
NASA
National Aeronautics and
Space Administration
EXPLORE SCIENCE
Dr. Thomas H. Zurbuchen
Associate Administrator
NASA Science Mission Directorate
@Dr_ThomasZ
July 22, 2021

NEWS &
UPDATES

PROGRAMS &
RESEARCH

DIVISION
HIGHLIGHTS

NASA Leadership

Sen. Bill Nelson
NASA Administrator

Pam Melroy
NASA Deputy Administrator

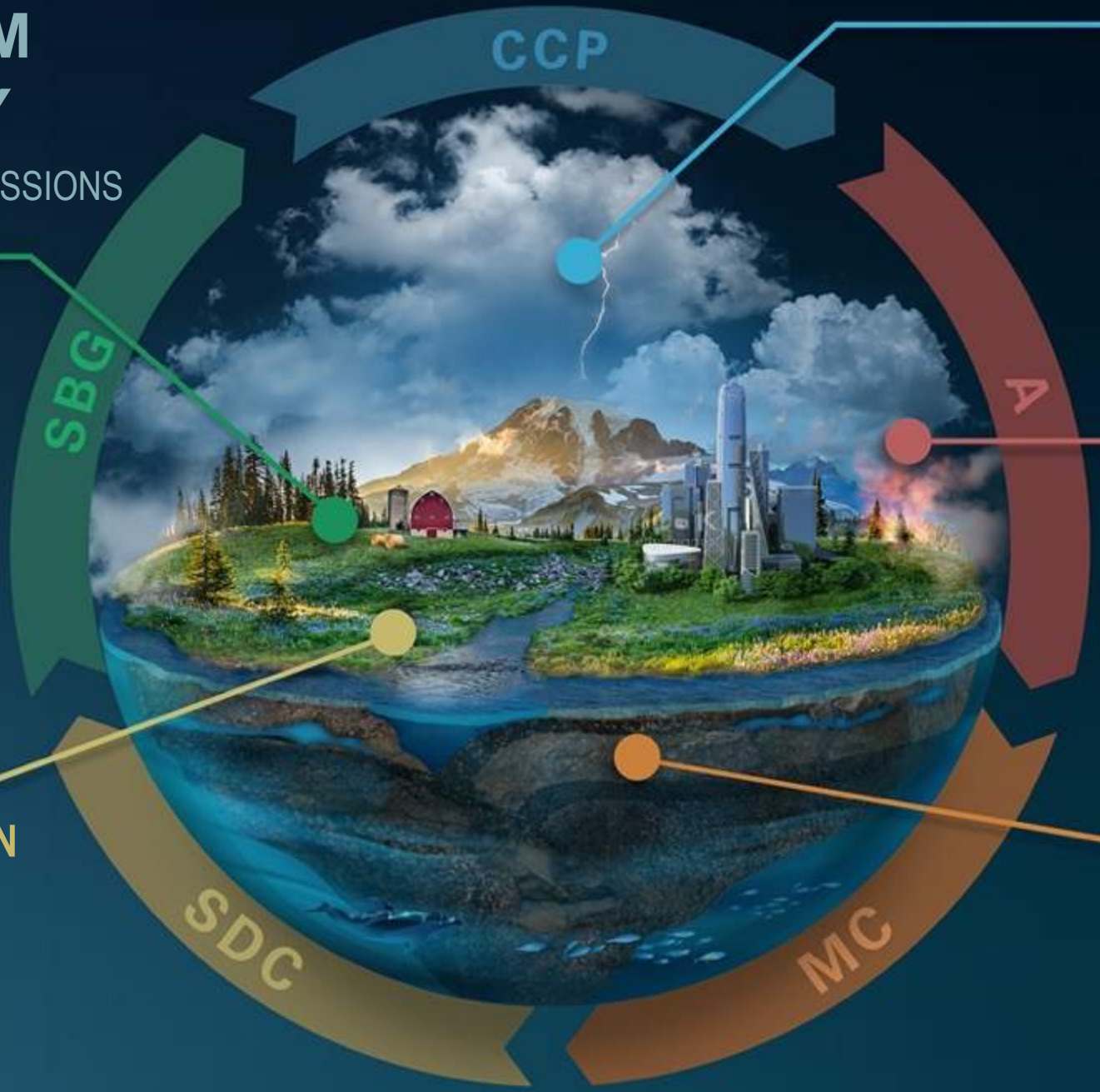
Bob Cabana
NASA Associate Administrator

Agency FY22 Budget Highlights

- A strong NASA budget investing $24.8 billion dollars for America’s future in space; funding proposed represents an increase of 6% over the previous year
- Building the Earth Systems Observatory to enhance and integrate Earth system science and applications to increase the nation's preparation, mitigation and resilience in the face of climate change
- Keeps NASA on the path to land the first woman and the first person of color on the Moon
- Supports NASA efforts to strengthen Inclusion, Diversity, Equity and Accessibility both within NASA and among the space community

