



National Aeronautics and
Space Administration

NASA earth

Community Forum | Oct. 22, 2024

Decadal Midterm Review and Response

Karen St. Germain

Director

Earth Science Division



Housekeeping



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Enter your questions into the Q&A section



This webinar will be recorded

Agenda

01 Background and Context

02 Midterm Response

- Engaging Our Community
- Developing ESO Through Budget Constraints
- Strategic Approaches to Continuity and Modeling

03 Conclusion and Upcoming Events

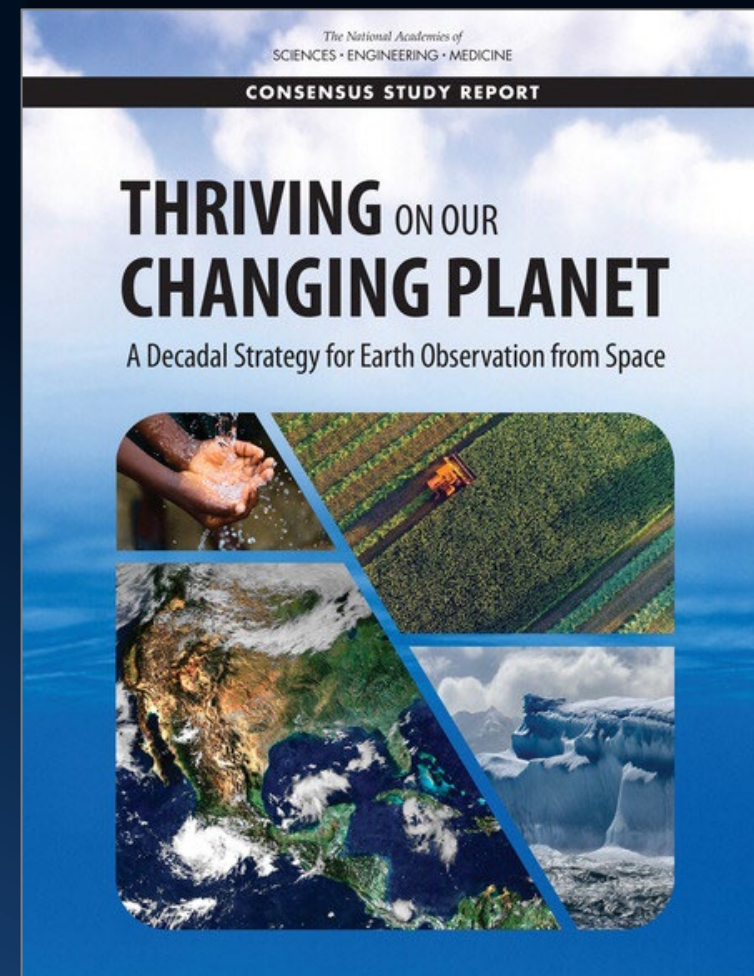
The right side of the slide features a large, stylized graphic of a human head in profile, facing right. The head is filled with a vibrant, abstract pattern of colors including blue, green, yellow, and orange, resembling a satellite image of Earth or a complex data visualization. Overlaid on this graphic is the text "NASA earth" in a white, sans-serif font. "NASA" is in all caps and "earth" is in lowercase.

NASA
earth

NASA Earth Science at the Decadal Midterm: Progress and Opportunity

NASA Earth Science Division's Decadal Strategy:

- Meet our Program of Record commitments to advance flight, research, applications and technology
- Implement next-generation capability to meet the Designated Observables and Explorers
- Position NASA Earth Science to maximize science and societal benefit



Earth Science to Action Strategy

Earth Science to Action



Virtuous Cycle

- User needs inform next iteration of programs, missions and initiatives

Public Understanding & Exchange

- Put more scientific understanding into public sphere
- Deliver applied science to users
- Participate in multi-way info exchange
- Use input to inform subsequent work

Solutions & Societal Value

- Offer models, scientific findings and info through Open-Source Science principles
- Support climate services
- Provide science applications and tools to inform decisions

Earth System Science & Applied Research

- Grow scientific understanding of Earth's systems
- Develop predictive modeling for science applications and tools to mitigate, adapt and respond to climate change

Foundational Knowledge, Technology, Missions & Data

- Technology innovation
- Earth observations missions
- Data collected from space, air and ground

