



National Aeronautics and  
Space Administration

# EXPLORE SCIENCE

**Joint Meeting of ASEB and SSB**

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Associate Administrator

NASA Science Mission Directorate

 @Dr\_ThomasZ

June 10, 2020





# Welcome, Dr. Karen St. Germain

- Welcome Dr. Karen St. Germain, Director Earth Science Division
- Held senior position at the National Oceanic and Atmospheric Administration (NOAA) as the Deputy Assistant Administrator, Systems, for NOAA's National Environmental Satellite, Data, and Information Service (NESDID)
- I want to thank Sandra Cauffman for her leadership during the leadership transition period. She took on a challenging role and successfully kept our Earth Science work on track. I also want to thank Dr. Paula Bontempi who served as deputy director. They both have my deepest gratitude.



# Welcome, Jeff Gramling

- Effective June 22, 2020 Jeff Gramling will serve as Mars Sample Return Program Director
- Jeff comes to us from the Johns Hopkins University Applied Physics Laboratory in Laurel, Maryland, where he is a program manager and has worked on the Galactic/Extragalactic Ultra long duration balloon Spectroscopic Terahertz Observatory (GUSTO) and also served as a member of the Standing Review Board for the Mars 2020 mission
- Throughout his career, in his project and program management positions on NASA projects in HEOMD and SMD, he has worked on directed, decadal, and AO missions
- I would like to thank Jim Watzin for his excellent leadership during the early formulation phase to enable the NASA and ESA team to develop the Mars Sample Return approach we are now implementing

# Thank You From SMD



## Steve Clarke

Deputy Associate Administrator for Exploration, will transition into his new role as Aeronautics Research Mission Directorate Deputy Associate Administrator in mid-June.



## Craig Tupper

SMD Resource Management Division Director is retiring after almost 33 years at NASA, we wish him the best of luck.



# Coming Soon

Recruitment for multiple SMD Program Scientists at NASA Headquarters coming June 22, 2020.

- Program Scientists have a broad responsibility for advancing NASA's science portfolio
- Will work as part of a diverse and agile team whose core values include excellence, integrity, transparency, teamwork and a growth mindset towards stewarding NASA's and the nation's space-based science program
- Announcement will be released on <https://www.usajobs.gov>



# NASA Science Overview

Current Status

NASA Science Highlights

Science 2020-2024: A Vision for  
Scientific Excellence



# NASA Science Overview

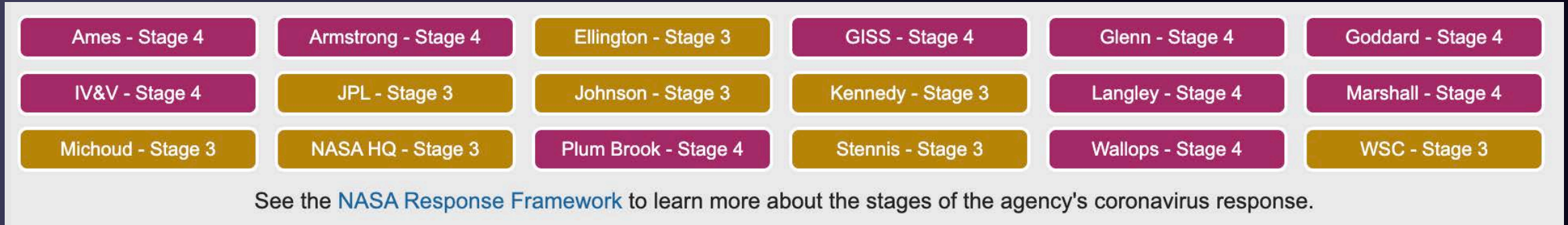
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# NASA COVID-19 Response

