

NESDIS Update to the Committee on Earth Science and Applications from Space

National Environmental Satellite,
Data, and Information Service

March 24, 2021

Dr. Stephen Volz, Assistant Administrator
NOAA Satellite and Information Service

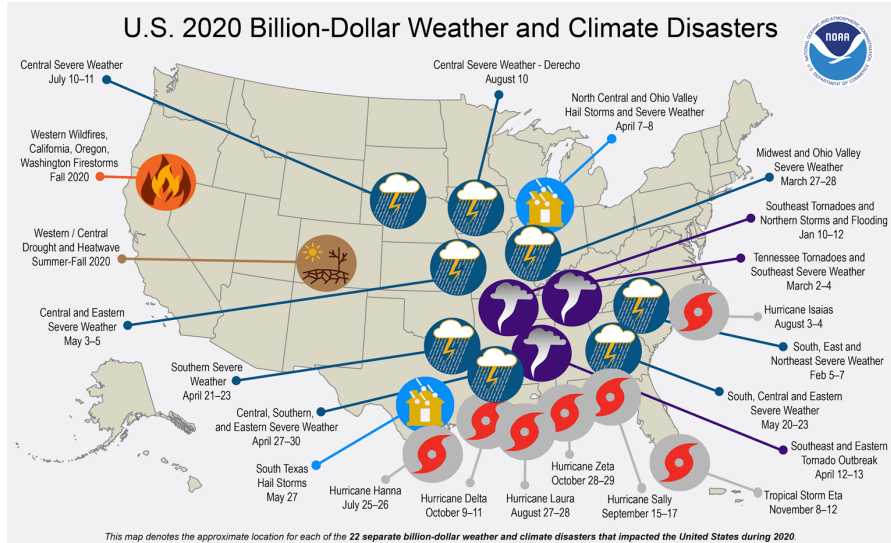
Outline

- Driving Requirements
- Meeting NOAA objectives
- NESDIS *Reimagined*
- Mission Execution

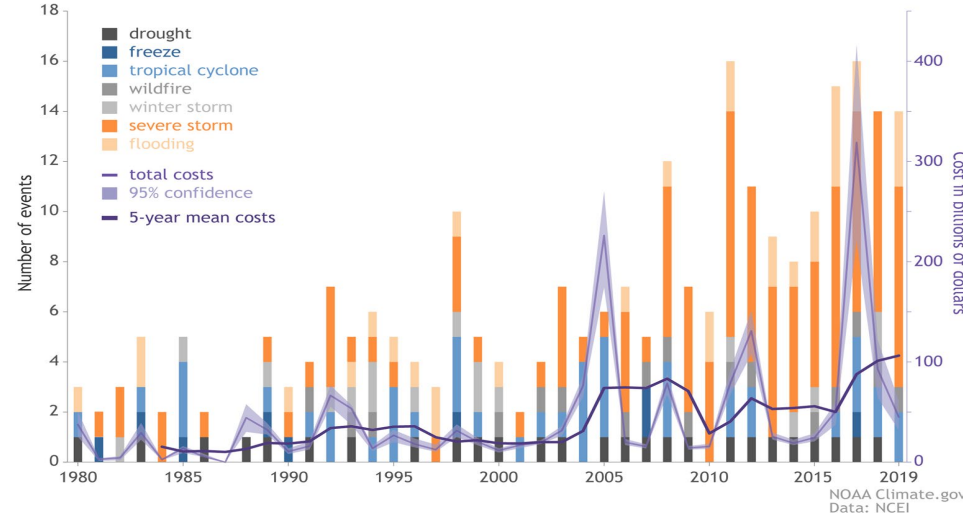


2020: Billion-Dollar Record

The US Billion Dollar Disaster Report is an annual NESDIS NCEI publication. 2020 was the 41st year of publication



Billion-dollar disasters by type, from 1980-2019



Weather/climate disaster events in the U.S. in 2020...

- Record 22 events with losses **exceeding \$1b**
- Resulted in 262 deaths
- Previous annual record was 16 events (2011, 2017)
- 1980-2020 annual average is 7 events; annual average for 2016-2020 is 16.2 events (**inflation-adjusted**)

NOAA National Centers for Environmental Information: ncdc.noaa.gov/billions



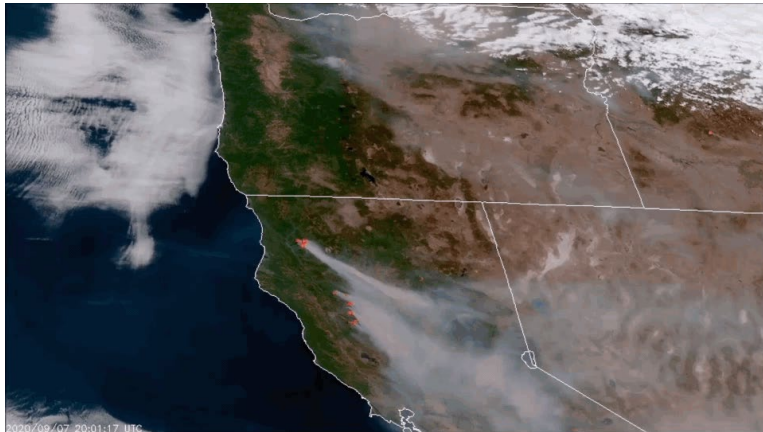
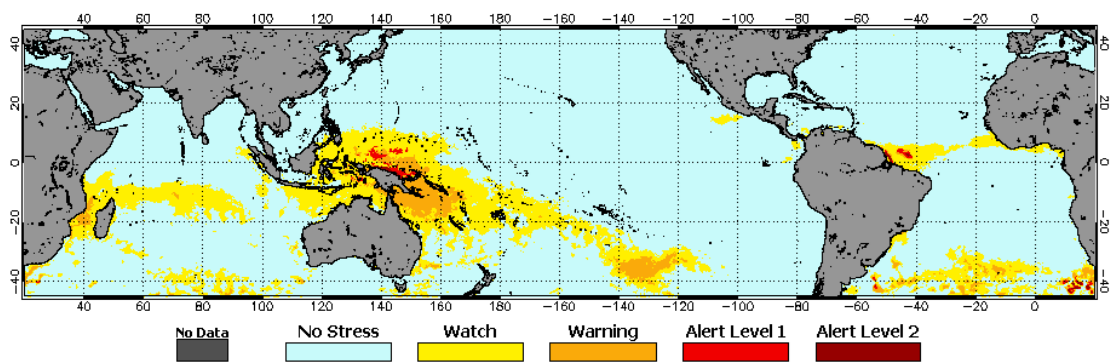
Crisis Response and Economic Recovery