EARTH SYSTEM OBSERVATORY

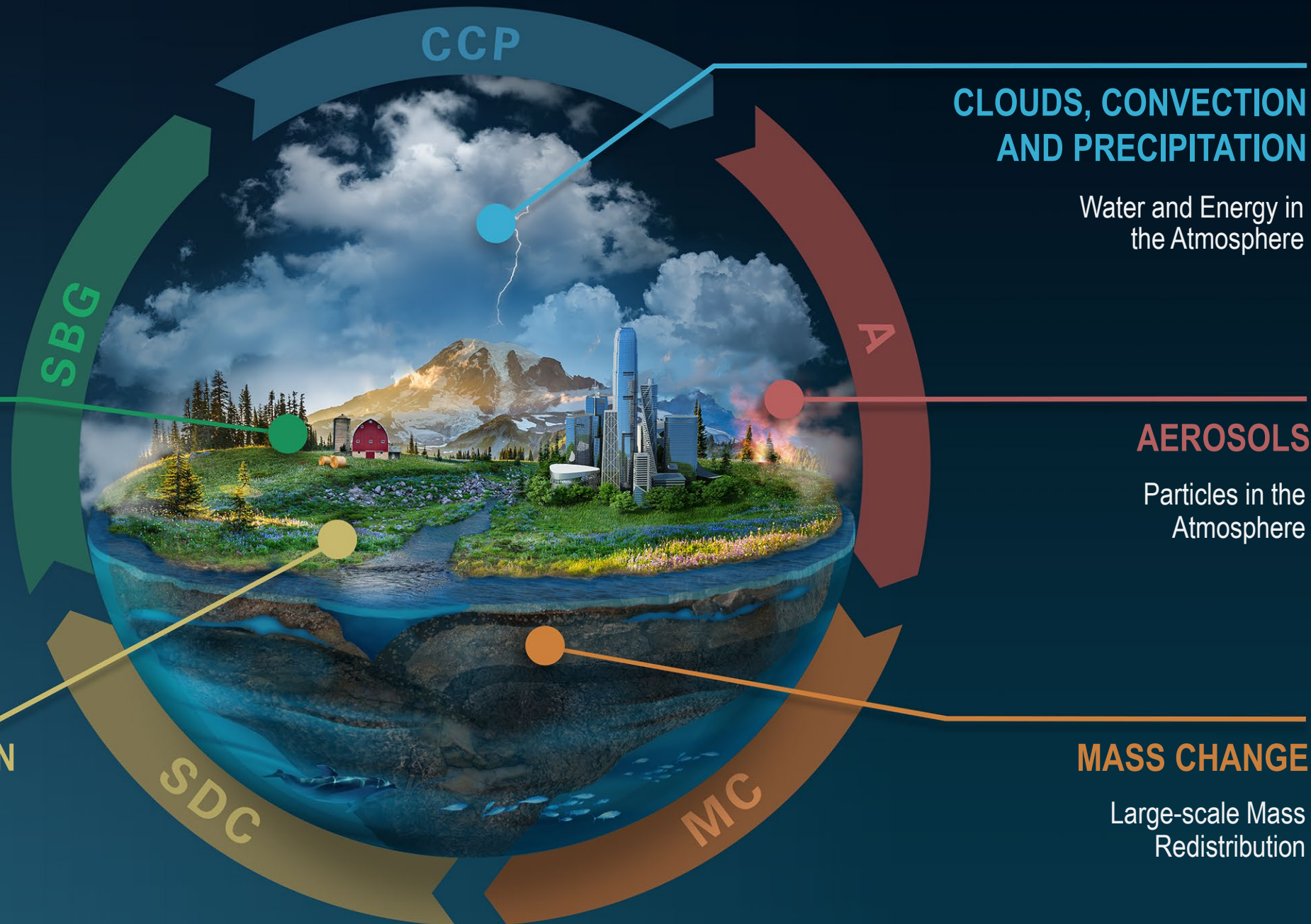
INTERCONNECTED
CORE MISSIONS

SURFACE BIOLOGY AND GEOLOGY

Earth Surface &
Ecosystems

SURFACE DEFORMATION AND CHANGE

Earth Surface Dynamics



EARTH SYSTEM OBSERVATORY

INTERCONNECTED
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SURFACE BIOLOGY AND GEOLOGY

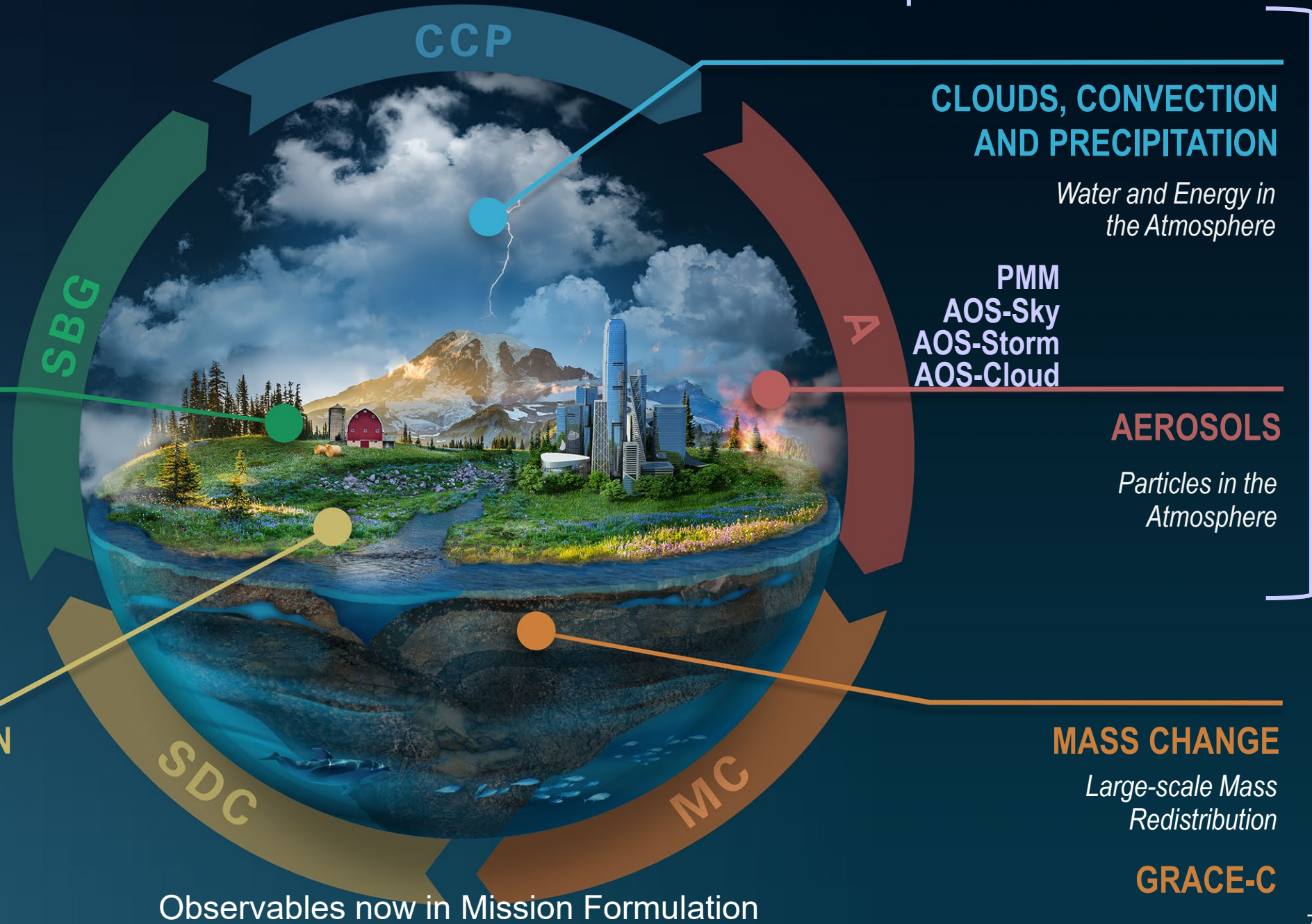
*Earth Surface &
Ecosystems*

SBG-TIR
SBG-VSWIR

SURFACE DEFORMATION AND CHANGE

Earth Surface Dynamics

Met by **NISAR** launch in 2025



The background of the slide is a composite of aerial satellite images. The top-left shows a rugged, mountainous terrain with a river cutting through it. The top-right and bottom-right show a complex river delta system with numerous distributaries flowing into a larger body of water. The bottom-left is a solid dark blue rectangle. A dark blue horizontal band across the center contains the title text.

