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SPACE STUDIES BOARD

Committee on Solar and Space Physics

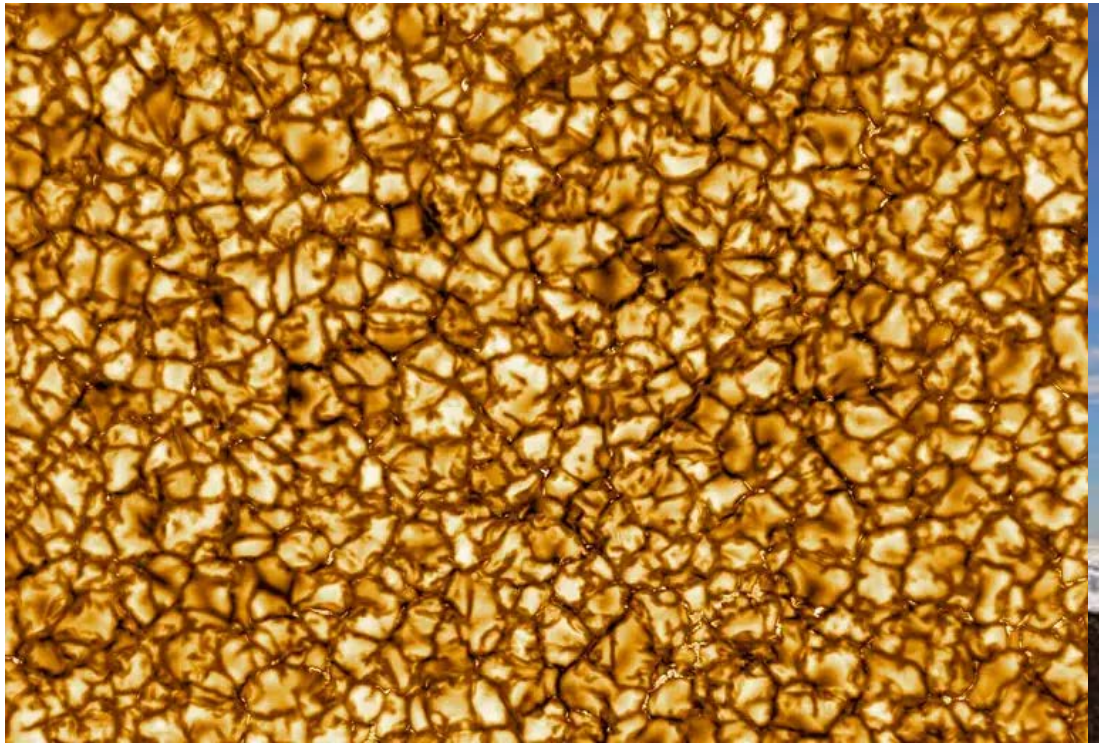
Presentation to SSB, June 10, 2020
CSSP Spring Virtual Meeting, March 31 – April 2, 2020

- **Co-Chairs:** Sarah Gibson and Maura Hagan
- **Members:** Brian Anderson, Steven Battel, Rebecca Bishop, Mark Cheung, Christina Cohen, Yue Deng, Tai Phan, Tuija Pulkkinen, Jiong Qiu, Howard Singer, Leonard Strachan, Barbara Thompson
- **Staff:** Abigail Sheffer and Megan Chamberlain

Statements made in this presentation are those of individual CSSP members and do not necessarily reflect the official views of the Space Studies Board or the Academies.

