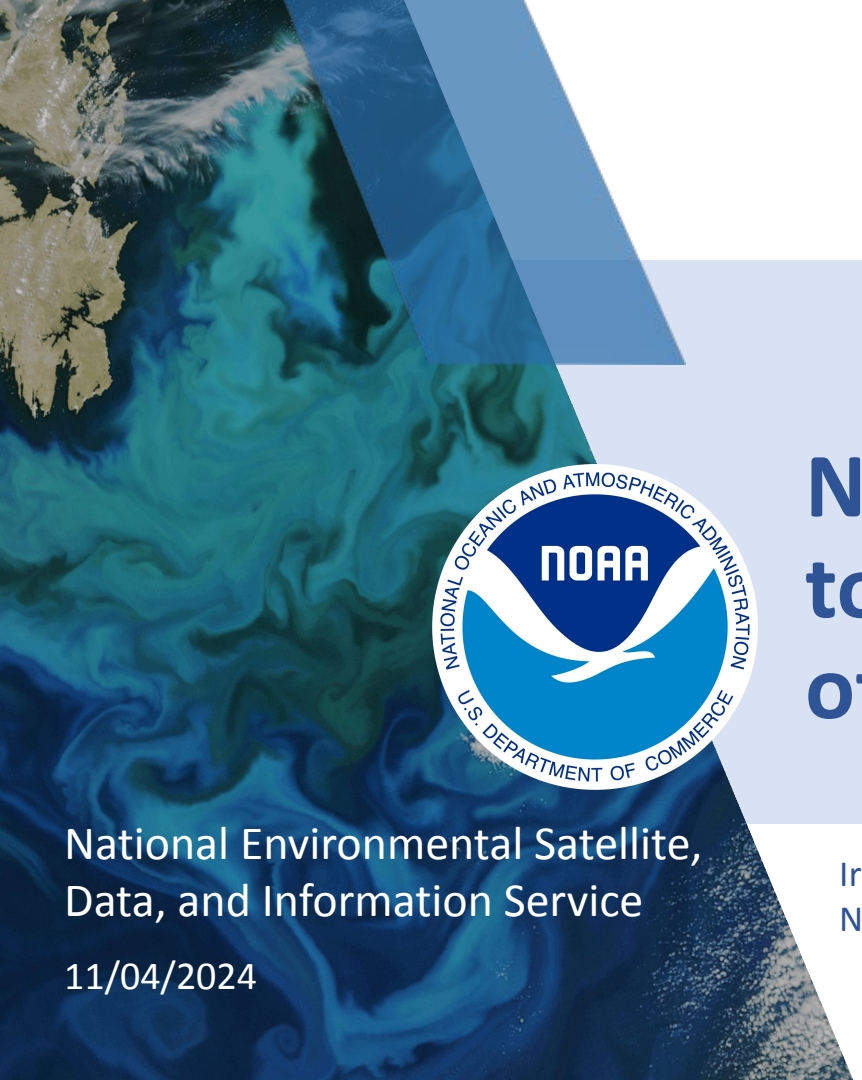

NOAA/NESDIS Response to Midterm Assessment of 2017 Decadal Survey

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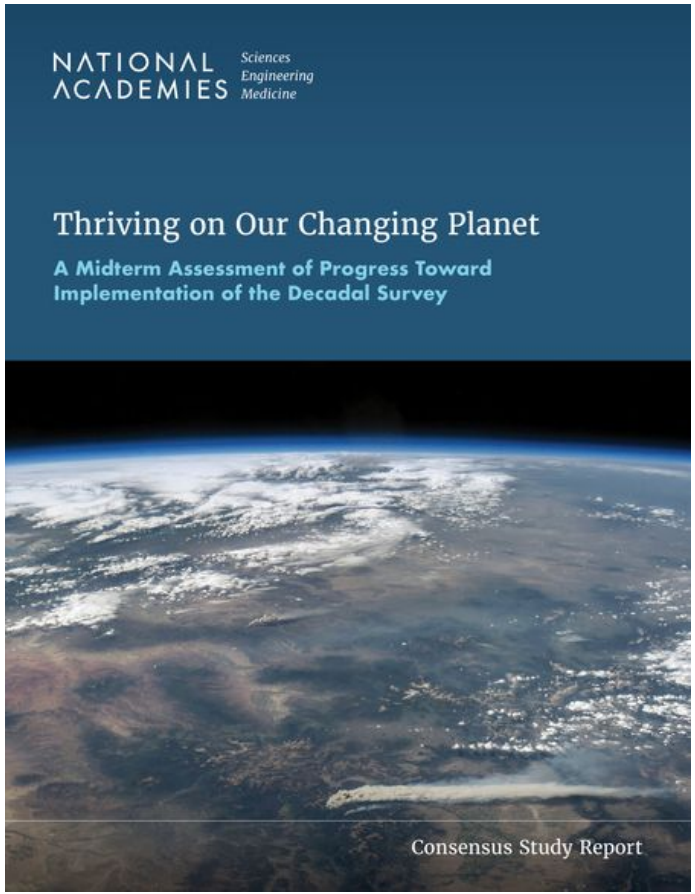
Outline

- Operations-Targeted Research
- Focus on CESAS Comment Topics 1 & 2
- Response to NOAA Recommendations from Midterm Assessment
- Highlights of NOAA Progress for Midterm Assessment

A Midterm Assessment of Progress Toward Implementations



- In Dec. 2022, NASA formally requested a NAS Midterm review of NASA, NOAA, and USGS progress towards the 2027 decadal survey
- NAS/CESAS requested feedback on the Midterm from NOAA and the other decadal survey sponsor agencies
- NAS/CESAS seeks sponsor guidance regarding priorities, actions, reception by sponsors, and specific topics worthy of attention

Operations-Targeted Research

It is first worth praising the operational-targeted research coming from the partnerships between NOAA, USGS, and NASA.

NOAA applauds NASA's foresight and focus on research with outcomes for operational transition. This has been the underpinning of NOAA operational capabilities for the past 48+ years. NASA provides pioneering critical technologies for evolution and implementation in NOAA operational settings.

NOAA, as the objectives-setting sponsor of the nation's climate and operational environmental applications, is heavily invested in the ongoing maturity of research and development and the advancements learned through R2O2R and the subsequent of feedback from operational lessons learned back into research programs.