Midterm Response Highlights

The background of the slide is a composite image. It features an aerial photograph of a river delta, likely the Colorado River, with its characteristic branching channels and sediment patterns. The image is overlaid with a semi-transparent blue layer and several green, leaf-like shapes that are oriented diagonally across the frame. A dark blue horizontal band runs across the middle of the image, containing the title text.

Engaging our Community

Engaging our Community and Stakeholders

What we heard:

- Articulate societal value and urgency of implementing the Decadal (p 30)
- Take full advantage of CESAS meetings to seek feedback (p 37), including seeking input on program balance (p 35)
- Communicate with the community about decisions made, especially those due to budget pressure, through a variety of means (p 54)
- Engage the broader Earth science constituency along with NOAA and USGS in preparation for the next Decadal (p 58)

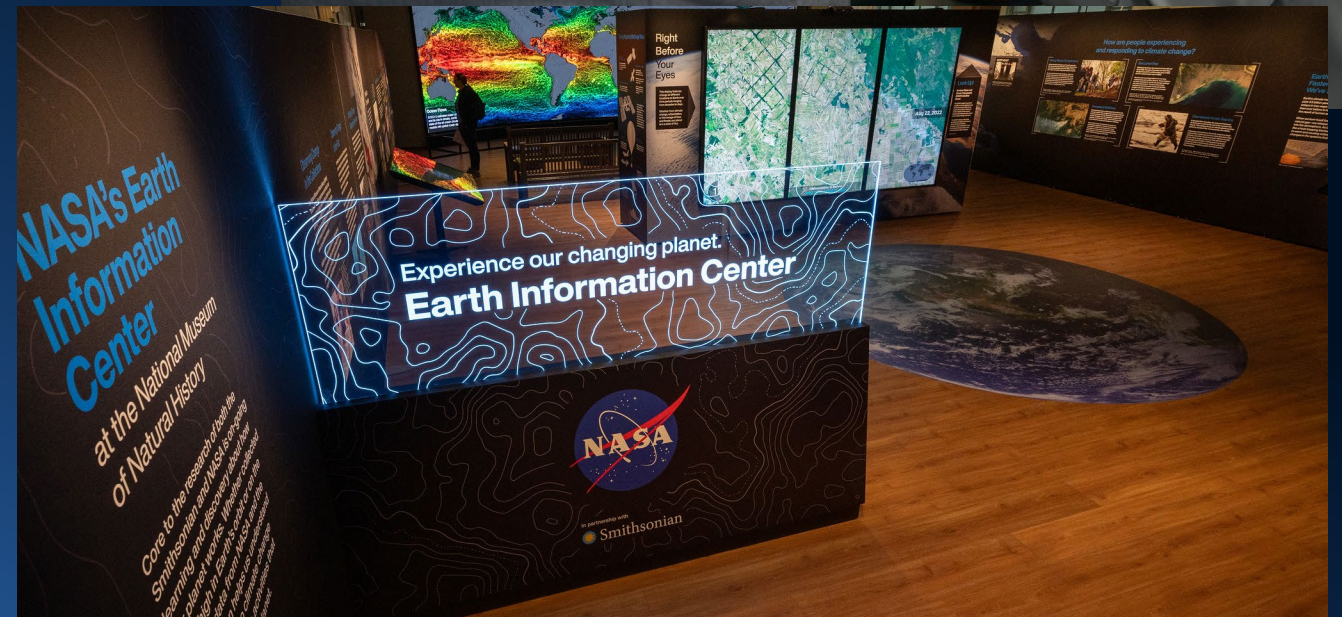
Articulating value

What we're doing to articulate value and urgency:

- Earth Information Center expansion and congressional visits
- Hill briefings/events
- Agriculture roadshows
- Early Adopters Showcase
- Working with people who are influential in their communities



NASA/Heather Hanson



NASA/Bill Ingalls

Two-Way Communication with our Community

More frequent updates:

- Increasing NASA-hosted engagements, including a ROSES release community forum
- Initiated ESD Director Postcard

Information exchange:

- Increasing discussion time with CESAS
- Planning events to get input on Earth Science to Action strategy implementation
- Held ESO Industry Days
- Establish competed integrated ESO science teams (in addition to mission teams) to prioritize cross-mission science and applications
- Gathering input from end users on uses of ESO data



Subscribe to Postcards from NASA Earth Science
<https://go.nasa.gov/4eMXPkD>

When in an embargo, we continue to use the Decadal decision rules to guide our decisions

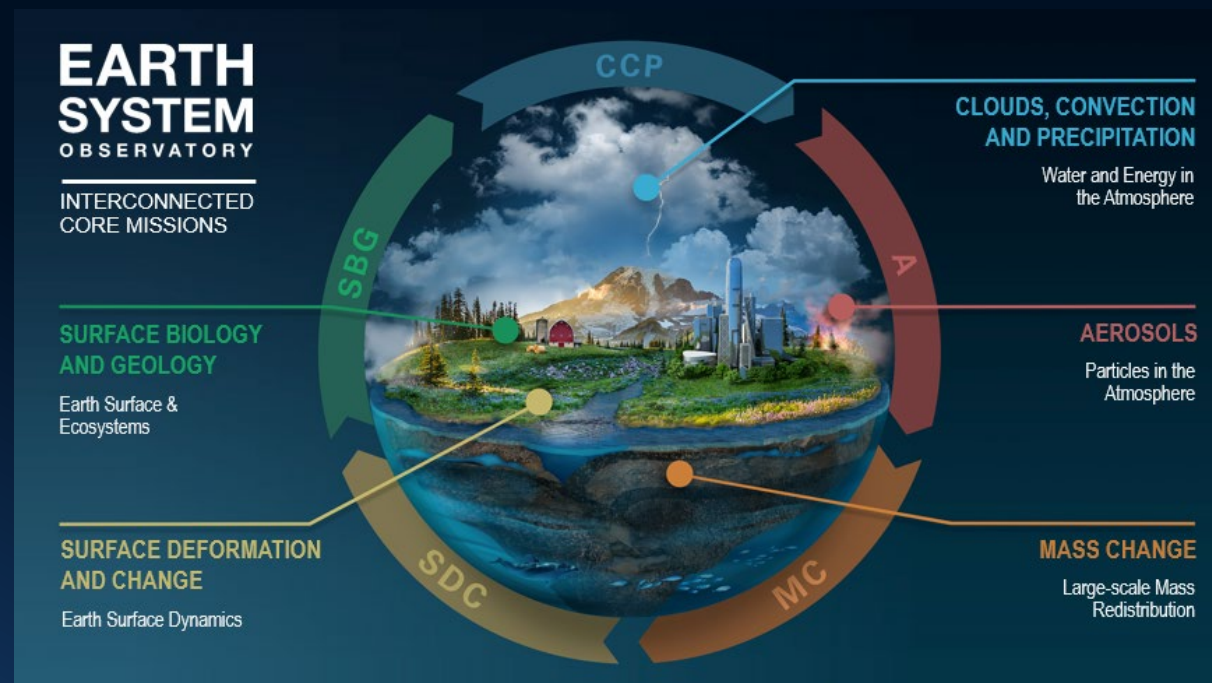
An aerial photograph of a river delta, likely the Colorado River, showing a complex network of distributaries flowing into a larger body of water. The land is green and brown, indicating vegetation and exposed soil. A large, semi-transparent blue rectangular area is overlaid on the left side of the image, partially obscuring the river and the text.