Top: Coral Reef Watch bleaching alert, December 2020 - January 2021

Bottom left: Oregon and California Fires, Sept. 7-9, 2020

Bottom right: Fog at San Francisco International Airport, March 2017

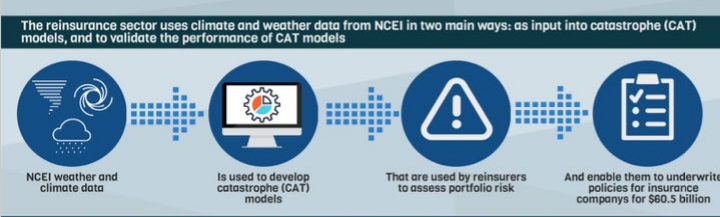
NOAA Coral Reef Watch Daily 5km Bleaching Alert Area 7d Max (Version 3.1) 27 Dec 2020



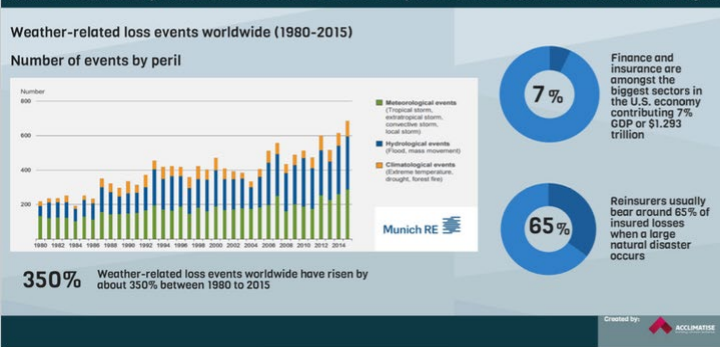


Information for the Nation

The cost of extreme weather events in the U.S. is rising. Data from NOAA's National Centers for Environmental Information provides economic insulation against the impacts of weather-related catastrophes



The ability to price risk means that reinsurance can provide a safety net for primary insurance in the event of natural disasters. These sectors protect communities from the economic impacts of extreme weather events time and time again



Climate-induced weather events **disproportionately** affect those with the least access to financial resources, historically underserved communities, and those with health vulnerabilities.

NESDIS helps leaders and communities **better understand** global and local trends to plan for a **more equitable, resilient, and sustainable future.**



Executive Orders Provide Direction Additive to our existing mission charters

Executive Order on Tackling the Climate Crisis at Home and Abroad

JANUARY 27, 2021 • PRESIDENTIAL ACTIONS

The United States and the world face a profound climate crisis. We have a narrow window to pursue action at home and abroad in order to avoid the most catastrophic risks and to seize the opportunity that tackling climate change presents. Donald Trump must go hand-in-hand with United States international leadership, aimed at global enhancing global actions. Together, we must listen to science and meet the moment. By the authority vested in me as President by the Constitution and the laws of the United States of America, I hereby order as follows:

PART I — PUTTING THE CLIMATE CRISIS AT THE CENTER OF UNITED STATES POLICY AND NATIONAL SECURITY

Section 1. Policy. The United States international engagement to address climate change, which has become a climate crisis — is more necessary and urgent than ever. The community has made clear that the scale and speed of necessary actions greatly exceeds previously believed. There is little time left to avoid setting the world on a dangerous, potentially catastrophic, climate trajectory. Responding to the climate crisis with significant, short-term global reductions in greenhouse gas emissions and net-zero emissions by mid-century or before.

It is the policy of my Administration that climate considerations shall be an essential element of United States foreign policy and national security. The United States will work countries and partners, both bilaterally and multilaterally, to put the world on a climate pathway. The United States will also move quickly to build resilience, both at home and abroad, against the impacts of climate change that are already manifest and continue to intensify according to current trajectories.

Sec. 2. Purpose. This order builds on and reaffirms my actions as Administrator to take to place the climate crisis at the forefront of the Nation's foreign policy and security planning, including submitting the United States Instrument of Acceptance to the Paris Agreement, in implementing — and building upon — the Paris Agreement covering climate objectives (to safer global temperature, increased climate resilience, a flow, aligned with a pathway toward low greenhouse gas emissions and climate development), the United States will exercise its leadership to promote a significant increase in global climate ambition and meet the climate challenge. In this regard:

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

JANUARY 20, 2021 • PRESIDENTIAL ACTIONS

By the authority vested in me as President by the Constitution and the laws of the United States of America, I hereby order as follows:

Section 1. Policy. Our Nation has an overriding commitment to empower our workers and communities, promote and protect our public health and the environment, and conserve our natural resources and monuments, places that secure our national memory. Where the Federal Government has failed to meet that commitment in the past, it must advance environmental justice. Increasing our risks through the Federal Government must be guided by the best science and be protected by processes that ensure the integrity of Federal decision-making. It is, therefore, the policy of my Administration to return the science to improve public health and protect our environment to ensure access to clean air and water; to limit exposure to dangerous chemicals and pesticides that hold polluters accountable; including those who disproportionately harm communities of color and low-income communities; to reduce greenhouse gas emissions to bolster resilience to the impacts of climate change; to restore and protect our national treasures and monuments; and to prioritize both environmental justice and the creation of the well-paying jobs necessary to deliver on these goals.

To that end, this order directs all executive departments and agencies (agencies) to immediately review and, as appropriate and consistent with applicable law, take action to address the promulgation of Federal regulations and other actions during the last 4 years that conflict with these important national objectives, and to immediately commence work to confront the climate crisis.

Sec. 2. Immediate Review of Agency Actions Taken Between January 20, 2017, and January 20, 2021. (a) The heads of all agencies shall immediately review all existing regulations, orders, guidance documents, policies, and any other similar agency actions (agency actions) promulgated, issued, or adopted between January 20, 2017, and January 20, 2021, that are or may be inconsistent with, or present obstacles to, the policy objectives in section 1 of this order. For any such action identified by the agencies, the heads of agencies shall, as appropriate and consistent with applicable law, consider suspending, revising, or rescinding the agency actions. In addition, for the agency actions in the categories set forth in subsections (1) through (4) of this section, the head of the relevant agency, as appropriate and consistent with applicable law, shall consider publishing for notice and

Memorandum on Restoring Trust in Government Through Scientific Integrity and Evidence-Based Policymaking

JANUARY 27, 2021 • PRESIDENTIAL ACTIONS

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

It is the policy of my Administration to make evidence-based science and data, scientific and technological information central to the development and iterative improvement of our regulatory programs, across every area of government. Such information is considered in policy decisions. It should be subject to scientific processes, including peer review where feasible and protection for privacy. Any improper political interference in the other scientists who support the work of the Federal Government of scientific facts undermines the workers of the Nation, our institutions, and violates the trust that the public places in our collective interests.