Solar and Space Physics Highlights - NSF

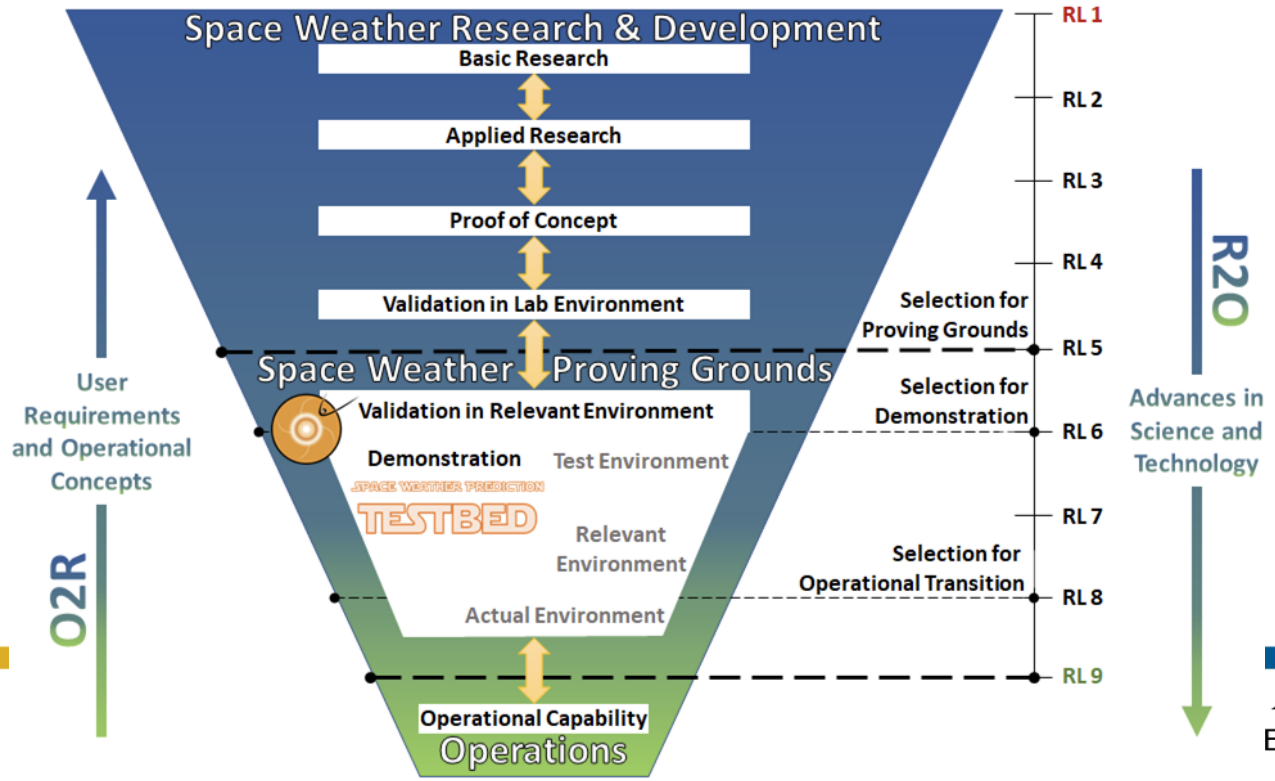
Daniel K. Inouye Solar Telescope goes live!

