Heliophysics Division Overview

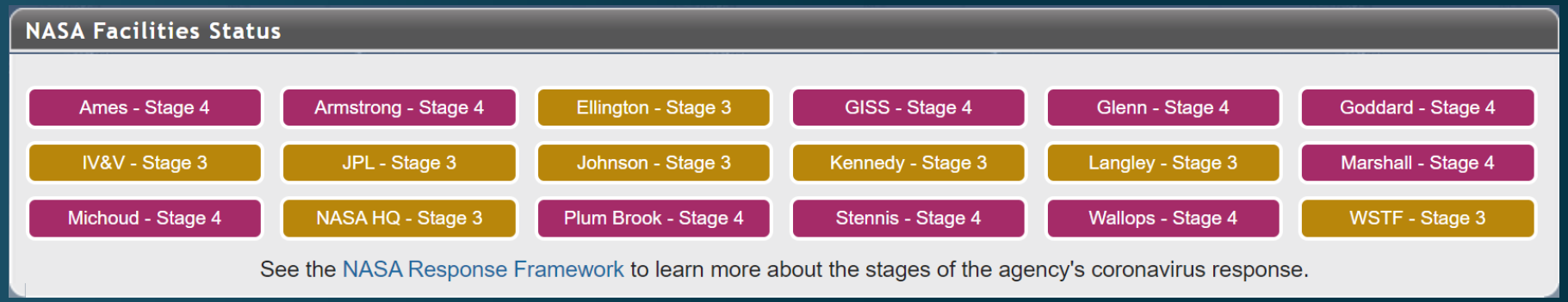
Committee on Solar and Space Physics

Dr. Nicky Fox, Director, Heliophysics

March 31, 2020

Coronavirus (COVID-19) Response – Agency

- Agency leadership continues to monitor developments regarding coronavirus (COVID-19) around the nation, closely following the advice of health professionals and the White House Coronavirus Task Force to **keep our workforce safe**
- Effective March 17, all centers and facilities elevated to Stage 3 of NASA's Response Framework. All employees and contractors moved to mandatory telework until further notice. Mission-essential personnel will continue to be granted access onsite
- Some Centers have been elevated to Stage 4 of NASA's Response Framework:



- SLS and Orion manufacturing and testing activities at Michoud Assembly Facility and Stennis Space Center are temporarily on hold
- Ames Research Center is keeping the agency's supercomputing resources online
- Work associated with supporting International Space Station operations continues at Johnson Space Center

Coronavirus (COVID-19) Response – Science Mission Directorate (SMD)

- There will be impacts, and we don't yet know the extent. We're working with each mission and project in detail based on where they are in development process
- **Priority is everyone's safety and protecting hardware and integrity of data for operating missions**
- Conducted status assessment of all 47 flight projects in the SMD Portfolio
- Most missions are in development phases early enough (phases A-B-early C) that bulk of the work can be done virtually
- Missions in integration and testing (I&T) will continue to the extent possible with small teams
- Will work with our domestic and international partners to refine the prioritization of our projects, especially those in I&T
- Have consulted with the NASA Chief Medical Officer and have protocols for working in clean rooms
- **Anticipate impact to solicitations and evaluations**

Coronavirus (COVID-19) Response – Science Mission Directorate (SMD)

Missions

- **Mars 2020**, which includes the Perseverance Rover and Mars Helicopter, remains a high priority for the agency, and **launch and other mission preparations will continue**

- James Webb Space Telescope is suspending integration and testing operations; the observatory remains safe in its cleanroom environment

Coronavirus (COVID-19) Response – ROSES 2020

- We know that progress on funded research may slow, and in some cases, even stop due to necessary telework and lack of access to facilities and labs, and other family obligations
- SMD understands this potential outcome and will work with the research community and its institutions to mitigate any impacts and to make plans, when possible, for a way forward
- NASA has instituted a number of grant administration flexibilities to ease the burden on grant recipients during the COVID-19 emergency
- Considering converting all Step-1 proposals due within the next 30 days into mandatory NOIs to alleviate pressure on Sponsored Projects Offices
- SMD's policy on late proposals will be applied leniently on a case-by-case basis
- Expect that research progress may slow or stop; SMD is prepared to rephase or no-cost extend awards as needed on a case-by-case basis
- Encouraging all to continue to pay graduate students, post-docs, and lab staff
- **Watch the NSPIRES email lists for up-to-the-minute changes in due dates or policies**

Coronavirus (COVID-19) Response – R&A FAQs

- OMB has issued guidance in Memo M-20-17 (available at https://www.whitehouse.gov/wp-content/uploads/2020/03/M-20-17.pdf)
- Allows for paying soft-money researchers as well as graduate students, post-docs, and other lab staff during the COVID-19 epidemic, if the institution's own policies allow for it
- Allows for institutions to charge restart costs to their grants
  - SMD will make use of this modification allow other costs associated with resuming funded grant activities to be charged to currently active grants
  - SMD has not yet determined in detail its policy regarding augmentations to awards negatively impacted by the COVID-19 epidemic; it is likely that any policy on augmentations will not be issued until the full extent of the impacts of the epidemic are more clearly understood

Coronavirus (COVID-19) Response – R&A FAQs (cont'd)

- OMB has issued guidance in Memo M-20-17 (available at https://www.whitehouse.gov/wp-content/uploads/2020/03/M-20-17.pdf)
- Provides agencies flexibility with regard to the submission of proposals.
  - SMD's policy on late proposals will be applied leniently on a case-by-case basis
  - Proposals started before the due date, but not submitted until after the due date due to the impacts of the COVID-19 epidemic, will be strongly considered for acceptance if they are submitted within seven calendar days of the due date
  - Proposals not yet started in NSPIRES by the time of the due date and submitted after the due date will only be accepted after an analysis of the particular reasons for the late start/late submission by the program element point of contact and with the agreement of the selecting official.

Coronavirus (COVID-19) Response – Stay Updated

- This is a new and unprecedented situation
- We recognize everyone's personal and professional challenges at this time
- As the situation evolves, we will continue to communicate with all of you, whether through Town Halls, NSPIRES notices, or other modes
- In the meantime, please continue to follow agency updates:
  - Web: **nasa.gov** and **nasapeople.nasa.gov/coronavirus**
  - Twitter: @**NASA** and @**JimBridenstine**

Major Recent Accomplishments FY19-20

- Space Environment Testbeds (SET) launched in June 2019 with a U.S. Air Force Research Lab spacecraft
- Selected PUNCH and TRACERS (SMEX) and AWE (Explorers Mission of Opportunity)
- Ionospheric Connection Explorer (ICON) launched in October 2019
- GDC STDT Report delivered to HPAC in October 2019
- The Grand Challenge Initiative Sounding Rocket program continued. Three additional missions launched (AZURE, ICI-5, CHI)
- Two successful balloon campaigns: BITSE (August 2019) and BARREL (December 2019)
- Selected Phase 1 Heliophysics DRIVE Science Centers
- First scientific results describing Parker Solar Probe's unprecedented near-Sun observations through two record-breaking close flybys were published in *Nature* in December 2019, quickly followed by over 40 papers in ApJ in February 2020
- The Solar Orbiter spacecraft launched in February 2020
- NASEM delivered Heliophysics Decadal Midterm Assessment in February 2020

Planned Accomplishments FY20-21

- Parker Solar Probe will make successive passes through the inner heliosphere and complete a third Venus Gravity Assist which will take the spacecraft to within 8.36 million miles of the Sun's surface and reach a new speed record of 290,000 mph
- Step-2 Selections for 2018 Explorers Mission of Opportunity
- Step-2 Selections for 2018 STP Science and Tech Demo Missions of Opportunity for launch with IMAP
- Complete Grand Challenge Sounding Rocket program
- Implement inter-disciplinary research program, "Heliophysics System Observatory Connect," to integrate the full breadth of the Heliophysics fleet and model coordinating observations in a novel way
- Initiate 9 Phase 1 studies for DRIVE Science Centers
- Initiate planning activities for the next Heliophysics Decadal Survey
- 3 CubeSats expected to launch in FY20 (CuSP, CURIE, LLITED)
- Solicitation for 2nd ECIP call
- Conduct 2020 Senior Review

Heliophysics Highlights

Solar Orbiter

Launched: Feb 9 on Atlas V rocket from KSC.