Developing ESO Through Budget Constraints

Developing the ESO

What we heard:

- Proceed with SBG-TIR on current schedule and maximize achievable overlap with SBG-VSWIR without increasing cost (p 52)
- Simplify requirements and compete parts of AOS (p 52)
- Implement GRACE-C on current timeline; identify long-term continuity solution (p 53)
- Engage Copernicus program to explore potential collaboration to meet SDC objectives; re-evaluate unmet objectives after NISAR launch (p 53)
- Frustration that more missions aren't further along (p 37)



ESO in FY25 President's Budget

- **GRACE-C** (formerly **Mass Change**), no change (launch 2029)
- **SBG-TIR** retained as an instrument contributed to a partner mission (launch 2028)
- **SBG-VSWIR** delayed by 2.5 years (launch now NET 2032)
- **AOS-Sky** restructured for ACCP designated observables collected by a mix of competed and directed missions with decoupled schedules (launch 2030-2031)
 - **AOS-Cloud** to be competed
- **AOS-Storm** reconfigured with launch to meet partner commitments JAXA **Precipitation Measurement Mission (PMM)** and a co-launch of a second CNES-built radiometer on a GSFC-integrated platform (launch 2029)
- **SDC** will not move into formulation as NISAR will meet Decadal observational needs
 - Note ROSE-L / SDC study initiated October 2023; SDC Study Team to lead NISAR Lessons Learned study