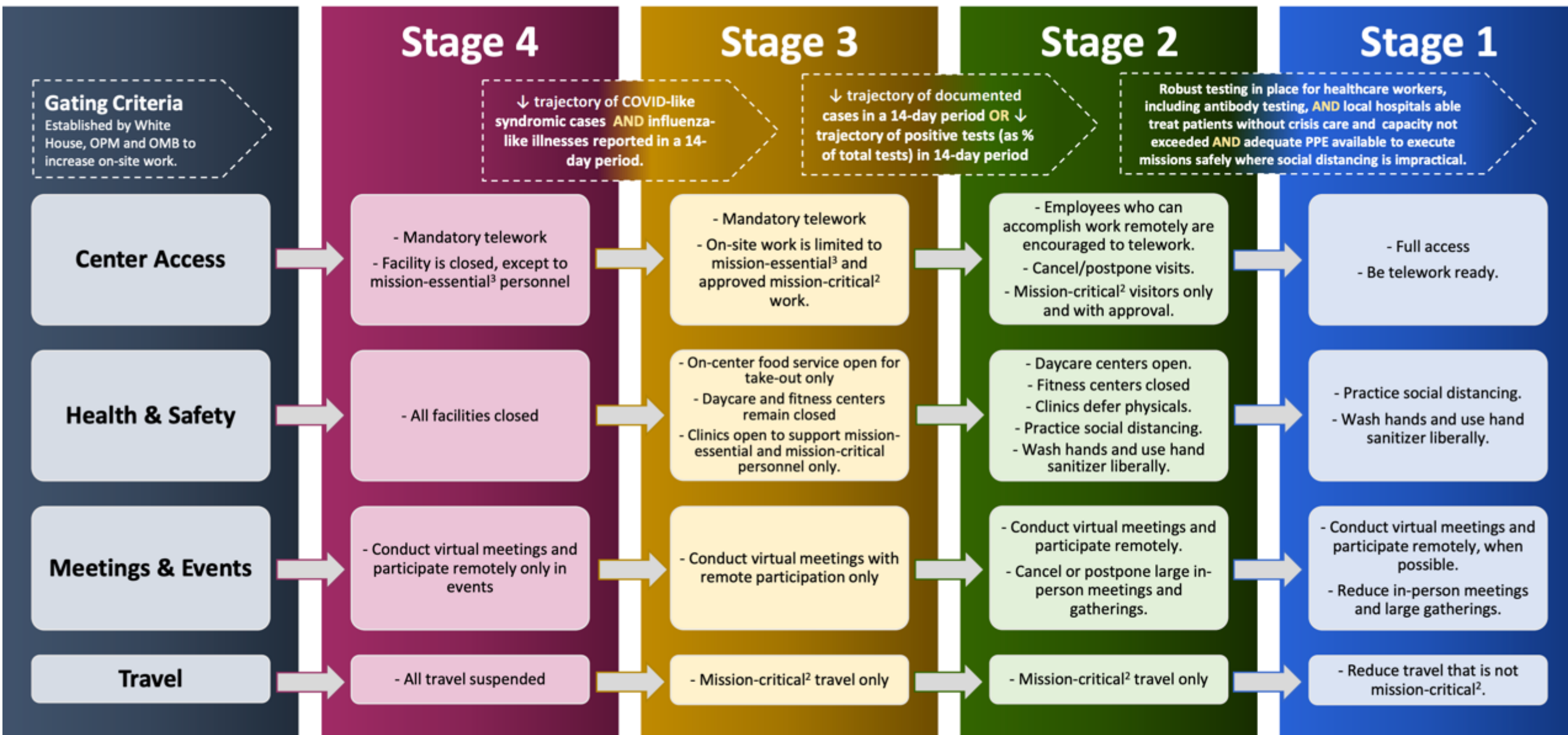
- All NASA Facilities Status as of June 8, 2020



- NASA leadership has developed agency wide guidance that takes into account guidelines provided by the White House and the Offices of Personnel Management and Management and Budget, and calls for a controlled, methodical and flexible return to on-site work

# NASA Framework for Return to On-Site Work (as of 3 May 2020)

\* This guidance applies to NASA civil servants. Contractor employees should reach out to their management.



1. All travel to or from centers at Stage 3 or higher, or to countries at Level 3 or higher, requires an approved Request for Travel Exception form. The [Request for Travel Exception](#) form is available on the NASA People website. For the latest CDC international travel information, go to <https://www.cdc.gov/coronavirus/2019-ncov/travelers/index.html>.

2. **Mission critical:** work that must be performed to minimize the impact on mission/project operations and/or schedules and cannot be performed remotely or virtually.

3. **Mission essential functions:** As described in the COOP, during an emergency, NASA's Primary and Mission Essential Functions (P/MEFs) must be continued with minimum interruption and are focused on protecting life and property as well as insuring agency leadership and control of the agency.

