted on the platform.



NESDIS Common Cloud Framework

NESDIS Common Cloud Framework (NCCF) is an operational enterprise framework in the commercial cloud, with a data-centric architecture that will provide full ground capability in the cloud with applicability to innovative use of new antenna and missions operations tools and technologies as well as continuation of operational data ingest, processing, archive, and dissemination. OCS is architecting and building these services and its capabilities for NESDIS to leverage for data management. The NCCF is a collection of five enterprise core mission functions, Secure ingest of data, Product Generation, Archive and Data Stewardship, Science Sandbox, and Dissemination and User Access which will enable operational use and scientific development of all NESDIS data.

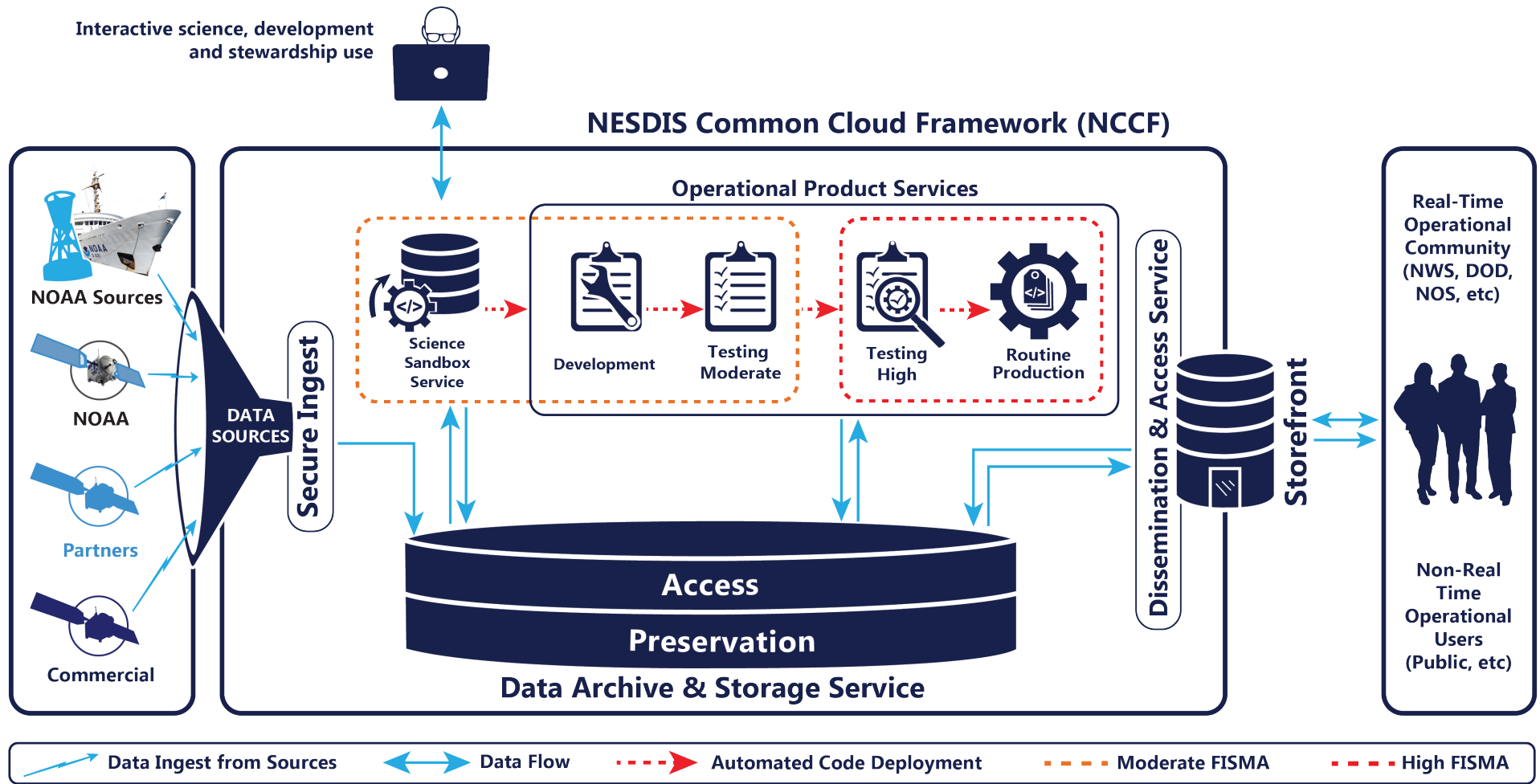
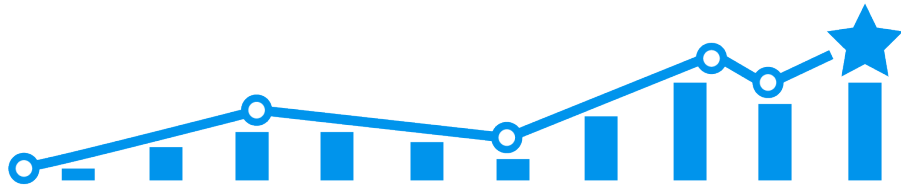