EARTH SYSTEM OBSERVATORY

INTERCONNECTED CORE MISSIONS



CLOUDS, CONVECTION AND PRECIPITATION

Water and Energy in the Atmosphere

AEROSOLS

Particles in the Atmosphere

MASS CHANGE

Large-scale Mass Redistribution

SURFACE BIOLOGY AND GEOLOGY

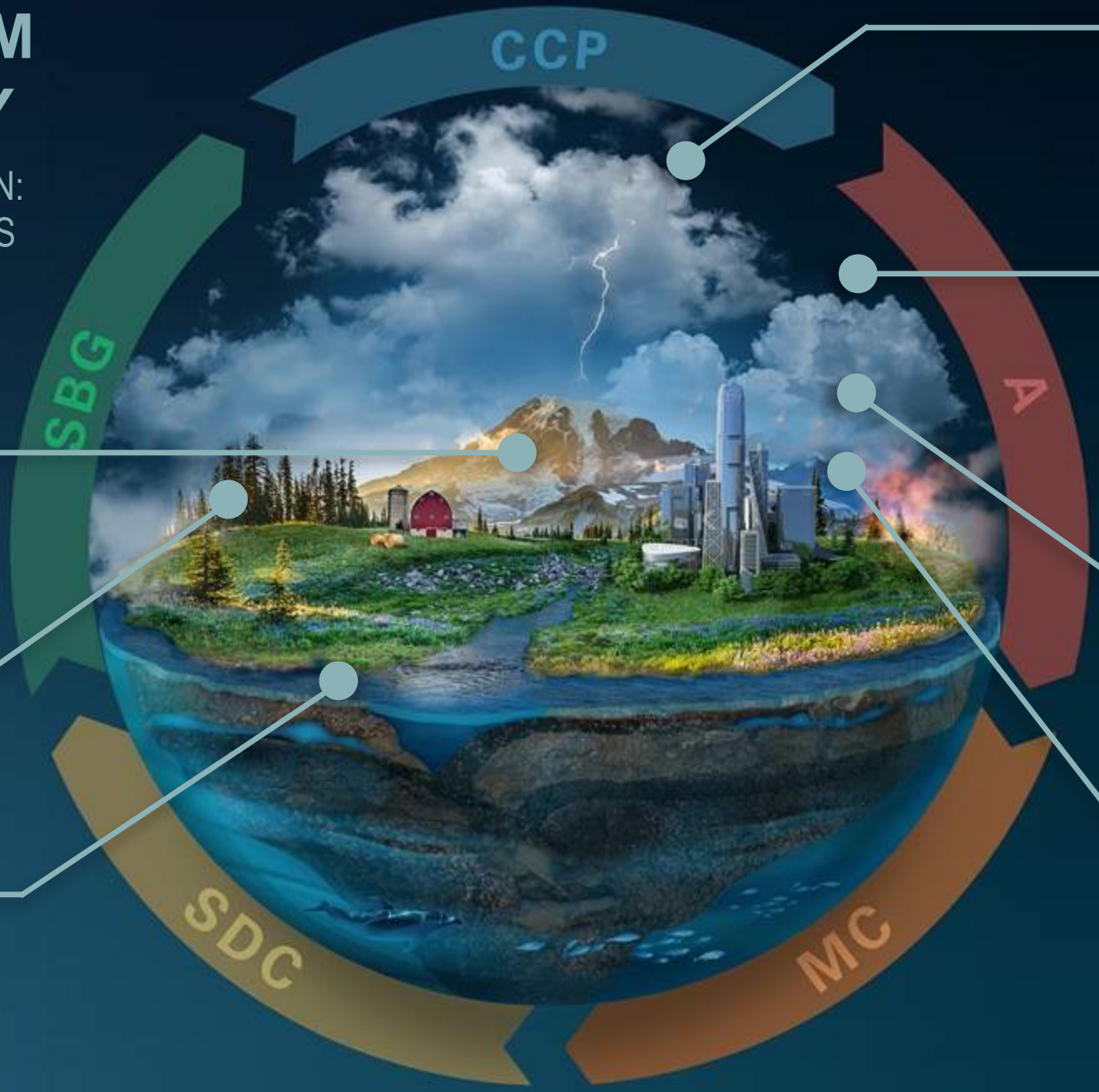
Earth Surface and Ecosystems

SURFACE DEFORMATION AND CHANGE

Earth Surface Dynamics

EARTH SYSTEM OBSERVATORY

INNOVATION & COMPETITION:
EARTH EXPLORER MISSIONS



Greenhouse Gases

Ozone and Trace Gases

Atmospheric Winds

Ice Elevation

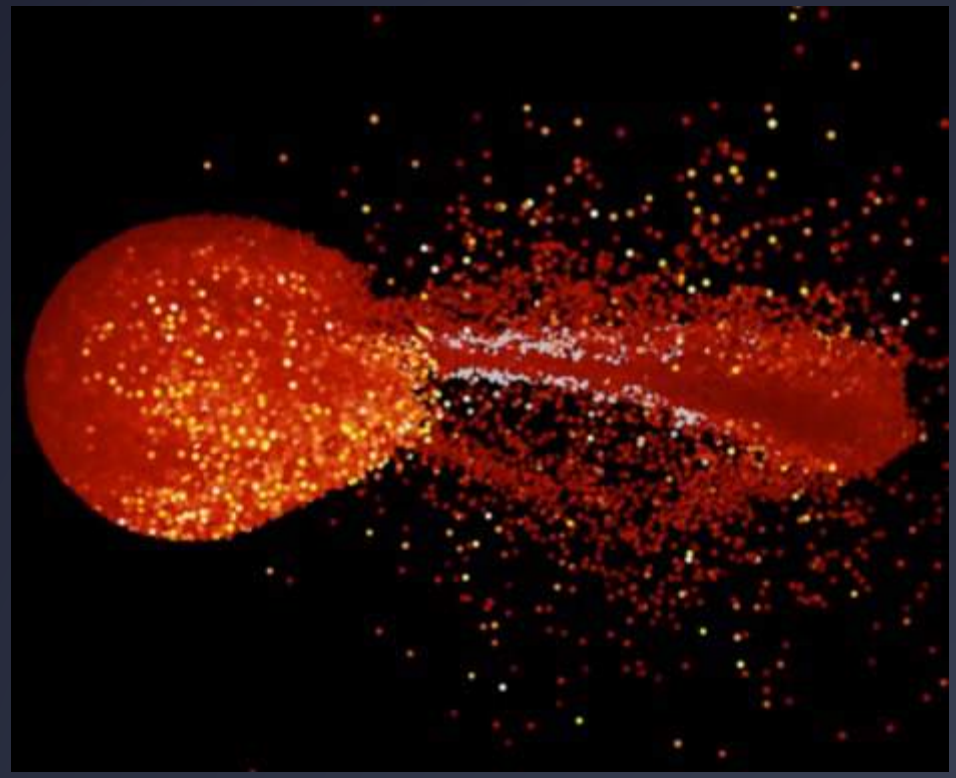
Snow Depth and Water Content

3D Ecosystem Structure

Ocean Surface Winds and Currents

Catalyzing High-Risk/High Impact Research

- SMD recognizes that taking risks is a necessary ingredient of innovation and risk in leadership
- A healthy research portfolio must blend foundational research with innovative, high-risk/high-impact science
- SMD funds high-risk/high-impact proposals at a 50% higher rate than foundational proposals
- To further demonstrate our commitment to funding HR/HI research, SMD established a Blue Ribbon panel of experts to take a second look at HR/HI proposals that were not initially selected in disciplinary review panels
- 6 HR/HI proposals were selected due to their potentially transformative nature
- SMD encourages High-Risk/High-Impact proposals from the community!



First HR/HI Selection: Moon Formation via Streaming Instability (Dr. Miki Nakajima, U. Rochester)

SMD Focused on Workforce

Return to Work/Future of Work Status

- NASA is currently operating at Stage 2 at 25% occupancy
  - Following process in OMB M-21-25 to seek increased on-site occupancy and stage changes
- SMD has demonstrated that we can operate effectively in full telework status during the last year and we want to continue those lessons learned as we go forward
