The 2013-2022 NRC Decadal Strategy for Solar and Space Physics

Ron Turner and Michael Hesse, Research to Operations Working Group Co-leads

Daniel N. Baker, Chair

Thomas Zurbuchen, Vice-Chair

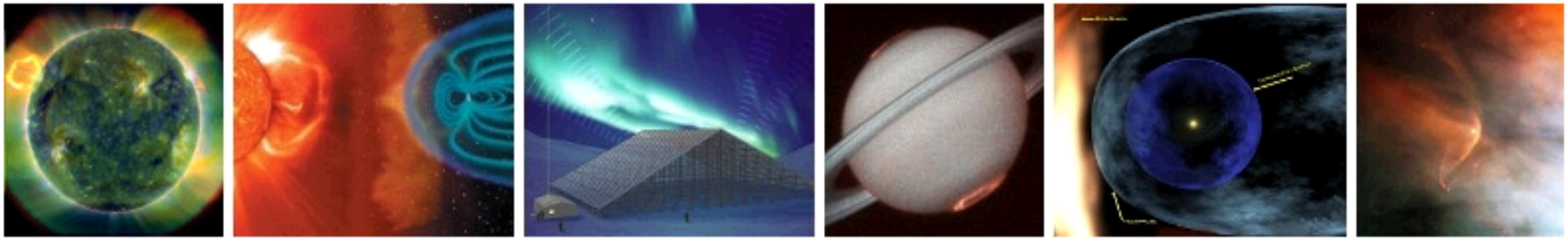
Arthur Charo, National Research Council

Survey's Task Summary

- **Provide an overview of the science and a broad survey of the current state of knowledge in the field**, including a discussion of the relationship between space- and ground-based science research and its connection to other scientific areas;
- **Identify the most compelling science challenges** that have arisen from recent advances and accomplishments;
- **Identify the highest priority scientific targets** for the interval 2013-2022 (having considered scientific value, urgency, cost category and risk, and technical readiness).
- **Develop an integrated research strategy** that will present means to address these targets

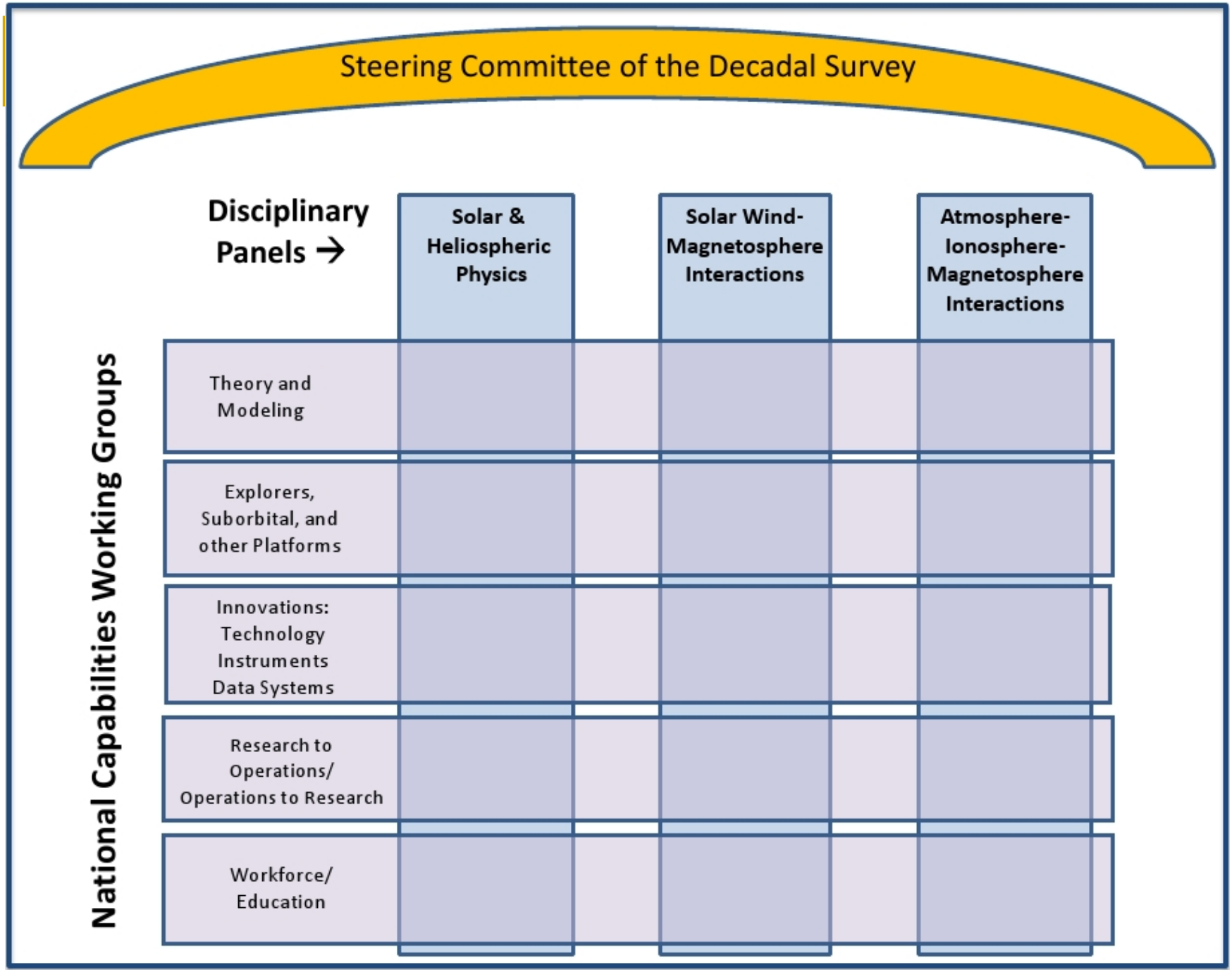
Note:

1. NASA missions not yet in formulation or development will be reprioritized;
2. Reference missions can be proposed by White Paper. No grandfathered missions.



Survey Organization

- Steering Committee--Responsible for Final Report
  - Approximately 18 members representing the broad solar and space physics community
  - Representatives from the supporting study panels
- Disciplinary Study Panels ~ 15 members each
  - Atmosphere-Ionosphere-Magnetosphere Interactions
  - Solar Wind-Magnetosphere Interactions
  - Solar and Heliospheric Physics
- “National Capabilities” working groups to address important cross-disciplinary opportunities (next slide)
  - Option for focused workshops e.g., Research to Operations


Steering Committee of the Decadal Survey
Disciplinary Panels →
Solar & Heliospheric Physics
Solar Wind-Magnetosphere Interactions
Atmosphere-Ionosphere-Magnetosphere Interactions
National Capabilities Working Groups
Theory and Modeling
Explorers, Suborbital, and other Platforms
Innovations: Technology Instruments Data Systems
Research to Operations/ Operations to Research
Workforce/ Education

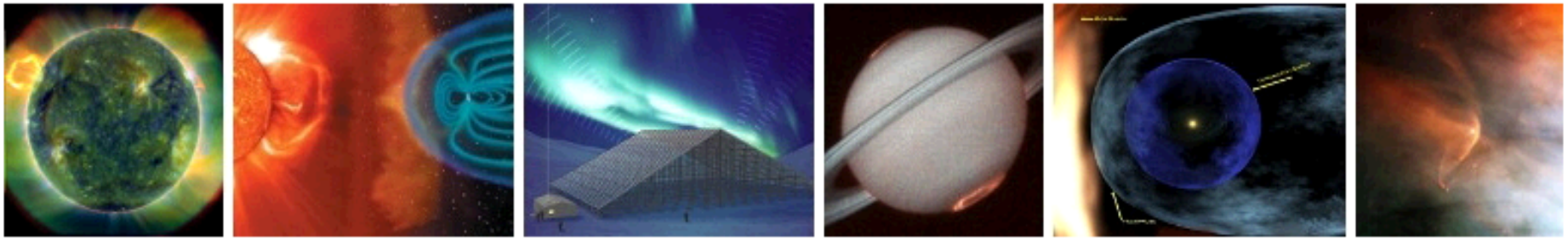
Research to Operations Working Group

- The “Research to Operations” cross-discipline working group will represent to the Decadal Survey Steering committee the interplay between research and operations.
- Specific Questions this WG addresses:
  - How are observations, models, or data collected for research used to support operations?
  - How are operational observations, models, or data used to support research?
  - What are key science questions that could substantially improve operational support?
  - What is the best strategy for improving the transition from research to operations?

Your Participation is Needed

- A successful decadal survey engages the wide community in developing a consensus document that sets explicit science-based priorities.
- We strongly encourage you to:
  - Write a concept paper (e.g., mission, observation, theory, or modeling activity) that identifies and motivates one or more new or existing science or societal objectives and promises to advance the scientific objectives, contribute to fundamental understanding of the Sun-Earth/planetary system, and/or facilitate the connection between science and societal needs (e.g., improvements in space weather prediction). Details on how to submit a paper are on our website. Responses are due by November 12, 2010.
  - Participate in community town halls and workshops. Check our website for upcoming events.
- **Overall schedule: Deliberations through summer 2011; pre-pub due March 31, 2012**.