Astrophysics	Earth	Planetary	JASD
<b>JWST</b>	Landsat-9	<b>Mars 2020</b>	GOES-T
WFIRST	PACE	DART (APL)	GOES-U
WFIRST Coronagraph	NISAR	Lucy	JPSS-2
GUSTO	SWOT	Psyche	JPSS-3 and 4
IXPE	Sentinel-6 Michael Freilich	JUICE	SWFO-L1
Euclid	TEMPO	MMX MEGANE and P-Sampler	
SPHEREx	GeoCarb	Europa Clipper	<b>Helio</b>
ARIEL	EMIT	VIPER	HERMES
XRISM	MAIA	Dragonfly	IMAP
Balloons	CLARREO-PF	Luna-H Map	PUNCH
Athena, LISA	TROPICS	MOMA-MS	AWE
SOFIA	PREFIRE	Lunar Trailblazer	TRACERS
<b>ESSIO</b>	GLIMR	<b>JANUS</b>	EscaPADE
NPLP	TSIS-2		Sounding Rockets
CLPS - Astrobotics, Intuitive Machines, Masten Space Systems	Libera		SunRISE
LSITP	Airborne Science		

# Missions in Development: Return to Site Status

## Status as of June 8, 2020

- **Red:** Work at Stage 4
- **Green:** Approved to work on site
- **Yellow:** Expected to submit for approval
- **Grey:** Not yet requested to work on site

# SMD COVID-19 Impacts to Date

- Duration and impact of COVID-19 disruptions continues to be uncertain, especially for projects in formulation
  - Many, but not all, SMD activities are affected
  - Impacts from inefficiencies for on-site work due to safety concerns with proximity and personal protective equipment (PPE) both at NASA and industrial partners
  - Potential impacts of supply chain
- Interagency partnership missions are continuing—most work with minimal impact to date
- Minimal impact to Mars 2020. Preparations continue at NASA's Kennedy Space Center
- James Webb Space Telescope Status
  - Although the NASA portion of the NASA/NGSS team returned home mid-March, and I&T at NGSS had reduced shifts, Observatory I&T continued making progress
- Operational missions:
  - Have not lost any data since the COVID issues
  - Have mitigation plans, e.g., backup Mission Ops Centers
- Airborne assets in place to assist Mars 2020 (and other projects) as well as disaster relief

# SMD COVID-19 Response – R&A

- SMD acknowledges that the impacts of the COVID-19 epidemic do not affect us all equally
  - SMD does not want the COVID-19 epidemic to derail the careers of future leaders (graduate students, post-docs, and early career researchers in soft-money positions)
  - SMD is finalizing a process to provide limited adjustments (augmentations or funded extension requests) to existing grants and will release the guidance at the end of the month
    - The guidance will also prioritize how these requests are considered
- SMD is also considering options for helping SMD-funded, recently graduated PhDs and post-docs whose appointments are ending to weather the expected freeze in hiring by many research institutions
  - SMD is expanding number of NPP Fellows – currently identifying the number that can be supported
  - SMD is also working with NASA Centers to see if term-limited hiring approaches can be used too
- Review panels have all been converted to virtual events and are functioning well albeit in some cases taking longer than originally planned
  - Expect this to be the norm until at least September
- NASA's implementation of OMB's guideline for managing grants can be found at <https://science.nasa.gov/researchers/sara/library-and-useful-links>

# SMD COVID-19 Response – R&A (continued)

- Several more ROSES due dates have been moved based on community comments
  - ESD is working to resolve the pile-up of three ROSES solicitation in the same focus area (MAP, PO, Cryo)
  - Cryosphere Science has already been delayed by four weeks
  - Step-2 due dates for 5 planetary science solicitations have also been delayed
- Honoraria for peer reviewers have been raised in general and funding to partially defray the added costs of participation in virtual panels has been added as well
- Planetary Science and Astrobiology Decadal Survey has started
  - White paper due date moved to July 4<sup>th</sup> but can't be moved later
    - Looking into how to monitor COVID impacts to diversity of white paper authors
  - LPSC Decadal Survey Early Career Workshop conducted virtually
  - LPSC Session on the results of the Planetary Mission Concept Studies also conducted virtually  
Several hundred individuals attended
  - Co-Chairs have been named, Robin Canup (SwRI) and Phil Christensen (ASU)
- Astrophysics Decadal Survey proceeding
  - Final report will be delayed until Spring 2021