  - Within SMD, intention is to provide staff with maximum flexibility and learn how to work in hybrid mode while still ensuring 100% effectiveness
- For the SMD broad community, we will enable hybrid meetings and reduce travel overall as compared to our pre-Covid operational modes
  - Our proposal reviews will continue to be virtual through ROSES 2021, with exceptions granted where needed
  - We recognize that virtual meetings have helped greatly to broaden participation
  - But there is also a clear need for high-value in-person interactions with the community, including purposeful in-person attendance at scientific conferences and critical mission interactions

NEWS &
UPDATES

PROGRAMS &
RESEARCH

DIVISION
HIGHLIGHTS

Status of SMD Programs

- The state and health of the SMD Flight Portfolio is Good
- Several missions have successfully completed Key Decision Point (KDP) milestones and replan reviews:
  - SWOT (KDP-D), Libera (KDP-B), IMAP (KDP-C), GeoXO (KDP-A), SWFO (KDP-B), TEMPO (Replan)
  - One Earth Science and four Heliophysics missions are scheduled for confirmation (KDP-C) in the next three months
- COVID Impacts and SMD Actions:
  - SMD missions continue to be impacted by COVID; however, impacts are trending downward
    - SMD continues to hold adjustment reviews to address COVID impacts (latest reviews: MAIA, EMIT, and Roman)
    - Supply chain issues are ongoing and may have long-term consequences
- Significance to the Community:
  - Working with NASA centers, companies, academia partners, and others to support transition to onsite and hybrid models
  - With increased vaccinations, face-to-face meetings are being held on a limited basis and travel has increased, enabling more interaction with our project teams, partners, and vendors
- Upcoming Launches (Go SCIENCE!):
  - This fall and winter: Landsat-9, Lucy, JWST, DART, IXPE, and GOES-T