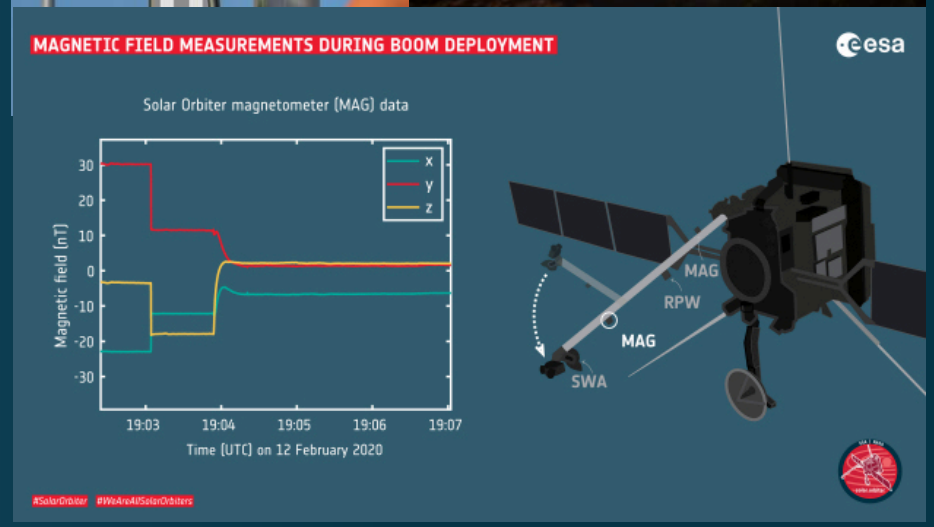
Solar Orbiter, an ESA-led mission with strong NASA participation, will provide the first views of the Sun's uncharted polar regions, giving unprecedented insight into how our parent star works.

It will also investigate how intense radiation and energetic particles being blasted out from the Sun and carried by the solar wind through the Solar System impact our home planet, to better understand and predict periods of stormy 'space weather.'

Solar Orbiter

Spacecraft Status

- As of Mar. 1, Solar Orbiter was 9.3 million km from the Earth (0.06 AU), 146 million km from the Sun (0.98 AU). The one-way signal travel time was 31 seconds
- The spacecraft platform commissioning is complete with some small activities carried over to the few next weeks
- The in-situ instruments will collect scientific data about the environment around the spacecraft. Only the four “in situ” will remain taking data during the ~1.5-year cruise phase
- The remote-sensing telescopes will focus on calibration to prepare for science operations near the Sun
- Nine of ten instruments have been turned on successfully
- The Solar Orbiter Heliospheric Imager (SoloHI) was successfully checked out. The door opening is tentatively planned for late May 2020
- Solar Wind Analyzer (SWA) commissioning has been postponed until personnel can return to the European Space Operations Center (ESOC)



Solar Orbiter in-orbit commissioning has been put on hold as of Mar. 22 related to COVID-19

Parker Solar Probe

SCIENCE HIGHLIGHT

Parker Solar Probe observed switchbacks — traveling disturbances in the solar wind that caused the magnetic field to bend back on itself — an as-yet unexplained phenomenon that might help scientists uncover more information about how the solar wind is accelerated from the Sun.
Credits: *GSFC Conceptual Image Lab*

New discoveries first published on Dec. 4, 2019, in the journal *Nature*

Solar Encounters #1-4 Complete:
Venus Flyby #2: Dec 26, 2019

Perihelion #4:
Jan 29, 2020

Records:
11.6 million miles to the sun

244,225 miles per hour

Parker Solar Probe

Support for Parker Solar Probe Encounter #4

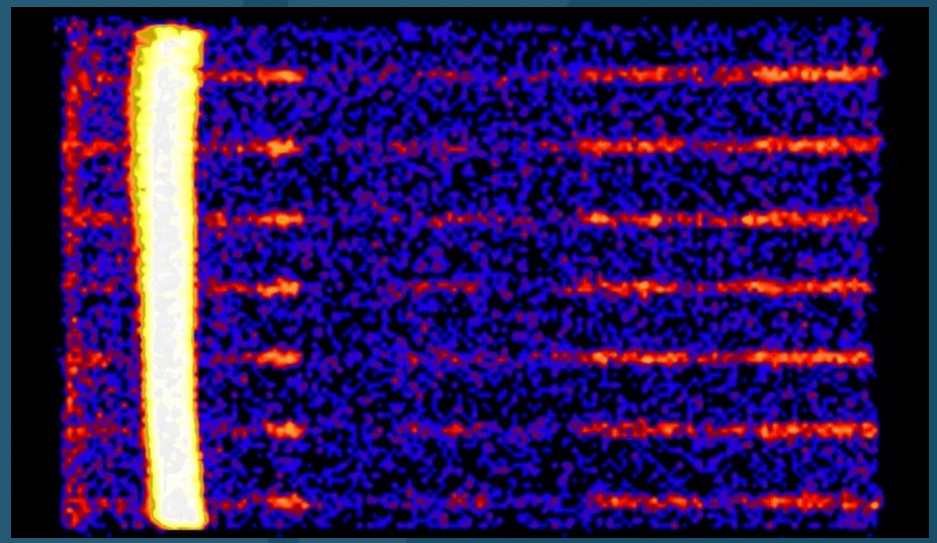
- Official Whole Heliosphere & Planetary Interactions (WHPI) campaign was Jan. 15 – Feb. 11, 2020
- Encounter #4 had extensive support for the WHPI campaign
  - At least 22 ground-based optical observatories
  - At least 13 ground-based radio observatories
  - At least 9 space-based missions
  - At least 6 ground-based Geospace observatories

Looking forward – Venus Flyby #3, July 2020

- Parker will observe FIELDS, SWEAP plasma and ISoIS particle environment of Venus and WISPR is looking into Venus cloud remote sensing option.
- Simultaneously, 10m Keck II telescope offered to take pre-dawn high-resolution night-side Venus spectra in visible and near-UV.
- **Goal:** Confirm Venus aurora observations, investigate possible causal relation with presence of suprathermal/energetic solar wind protons.

Ionospheric Connection Explorer (ICON)