# Earth Science COVID-19 Research Proposals

Earth Science Division released a new opportunity on 3/31/20 under ROSES 2020 Element A.28 Rapid Response and Novel Research in Earth Science (RRNES) “Making Innovative Use of NASA Satellite Data to Address Environmental, Economic, and/or Societal Impacts of the COVID-19 Pandemic”

- Addresses research in underlying physical, biological and/or Applied Sciences-related topics characterizing impacts of decisions or efforts to inform decision makers on regional-to-global levels in their responses to mitigate the impacts of the disease
- Proposed studies must use NASA satellite data and information products as primary research tools, may also utilize additional remote sensing data and products from government agencies, international, or commercial sources
- Rolling deadline – over 100 inquiries, over 30 proposals received, seven selections to date, plus one augmentation
- Period of performance 12 months or less
- Est Over \$1M selected, investment could increase pending submissions
- Selection overview: <https://science.nasa.gov/earth-science/rrnes-awards>
- POC: Dr. Laura Lorenzoni ([laura.lorenzoni@nasa.gov](mailto:laura.lorenzoni@nasa.gov))

# Space Apps COVID-19 Challenge



- Global Virtual Hackathon
  - Over 15,000 individuals registered
    - 2,000+ teams, 1400+ projects
  - Participants from 150 countries
    - Brazil, Egypt, and USA had the most participants
  - 24 chat channels in six languages hosted 220+ subject matter experts from the space agency partners to answer data questions
- Challenges: 12 challenges in four thematic areas using EO data:
  - Virus and its spread
  - Local response/change and solutions
  - Changes in the Earth system/Earth system response
  - Economic opportunity, impact, and recovery during and following COVID-19





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*Engineers and technicians working on the Mars 2020 Perseverance team insert 39 sample tubes into the belly of the rover. The rover will carry 43 sample tubes to Mars' Jezero Crater. The image was taken at NASA's Kennedy Space Center in Florida on May 20, 2020.*

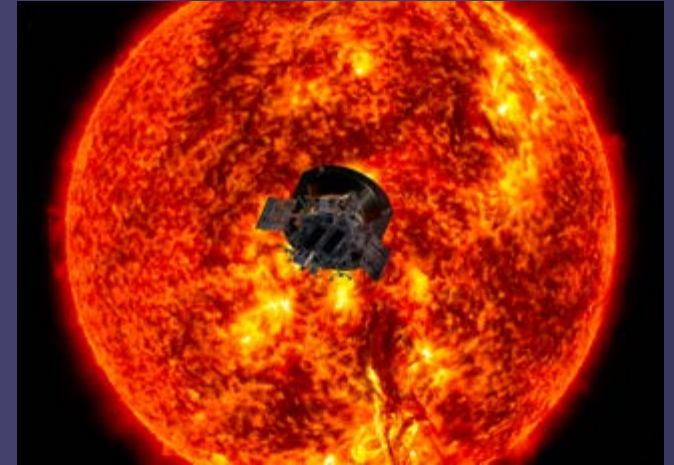


*On May 15, the primary structure for NASA's Double Asteroid Redirection Test (DART) spacecraft returned to the Johns Hopkins Applied Physics Laboratory (APL) in Laurel, Maryland equipped with its chemical propulsion system and elements of its electrical propulsion system.*

# Parker Solar Probe



## SCIENCE HIGHLIGHT



*May 9, 2020 – Parker Solar Probe entered its fifth orbit around the Sun, activating its instruments at a distance of 62.5 million miles from the Sun's surface, marking the start of the mission's longest observation campaign to date. This mission continues to revolutionize our understanding of the Sun.*





*NASA's James Webb Space Telescope fully stowed into the same configuration it will have when loaded into an Ariane V rocket for launch. The image was taken from a webcam in the clean room at Northrop Grumman, in Redondo Beach, California*

