

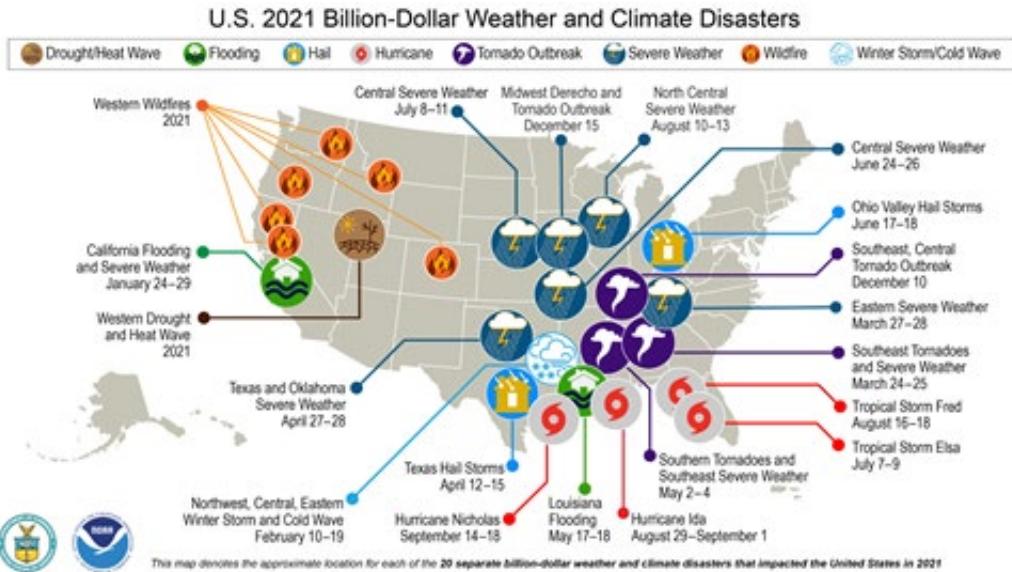
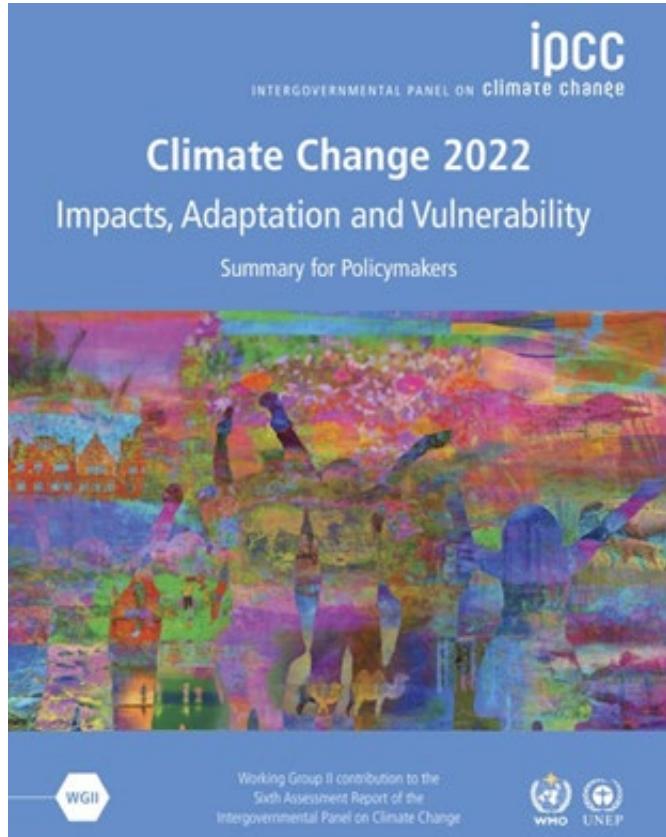
Developing an Integrated Understanding of our Earth Environment

National Environmental
Satellite, Data, and Information
Service
Briefing to CESAS
March 23, 2022

Dr. Stephen Volz

NOAA Assistant Secretary of Commerce for Environmental
Observation and Prediction (Acting), NESDIS Assistant
Administrator for Satellite and Information Services

Why Now? More Storms, More Severity



NOAA Mission: Science - Services - Stewardship

- NOAA, NASA, and other federal agency climate **Science** is the foundation for smart policy, and decision-making in a changing world.
- NOAA delivers climate **Services** to federal agencies, states, tribes, communities, and businesses across America, helping people protect themselves and their livelihoods in a changing world.
- NOAA's climate **Stewardship** protects our lands, waters, resources, and people.



NOAA Priorities

Science, Service and Stewardship



Climate

Establish that NOAA is the authoritative source for climate products and services that can be applied to a diverse range of missions.



Balance

Advance NOAA's complementary work on environmental stewardship and economic development with a particular focus on the New Blue Economy.



Equity

Exhibit equity in how we build and provide services. Within NOAA, we will promote diversity, equity, inclusion and accessibility in the workforce. Externally, we will provide equitable access to our products and services.

