



# Developing an Integrated Understanding of our Earth Environment

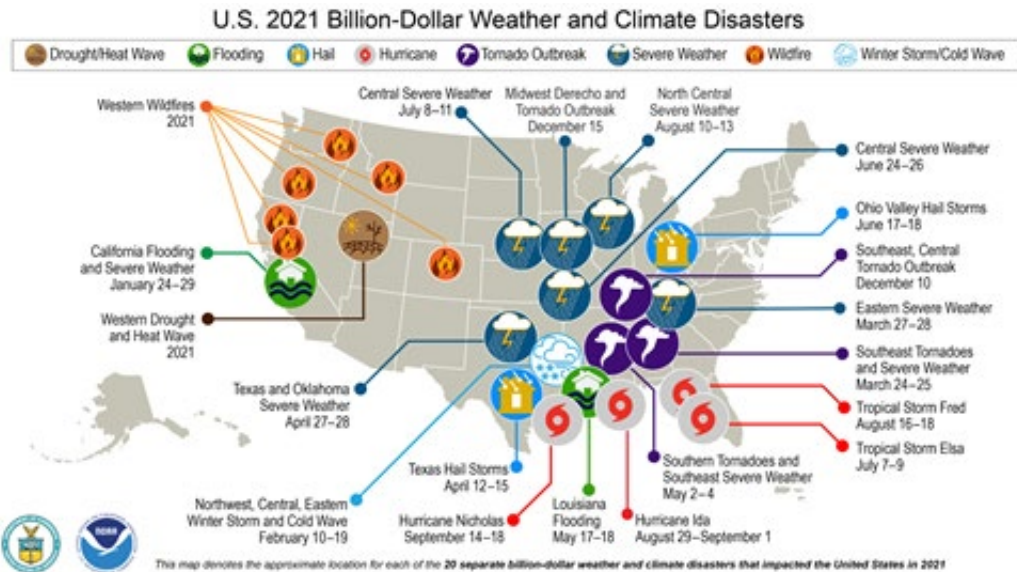
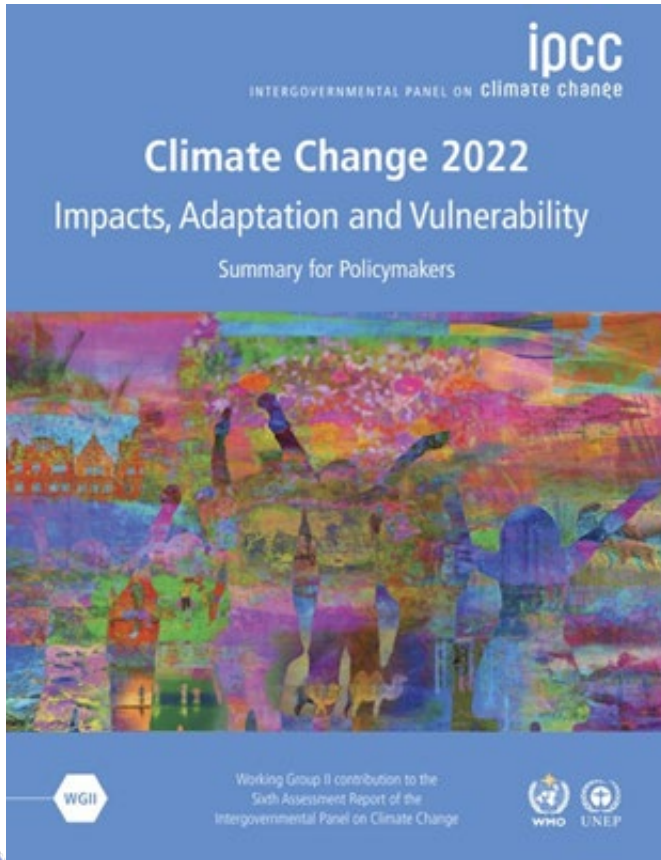
National Environmental  
Satellite, Data, and Information  
Service

