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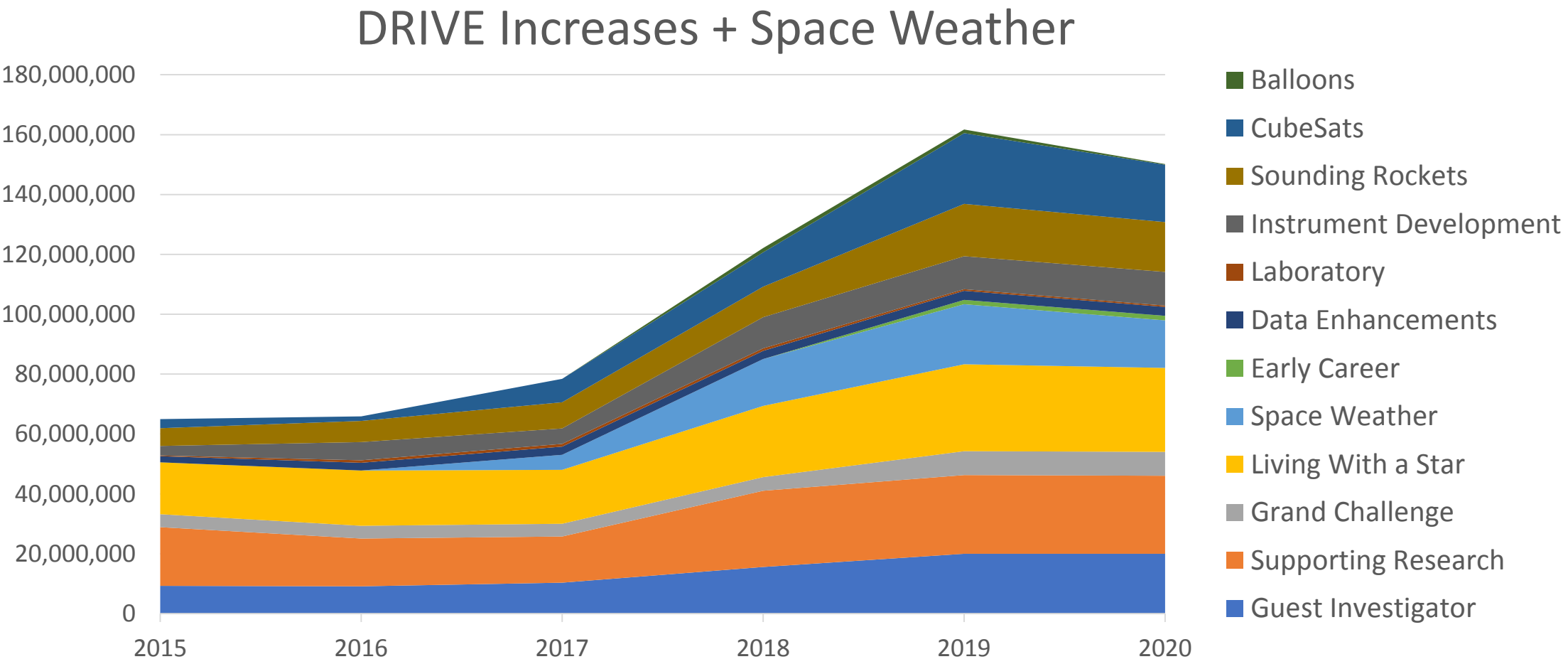
Heliophysics Division Director

Midterm Report on Decadal Survey, National Academy of Sciences

April 3rd, 2019

Fully Funded DRIVE Program



Research Line includes additional infrastructure support for Sounding Rockets and Research Range

Heliophysics Research

ROSES 18

Awarded

Program	Submission to Notify	# submitted	# selected	%
Guest Investigator	4 months	142	37	26.1%
Space Weather O2R	3 months	19	9	47.4%
Data Environment Enhancements	5 months	4	4	100%
Supporting Research	7 months	168	33	19.6%
Early Career Investigator	6.5 months	50	11	22.0%

Open Solicitations

Program	NOI/Step-1 due date	proposal due date
Living with a Star	3/12/19	5/9/19
DRIVE Science Centers	3/1/19	6/20/19
2nd Space Weather O2R	3/12/19	5/16/19

★ Notified this week

ROSES 19

Released March 14, 2019

- Open Research Solicitations:
  - Supporting Research
  - Theory, Modeling and Simulations
  - Guest Investigator Open
  - Living With a Star Science
  - Space Weather Science Applications O2R
  - LWS Strategic Capabilities
  - Data Environment Enhancements