# Nancy Grace Roman Space Telescope

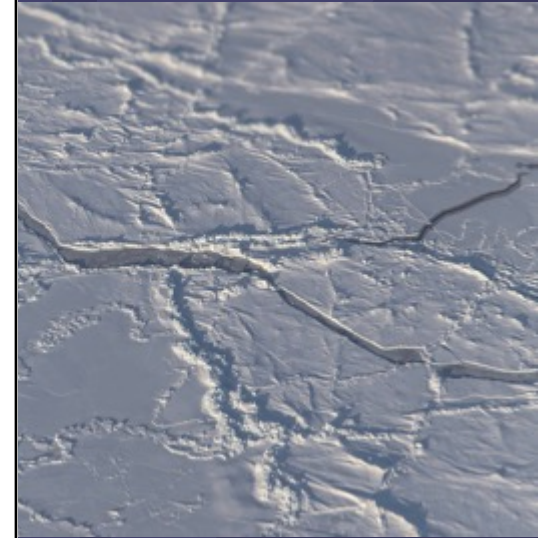


SCIENCE  
HIGHLIGHT



*May 20, 2020 – NASA has named its Wide Field Infrared Survey Telescope (WFIRST), in honor of Nancy Grace Roman, NASA's first chief astronomer, who paved the way for space telescopes focused on the broader universe.*

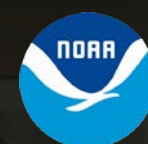
## SCIENCE HIGHLIGHT



2020 – Scientists have used ICESat-2 to measure the thickness of Arctic sea ice, as well as the snow on the ice. A view of the Arctic Ocean with monthly average sea ice thickness spanning November 2018 to November 2019. Low values are depicted in blue, and higher values (5 meters or more) are depicted in magenta.



*The Copernicus Sentinel-6 Michael Freilich satellite is currently being tested at IABG's center near Munich, Germany to ensure that it will withstand the rigors of launch and the harsh environment of space during its life in orbit around Earth.*



SENTINEL 6

# ARTEMIS : Landing Humans On the Moon in 2024



LRO: Continued surface and landing site investigation



Artemis I: First human spacecraft to the Moon in the 21st century



Artemis II: First humans to orbit the Moon and rendezvous in deep space in the 21st Century



Gateway begins science operations in lunar orbit with launch of PPE and HALO



Initial human landing system delivered to lunar orbit



Artemis III: Orion and crew dock to human landing system for crew expedition to the surface



**Early South Pole Robotic Landings**  
*Science and technology payloads delivered by Commercial Lunar Payload Services providers*

**Volatiles Investigating Polar Exploration Rover**  
*First mobility-enhanced lunar volatiles survey*

**Humans on the Moon - 21st Century**  
*First crew leverages infrastructure left behind by previous missions*

**LUNAR SOUTH POLE TARGET SITE**

# Commercial Lunar Payload Services (CLPS)

- Deliveries to the lunar surface initiated using a task order, any of the 14 companies on the CLPS catalog can respond to a task order
- First three lunar surface delivery task orders have been awarded with deliveries commencing in 2021; all three continue to make significant progress
  - Astrobotic (*pictured at top*) continues assembly of the Structural Test Model
  - Intuitive Machines (*pictured at bottom*) held successful design review, continues hot fire testing using moon lander engine
  - Masten developing detailed interface requirements in collaboration with payload development teams, working on launch vehicle contract
- NASA and external partners continue development of manifested payloads for delivery to CLPS lander partners
- **Today at 2:30 pm (EDT) will announce the selection of commercial provider to deliver VIPER (Volatiles Investigating Polar Exploration Rover) to lunar surface in 2023**





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# NASA Science Plan Released

- Science 2020-2024: A Vision for Scientific Excellence released May 28, 2020 at [science.nasa.gov/about-us/science-strategy](https://science.nasa.gov/about-us/science-strategy)
- Through close collaboration with the entire Science Mission Directorate leadership team and NASA Center Directors, laid out ambitious program over next five years to build on current activities and drive change in high-priority areas where we can have the greatest impact
- Demonstrated commitment to excellence across SMD portfolio through leadership and strategic engagement with partners
- Consulted with the NAC Science Committee and Space Studies Board ad hoc committee to validate approach
  - Thank you to Jeff Dozier (Chair), Victoria Hamilton (Vice Chair), and members of the ad hoc committee
- Will continually assess progress for transparency and accountability



# NASA Science Strategic Approach

## VISION

Lead a globally interconnected program of scientific discovery that encourages innovation, positively impacts people's lives, and is a source of inspiration

## MISSION

Discover the secrets of the universe

Search for life elsewhere

Protect and improve life on Earth

## VALUES

Excellence

Leadership

Integrity

Teamwork

Safety

## FOCUS

Exploration and Scientific Discovery

Innovation

Interconnectivity and Partnerships

Inspiration



## Exploration and Scientific Discovery

Seeking to discover the secrets of the universe, search for life, and protect and improve life on Earth. We utilize a balanced portfolio approach that is informed by Decadal Surveys and is responsive to Administration priorities and direction from Congress to make progress and enhance opportunities for cross-disciplinary science.