**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](https://noaa.gov/our-mission-and-vision)

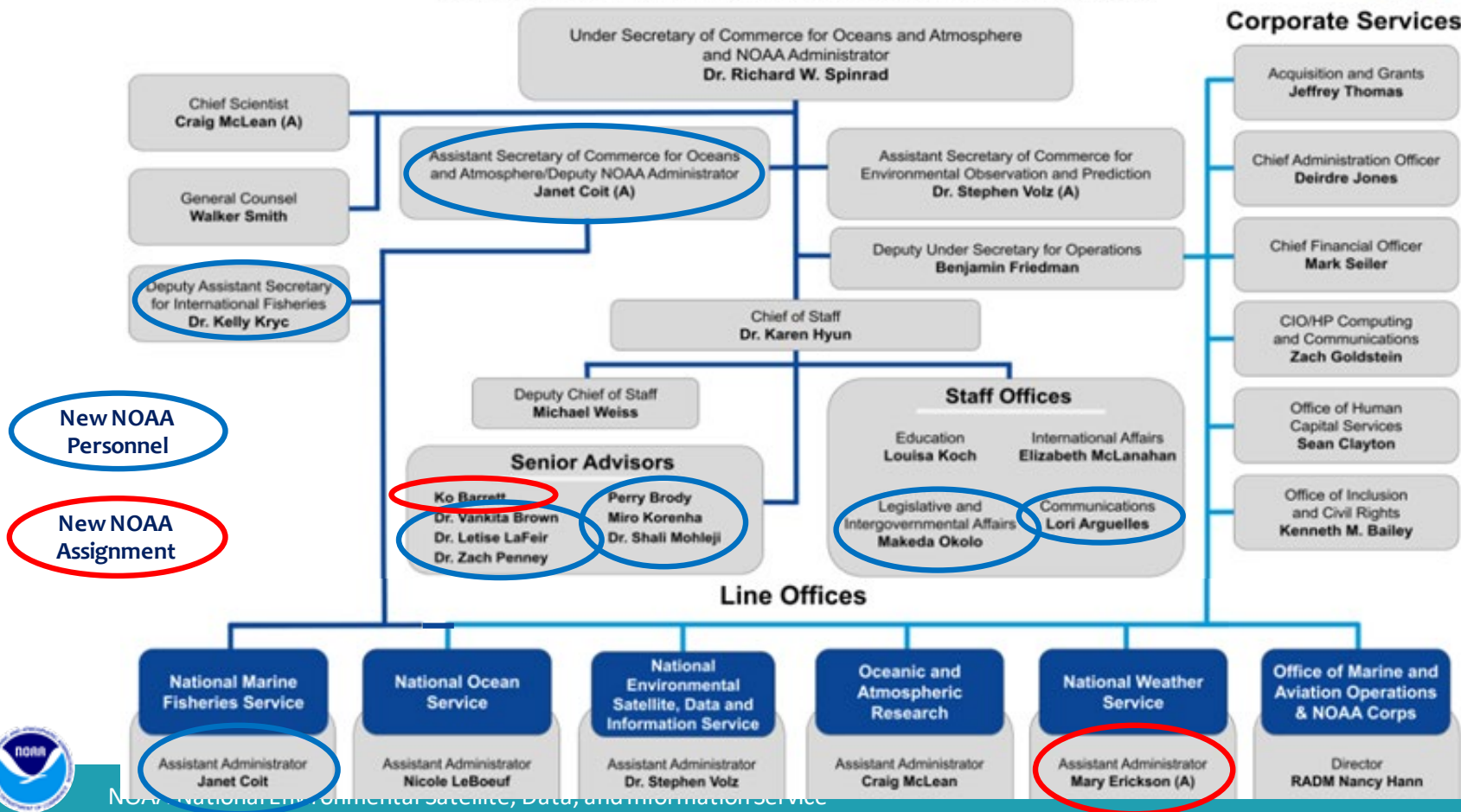


(PDO) = Performing the Duties of  
(A) = Acting

# 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






# 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

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

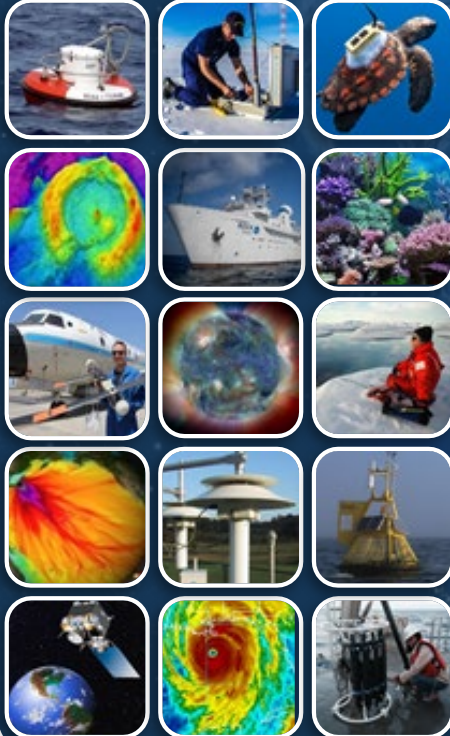
## C&E Roundtables in:

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



# Making Data Useful

## Earth Observing Systems



## Scientific Data Stewardship

NESDIS:  
STAR  
NCEI  
OSPO  
OSGS

## Authoritative Products for Decision-Making

Snowfall  
Impact  
Index  
FEMA

Tsunami  
Warning  
Emergency  
Managers