The policy and appropriations partnerships between the three sponsor agencies are perhaps stronger than ever and are an essential component of furthering their decadal accomplishments.

Focus on CESAS Comment Topics 1 & 2

There are two central areas where NOAA has questions and comments about the Midterm Assessment. The two areas align with two of the topics in the CESAS comments:

- CESAS Topic 1: Ensuring alignment of ESD programmatic changes with Decadal Survey balance and priorities
  - Forcing functions for narrow scope of review?
  - Stray from Congressional provision for three-sponsor approach?

- CESAS Topic 7: Guidance for the next Decadal Survey
  - Seeking greater inclusions, especially flight project capabilities, non-flight programs, climate-forward emphasis, user engagement and DEI initiatives
  - Clarity on R2O2R and operations-focused outcomes

Response to NOAA Recommendations from Midterm Assessment (1 of 3)

Page 9 & 58 Recommendation under "Engage a Broader Constituency": Prior to the next decadal review, NASA, the National Oceanic and Atmospheric Administration, and the U.S. Geological Survey should engage a broader Earth sciences constituency…

NOAA is committed to expanding collaboration with NASA and USGS to engage a broader Earth Sciences community.

Equitable Engagement: Through its *Equitable Climate Services Action Plan*, NOAA aims to:

- Ensure accessible climate information for all.
- Focus on local-level impacts.
- Integrate socioeconomic data.
- Review equitable data collection.
- Strengthen its workforce for these goals.