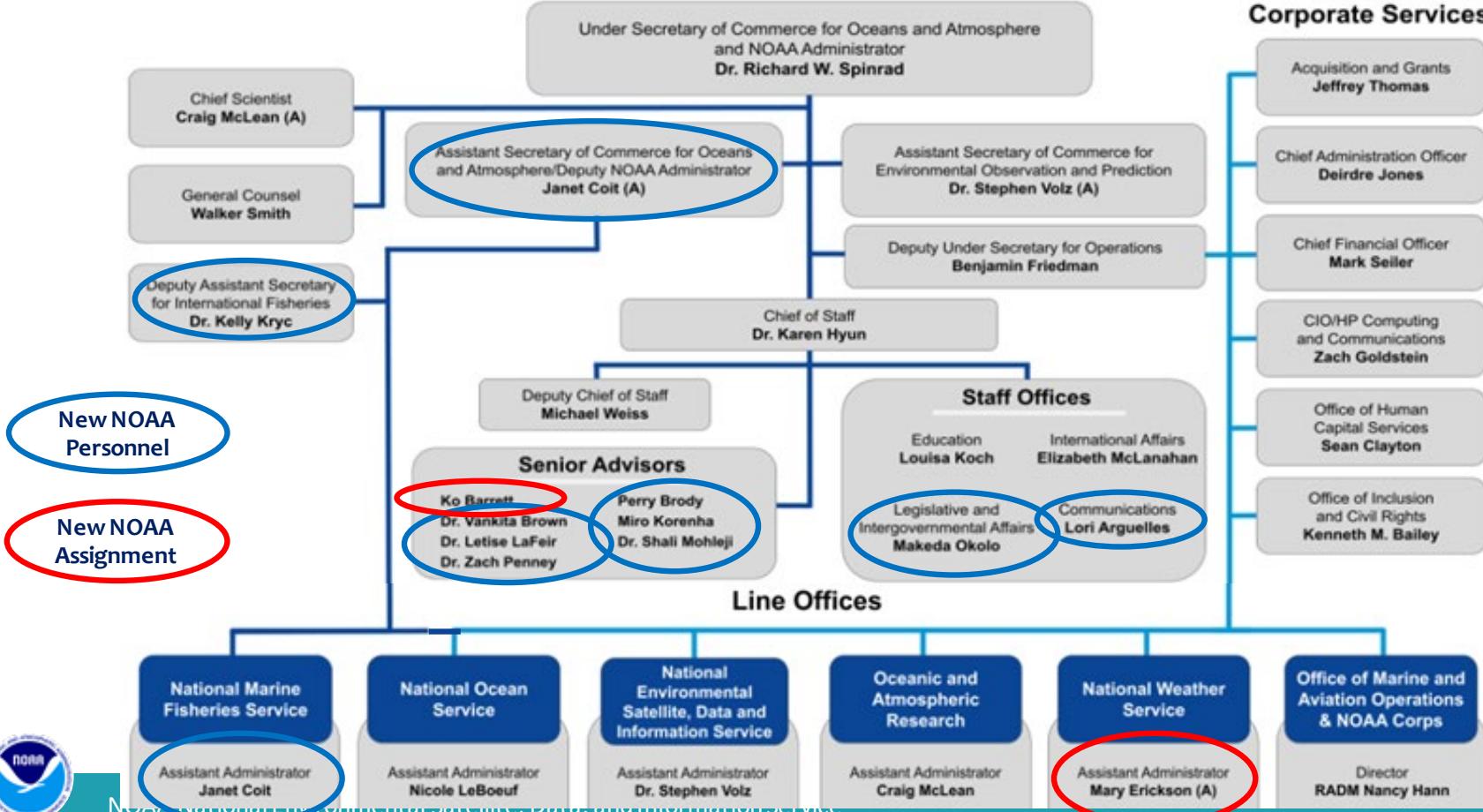
noaa.gov/our-mission-and-vision



NOAA Organization



Office of the Under Secretary for Oceans and Atmosphere



NOAA is Aligned with the Whole of Government Approach

BRIEFING ROOM

Executive Order on Tackling the Climate Crisis at Home and Abroad

JANUARY 27, 2021 • PRESIDENTIAL ACTIONS

BRIEFING ROOM

Executive Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis

JANUARY 20, 2021 • PRESIDENTIAL ACTIONS

Opportunities for Expanding and Improving
CLIMATE INFORMATION AND SERVICES FOR THE PUBLIC



REPORT TO THE NATIONAL CLIMATE TASK FORCE - OCTOBER 2021

   FEMA



NOAA's Climate and Equity Roundtables: Listening to Help Define our Future

- In 2021, NOAA organized 8 roundtables across the United States, exploring regional-specific needs with tribal, federal, regional, and local partners.
 - In Alaska for example, NOAA met with the Alaska Native Tribal Health Consortium, representing all 229 Alaska Native tribes.

Thematic Listening Sessions:

- Retail Industry
- Insurance & Reinsurance
- Architecture & Engineering
- New Blue Economy
- 3/28/22, Travel & Tourism

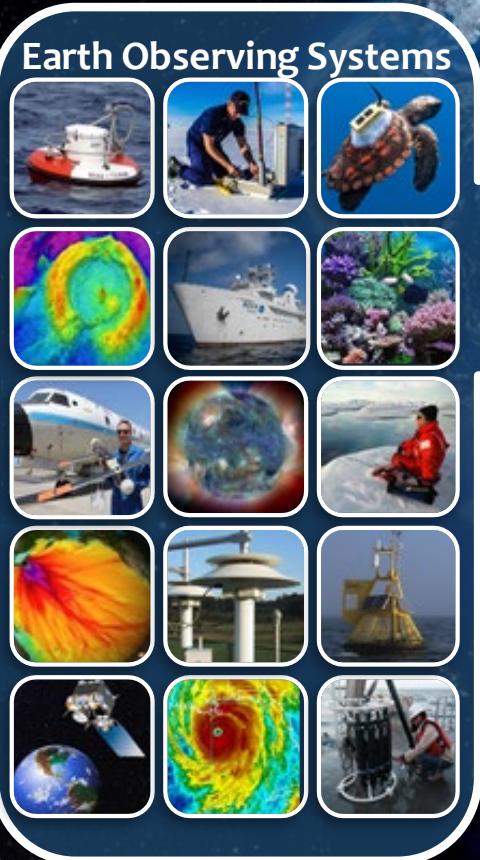
 Better understand and coordinate with partners	 Support diversity of regional and local needs	 Be more inclusive
<ul style="list-style-type: none">▪ Enhance climate risk and resilience information▪ Address excessive heat▪ Ensure equitable access	<ul style="list-style-type: none">▪ Help communities use NOAA data▪ Support community planning▪ Provide tailored products to meet community needs	<ul style="list-style-type: none">▪ Respect local and indigenous knowledge▪ Ensure equitable access▪ Address systemic bias

