Committee on Solar and Space Physics Update

Co-Chairs: Sarah Gibson and Maura Hagan*

Members: Brian Anderson, Steve Battel, Yue Deng, Stephen Fuselier, Todd Hoeksema, Mary Hudson, Robyn Millan, Tai Phan, Jiong Qiu, Josh Semeter, Howard Singer, Leonard Strachan, Barbara Thompson, Gary Zank

Staff: Abigail Sheffer, Sarah Brothers, and Anesia Wilks

*These slides are Hagan's personal assessment of issues discussed during recent CSSP meetings; should not be cited or quoted; these views do not reflect those of the CSSP, SSB, or NRC.

Topics

- NASA Heliophysics Division Leadership Changes
- Other Issues that Bear Watching
- Recent Space Weather Advances

Recent NASA Heliophysics Division Personnel Changes

Division Leadership:

- Heliophysics Division Director – Nicky Fox to start August 2018
- Acting Chief Scientist – Jim Spann* (on detail from MSFC)

Assignments:

- Mona Kessel – on detail to GSFC since Jan 2018

New Faces:

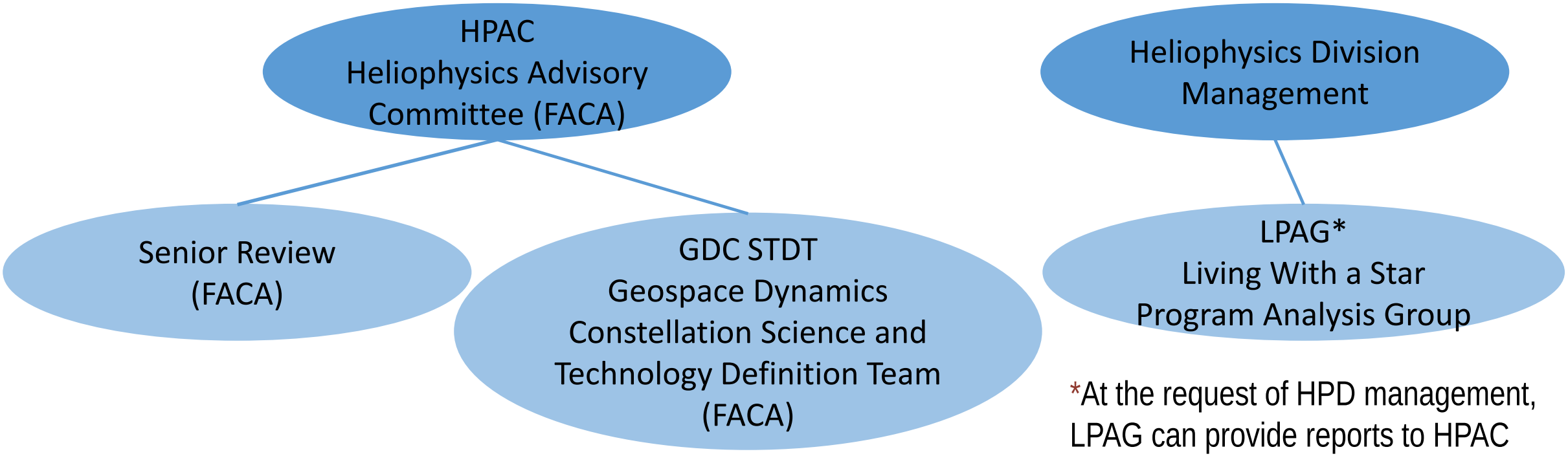
- Terry Onsager – on detail from NOAA/SWPC
- Roshanak Hakimzadeh – on detail from GRC
- Bill Atkinson – on detail from KSC

*Replaces Dr. Elsayed R. Talaat who is now the Director of the Office of Projects, Planning, and Analysis (OPPA) for NOAA's Satellite and Information Service.

Other Issues that Bear Watching

- Upcoming launches
  - Parker Solar Probe - July 2018
  - Ionospheric Connection Explorer - June 2018
  - Space Environment Testbed – June 2018
- Flagship mission delay
  - Geospace Dynamics Coupling constellation (LWS-7) mission formulation shifted from FY 2018 to FY 2019-20
- Daniel K. Inouye Solar Telescope
  - Construction 83% complete as of 31 January 2018
  - Readiness of first-light instruments in 2020
  - Optics, Instrument Integration and Commissioning through 2019
- New Heliophysics Division Advisory Structure

New NASA Heliophysics Division Advisory Structure



*At the request of HPD management, LPAG can provide reports to HPAC

FACA meeting requirements:

- Public meeting announcements 30 days in advance
- Requires members become Special Government Employees
  Ethics training and financial disclosure forms
  US Citizenship

New & Noteworthy Interagency Space Weather Collaborations

- NASA and NSF
  - Some DRIVE* Science Centers may implement Space Weather relevant efforts
  - Statement of work to support a benchmarking workshop & community report
- NASA-NSF-NOAA – New pilot O2R research activity
  - $1.5M with equal contributions from each organization
  - Research focus - improve forecasts of solar wind and coronal mass ejections
  - Proposals were due March 30

*Decadal Survey initiative to Diversify, Realize, Integrate, Venture, Educate

26 April 2018 Hearing before the U.S. House of Representatives Joint Subcommittees on Space and Environment of the Committee on Science, Space, and Technology: *Surveying the Space Weather Landscape*

- https://docs.house.gov/Committee/Calendar/ByEvent.aspx?EventID=108217
- Witnesses
  - Neil Jacobs (Assistant Secretary of Commerce for Environmental Observation and Prediction, NOAA)
  - Jim Spann (Acting Chief Scientist, Heliophysics Division, NASA)
  - ☞ Sarah Gibson (Sr. Scientist, National Center for Atmospheric Research; CSSP Co-Chair)
  - W. Kent Tobiska (President and Chief Scientist, Space Environment Technologies)
- House space weather bill (H.R.3086) introduced in June 2017 by Mr. Perlmutter (CO), Ms. Johnson (TX), and Mr. Bridenstine (OK)
- Sarah testified, “Legislation is needed now.”

Backup Slides
March 2018 CSSP Meeting Summary

CSSP March 2018 Space Science Week Meeting Highlights

- Agency Briefings
  - NASA Heliophysics Division – Peg Luce
  - NSF Geospace Section – Mike Wiltberger
  - NSF Astronomy Division – Dave Boboltz
  - NOAA Space Weather Prediction Center – Bill Lapenta
- Report from NASA Heliophysics Advisory Committee – Jill Dahlburg
  - Inaugural Meeting 29 November – 01 December 2017
- Mid-Term Review of Decadal Survey
  - Statement of Task Revision
  - Expect June 2018 start
- Virtual Tour of Parker Solar Probe Satellite – Nicky Fox

Highlights - NASA Heliophysics Division - FY19 Budget Request

- Future Mission Funding
  - Up to two SMEX missions and up to two MoOs from SMEX 16 AO
  - Addition of a Tech Demo MoO (2nd MoO), and an Evolved Expendable Launch Vehicles (EELV) Secondary Payload Adapter (ESPA) ring to IMAP (STP-5) mission
  - GDC (LWS-7) mission formulation shifted from FY 2018 to FY 2019-20
- R&A Augmentation:
  - Space Weather, CubeSats/SmallSats, Technology Investment, Early Career Investigator Program
  - Wallops Research Range for facility upgrades and maintenance
- Launch Readiness Date Changes for Missions in development
  - ICON was: October 2017 is: no earlier than June 14, 2018
  - SET was: January 2018 is: no earlier than June 2018
  - Solar Orbiter was: October 2018 is: February 2020

Highlights - NASA Heliophysics Division - Space Weather Augmentation

- Working with NSF
  - Co-funding Community Coordinated Modeling Center (CCMC) facility
  - Co-funding Living With a Star Strategic Capabilities
  - NASA-NSF opportunity with multiple NSF Divisions focused on Computational Aspects of Space Weather
- NASA-NOAA MOU - Collaboration between CCMC and NOAA/SWPC on space weather modeling capability
- NASA-NSF-NOAA - Pilot O2R research activity
  - $1.5M with equal contributions from each organization
  - NASA-NOAA funding available through ROSES 17
- Some DRIVE Science Centers may implement Space Weather relevant efforts

Highlights - NASA Heliophysics Division – ROSES 18

- ROSES18 HTIDeS restructured
  - Laboratory Nuclear, Atomic, and Plasma Physics (LNAPP) and Instrument and Technology Development (ITD) elements expanded selections via the Diversify, Realize, Integrate, Venture, Educate (DRIVE) initiative
  - Research and Technology (R&T) Flight Program; in-line with NPR7120.8
    - Split LCAS ➔ CubeSats and all sub-orbitals
    - R&T Prime (> $3.5M total cost) ➔ Mandatory formulation study with down-select
- New Elements included in ROSES18 release:
  - B.8 GOLD and ICON Guest Investigator (TBA)
  - B.9 H Grand Challenges Research - Science Centers (TBA)
  - B.10 H Early Career Investigator Program
  - B.12 H Space Weather Operations to Research

