Organizing Community Input to Decadal Surveys

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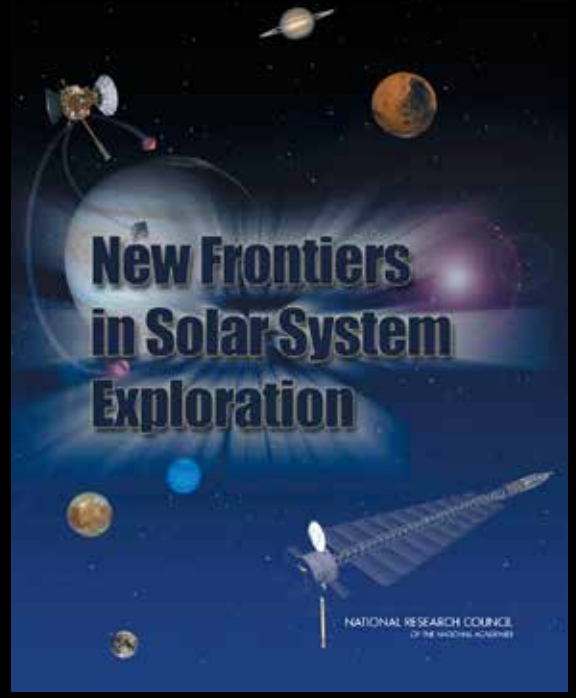
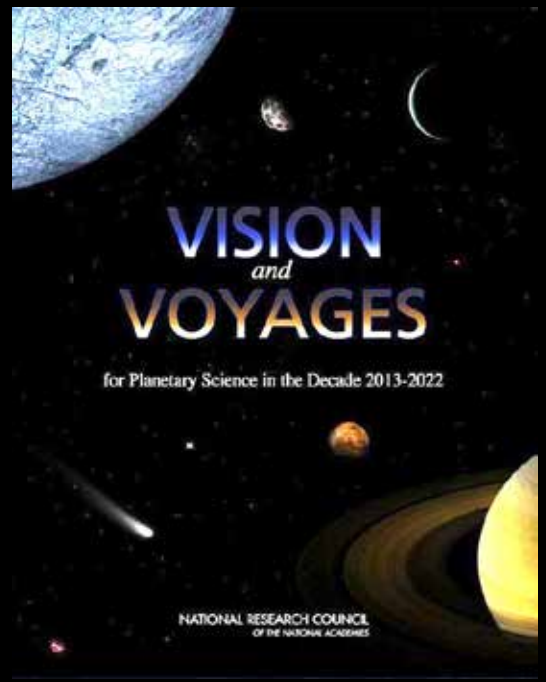
Formulating Input to a Decadal Survey

The Charge

- What was proposed.
- Talk about how you came to choose your white paper topic.
- Forming a team.
- Developing a white paper.





Community Science Priorities

Identifying important science questions in the field.

- Getting the community involved through the white paper process or
- Community meetings – invite presentations from individuals to identify and justify why issues should be included.
- Discussion and even voting can occur.
- Be inclusive!

Individual Initiative.

- Lead a team to develop the white paper
- It takes one or two heroes to develop the first draft
- Circulate to a group of interested experts for co-authorship or signatory status
- Be inclusive!

What was Proposed

Example: Lunar Geophysical Network (aka why a non-geophysicist led the charge!)

- White paper focused on the science return from a global, long-lived lunar geophysical network.
- Built on the results of Apollo.
- Did NOT focus on implementation

- Internal structure and heterogeneities not known.
- Shallow moonquake mechanisms not known – form potential hazard to surface infrastructure given their magnitude.
- Test fundamental models of lunar evolution (magma ocean)
- Understanding the early lunar core dynamo and surface magnetic anomalies
- Understanding heat flow in different lunar terranes, the thermal evolution of the Moon, and bulk composition.

THE RATIONALE FOR DEPLOYMENT OF A LONG-LIVED GEOPHYSICAL NETWORK ON THE MOON

Submitted to
The Inner Planets Panel, NRC Decadal Survey for the Planetary Sciences Division, Science Mission Directorate, NASA

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Team & Paper Development

- Having an expert group helping in developing the white paper is critical
- Hardest part = first draft!
- Releasing it to a broader group for comment and co-authorship/signatory
- Can make it open to anyone for comment and inclusion
- Do not have to be at US institutions as community science priorities go beyond borders – enables collaboration

