



GODDARD SPACE FLIGHT CENTER



THIS IS SCIENCE

THE GODDARD PROJECT LIFE CYCLE

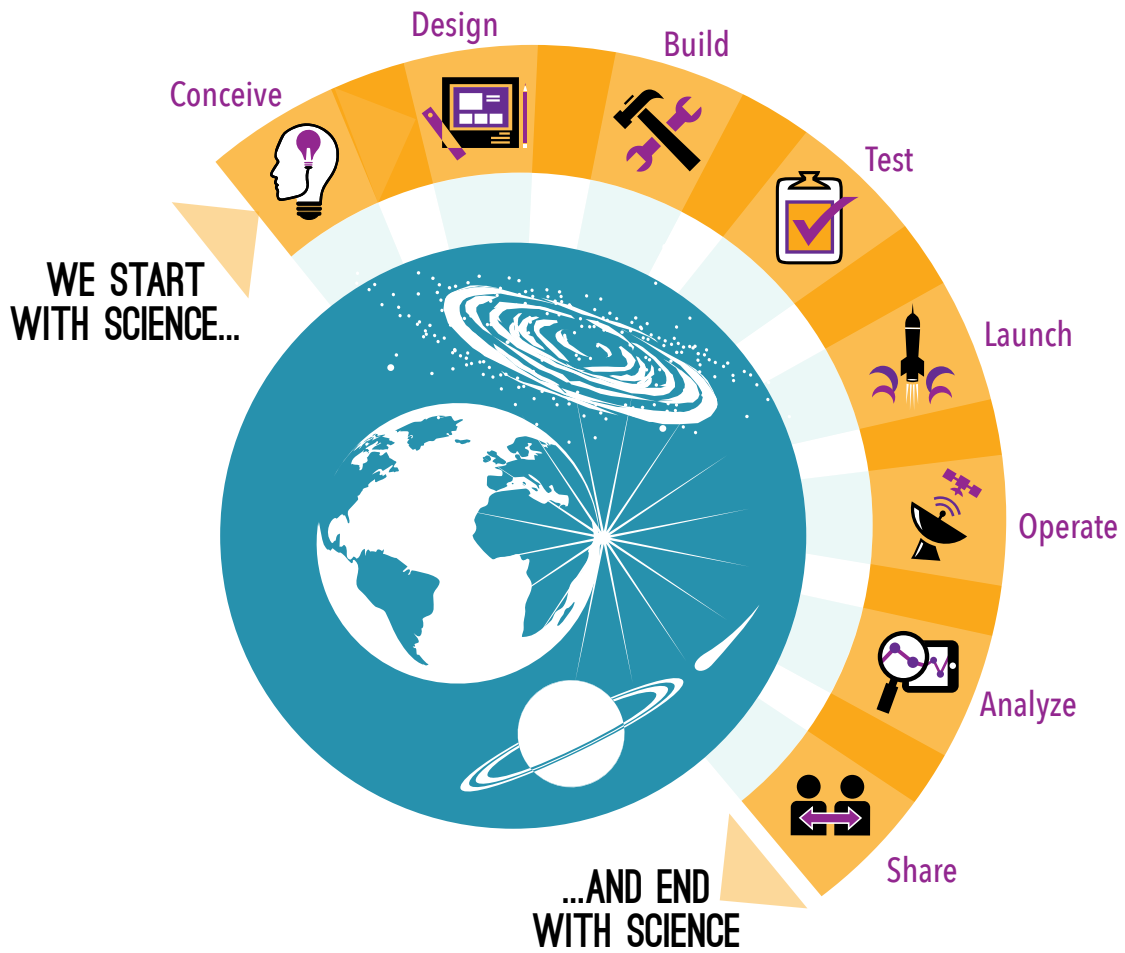


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GLOBAL PROVIDER OF SCIENTIFIC RESEARCH, TECHNOLOGY AND MISSIONS THAT TRANSFORM OUR KNOWLEDGE OF EARTH AND SPACE

NASA's Goddard Space Flight Center has been working since 1959 to increase scientific understanding and answer humanity's most pressing questions about our world, the solar system and beyond, all for the benefit of society and the communities we serve. The center's work in science, engineering, technology and communications strengthens our ability to envision the origins of life, preserve our way of living and define our place in the universe. We identify requirements and innovations; design, build and launch spacecraft; and manage and support space missions. Our fundamental communications infrastructure enables NASA and others to retrieve knowledge from space, share it with diverse customers and apply it to society in countless ways.

ONE WORLD-CLASS ORGANIZATION: SIX UNIQUE SITES • OVER 10,000 PEOPLE PLUS MANY OTHER LOCATIONS WORLDWIDE

GODDARD
Greenbelt Campus • Maryland

Est. 1959

Est. 1945
WALLOPS FLIGHT FACILITY
WALLOPS ISLAND VIRGINIA

Est. 1978*
WHITE SANDS COMPLEX
LAS CRUCES NEW MEXICO

Est. 1961
COLUMBIA SCIENTIFIC BALLOON FACILITY
PALESTINE TEXAS

Est. 1961
GODDARD INSTITUTE FOR SPACE STUDIES
NEW YORK CITY NEW YORK

Est. 2000^
INDEPENDENT VERIFICATION & VALIDATION FACILITY
FAIRMONT WEST VIRGINIA

*Goddard-managed ground communications stations
^Goddard-assumed management

ROBERT H. GODDARD
THE FATHER OF MODERN ROCKETRY
(1882–1945) The American engineer, professor, physicist, and inventor credited with creating and building the world's first liquid-fueled rocket.

EDUCATING

12,275 Students Impacted
IV&V Educator Resource Center

30,000 Boy Scouts Educated on 2017 Total Solar Eclipse

INSPIRING

236 MILLION+ Flickr Views

144 MILLION+ YouTube Views
(most among all NASA YouTube accounts)

ENGAGING

620 NASA.gov Articles Published

11,775 Visitor Center Tour Participants

DID YOU KNOW? Goddard has launched more than 300 robotic missions to date.

Goddard AT A GLANCE



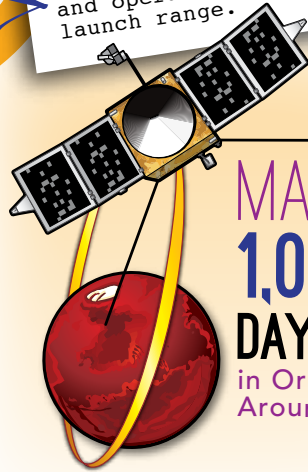
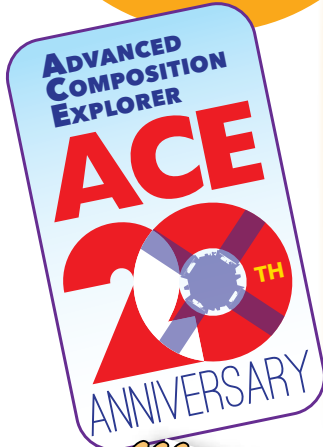
NASA's only owned and operated rocket launch range.



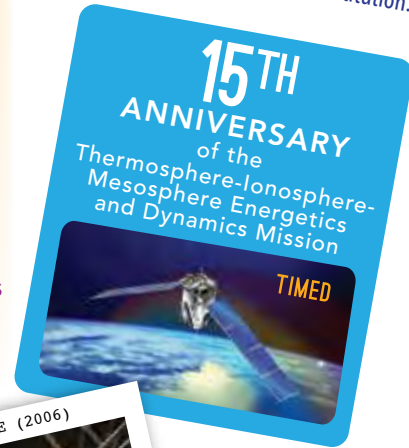
1,700+
BALLOONS
LAUNCHED FROM THE COLUMBIA SCIENTIFIC BALLOON FACILITY



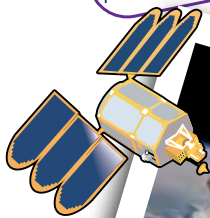
Goddard has built and operated more Earth science research satellites than any other institution.



MAVEN
1,000+
DAYS
in Orbit Around Mars



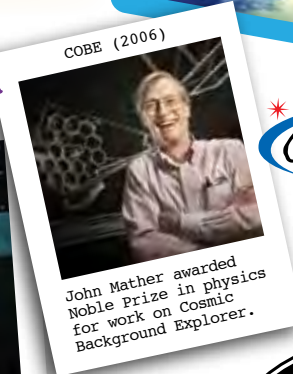
GODDARD'S FIRSTS



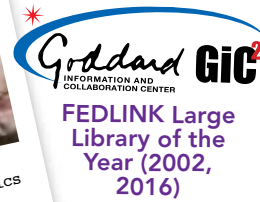
Total Ozone Mapping Spectrometer launches aboard Nimbus 7, later discovering the ozone hole and long-term damage to the ozone layer.



First Tracking and Data Relay Satellite deploys, providing global coverage for space communications networks.



John Mather awarded Noble Prize in physics for work on Cosmic Background Explorer.



HUBBLE SPACE TELESCOPE



DATA PUBLISHED IN **15,000+** SCIENTIFIC PAPERS

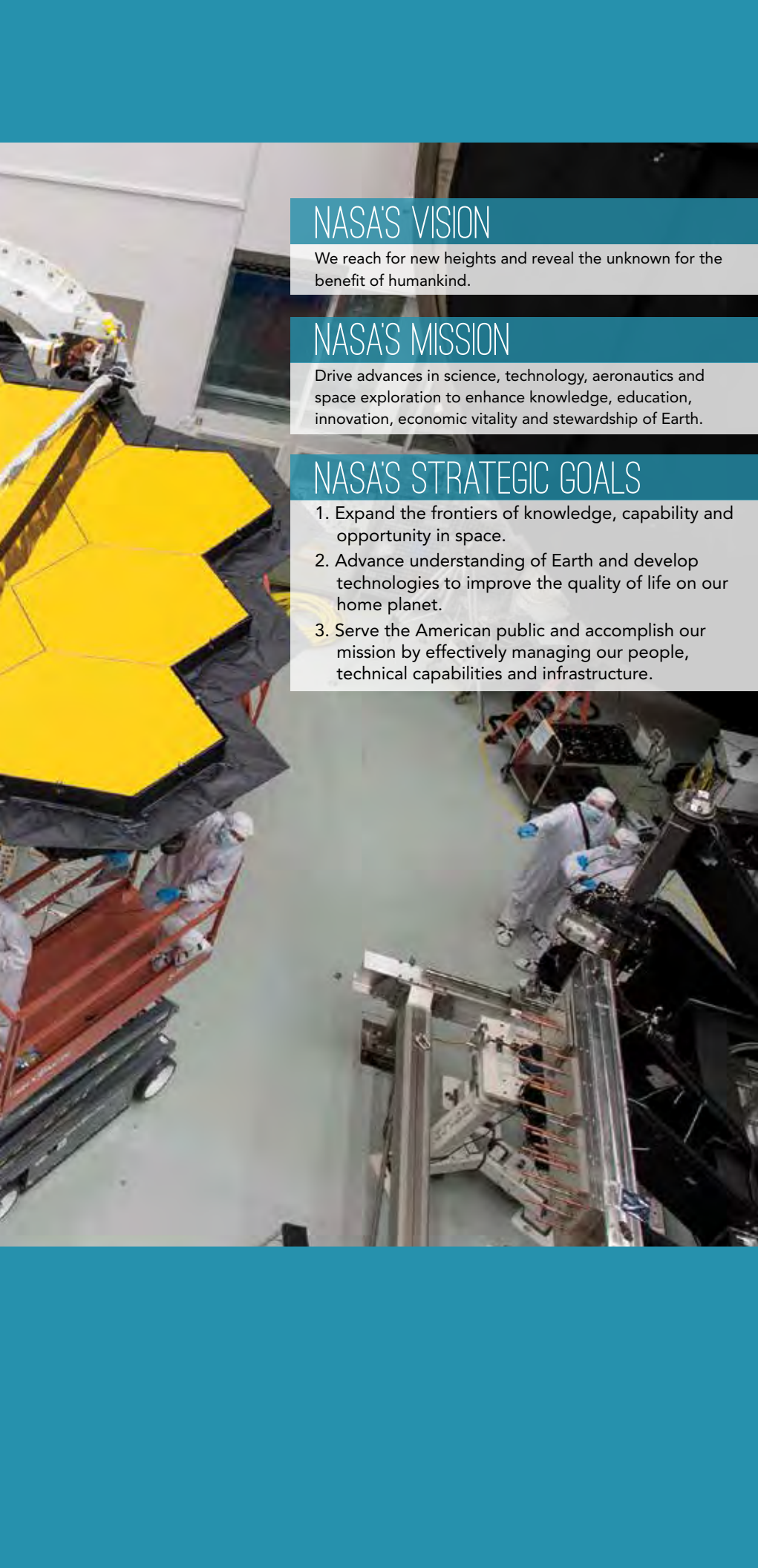
www.nasa.gov/goddard



A high-angle photograph of a large, yellow, hexagonal satellite component, likely a solar panel array, being assembled in a cleanroom. Several technicians in white protective suits and blue gloves are working on the component. One technician is on a red scissor lift, while others are on the floor. The cleanroom has large windows and various pieces of equipment. The text "THIS IS WHO WE ARE" is overlaid in white on the top left.

THIS IS WHO WE ARE

OUR LEGACY



NASA'S VISION

We reach for new heights and reveal the unknown for the benefit of humankind.

NASA'S MISSION

Drive advances in science, technology, aeronautics and space exploration to enhance knowledge, education, innovation, economic vitality and stewardship of Earth.

NASA'S STRATEGIC GOALS

1. Expand the frontiers of knowledge, capability and opportunity in space.
2. Advance understanding of Earth and develop technologies to improve the quality of life on our home planet.
3. Serve the American public and accomplish our mission by effectively managing our people, technical capabilities and infrastructure.