This memorandum reaffirms and builds on the Presidential Memorandum of December 12, 2017 (Scientific Integrity). By the authority vested in me as President by the Constitution and the laws of the United States of America, I direct as follows:

Section 1. Role of the Director of the Office of Science and Technology Policy (OSTP) and the Office of Science and Technology Policy (OSTP) shall identify all aspects of executive branch involvement with processes. This responsibility shall include ensuring that all agencies (agencies) establish and enforce scientific integrity, political interference in the conduct of scientific research and technological data, and that prevent the suppression of scientific and technological findings, data, information, conclusions, or findings. This memorandum, the Director shall, as appropriate, convene agencies and with personnel within the office of the President including the Office of Management and Budget.

Sec. 2. Task Force on Scientific Integrity. (a) The Director shall direct the "Task Force" of the National Science and Technology

Executive Order on Advancing Racial Equity and Support for Underserved Communities Through the Federal Government

JANUARY 20, 2021 • PRESIDENTIAL ACTIONS

By the authority vested in me as President by the Constitution and the laws of the United States of America, I hereby order as follows:

Section 1. Policy. Equal opportunity is the bedrock of American democracy, and our diversity is one of our country's greatest strengths. But for too many, the American Dream remains out of reach. Entrenched disparities in our laws and public policies, and in our public and private institutions, have often denied that equal opportunity to individuals and communities. Our country faces concerning economic, health, and climate crises that have exposed and exacerbated inequalities, while a historic movement for justice has highlighted the unbearable human costs of systemic racism. Our Nation deserves an antidote to these problems: equal opportunity that matches the scale of the opportunities and challenges that we face.

It is therefore the policy of my Administration that the Federal Government should pursue a comprehensive approach to advancing equality for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality. Affirmatively advancing equality, civil rights, racial justice, and equal opportunity is the responsibility of the whole of our Government. Because advancing equality requires a systematic approach to embedding fairness in decision-making processes, executive departments and agencies (agencies) must recognize and work to reduce inequalities in their policies and programs that serve as barriers to equal opportunity.

By advancing equality across the Federal Government, we can create opportunities for the improvement of communities that have been historically underserved, which benefits everyone. For example, an analysis shows that closing racial gaps in wages, housing credit, lending opportunities, and access to higher education would result in an additional \$5 trillion in gross domestic product in the American economy over the next 5 years. The Federal Government's goal in advancing equality is to provide everyone with the opportunity to reach their full potential. Consistent with these aims, each agency must assess whether, and to what extent, its programs and policies perpetuate systemic barriers to opportunities and benefits for people of color and other underserved groups. Such assessments will better equip agencies to develop policies and programs that deliver resources and benefits equitably to all.



Our aspiration

Provide a truly integrated digital understanding of our earth environment that can evolve quickly to meet changing user expectations by leveraging our own capabilities and partnerships

Meeting NOAA Objectives



DSCOVR

OPERATIONAL JULY 27, 2016

JASON-3

OPERATIONAL JULY 1, 2016

SWFO

SWFO L1 - FY 2024

SENTINEL-6 Michael Freilich

Sentinel-6 Michael Freilich - NOV 21 2020

COSMIC-2

COSMIC-2 - OPERATIONAL FEB 25, 2020

GOES-R SERIES

GOES-16 - OPERATIONAL DEC 18, 2017
GOES-17 - OPERATIONAL FEB 12, 2019
GOES-T - FY 2022
GOES-U - FY 2025

JPSS SERIES

NOAA-20 - OPERATIONAL MAY 30, 2018
JPSS-2 - FY 2023
JPSS-3 - FY 2026
JPSS-4 - FY 2031

Geostationary: ~\$12B

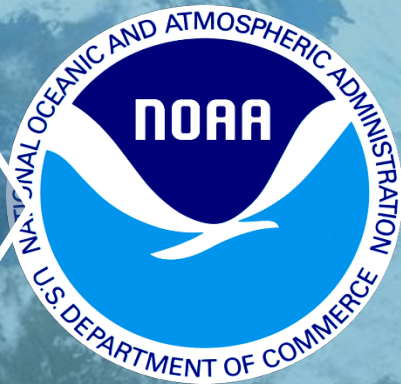
Polar Orbit: ~\$19B

Space Weather: ~\$1B

NESDIS Programs of Record

Environmental Product, Data, and Information Services

Earth Observing Systems



NESDIS

Data stewardship to enable data discoverability, accessibility, interoperability, and usability