Figure 1: NESDIS Common Cloud Framework (NCCF) is an enterprise set of services to support five core mission functions: Secure ingest of data, Product Generation, Archive and Data Stewardship, Science Sandbox, and Dissemination and User Access.



Accomplishments:

Throughout FY23 OCS has worked to build, deliver, operationalize and scale NCCF. While some core services are still under development, end users are using data products generated on NCCF. At the end of FY23 the NCCF had 674 products in operation, an increase of over 200% in FY23.

OCS delivered the Regional Hourly Advanced Baseline Imager (ABI) and Visible Infrared Imaging Radiometer Suite (VIIRS) Emissions (RAVE) algorithms for operational implementation. Following full lifecycle development in the NESDIS Common Cloud Framework (NCCF), using agile and devops processes (in coordination with Center for Satellite Applications and Research (STAR) and Office of Satellite and Product Operations (OSPO). RAVE products improve wildfire detection and numerical weather prediction models that forecast air quality and smoke.

The Science Sandbox service was developed and demonstrated with four science teams allowing them to utilize both operational and non-operational data in testing algorithms in the same environment.

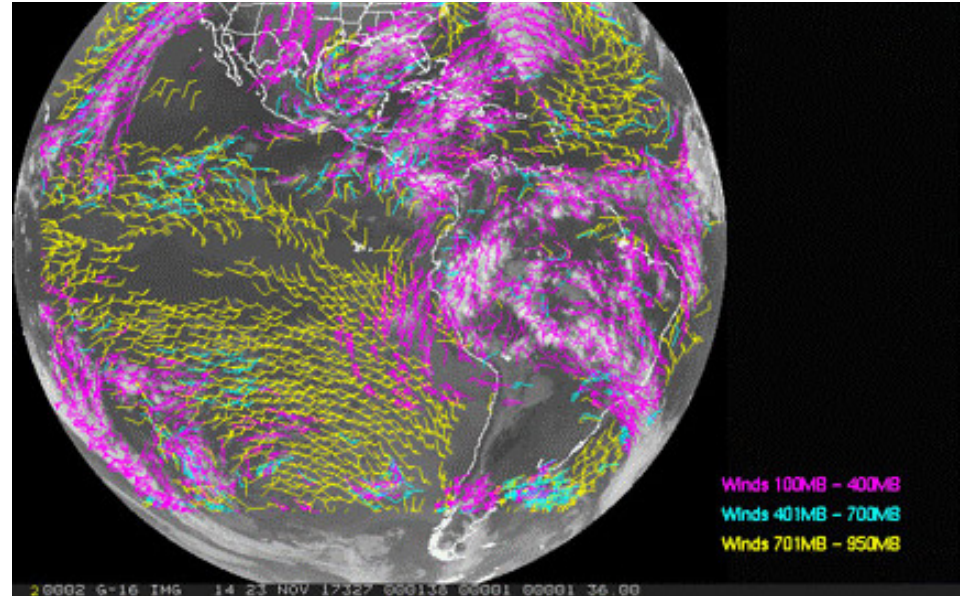


Figure 2: GOES-16 derived motion winds product using ABI Band 14 on November 23, 2017. High level (100-400 hPa) winds are shown in violet; mid-level (400-700 hPa) are shown in cyan; and low levels (below 700 hPa) are shown in yellow.