Supporting Work-Life Balance

- SMD recognizes the importance of balancing one's work with the requirements of one's family, friends and personal physical and mental health
- We have created a web page to inform SMD-funded researchers about NASA-provided wellness resources and leave options that may be available
- The web page discusses resources and flexibilities for
  - Recipients of NASA grants and cooperative agreements
  - NASA Civil Servant Scientists
  - NASA on-site contractors
  - NASA Postdoctoral Program Fellows
- https://science.nasa.gov/researchers/work-life-balance

Embracing Commercial Suborbital Capabilities

- SMD is excited by the emergence of new commercial suborbital platforms that complement NASA's existing capabilities
- Beginning in ROSES-22, SMD plans to make commercial platforms available for all programs that fly suborbital payloads, including for Astrophysics, Biological and Physical Sciences, and Heliophysics
- These capabilities will be offered alongside NASA-provided platforms
- SMD will further incentivize nimble and innovative science experiments to utilize the capabilities (e.g., mass, altitude, acceleration levels, duration) provided by commercial suborbital platforms

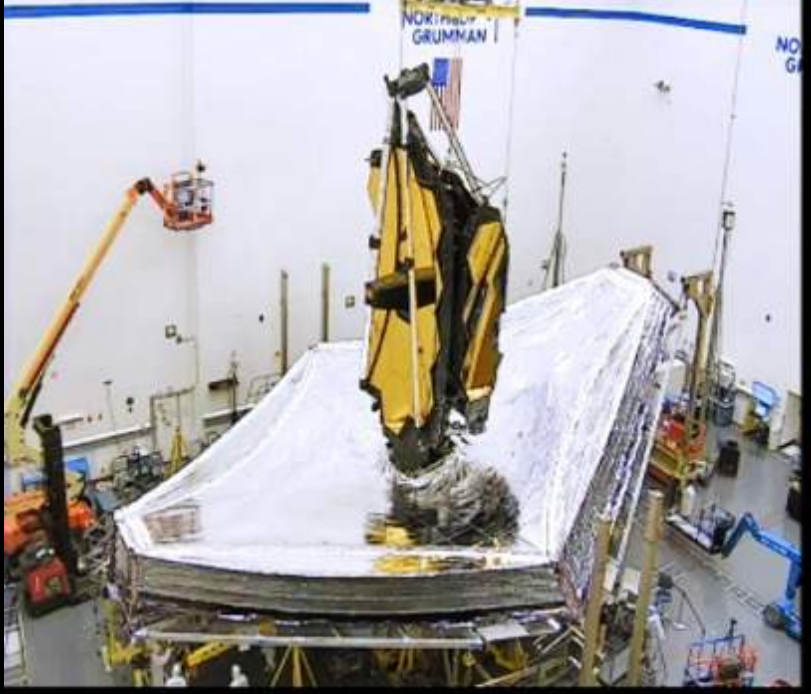
NEWS &
UPDATES

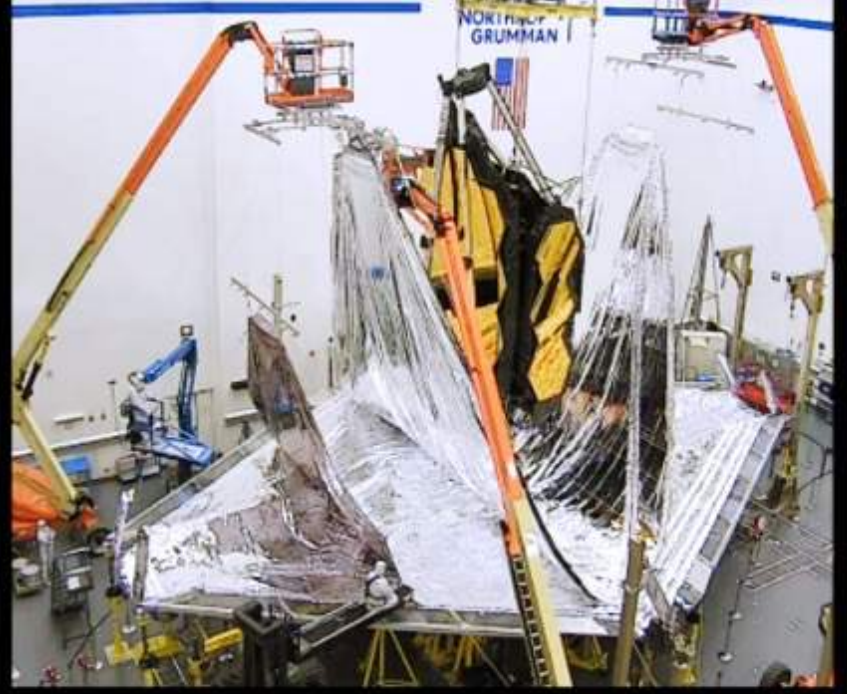
PROGRAMS &
RESEARCH

DIVISION
HIGHLIGHTS

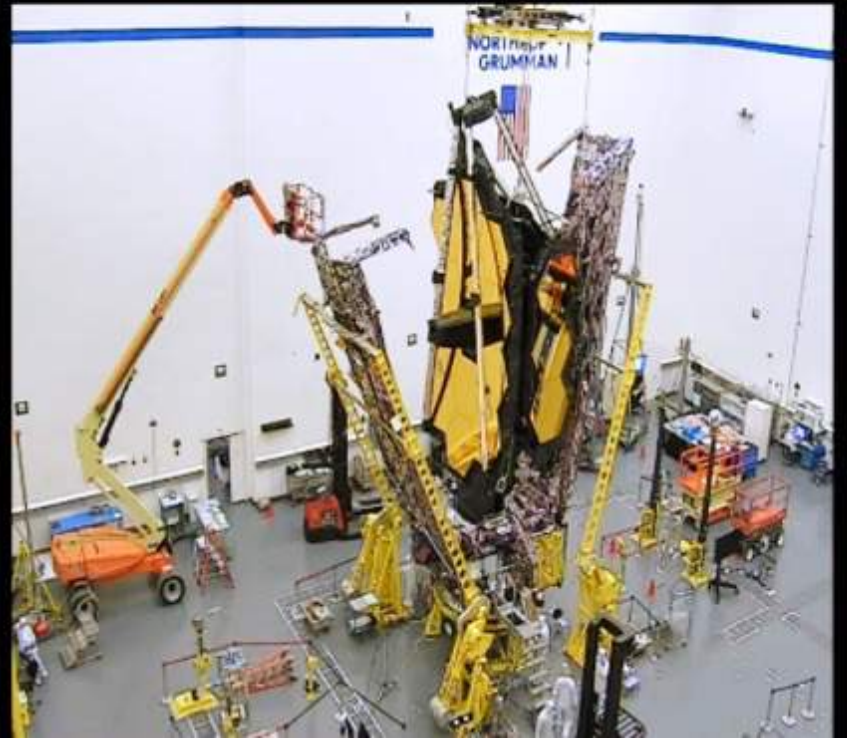
Division Highlights

- James Webb Program Office (Webb) – Greg Robinson
- Exploration Science Strategy and Integration Office (ESSIO) – Joel Kearns
- Astrophysics – Paul Hertz
- Biological and Physical Sciences (BPS) – Craig Kundrot
- Earth Science Division – Karen St. Germain
- Heliophysics – Nicky Fox
- Planetary Science – Joan Salute


NORTHROP
GRUMMAN


NORTHROP
GRUMMAN


NORTHROP
GRUMMAN


NORTHROP
GRUMMAN

ESSIO Highlights

Instrument suite selections announced for *Payloads and Research Investigations on the Surface of the Moon* (PRISM-1)

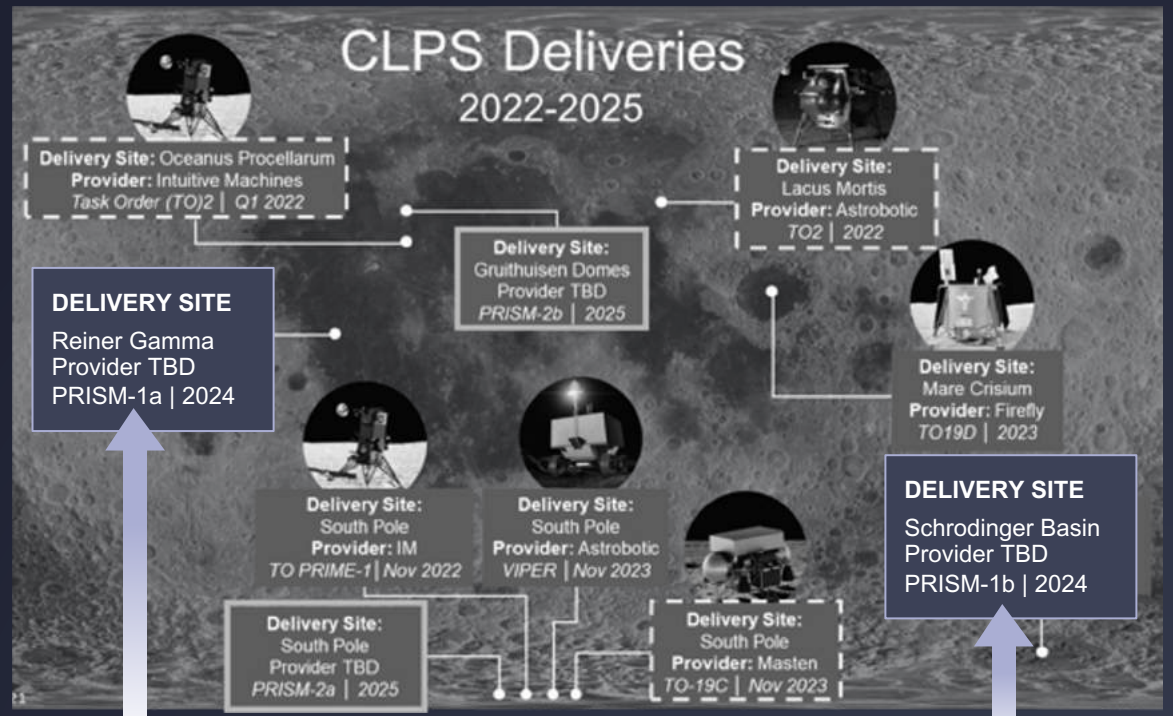
- Lunar Vertex | PI: D. Blewett (APL)
- Farside Seismic Suite (FSS) | PI: M. Panning (JPL)
- Lunar Interior Temperature and Materials Suite (LITMS) | PI: R. Grimm (SwRI)