The 2013-2022 NRC Decadal Strategy for Solar and Space Physics



www.nas.edu/ssb

(click on “A Decadal Strategy for Solar and Space Physics”)

Backup Slides

Steering Committee

Steering Committee Members

Chair
Daniel Baker, NAE
University of Colorado, Boulder

Vice Chair
Thomas H. Zurbuchen
University of Michigan

Members

Brian H. Anderson
Johns Hopkins University APL

Mary K. Hudson
Dartmouth College

Steven J. Battel
Battel Engineering

Thomas Immel
University of California, Berkeley

James F. Drake Jr.
University of Maryland, College Park

Justin Kasper
Harvard-Smithsonian Center for Astrophysics

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University of Michigan

Judith L. Lean NAS
Naval Research Laboratory

Sarah Gibson
National Center for Atmospheric Research

Ramon E. Lopez
University of Texas, Arlington

Michael A. Hesse
NASA Goddard Space Flight Center

Howard J. Singer
NOAA Space Weather Prediction Center

J. Todd Hoeksema
Stanford University

Harlan E. Spence
University of New Hampshire

David L. Hysell
Cornell University

Edward C. Stone, NAS
California Institute of Technology

Panels

Panel on Atmosphere-Ionosphere-Magnetosphere Interactions (AIM)

Chair
Jeffrey M. Forbes
University of Colorado, Boulder

Vice Chair
James H. Clemmons
The Aerospace Corporation

Panel on Solar-Wind Magnetosphere Interactions (SWM)

Chair
Michelle F. Thomsen
Los Alamos National Laboratory

Vice Chair
Michael Wiltberger
National Center for Atmospheric Research

Panel on Solar and Heliospheric Physics (SHP)

Chair
Richard A. Mewaldt
California Institute of Technology

Vice Chair
Spiro K. Antiochos
NASA Goddard Space Flight Center

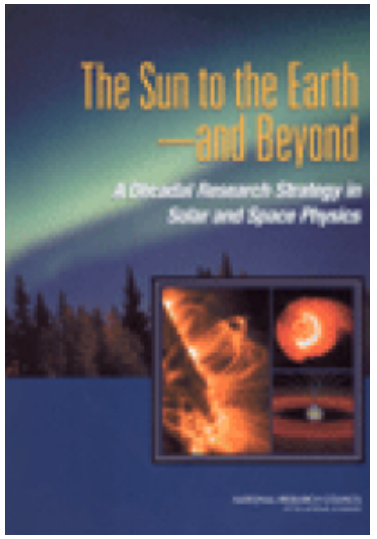
Working Group Leads

- Theory and Modeling
  - Jim Drake, UMD and Jon Linker, Predictive Science, Inc
- Explorers, Suborbital, and other Platforms
  - Kristina Lynch, Dartmouth and Brian Anderson, JHUAPL
- Innovations: Technology, Instruments, Data Systems
  - Andy Christensen, Dixie State U. and Stuart Bale, UC Berkeley

Working Group Leads (con't)

- Research to Operations/Operations to Research
  - Michael Hesse, NASA GSFC, and Ron Turner, ANSER.
- Workforce and Education
  - Mark Moldwin, U. of Michigan and Cherilynn Morrow, Ga. State Univ.

Context



- *The Sun to the Earth—and Beyond: A Decadal Research Strategy in Solar and Space Physics*
  - Summary Report (2002)
  - Compendium of 5 Study Panel Reports (2003)

- First NRC "decadal survey" in Solar and Space Physics
  - Community-led
  - Integrated plan for the field
  - Prioritized recommendations
  - Sponsors: NASA, NSF, NOAA, DoD (AFOSR and ONR)

Decadal Survey Purpose & OSTP* Recommended Approach

"Decadal Survey benefits:

- **Community-based documents offering consensus of science opportunities to retain US scientific leadership**
- **Provides well-respected source for priorities & scientific motivations to agencies, OMB, OSTP, & Congress"**

"Most useful approach:

- **Frame discussion identifying key science questions**
  - **Focus on what to do, not what to build**
  - **Discuss science breadth & depth (e.g., impact on understanding fundamentals, related fields & interdisciplinary research)**
- **Explain measurements & capabilities to answer questions**
- **Discuss complementarity of initiatives, relative phasing, domestic & international context"**

*From "The Role of NRC Decadal Surveys in Prioritizing Federal Funding for Science & Technology," Jon Morse, Office of Science & Technology Policy (OSTP), NRC Workshop on Decadal Surveys, November 14-16, 2006