A PLACE FOR SCIENCE

We advance NASA's mission by leading scientific research and building, launching and operating scientific instruments, spacecraft and information systems. As a science center, Goddard seeks to understand Earth and explore the universe through robust programs in Earth science, astrophysics, heliophysics and planetary science. As a space-flight center, Goddard utilizes its core technical and programmatic expertise and facility capabilities to execute a broad range of flight missions and field campaigns. We are committed to enabling innovation and developing new technologies that expand NASA's technical capabilities in support of its overarching mission. Goddard then applies its breakthroughs to society: stimulating economic growth, educating future generations, and inspiring the nation and the world.

A MESSAGE FROM THE CENTER DIRECTOR

Since its establishment in 1959 as the agency's first spaceflight center, NASA's Goddard Space Flight Center has built a legacy in advancing humanity's knowledge of the universe, from our home planet to the farthest galaxies and everything in between. We opened the center with borrowed offices. Today, our sprawling campus and remote sites boast the world's largest concentration of scientists, engineers and technologists dedicated to the study of space. Their collective work over the decades has elevated our global reputation in the core areas of astrophysics, Earth science, heliophysics, planetary science, and engineering and technology.

In 2017, we celebrated the continuous productivity of some missions, said goodbye to others and pushed forward with some of NASA's largest projects that will change the landscape of space exploration in the years to come.

Within our solar system, the MAVEN spacecraft completed 1,000 days in orbit around Mars and discovered metal in its ionosphere, providing clues into how the Red Planet's atmosphere is dissipating into space. The Cassini mission, for which Goddard contributed three instruments, made its "Grand Finale" as it dove into Saturn's atmosphere following 20 years of landmark discoveries. As we bid farewell to Cassini, we moved ahead with Lucy, a future mission which will

explore Jupiter's Trojan asteroids and provide possible clues into the origins of the solar system.

Closer to home, our exhaustive portfolio of Earth science missions continued to monitor our planet's changing climate, with data ranging from precipitation and soil moisture to ice sheet balance and air quality. Forecasters and first responders relied on our data, along with those of our partners, as several hurricanes made landfall in the United States and its territories. We also launched the next Geostationary Operational Environmental Satellite, continuing a long-standing relationship with the National Oceanic and Atmospheric Administration to advance the nation's weather forecasting capabilities.

We worked with partners to move Parker Solar Probe closer to launch. The mission is the first of its kind, flying directly in the face of the sun to measure its magnetic fields. In August, when a total solar eclipse traversed the contiguous United States for the first time in nearly a century, Goddard was at the center of it all, spearheading NASA's efforts to

engage, educate and inspire the public around this rare scientific phenomenon.

Looking deeper into the cosmos, the Hubble Space Telescope remains at the peak of its scientific productivity 27 years after launch. When scientists discovered several planets with characteristics conducive to life in the TRAPPIST-1 exoplanet system, Hubble set out to screen those within the "habitable zone." In May, after years of integration and testing, the science payload for the James Webb Space Telescope left Goddard for additional tests at NASA's Johnson Space Center in Houston prior to final testing and integration in California. Set to be the most powerful space telescope ever built upon its completion and launch in 2019, Webb will observe the formation of the first stars and galaxies and help determine how they evolved over billions of years. Goddard will provide overall mission management for Webb after it is fully commissioned in space and perched a million miles away from Earth.

This report highlights our achievements over the past year in greater detail and outlines our goals for the future, all while celebrating the men and women whose tireless dedication and commitment make it all possible. It also underscores the importance of our work to the nation and communities we serve, knowing full well that the

public is and always will be our greatest stakeholder.

Our journeys into space are among the greatest ever undertaken in history, redefining

humanity's understanding of possibility and progress, but our work is far from over. As we approach six decades in operation, we stand at the threshold of new challenges and opportunities.

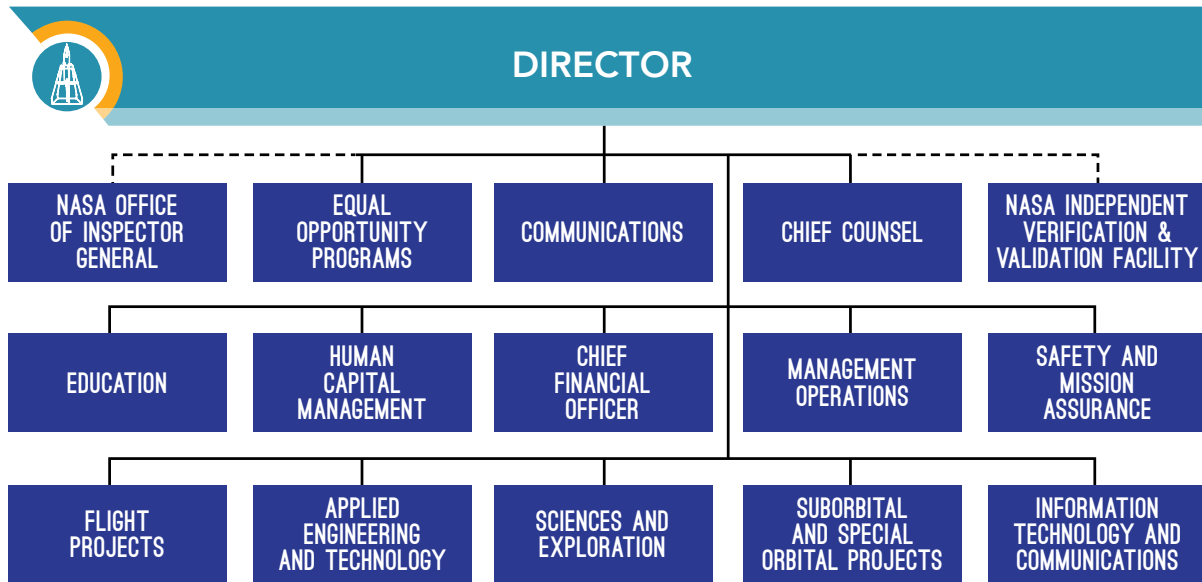
Similar to the days of our humble beginnings, the possibilities of what we can accomplish are as limitless as the boundaries of the universe.

Chris Scolese • Center Director



NASA'S
GODDARD
SPACE FLIGHT CENTER
HAS ADDRESSED SOME OF
HUMANITY'S GREATEST QUESTIONS

OUR ORGANIZATION



AN INNOVATION STATION

As in the early years of space exploration, Goddard scientists, engineers and technologists remain committed to innovating solutions that advance humanity's quest to understand the cosmos. Today, they are addressing everything from nanosized instrument components invisible to the naked eye to mission concepts designed to answer fundamental questions in astrophysics, Earth science, heliophysics and planetary science.

Although the center's innovators advance their ideas through a variety of funding mechanisms, Goddard's Internal Research and Development, or IRAD, program serves as the initial source of support for many. Managed by the Goddard Office of the Chief Technologist, this program provides seed funding to promote advanced technology, reduce technological risk and develop new mission concepts.

Fiscal 2017 proved to be exceptionally productive for the center's scientists, engineers and technologists.



For example, at least 16 Goddard teams flew or were scheduled to fly advanced technologies and payloads on one of many different types of scientific platforms, including the International Space Station, research aircraft, scientific balloons, sounding rockets and CubeSats.

Some demonstrated new capabilities, like the radiometer flown on the Goddard-led IceCube CubeSat mission launched in April. Others represented Small Explorer-class payloads, like the Neutron star Interior Composition Explorer, or NICER, mission launched in May to the International Space Station, where it is studying neutron stars and demonstrating next-generation X-ray navigation techniques.

In addition to flight opportunities, Goddard professionals also proved successful in winning

three Phase A Explorer-class mission studies and at least five CubeSat mission studies. These missions cover the gamut, studying everything from the electromagnetic counterparts to gravitational waves, solar flares and comets to water on the moon, the plumes on Saturn's moon Enceladus and why planets lose their atmospheres.

Meanwhile, the Goddard Strategic Partnerships Office continues to forge innovative partnerships that link the center's internal inventors with corporations, startups, universities and other government agencies. This fiscal year, the office was responsible for collecting 221 new technologies, resulting in 38 patent applications filed by Goddard.

These examples cover just a fraction of the successes that the center's technologists enjoyed in fiscal 2017. Because of their efforts, Goddard is well-positioned strategically to realize new missions and gain an even richer understanding of Earth and the universe in the future.





GODDARD SHINES BRIGHT...

For the first time in nearly a century, a total solar eclipse swept across the contiguous United States from coast to coast on Aug. 21, 2017, bringing hundreds of millions of people together to watch one of nature's most awe-inspiring sights. The path of totality traversed 14 states, while all other states—as well as the rest of North America—witnessed at least a partial eclipse. Viewing events were held nationwide, including at NASA's Goddard Space Flight Center, which organized a gathering for employees on its main campus as well as one for the public at the Goddard Visitor Center.

Whether they gazed up at the sun with eclipse glasses, looked down at the sun's projection from a pinhole viewer, watched a live stream online or simply wanted to learn more about the science, spectators around the country turned to Goddard every step of the way to make it an educational, safe and enjoyable experience.

NASA Headquarters in Washington reached out to the Goddard Heliophysics Education Consortium in 2015 to put an agency plan in place for covering this once-in-a-lifetime event and engaging the masses. For nearly two years, the team developed partnerships and participated in countless outreach efforts, ensuring NASA was at the forefront of this landmark occasion. Furthermore, the center's scientists participated in more

than 500 media interviews to further educate the public. Goddard's work, resources, videos and photos were documented on NASA's official eclipse website: eclipse2017.nasa.gov.

Total page views for the eclipse site and www.nasa.gov topped 90 million on Aug. 21, breaking the agency's previous web traffic record for one event about seven times over. The eclipse site was the most popular government website for weeks leading up to the eclipse.

Safety: Our No. 1 Priority

There was no shortage of public enthusiasm for the eclipse, but the most important task was teaching spectators how to stay safe. Whether focusing on eye protection or travel precautions in the path of totality, safety remained a key message throughout all NASA campaigns.

A safety viewing bulletin was developed with input from six organizations—NASA, American Astronomical Society, American Academy of Ophthalmology, American Academy of Optometry, American Optometric Association and National Science Foundation—ensuring consistent and accurate safety messages.

In the weeks and months leading up to Aug. 21, Goddard distributed at least 40,000 pairs of eclipse glasses—all certified safe for viewing by the International

Organization for Standardization—and other educational materials to the public, scientific organizations, educational institutions, museums, libraries and community groups. In addition to explaining the proper usage for glasses, the website cited information from the Department of Transportation's eclipse guide, outlined hiking and outdoor safety tips, and taught parents how to keep kids safe during viewing.

On June 21, exactly two months before the eclipse, NASA co-hosted an overview and safety briefing at the Newseum in Washington, D.C., allowing the public and press to discuss safety issues with experts from Goddard, NASA Headquarters, the National Park Service and other organizations.

Engaging Our Partners: From the National Pastime to National Parks

To ensure a NASA presence along the entire path of totality, Goddard secured partnerships with dozens of organizations hosting eclipse-related gatherings in or near the 70-mile-wide path. The Goddard team recruited subject matters experts from within and outside the agency, assigning them to locations across the country and coordinating their involvement in events and interviews. Among these partnerships were three Minor League Baseball teams in Oregon, Idaho and South Carolina. The teams delayed their games on Aug. 21

...DURING HISTORIC SOLAR ECLIPSE

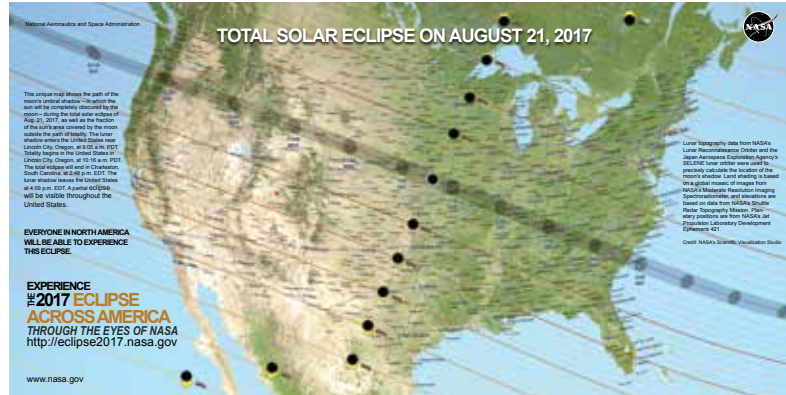
to allow attendees to view the eclipse between pitches—the first such delays in professional baseball history—while NASA distributed glasses and educational materials.

Several of these locations were featured on NASA's broadcast on the day of the eclipse—"2017 Eclipse Across America: Through the Eyes of NASA"—which aired live on NASA Television and multiple viewing platforms. The live stream of the broadcast became one of the most viewed Internet events in recent history, surpassing streaming figures from recent Super Bowls.

Twenty-one national parks lie within the path of totality, and NASA partnered with the National Park Service to hand out glasses, brochures, maps and educational materials, as well as solar eclipse patches to more than 30,000 Boy Scouts. Three hundred boxes containing eclipse-related materials and activities were also sent to Girl Scout councils around the country.

Goddard held a weeklong training session in astronomy and eclipse science for 11 Girl Scout council teams, totaling 50 attendees, as a way to encourage them to start Girl Scout astronomy clubs.