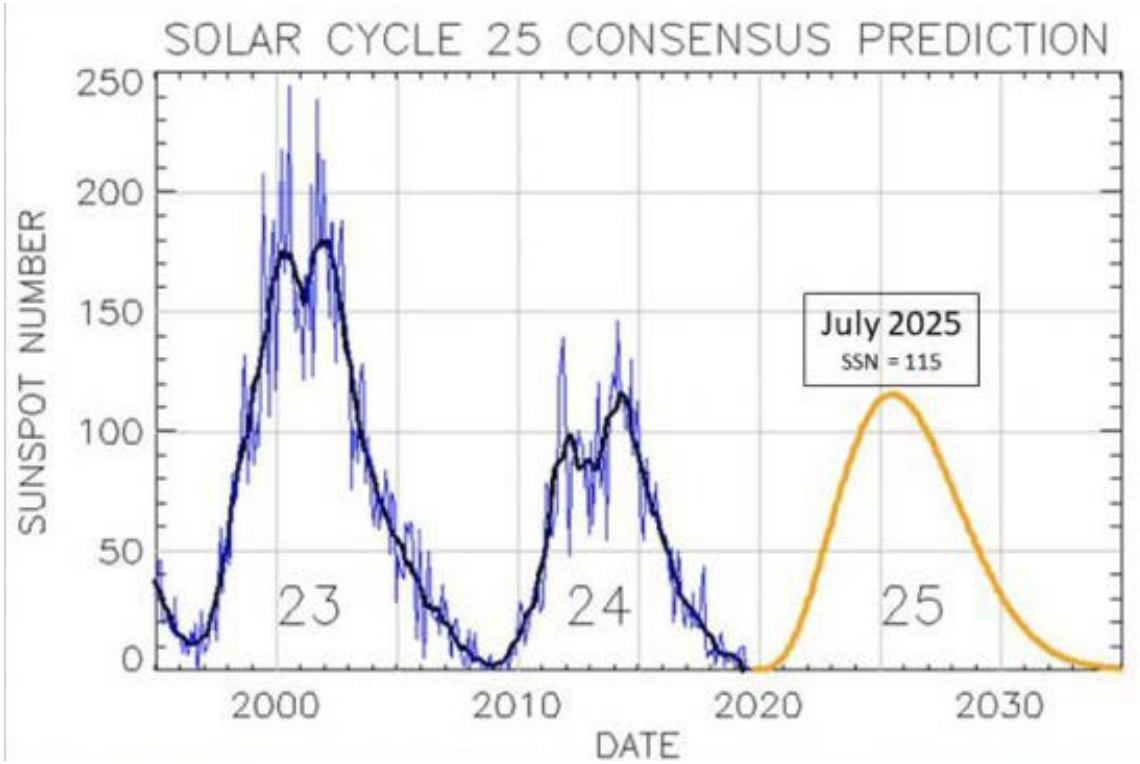


Solar and Space Physics Highlights - NOAA

Space weather prediction center

- Cross-agency R2O2R
- Legislation in House and Senate





NESDIS

- Space Weather Follow-On mission (SWFO)
- NASEM space weather workshop

Solar and Space Physics Highlights - NASA

Parker Solar Probe

- **Science results** published (*Nature* – December 2019 and *ApJ* – February 2020).
  - Discovery of "switchbacks"
- **Flybys**
  - January 2020 – extensive ground/space-based support
  - July 2020 – Venus flyby (support from Keck – studying aurorae)

Solar Orbiter launched February 2020

- 1.5 year cruise phase
- All 10 instruments turned on successfully

Agile Responses to Short-Notice Rideshare Opportunities for the NASA Heliophysics Division

Short Report (released Feb 2020)

- **Conclusion: Short-notice rideshare opportunities are likely to arise more frequently** on a variety of host platforms and at a variety of orbits, **motivating a program dedicated to an agile response to these opportunities.**

- **Conclusion:** Science suited to an agile rideshare program can be categorized into **three groups**: **space weather and space climatology** enabled by **temporally continuous observations**; **systems and contextual science** enabled by **spatially distributed observations**; and **exploratory science** enabled by **novel observation**s (e.g., technology demonstrators and new vantage points).

- **Conclusion: Secondary payloads,** either ridealongs or free-flyers, that lend themselves to an agile rideshare program include **technology demonstrators** as well as **standard instrumentation** that may be stocked and stored for limited periods. Free-flyers with propulsive capability can also expand the scientific potential of rideshare opportunities. Investments in standardization and other technologies facilitating rapid integration and general accommodation adaptation can expand the scientific potential of rideshare opportunities.

Agile Responses to Short-Notice Rideshare Opportunities for the NASA Heliophysics Division

- **Conclusion:** NASA and the research community it serves would benefit from programmatic efficiencies resulting from **expedited contractual and review processes**; **standardization** of calibration, validation, verification, metrics, and ground infrastructure; and the development of a **centralized database** containing standardization and secondary payload availability and a document to characterize and scope the elements of the secondary payloads.

- **Conclusion:** Implementation approaches aimed at optimizing the effectiveness of a new Heliophysics Division (HPD) agile rideshare program may include strategic investments in **innovative infrastructure and management approaches** along with **risk tolerance** that extends beyond the accepted norms of traditional HPD programs.