C&E Roundtables in:

- Alaska
- US Central
- Great Lakes
- Gulf of Mexico
- Pacific Islands
- Southeast
- West
- North Atlantic

Making Data Useful

NESDIS:
GEO
LEO
SWO
OSGS
OSPO



Earth Observing Systems



Authoritative Products for Decision-Making

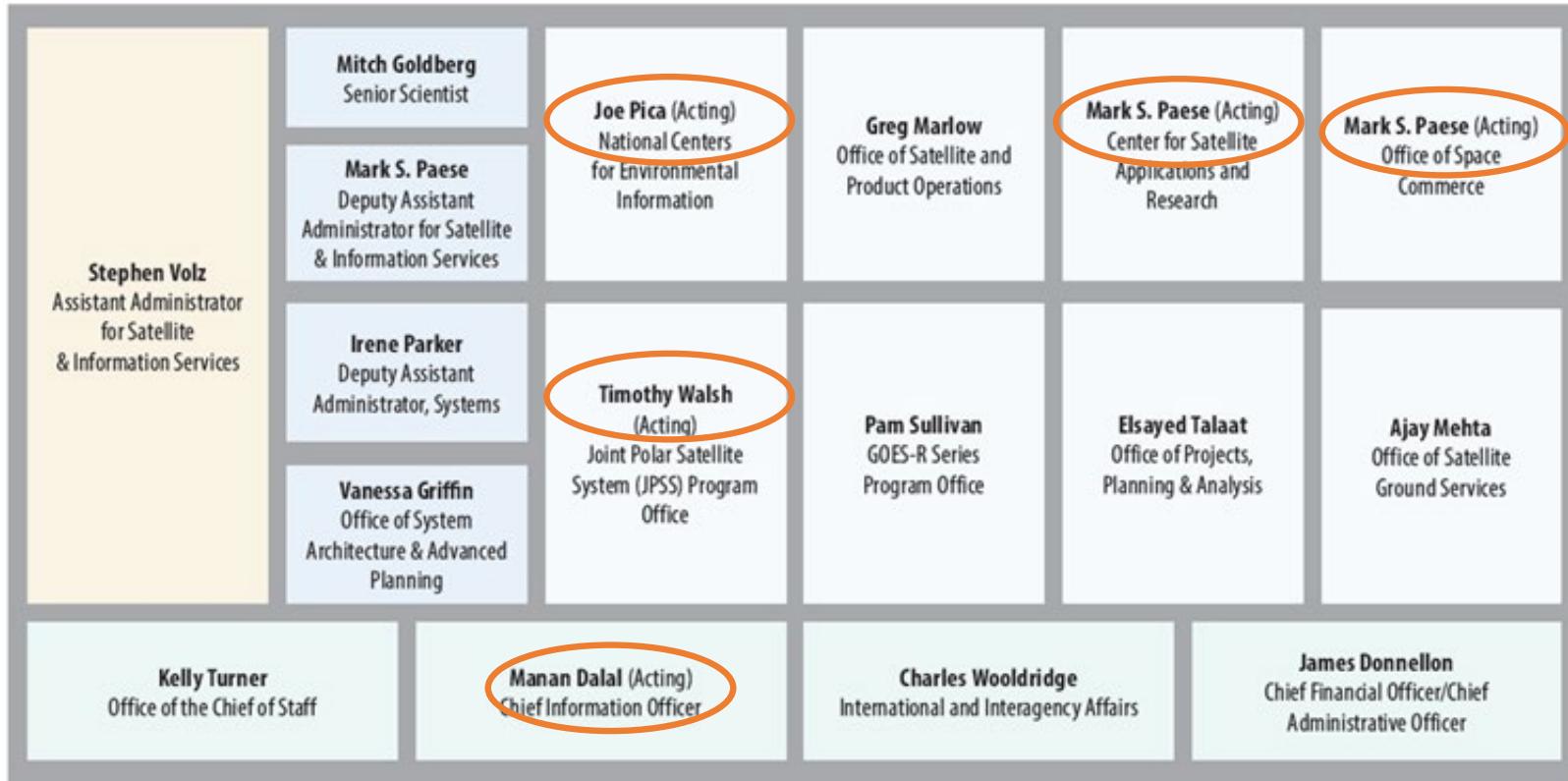




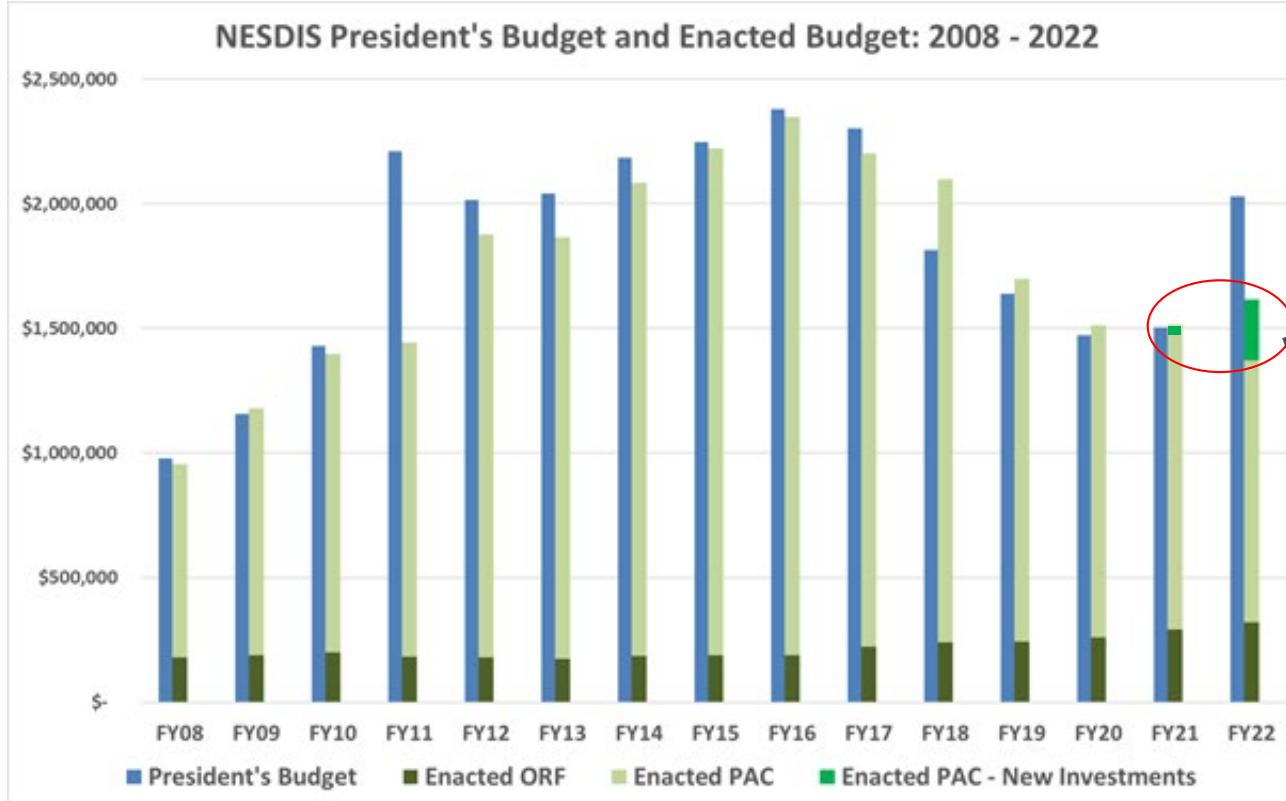
NOAA Satellite and Information Service Organizational Chart



Acting



Fiscal Years 2008 - 2023 Budget



Next-generation investments begin



NOAA & Observing System Partners



X16 NOAA Operated

- JAPAN
- SOUTH KOREA
- CANADA
- SPAIN
- FRANCE
- USA
- NOAA
- EUMETSAT
- EUROPEAN COMMISSION
- NATIONAL SPACE ORGANIZATION (NSPO)