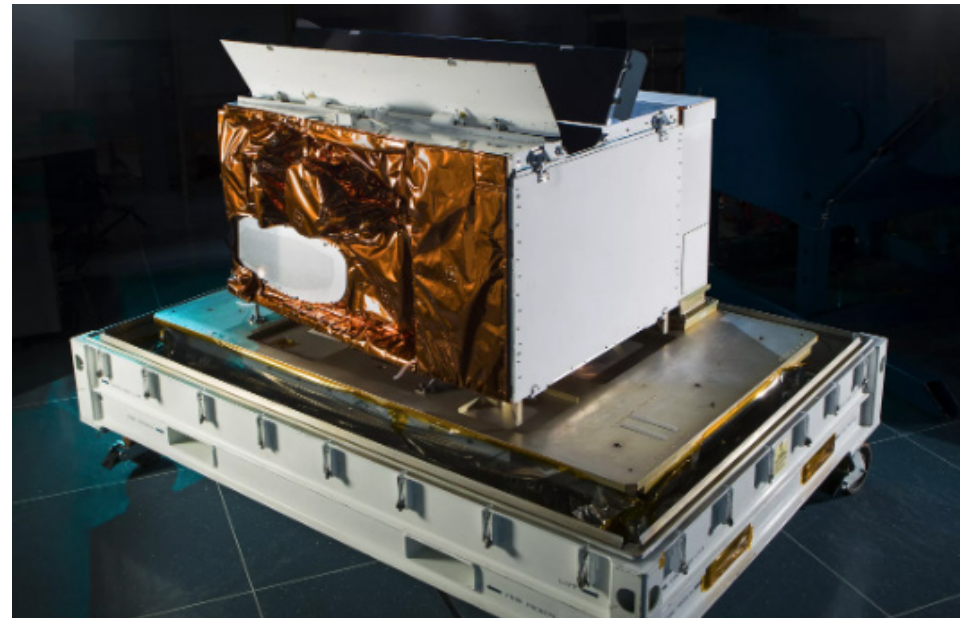
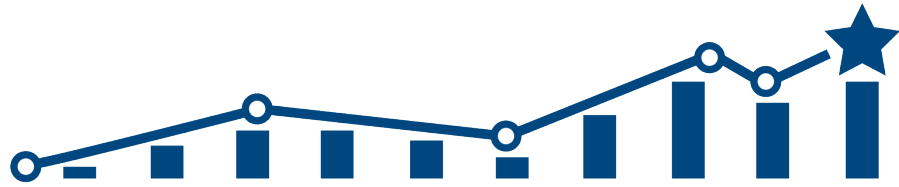


Figure 3: Image of the Visible Infrared Imaging Radiometer Suite (VIIRS)

Product Portfolio Management

Product Portfolio Management (PPM) invests in products to support NOAA’s mission, capitalizes on scientific advances, and exploits new satellite capabilities. It works

across NESDIS and connects with NOAA line offices to enhance and create powerful products, reacting to emerging needs.



Accomplishments:

NESDIS identified an inherent need to bridge science and operations across NOAA Line Offices. The benefits of PPM quickly made an impact by developing a new way of working approaches and methodologies - rapid response to emerging priorities, strengthened algorithms and streamlining processes.

In FY23 the Portfolio Management Branch has established 18 portfolios among 5 Product Portfolio Managers and funded 91 Algorithms that produced close to 300 products. The Portfolio Management Branch (PMB) also addressed 8 User Requests from National Ocean Service (NOS), NOAA Marine Fisheries Service (NMFS), National Weather Service (NWS), and Office of Oceanic and Atmospheric Research (OAR) which enhanced 6 product portfolios and added 8 non-NOAA satellite data sources to the portfolio. A new approach was launched to convene an expert panel in FY24 to inform NOAA’s next generation Net Primary Productivity (NPP) algorithm for National Marine Fisheries Service (NMFS) application.