Highlights - NASA Heliophysics Division – Technology Development

- Created a dedicated SmallSat activity within H-TIDeS (Heliophysics Technology and Instrument Development for Science) for SmallSat investigations; separated from LCAS with approximately double the cost cap
- 18 Total HPD CubeSat investigations have been selected to date
  - One HPD CubeSat mission complete – MinXSS
  - Five HPD CubeSats scheduled for launch in 2018
- 2018 Sounding Rocket Launch Manifest
  - 22 NASA missions + four reimbursable missions
- Selections of new missions to begin in 2018
  - Five HPD CubeSat
  - 15 HPD Suborbital; (13 Sounding Rockets, 2 Balloons)

Highlights - NSF Geospace Section Update

- FY2019 President's Budget Request
  - NSF overall -0.4% (with respect to FY2017 enacted)
  - Atmospheric and Geospace Science Division ➔ -5.6%
  - "10 Big Ideas" $282M ➔ 5% research & related activity reductions across Directorates
- Facilities Update
  - 5-year award for operations of Arecibo Observatory to consortium led by University of Central Florida with Universidad Metropolitana and Yang Enterprises, Inc.
  - $14.3M in disaster relief funding for Arecibo Observatory repairs
  - Support for Sondrestrom Incoherent Scatter Radar Operations ended on March 31
- Support for SWORM (Space Weather Operations, Research, & Mitigation)
  - Statement of work to support a Benchmarking workshop & community report (w/ NASA)
  - RFI to gather community input on research priorities for space weather closed on April 6
  - Tri-agency O2R pilot program (with NASA & NOAA)

Highlights - NSF Astronomy Division Update

- FY2018 NSF Appropriations
  - NSF overall up 4%; MREFC fully funded, including construction of the Daniel K. Inouye Solar Telescope (DKIST) and Large Synoptic Survey Telescope (LSST)
- DKIST
  - Construction 83% complete; $324.5M NSF funding to date
  - Remote Office Building in Pukulani scheduled for completion in April 2018
  - National Solar Observatory sponsored 6 Critical Science Plan Workshops (11/17-5/18)
- NSO Divestitures – 2012 Portfolio Review Recommendations
  - Sacramento Peak: New Mexico State University to lead consortium and operate the Dunn Solar Telescope and Visitor Center (NSF bridge and State of New Mexico funding)
  - Kitt Peak: McMath-Pierce in flux – no viable proposals; back-up plan may involve NOAO Visitor Center; vacuum tower deconstruction under investigation
- GONG upgrade ongoing; engineering site relocated to Boulder, CO

Highlights – NOAA Space Weather Prediction Center Update - 1

First Operational Coronagraph

- FY17&18 funds towards NRL Compact CORonagraph (CCOR) development
- CCOR In Phase B
- NRL Preliminary Design Review 9/28/18
- Possible deployment on GOES U 2024

Space Weather Forward Observatory (SWFO)

- Partnership under consideration with NASA to fly separate solar wind monitor with IMAP launch 2024
- NESDIS Office of Planning, Projects and Analysis (OPPA, led by Elsayed Talaat) developing path forward

Highlights – NOAA Space Weather Prediction Center Update - 2

Space Weather Models

- Major upgrades to WSA-Enlil Heliospheric Model in 2018 (USAF partnership)
- Current Geospace Model focus on regional validation of storm predictions
- Validating total electron content coupled whole atmosphere model and ionospheric plasma electrodynamics (WAM-IPE) model predictions with GloTEC data driven assimilative model
- Experimental Geoelectric Field Model computed from ground-based magnetometer data and ground-conductivity maps

Coordinated Interagency Space Weather Research Funding

- Joint NASA/NOAA pilot funding opportunity (National Space Weather Action Plan)
- Research focus - improve forecasts of solar wind and coronal mass ejections
- Proposals were due March 30

Potential Topics for Next CSSP Short Report

- Missions studies in advance of the next Decadal Survey
  - Actions taken since previous DS ➔ What has been done? What can be done?
  - Candidate areas for future studies
  - Constellation missions ➔ cost of scale-up
  - Smaller class mission accomplishments
- Space Weather, including O2R
  - Pressing need
  - O2R metrics
  - Draw from expertise in other disciplines
  - Validation
  - Benchmark - what is accomplished ➔ next steps