- EUROPEAN SPACE AGENCY
- NASA
- DEPARTMENT OF DEFENSE

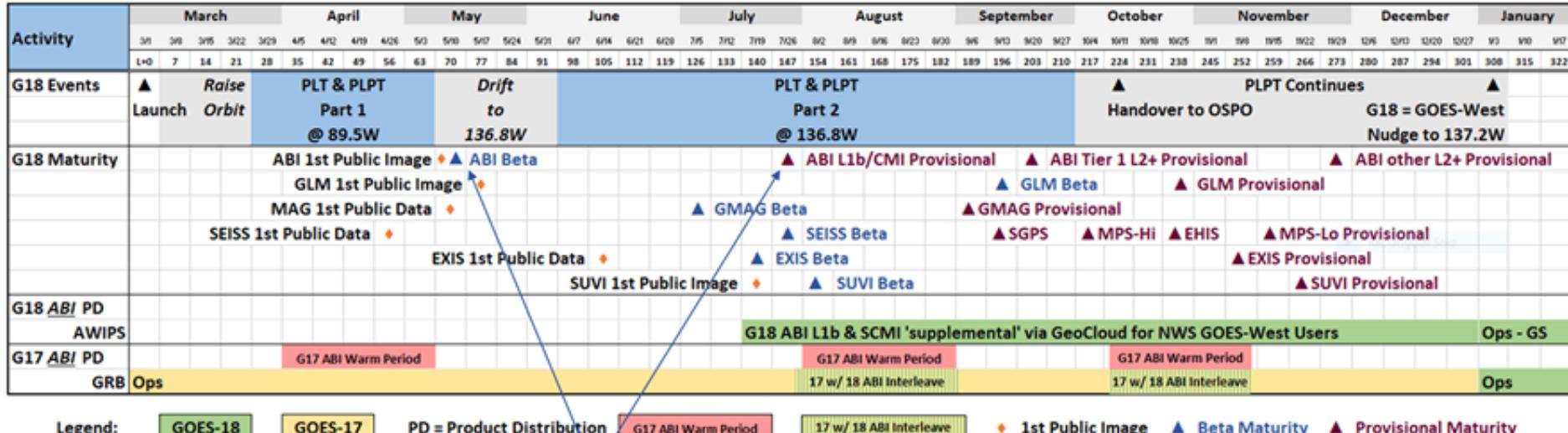


Geostationary (GEO) Portfolio

GOES-T Launch
March 1, 2022



GOES-T and GOES-U



- **GOES-T (now GOES-18) post-launch Timeline:**
 - GOES-18 ABI data projected to achieve *beta* maturity pre-drift (May 2022).
 - Enables GOES-18 ABI data to reach *provisional* maturity just before the GOES-17 ABI August Warm Period. (At this time, NWS does not plan to request GOES-15 supplemental support.)
- **GOES-U:** Compact Coronagraph mechanically integrated; satellite integration and testing ongoing. On track for a Spring 2024 launch planning date.