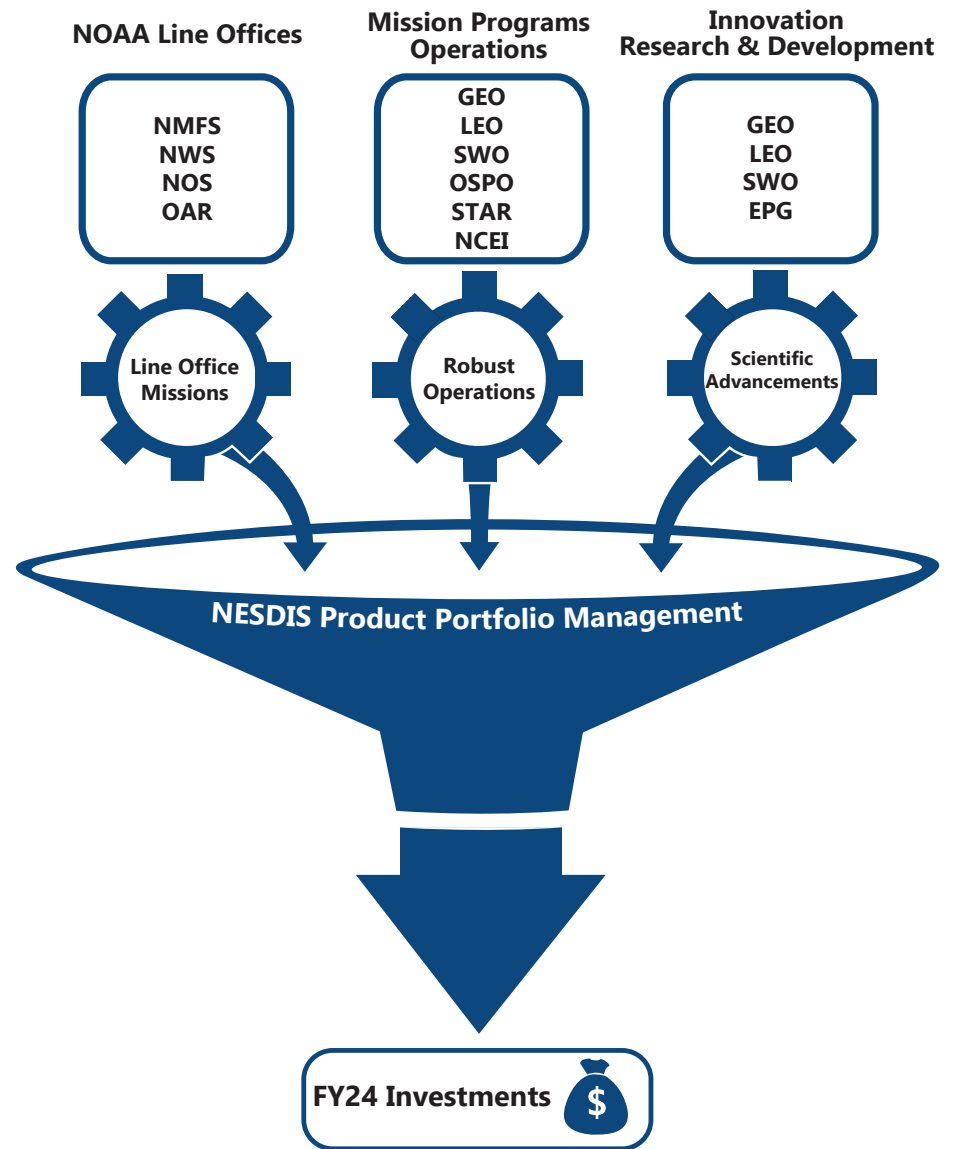
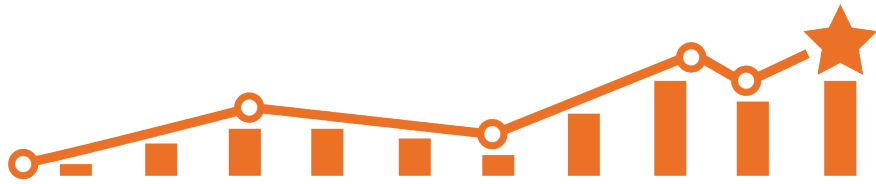


Figure 4: Diagram showing PPM/PMD portfolio management processes



Wildfire Programs

The Wildland Fire Program is composed of a NESDIS-wide team, is a first-of-a-kind cross-cutting thematic NESDIS program. This program is aligning NESDIS wildland products and services with NOAA-wide priorities and piloting new impact-focused service delivery processes, including development of a cloud-based data and information portal.