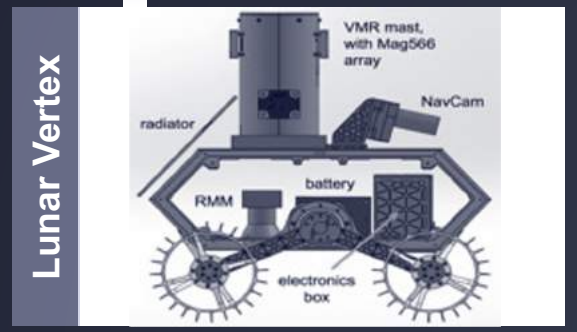
PRISM-1 delivery sites

- PRISM 1a: Lunar Vertex will land at Reiner Gamma, a lunar swirl feature on the near side
  - Planetary decadal science: understand how lunar surface has been modified by geological processes within a lunar magnetic anomaly and determine the origin of magnetized crust
- PRISM 1b: FSS and LITMS will land at Schrödinger Basin, the first CLPS lunar farside delivery
  - Planetary decadal science: characterize differentiation and evolution of the Moon's interior using geophysical techniques

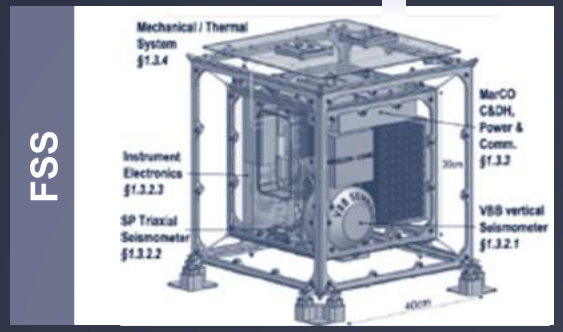
PRISM-2 draft solicitation released in May

- Final solicitation planned for release in late summer 2021 with deliveries planned for South Pole and Gruithuisen volcanic domes ~2025





Lunar Vertex: lunar magnetic anomalies and plasma environment (Reiner Gamma)



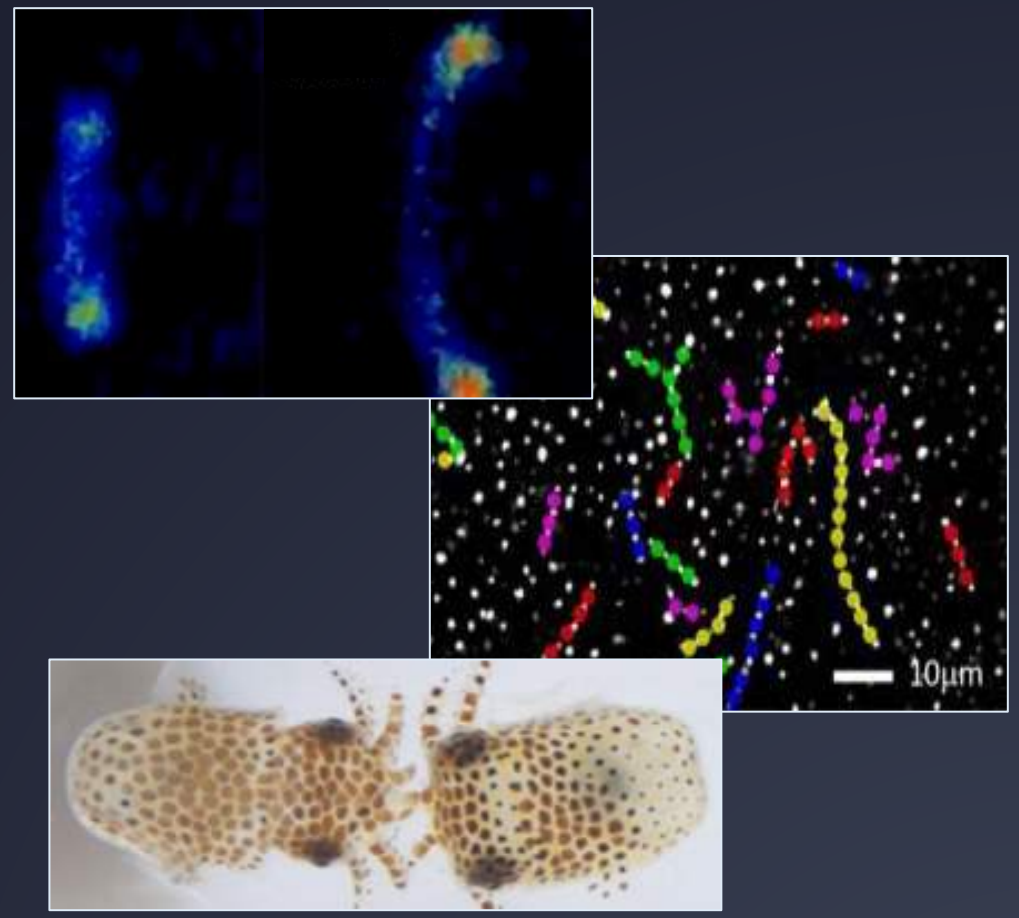
LITMS *(not pictured above)* & FSS: moonquakes, heat flow, interior and crustal structure (Schrödinger Basin)