SCIENCE HIGHLIGHT

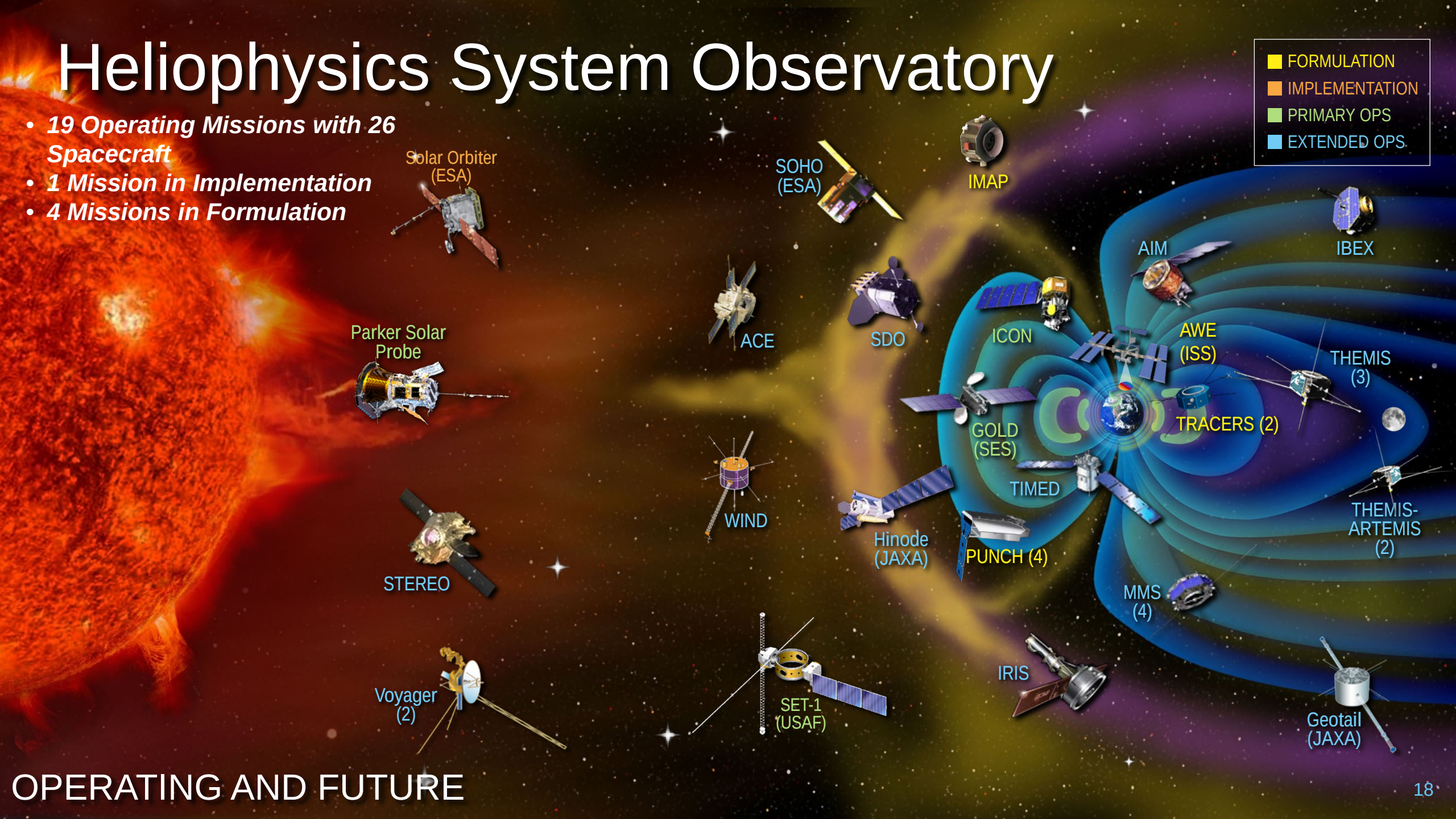


The Extreme Ultraviolet Instrument on ICON depends upon accurately measuring the light from glowing oxygen in order to track the height and density of the daytime ionosphere. The ICON team calibrated the Extreme Ultraviolet instrument on a known source: the Moon. The bright line on the left is EUV emissions from ionized helium in the solar wind, which fills the solar system. The horizontal stripes are the result of EUV scanning over the Moon, which reflects solar radiation.
Credits: *NASA/ICON/Martin Sirk/Joy Ng*

Mission Status

Heliophysics System Observatory

- ***19 Operating Missions with 26 Spacecraft***
- ***1 Mission in Implementation***
- ***4 Missions in Formulation***



OPERATING AND FUTURE

HPD at a Glance: Operating Missions

Mission	Launch Date	Phase	Extension	M-3	M-2	M-1	Cur. M.	Remarks
Voyager 1 + 2	8/20/1977	Extended	9/30/2021	G	G	G	G	As of Mar. 2, Voyager 2 is in a stable state and will travel through space without receiving commands from Earth for 11 months due to DSN upgrades.
Geotail	7/24/1992	Extended	9/30/2021	G	G	G	G	
Wind	11/1/1994	Extended	9/30/2021	G	G	G	G	
SOHO	12/2/1995	Extended	9/30/2024	G	G	G	G	
ACE	8/27/1997	Extended	9/30/2021	G	G	G	G	
TIMED	12/7/2001	Extended	9/30/2021	G	G	G	G	
Hinode	9/23/2006	Extended	9/30/2021	G	G	G	G	
STEREO	10/25/2006	Extended	9/30/2021	G	G	G	G	
THEMIS+Artemis	2/17/2007	Extended	9/30/2021	G	G	G	G	
AIM	4/25/2007	Extended	9/30/2021	G	G	G	G	
IBEX	10/19/2008	Extended	9/30/2021	G	G	G	G	
SDO	2/11/2010	Extended	9/30/2021	G	G	G	G	
IRIS	6/27/2013	Extended	9/30/2021	G	G	G	G	
MMS	3/12/2015	Extended	9/30/2021	G	G	G	G	
GOLD	1/25/2018	Prime	10/17/2020	G	G	G	G	
Parker	8/12/2018	Prime	9/30/2025	G	G	G	G	On Oct. 7, 2019, the EPI- Hi instrument of the ISoIS suite did not turn on as expected after a Ka-Band pass. ISoIS team identified and corrected root cause. EPI-Hi successfully powered on Feb. 12, 2020, after solar encounter 4. Root cause: memory corruption during power-off process.
SET-1	6/25/2019	Prime	7/1/2020	G	G	G	G	
ICON	10/10/2019	Prime	10/10/2021	G	G	G	G	

G Mission proceeding to meet science requirements

Y Area of concern - possible reduction in capability

R Significant problem – possible or probable loss of mission

B Mission Decommissioned

Voyager

Status

- As of Mar. 2, 2020, Voyager 2 is in a stable state and will travel through space without receiving commands from Earth for 11 months.
- During that time, upgrades will be made to the Deep Space Network's 70-meter-wide (230-feet-wide) radio antenna in Canberra, Australia. The Voyager team will still be able to receive science data from Voyager 2 while these upgrades are being made. The work on the Canberra DSN station is expected to be completed by January 2021 but there may be potential COVID-19 impacts.

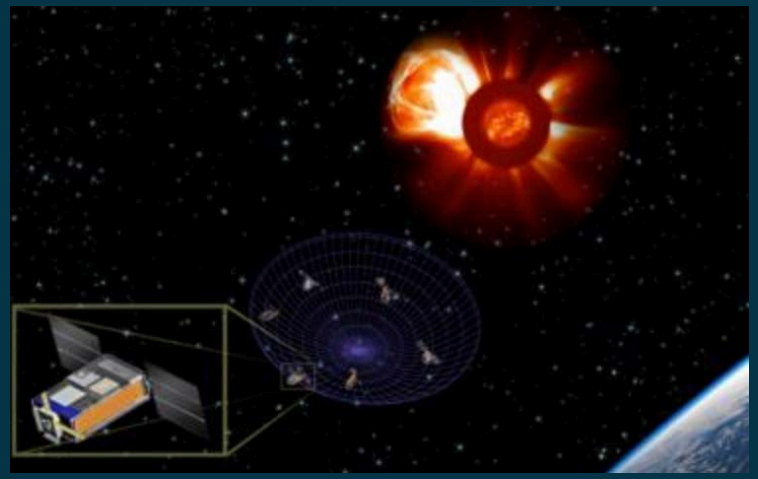
January Anomaly

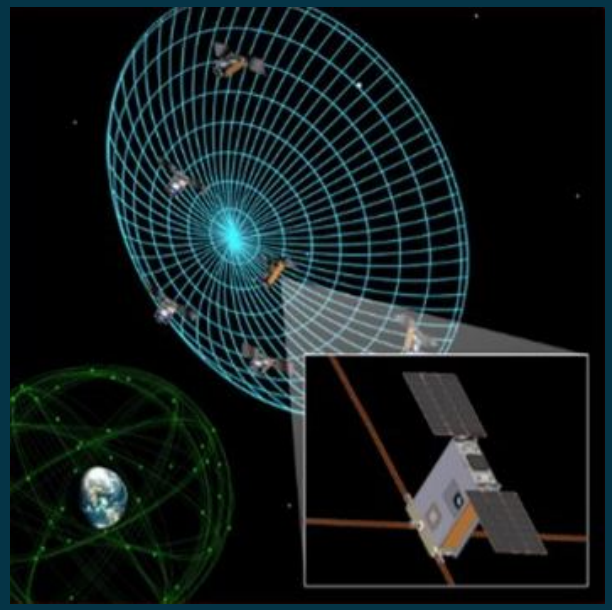
- Voyager 2 experienced an anomaly on January 25 during the execution of a Magnetometer roll observation. Due to a timing shift between CCS processors, both the gyros and the Bay 1 heater were on at the same time. The spacecraft entered a fault protection routine caused by the lack of available power.
- As of February 10, both spacecraft and instruments have been returned to normal operating conditions.
- The project has performed a review of the Voyager 2 status and determined that the spacecraft is ready for the DSS43 downtime.