Heating &  
Cooling  
Degree Days  
Energy Sector

Hurricane  
Tracks  
Emergency  
Planners

Coastal Digital  
Elevation  
Models  
Hazard  
Mitigation

Solar  
Activity/Sun  
Spots  
Power  
Distribution

Annual State  
of the Climate  
Reports  
Decision  
Makers

Global & U.S.  
Climate  
Summaries  
Numerous  
Sectors

Temperature &  
Precipitation  
Outlooks  
Agriculture

IPCC & National  
Climate  
Assessments  
Gov't  
Policymakers

Billion \$  
Disasters,  
Climate  
Extremes Index  
Insurance

Climate  
Normals  
Construction,  
Infrastructure,  
Agriculture

NESDIS:  
GEO  
LEO  
SWO  
OSGS  
OSPO





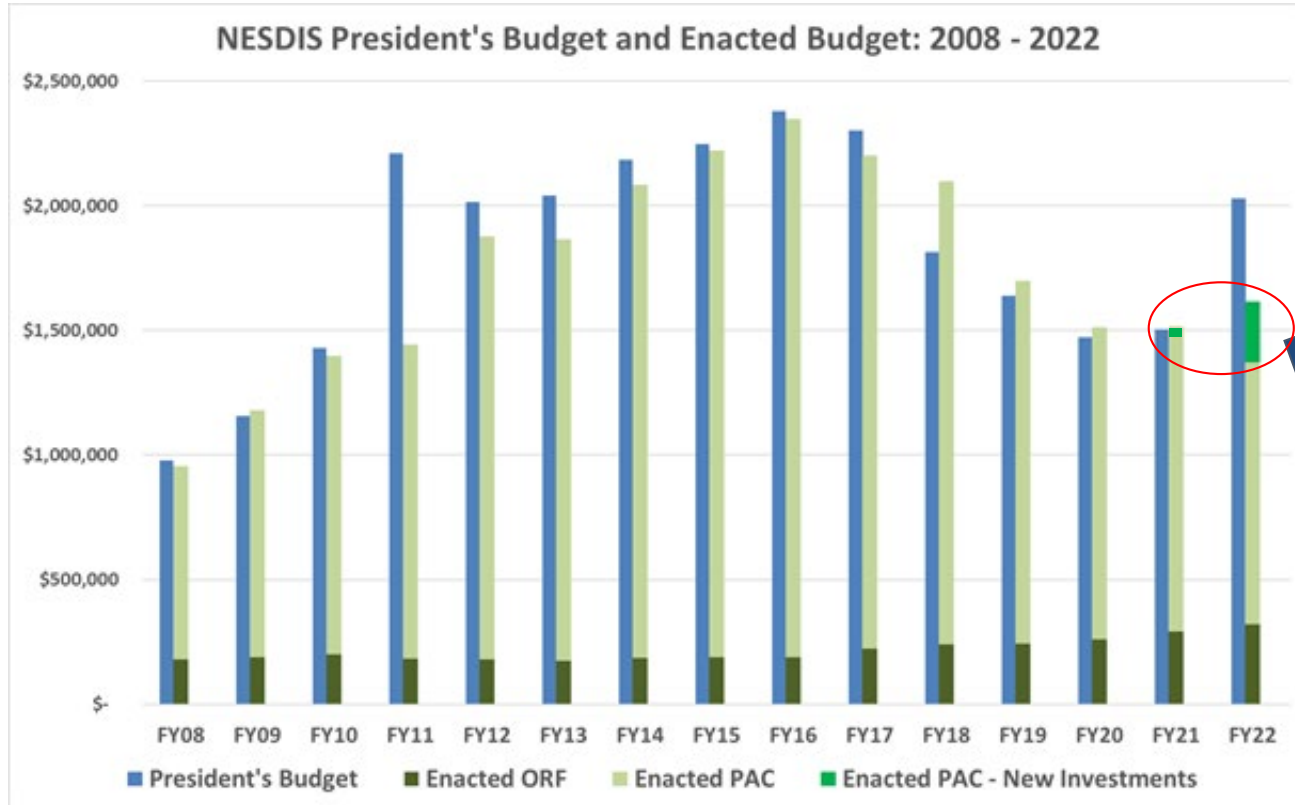
# NOAA Satellite and Information Service Organizational Chart