Science products for decision-making

Harmful Algal
Blooms
Observing

Coastal
Digital
Elevation
Models

Heating &
Cooling Degree
Days

Hurricane
Tracks

Solar
Activity/
Sunspots

Tsunami
Warning

Net Annual Investment ~\$250M

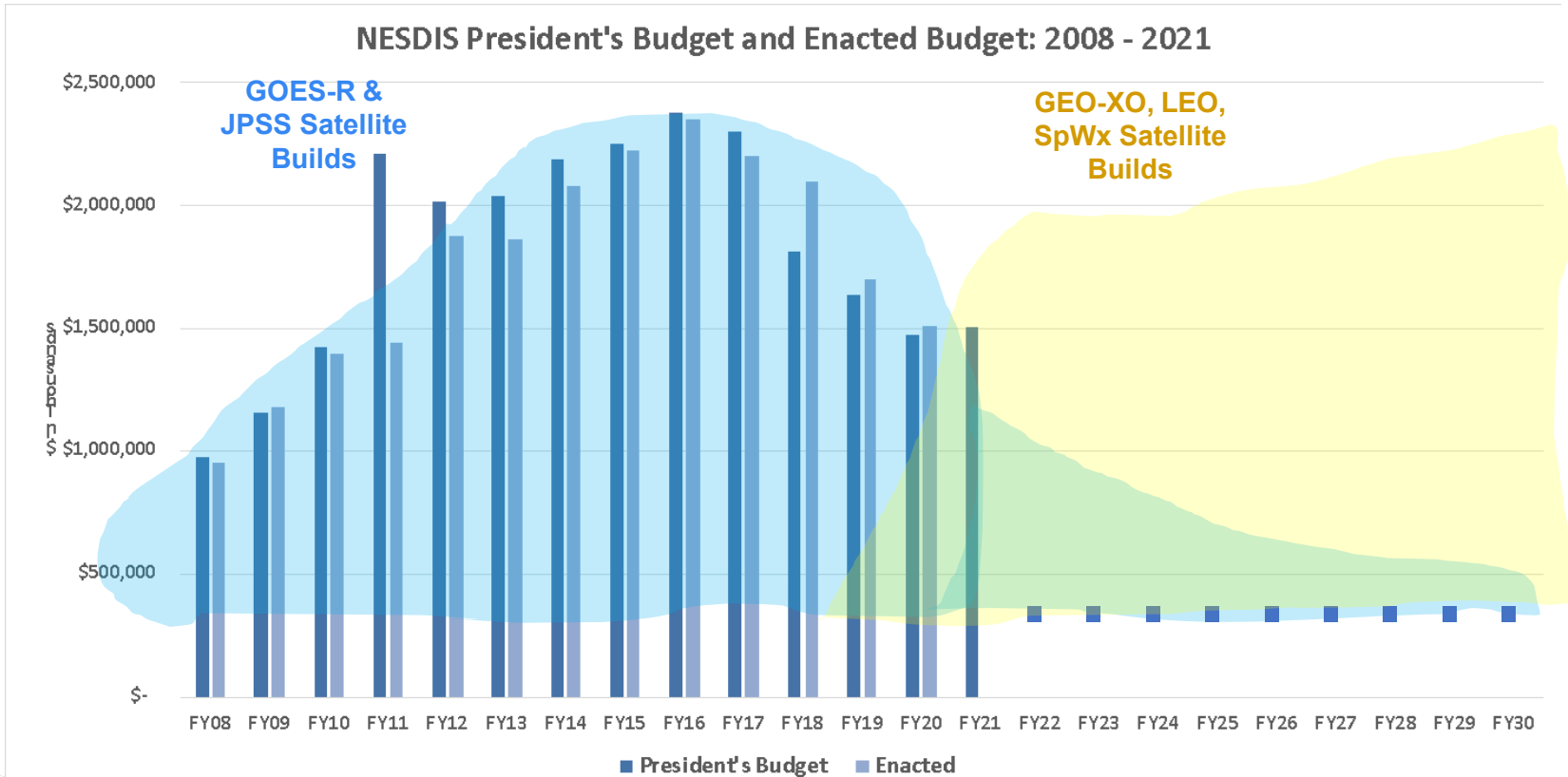
NESDIS Budget, Present and Future

NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE							
FY 2022 PROPOSED OPERATING PLAN (\$ in Thousands)	FY 2020 Enacted	FY 2021 Enacted	PY 2022 Budget	PY 2023 Budget	PY 2024 Budget	PY 2025 Budget	PY 2026 Budget
Operations, Research and Facilities							
Environmental Satellite Observing Systems							
Satellite and Product Operations (SPO)	166,063	189,099					
Product Development, Readiness & Application (PDR&A)	28,434	28,434					
Commercial Remote Sensing Regulatory Affairs (CRSRA)	1,800	0					
Office of Space Commerce (OSC)	2,300	10,000					
U.S. Group on Earth Observations (USGEO)	500	500					
National Center for Environmental Information (NCEI)	61,642	63,500					
Total, NESDIS - ORF	260,739	291,533					
Procurement, Acquisition and Construction							
Geostationary Systems - R (GOES-R)	304,056	334,500					
Polar Weather Satellites (PWS)	745,000	657,835					
- Joint Polar Satellite System (JPSS)		[371,538]					
- Polar Follow On (PFO)		[286,297]					
Cooperative Data and Rescue Services (CDARS)	11,350	14,400					
Space Weather Follow On (SWFO)	64,000	108,115					
COSMIC 2/GNSS RO	5,892	5,892					
Satellite Ground Services (SGS)	55,707	39,287					
- DACS		[5,015]					
Projects, Planning and Analysis (PPA)	31,000	15,945					
Low Earth Orbit (LEO)		0					
Geostationary Earth Orbit (GEO)		10,000					
Systems/Services Architecture & Engineering (SAE)	33,990	38,500					
- Architecture, Requirements, and Planning (ARP)		[13,722]					
- Commercial Data Program (CDP)		[8,000]					
- Commercial Weather Data Pilot (CWDP)		[3,000]					
- Commercial Data Purchase (CDP)		[5,000]					
- Joint Venture (JV)		[2,268]					
Subtotal, NESDIS Systems Acquisition	1,250,995	1,224,474					
NESDIS Construction - CDA Facilities	2,450	2,450					
Transfer to OIG		(2,000)					
Total, NESDIS - PAC	1,252,143	1,224,924					
GRAND TOTAL NESDIS	1,512,882	1,516,457					

To be defined by the current Administration



NESDIS Future Mission Needs



Our aspiration

Provide a truly integrated digital understanding of our earth environment that can evolve quickly to meet changing user expectations by leveraging our own capabilities and partnerships

The approach that produced the program of record will not achieve this aspiration, and will not meet the challenge of living with and adapting to climate change.

NESDIS
Reimagined

Under our *NESDIS Reimagined* work we have adjusted our overall mission development process

- Requirements management
- User engagement
- Partner engagement throughout mission timeline
- Portfolio management and mission development

NESDIS Level Requirements (NLR)

The Legacy approach for requirements definition and management:

- Organized around satellite programs and is often tied to specific instruments and hardware;
- Difficult to track requirements that rely on multiple observations; and
- System optimization very difficult.

Our assessment of trends in Earth Science and satellite Earth Observations show the growing importance of earth system assessments, integrated or blended data products, and satellite observations operating as part of the overall observing system to meet NOAA mission objectives.

- We must manage our satellite assets in part by how they play with other elements of the system.
- When we architect our contributions to the overall system, we start by defining the outcome we want the system to produce, and then move to the specification of the individual satellite components.

The new NESDIS Level Requirements (NLR) address this need by defining the observing system or mission requirements we must address to meet NOAA objectives.

- The NLR provide a thematic or mission service area framework to define mission needs.



Five NESDIS Level Requirements (NLR)

NLR REQ-001 (or, what NESDIS does)

NESDIS will provide environmental data, information, products and reports in the Foundational, Geophysical, and Analytical thematic product areas.

NLR REQ-002 (where NESDIS gets its data)

NESDIS will develop, acquire, implement, or operate environmental data sources and systems as needed to fulfill its validated user requirements.

NLR REQ-003 (when NESDIS delivers data)

NESDIS will provide secure, timely, and reliable delivery of accurate and high-quality near-real-time and retrospective data products and reports to fulfill NOAA's mission.

NLR REQ-004 (how NESDIS ensures data quality)

NESDIS will ensure the quality, accuracy, reliability, preservation, discoverability, and accessibility of the Nation's historical sensor, environmental, and model data archives consisting of data from NOAA, U.S., and global observing systems.

NLR REQ-005 (how NESDIS ensures data usefulness & exploitability)

NESDIS will conduct an integrated program of research and technology development in the application of data systems, products, and reports to support NOAA's mission.

Example: NLR REQ-001

NESDIS will provide environmental data, information, products and reports in the Foundational, Geophysical, and Analytical thematic product areas.