Missions in Formulation

Heliophysics Selects Sun Radio Interferometer Space Experiment (SunRISE)

- SunRISE will study how the Sun generates and releases giant space weather storms, known as solar particle storms, into planetary space. Not only will such information improve our understanding of how our solar system works, but it ultimately can help protect astronauts traveling to the Moon and Mars by better understanding how the Sun's radiation affects the space environment they must travel through.
- Array of six CubeSats operating as one very large radio telescope.
- Chosen in Aug. 2017 as one of six Mission of Opportunity proposals to conduct an 11-month mission concept study. In Feb. 2019, NASA approved a continued formulation study of the mission for an additional year.
- **Launch:** no earlier than July 1, 2023.
- **Principal Investigator:** Justin Kasper at the University of Michigan in Ann Arbor

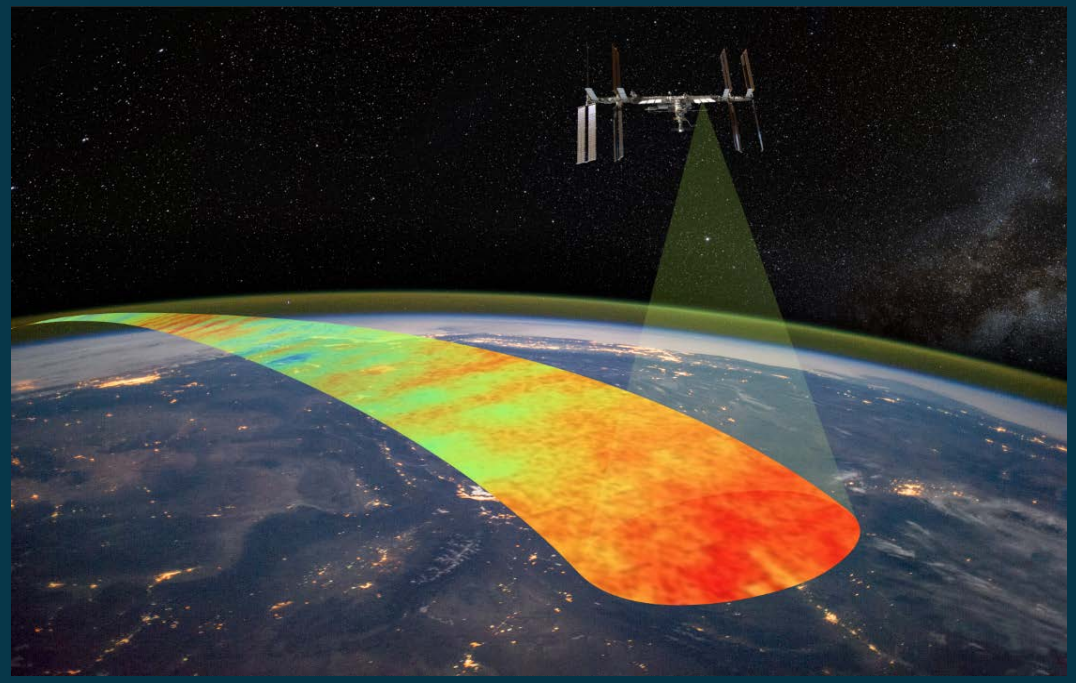




Atmospheric Waves Experiment (AWE)

2016 MO Selection

- **Milestones**
  - SRR/MDR, Feb. 5-6, 2020
  - Science Team Meeting, Mar. 10-12, 2020
  - PDR/CDR, September 2020
  - Launch Readiness Date no earlier than Aug. 2022
- **Principal Investigator:** Mike Taylor at Utah State University



Heliophysics Explorers Selections (cont.)

2016 SMEX Selections, LRD NET Feb 2023

Polarimeter to Unify the Corona and Heliosphere (PUNCH)

- **Milestones**
  - SRR, Apr. 6, 2020
  - PDR, Fall 2020
  - KDP-C, Fall 2020
- **Principal Investigator:** Craig DeForest at Southwest Research Institute

Tandem Reconnection and Cusp Electrodynamics Reconnaissance Satellites (TRACERS)

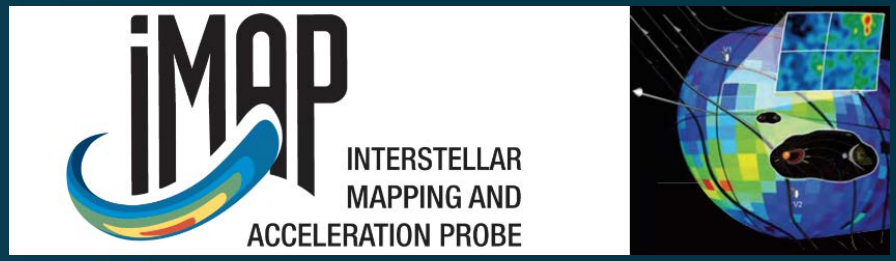
- **Milestones**
  - Rideshare mission initiated, Oct. 23, 2019
  - Final review of 9-month concept study reports, Spring 2020
- **Principal Investigator:** Craig Kletzing at University of Iowa

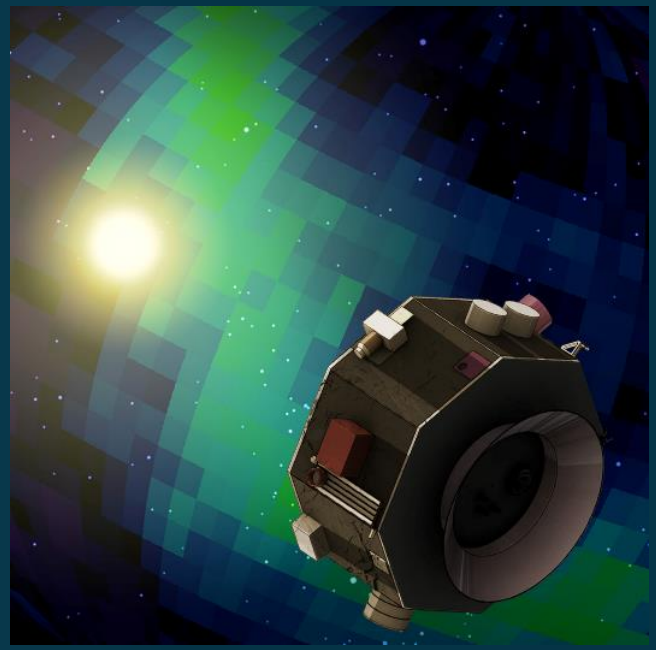
TRACERS

"We carefully selected these two missions not only because of the high-class science they can do in their own right, but because they will work well together with the other heliophysics spacecraft advancing NASA's mission to protect astronauts, space technology and life down here on Earth" – Thomas Zurbuchen

Interstellar Mapping and Acceleration Probe (IMAP)

- IMAP successfully completed its Key Decision Point B review on Jan. 28, 2020 which now allows the IMAP team to move forward with preliminary design work on the mission, spacecraft, and instruments.
- **Milestones**
  - Preliminary Design Review, Feb. 2021
  - Confirmation Review, Mar. 2021
  - Launch Readiness Date, Fall 2024
- IMAP will simultaneously investigate the acceleration of energetic particles and interaction of the solar wind with the interstellar medium.
  - **PI:** David McComas of Princeton University

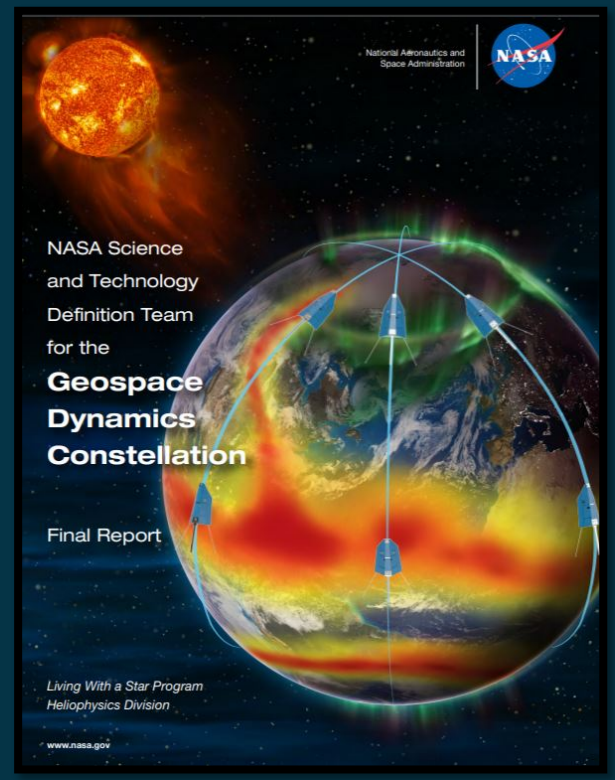




Geospace Dynamics Constellation

- Recommended by 2013 Solar and Space Physics Decadal Survey, next mission for Living With a Star (LWS) program.
- GDC is a science mission to dramatically improve our understanding of the upper atmosphere and its strong variability in response to energy inputs from the Sun, from near-Earth space, and from the lower atmosphere.