## Innovation

Fostering a culture that recognizes innovation and measured risk-taking as the cornerstones of a forward-looking program of scientific discovery. We encourage innovation, entrepreneurship, and collaboration in pursuit of common goals and to capitalize on the rapid evolution of commercial capabilities.



## Interconnectivity and Partnerships

Forming strategic partnerships that leverage each contributor's strengths to yield advances for mutual benefit. We recognize and support the important role NASA Centers, Federal agencies, private industry, academia, non-profits, community-based organizations, and international partners play in helping make our scientific vision a reality.



## Inspiration

Building opportunities to encourage as wide an audience as possible to engage in our work. We seek to reduce barriers to entry, in order to allow people of all ages and backgrounds to join us for the benefit of the entire scientific and engineering community, as well as the world.

## VISION

To lead a globally interconnected program of scientific discovery that encourages innovation, positively impacts people's lives, and is a source of inspiration

## MISSION

Discover the secrets of the universe. Search for life elsewhere.  
Protect and improve life on Earth

### PRIORITY 1: Exploration and Scientific Discovery

**STRATEGY 1.1:** Execute a balanced science program based on discipline-specific guidance from NASEM, Administration priorities, and direction from Congress

**STRATEGY 1.2:** Participate as a key partner in the agency's exploration initiative, focusing on scientific research of and from the Moon, lunar orbit, Mars, and beyond.

**STRATEGY 1.3:** Advance discovery in emerging fields by identifying and exploiting cross-disciplinary opportunities between traditional science disciplines

**STRATEGY 1.4:** Develop a Directorate-wide, target-user focused approach to applied programs, including Earth Science Applications, Space Weather, Planetary Defense, and Space Situational Awareness

### PRIORITY 2: Innovation

**STRATEGY 2.1:** Foster a culture that encourages innovation and entrepreneurship across all elements of the SMD portfolio.

**STRATEGY 2.2:** Foster a culture that encourages collaboration in pursuit of common goals.

**STRATEGY 2.3:** Enhance our focus on high intellectual risk/high impact research investments.

**STRATEGY 2.4:** Drive innovation in focused technology areas to capitalize on the rapid evolution of commercial capabilities

### PRIORITY 3: Interconnectivity and Partnerships

**STRATEGY 3.1:** Actively engage with the NASA Centers to make more informed strategic decisions that further NASA's scientific goals and are aligned with each Center's unique capabilities.

**STRATEGY 3.2:** Actively seek collaborations with international partners based on their unique capabilities and mutual scientific goals.

**STRATEGY 3.3:** Actively engage with other federal agencies to make more informed decisions, cooperate in scientific research, and pursue partnerships that further national interests.

**STRATEGY 3.4:** Provide increasing opportunities for research institutions, including academia and non-profits, to contribute to SMD's mission.

**STRATEGY 3.5:** Pursue public-private partnerships in support of shared interests with industry.

### PRIORITY 4: Inspiration

**STRATEGY 4.1:** Increase the diversity of thought and backgrounds represented across the entire SMD portfolio through a more inclusive environment.

**STRATEGY 4.2:** Purposefully and actively engage with audiences and learners of all ages to share the story of NASA's integrated science program.

A child in a red space suit is walking on a lunar surface. In the background, the Earth is visible in the dark sky. The scene is set against a dark, reddish-brown background with a large blue circular graphic on the left side.

# 2024 Future State

- Implement recommendations of Decadal Surveys in concert with national priorities and needs through creative partnership models that go beyond traditional ways of developing and executing missions
- Challenge assumptions about what is technically feasible and enable revolutionary scientific discovery through a deliberate focus on innovation, experimentation, and cross-disciplinary research
- Create a more collaborative culture within SMD and across science community, encouraging diversity of thought, sharing best practices, and informed risk-taking to improve operations
- Develop future leaders and inspire learners of all ages through new opportunities and hands-on experiences
- **Read the full document at [science.nasa.gov/about-us/science-strategy](https://science.nasa.gov/about-us/science-strategy) to understand our priorities and how we will continue to interact with the community**

# EXPLORE

with us