Acting



# Fiscal Years 2008 - 2023 Budget



Next-generation investments begin



# NOAA & Observing System Partners

X16 NOAA Operated



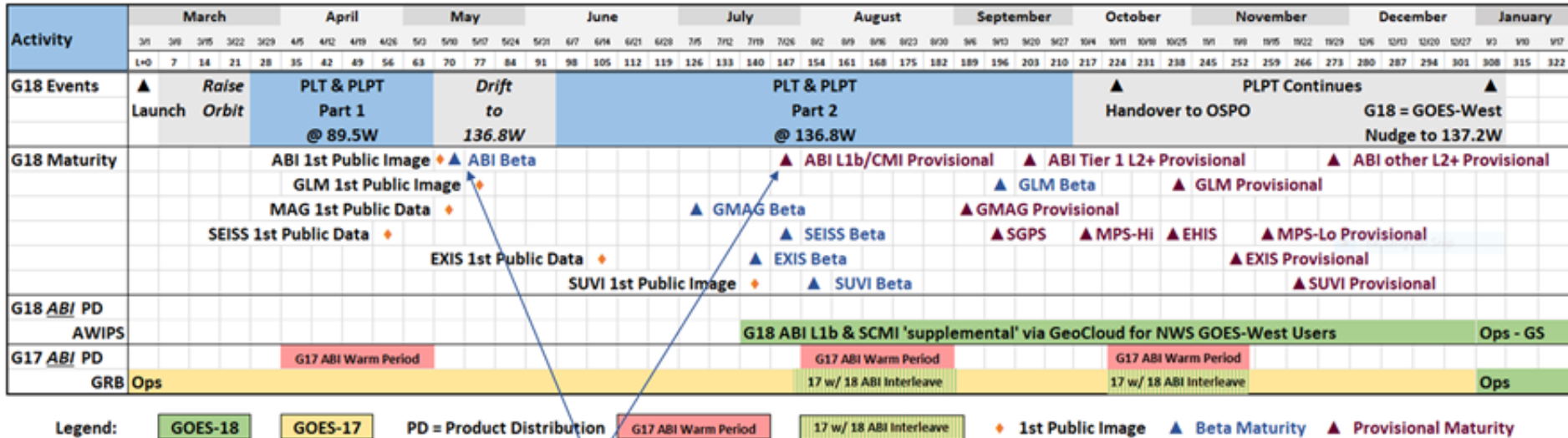
# Geostationary (GEO) Portfolio

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**

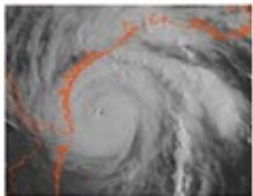


# GeoXO: Continuity & Enhancement of NOAA's Observing System in GEO

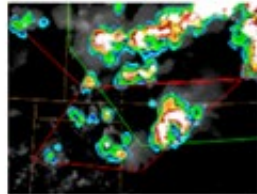
- In addition to ensuring continuity of today's 24/7 now-casting, GeoXO advances NOAA's observational capabilities to meet mission requirements and supports World Meteorological Organization's vision for 2040
- Ongoing Phase A activities:
  - **Imager** Phase A studies ongoing with L3Harris and Raytheon.
  - **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