  Will inform space weather studies (e.g. radiation effects, navigation/communication disturbances) and Agency exploration goals (e.g. sustained human presence at Mars)
- STDT convened in 2018. Report delivered to HPAC in October 2019.
- The Pre-Project Office is planning for a Mission Concept Review (July 2020). In preparation, the office will help facilitate:
  - Science team build out of the necessary content from STDT report, including refined science requirements
  - Support HPD inter-agency/international collaboration discussions
  - Market survey of s/c and associated engineering services provider(s), make/buy process



Space Weather

Gateway: HERMES

NASA selects first two scientific investigations to fly on Gateway in support of Artemis

- The NASA space weather instrument suite, led by HPD, will observe solar particles and the solar wind. The second scientific investigation is a radiation instrument package, built by the European Space Agency.
  - **HERMES** (NASA - Heliophysics Environmental and Radiation Measurement Experiment Suite)
- **Program Office:** Living With a Start (LWS) Program, Explorers and Heliophysics Projects Division (EHPD), Goddard Space Flight Center (GSFC)
- This payload will enable meaningful science, support Artemis, and be forward looking to crewed missions to Mars.

Space Weather Instrument RFI

- HPD will be releasing a Request for Information in the coming weeks to seek community inputs on space weather instruments and spacecraft to populate a pipeline for future opportunities.

Gateway: HERMES (cont.)

Coordinated System of Observations

- **Solar Energetic Particles (SEP) –** Improved understanding of the arrival location of the particles and the acceleration mechanism as the shocks pass by the lunar environment.
- **Solar Wind Structures –** Resolve 3D solar wind structures that will enable the ability to explore Galactic Cosmic Ray (GCR) variability across a compelling and interesting range of spatial and temporal scales needed to unravel these structures.
- **Magnetotail Dynamics –** Provide a synoptic view of the global energy input in the magnetosphere during storms and substorms, and how magnetic reconnection operates from a pristine location, unaffected by Earth's strong dipole.

Primary Payload

- **Miniaturized Electron pRoton Telescope (MERIT),** GSFC, Dr. Shrikanth Kanekal, Principal Investigator (PI)
- **Electron Electrostatic Analyzer (EEA),** GSFC, Dr. Daniel Gershman, PI
- **Solar Probe ANalyzers (SPAN)-A-ions,** University of California-Berkeley, Dr. Roberto Livi, PI
- **Fluxgate and Magneto-Inductive Magnetometers (MAG),** GSFC and University of Michigan-Ann Arbor, Dr. Eftyhia Zesta, PI, and Dr. Mark Moldwin, CO-I
- **Instrument Control Electronics (ICE),** GSFC Project Office
- **Integration Plate,** GSFC Project Office

Space Weather Science Application

- **NASA/NOAA Space Weather R2O2R Framework**
  - NASA and NOAA developed a framework required to leverage talents and resources to accelerate research-to-operations and enhance operations-to-research; briefed to OMB and will expand to other Federal agencies.
- **Space Weather Analysis Group (SWAG)**
  - The SWAG will serve as a community-based, interdisciplinary forum for soliciting and coordinating community analysis and input in support of Heliophysics Space Weather Science Application (SWxSA) objectives.
- HPD is participating in the planning for the NOAA sponsored **NASEM Space Weather Future Infrastructure Workshop** currently scheduled for June 16-18, 2020

Rideshare

Rideshare

- CSSP Short report on rideshare delivered to HPD, Feb. 2020
  - Briefed to Science Committee, NASA Advisory Council
- Agile Access 2 Space Workshop, Feb. 2020
  - Splinter groups focused on:
    - Science that Drives the Pipeline Based on Destination
    - Instrument Types and Configurations that Drive the Pipeline Based on Science
    - Launch Vehicle Barriers and Issues that Hinder the Pipeline
    - Small Spacecraft Technology Challenges that Hinder the Pipeline
    - Programmatic Challenges that Hinder the Pipeline
- All Rideshare opportunities on IMAP ESPA Grande identified
- Supporting accommodation of rideshare payloads selected under the SIMPLEX call

Rideshare Office

- SMD is creating a full-time Rideshare office housed within the Heliophysics Division that will be staffed with a permanent lead and support team.
- Teams are advised to consult with this office for questions on deliverables and deadlines, policies and processes.

Suborbital

Suborbital & CubeSats Highlights

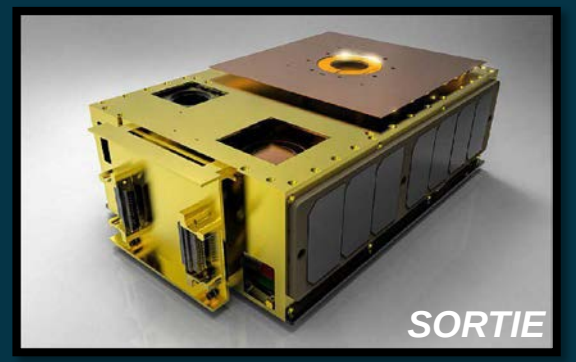
Providing Low Cost Access to Cutting Edge Research

Sounding Rocket Updates

- **Cusp Heating Investigation (CHI)** launched from Svalbard, Norway on Dec. 10, 2019.
  - Measured neutral upwelling and high-resolution electric fields over an extended region in the Cusp.
- **PolarNOx** launched from Poker Flat Research Range, Alaska on Jan. 27, 2020.
  - Designed to measure the intensity of nitric oxide in the mesosphere and lower thermosphere in the polar region by observing starlight with a high spectral resolution UV spectrograph operating near 215 nm.

CubeSat Updates

- **Scintillation Observations and Response of the Ionosphere to Electrodynamics (SORTIE)**
  - Designed to discover the sources of wave-like plasma perturbations in the F-region ionosphere, and determine the relative role of dynamo action versus direct mechanical forcing in the formation of wave-like plasma perturbations.
  - The spacecraft was released from the International Space Station (ISS) on Feb. 19, 2020.

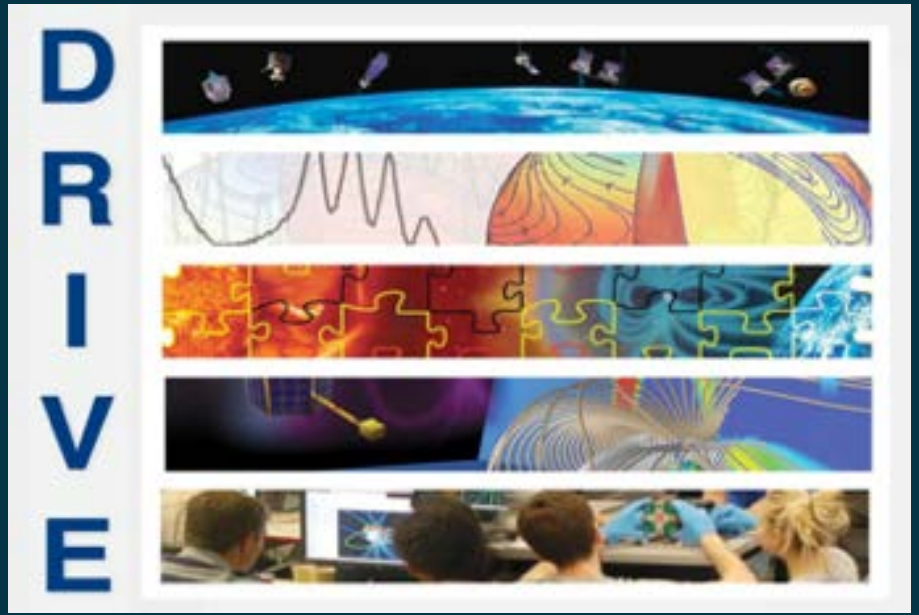


Research

DRIVE initiative is now part of the Heliophysics R&A baseline

DRIVE Elements include:

- HTIDs:
  - Instrument Technology Development (ITD) and LNAP
- HFORT:
  - Low Cost Access to Space (LCAS): Sub-orbital and CubeSats
- Guest Investigator
  - Open and mission focused
- Supporting Research
- Heliophysics Science Centers
- Theory, Modeling and Simulation
- Early Career Investigator Program & FINESST
- Living With a Star (LWS) Science
- Space Weather O2R
- Data Environment Emphasis

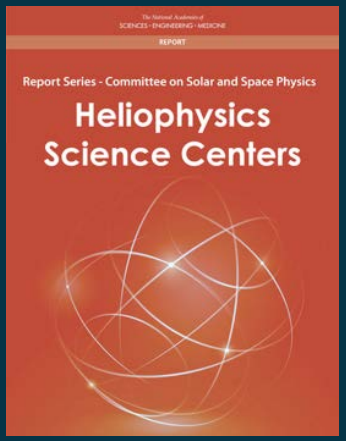


ROSES-18

	ROSES Element				Proposal Due Date	Notify Date	Days Since Received	# Proposals received	# Proposals selected	% selected	# New PI	% New PI
2018	HGIO		Guest Investigators Open		6/15/2018	10/25/2018	132	142	37	26%	33	89%
	HTIDS	ITD & LNAPP	Technology and Instrument Development for Science	Instrument Technology Development & Laboratory Nuclear, Atomic, and Plasma Physics	7/20/2018	12/20/2018	153	74	13	38%	6	46%
		LCAS		Low Cost Access to Space	7/20/2018	2/11/2019	206		9		3	33%
		R&T Prime		Research and Technology Prime (>$3.5M)	4/30/2019	8/27/2019	119		3		3	100%
	HDEE		Data Environment Enhancements		7/20/2018	12/20/2018	153	4	4	100%	4	100%
	SWO2R		Space Weather Operations to Research		8/3/2018	10/23/2018	81	19	9	47%	9	100%
	HSR		Supporting Research		9/7/2018	4/1/2019	206	168	33	20%		0%
	ECIP		Early Career Investigator Program		9/21/2018	4/1/2019	192	51	12	24%	12	100%
	LWS Science		Living With a Star Science		5/9/2019	10/18/2019	162	104	28	27%	19	68%
	SWO2R-2		Second Space Weather Operations to Research		5/16/2019	10/22/2019	159	12	7	58%	7	100%
	DRIVE Centers		Phase I DRIVE Centers		6/20/2019	12/20/2019	183	39	9	23%	0	0%

Heliophysics DRIVE Science Center Selections – Phase 1

Panel	PI/Institution	Title
SH	James Drake/UMD	Solar Flare Energy Release
MAG	Tamas Gombosi/U Mich	Solar Storms and Terrestrial Impacts Center (SOLSTICE)
MAG	Viacheslav Merkin/JHU	Center for Geospace Storms (CGS)
ITM	Cora Randall/UC Boulder	Wave-induced Atmospheric Variability Enterprise (WAVE)
FP	David Brain/UC Boulder	Do Habitable Worlds Require Magnetic Fields?
SH	Todd Hoeksema/SU	Consequences of Flows and Fields in the Interior and Exterior of the Sun (COFFIES)
FP	Merav Opher/BU	Our Heliospheric Shield
ITM	Daniel Welling/UTA	The Center for the Unified Study of Interhemispheric Asymmetries (CUSIA)
FP	Marco Velli/UCLA	HERMES: HEliospheRic Magnetic Energy Storage and conversion



DRIVE (Diversity, Realize, Integrate, Venture, Educate)

ROSES-19

	ROSES Element		Proposal Due Date	Notify Date	Days Since Received	# Proposals received	# Proposals selected	% selected	# New PI	% New PI
2019	HDEE	Data Environment Emphasis	6/20/2019	10/21/2019	123	15	11	73%	11	100%
	HGIO	Guest Investigators Open	7/17/2019	1/17/2020	184	128	30	23%	24	80%
	HSODS	Heliophysics System Observatory Data Support	8/15/2019	9/30/2019	46	6	4	67%	4	100%
	HTIDS	Technology and Instrument Development for Science	8/28/2019	*		31				
	HSR	Supporting Research	10/18/2019	*		122				
	HFORT	Flight Opportunities for Research and Technology	11/8/2019	*		42				
	TMS	Theory, Modeling, Simulation	12/3/2019	*		54				
	OHGI	Outer Heliosphere Guest Investigator	12/10/2019	3/5/2020	86	16	5	31%	3	60%
	SWO2R	Space Weather Applications Operations 2 Research	2/13/2020	+		48				
	LWS Science	Living With a Star Science	2/27/2020	+		65				
	HSO Connect	Heliophysics System Observatory Connect	3/13/2020	+		14				

Status

+ Panel(s) to be scheduled

^ Panels scheduled

* Selection pending

ROSES-20 B.1 Released on Feb. 14, 2020

ROSES Updates

Volunteer for a Proposal Review Panel!
https://science.nasa.gov/researchers/volunteer-review-panels

High Risk/High Impact

- PIs are being asked to self-certify whether or not their 2020 proposals are high risk/high impact.

Dual Anonymous

- First test of dual anonymous will be in HGIO 2020. Proposals must be anonymized (guidelines on NSPIRES with this solicitation) and reviewers will not know the identity of the team during the merit evaluation. There will be a reveal at the end for proposals at the top end and reviewers can comment on team qualifications (not expected to change outcome).

Mock Panel

- Heliophysics conducted a mock ROSES Panel to train new Program Scientists and share best practices for ROSES Panel facilitation.
- The panel reviewed 3 proposals for the NRA “Best Breakfast for Children Ages 8-12 Years Old: Egg, Cereal, or Pancakes.” HPD PSs performed the role of reviewers and rotated performing Panel Official and Panel Chair each round.
- The Mock Panel allowed for the opportunity for PSs to share their strategies in facilitating panels as well as solving problems. It also highlighted key HPD-specific policies such as summary evaluation language and information to provide reviewers on their role.

Citizen Science

Heliophysics as a field has demonstrated extremely high suitability for the citizen science methodology (e.g. SunSpotter, Aurorasaurus, Sungrazer, HamSci) with demonstrated high-scientific return and innovation in projects involving both experimental data and primary data analysis.

- SMD issued a policy in 2018 (SPD-33), instructing each Division to develop a Citizen Science policy
- In response to SPD-33, HPD has expanded the approach to Citizen Science, including the establishment of the Citizen Science Strategic Working Group (SWG), which identified or initiated the following:
  - HPD and Science Engagement and Partnerships (SE&P) will spearhead the citizen science 'checkbox' proposal effort (joint review and funding)
  - Policies and procedures for HPD Program Officers
  - Identified varying interpretations among Divisions regarding citizen science, and bridge solutions
  - Review of SPD-33 policy options with regard to Heliophysics investments
  - Design of a strategic program-building process
  - Evaluating a change management-informed approach to socialize emerging Citizen Science policy

HELIO CONNECTS through Science

We want to share your research with others at NASA, with the community, with the public and with the media! But we need your help…

- Please let NASA's heliophysics communications team know about:
  - Upcoming papers
  - Upcoming mission events (i.e., testing, anniversaries, records broken)
  - Outreach events: school visits, press interviews, stakeholder interactions, etc.
- We can feature your research via numerous outlets:
  - With NASA leadership: weekly and monthly updates
  - With the community: newsletters (sign up for it here)
  - With the public
    - Internet: NASA.gov/sunearth and blogs.nasa.gov/sunspot
    - Social media: @NASASun and facebook.com/NASASunScience
    - Imagery: Videos, visualizations, infographics (https://svs.gsfc.nasa.gov/Gallery/NASAsHeliophysicsGallery.html)
  - With the media: Press releases and press briefings

Let us know at: bit.ly/SubmitHelioScience

Looking Forward

Senior Review 2020

Objectives

- Maximize the science return (from missions and from the HSO)
- Ensure data is archived, usable, and useful
- Treat the archives as an aspect of the HSO concept
- Reduce the burden on the missions and for NASA in assessing continued operations
- Give NASA stakeholders a better insight into our decision processes

Major Changes

- Missions may propose either a science investigation or to move into HSO infrastructure
- Project Data Management Plan vs. Mission Archive Plan
- Proposals must present plans to move to open source code
- In-depth evaluation of proposer data archives in Space Physics Data Facility (SPDF) and Solar Data Analysis Center (SDAC)
- No longer use non-NASA data archives

Timeline

- Call for Proposals issued
  - **October 28, 2019**
- Senior Review Proposals due
  - **May 6, 2020**
- Senior Review panel meets:
  - Week of **July 13, 2020**
- Senior Review results to projects
  - **August 28, 2020**
- Publication of the panel's report
  - **September, 2020**

2024 Decadal Planning

2024 Decadal Planning

- Heliophysics 2050 Workshop
  - NASA- and NSF-enabled, community-led workshop
  - Develop short-, medium-, and long-term science objectives, including capability needs
  - Scheduled for Aug. 2020; Venue search underway
  - Community announcements on scope and process to be released soon
- Discussions between sponsoring agencies underway, including NOAA and NSF
- Conversations with NAS, CSSP underway

A separate briefing on Decadal planning to follow.