Technology Development: HTIDeS

ROSES 18 HTIDS

LNAPP and ITD

- 13 of 35 proposals selected, 2 LNAPP & 11 ITD

R&T Flight (in-line with NPR 7120.8):

- 25 non-prime proposals received (≤$3.5M)
  - 10 LCAS proposals selected
  - 1 CubeSat proposal selected
- 14 prime proposals received (>$3.5M)
  - 1 LCAS proposal selected for concept study
  - 5 CubeSat proposals selected for concept study

ROSES 19 HTIDS + HFORT

Released March 14, 2019

Restructured: Split Into Two Program Elements

- Heliophysics Technology and Instrument Development for Science (H-TIDeS): LNAPP and ITD elements (lower TRL)
- Heliophysics Flight Opportunities for Research and Technology (H-FORT): LCAS, SmallSats and Rideshare Opportunities (SRO); in-line with NPR7120.8
  - Provide flight opportunities for more mature technologies

Solar Orbiter Collaboration (with ESA)

Mission Line: Living With Star

Launch Vehicle: U.S. Provided Atlas-V 411

Launch Site: Cape Canaveral

LRD: Launch Window: February 5 – 24, 2020

Solar Orbiter Collaboration Project Scientist: Chris St. Cyr

U.S. Provided Instruments:

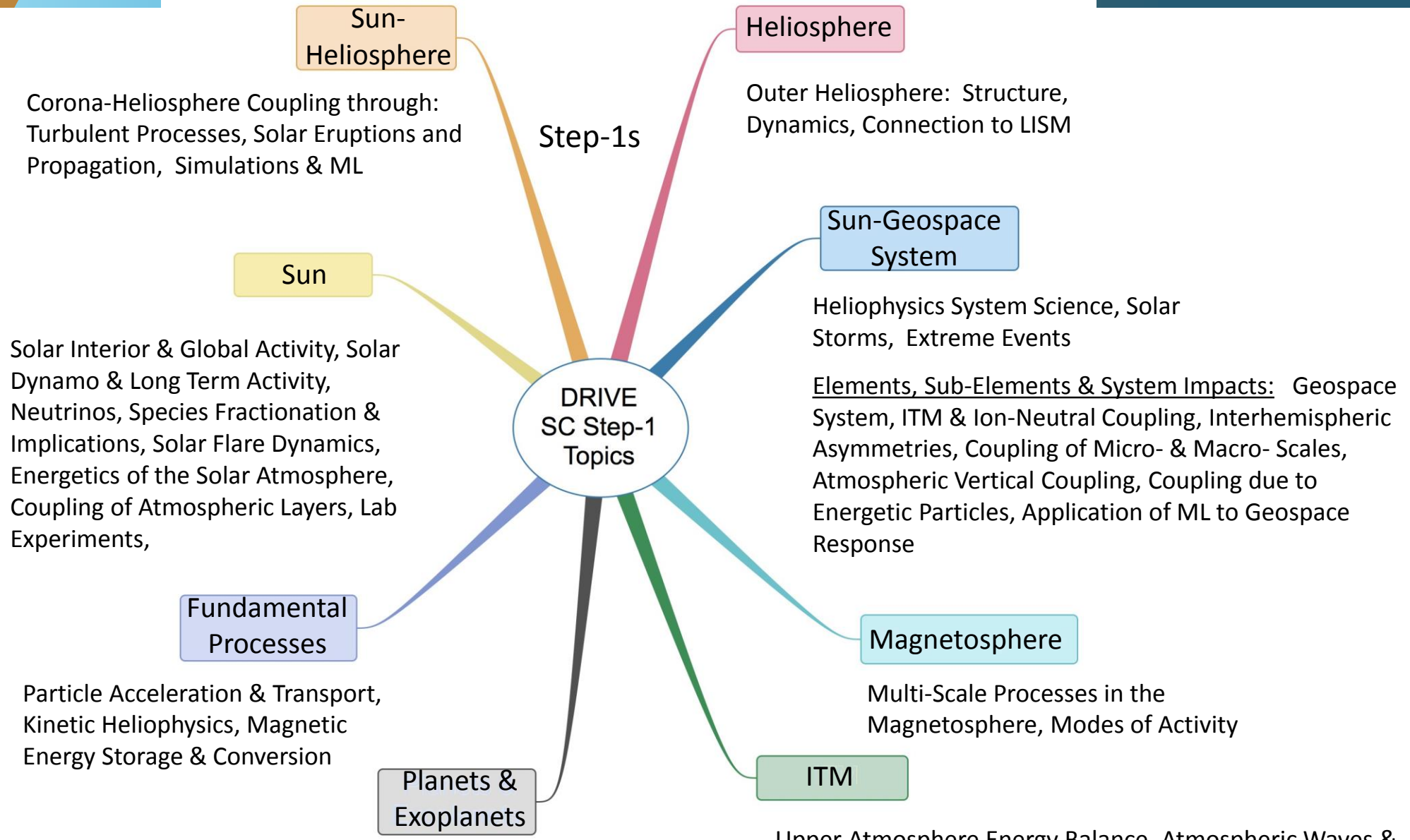
HIS (Heavy Ion Sensor) part of SWA, SoloHI (Heliospheric Imager) have been fully integrated.