Foundational

Imagery

Sensor Data

Geophysical

Atmosphere

Atmospheric Composition and Air Quality

Volcanic Eruption Characteristics

Atmospheric Water Vapor

Atmospheric Temperature

Clouds

Precipitation

Lightning

Radiation Budget

Tropical Cyclone Characteristics

Winds

Cryosphere

Lake and Sea Ice

Snow and Glaciers

Land

Fires

Flood

Surface Moisture

Surface Temperature

Vegetation

Oceans and Coasts

Topography and Bathymetry

Surface Height

Water Temperature and Salinity

Biology and Biogeochemistry

Water Pollution

Space

Solar

Heliosphere

Ionosphere

Magnetosphere

NESDIS coordinated across NOAA to ensure our **31 observation areas** satisfy Line Office mission objectives.

Analytical

Climate

Weather

Oceans and Coasts

NLR Thematic Product Area (Primary)

NLR Product Category (Secondary)

Product Name

Source / Platform

Atmosphere

Lightning

Lightning Detection: Events, Groups, & Flashes

GOES-16

Atmosphere

Lightning

Lightning Detection: Events, Groups, & Flashes

GOES-17

Requirements Management

GeoXO User Engagement in 2020-2021

- User Needs Virtual Workshops
 - Topics of **Fire** (178 attendees), **Weather** (233), **Agriculture** (152), **Health** (207), **Oceans** (142)
 - National agencies: NASA, USGS, and 20 other Federal Agencies
 - State/Local: 26 States, multiple cities, and several counties and tribal areas
 - International: WMO, Canada, Mexico, EUMETSAT, multiple Caribbean/South American orgs
 - Industry: more than 70 companies and advocacy groups from weather, transportation, communications, media, aerospace, natural resource, and energy sectors
 - Academia: more than 60 universities
- Community Meeting on NOAA Satellites
 - 1013 participants representing 33 countries
 - >250 organizations including Federal Agencies, international meteorological organizations, academia, and industry.
- Listening Sessions, Panels, and Presentations
 - National Weather Association
 - American Meteorological Society
 - American Geophysical Union



User Engagement



Increasing Value through User Engagement

In 2020 NESDIS engaged **2761 users** from sectors including:

- Federal agencies
- Private sector
- Academic sector
- State, Territory or Local
- International

Areas of use included:

- Forest Fire
- Weather Forecasting
- Human Health
- Agriculture
- Ocean

We are data driven!

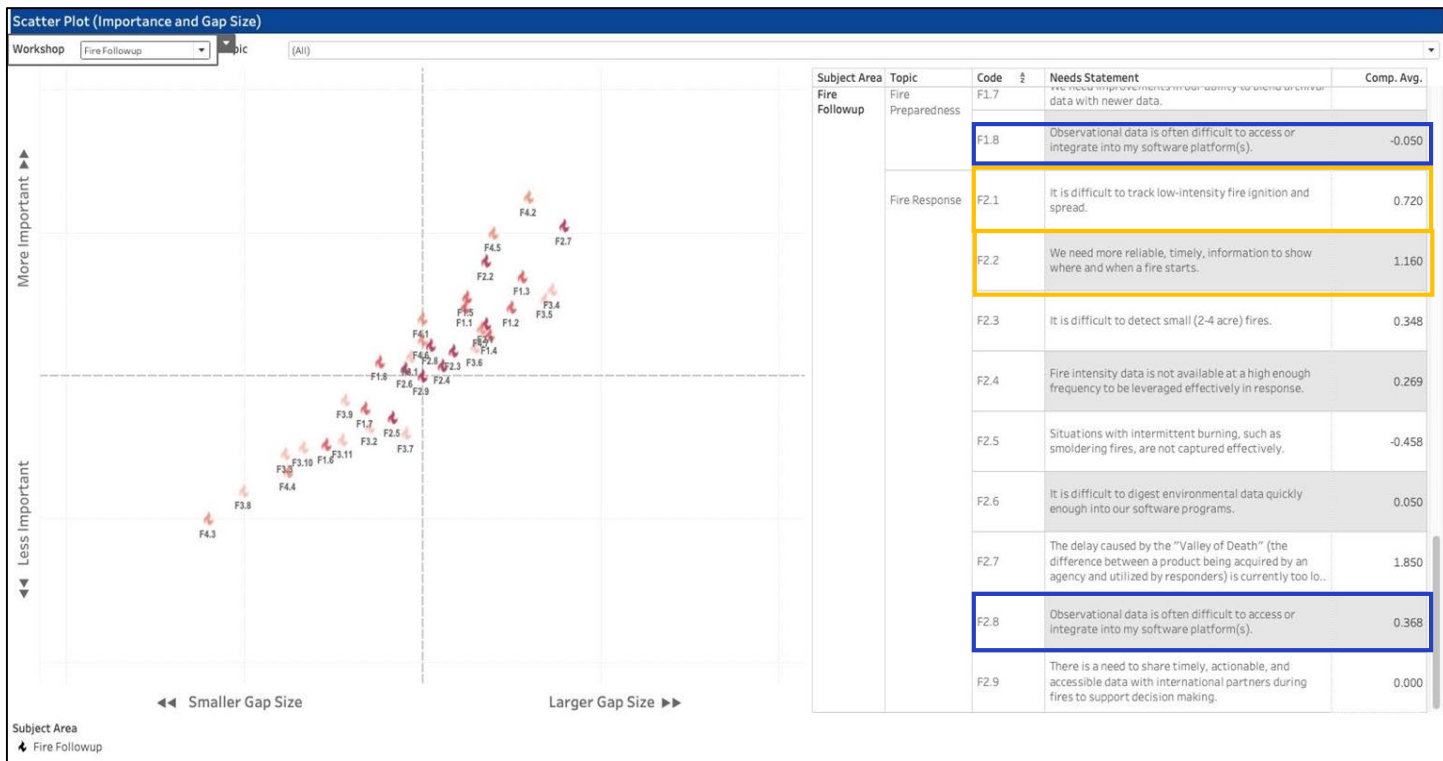
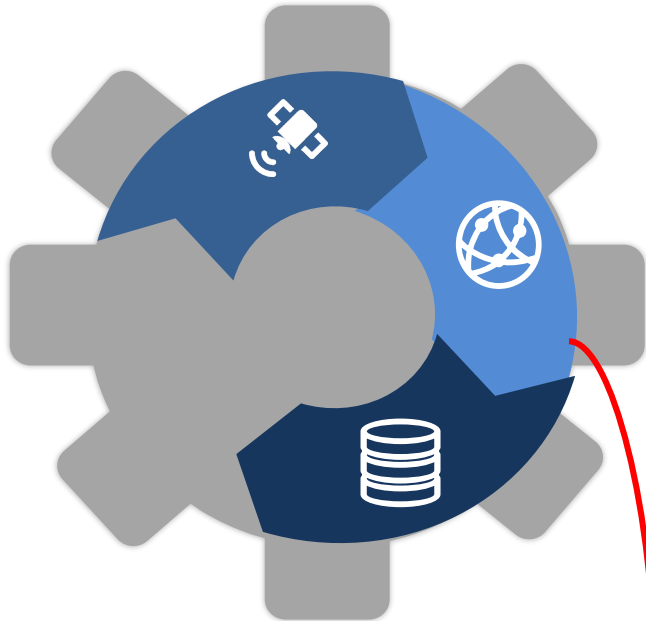


Figure: Scatter-plot representation of fire-related needs collected from 2020 workshops arranged by gap size (x-axis) and importance (y-axis).