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Results

Mid-Size Missions

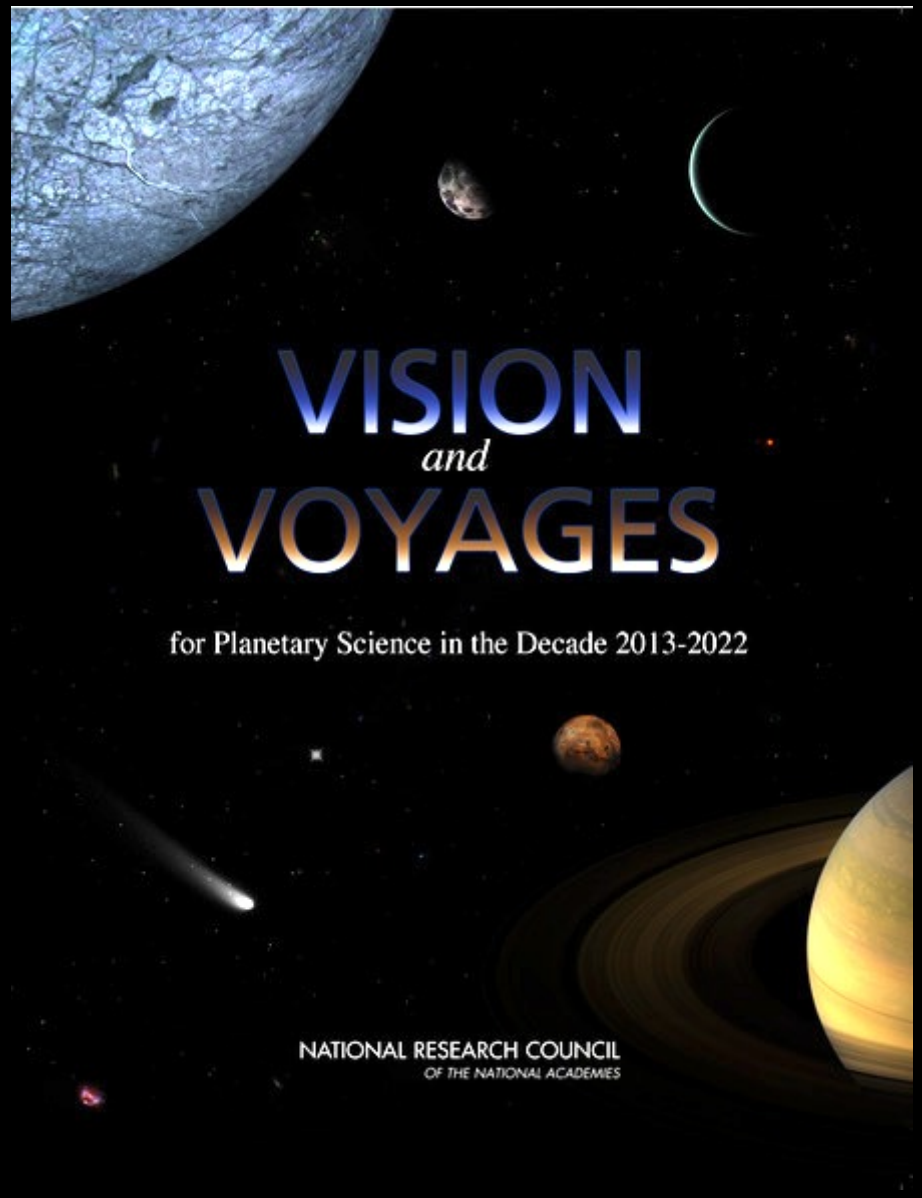
For the New Frontiers Mission 5 (2022) selection, the following missions should be added to the list of remaining candidates:

- *Io Observer, and*
- *Lunar Geophysical Network.*

Vision & Voyages (2012) https://www.nap.edu/download/13117

Finding: Scientific discoveries from lunar orbit or in terrestrial laboratories and technical advances in instrumentation since the 2011 decadal survey do not replace or obviate the need for the LGN.

CAPS (2020) Options for the Fifth New Frontiers Announcement of Opportunity. https://www.nap.edu/download/25868



Final Thoughts

Important synergies with the Lunar Exploration Analysis Group (https://www.lpi.usra.edu/leag/)

Lunar Exploration Roadmap (https://www.lpi.usra.edu/leag/roadmap/) in terms of science on the Moon and Human Exploration:

Goal Sci-D: Use the unique lunar environment as research tool:

- Combustion (4 Objectives, 14 Investigations)
- Fluid Physics and Heat Transfer (4 Objectives, 11 Investigations)
- Materials Processing (3 Objectives, 5 Investigations)
- Life Science (11 Objectives, 29 Investigations)

Final Thoughts

Objective Sci-D-4: Use the unique environment of the lunar surface to perform experiments in the area of fundamental physics.

Objective Sci-D-7: Study behavior of granular media in the lunar environment.

Objective Sci-D-9: Investigate the production of oxygen from lunar regolith in lunar gravity.

Objective Sci-D-16: Evaluate consequences of long-duration exposure to lunar gravity on the human musculo-skeletal system.

Objective Sci-D-20: Study the influence of the lunar environment and its effects on short and long-term plant growth, productivity (as a food source), palatability, and nutrition.

Need to reconnect our two communities