GeoXO Constellation



GEO-West

Visible/Infrared Imager
Lightning Mapper
Ocean Color



GEO-Central

Hyperspectral Infrared Sounder
Atmospheric Composition
Partner Payload



GEO-East

Visible/Infrared Imager
Lightning Mapper
Ocean Color

**First GeoXO
Launch 2032**

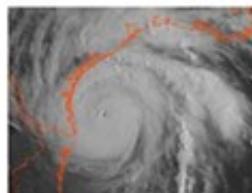


GeoXO: Continuity & Enhancement of NOAA's Observing System in GEO

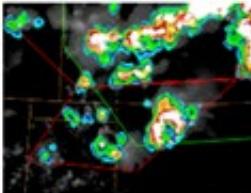
- In addition to ensuring continuity of today's 24/7 now-casting, GeoXO advances NOAA's observational capabilities to meet mission requirements and supports World Meteorological Organization's vision for 2040
- Ongoing Phase A activities:
 - **Imager** Phase A studies ongoing with L3Harris and Raytheon.
 - **Sounder** Phase A studies underway with Ball Aerospace and L3Harris.
 - Proposals received and under review for **Ocean Color, Lightning Mapper, and Atmospheric Composition** instruments; award of study contracts in FY22.
 - **Spacecraft** RFP released in February 2022; proposals due in March.

New NOAA Geostationary Capabilities

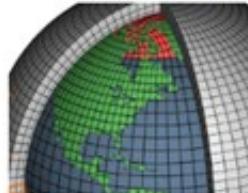
Vis/Near-IR Imagery



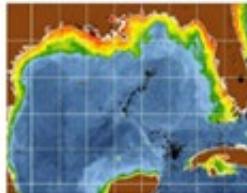
Lightning Mapping



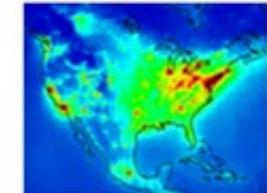
IR Sounding



Ocean Color



Atmo. Composition



Low Earth Orbit (LEO) Portfolio



Polar Weather Satellites

- **JPSS-2:**

- Now in environmental testing; thermal vacuum began on March 1st
 - NASA Low-Earth Orbit Flight Test of an Inflatable Decelerator (LOFTID) planned delivery on track for rideshare with JPSS-2.
 - Proceeding towards Launch Readiness Date of Sept 31, 2022.

- **JPSS-3:**

- JPSS-3 Libera Interagency Agreement (IAA) in final signature cycle
 - On track for March 2025 Satellite Readiness Date (SRD), target Launch date 2027

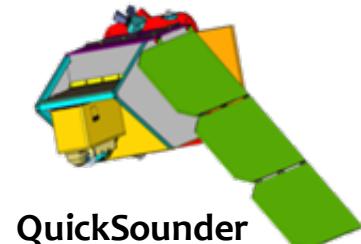
- **JPSS-4:**

- On track for March 2028 SRD, target launch date 2032



LEO QuickSounder Mission

- The LEO QuickSounder mission will demonstrate disaggregation, agility, and operational observations can be achieved through the exploitation of “New Space” and new business models. Objectives of the mission include:
 - Advance aspects of agile, disaggregated architecture: from authorization to launch in **~3 years**; employing **greater risk tolerance** in individual mission elements
 - Understand and establish NOAA procurement and programmatic **practices** for leveraging elements of commercial space hardware, to include acquiring “**off the shelf**” spacecraft and launch vehicle
 - **Validate** program cost and schedule **estimates**, and models for similar future satellites
 - **Demonstrate** small satellites can provide observations that **meet** our mission requirements
- QuickSounder milestones:
 - December 2021: Mission Concept Review (MCR)
 - February 2022: Sponsor Commitment by NOAA Administrator
 - March 2022: Issued Rapid Spacecraft Development Office (RSDO) spacecraft Request For Information (RFI)
 - **Upcoming: DOC Milestone 1 review, Fall 2022**

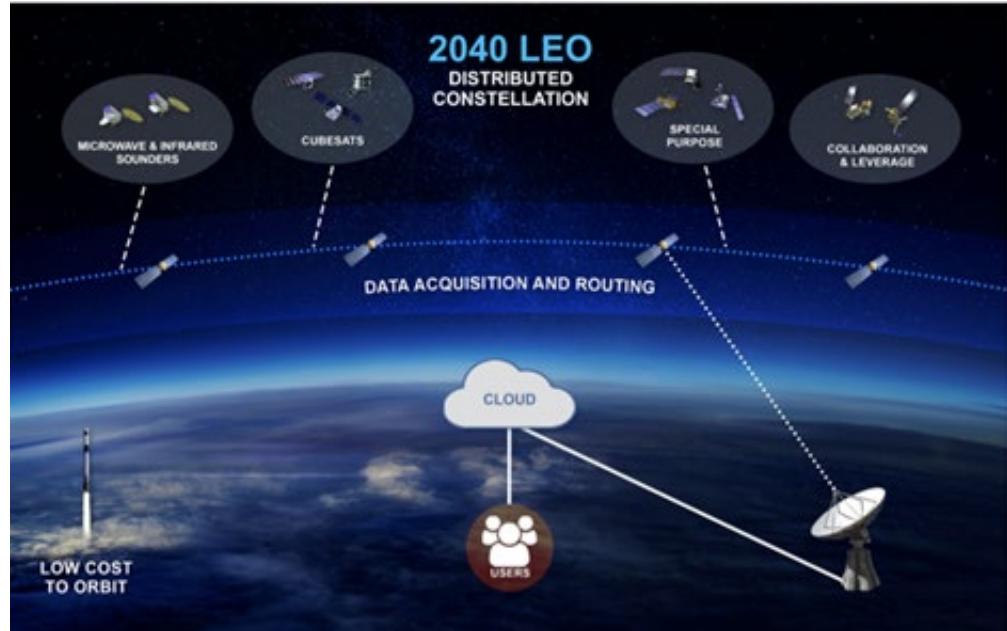


QuickSounder
Concept



LEO Architecture and Formulation

- NOAA seeks to leverage recent **innovations** by the **commercial aerospace** industry in **small satellite technology**, **access to space**, **communications** and ground services (“**New Space**”).
- LEO Next remains in Pre-Formulation after Milestone 0 approval in June 2021.
- LEO Next considering to include:
 - Microwave sounding
 - Infrared sounding
 - Multipurpose imagery
 - Ozone monitoring
 - Commercial radio occultation