User Engagement

NESDIS Leads in Innovative Systems, Product, and Service Delivery; Leverages Partner Satellite Tech and Commercial Distribution



Products and Services that are Useful, Usable, and Used

Sat Tech Innovation

Instrument & Mission innovation; smallsat constellations; Commodity spacecraft and data services; basic science process research

Product and Service Innovation

Observing system integration; Global data archives; Operational constellation management; Cloud operations; Artificial Intelligence; Rigorous User Needs Assessment

Commercial Applications

Apps; Emerging Digital Interface and Distribution; Enhanced & Tailored Products and Services; Cloud platforms

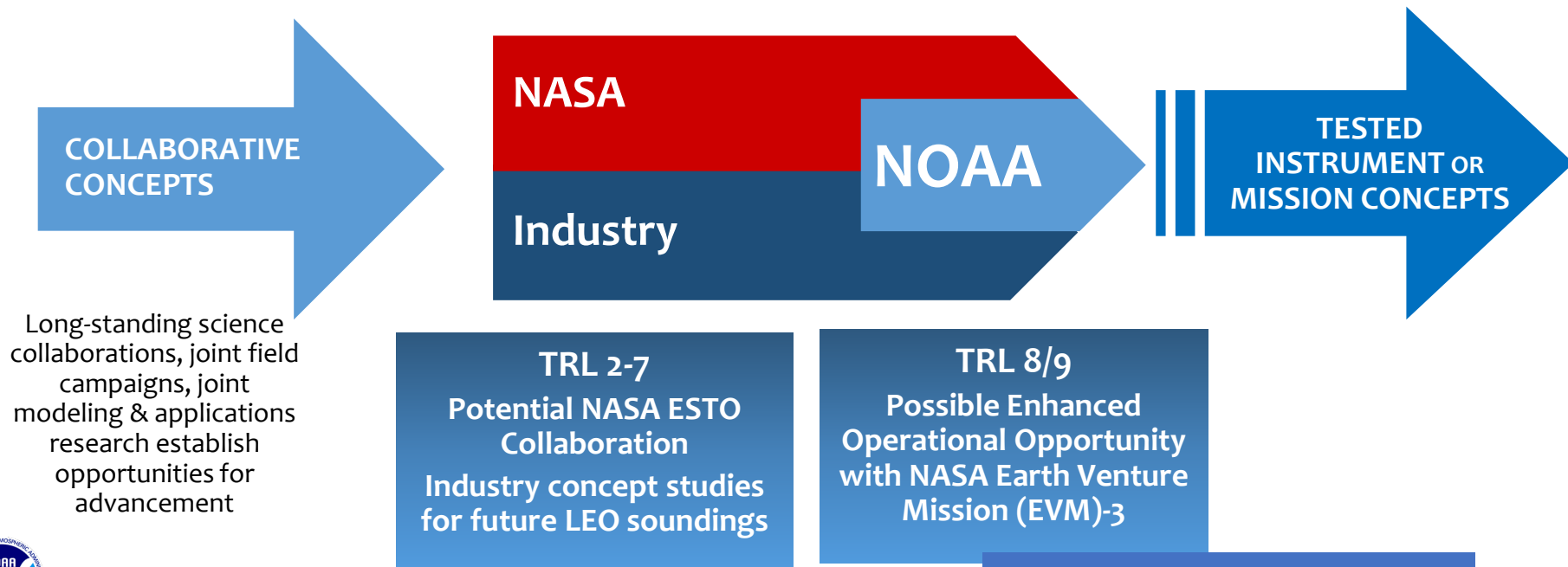
NESDIS Sweet Spot

Partner Engagement



Developing Capabilities Through Joint Venture

NOAA develops new technology and capabilities with NASA and industry through a new funded Joint Venture line in NOAA's budget.



Example: NOAA-Google OTA

- Large-Scale Enhancement using AI Processing (LEAP Project) began in Oct 2020
- First use of the OTA from the Weather Act/NIDIS reauthorization
 - Goal 1: Establish an AI/ML Center of Excellence Team
 - Goal 2: Google will conduct research and development activities
 - Goal 3: Deliver Proof of Concept system that will allow NOAA to exploit satellite data more efficiently and expand the type of observations NOAA services can exploit
- Potential topic areas: AI based observations pre-processing, remote sensing algorithms, data fusion & assimilation, post processing, OSSEs, etc

	Dollars committed*	Actual funds flowing to Google**	
		FY2020	FY2021
Google	\$7,083,000		
NOAA	\$3,445,000	\$1,271,000	\$500,000
SGS	\$1,030,000	\$530,000	\$500,000
SPO	\$741,000	\$741,000	-
PDR&A	\$1,674,000	-	-
Total	\$10,528,000		

THE HILL

Google collaborates with NOAA to use artificial intelligence for weather forecasting, research

BY REBECCA KLAR · 10/27/20 11:00 AM EDT

1,082 SHARED

Just In...

Corynyn spoke: Neera Tanden has 'no chance' of being confirmed as Biden's OMB pick
SENATE — 17M 20S AGO

Pa. lawmaker was informed of positive coronavirus test while meeting with Trump: report
ADMINISTRATION — 1H 46M AGO

Five things to know about Georgia's Senate runoffs
CAMPAIGN — 1H 53M AGO

Officials shut down New York City club following nearly 400-person party
BLUES BREKING ROOM — 1H 58M AGO

FOR MILLIONS OF AMERICANS, CONNECTIVITY IS MORE CRITICAL NOW THAN EVER BEFORE
Randy Harnoy, veterinarian
HUAWEI
factcheck.com

Most Popular

- 1 Trump: 'I'm ashamed that...'
934 SHARES
- 2 Is Trump headed to another...



Partner Engagement

NOAA National Environmental Satellite, Data, and Information Service

International Partnerships



Partner Engagement

Four Pillars of NOAA's Next-Gen Earth Observation

Integrated, Adaptable, and Affordable: Orbits, Instruments & Systems

LEO

JPSS
COSMIC-2
Jason-3
CDARS
LEO-next

Miniaturized instruments on small, affordable, and proliferated satellites and partner data improving forecasts through better and additional data. Better precipitation forecasts, wave height predictions, ocean currents, and more.

GOES-R
GEO-XO

GEO

Continuous real-time observations supporting warnings and watches of severe weather and hour-by-hour changes. High-inclination orbits to observe northern latitude & polar regions.