Modeling Strategy: NOAA's *2024-2033 Modeling Strategy* embraces unification, diversity, and open science to enhance Earth System Modeling. It emphasizes collaboration with NASA, USGS, and other partners, a unified approach to modeling for a range of timescales and spatial needs, and integration of emerging fields like AI and community-based science.

Earth Observations Connection: NOAA is aligning Earth Observations with Earth System Modeling (ESM) needs. Regular collaborations and global meetings ensure that observing systems are tailored to ESM goals, helping NOAA provide critical decision-support information.

Response to NOAA Recommendations from Midterm Assessment (2 of 3)

Page 10 & 60 Recommendation: Through requests for information and workshops, NASA, the National Oceanic and Atmospheric Administration, and the U.S. Geological Survey should more actively engage the Earth system modeling community to devise strategies to more fully exploit existing and potential Earth observations for advancing model parameterizations and predictions.

NOAA fully supports this recommendation. We're advancing new observational tools, moving from R&D to demonstration missions that serve as proxies for future operational capabilities. Instruments like TEMPO, GOCI, GLIMR, and QuickSounder are already providing critical data for refining model accuracy, paving the way for future systems like GeoXO and NEON.

Since 2022, **active engagement with the modeling community** has been a core focus. We've invested in coordination staff and strategic planning to enhance collaboration and ensure these new capabilities deliver maximum value.

Response to NOAA Recommendations from Midterm Assessment (3 of 3)

Page 49: …Future NOAA mission plans as described to the committee will, in general, favor a disaggregated architecture …and place increased emphasis on leveraging partner and/or commercial data sources. It remains unclear which elements of its future architecture would be funded or implemented directly by NOAA versus other partners. As it becomes increasingly reliant upon external data sources, NOAA will need to ensure its stakeholders remain aware of the need to support those partners accordingly to enable mutual advocacy and appropriate budget priority.

NOAA is driven to evolve its satellite constellations to meet new operational needs, always seeking opportunities for collaboration with other agencies, international, and commercial partners. Past and ongoing efforts include partnerships like the NOAA/EUMETSAT cooperation for LEO AM MetOp and PM JPSS orbits.

Advancing Capabilities: The GeoXO program is expanding beyond visible and IR imagers to include hyperspectral IR soundings, ocean color radiances, and atmospheric composition data. Meanwhile, our LEO program is adding enhanced ocean color radiances, 3D wind measurements, and more.

Innovative Approaches: NESDIS has explored a fully disaggregated LEO constellation, allowing for flexible upgrades as technology advances. International partnerships, like EUMETSAT's EPS-Sterna microsatellites, play a crucial role in modernizing this architecture.

Commercial Collaboration: Through the *Commercial Data Program*, NESDIS is maximizing partnerships, with recent initiatives in microwave soundings, radio occultation, ocean surface winds, and space weather. This **hybrid "build-borrow-buy" strategy** is key to NOAA's future.

Highlights of NOAA Progress for Midterm Assessment

In alignment with the Decadal Strategy, NOAA is leveraging observations, data stewardship, use-inspired science, service delivery and decision support tools to prepare the nation for dynamic changes of the global environment.

i. Leveraging Observation Strengths in Multiple Environments
ii. NOAA Non-flight Observations
iii. Partnerships Between the Sponsor Agencies
iv. Approach to User Engagement
v. Workforce Investments

NOAA is proud to share more about the achievements being made at both the intra- and inter-agency level. The multi-sponsor agencies are indeed making tremendous strides on their own as well as through collaborative initiatives. All such endeavors are deserving of investigation and reporting through the Midterm Assessment. NOAA remains primed for discussion of an improved approach going forward, especially in light of establishing a full tri-agency scope for the next decadal survey.