Astrophysics Division Highlights

- The Nancy Grace Roman Space Telescope has been replanned due to impacts of COVID and is on track for Critical Design Review this Fall
- The Imaging X-ray Polarimetry Explorer (IXPE), NASA's next Astrophysics SMEX, is fully assembled and has begun environmental testing, on track for launch in November
- The first four Astrophysics Pioneers missions are halfway through their mission concept studies, with technical and cost reviews at the end of the year
- Hubble, Spitzer, and Swift contributed to the discovery of the first identified electron-capture supernova, a third flavor of supernovae previously hypothesized
- NASA has prepared for receiving the Decadal Survey, and will be holding an Astrophysics Town Hall to share its plans about 10 weeks after receipt of the Survey

BPS Division Highlights

- An environment like spaceflight enables discoveries that we would not be able to make on Earth. What if those discoveries yielded a cure? What if those discoveries helped innovate new materials that extended spacecraft life?
- President's budget proposes first increased BPS budget in 15 years, by 38%, for three reasons:
  - Take advantage of the International Space Station, a finite resource
  - Take advantage of new and commercial platforms that are becoming available to do research
  - There are important and urgent science problems that need to be addressed, especially in Quantum Science (cold atoms), Soft Matter (colloids), and Thriving in Deep Space (animals and plants).
- These areas require the unique environment of space.
  - Quantum bubble-shell configurations explore the limits of large Bose-Einstein Condensates
  - Colloids driven to form 3-D structures aid the development of smart materials which reconfigure in response to external forces
  - Symbiotic bacteria colonizing an animal sheds light on humans staying healthy on Earth and in space

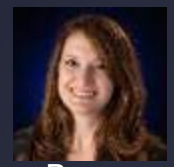


- NASA is preparing for the upcoming 2023 Decadal Survey in BPS with topical whitepapers due October 31 and research campaign whitepapers due December 23. Have your voice heard – this is a great time for BPS!

Earth Science Division Highlights

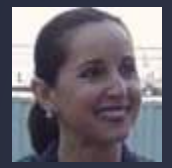
- SWOT shipped June 27 from JPL to CNES for spacecraft integration at a clean room near Cannes; arrived June 29
  - SWOT will make global surveys of Earth's surface water
- Sentinel-6 Michael Freilich sea level height data went public June 22
- Dynamics and Chemistry of the Summer Stratosphere (DCOTSS) conducted first science flights to study strong convective storm development
- DEVELOP completed a 6-day virtual Software Carpentry workshop on how to build capacity with research computing skills
- Completed Satellite Needs Working Group (SNWG) Cycle 3 for GEO/EOP/OMB – bringing the power of NASA science to help other agencies achieve their missions
- Landsat 9 completed successful ORR – on the road to launch!
- Pioneering TEMPEST-D deorbited after successful 3-year mission
  - Collected near-real time data on high-impact weather events
- New Staff:
  - Kathleen Boggs, Deputy AD for Flight Programs
  - Kate Becker, Executive Officer
  - Christine McMahon-Bognar, 2021 CEOS Chair Team, Detail