Accomplishments:

OCS contributed to the success of the Wildland Fire Program and delivered the Regional Hourly Advanced Baseline Imager (ABI) and Visible Infrared Imaging Radiometer Suite (VIIRS) Emissions (RAVE) algorithms for operational implementation. RAVE products improve wildfire detection and numerical weather prediction models that forecast air quality and smoke.

Following full lifecycle development in NCCF, using agile and devops processes (in coordination with Center for Satellite Applications and Research (STAR) and Office of Satellite and Product Operations (OSPO), RAVE demonstrated reduced development timelines from 3 years to less than 1 year; and was the first algorithm to be completely developed in the NCCF.

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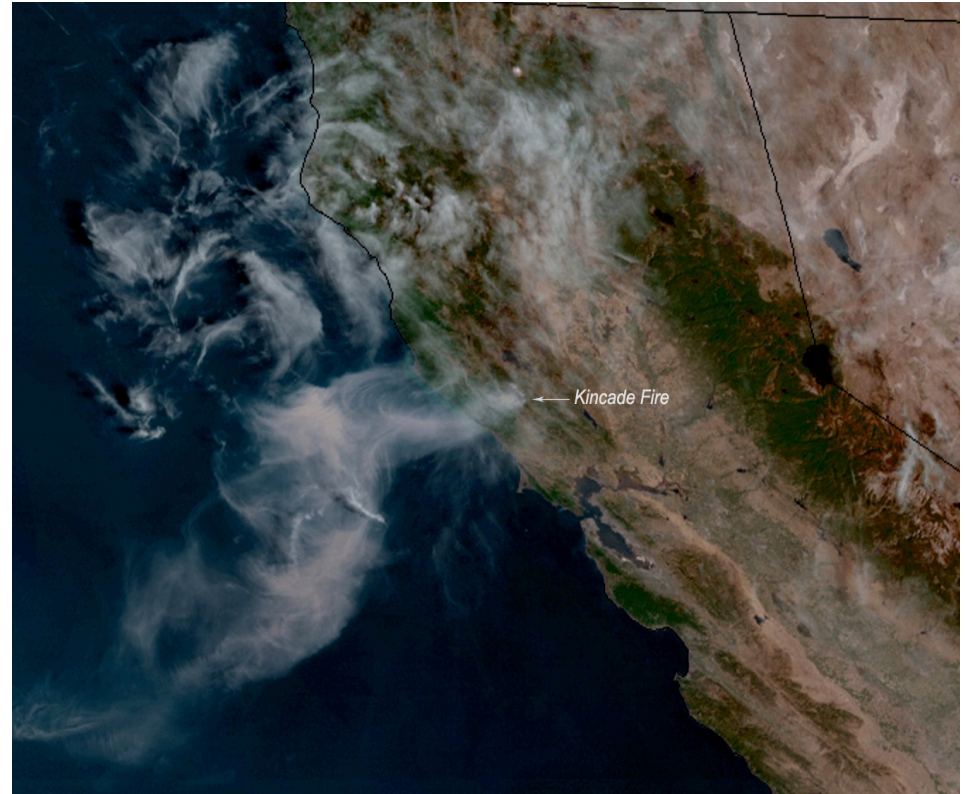