Headquarters Updates

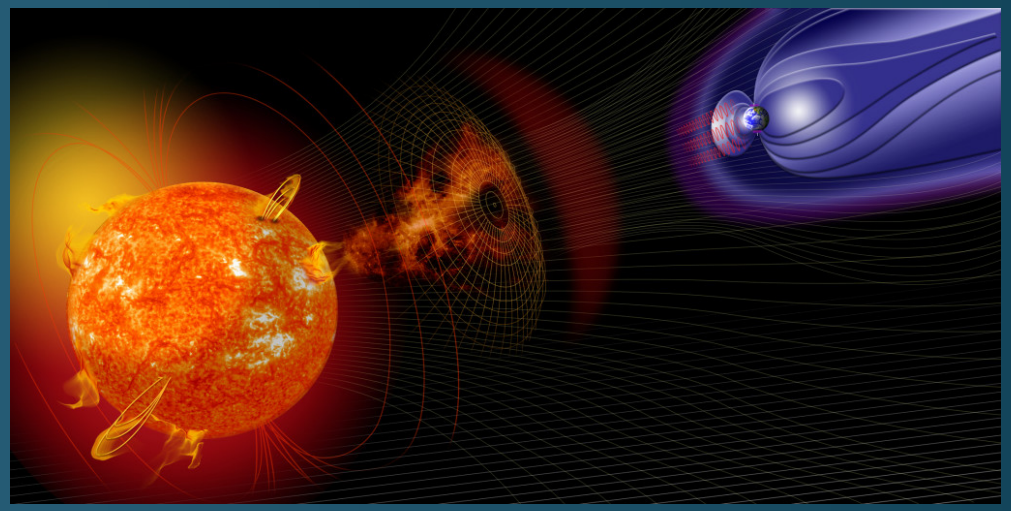
Program Executives

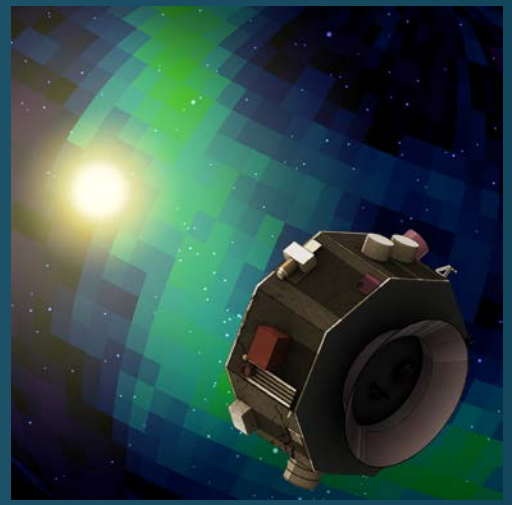
- 2 new PEs hired – welcome **Jamie Favors** and **Heather Futrell**!
- 2 new PEs to be hired via direct hire authority
- 2 new PEs brought on via detail

Program Scientists

- 2 new PSs to be hired via Intergovernmental Personnel Act (IPA)
- 3 new PSs to be hired via direct hire authority Summer 2020

It is a Great Time to be a Heliophysicist!





Heliophysics Division is poised like never before to:

- Capitalize on our unique opportunity to study the Sun and its effects throughout the Heliosphere
- Augment the Heliophysics fleet with new, innovative missions, a robust suborbital program, and an enhanced ride share program
- Make research and technology investments to enable science, e.g. interstellar probe, solar sails
- Develop the next generation of Heliophysicists and engage the public with science knowledge
- Fulfill our responsibility for the Nation enabling advances in space weather
- Play a critical role in Exploration supporting the Artemis mission
- Lean forward for success in the next decade

#HelioRocks

Back-up

COVID-19 Response – Impacts and Planning

Agency

- Agency leadership continues to monitor developments regarding coronavirus (COVID-19) around the nation, closely following the advice of health professionals and the White House Coronavirus Task Force to keep our workforce safe

Science Mission Directorate

- There will be impacts, and we don't yet know the extent. We're working with each mission and project in detail based on where they are in development process
- Priority is everyone's safety and protecting hardware and integrity of data for operating missions
- Conducted status assessment of all 47 flight projects in the SMD Portfolio
- Most missions are in development phases early enough (phases A-B-early C) that bulk of the work can be done virtually
- Missions in integration and testing (I&T) will continue to the extent possible with small teams
- Will work with our domestic and international partners to refine the prioritization of our projects, especially those in I&T
- Have consulted with the NASA Chief Medical Officer and have protocols for working in clean rooms
- Anticipate impact to solicitations and evaluations

COVID-19 Response – Stay Updated

This is a new and unprecedented situation

- We recognize everyone's personal and professional challenges at this time
- As the situation evolves, we will continue to communicate with all of you, whether through this type of venue or other modes
- In the meantime, please continue to follow agency updates:
- Web: nasa.gov and nasapeople.nasa.gov/coronavirus
- Twitter: @NASA and @JimBridenstine
- Resources:
  - https://science.nasa.gov/researchers/virtual-townhall-2020
  - https://www.nasa.gov/press-release/nasa-leadership-assessing-mission-impacts-of-coronavirus
  - Grants and Research during the COVID-19 Epidemic FAQ from SMD

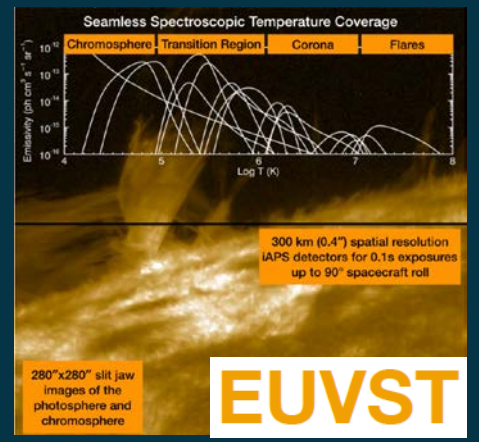
Heliophysics Explorers Recent Selections [3/3]

2018 MO Selections: Down Select 2020

Aeronomy at Earth: Tools for Heliophysics Exploration and Research (AETHER)

Electrojet Zeeman Imaging Explorer (EZIE)

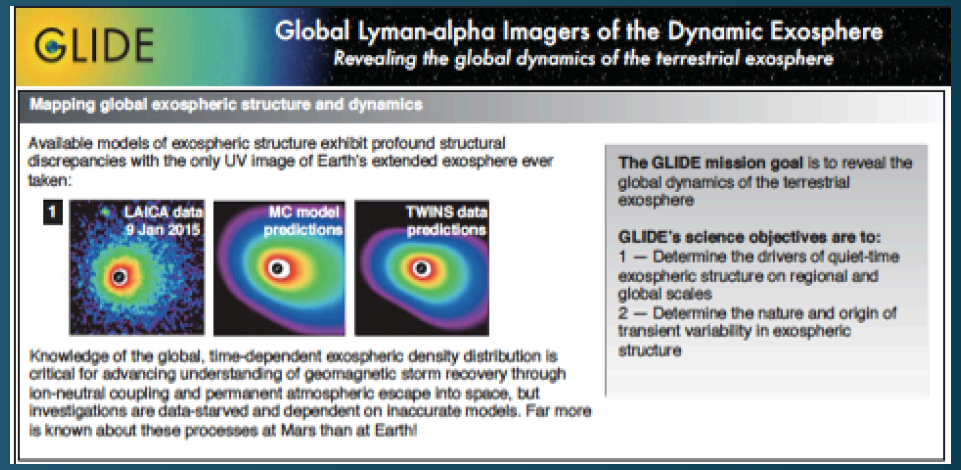
Extreme Ultraviolet High-Throughput Spectroscopic Telescope (EUVST) Epsilon Mission