SWOT jets off to Cannes for satellite integration

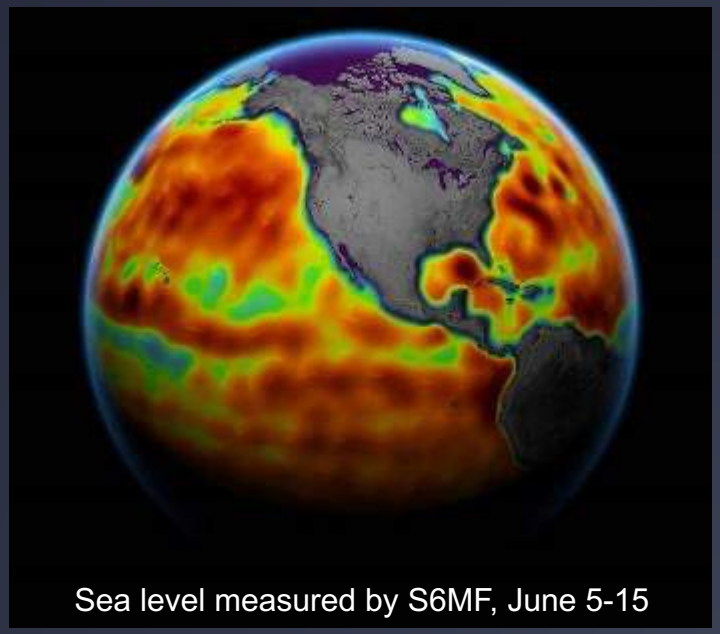


Boggs

Becker



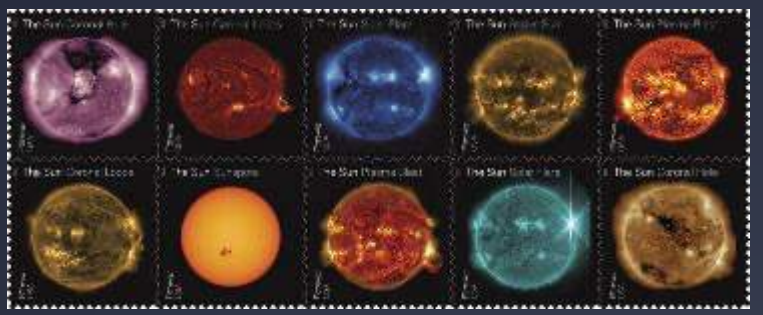
McMahon-Bognar

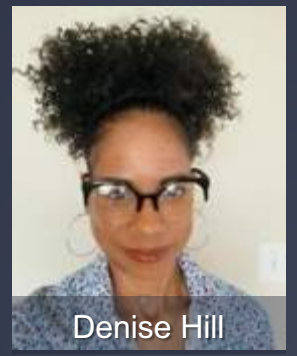


Sea level measured by S6MF, June 5-15

Heliophysics Division Highlights

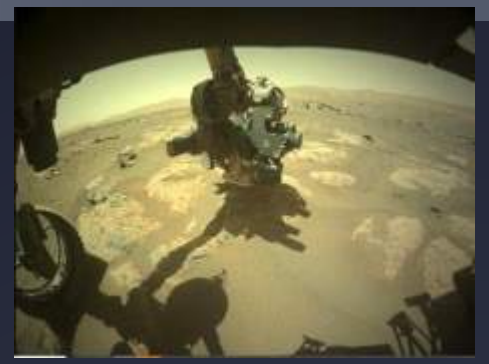
- **Parker Solar Probe:** Received the National Space Club and Foundation's Nelson P. Jackson Award, which recognizes the most outstanding contribution to aerospace in the preceding year.
  - Completed solar encounter #8 on Apr. 29; set a new solar approach record of 6.5 million miles (.07 AU) and new speed record of 330,000 mph
  - August 9, 2021: Perihelion #9
- Heliophysics 2050 Workshop held May 3-7, 2021
  - Over 1,150 registrants with approximately 425 to 650 engaged each day.
- Heliophysics Early Career Roundtables held in May and June
- **IMAP:** Successfully completed PDR on May 21 and KDP C on July 12th
- **PUNCH:** Successfully completed PDR on May 21. KDP C is tomorrow, Jul 23
- **ESCAPADE:** Successfully completed PDR on Jun 23
- U.S. Postal Service released SDO Sun Stamps
- 7 Sounding Rocket launches since April 2021
  - KiNET-X, EUNIS, VIPER, CIBER-2, RockOn, Dynamo (x2)
- **Staffing:** Welcome to Susanna Finn (Program Scientist) and Denise Hill (Communications and Outreach)!





Planetary Science Division Highlights

- Planetary Science importance recognized, largest ever PSD Budget in President's request
- Three Venus missions selected: VERITAS and DAVINICI (Discovery); EnVision (ESA M5)
- Updates of missions in operation
  - Mars2020/Perseverance: has begun science operations, supported by Ingenuity in the operational demo phase; nine total flights as of July 13.
  - OSIRIS-REx: departed Bennu May 10, 2021 (samples arrive Sep. 2023)
- Updates of missions under development
  - Europa Clipper: continues toward 2024 launch; Commercial LV procurement underway
  - NEO Surveyor: passed KDP-B; with target to complete Phase B in 2023, LRD in 2026
  - Lucy: due to ship to Cape Canaveral late July; launch window opens Oct. 2021
  - DART: progressing well, launch window opens Nov. 2021
  - Psyche/Janus: Psyche ATLO is progressing, scheduled for launch Sep. 2022
- Mars Sample Return (Phase A):
  - Earth Return Orbiter PDR, Capture, Containment and Return System SRR, and Sample Fetch Rover SRR – all completed in Apr. 2021
  - NASA supported ESA in Sample Transfer Arm technical assessment
  - Agency Delta Acquisition Strategy Meeting held in May 2021




National Aeronautics and
Space Administration
NASA
with us
COME