Eleven spacecraft from NASA and partners—the National Oceanic and Atmospheric Administration and the Japan Aerospace Exploration Agency—collected data from the sun, moon and



Earth during the eclipse, and Goddard scientists will continue to study the results in the years to come to better understand Earth's interactions with our closest star. Goddard will also study the findings of citizen scientists with whom we partnered during the eclipse. More than 50 student teams used weather balloons to look down at Earth and observe the moon's shadow. Fifty-five college and high school teams launched high-altitude balloons to stream live video for NASA TV and share data with other citizen scientists worldwide. The Citizen Continental America Telescopic Eclipse experiment, or Citizen CATE, was supported by NASA and the National Science Foundation and trained 62 groups deployed along the path of totality to observe the eclipse with nearly identical telescopes and imaging systems. The experiment created first-of-its-kind observations of the eclipse from nearly coast to coast.

Outreach Materials and Distribution

NASA researchers estimate that more than 100 million people

watched the solar eclipse in person. Getting supplies to everyone was one tall order. Glasses, maps and other educational materials needed to be designed, fact-checked and printed prior to distribution. This was no easy task given that plenty of recipients, such as museums, had their own branding requirements for the materials.

The agency also faced some unexpected difficulties, such as when Amazon.com announced that some of the glasses it sold did not meet safety standards and had to issue refunds. When NASA Headquarters and the Goddard team heard about the situation, they ordered and sent out extra glasses at a moment's notice.

Goddard oversaw the production of dozens of print items. In addition to the glasses, these included a full eclipse map, individual maps of the 14 states in the path of totality, posters, fact sheets, safety fliers, 28 one-page science reports, bookmarks, folders, info cards, brochures, pinhole handheld fans and pinhole cards.



JAMES WEBB SPACE TELESCOPE

UNLOCKING THE MYSTERIES OF THE UNIVERSE

In 1996, NASA set off to build a successor to the Hubble Space Telescope that would peer into the far reaches of the universe using infrared light. Engineers came up with a design that included an optical telescope element composed of 18 mirror segments, an integrated science instrument module containing four main science instruments, a sunshield that insulates the telescope's sensitive optics and science instruments from the heat of the sun, and a spacecraft bus that provides support functions for the telescope's operations.

The James Webb Space Telescope, renamed in 2002 after NASA's second administrator, has been under construction for more than 20 years, but this past year marked the beginning of the end for Webb's assembly and testing. After a series of tests at NASA's Goddard Space Flight Center, the combined optical element and instrument module—known as OTIS—moved to NASA's Johnson Space Center in Houston in May 2017 for further testing. With that testing now complete, OTIS will travel to Northrop Grumman's facilities in Redondo Beach, California, for final testing and integration with the sunshield and spacecraft bus. Webb is scheduled to launch from the European Space Agency's spaceport in Kourou, French Guiana, in 2019.

From late 2015 to early 2016, Goddard engineers assembled Webb's primary mirror segments onto the telescope's backplane and support structure, then combined the optical telescope element and integrated science instrument module to create OTIS and form the top half of the entire observatory. The "fully bloomed" 6.5-meter (21.3-foot) primary mirror, the "golden crown" of OTIS, was unveiled to the public in November 2016 during a media day with then-NASA Administrator Charles Bolden and Webb Senior Project Scientist John Mather, a Nobel physics laureate who helped validate the big-bang theory with his work on the Cosmic Background Explorer mission.

A month later, OTIS was subjected to a gauntlet of tests at Goddard—most notably vibration and acoustic tests—ensuring it could survive the rigors of launch and the harsh space environment. From July to November 2017, cryogenic testing at Johnson's Chamber A—the center's massive thermal vacuum testing chamber—ensured the fully assembled OTIS was ready for the extremely cold temperatures in space. The entire integrated observatory will undergo final simulated launch environment testing at Northrop Grumman, followed by flight and deployment testing prior to launch. Goddard will

lead the team that will shepherd Webb through its commissioning—the process of readying the telescope for science observations—which will begin as soon as the spacecraft separates from its Ariane 5 launch vehicle. At the start of commissioning, the telescope will unfold from its stowed position as it journeys for about 30 days to its orbit at Earth's second Lagrange point, a stable orbiting location about 1.5 million kilometers (approximately 1 million miles) away from Earth. Once fully deployed, Webb will undergo the next steps of the commissioning process: aligning the telescope's mirrors, calibrating the telescope and making sure all of its instruments are functioning properly. After commissioning, Goddard will provide overall mission management, and the Space Telescope Science Institute in Baltimore will perform flight and science operations.

Once in orbit and commissioned for observations, Webb will begin to fulfill its science mission: to observe the formation of the first stars and galaxies, to help discover how galaxies have assembled and evolved over billions of years, to peer into cosmic nurseries to witness the formation of stars and planetary systems, and to analyze the atmospheres of exoplanets and potentially identify the building blocks of life.

The James Webb Space Telescope, the scientific complement to NASA's Hubble Space Telescope, will be the premier space observatory of the next decade. Webb is an international project led by NASA with its partners, ESA (European Space Agency) and CSA (Canadian Space Agency).

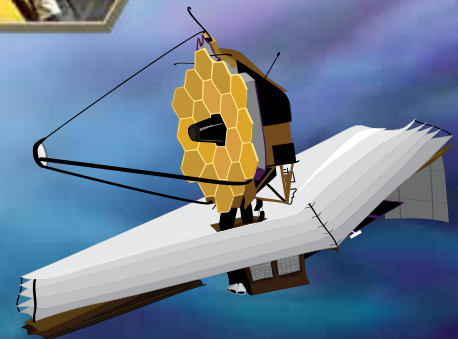
In addition to its international partners, NASA's Webb telescope has benefitted from the work of several contractors across the United States that have been integral parts of the observatory's assembly and

testing, including Northrop Grumman, Ball Aerospace and Harris Corporation.

For more information about the James Webb Space Telescope, visit www.webb.nasa.gov or www.nasa.gov/webb.



WEBB WILL BE THE PREMIER OBSERVATORY OF THE NEXT DECADE, SERVING THOUSANDS OF ASTRONOMERS WORLDWIDE. IT WILL STUDY EVERY PHASE IN THE HISTORY OF OUR UNIVERSE.





OUR FOCUS AREAS



EARTH SCIENCE

Observes and studies Earth's system to further scientific understanding of our home planet and improve predictions of its evolving state due to human behavior and natural changes.



ASTROPHYSICS

Investigates the universe through astronomy, astrophysics and fundamental physics on issues such as dark matter and energy, life-harboring planets and black holes.



HELIOPHYSICS

Researches the sun and the constantly changing magnetic system that surrounds it—which affects Earth, the planets and the space environment extending far out into the solar system.

CROSS-CUTTING TECHNOLOGIES

Sensor Systems and Instrument Platforms

Goddard develops and builds missions and instruments, from subsystems (detectors and optical elements) to complete instruments and instrument suites.

Large-Scale Scientific Information Systems, Data Processing and Dissemination

Goddard designs and implements custom, large-scale data systems and supercomputing applications for high-performance computing and archiving of a wide range of science data.

In-Space Satellite Servicing

Goddard services enable extended mission operations, reconfiguration and recovery, including in-orbit spacecraft refueling and repair, and assembling large structures in orbit and modular designs.



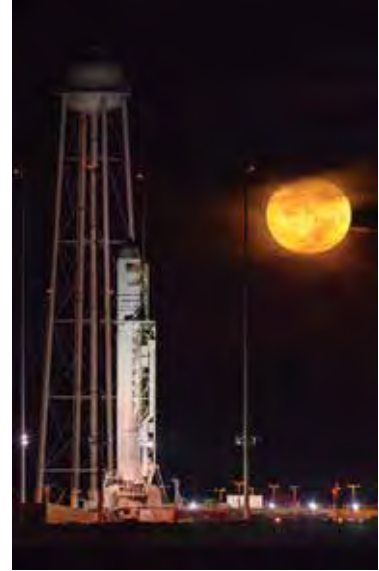
PLANETARY SCIENCE

Investigates the planets, moons and small objects in the solar system and beyond, including their evolution, inner structures and forces that alter them.



SPACE COMMUNICATIONS AND NAVIGATION

Develops systems, technologies and services in support of science, exploration and space operations missions that are near Earth and in deep space.



SUBORBITAL PLATFORMS AND RANGE SERVICES

Manages programs and services for sounding rockets, balloons, aircraft and commercial space, including NASA's only launch facility—Wallops Launch Range.

OTHER ENABLING CAPABILITIES

Program and Project Management

Goddard conducts effective, tailored management and cost estimation, maintains schedules, develops technology, manages risk, and assures outcomes for missions and their supporting elements and services.

End-to-End Mission Systems Architecture and Engineering

Goddard addresses the full life cycles of science missions, spacecraft, *in situ* and remote-sensing instruments, and payloads, from advanced concepts through implementation.

Safety and Mission Assurance

Goddard is a recognized leader in safety and mission assurance with a lengthy history of implementing effective and innovative approaches to reduce risk and enable mission success.



2017 IN FIGURES

ONE GODDARD
MORE THAN 10,000 PEOPLE



3,000+
CIVIL SERVANTS
6,000+
ON-SITE CONTRACTORS
1,000s
OF OTHERS
(including off-site contractors, emeritus employees and interns)



500 INTERNS

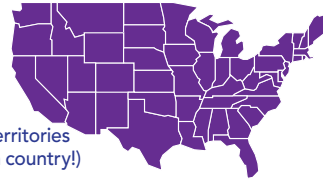
37% FEMALE
(Civil Servants)



63% MALE
(Civil Servants)



46 STATES



(plus two U.S. territories and one foreign country!)



BUDGET: \$5.2B

DIRECT GSFC BUDGET: \$3.7B

REIMBURSABLE GSFC BUDGET: \$1.5B

(FROM OTHER GOVERNMENT AND NONGOVERNMENT ENTITIES)

JOINT AGENCY SATELLITES

7 AGENCIES



BEST PLACES

TO WORK IN THE FEDERAL GOVERNMENT

#1
#2

NASA RANKED OUT OF 18 LARGE AGENCIES (SIXTH CONSECUTIVE YEAR)

GODDARD RANKED OUT OF 150 AGENCY SUBCOMPONENT ORGANIZATIONS

ECLIPSE 2017

40,000+ glasses distributed

500+ interviews conducted

90 MILLION+ website page views



Credit: S. Habbal, M. Druckmüller and P. Aniol



620 articles posted to NASA.gov

168 videos uploaded to YouTube

SOCIAL MEDIA FOLLOWERS



1.1+ MILLION



2.1+ MILLION



413,000+



397,000+

PUBLICATIONS



350

ASTROPHYSICS

548

EARTH SCIENCE

250

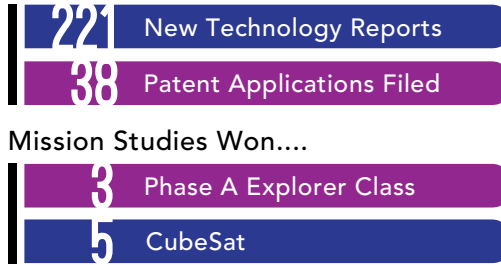
HELIOPHYSICS

310

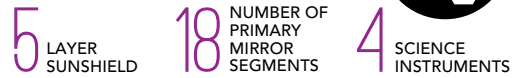
PLANETARY SCIENCE



TECHNOLOGICAL INNOVATIONS



JAMES WEBB SPACE TELESCOPE



Please visit <http://jwst.nasa.gov/recentaccomplish.html#2017>



3,000+

ACTIVE PROCUREMENT INSTRUMENTS

GODDARD VISITOR CENTER



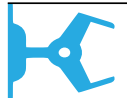
4
NEW
EXHIBITS

45,602
TOTAL
VISITORS

MAGNETOSPHERIC MULTISCALE MISSION

MMS

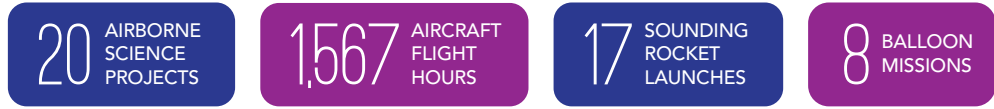
data has contributed to
OVER 340
papers led by scientists around the world, and its new orbit, above and beyond its previous circuit, opens the doors to countless new discoveries.



300+

 ROBOTIC MISSIONS LAUNCHED TO DATE

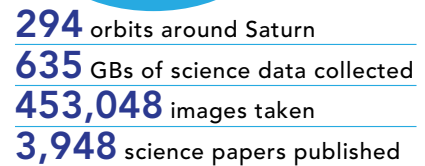
WALLOPS FLIGHT FACILITY



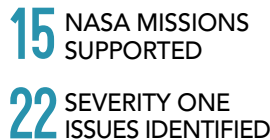
COLUMBIA SCIENTIFIC BALLOON FACILITY



3
instruments developed by Goddard



Figures are for fiscal 2017 unless noted otherwise.





DELIVERING YOUR DATA FROM SPACE

Since 1959, Goddard's communications networks have served NASA, the nation and the world as the backbone for products and services derived from satellite data.

MANY ASPECTS OF SOCIETY ARE IMPROVED BY SATELLITE DATA

SCIENTIFIC DISCOVERY



HEALTH AND MEDICAL



EDUCATION



FINANCIAL



TRANSPORTATION



WEATHER FORECASTING



HOW WE DO IT

Space Network (SN)

A constellation of nine Earth-orbiting **Tracking Data Relay Satellites (TDRS)** and four ground terminal locations that provide a continuous global link between satellites and the ground.

Near Earth Network (NEN)

A series of fifteen globally-located NASA-owned and contracted commercial ground terminals that provide comprehensive communications services to satellites in near-Earth orbit.

NASA Communications Network (NASCOM)

The central nervous system connected to all of NASA's communications circuits, NASCOM transports and delivers the data to control centers or data centers which process and disseminate for the science community, other agencies and the public.