Space Weather

DSCOVR
SWFO
SWx-next

Reliably monitoring coronal mass ejections from L1, GEO, and LEO can protect the nation's valuable, vulnerable infrastructure. New capabilities at L5 and high earth orbit can provide additional insight and improve forecasts.

Common Ground Services

DACS
Cloud Migration

Secure ingest of data in different formats from different partners requires a flexible, scalable platform. Common Services approach integrates cloud, AI, and machine-learning capabilities to verify, calibrate, and fuse data into new and better products and services.

Portfolio Management &
Mission Development



Example Mission Definition: GEO-XO

- User engagement and NLR define mission scope
- Mission continuity comparisons ensure NOAA mission services needs are met w/o interruption
- Analyses seek to quantify the Return on Investment (ROI) of the potential observation suite

GEO-XO: Observations for an Integrated Earth System
Planning for the Planet in 2030 & Beyond

- **Wildfires are growing in size and frequency:** higher spatial resolution imagery will detect fires earlier, and atmospheric composition measures
- **Beach closures and monitoring:** higher resolution imagery will detect harmful algal blooms (HABs) earlier, and atmospheric composition measures
- **Link between time and space:** time series data will improve understanding of coastal ecosystems
- **Hurricane detection and forecasting:** higher resolution imagery will detect hurricanes earlier, and atmospheric composition measures
- **Forecasting with advanced data:** higher resolution imagery will detect hurricanes earlier, and atmospheric composition measures

Number of Times that Beaches have Closed due to Harmful BGA Blooms

Year	Number of Times
2014	104
2015	138
2016	92

GEO-XO: Observations for an Integrated Earth System
Tools for a Changing Earth

Challenge	GOES-R Impact	GEO-XO	Enabling Technology
Wildfires			
Harmful Algal Blooms			
Air Quality			
Tropical Weather			

GEO-XO: Observations for an Integrated Earth System
Return On Investment: Ocean Color Measurement
Imagery for Ocean Health/Productivity Monitoring
Measuring Harmful Algal Blooms, Chlorophyll, Phytoplankton, Water Clarity

- **Where the value lies:**
 - Highest value U.S. ports, responsible for \$939M/year, experience heavy cloud cover
 - Persistent observations increase the ability to monitor fishery conditions
- Bycatch reduces the potential yield of U.S. commercial fisheries >\$4B/year in loss of sales
 - Real time data will enable industry to avoid bycatch and maximize yield
- Health effects of Harmful Algal Blooms (HABs) are estimated at >\$1B/year
 - More timely and precise HABs forecasts will reduce impacts by two orders of magnitude
- **Climate Data Contribution**
 - Monitoring ocean and coastal ecosystem health
 - Providing data to predict climate change impacts on the U.S. commercial fisheries valued at \$244B and supporting 1.74 M American jobs

Climate change is affecting harmful algal bloom patterns

NOAA National Environmental Satellite, Data, and Information Service

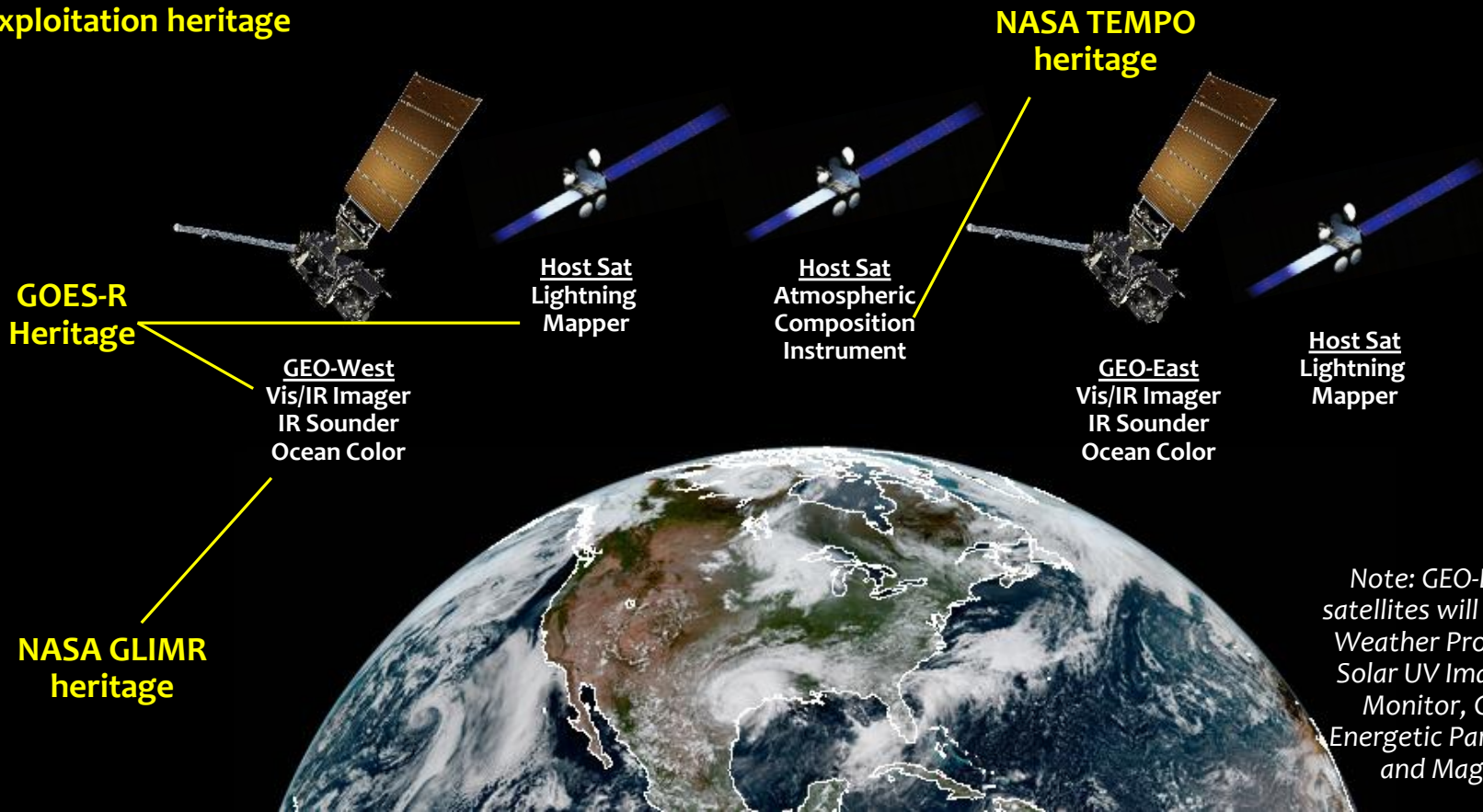
Portfolio Management & Mission Development

Instruments leverage
NOAA and partner
development heritage
This will include data
exploitation heritage