Evolve the capability to launch advanced sensors when and where needed



Space Weather Observations (SWO) Portfolio



Space Weather Follow On (SWFO)

- **SWFO L1 mission is on track for 2025 Launch**
 - CCOR-1 mechanically integrated onto the Solar Pointing Platform on February 11, 2022.
 - Door life model thermal vacuum (TVAC) testing continues; expected complete mid-March.
- **NASA Interstellar Mapping and Acceleration Probe:** Continue to work launch vehicle accommodation with IMAP and Launch Services Program for February 2025 Launch Readiness Date.
- **NOAA-ESA Agreement signed:** Agreement between NOAA and ESA for cooperation on space-based space weather observations signed on March 4th. Includes shared instruments on SWFO-L1 and planned ESA L5 Vigil mission

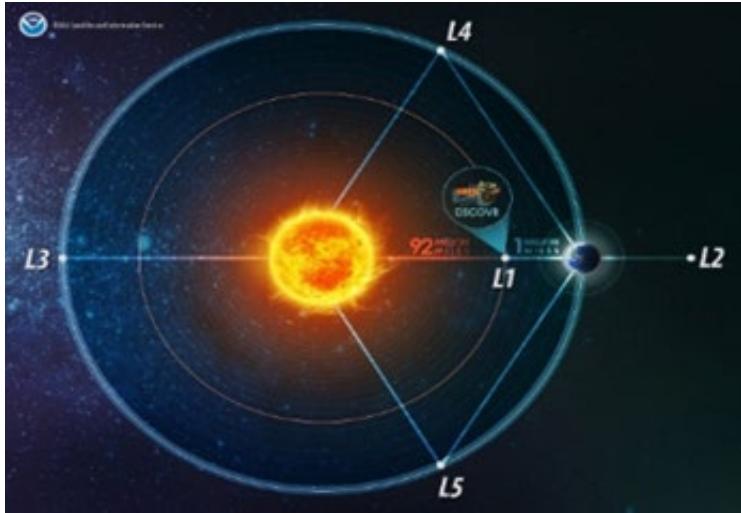


SWFO-L1 spacecraft

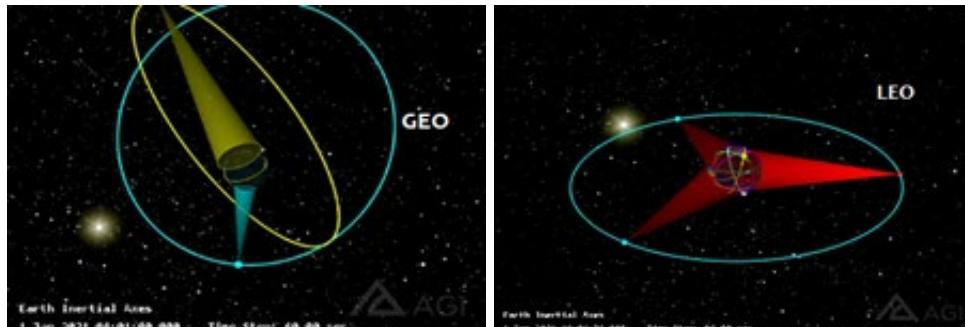
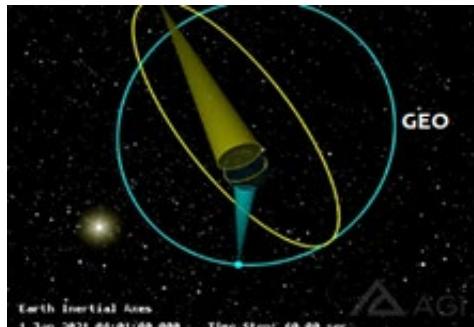


Space Weather Observations Program

- Space Weather Observations (SWO) is now in Pre-Formulation after Milestone 0 approval in February 2022.
- At present, SWO would include missions to L1, L5 (rideshare with ESA), and GEO; NOAA is also considering observations in LEO and HEO orbits.
- SWO is targeting a program- level DOC Milestone 1 in FY22.



NESDIS SWO will provide comprehensive observational capability from several orbital regimes.



NOAA and the DOC Have An Additional Space Weather and SSA Mission

- NOAA is responsible for monitoring our space weather as well as terrestrial weather
 - We use observations from NASA, NOAA, and ESA,
 - Apply models developed by NOAA, NASA and academic partners
- NOAA & the DOC are responsible for the provision of civilian Space Situational Awareness (SSA) “traffic monitoring” in the future
- **We need more and better observations, and better models and forecasts to meet the need**

- SpaceX lost 38/49 Starlink satellites launched Feb 3
 - Due to increased drag during orbit raising
- Geomagnetic storms (G1) on Feb 3-4.
 - Watch for G1 on Feb 3 was issued Jan 31, then later cancelled on Feb 2