Notable NOAA non-flight observations include:

- The National Centers for Environmental Information (NCEI)
- The NOAA Corps Aircraft Operations and Nautical Fleet
- Numerous networks of weather, solar radiation, and trace gas in-situ surface observations, free-flight balloon sondes, and tethered balloon capabilities
- Networks of buoy moorings in coastal, coral reef, lake, and open ocean locations as well as autonomous surface vehicles
- The National Weather Service network of NEXRAD WSR-88D radar capabilities

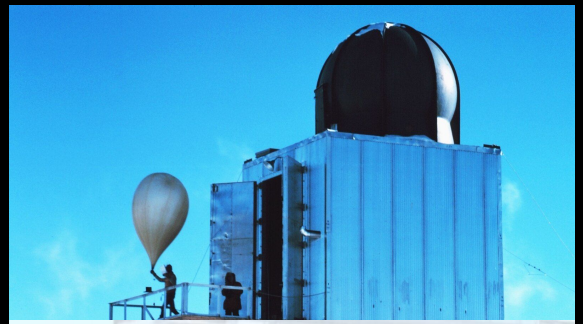
How can we enhance our impact?

Let's explore how our relationship with the NAS Decadal Survey process, as well as intra- and inter-agency collaborations, can drive greater achievements, moving toward a full tri-agency scope.

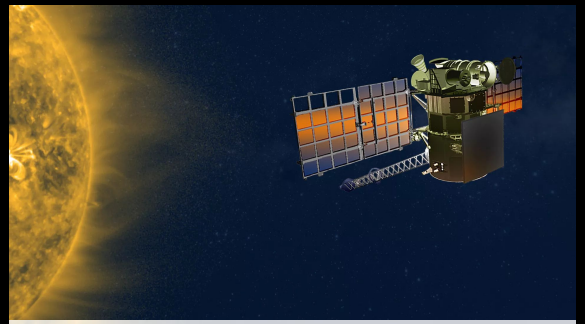
BACKUP SLIDES

NOAA Observing Systems

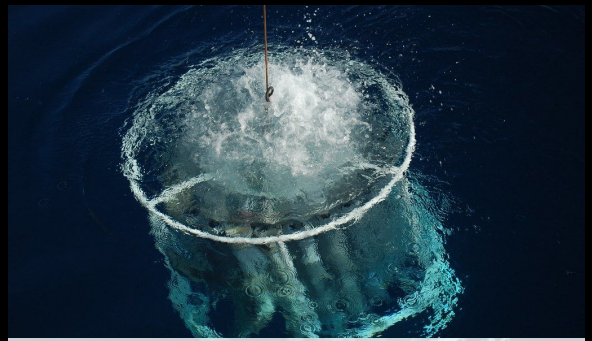
Two women wearing rubber boots, standing on rocks at the shore and installing a tide gage instrument.



Two people standing on a platform in front of a radar installation, ready to release a weather balloon



Artist's depiction of the Deep Space Climate Observatory satellite in space and the Sun showing solar flares

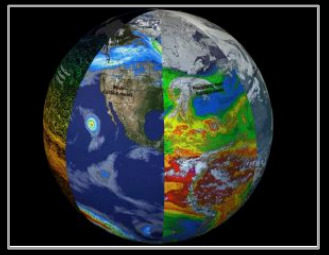


Conductivity, Temperature and Depth (CTD) sensor being lowered into the ocean with air bubbles at the ocean surface

NOAA P3 airplane flying above the ocean with pink clouds in the background

NOAA ship the Bell Shimada at sea with a large wave breaking on one side of the ship

End-to-End Responsibility



Requirements & Planning (SAE)

Launch (OSPO, LEO, GEO, SWO)

Processing & Distribution (OCS, NCEI)

