



National Aeronautics and
Space Administration

CESAS: Foundational Observables

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Agenda

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- Foundational Observables
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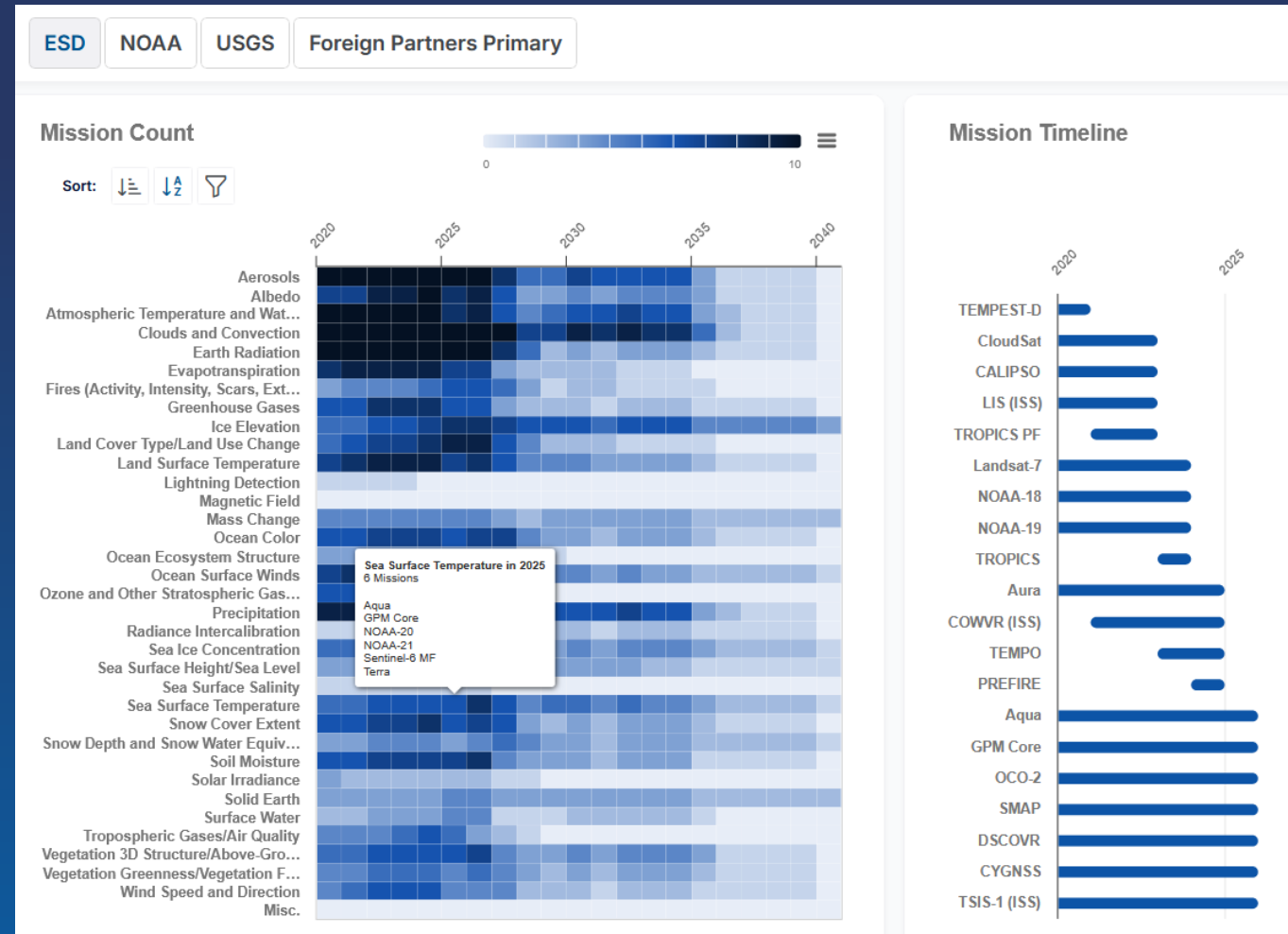


Introduction

- ESD developed NASA Earth Science Strategic Integration Environment (NESSIE) to provide an integrated, impartial, data-driven capability to plan and manage a strategic suite of missions
 - Helps navigate uncertainties, such as mission lifetimes, tech availability, and partnerships
 - Identifies potential threats to capabilities and opportunities and flexibilities
- ESD is now working to increase the tool's fidelity
 - Updating NESSIE with additional functionality
 - Creating more fidelity in observable definitions as inputs to NESSIE

Observable Heatmap: NASA Earth Science Strategic Integration Environment (NESSIE) Tool

- NESSIE was developed by LaRC's Systems Analysis and Concepts Directorate for ESD
- NESSIE helps assess observable coverage
- NESSIE Today
 - Uses public mission information for heatmap
 - Toggles NASA, NOAA, USGS, and international partner missions
- NESSIE Future
 - Available for non-NASA users
 - Uses Foundational Observable refined definitions for heatmap
 - Expand to industry missions that meet definition



<https://loch.ndc.nasa.gov/>

Foundational Observables (FO)

- NESSIE is tracking key observables, including Foundational Observables (FO)
- ESD defines Foundational Observables (FO) as long-term observations of critical aspects of the Earth system
- There are many ways to attain these observables (e.g., NASA, other US agencies, international partners, industry)
- ESD is developing a framework to confirm the definition of each FO to assess coverage, add more detail to the definitions, and inform strategic opportunities

Foundational Observable Definition Review

- ESD is confirming minimum definition needed for each observable to understand Earth as a system
 - Definitions may differ by sub-observable and community
 - Definitions should be agnostic of technological implementation
- ESD Program Scientists are gathering inputs from community/stakeholders
- Completion targeted by end of summer 2026

Attributes <i>(these are examples and some may not be applicable)</i>	Community/ Stakeholder 1	Community/ Stakeholder 2	...
Sub-observable (if applicable)			
Length of continuity record			
Reasoning for definition			
Length of breaks/gap allowed for the observable			
Impact if gap longer than expected			
Bands and spectral resolution			
Spatial resolution			
Temporal resolution			
Vertical resolution and extent			
Coverage (e.g., global, N and S latitude)			
Calibration needs			
Stability			
Data Products			
...			

Template for Observable Definitions

Summary and Next Steps

- NESSIE and Foundational Observable definitions are being updated to have more fidelity
 - Framework is being enhanced to widen the range of opportunities while ensuring it effectively serves the needs of the community
 - Science community is being consulted in the creation of the detailed definitions
- NESSIE and the definitions will be available in time for the decadal survey team to use
- These resources can be used to understand existing missions/capability and the observable coverage in the decadal timeframe to inform recommendations



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