Figure 5: Kincadee Fire. 10.23.2019

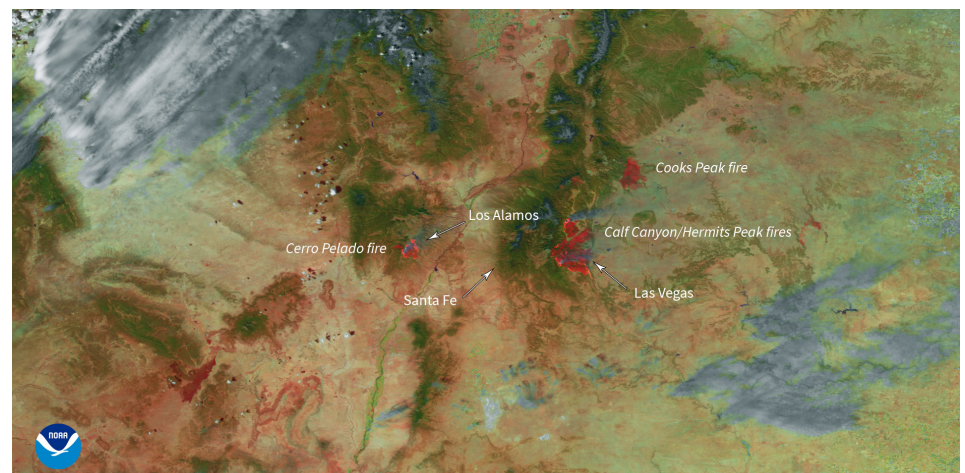


Figure 6: Fires in New Mexico. 5.3.2022

Ground Systems Evolution & Legacy

OCS continues to focus and support on the ground system definition and the evolution of its future ground systems. This includes a series of antennas, communications networks, and processing facilities that command and control the satellites, bring their data down to Earth, route data to processing facilities, create data products and distribute them. While also leading the efforts to evaluate legacy systems doing an initial assessment and creating a scope for what will migrate to the cloud or be retired.

Taking the functionality of these systems old and new and migrating them to the cloud, will provide NESDIS with a flexible and scalable resource that can continue to evolve with the necessary funding.

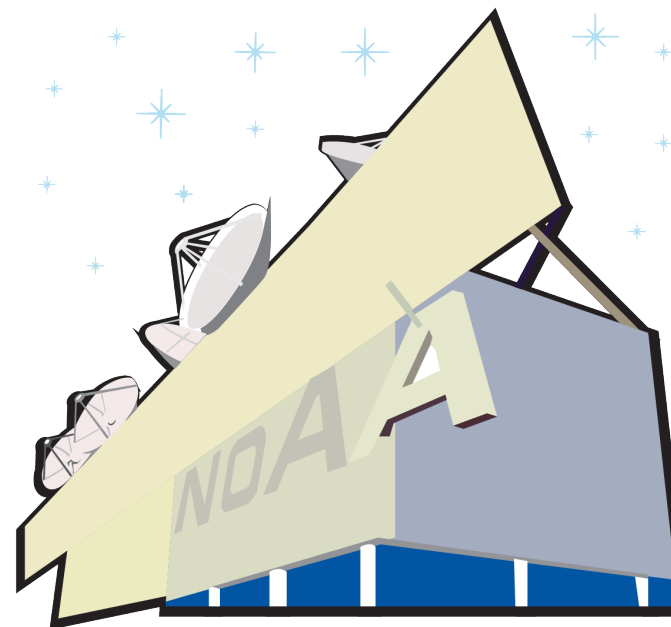


Accomplishments:

Phased Array Cooperative Research and Development Agreement (CRADA): NOAA and L3Harris have entered a formal agreement under a CRADA to develop the Multi-Band Multi-Mission Digital Beamforming (DBF) Phased Array Antenna System (DPAAS) with the goal of improving technology that will enable NOAA to handle its growth of satellite data expected during the next decade. NOAA will gain knowledge in the areas of architecture, implementation, integration and operation of a DPAAS, while L3Harris will benefit through an expanded understanding of DPAAS operational mission applications. In addition, L3Harris will perform DPAAS development and evaluation and NOAA would provide access, facilities, infrastructure, power and system.

Additional Ground System Accomplishments:

- Commercial Services Cloud Software Defined Radio Broad Agency Announcement (BAA) released, supporting the development of an enterprise solution for space-to-ground communications.
- Completed factory acceptance of Radio Frequency Interference Monitoring System (RFIMS) Remote Monitoring Subsystem (RMS) unit to meet National Weather Service (NWS) needs in Ford Island, HI which marks the completion of the production baseline.
- Successful launch antenna support for Indian Space Research Organization (ISRO) OceanSat-3 satellite from NESDIS facility in Fairbanks, Alaska and deployed Oceansat-3 Telemetry, Tracking & Commanding capability.
- Successful completion of Hurricane Rated (HR) Series antenna feed upgrades that enables enterprise satellite data collection from legacy and current geostationary data assets.



**Thanks Everyone
For a Great Year**