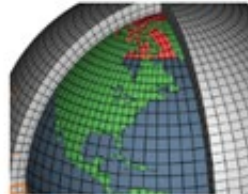
Vis/Near-IR Imagery



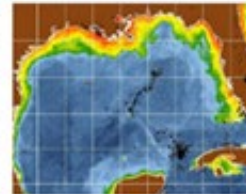
Lightning Mapping



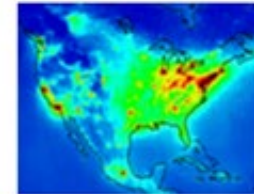
IR Sounding



Ocean Color



Atmo. Composition



# Low Earth Orbit (LEO) Portfolio





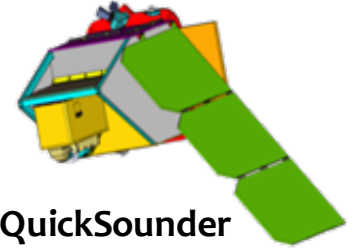
# Polar Weather Satellites

- **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*

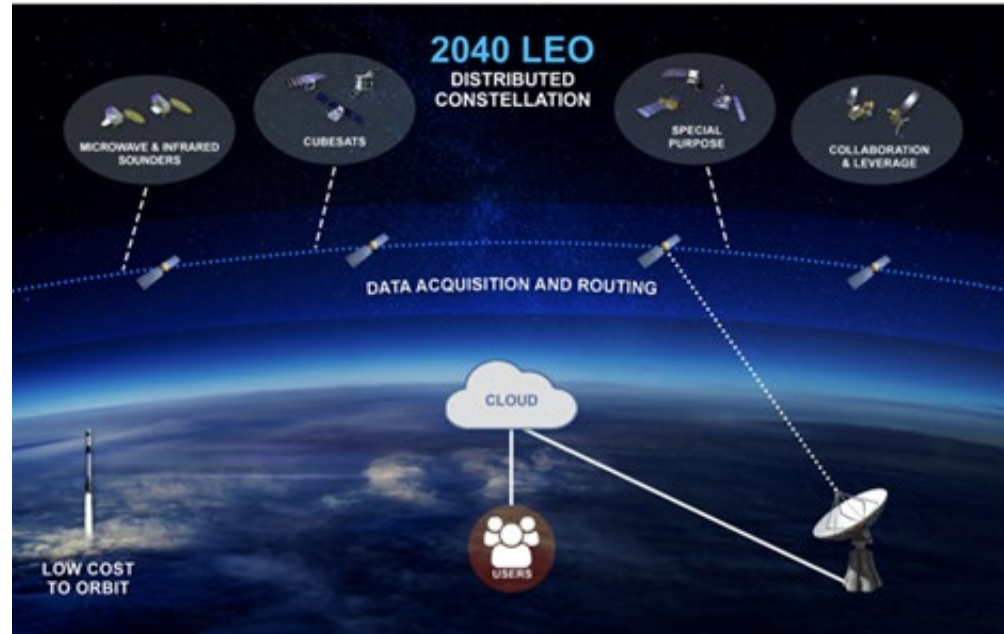