NEWS OPINION

LAUNCH CIVIL COMMERCIAL MILITARY POLICY & POLITICS

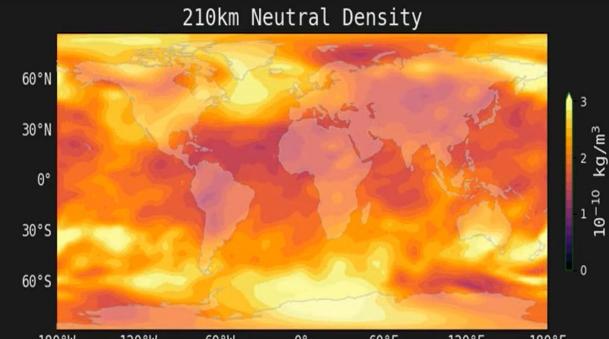
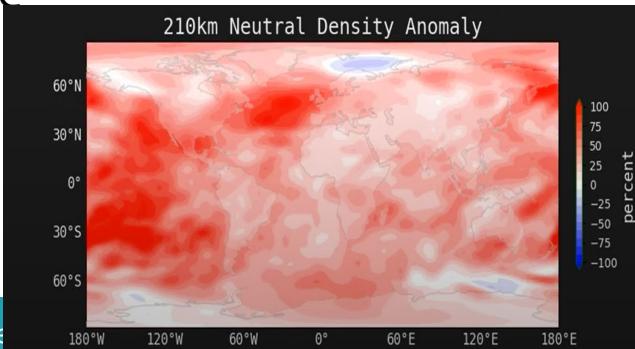
SPACE NEWS

Dozens of Starlink satellites from latest launch to reenter after geomagnetic storm

by Jeff Foust — February 9, 2022



A Falcon 9 lifted off from the Kennedy Space Center Feb. 3 carrying 49 Starlink satellites. Up to 40 of those satellites will reenter after a geomagnetic storm kept the spacecraft from



Common Services & Product Development



Advancing Data Science and Information Services

TODAY'S GROUND SERVICE

- Single system data services
- Limited computing power

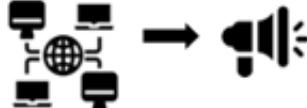


Data Collected & Transmitted from Single Observation System

Delivery to NOAA Users



Development of Products & Services

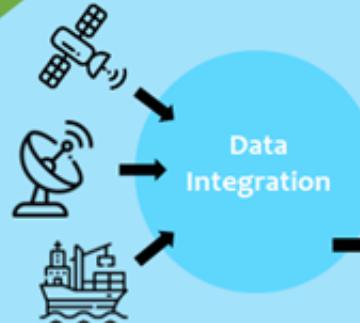


Forecasts, Warnings, Watches

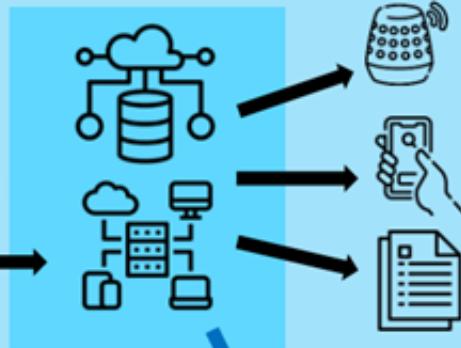
NOAA is moving to a ground system that matches our agile space-based observation systems.

TOMORROW'S GROUND SERVICE

- Secure ingest for all data types
- Powered by AI, data science
- High performance computing capability, cloud transition & hosting for data storage, stewardship & access



Data Collected & Transmitted from Multiple Sources: International, Commercial, USGS Partners