Description:

Solar Orbiter aims to make significant breakthroughs in our understanding both of how the inner heliosphere works, and of the effects of solar activity on it.

The spacecraft will take a unique combination of measurements: in situ measurements will be used alongside remote sensing close to the Sun to relate these measurements back to their source regions and structures on the Sun's surface.

Next Step: *Solar Orbiter successfully completed Sine vibration and Acoustic testing. Formal documentation of ESA's intent to launch in February 2020 was completed.*


Step-1s
DRIVE SC Step-1 Topics
Sun-Heliosphere
Corona-Heliosphere Coupling through: Turbulent Processes, Solar Eruptions and Propagation, Simulations & ML
Heliosphere
Outer Heliosphere: Structure, Dynamics, Connection to LISM
Sun
Solar Interior & Global Activity, Solar Dynamo & Long Term Activity, Neutrinos, Species Fractionation & Implications, Solar Flare Dynamics, Energetics of the Solar Atmosphere, Coupling of Atmospheric Layers, Lab Experiments,
Sun-Geospace System
Heliophysics System Science, Solar Storms, Extreme Events
Elements, Sub-Elements & System Impacts: Geospace System, ITM & Ion-Neutral Coupling, Interhemispheric Asymmetries, Coupling of Micro- & Macro- Scales, Atmospheric Vertical Coupling, Coupling due to Energetic Particles, Application of ML to Geospace Response
Fundamental Processes
Particle Acceleration & Transport, Kinetic Heliophysics, Magnetic Energy Storage & Conversion
Magnetosphere
Multi-Scale Processes in the Magnetosphere, Modes of Activity
Planets & Exoplanets
Exoplanets, Planetary Plasma Processes, Habitability & Planetary Magnetospheres
ITM
Upper Atmosphere Energy Balance, Atmospheric Waves & Variability, Effects of Small-Scale Ion-Neutral Coupling, Scintillations, Innovation in Data Collection

QUOTES ON DIVERSITY IN DRIVE

- **Quotes from ROSES 2018 NRA, B. 13**
- ”Diversity and Inclusion: NASA is invested in attracting, developing, and leveraging the full spectrum of intellectual talent in the country. Diversity is defined as the similarities and differences in individuals representing more than one national origin, color, religion, socioeconomic stratum, and sexual orientation, etc. The strengths afforded by diversity in styles, ideas, and organizational contributions drive innovation, creativity and engagement. An important mechanism for enabling diversity is ensuring that the pipeline leading to science and engineering careers affords equal opportunities to a diverse population of students.”
- “The characteristics of a successful DSC, include:” “creative, substantive activities aimed at enhancing education, diversity, and public outreach” and “a talented, diverse, multi/inter/trans-disciplinary, and fully integrated team to execute the research program.”
- “Science centers also create an environment conducive to addressing diversity issues. The 2010 AAAS Review of the NSF Science and Technology Centers Integrative Partnerships (STC) Program 2000-2009 found that science centers ‘harbor the potential to cultivate cohorts of students who look more like America than the current U.S. science workforce.’ Diversity Plans outline the context, goals and specific actions for promoting diversity within the center's supported researchers (faculty, postdoctoral researchers, graduate students), partners, and advisers. These plans are developed as part of the strategic planning activities of a Phase I DSC. Phase II DSCs are expected to implement these plans, building capacity while creating an inclusive culture to support research, discovery, education, and innovation, producing significant outcomes within their 5-year timeframe.”
- “DSCs are expected to integrate their research with activities that broaden the impact of their research. For this program activities for broadening impacts refers to STEM engagement and future workforce development, higher education & professional learning, diversity and inclusion, and/or outreach and informal science communication.”