Agile Responses to Short-Notice Rideshare Opportunities for the NASA Heliophysics Division

Need to respond quickly to new opportunities introduces an urgency that differs from NASA's usual systematic and strategic approach.

Landscape of known agile rideshare opportunities is rapidly changing. This provides motivation for NASA HPD to develop an ***adaptable*** program that can respond to:

- Evolving rideshare opportunities
- Secondary payload innovations

View or download the report

Decadal Planning

- **Progress Toward Implementation of the 2013 Decadal Survey for Solar and Space Physics: A Midterm Assessment (**delivered Feb 2020) View report
  - Recommendation 6.1: NASA and NSF should implement and fund advanced planning for the next decadal survey that involves the community strategically in the formulation of decadal goals and stretch goals (ambitious objectives that might extend past the next decade).
    - NASA and NSF could request the Space Studies Board's Committee on Solar and Space Physics (SSB-CSSP) to evaluate options for implementing this planning for the next decadal survey.

- **Heliophysics 2050 Workshop**
  - NASA HQ-enabled, community-led workshop will lay the groundwork for the next Decadal Survey
  - (Likely delayed from Summer 2020 to late 2020 or Spring 2021)

Decadal Planning

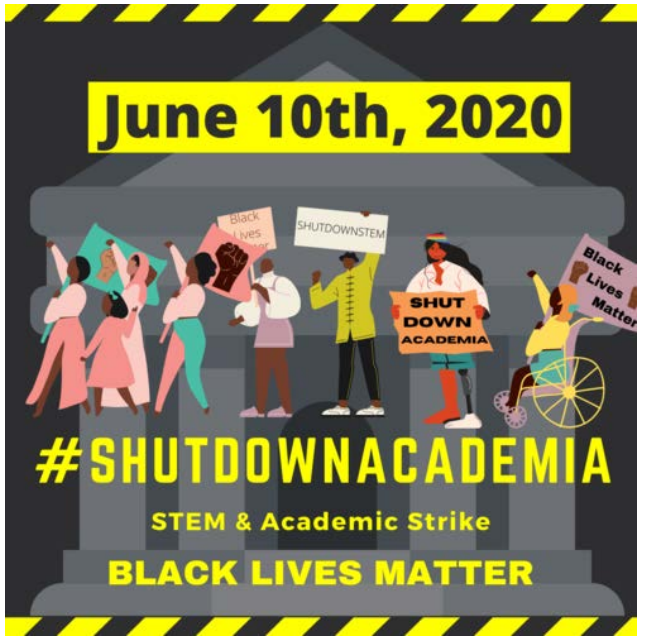
- **Progress Toward Implementation of the 2013 Decadal Survey for Solar and Space Physics: A Midterm Assessment**
  - Recommendation 6.2: NASA Heliophysics Division should conduct a demographics / diversity survey before the next heliophysics decadal survey to understand how the community's demographics have evolved and to assess whether progress has occurred in enhancing diversity in the community.
    - Thereafter, to benefit all of the space science disciplines within NASA's Science Mission Directorate (SMD) and to inform decadal survey planning across SMD, NASA at the SMD-level should conduct this demographics / diversity survey on a 5-year cadence with clear identification of science areas relevant for each science division.

- **SMD-wide survey?**
  - HPD-CSSP discussions underway regarding possible assistance with scoping of likely state-of-the-profession data input needs.

Upcoming CSSP Activities

- CSSP members have decided that the Fall 2020 meeting will be virtual
- October 19-21, TBC
- Members are facing the challenges of balancing the pressures of work (i.e., day jobs) during the pandemic and finding time for NAS/SSB/CSSP service responsibilities thereafter

Black Lives Matter



#ShutDownAcademia #ShutDownSTEM

Today, June 10, 2020 is the day that
STEM professionals and academics take action for Black lives,
act to eradicate anti-Black racism in academia and STEM.

– https://physicstoday.scitation.org/do/10.1063/PT.6.2.20200608a/full/

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https://www.npr.org/2020/05/29/865261916/a-decade-of-watching-black-people-die