QuickSounder  
Concept



# 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

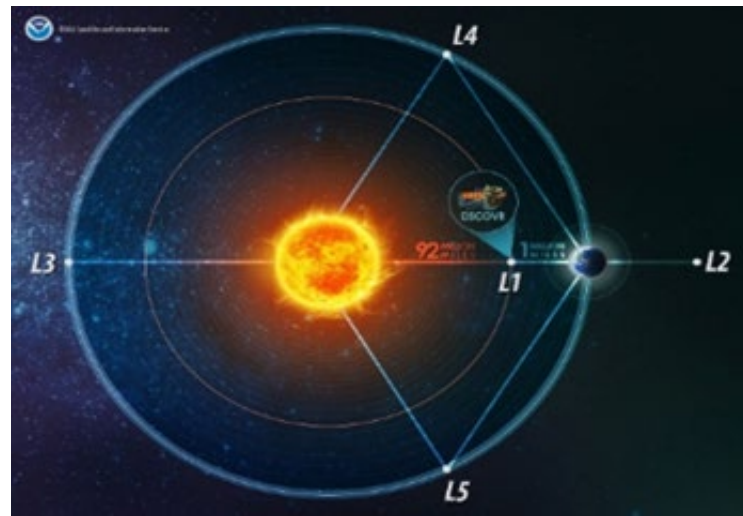


*SWFO-L1 spacecraft*

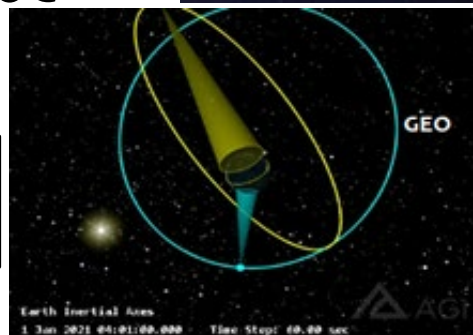


# Space Weather Observations Program

- 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.



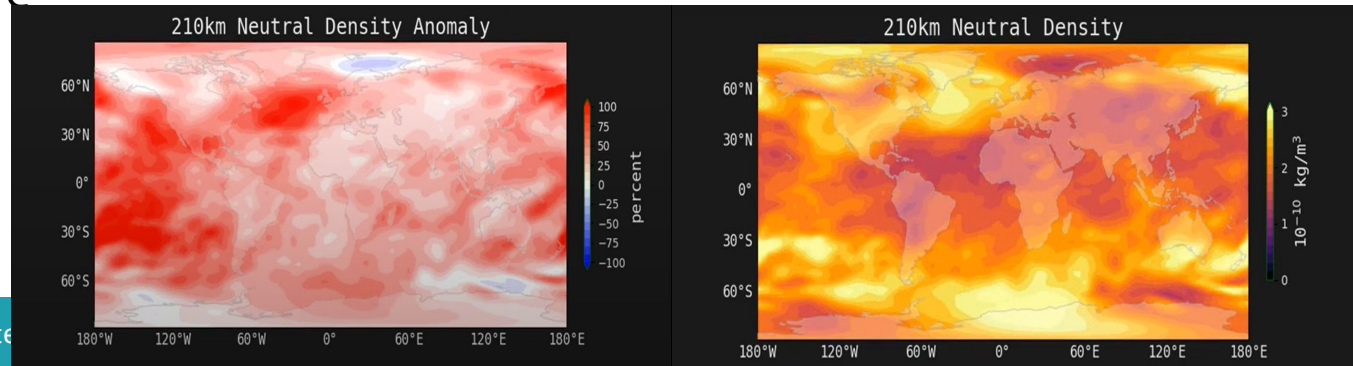
**NESDIS SWO will provide comprehensive observational capability from several orbital regimes.**