ESO Formulation and Development Milestones

AOS

KDP-A: Jan 2023

SBG

KDP-A: Nov 2022
SBG-TIR KDP-B: July 2024

GRACE-C

KDP-C: May 2024

SDC

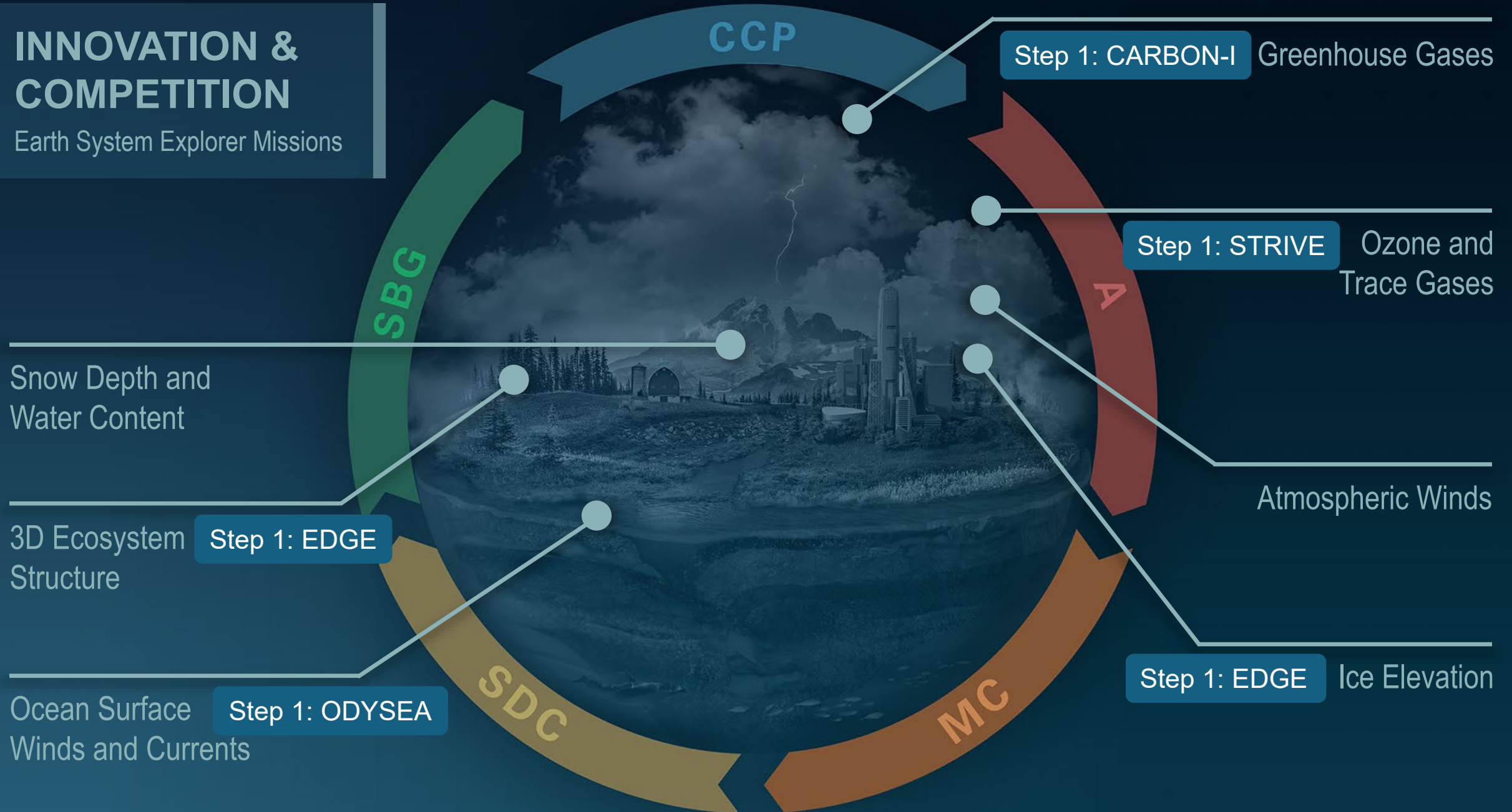
NISAR launch early 2025

- AOS-Cloud Community Announcement released April 2024
 - See <https://explorers.larc.nasa.gov/AOS-Cloud/>
- GRACE-Continuity entered Phase C in May 2024
- SBG-TIR entered Phase B in July 2024

ESO Independent Review Board (2022) report and NASA response posted at nasa.gov/reports

INNOVATION & COMPETITION

Earth System Explorer Missions



Earth System Explorers Step 1 Selections

Ocean Dynamics and Surface Exchange with the Atmosphere (ODYSEA) - JPL

- **PI:** Sarah Gille; University of California in San Diego
- **Targeted Observable:** Ocean Surface Winds and Currents
- Would measure ocean surface currents and winds to improve our understanding of air-sea interactions and surface current processes that impact weather, climate, marine ecosystems, and human wellbeing

Stratosphere Troposphere Response using Infrared Vertically-Resolved Light Explorer (STRIVE) - GSFC

- **PI:** Lyatt Jaegle; University of Washington in Seattle
- **Targeted Observable:** Ozone and Trace Gases
- Would provide near global daily measurements of temperature, various atmospheric elements, and aerosol properties from the troposphere to the mesosphere.
- Would also measure vertical profiles of ozone and trace gasses to monitor and understand ozone recovery.

Earth Dynamics Geodetic Explorer (EDGE) - GSFC

- **PI:** Helen Amanda Fricker; University of California in San Diego
- **Targeted Observable:** 3D Ecosystem Structure; Ice Elevation
- Would observe the three-dimensional structure of terrestrial ecosystems and the surface topography of glaciers, ice sheets, and sea ice as they are changing in response to climate and human activity

Carbon Investigation (Carbon-I) - JPL

- **PI:** Christian Frankenberg; California Institute of Technology in Pasadena
- **Targeted Observable:** Greenhouse Gases
- Would enable simultaneous, multi-species measurements of critical greenhouse gases and potential quantification of ethane to provide unprecedented spatial resolution and global coverage that would help better understand the carbon cycle and the global methane budget.



Strategic Approaches for Continuity and Modeling



Continuity

What we heard:

- Observation continuity decisions seem ad hoc; prioritization isn't communicated (p 59)
- This is a multi-agency challenge (p 59)

What we are doing:

- Continue to use a variety of means (Venture, directed, and partner missions) to achieve continuity
- Communicate more clearly about use of the Sustained Observations for Climate Future Missions budget line and other continuity planning
- Work with CESAS and partners to address this national challenge