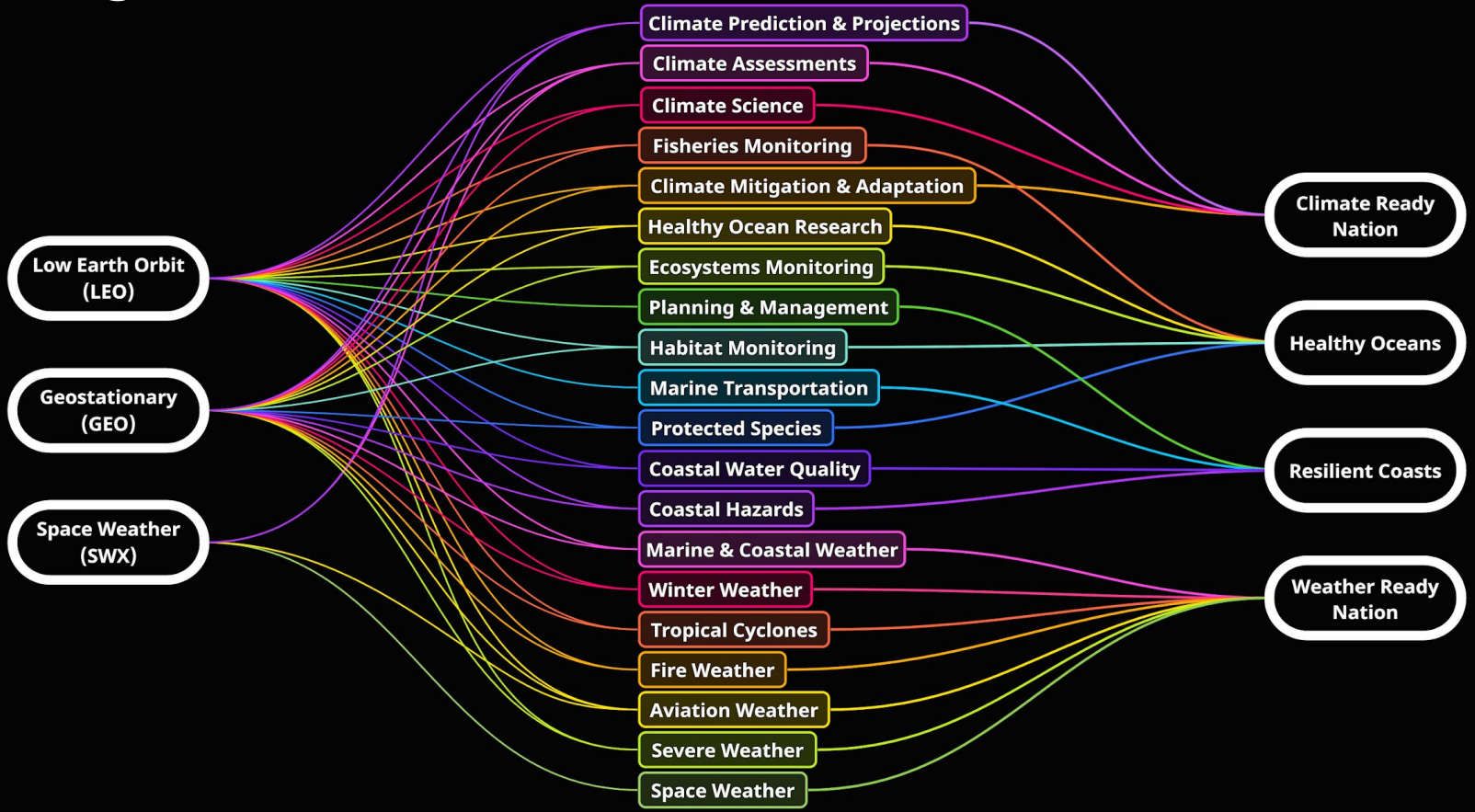
Products & Services (STAR, NCEI)

System Acquisition (LEO, GEO, SWO)

Command & Control (OSPO)

Data Archive & Access (OCS, NCEI)

Mapping Constellations to Mission Service Areas to NOAA Goals



User Engagement

Focus on the actual experience of the people whom NOAA services are meant to serve and delivering those services equitably and effectively.

User Engagement is an evidence-based, multidisciplinary practice that focuses on understanding users and their needs in context.

Example: Fire Danger Warnings

Land management agencies:

A) Need to know which forested areas are more likely to catch on fire because of dry conditions (fire danger warnings)
B) Can't ingest the best NWS data into their computer systems
C) Staff are firefighters, not trained to work with complicated data sets that NWS can offer

NOAA Partners to Observe the Earth