Deep Space Network (DSN)

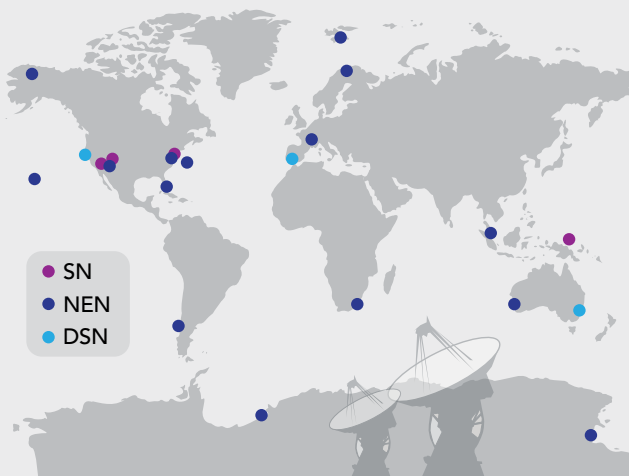
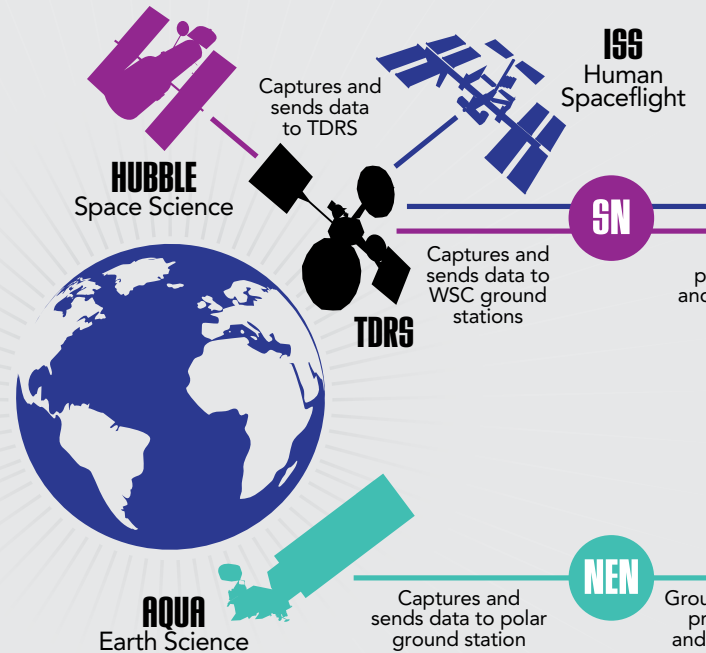
NASCOM also provides connectivity to the ground stations of NASA's third communications network, DSN, which is managed by the Jet Propulsion Laboratory.

DID YOU KNOW?

- 98% of all NASA data comes through Goddard via SN and NEN.
- SN and NEN collectively transmit 29.5 TB of data per day.
- NEN supports about 40 NASA and other agency satellites.

JUST THREE EXAMPLES OF THE MANY WAYS WE ARE BRINGING SCIENCE HOME!

Hubble Space Telescope observes the most distant stars and galaxies in the universe as well as the planets in our solar system. The **International Space Station (ISS)** collects data on global climate, environmental change and natural hazards using crew-operated and automated Earth observation payloads. **Aqua** is a multi-national Earth-observing research satellite studying the precipitation, evaporation and cycling of water.



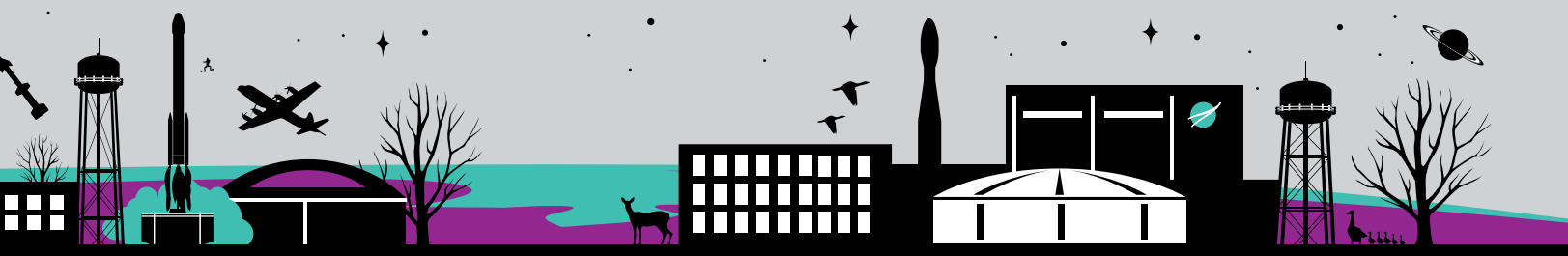
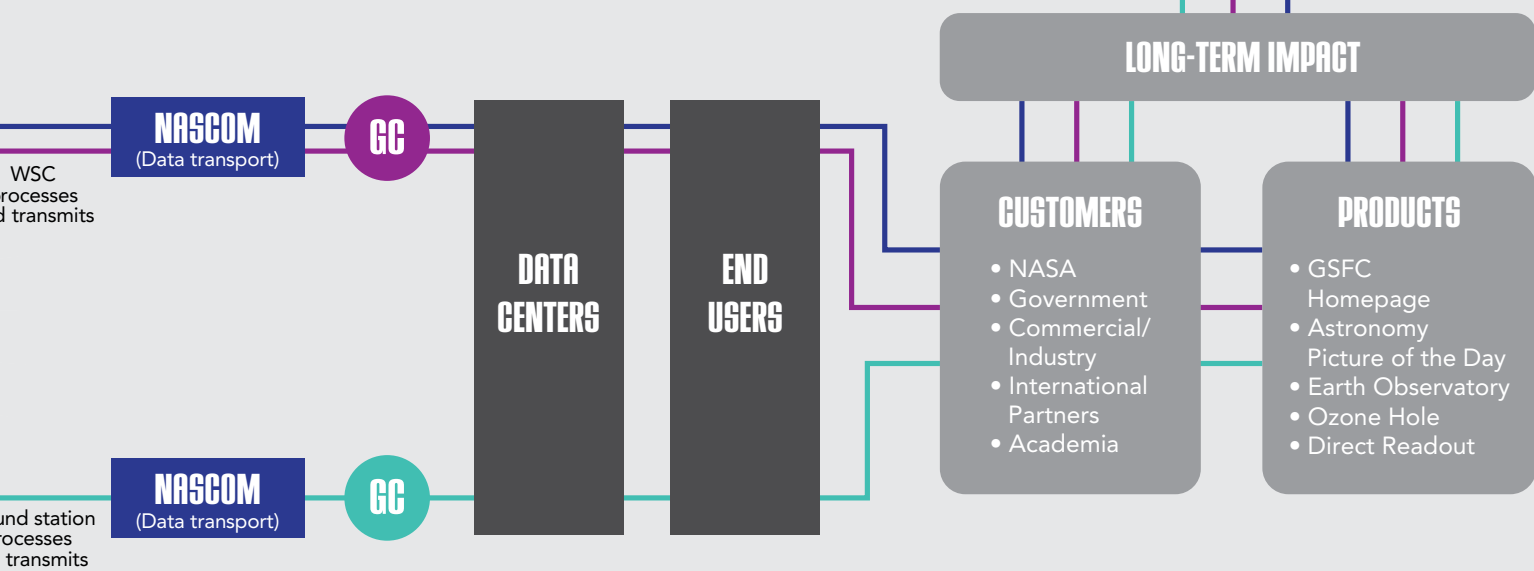
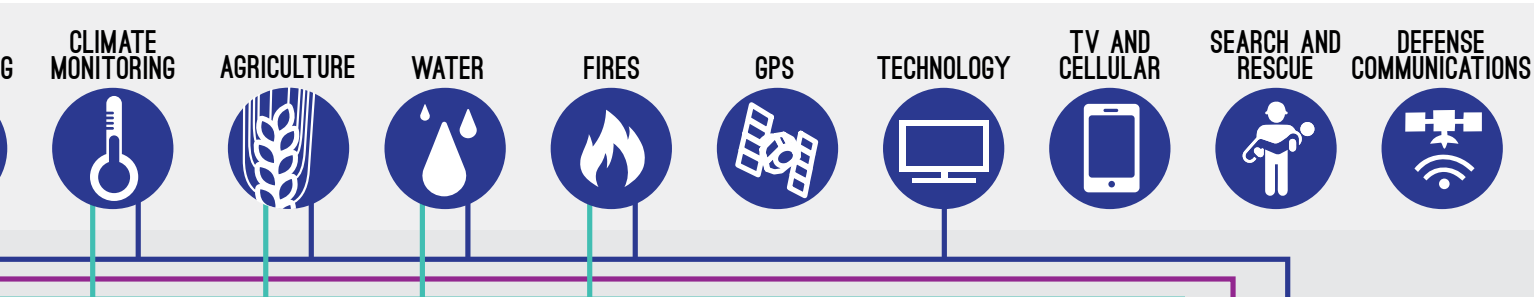
KEY FACILITIES

WHITE SANDS COMPLEX (WSC)

The SN ground segment at the White Sands Complex features ground terminals that provide the hardware and software necessary to guarantee a constant communication link among the customer spacecraft, TDRS and the NASCOM interface to the customer control center.

WALLOPS FLIGHT

One of the NASA's... vide high-quality, l... Global Monitor a... passes allowing fo... other sites, includ... at Kennedy Space... ties to the Space l...



WHITE SANDS FLIGHT FACILITY (WFF)

Owned tracking stations, WFF hosts five NEN antennas that provide low-cost communications services to supported flight missions. Its Ground Control Center (GMaCC) provides continual monitoring of launch vehicles and remotely-controlled, locally unattended station operations at the nearly completed Launch Communications Stations (LCS) Center. LCS will provide critical launch communications capabilities for the Space Launch System rocket and Orion spacecraft.

GODDARD GREENBELT CAMPUS (GC)

In addition to overall management of SN and NEN, Greenbelt manages the NASCOM which handles all data from SN, NEN and DSN. Its global system of communications transmission, switching, and terminal facilities provides Internet Protocol (IP) routed data, high-rate data and video services. Other capabilities include mission voice communications services and high volume data transfer among NASA supercomputers including the NASA Center for Climate Simulation at Goddard.

NEW VISITOR CENTER EXHIBITS

PUTTING SCIENCE ON DISPLAY

The Goddard Visitor Center has played a central role in sharing Goddard's scientific achievements and missions with the public, having hosted more than 1 million guests since its opening in May 1976. This year, the visitor center underwent a major transformation following a redesign of the gallery space and the addition of three new permanent exhibits: "Welcome to Goddard," "GLOBE Hall" and "Neighborhood Earth."

"Welcome to Goddard" introduces guests to Goddard's core science competencies—astrophysics, Earth science, heliophysics and planetary science—and explains the various stages in a mission's life cycle. It also outlines Goddard's history and the influence of the center's technologies on our daily lives.

"GLOBE Hall" introduces visitors to its namesake Global Learning and Observations to benefit the Environment Program, encouraging them to download the GLOBE app and become citizen scientists. It focuses on field observations that visitors can upload to help NASA expand what we know about Earth and its systems.



One of the largest exhibits in the main gallery, "Neighborhood Earth" explains how Earth is one connected neighborhood from NASA's viewpoint in space. Visitors explore our home planet like a NASA scientist, discovering how satellite technology provides clues about the life, air and water around us. The exhibit is highly interactive, with several digital and hands-on activities focusing on ice cores, freshwater availability, active sensing, agriculture and more. The centerpiece of the exhibit is a multisensory touch experience that lets visitors discover how air, water and life intersect across the world

through NASA visualizations. "Exploration Station," an 80-inch touch screen, presents the latest in media visualizations and data sets from all four of the sciences in a minitheater.

In addition to the permanent exhibits, "The James Webb Space Telescope: Art + Science 2017" showcased artist interpretations of the next-generation space telescope across a wide range of art forms, from painting and sculpture to music and poetry. The temporary exhibit, which was on display from March to July 2017, was the product of an artist session in front of the telescope in November 2016.





HIGHLIGHTS

education
TDRS MMS
WFIRST
SUN INNOVATION
UNIVERSE
TECHNOLOGY
Suborbital
MAVEN
Solar System
hubble
SPINOFF
Webb
EARTH
MISSION SUCCESS
planetary
PARKER SOLAR PROBE
NICER
CASSINI
PACE
eclipse
GOES-R

OF FISCAL 2017



- 1 WEBB
- 2 ECLIPSE 2017
- 3 ANTARES LAUNCH
- 4 GOES-R
- 5 OSIRIS-REX
- 6 PARKER SOLAR PROBE
- 7 TDRS-M
- 8 HURRICANE MONITORING
- 9 CASSINI
- 10 HUBBLE
- 11 RAVEN
- 12 LUCY
- 13 PACE
- 14 MMS
- 15 WFIRST
- 16 NICER
- 17 MAVEN
- 18 RESTORE-L



HIGHLIGHTS OF FISCAL 2017

1 WEBB

Final Testing Completed at Goddard

The James Webb Space Telescope will be the most powerful space telescope ever built upon its completion and launch in 2019. The optical element and instrument module were constructed and tested at Goddard. They were sent to NASA’s Johnson Space Center in Houston in May 2017 for additional cryogenic testing, and they will link up with the telescope’s sunshield and spacecraft bus at Northrop Grumman’s facilities in Redondo Beach, California, for final testing and integration prior to launching from the European Space Agency’s spaceport in French Guiana.



UNIVERSE

2 ECLIPSE 2017

Goddard Shines Bright as Day Turns to Night

A total solar eclipse traversed the contiguous United States from coast to coast on Aug. 21, 2017, for the first time in nearly a century. For years leading up to the event, Goddard engaged in an extensive effort to educate the public, coordinate outreach events, develop partnerships, and distribute safety glasses and other materials. Goddard hosted a public viewing event, drawing more than 1,800 attendees, while the center also supported record-breaking communications efforts for NASA across numerous outlets—websites, social media accounts and NASA Television.