Modeling

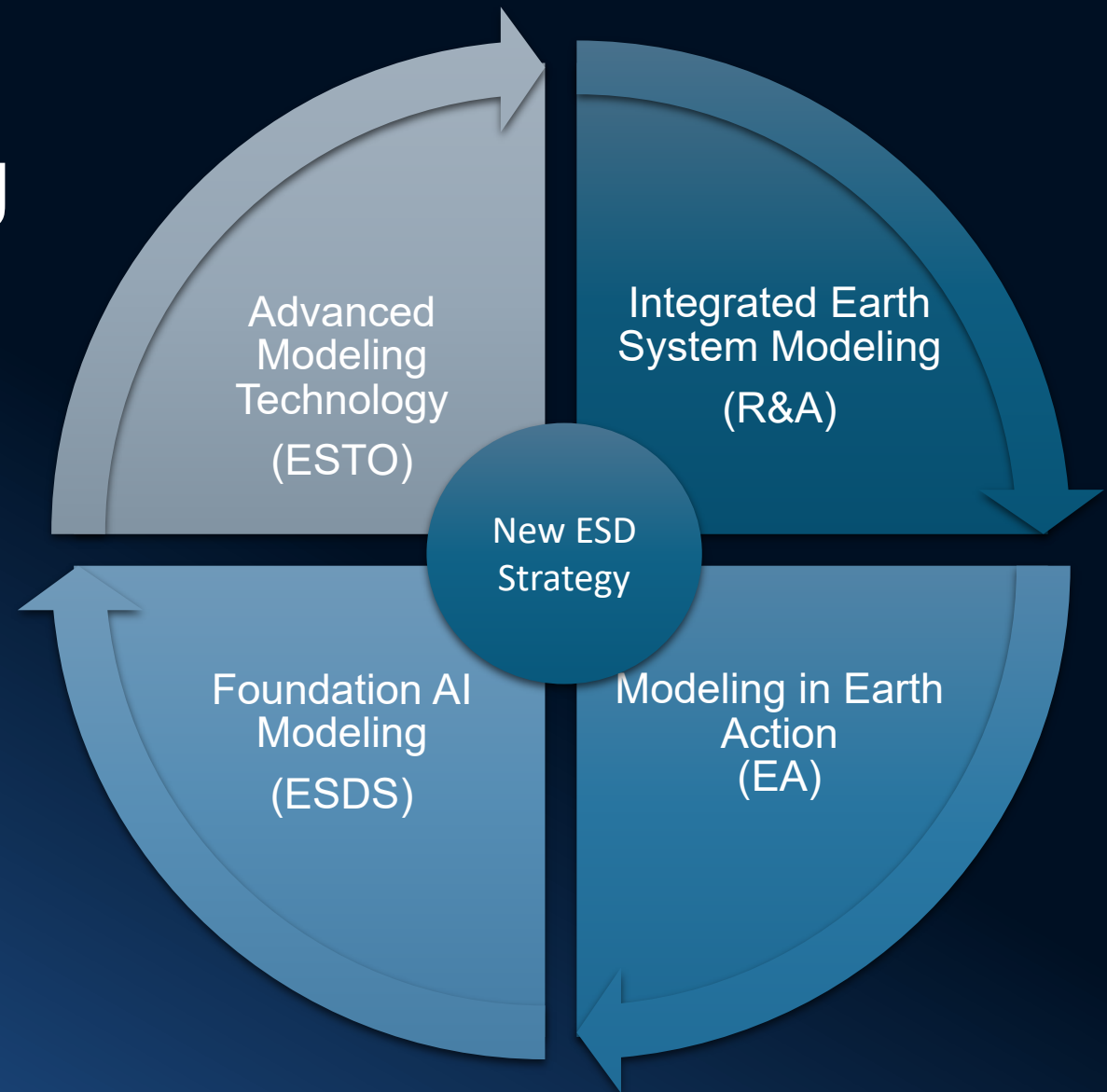
What we heard:

- Engage the community (along with NOAA and USGS) to advance model parameterizations and predictions (p 60)

Earth System Modeling

What we are doing:

- Hired modeling strategy lead Ivanka Stajner
- Focusing on integration of many advanced techniques
- Will develop modeling strategy in coordination with other federal agencies and through engagement with CESAS and the community



We will develop an advanced and integrated end-to-end Earth system modeling capability.

An aerial photograph of a river delta, likely the Amazon, showing a complex network of channels and distributaries. A semi-transparent blue overlay is applied to the left side of the image, partially obscuring the river channels.

Conclusion and Upcoming Events

National Aeronautics and
Space Administration



EARTH SCIENCE TO ACTION STRATEGY 2024-2034



<https://science.nasa.gov/earth-science/earth-science-to-action/>

Read Our Full Response to the Decadal Survey Midterm

Read more about our mid-term
response to the Decadal Survey
Midterm

<https://go.nasa.gov/3Ui8GE2>



Upcoming Key Dates

- **CESAS Fall Meeting:** Nov. 4-5
- **ESD Town Hall at AGU:** Tuesday Dec. 10, 12:30-1:30pm ET
- **ESD Town Hall at AMS:** January, date and time TBD

Watch for additional events in the new year





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