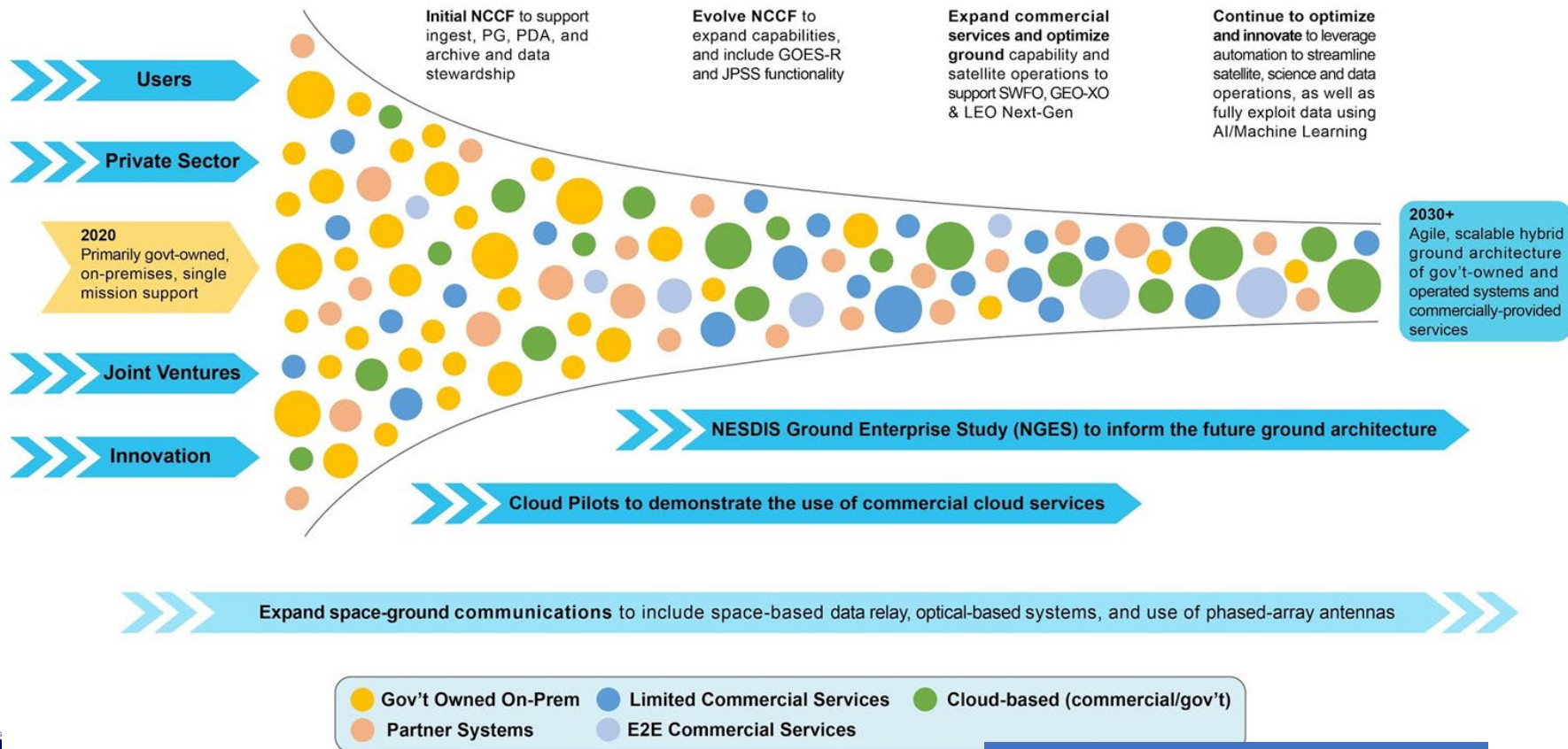
Geo-XO Constellation

(Preliminary, pending program approval)

Still in pre-formulation,
with additional trades in
process



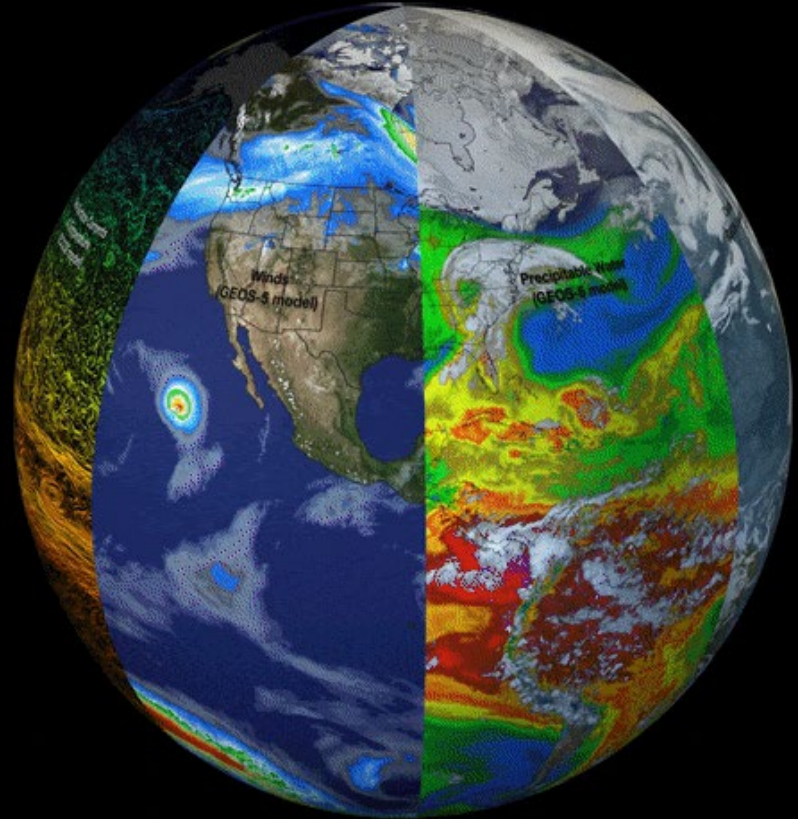
Evolution of NESDIS Common Services

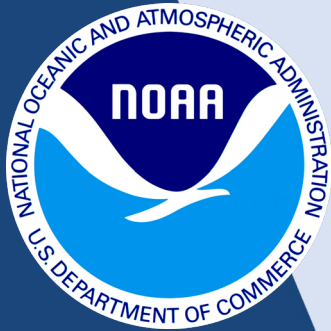


Portfolio Management & Mission Development

NOAA & NESDIS: Creating a “Climate Ready Nation”

- Engaging our users to better understand and meet their needs
- Working with 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





Thank you!

National Environmental Satellite,
Data, and Information Service

March 24, 2021

Dr. Stephen Volz, Assistant Administrator
NOAA Satellite and Information Service