SUN

3 ANTARES LAUNCH

After Two Years, Launches Back on Track at Wallops

Orbital ATK’s sixth contracted cargo resupply mission with NASA to the International Space Station launched aboard an Antares rocket on Oct. 17, 2016, from Wallops Flight Facility, delivering 5,100 pounds of science equipment, crew supplies and vehicle hardware inside a Cygnus spacecraft. It was the first such launch in two years from Wallops following an Antares explosion from the same pad in October 2014. Orbital ATK launched another resupply mission on April 18, 2017, from Cape Canaveral Air Force Station in Florida.



SPACE STATION

4 GOES-R

Boosting Weather Observation Capabilities

NASA launched the National Oceanic and Atmospheric Administration's Geostationary Operational Environmental Satellite-R (GOES-R) on Nov. 19, 2016. The satellite, renamed GOES-16 once it reached its designated orbit, represents the next generation of the GOES system, which began operations in 1974. GOES-16 is designed to enhance the nation's weather observation capabilities, leading to more accurate and timely forecasts, watches and warnings. Goddard oversaw the acquisition of the GOES-R spacecraft and instruments. The next satellite in the series, GOES-S, is scheduled for launch in 2018.



EARTH

5 OSIRIS-REX

Asteroid Sample Return Mission Slingshots Past Earth

The Origins, Spectral Interpretation, Resource Identification, and Security-Regolith Explorer—or OSIRIS-REx—launched in 2016 to return a sample from the near-Earth asteroid Bennu by 2023. The spacecraft used Earth's gravitational force on Sept. 22, 2017, to adjust its orbital plane and propel itself toward the asteroid for a scheduled rendezvous in 2018. The sample will help scientists investigate how planets formed and life began, as well as improve our understanding of asteroids that could impact Earth.

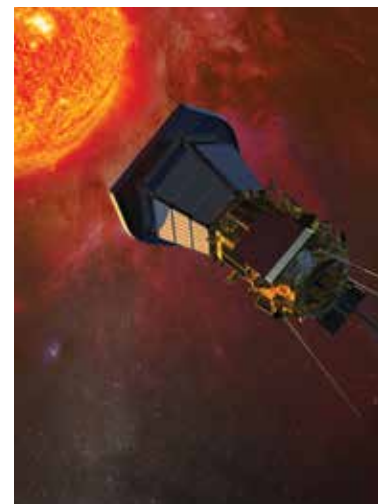


SOLAR SYSTEM

6 PARKER SOLAR PROBE

A Mission to Touch the Sun

Parker Solar Probe, managed by the Johns Hopkins University Applied Physics Laboratory (APL), will explore the sun's outer atmosphere and make critical observations on the physics of stars. The spacecraft's heat shield, which will provide protection as it flies directly into the sun's atmosphere, was installed on Sept. 21, 2017. Previously known as Solar Probe Plus, it was renamed in May after renowned solar astrophysicist Eugene N. Parker. Goddard is working with APL on environmental testing prior to Parker Solar Probe's scheduled launch in July 2018.



SUN



Expanding the Space Network

The newest in NASA's fleet of space communications satellites, Tracking and Data Relay Satellite-M (TDRS-M) launched on Aug. 18, 2017, from Cape Canaveral Air Force Station in Florida. Since the 1970s, TDRS satellites have comprised the space segment of the Goddard-managed Space Network, which provides data communications and accurate navigation to NASA missions. TDRS-M will extend these services to the International Space Station, Hubble Space Telescope and other missions. Following successful in-orbit testing, the spacecraft will officially join the TDRS fleet in early 2018 and become TDRS-13.



SPACE COMMS



NASA Provides Valuable Storm Data

In an active hurricane season, storms made landfall in Texas, Florida and several U.S. territories. Forecasters and first responders relied on data from select NASA's satellites, such as the Global Precipitation Measurement mission—and those of the National Oceanic and Atmospheric Administration—to track, measure and respond to the storms. Using the unique vantage point from space, the satellites—many of which are managed and operated by Goddard—measured everything from rainfall to ocean temperatures. All storms were continuously tracked on NASA's hurricane web page and social media accounts.



EARTH



Cassini Plunges Into Saturn for Grand Finale

Twenty years after setting off to explore the gas giant and its moons, the Cassini spacecraft plunged into Saturn's atmosphere on Sept. 15, 2017, to end its mission. One of the most ambitious undertakings in planetary science exploration, Cassini completed about 300 orbits around Saturn, discovered six named moons and produced more than 450,000 images. Goddard designed and constructed three critical instruments: the Composite Infrared Spectrometer, the Ion and Neutral Mass Spectrometer, and the Gas Chromatograph Mass Spectrometer.

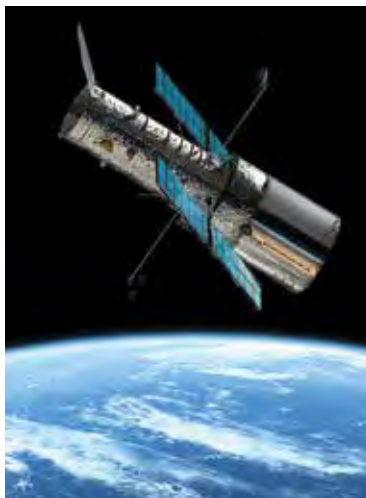


SOLAR SYSTEM

10 HUBBLE

Legendary Space Telescope
Still Going Strong

For 27 years, the Hubble Space Telescope has changed the course of astronomy through countless discoveries in our own solar system, the farthest galaxies and everything in between. Among the most notable this past year is the evidence of plumes erupting from Jupiter’s moon Europa, providing clues into possible life beyond Earth. In February 2017, the Spitzer Space Telescope discovered seven Earth-size planets around a single star in the TRAPPIST-1 exoplanet system. Hubble set out to screen four of the planets, including three inside the so-called “habitable zone.”

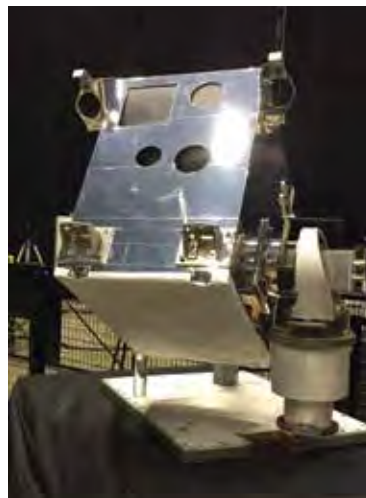


UNIVERSE

11 RAVEN

Making Autonomous
Rendezvous a Reality

Developed by the Goddard Satellite Servicing Projects Division, the Raven module is testing foundational technologies that will bring NASA one step closer toward realizing autonomous rendezvous capabilities in space between satellites, removing the need for human involvement—even from the ground. Launched aboard a SpaceX commercial resupply services mission on Feb. 19, 2017, and appended to the International Space Station, Raven is setting the stage for other NASA projects, including Restore-L, which is developing technologies to refuel a satellite that was not originally designed to be serviced.



TECHNOLOGY

12 LUCY

The First Mission to
Jupiter’s Trojans

NASA selected Lucy as one of its new Discovery-class missions. Scheduled for launch in October 2021, Lucy will perform the first reconnaissance of the Trojans, a population of primitive asteroids orbiting in tandem with Jupiter, to help scientists understand the origins of our solar system. It will fly by its targets between 2025 and 2033. Goddard will provide overall mission management, systems engineering, and safety and mission assurance. The center will also develop Lucy’s color-imaging and infrared-mapping spectrometer.



SOLAR SYSTEM



Future Mission to Monitor the Health of Our Ocean

The Plankton, Aerosol, Cloud, ocean Ecosystem (PACE) mission will reveal interactions between the ocean and atmosphere, including how they exchange carbon dioxide and how atmospheric aerosols may fuel phytoplankton growth in the surface ocean. PACE has completed its concept and technology development phase, and in July 2017, it entered the preliminary design and technology completion phase, moving the mission along toward an expected launch in 2022. Goddard manages the mission and will build its Ocean Color Instrument.

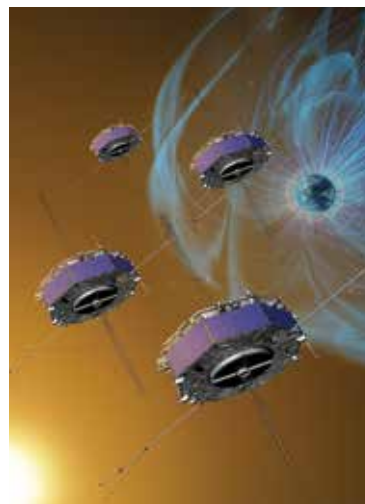


EARTH



Understanding Magnetic Reconnection Around Earth

The Magnetospheric Multiscale mission (MMS) comprises a quartet of identical spacecraft designed to study our planet's magnetosphere and provide insight into the phenomenon of magnetic reconnection. Traveling in a highly elliptical orbit, MMS switched to its second-phase orbit in February 2017, allowing it to fly twice as far away from Earth than before so it can explore the long tail of our planet's magnetic fields. The new orbit allows MMS to continue to map out the fundamental characteristics of space around Earth, helping us better understand the region through which satellites and astronauts travel.

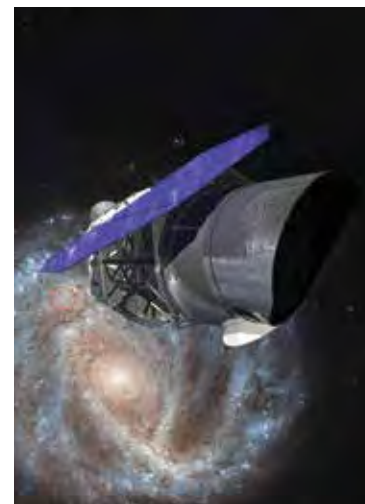


SUN



Exploring the Universe Through a Wider Field

Selected as the top priority by the National Academy of Sciences 2010 Decadal Survey for Astronomy and Astrophysics, the Wide Field Infrared Survey Telescope (WFIRST) is scheduled to launch in the mid-2020s to study the evolution of the universe, dark energy and exoplanets. This past year, NASA convened an independent review panel to assess the mission's scope, requirements and scientific promise. WFIRST will carry a wide-field instrument for surveys and a coronagraph technology demonstration to mask the glare of individual stars and reveal the faint light of planets orbiting around them.

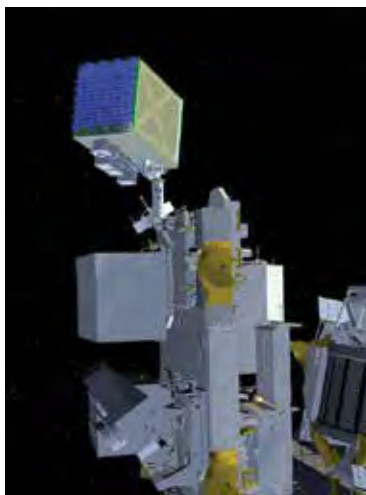


UNIVERSE



First Mission to Study Neutron Stars

The Neutron star Interior Composition Explorer (NICER) launched to the International Space Station on June 3, 2017, aboard a SpaceX commercial resupply services mission. NICER is the first NASA mission dedicated to studying neutron stars—objects containing dense matter at the threshold of collapse into black holes. The mission is coupled with the Station Explorer for X-ray Timing and Navigation Technology, or SEXTANT, an experiment using NICER’s timing data from pulsars—or rotating neutron stars which emit beams of electromagnetic radiation—as navigation beacons.



UNIVERSE



MAVEN Finds Metal in Martian Atmosphere

Results from the Mars Atmosphere and Volatile Evolution, or MAVEN, mission in April 2017 revealed the permanent presence of metal ions in the ionosphere of the Red Planet, the first such detection on a planet other than Earth. Metal atoms in a vapor trail left behind by high-speed meteoroids are stripped of some of their electrons by other charged atoms and molecules in the ionosphere, transforming them into electrically charged ions. The discovery is providing further insight into how the Martian atmosphere is being lost to space.



SOLAR SYSTEM



Demonstrating Robotic Satellite Servicing

Managed by the Goddard Satellite Servicing Projects Division, Restore-L will demonstrate how a robotic spacecraft can refuel a satellite in orbit. Twelve of its technology elements will be further developed by demonstrations aboard the Robotic Refueling Mission 3 (RRM3). Launching in 2018, RRM3 will test methods to replenish cryogenic fluids and xenon for in-orbit satellites. The robotic vehicle of the Asteroid Redirect Mission—designed to capture a boulder from a near-Earth asteroid and move it into orbit around the moon for exploration—had also leveraged several of Restore-L’s technologies.



TECHNOLOGY

An aerial photograph showing a vast glacier flowing towards the ocean. The sun is low on the horizon, creating a bright, shimmering path of light across the water's surface. The sky is a mix of blue and orange. In the bottom left corner, the wing of an airplane is visible, suggesting the photo was taken from an aircraft.

THIS IS WHAT WE DO

OUR PRIMARY LINES OF BUS



A PLACE FOR SUCCESS

We launch science. We help answer crucial science questions through complex missions that depend on dedicated and innovative teams to develop pioneering technologies. Goddard is one of the few organizations worldwide that manages a mission from the concept phase through operations, utilizing internal, partner and industry expertise and resources along the way. The depth and expertise of our scientists, engineers, technologists, project managers and support personnel form the foundation of our unique strength. With our leadership in scientific research and instrument and spacecraft development, the center has a renowned capability of conceiving and managing advanced science, technology and space systems through the entire mission life cycle.