# 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





# Common Services & Product Development



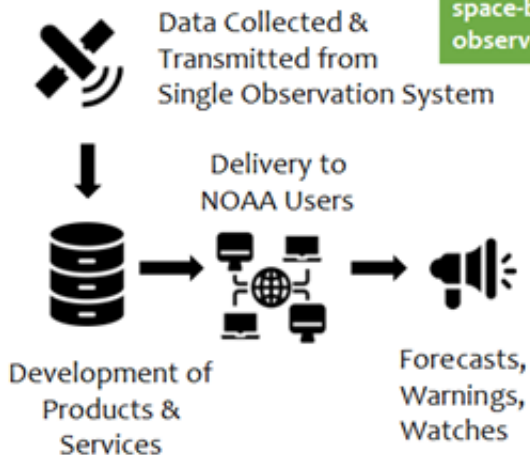


# Advancing Data Science and Information Services

## TODAY'S GROUND SERVICE

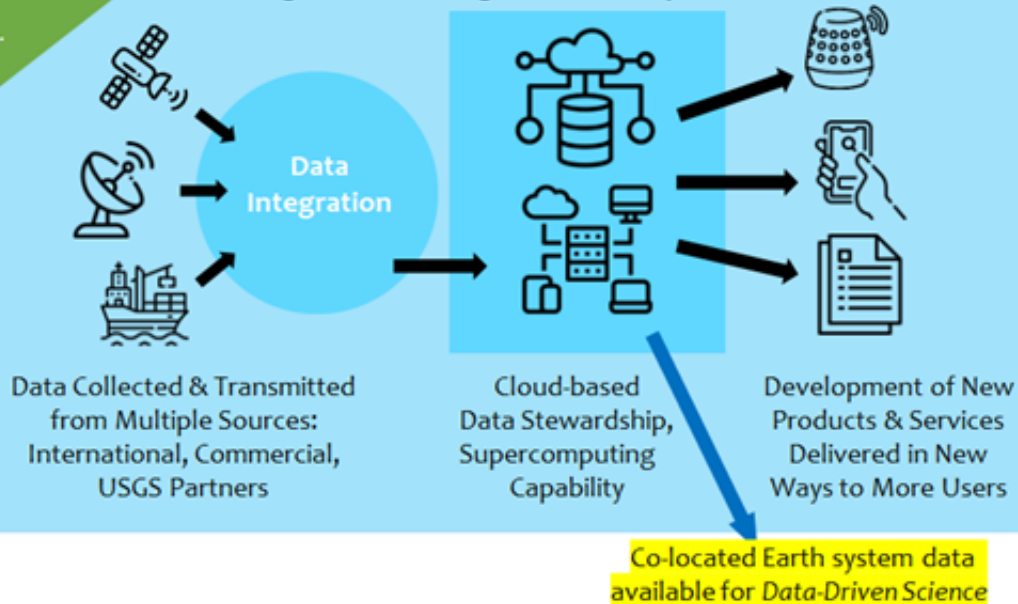
- Single system data services
- Limited computing power

