Committee on Earth Science Applications from Space (CESAS) Update to SSB

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Anne Nolin, CESAS co-chair

Note: Material contained herein represents my own opinions, informed by conversations with some CESAS members, but they do not purport to represent CESAS consensus views

Committee membership

Co-Chairs:

- William B. Gail
- Anne W. Nolin

Members:

- Ana P. Barros
- Don P. Chambers
- Ralph Dubayah
- Riley Duren
- Jonny Dyer
- Charles M. Ichoku
- Alexandra G. Konings
- Eric A. Kort
- Kristine M. Larson
- Kathleen (Kass) O'Neill Green
- Mayra I. Oyola-Merced
- Peter A. Pilewskie
- Cécile S. Rousseaux
- Graeme L. Stephens

Recent CESAS activities:

MIDTERM REPORT: REVIEWING AND SHARING PERSPECTIVES WITH NASA, NOAA, AND USGS

DEVELOPING ENHANCED COMMUNICATIONS WITH NASA, NOAA, AND USGS

ADDRESSING THE TWO QUESTIONS POSED BY THE SSB

"The two questions outlined below are meant to focus your discussions on a shared theme, though you are encouraged to explore these issues broadly and dynamically."

1. **Adapting to Budget Declines:**
   Please reflect on how the Decadal Survey decision rules might evolve if faced with continued budget constraints. While not every solution needs to be captured in a formal NASEM report, the Discipline Committees have a unique "bully pulpit" to engage with federal agency leaders. Your discussions and questions significantly shape scientific priorities and perspectives within the broader policy landscape. We encourage you to think about how your insights could be leveraged to influence decisions during fiscal uncertainty.
2. **Expanding Outreach and Engagement:**
   The second question invites you to consider how NASEM might expand its outreach efforts to diverse audiences. We are particularly interested in your ideas for new workshops, public engagement strategies, and ways to inform broader scientific and policy events.

   One example is *Spring Space Science Week*, which provides a platform for sharing the scientific community's priorities.

   We welcome suggestions for new modes of outreach or engagement that could enhance the visibility and impact of our work—particularly those not traditionally undertaken by NASEM.

1. Adapting to Budget Declines

How might the Decadal Survey decision rules evolve if faced with continued budget constraints?

Next slides:

- NASA ESD budget issues and approach since 2018
- Decadal Survey decision rules
- How the decision rules might evolve

Key budget issues:

External Budget Pressures: Covid and inflation have squeezed the Decadal Project budget

POR Growth Impacts: POR budget growth squeezes Decadal Project budgets

Research vs. operational: Continuity, sustained science, operational? How should sustained land imaging (SLI) and Landsat be prioritized with budget trade-offs?

Cadence: program elements have funding requirements peaking at the same time

Timely feedback: disconnect in the time cycle for NASA to receive feedback in a timely manner

The decadal survey recommended that NASA implement its space-based observing priorities through **five** distinct program elements:

1. Program of Record
2. Designated
3. Earth System Explorer
4. Incubation
5. Earth Venture

Each program element was recommended to be managed so that development costs of each element, and for each project within the Designated element, would not impact other elements or projects. (Midterm Report, p. 33)

2018 Decadal Survey Budget Reduction Decision Rules

1. Reductions should first be accommodated by delaying the large missions.
2. If additional reductions are required, the medium-size Designated missions should be delayed, unless these delays threaten the continuity of data sets that require continuous measurement.
3. Should continuity be threatened, the cadence of medium-size competitive missions should be reduced but not to fewer than two competitions in the decade. The budgets for Venture and research and applications should not be reduced by more than 5 percent from their historical averages.

- Large changes should be made only subsequent to additional review by CESAS

(NASEM 2018, pp. 197–198)

Earth System Observatory Budget Approach

*The science and applications opportunity costs of these decisions have not been tallied objectively, and thus if there are upcoming opportunities and, or threats to ESD's budget it will be very difficult for CESAS, if requested, to articulate meaningful guidance

NASA's approach

1. Decouple: splitting large missions into several smaller ones (AOS-Sky, SBG-TIR/VSWIR)*
2. Partner: with international space agencies
3. Compete: opening up some missions to competition rather than directed missions

In practice, there is also:

4. Delay: includes decision and mission delays
5. Descope:
   - Backscatter lidar on AOS
   - Surface Deformation and Change mission (will rely on NISAR)

Modified Decadal Survey Decision Rules

- Clarity is needed to create a framework for deciding between continuity and new discovery mission. Continuity is critically important to operational organizations (*see previous comment re: opportunity costs)
- Implement independent boards for design reviews developing missions
  - Consider science value-to-cost (with clear metrics, cost caps)
  - Establish minimum threshold of science value ***
  - Apply consistent approach across missions
- Use CESAS for guidance in a more regular manner:
  - To provide expert review and more timely decision-making
  - To enhance and broaden science and user community communications
- Implement large missions in a staggered/phased approach to ensure overall program health, even if it means less optimal overlap between missions
- If a mission cannot be met within the cost cap, then achieve the observables using an Earth System Explorer opportunity rather than proceeding with a higher cost implementation

2. Expanding Outreach and Engagement:

The question was: ***"How might NASEM expand its outreach to more diverse audiences?"***

Words matter:

"Outreach" is unidirectional, "more diverse" implies you already have diversity, "audience" implies a group that is anticipating information to be provided by the organization.

Consider rephrasing: ***"How might NASEM develop and expand its engagement with diverse communities?"***

"Engagement" is bidirectional, "develop and expand" "with diverse communities" implies that you wish to work *with* knowledge producers and user communities.

Thoughts on more diverse engagement:

How can we make Spring Space Science Week a bidirectional engagement opportunity?

- Invite diverse groups to co-design the event
- Hold facilitated community discussions
- Co-identify goals and desired outcomes
- Debrief and follow up

Look at organizations that successfully engage diverse communities

- UNICEF – their outreach for health, education, and emergency relief involves local/regional leaders, adapting materials to local languages, and focusing on culturally relevant education campaigns. Programs are inclusive of all gender, ethnic, and socio-economic groups.

Include diverse voices to speak and lead conversations

- Local, rural, and state community members
- Indigenous tribal members
- Non-scientists
- Legislators
- NGOs

More direct engagement:

Town hall events,

Earth Science-to-Action strategy

Go to where people in these diverse communities live and work

Hold townhall events – ask questions, listen to their challenges, concerns, and excitement

Articulate the societal value of Earth observations from space

Rinse and repeat

Engage with social media:

Podcasts

A recent Pew Research study shows that >80% get their news via digital devices.

Only 4% get their news from print media but >27% say they get their news via podcasts

Suggestions:

Create engaging NASEM science podcasts with regular updates

Include diverse voices and perspectives

Train scientists in how to be an engaging podcast guest

Thank you.