
Committee on Earth Science and Applications from Space

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Space Studies Board

April 4, 2014

Disclaimer: These slides represent a personal assessment of the issues discussed by the CESAS. This document should not be cited or quoted because the views expressed do not necessarily reflect those of CESAS, SSB, or the NRC.

Committee on Earth Science and Applications from Space (CESAS)

- Support scientific progress in Earth system science and applications
- Standing committee is sponsored by NASA
 - *Ad hoc* studies organized by CESAS and its predecessor, CES, have been supported by NASA, NOAA, and USGS
- Particular role vis-à-vis Decadal Surveys
 - Organize the survey
 - Monitor progress in implementation of its recommendations
 - Organize the midterm assessment of the survey

Committee Roster

1. Mark R. Abbott* (*Chair*), Oregon State University
2. Joyce E. Penner* (*Vice Chair*) University of Michigan
3. Steven A. Ackerman,* University of Wisconsin, Madison
4. Stacey W. Boland, Jet Propulsion Laboratory
5. Antonio J. Busalacchi,* Jr. University of Maryland
6. Lennard A. Fisk (NAS), University of Michigan
7. Lee-Lueng Fu (NAE),* Jet Propulsion Laboratory
8. Inez Y. Fung (NAS), University of California, Berkeley
9. Chelle L. Gentemann,* Remote Sensing Systems
10. Efi Foufoula-Georgiou, University of Minnesota, Twin Cities
11. Kenneth C. Jezek, Ohio State University
12. Michael D. King (NAE),* University of Colorado, Boulder
13. Molly K. Macauley, Resources for the Future
14. Walter S. Scott, Digital Globe, Inc.
15. David L. Skole, Michigan State University
16. William F. Townsend, Independent Aerospace Consultant
17. Steven C. Wofsy (NAS), Harvard University

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- Staff: Art Charo, Lewis Groswald, and Anesia Wilks
 - *Also a member of the “Continuity” study

A Framework for Analyzing the Needs for Continuity of NASA-Sustained Remote Sensing Observations of the Earth from Space

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Background to NASA ESD Study Request

- Instruments on NASA research and NOAA “operational” spacecraft measure numerous variables relevant to Earth’s biosphere, hydrosphere, atmosphere, and oceans —and their interactions on various spatial and temporal scales. Such data streams are critical components of Earth Science research programs
- Diminished fiscal resources, the coming loss of heritage assets, and increasing societal needs for information products derived from Earth observations create a growing tension between the need for measurement “continuity” and the development of new measurement capabilities.

Challenges

- Defining continuity for data products that require measurements of several variables, some with different temporal, spatial, and radiometric resolution requirements.
- Working within the boundaries set by NASA ESD, which does Earth System Science, but within the confines of a “climate-centric architecture”
- Developing a framework that can be backtested to demonstrate its utility going forward

Status of the Continuity Study

- Help establish a systems engineering framework for assessing new and continuing measurements and missions
 - Guide engineering and science
 - Important input to the upcoming Decadal Survey
- Report coming along well after much discussion defining the scope and then the approach
- Next meeting April 23-25, 2014
- Report should go to review in late summer

Continuity Study Timeline

- Committee Appointed, Aug 21, 2013
 - Telecon on September 30, 2013
 - Telecon on October 22, 2013
- 1st Meeting, November 12-14, 2013 in DC
- 2nd Meeting, January 29-31, 2014 in DC
- 3rd Meeting, April 23-25, 2014 in Irvine
- Potential for fourth and final meeting depending on accomplishments at third meeting
 - Very challenging subject matter, little to no prior work to base committee efforts off of
- Report Submission , July-August 2014

CESAS at Space Science Week 2014

- Focused on soliciting stakeholder input in preparation for next decadal survey
 - NASA, NOAA, USGS, OMB
- Also received agency updates from NASA, NOAA, and USGS
 - Major issues revolve around budget pressures and continuing uncertainty about roles and responsibilities for certain elements of the nation's EOS program across the agencies
- ESA
 - ESA is making significant contributions to Earth science
 - Focus of presentation was on how to engage Europe in next decadal survey

Further Planning for the Decadal Survey

- Continuation of work started at the November meeting about organizing the next Decadal Survey
 - Survey needs to start first quarter of 2015
 - Draft task statement to NASA, NOAA, USGS etc. by ~ mid-July
 - Contracts to allow work to begin needed ~ Sept./Oct. 2014
 - Nominations to the committees by end of calendar year
 - As noted in previous update to the Board, we will be incorporating lessons learned from the previous workshop:
 - Statement of task is critical
 - Resource limitations make consideration of international activities essential
 - Next survey will have to be resilient to budget and policy changes
 - Can the Cost Assessment and Technical Evaluation (CATE) process be modified to maintain its value while reducing its financial and time burdens?
 - How to balance science goals and specific mission recommendations

Some Constraints

- Many of the 15 NASA missions from the last DS are still in pre phase-A stage of development
- Some assumed for NOAA have been given back to NASA (e.g., ocean vector winds follow-on)
 - Congress recently assigned the following planned NOAA “continuity” measurements back to NASA: earth radiation budget, total solar irradiance, ozone profile
- Budgets will be tight
 - Most DS work under an implicit assumption of a slowly-growing budget
- How do we engage other agencies that have drivers other than the DS recommendations?
- Emerging mandates in “actionable science”

DS Strawman Structure

- ❑ Assess scientific progress since the first DS and identify the achievements of NASA missions
- ❑ New issues and opportunities
- ❑ Combine these together and give a framework to build towards a better system that provides relative investments and targets for:
 - New missions
 - Continuing missions
 - Venture missions
 - Technology investments
 - R&A
- ❑ Stewardship of the DS recommendations
- ❑ Specific studies for partner agencies (NOAA and USGS)

Work in Advance of the Survey

- Use next CESAS meeting to hold mini-workshop
 - International plans and partnerships
 - Possible impacts of disruptive technologies on measurement approaches
- Completion of continuity study
- Community solicitation for concepts on key science questions and measurement concepts
- Complete draft Statement of Task at June 3-4 meeting in Irvine