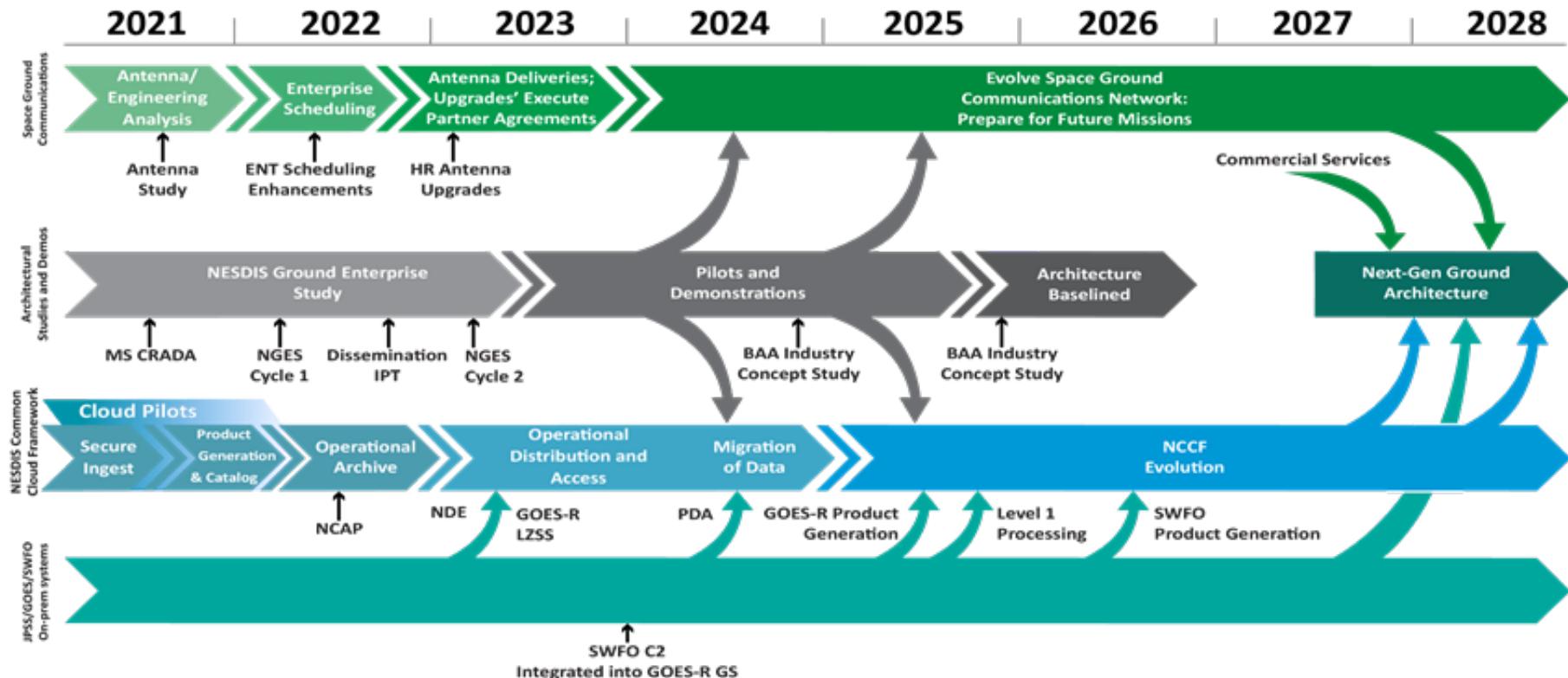


Cloud-based Data Stewardship, Supercomputing Capability

Development of New Products & Services Delivered in New Ways to More Users

Co-located Earth system data available for Data-Driven Science

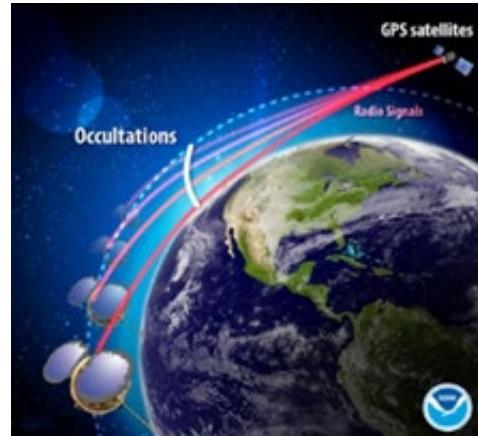
NESDIS Ground Enterprise Strategy



Commercial Weather Data and Joint Venture

Radio Occultation (RO) Data to Date:

- **Commercial Weather Data Pilot Round 3:** NOAA released an RFI for a third round on Nov. 10, 2021, **focusing on space weather data** available in the 2022-2027 timeframe. Multiple responses received.
- **Commercial Weather Data Purchase:** On Feb. 10, 2022, NOAA awarded Delivery Order 4 under its existing IDIQ contracts with Spire Federal and GeoOptics for RO data, doubling the number of daily profiles purchased.
 - Delivery Order four began on March 16, 2022.
 - On Dec. 1, 2021, NOAA released an RFI on draft Statement of Work for the next IDIQ data buy contracts covering 2023-2028.
 - In February 2022, NOAA submitted a report to Congress providing a cost-benefit analysis of commercial RO data purchased.



Joint Venture:

- NOAA continues to assess opportunities for technology and data exploitation with potential candidates to fund. Broad Agency Announcement studies to be awarded in fiscal year 2022.

Home / News & Events / Announcement

NOAA Awards Fourth IDIQ Delivery Order Contract

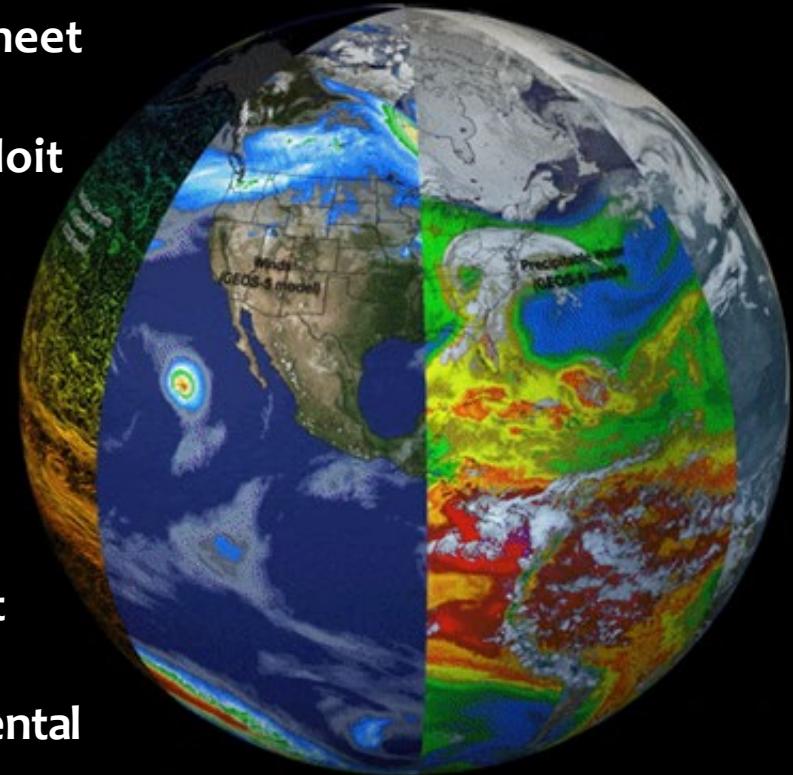
February 10, 2022

On Thursday, February 10, 2022, NOAA awarded a fourth Delivery Order under its existing Indefinite Delivery Indefinite Quantity (IDIQ) contract for commercial radio occultation (RO) satellite weather data. The RO data consist of vertical profiles of atmospheric temperature and related quantities for operational weather models and



NOAA is Enabling a Climate-Ready Nation

- Engaging our users to better understand and meet their needs
- Working with NASA and other partners to exploit new observations and understanding to improve the quality of our information
- Working with commercial partners to exploit new and emerging technologies in new observing systems and refreshing Information Technology
- Maintaining and growing commercial and international partnerships to deliver a resilient and high-performing observing system
- Meeting the increasing demand for environmental information and data products in a rapidly changing world





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Thank you!

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