SINESS



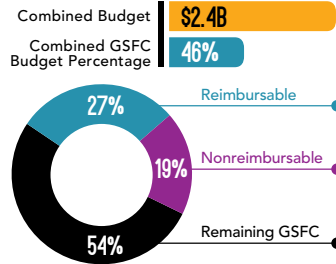
EARTH SCIENCE

During a busier-than-usual hurricane season in the United States and its territories, Goddard scientists worked with NASA's disaster response team to supply first responders with important data, including information on flooding and power outages. Goddard and other NASA scientists are using not only data from NASA's Earth-observing missions, but also their expertise in other missions to advance the role of remote sensing in response to natural disasters.

In January 2017, the Goddard Institute for Space Studies released its annual analysis of global temperatures, concluding that 2016 was the hottest year on record. Along with accompanying data from the National Oceanic and Atmospheric Administration (NOAA), the study was cited as an authoritative source on Earth's changing climate.

The Goddard-led Operation IceBridge continued its critical survey of flights over Greenland and Antarctica with one of its busiest years. News organizations relied on mission footage to document the calving of a massive iceberg from the Larsen C Ice Shelf in Antarctica.

Continuing a long-standing partnership with NOAA, NASA in November 2016 launched the Geostationary Operational Environmental Satellite-R, the latest in a series of weather forecasting satellites. Goddard also moved forward with the Joint Polar Satellite System-1—or JPSS-1—a polar-orbiting environmental satellite; and the Plankton, Aerosol, Cloud, ocean Ecosystem—or PACE—mission, which will reveal interactions between the ocean and atmosphere.



MISSIONS AND INSTRUMENTS IN DEVELOPMENT

- Geostationary Operational Environmental Satellite-S (GOES-S)*
- Global Ecosystem Dynamics Investigation (GEDI)
- Ice, Cloud, and land Elevation Satellite-2 (ICESat-2)
- Joint Polar Satellite System (JPSS)*
- Landsat 9*
- Plankton, Aerosol, Cloud, ocean Ecosystem (PACE)
- Polar Operational Environmental Satellite (POES)
- Thermal Infrared Sensor-2 (TIRS-2) for Landsat 9
- Total and Spectral Solar Irradiance Sensor (TSIS-1)



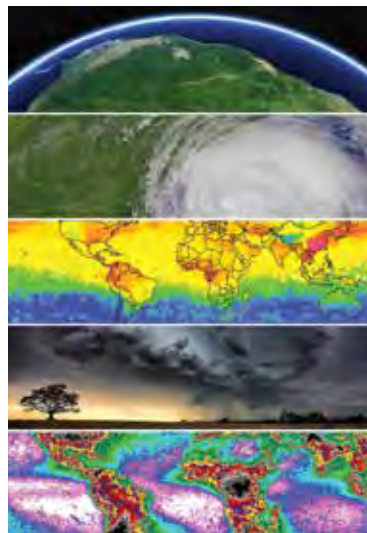
OPERATIONAL MISSIONS

- Aqua
- Aura
- Cloud-Aerosol Transport System (CATS)
- Deep Space Climate Observatory (DSCOVR)*
- Global Precipitation Measurement (GPM)*
- GOES-13*, GOES-14*, GOES-15*, GOES-16*
- Landsat 7*, Landsat 8*
- Operation IceBridge
- Soil Moisture Active Passive (SMAP)
- Solar Radiation and Climate Experiment (SORCE)
- Suomi-National Polar-orbiting Partnership (Suomi-NPP)*
- Terra

*Joint Agency Satellite

NASA Strategic Objective 2.2: Advance knowledge of Earth as a system to meet the challenges of environmental change and to improve life on our planet.

PORTFOLIO



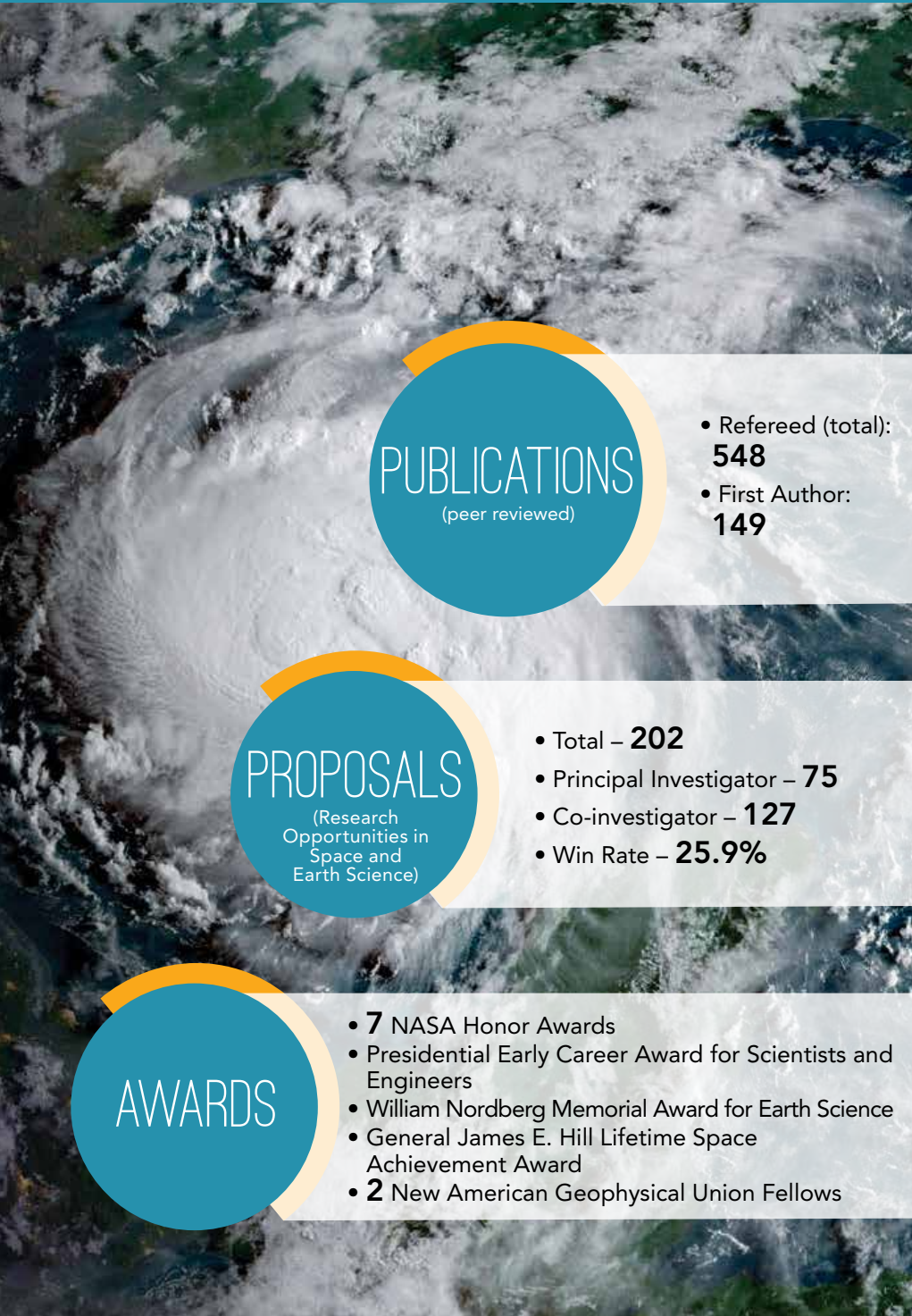
ATMOSPHERIC COMPOSITION

HYDROSPHERIC PROCESSES

CARBON CYCLE AND ECOSYSTEMS

CLIMATE AND WEATHER

EARTH SURFACE AND INTERIOR



PUBLICATIONS

(peer reviewed)

- Refereed (total): **548**
- First Author: **149**

PROPOSALS

(Research Opportunities in Space and Earth Science)

- Total – **202**
- Principal Investigator – **75**
- Co-investigator – **127**
- Win Rate – **25.9%**

AWARDS

- **7** NASA Honor Awards
- Presidential Early Career Award for Scientists and Engineers
- William Nordberg Memorial Award for Earth Science
- General James E. Hill Lifetime Space Achievement Award
- **2** New American Geophysical Union Fellows

UNDERSTANDING OUR DYNAMIC PLANET

MAKING HEADLINES

This NASA Scientist Won Leonardo DiCaprio's Climate Change Doc
— Nov. 1, 2016, *Inverse.com*

A Warm Winter Cyclone Thinned the Arctic Sea Ice, NASA Reveals
— Nov. 16, 2016, *Science World Report*

NASA Launches Advanced Geostationary Weather Satellite for NOAA
— Nov. 21, 2016, *Space Daily*

New NASA Imagery Shows How Fast Glaciers Are Melting
— Dec. 12, 2016, *CNN*

NASA Helps Allocate Rocky Mountains' Massive Water Runoff
— Jan. 24, 2017, *American Council on Science and Health*

How NASA's Satellite Data Could Help Protect Chimps
— Jan. 30, 2017, *CBS News*

Our Planet's Eye in the Sky Finally Closes: An Elegy for Earth Observing-1
— April 6, 2017, *The Atlantic*

HIGHLIGHTS



ASTROPHYSICS

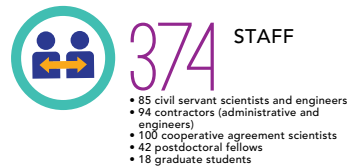
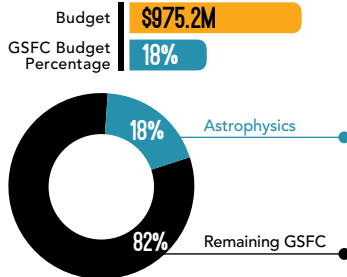
The Neutron star Interior Composition Explorer (NICER) mission payload was successfully launched and positioned aboard the International Space Station. NICER is expected to provide high-precision measurements of neutron stars—objects containing ultra-dense matter at the threshold of collapse into black holes.

The Primordial Inflation Polarization Explorer (PIPER) balloon payload had its first launch in a series of test flights. PIPER will investigate whether our universe expanded significantly immediately following the big bang.

The Transient Astrophysics Observer on the ISS, or ISS-TAO, was selected for a Phase A study. Its goal is to detect X-ray counterparts to gravitational waves produced by neutron stars merging with black holes and other neutron stars.

Looking ahead, final preparations are being made for the launch of the Transiting Exoplanet Survey Satellite, or TESS. This mission will search the sky for planets outside the solar system. The James Webb Space Telescope left Goddard for final cryogenic testing. Progress continues on the development work for the Wide Field Infrared Survey Telescope (WFIRST). WFIRST was recommended in 2010 by the U.S. National Research Council Decadal Survey committee as the top priority for the next decade of astronomy.

Orbiting Earth for more than 27 years, the Hubble Space Telescope continues to explore farther into the universe. The Swift satellite remains the only satellite capable of precisely locating the universe's most powerful explosions and monitoring them before they fade from view.



NASA Strategic Objective 1.6: Discover how the universe works, explore how it began and evolved and search for life on planets around other stars.



MISSIONS IN DEVELOPMENT

- High Resolution Mid-Infrared Spectrometer (HIRMES) for the Stratospheric Observatory for Infrared Astronomy
- James Webb Space Telescope
- Micro-X
- Transient Astrophysics Observer on the International Space Station (ISS-TAO)
- Transiting Exoplanet Survey Satellite (TESS)
- Wide-Field Infrared Survey Telescope (WFIRST)
- X-ray Advanced Concepts Testbed (XACT)



OPERATIONAL MISSIONS

- Balloon Experimental Twin Telescope for Infrared Interferometry (BETTI)
- Calorimetric Electron Telescope (CALET)
- Fermi Gamma-ray Space Telescope
- High Energy Astrophysics Science Archive Research Center (HEASARC)
- Hubble Space Telescope
- International Gamma-Ray Astrophysics Laboratory (INTEGRAL)
- International Space Station Cosmic Ray Energetics and Mass (ISS-CREAM)
- Neutron star Interior Composition Explorer (NICER)
- Nuclear Spectroscopic Telescope Array (NuSTAR)
- Primordial Inflation Polarization Explorer (PIPER)
- Swift
- X-ray Multi-Mirror (XXM-Newton)
- X-ray Quantum Calorimeter (XQC)

PORTFOLIO



How does the universe work? Probe the origin and destiny of our universe, including the nature of black holes, dark energy, dark matter and gravity.

PHYSICS OF THE COSMOS



How did we get here? Explore the origin and evolution of the galaxies, stars and planets that make up our universe.

COSMIC ORIGINS



Are we alone? Discover and study planets around other stars and explore whether they could harbor life.

EXOPLANET EXPLORATION



PUBLICATIONS

- **350+** refereed scientific papers
- **24** press releases

PROPOSALS

(Research Opportunities in Space and Earth Science)

- **57** proposals
- **6** selected, **45** pending selection decisions
- **50%** win rate

AWARDS

- 2017 Dan David Prize and 2017 Rossi Prize
- **3** New American Physical Society Fellows
- NASA Distinguished Service Medal
- NASA Outstanding Leadership Medal
- NASA Early Career Public Achievement Medal
- **2** NASA Exceptional Scientific Achievement Medals

HIGHLIGHTS

SEEING THE COSMOS IN A NEW LIGHT

MAKING HEADLINES

Two Trillion Galaxies, at the Very Least

— Oct. 17, 2016, *The New York Times*

Fermi Finds Farthest Gamma-Ray Blazar Yet

— Jan. 30, 2017, *United Press International*

NASA Wants You to Help Find a New Planet

— Feb. 16, 2017, *CNN*

NASA's Swift Mission Maps a Star's 'Death Spiral' Into a Black Hole

— March 21, 2017, *Science Newslines*

The Shipping and Handling of a Gigantic Space Telescope

— May 2, 2017, *The Atlantic*

New NASA Mission to Study Mysterious Neutron Stars, Aid in Deep Space Navigation

— May 26, 2017, *Science Springs*

New Mission Going to a Space Station to Explore Mysteries of 'Cosmic Rain'

— Aug. 13, 2017, *Global News Connect*



HELIOPHYSICS

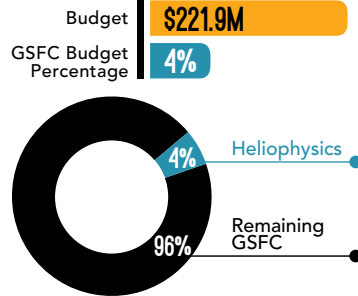
In 2017, the Goddard heliophysics team saw results—and new starts—that extended our knowledge of space.