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

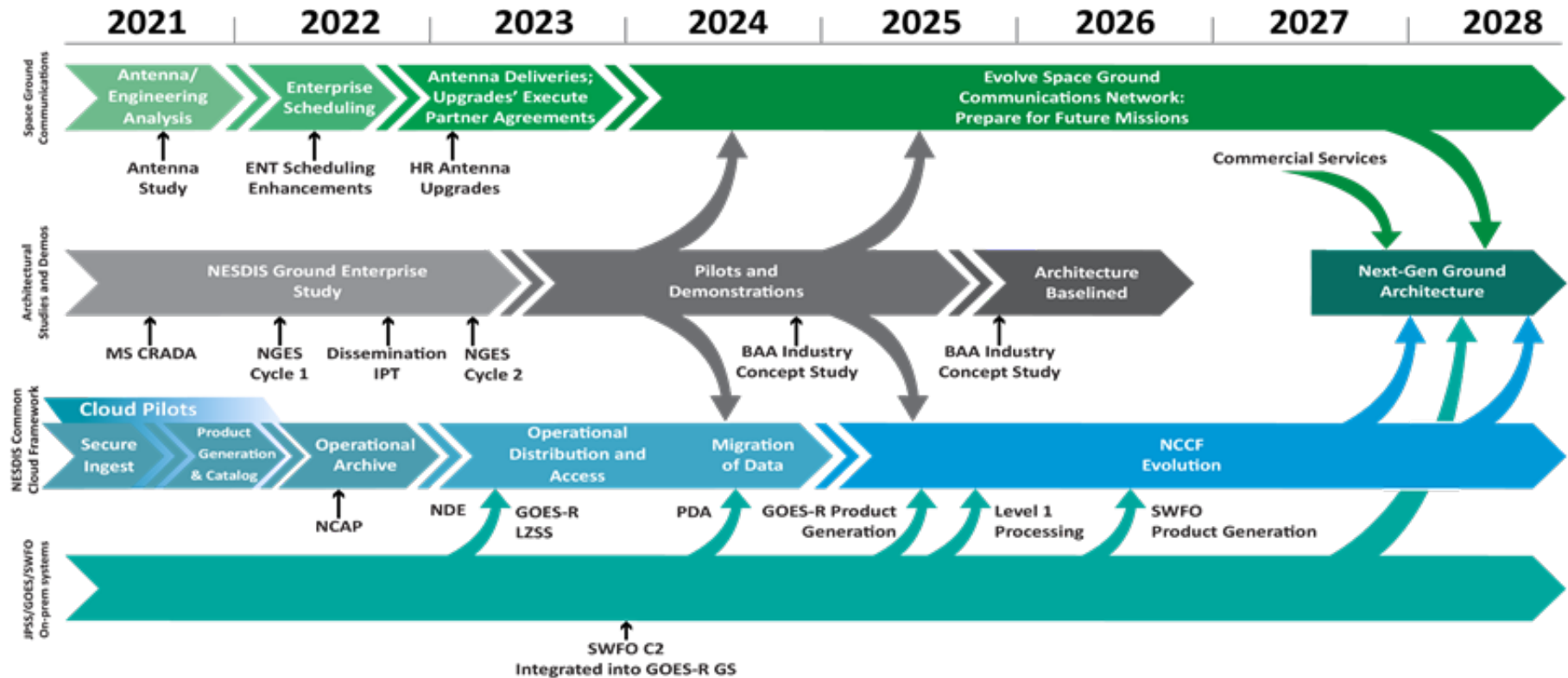


## TOMORROW'S GROUND SERVICE

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



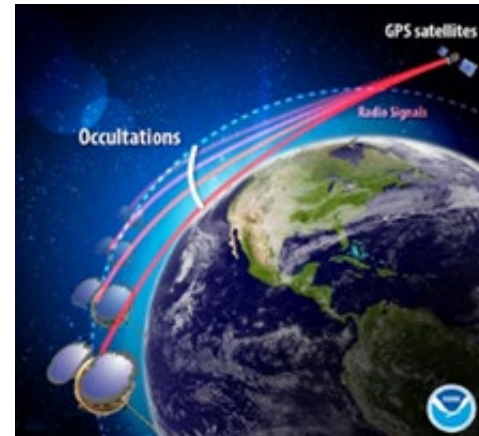
# NESDIS Ground Enterprise Strategy



# 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.



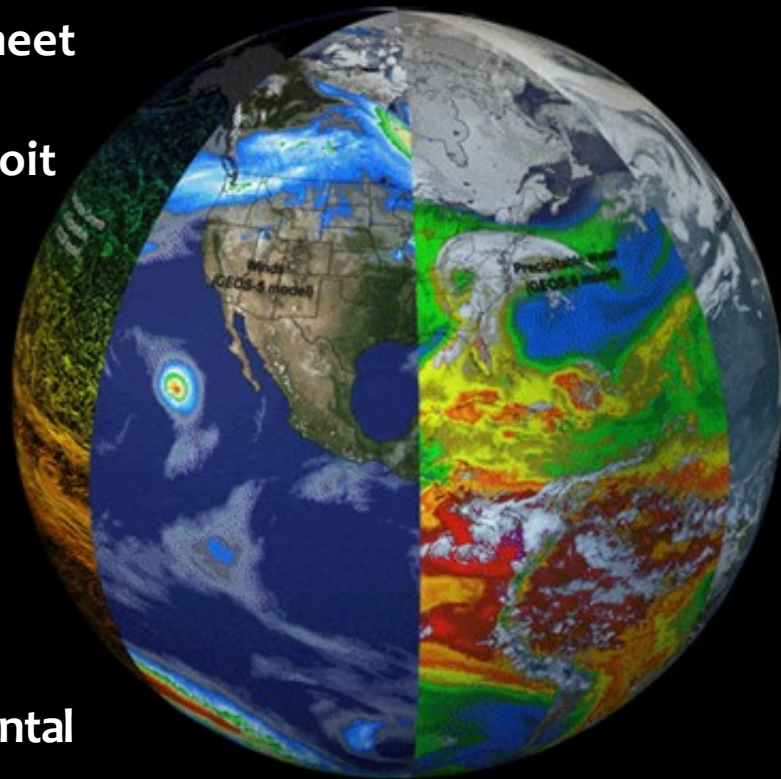
## Joint Venture:

- 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.



# 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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