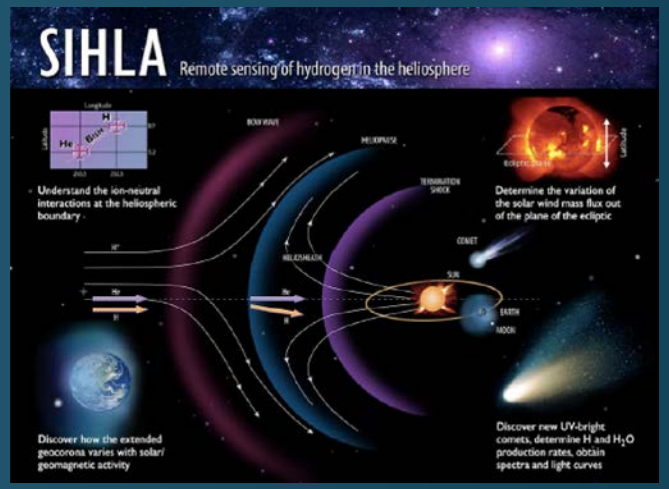
Heliophysics STP Recent Selections: Down Select 2020

2018 Science MOs w/ IMAP

Global Lyman-alpha Imagers of the Dynamic Exosphere (GLIDE)



Spatial/Spectral Imaging of Heliospheric Lyman Alpha (SIHLA)



2018 Tech Demo MOs w/ IMAP

Science-Enabling Technologies for Heliophysics (SETH)

Solar Cruiser

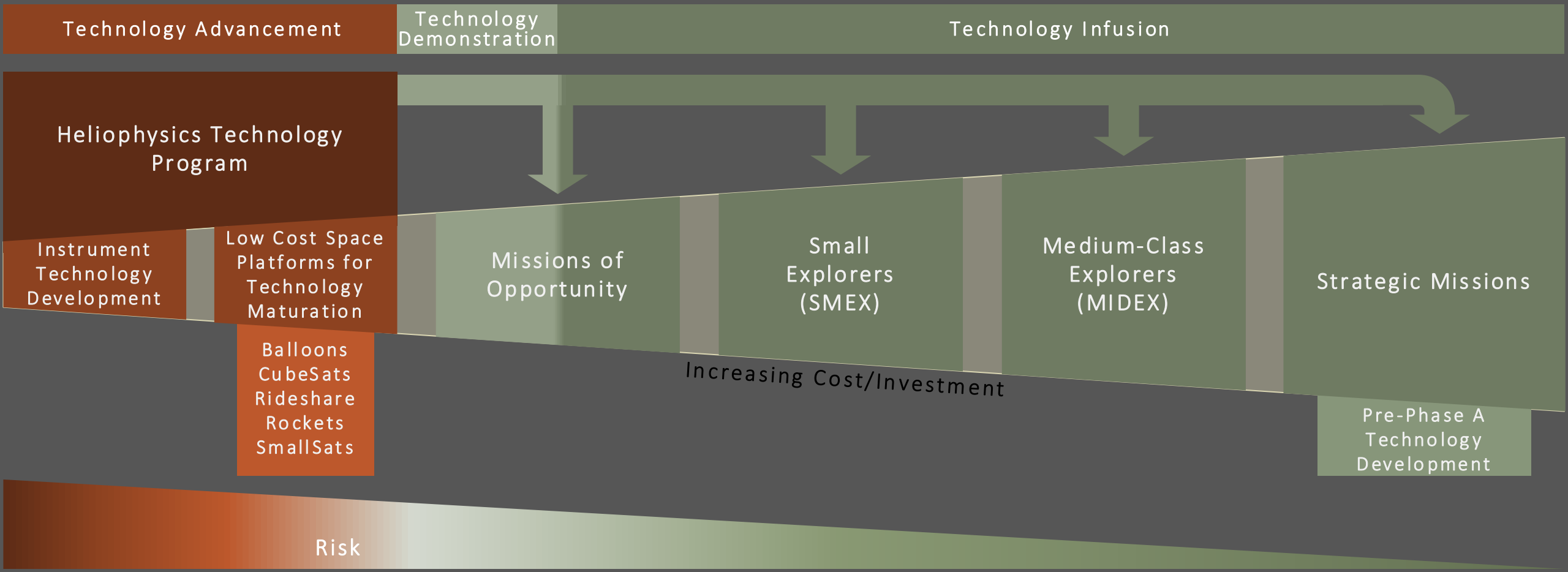
Heliophysics Division Technology Strategy

Vision

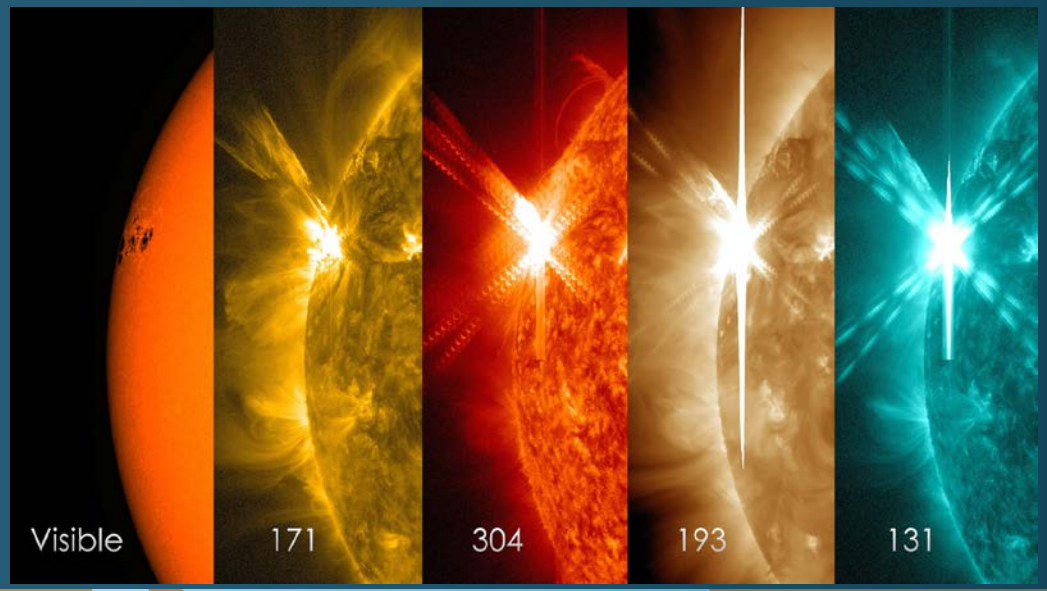
To Enable New Realms of Heliophysics Knowledge and Capability

Mission

- Advance Technology to Expand Heliophysics Science
- Improve Likelihood of Technological and Scientific Success
- Optimize the Return of Technology Investment



The Dawn of a New Era for Heliophysics



Heliophysics Division (HPD), in collaboration with its ***partners***, is poised like never before to --

***Explore uncharted territory*:** through pockets of intense radiation near Earth right to the Sun itself, and past the planets into interstellar space.

Strategically ***combine research from a fleet of carefully-selected missions*** at key locations to better understand our entire space environment.

To understand the interaction between Earth weather and space weather – ***protecting people and spacecraft****.*

Coordinate with other agencies to fulfill its role for the Nation enabling advances in ***space weather*** *knowledge and technologies*

Engage the public with research breakthroughs and citizen science

Develop the ***next generation*** of heliophysicists

HPD Data Management

- SMD developed a Strategic Data Management Working Group (WG) in 2018; generated white paper with 5-year strategy for each division to implement
- HPD has established an Archives Strategic Working Group to assess, restructure, and modernize the HPD Archives

Vision:

Democratize Heliophysics Science Access

Mission Objectives:

- Revise and expand the HPD data policy
- Modernize HPD data storage
- Increase access and analysis of legacy data
- Create long-term, sustainable curation standards

A separate briefing on Archives to follow.