The total solar eclipse on Aug. 21 was a key event highlighting how we study our sun. Education, communications and public engagement planning around the eclipse was one of the largest outreach programs ever taken on by NASA. Goddard was at the heart of this effort, executing plans that had been years in the making and spending Aug. 21 supporting NASA events nationwide.

After two years of studying the sun-facing side of Earth’s magnetic field, the Goddard-built Magnetospheric Multiscale mission is now observing the back side, or magnetotail. MMS data are helping us better understand how particles from the sun interact with Earth’s magnetic field—key information for protecting astronauts and satellites.

In early 2017, several sounding rockets launched from Poker Flat Research Range in Alaska to study the aurora and other near-Earth processes. The Ionospheric Connection Explorer, or ICON, and the Global-scale Observations of the Limb and Disk, or GOLD, missions are both on track for launch in 2018 to observe the ionosphere, a dynamic region that can interfere with satellites and communications.

Parker Solar Probe, humanity’s first mission to touch a star, is also slated for a 2018 launch. After a year of spacecraft integration, communication efforts and science preparation, the spacecraft came to Goddard this year for its final tests before setting off into space.



MISSIONS IN DEVELOPMENT

- Global Observations of the Limb and Disk (GOLD)
- Ionospheric Connection Explorer (ICON)
- Parker Solar Probe (managed by the Johns Hopkins University Applied Physics Laboratory)

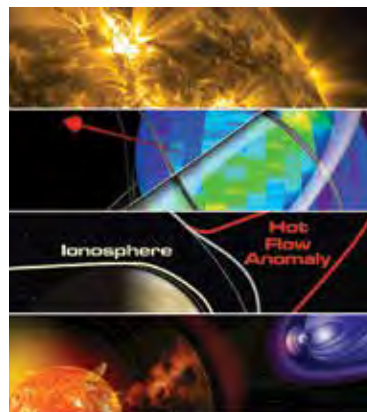


OPERATIONAL MISSIONS

- Advanced Composition Explorer (ACE)
 - Aeronomy of Ice in the Mesosphere (AIM)
 - Deep Space Climate Observatory (DSCOVR)*
 - Geotail*
 - Hinode*
 - Interface Region Imaging Spectrograph (IRIS)
 - Interstellar Boundary Explorer (IBEX)
 - Magnetospheric Multiscale (MMS)
 - Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI)
 - Solar and Heliospheric Observatory (SOHO)*
 - Solar Dynamics Observatory (SDO)
 - Solar Terrestrial Relations Observatory (STEREO)
 - Thermosphere-Ionosphere-Mesosphere Energetics and Dynamics (TIMED)
 - Time History of Events and Macroscale Interactions during Substorms (THEMIS/ARTEMIS)
 - Two Wide-Angle Imaging Neutral-Atom Spectrometers (TWINS)
 - Van Allen Probes
 - Wind
- *Joint Agency Satellite

NASA Strategic Objective 1.4: Understand the sun and its interactions with Earth and the solar system, including space weather.

PORTFOLIO



SOLAR PHYSICS

HELIOSPHERIC PHYSICS

GEOSPACE PHYSICS

SPACE WEATHER



PUBLICATIONS

- ~**250** publications in scientific journals
- More than **100** primary news articles and interviews

SUCCESSES

- Coordinated national, agencywide research, communications and outreach efforts for 2017 total solar eclipse
- Magnetospheric Multiscale mission reached full mission success
- Dellingr CubeSat delivered to International Space Station

AWARDS

- **7** NASA Honor Awards
- American Geophysical Union Basu Early Career Award
- John C. Lindsay Memorial Award
- Committee on Space Research Zeldovich Medal
- International Union of Radio Science Karl Rawer Gold Medal

HIGHLIGHTS

OBSERVING AND LIVING WITH OUR CLOSEST STAR

MAKING HEADLINES

High-Flying NASA Mission Sets New GPS World Record

— Nov. 7, 2016, *Space.com*

Could You Go Surfing on the Sun?

— Dec. 4, 2016, *Forbes*

Solar Flares May Lead Whales to Peril

— Feb. 8, 2017, *Discover Magazine*

A Physicist Explains the Shimmering Science Behind Auroras

— May 12, 2017, *Science Friday*

Our VLF Radio Waves Are Changing Space

— May 17, 2017, *Popular Mechanics*

NASA Probe to Explore the Sun's Atmosphere for the First Time

— May 31, 2017, *The Wall Street Journal*

The Solar Eclipse: Highlights From Its Path Across the United States

— Aug. 21, 2017, *The New York Times*

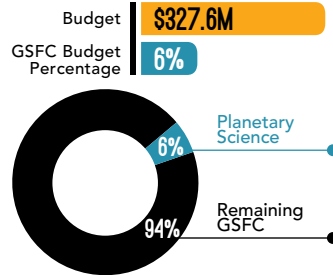


PLANETARY SCIENCE

OSIRIS-REx, NASA's first asteroid sample return mission, flew past Earth on Sept. 22, 2017, during its outward journey to study the asteroid Bennu. MAVEN data revealed that Mars has metal high in its atmosphere. The Sample Analysis at Mars instrument suite scooped and drilled samples of organic matter from the Martian surface, and the Juno magnetometer measured magnetic fields around Jupiter.

The Lunar Reconnaissance Orbiter continues to revolutionize our understanding of the moon, finding new evidence of frost on the lunar surface and discovering that solar storms could spark soils at the poles. At Saturn, NASA bid farewell to the Cassini mission—for which Goddard provided the Composite Infrared Spectrometer (CIRS). During its time in orbit aboard Cassini, CIRS made some stunning discoveries, including a heat signature reminiscent of the 1980s video game icon Pac-Man on Saturn's moons Mimas and Tethys. The instrument also helped decipher the mystery of the plumes near the south pole of the moon Enceladus by mapping the intensity of heat along the cracks, known as "tiger stripes."

A new mission, Lucy, was selected by the agency as one of two future New Frontiers missions. Lucy will perform the first reconnaissance of Jupiter's Trojan asteroids, objects which may hold vital clues to the history of the solar system. Work continues on the mass spectrometer for the Mars Organic Molecule Analyzer aboard the ExoMars mission and magnetometers for Parker Solar Probe.



1 GSFC FACILITY
Greenbelt

6 LABORATORIES/OFFICES

321 STAFF
Civil Service, Contract, Other

NASA Strategic Objective 1.5:
Ascertain the content, origin and evolution of the solar system and the potential for life elsewhere.

MISSIONS AND INSTRUMENTS IN DEVELOPMENT

- Lucy
- Magnetometers for Parker Solar Probe
- Mass Spectrometer for MOMA (Mars Organic Molecule Analyzer) on ExoMars

OPERATIONAL MISSIONS

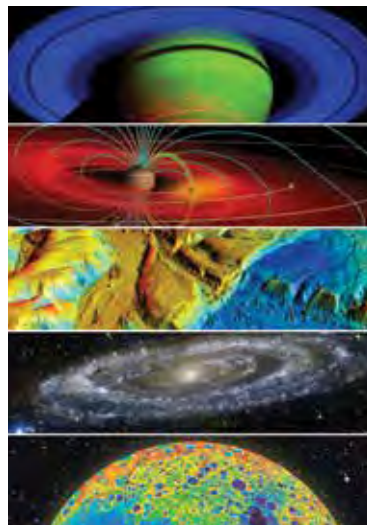
- Lunar Reconnaissance Orbiter (LRO)
- Mars Evolution and Volatile Evolution (MAVEN)
- Origins, Spectral Interpretation, Resource Identification, Security-Regolith Explorer (OSIRIS-REx)

OPERATIONAL INSTRUMENTS

- Linear Etalon Imaging Spectral Array (LEISA) for New Horizons' Ralph Camera
- Lunar Orbiter Laser Altimeter (LOLA) for LRO
- Magnetometer for the Deep Space Climate Observatory (DSCOVR*)
- Magnetometers for Juno, MAVEN, Van Allen Probes and Voyager
- Neutral Gas and Ion Mass Spectrometer (NGIMS) for MAVEN
- OSIRIS-REx Visible and Infrared Spectrometer (OVIRS)
- Sample Analysis at Mars (SAM) Instrument Suite for Mars Curiosity Rover
- Thermal Infrared Sensor (TIRS) for Landsat 8

*Joint Agency Satellite

PORTFOLIO



MASS SPECTROMETRY
Sampling on the Spot

INFRARED SPECTROMETRY
Remote Sensing

MAGNETOMETRY
The Influence of Planets

LASER AND LIDAR
Precision Measurements

ASTROBIOLOGY
Origins of Life

SPACE GEODESY
Next-Generation Mapping

EXPLORING OTHER WORLDS

MAKING HEADLINES

Earth's Moon Hit by Surprising Number of Meteoroids

— Oct. 13, 2016, *Nature*

NASA Selects Mission to Study Jupiter's Trojan Asteroids

— Jan. 4, 2017, *Sky & Telescope*

Mars Volcano, Earth's Dinosaurs Went Extinct About the Same Time

— March 20, 2017, *Space.com*

NASA Study Finds Unexpectedly Primitive Atmosphere Around 'Warm Neptune'

— May 11, 2017, *Scientific American*

NASA Finds Moon of Saturn Has Chemical That Could Form 'Membranes'

— July 28, 2017, *Popular Mechanics*

New Gravity Map Suggests Mars Has a Porous Crust

— Sept. 13, 2017, *Gizmodo*

NASA's OSIRIS-REx Spacecraft Slingshots Past Earth

— Sept. 22, 2017, *The New York Times*

DID YOU KNOW?

- LRO is the longest operating mission around the moon.
- MAVEN made the first detection of a permanent presence of metal ions in the upper atmosphere of Mars.

FAST FACTS

- On June 17, 2017, the MAVEN mission celebrated 1,000 Earth days in orbit around the Red Planet and determined that most of the gas that has ever been held in the Martian atmosphere has been lost to space.
- Elevation data of the moon provided by LRO, coupled with detailed NASA topography data of Earth, produced the most accurate maps of the total solar eclipse on Aug. 21, 2017.

LEADERSHIP

Our scientists hold leadership roles in the following:

- Goddard Center for Astrobiology*
- DREAM2 Center for Space Environments**
- Nexus for Exoplanet Systems Science (NExSS)
- Remote *In Situ* and Synchrotron Studies for Science and Exploration**
- Solar System Exploration Data Services Office

In addition, we published **310** papers and won **33** research grants in fiscal 2017.

*A node of the NASA Astrobiology Institute

**Part of NASA's Solar System Exploration Research Virtual Institute

HIGHLIGHTS



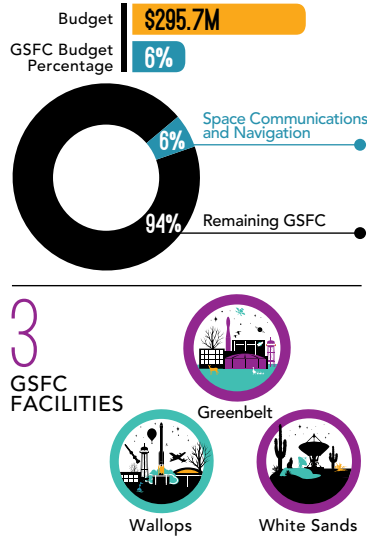
SPACE COMMUNICATIONS AND NAVIGATION

NASA's newest space communications satellite—Tracking and Data Relay Satellite-M—launched on Aug. 18, 2017. The spacecraft supports NASA's Space Network, which provides high-data rate communications and accurate navigation to missions. Network upgrades allowed for the first ultra-high-definition live stream from the International Space Station in April. The Near Earth Network, which offers orbital communications support for near-Earth-orbiting customer platforms via ground stations, had one of three antennas replaced at the Alaska Satellite Facility at the University of Alaska Fairbanks. Its uplink station at NASA's Kennedy Space Center in Cape Canaveral, Florida, was completed and began auto-tracking operations.

The Laser Communications Relay Demonstration—which proposes to revolutionize how we send and receive data, video and other information—released its "Introduction for Experimenters" document to request optical communications-related experiment proposals.

The Goddard Exploration and Space Communications Projects Division completed a study on the possible embedding of optical communications aboard Orion Exploration Mission-2, resulting in the Laser-Enhanced Mission Navigation and Operational Services project.

Distress beacon technology, developed by NASA's Search and Rescue Office, helped first responders save lives during hurricane season. Second-generation beacon technology underwent significant testing.



MISSIONS IN DEVELOPMENT

- Laser Communications Relay Demonstration (LCRD)
- Laser-Enhanced Mission Communications Navigation and Operational Services (LEMNOS)



OPERATIONAL MISSIONS

- Tracking and Data Relay Satellite-C-M (TDRS-C-M)



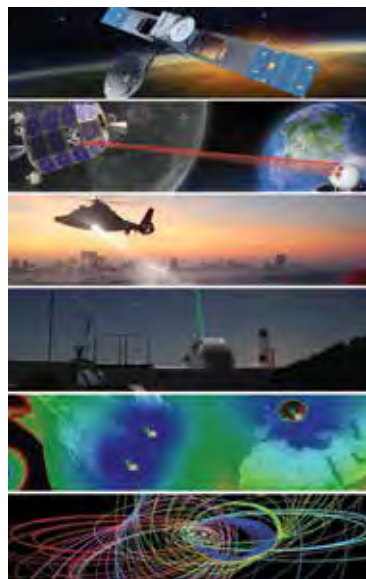
3 LABORATORIES/OFFICES

NASA Strategic Objective 1.1: Expand human presence into the solar system and to the surface of Mars to advance exploration, science, innovation, benefits to humanity and international collaboration.

NASA Strategic Objective 1.2: Conduct research on the International Space Station (ISS) to enable future space exploration, facilitate a commercial space economy and advance the fundamental biological and physical sciences for the benefit of humanity.

NASA Strategic Objective 3.2: Ensure the availability and continued advancement of strategic, technical and programmatic capabilities to sustain NASA's mission.

PORTFOLIO



SATELLITE TELECOMMUNICATIONS

Space Network: Four ground terminals to support nine TDRS spacecraft. Near Earth Network: fifteen ground terminal locations with 50 percent of services by commercial providers.

LASER COMMUNICATIONS

Engineering lead and operations coordinator for three optical stations.

SEARCH AND RESCUE

Architecture and engineering support for 93 international GEO/LEO/MEO local user terminals.

SATELLITE LASER RANGING

SLR: Operations and maintenance for eight stations worldwide. ILRS: Global network of 40+ ground stations.

SPECTRUM MANAGEMENT

Identification of mission parameters and frequencies within radio spectrum allocations for communications or data transfer.

NAVIGATION

Life cycle trajectory designs, orbit, estimation and associated space/ground system development.



OUR INTERNS

- **72** interns from **35** universities concentrated on increasing network capabilities, implementing process efficiencies and infusing technologies into network systems. They have filed **6** invention disclosures to date.

HIGHLIGHTS

- TDRS-M launch
- Near Earth Network's Kennedy Uplink Station was completed and began auto tracking
- Goddard Exploration and Space Communications Projects Division completed study on optical communications aboard Orion EM-2, resulting in LEMNOS development project

HIGHLIGHTS

- Search and Rescue Mission Office's distress beacon technology helped first responders save lives during September 2017 hurricanes
- Laser Communications Relay Demonstration requested optical communications-related experiment proposals
- Space Network's upgrades allowed for the first 4K, ultra-high-definition live stream from the International Space Station in April 2017

HIGHLIGHTS

BRINGING KNOWLEDGE BACK TO EARTH

MAKING HEADLINES

Lasers to Boost Communication Across Space

— Feb. 28, 2017, *SpaceFlight Insider*

Dial-Up Space Communications System Gets 'High-Speed' Upgrade

— March 28, 2017, *Space.com*

NASA Completes Critical Space Communications Network With Spectacular Launch of Final TDRS Relay Satellite

— Aug. 18, 2017, *Universe Today*

TDRS Launch Marks End of an Era

— Aug. 18, 2017, *SpaceNews*

Small Satellite Promises Big Discoveries at NASA

— Sept. 22, 2017, *Space Daily*

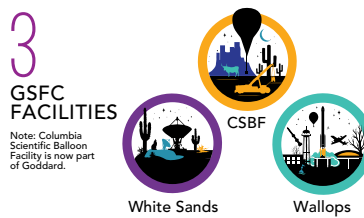
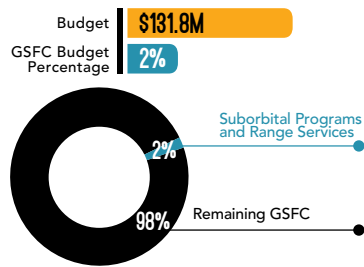


SUBORBITAL PROGRAMS AND RANGE SERVICES

In fiscal 2017, Wallops Flight Facility's suborbital flight platforms powered 45 missions from pole to pole: 20 airborne science missions, eight scientific balloon flights and 17 sounding rockets. Additionally, the beginning of the fiscal year saw the return-to-flight mission of the Orbital ATK Antares rocket, which carried about 5,100 pounds of experiments and supplies to the International Space Station.

Special projects at Wallops saw a huge boost in the fiscal year. Notably, the Cosmic Ray Energetics and Mass—or CREAM—experiment, which got its start as a scientific balloon experiment, launched to the space station and began operations. Additionally, the 10-pound, breadloaf-size IceCube—the first small satellite project managed by Wallops—launched to and was deployed from the space station. The facility's controlled airspace was expanded as a means to improve safety and the operational capabilities at the Wallops airfield. The new Mid-Atlantic Regional Spaceport Unmanned Aerial Systems runway on the northern end of Wallops Island opened for business with the capability to support drone work not just in the air, but also on land and in the sea.

Finally, much needed facility upgrades came to fruition throughout the year. Upgrades to the range control center, the opening of a new fire station and the construction of a new mission operations control center were key modernization initiatives. Furthermore, ongoing runway revitalization work ensures Wallops' ability to support NASA and the flight activities of partner organizations for decades to come.



MISSIONS IN DEVELOPMENT

- Dual-Polarization, Dual-frequency, Doppler in PyeongChang, South Korea, to support the 2018 Winter Olympics and Paralympics
- HaloSat and TROPICS small satellite missions
- Orbital ATK missions for Antares and Minotaur (4)
- Scientific balloon missions (18)
- Sounding rocket missions (28)



OPERATIONAL MISSIONS

- Airborne Carbon and Transport – America (ACT-America)
- Cloud and Aerosol Monsoonal Processes – Philippines Experiment (CAMPEX)
- International Space Station Commercial Resupply Services
- North Atlantic Aerosols and Marine Ecosystems Study (NAAMES)
- Observation of Aerosols above Clouds and their interactions (ORACLES)
- Operation IceBridge
- The Grand Challenge

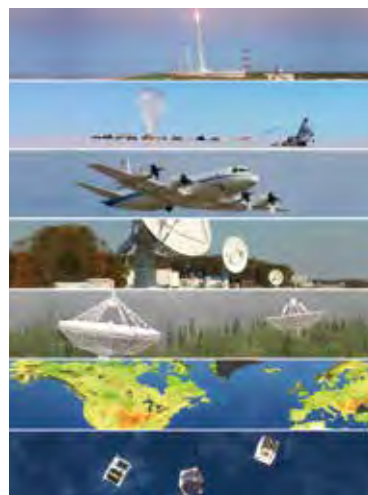
NASA Strategic Objective 1.1: Expand human presence into the solar system and to the surface of Mars to advance exploration, science, innovation, benefits to humanity and international collaboration.

NASA Strategic Objective 1.7: Transform NASA missions and advance the nation's capabilities by maturing cross-cutting and innovative space technologies.

NASA Strategic Objective 2.1: Enable a revolutionary transformation for safe and sustainable U.S. and global aviation by advancing aeronautics research.

NASA Strategic Objective 3.4: Ensure effective management of NASA programs and operations to complete the mission safely and successfully.

PORTFOLIO



SOUNDING ROCKETS

SCIENTIFIC BALLOONS

RESEARCH AIRCRAFT

LAUNCH RANGE/MISSION MANAGEMENT

NEAR EARTH NETWORK

EARTH SCIENCE FIELD SUPPORT OFFICE

SMALL SATELLITES



SUBORBITAL MISSIONS

- Sounding rocket, scientific balloon and aircraft student payload flight services
- **45** missions from pole to pole
- Unmanned aerial systems

PROGRESS

- Established a special projects office for small satellite development
- Ribbon-cutting ceremony for Mid-Atlantic Regional Spaceport Unmanned Aerial Systems runway
- Upgraded range control center and completed new mission operations command center

FAST FACTS

- **17** sounding rocket launches
- **8** balloon missions
- **20** airborne science projects
- **1,567** aircraft flight hours
- Dellingr and IceCube small satellites launched to the International Space Station
- Near Earth Network supported: **50,228** passes collecting **38,383** hours of data
- **60** flights supported by the Airborne Topographic Mapper team took measurements for Operation IceBridge

HIGHLIGHTS

ENABLING SCIENCE AND EXPLORATION

MAKING HEADLINES

Orbital ATK's Antares Rocket Returns to Flight With Successful Launch to the Space Station

— Oct. 17, 2016, *The Verge*

NASA Sends Super Pressure Balloon From New Zealand to the Edge of Space

— April 25, 2017, *ABC News*

Hypnotic NASA Timelapse Shows a Flight Over Greenland's Southern Glaciers

— May 10, 2017, *Daily Mail*

NASA Collects Data From the Skies for Truth About Greenhouse Gases

— May 11, 2017, *The Virginian-Pilot*

Drone Runway Opening at Wallops Island

— May 18, 2017, *U.S. News & World Report*

Gov. McAuliffe Flies Aboard Drone at NASA's Wallops Island

— May 18, 2017, *The Virginian-Pilot*

NASA Experiment to Color the Skies Over the U.S. East Coast

— June 11, 2017, *Reuters*



THIS IS WHY IT MATTERS

OUR LIFE @ GODDARD

A young girl with dark hair, looking upwards and to the left with a thoughtful expression. The background is blurred, showing what appears to be a library or a room with bookshelves. The image is framed by a teal border at the top and bottom.

A PLACE FOR SERVICE

Our talented people, driven by a common and worthwhile purpose, have made countless contributions toward enhancing our collective knowledge and way of life. We safeguard the long-term public trust by cultivating our workforce, ensuring a safe and sustainable workplace, effectively meeting our mission commitments, and applying our scientific breakthroughs to stimulate economic growth, foster education, inspire the nation and impact the world. We achieve this through a broad spectrum of institutional support efforts, including:

- Legal
- Procurement
- Information technology
- Financial management
- Human capital management
- Equal opportunity programs
- Diversity and inclusion
- Conflict management (alternative dispute resolution, anti-harassment)
- Protective services
- Environmental and medical management
- Facilities management and transportation
- Logistics
- Knowledge and information management
- Government and community relations
- Proposal development
- Education and public outreach
- Public communication

It is difficult to say what is impossible, for the dream of yesterday is the hope of today and the reality of tomorrow.

– Robert H. Goddard



INSTITUTIONAL SUPPORT

PAVING THE ROAD TO MISSION SUCCESS

Goddard is committed to providing comprehensive center support services for its workforce and current missions, as well as to transforming and preparing the center for the missions of tomorrow. Overall institutional support includes procurement operations, facilities management, protective services, medical and environmental management, and information and logistics management.

NASA Strategic Objective 3.1 Attract and advance a highly skilled, competent and diverse workforce, cultivate an innovative work environment and provide the facilities, tools and services needed to conduct NASA's missions.

2017 HIGHLIGHTS OF CENTER SUPPORT FOR GODDARD'S MISSION:

- 1 With more than 3,000 active procurement instruments, Goddard continues to maintain one of the agency's largest and most diverse acquisition portfolios and leads the agency in the number of procurement transactions. To ensure that the center meets its mission needs and agency commitments, Goddard completed 12 major contract awards.
- 2 Goddard managed more than \$115 million in construction to meet the current demands of its facilities. Major projects included a new instrument development facility, fire station and mission operations control center, as well as the rehabilitation of the integration and testing complex. Utility system upgrades have helped enhance facility readiness and reliability.
- 3 Consistent with the center's focus on Earth science, Goddard's Energy Conservation Performance Plan outlines how Goddard will reduce its energy consumption by 25 percent from 2015 through 2025. Goddard also leads the agency in coastal resilience initiatives, including a plan to continue replenishing the shoreline at Wallops Flight Facility.
- 4 Electrical, electronic and electromechanical parts acquisitions for Goddard missions exceeded \$32 million. Goddard also planned and provided mission-critical spacecraft shipping operations for the James Webb Space Telescope; the Advanced Topographic Laser Altimeter System aboard the Ice, Cloud, and land Elevation Satellite 2; and the Ocean Color Instrument of the Plankton, Aerosol, Cloud, ocean Ecosystem mission.
- 5 The Goddard Information and Collaboration Center, which integrates the center's library collections and reading room space with collaboration hubs and meeting areas, received recognition as the 2016 Federal Large Library of the Year from the Library of Congress' Federal Library and Information Network.



MODERNIZING, INNOVATING AND SECURING IT FOR GODDARD'S MISSIONS

The past year featured information technology accomplishments that furthered Goddard's ability to achieve its science and technology mission. Goddard successfully migrated more than 400 of its public websites to Internet Protocol Version Six, improving the security posture of Goddard's corporate network. Goddard TV televised the solar eclipse on Aug. 21 for media conglomerates and about 34 stations in the top 15 markets across the country. With the award of the Next Generation Land Mobile Radio contract last year, the IT and communications directorate provided new two-way radios to first responders at the Greenbelt campus, Independent Verification & Validation Facility in West Virginia, Goddard Institute for Space Studies in New York, and Wallops Flight Facility in Virginia. Goddard prototyped a private cloud solution for use by the sciences and exploration directorate, and the IT and communications directorate worked closely with Goddard customers to develop enhanced applications that automate processes and save customers time and money. Miles of unused cabling from the center's ductwork were removed, allowing the placement for cutting-edge network infrastructures to better support critical missions and their growing communications requirements. Finally, Goddard upgraded its remote login capability—virtual private network—to a more secure connection, a large-scale accomplishment with minimal impact to center employees.

ONGOING PROJECTS:

Mission Network: Goddard continues leading the deployment of the next generation of NASA mission networks through effective project management of mission network security enhancement projects. Goddard improved and expanded capabilities to support spaceflight and its mission customers, as well as those at NASA's Johnson Space Center in Houston and NASA's Marshall Space Flight Center in Huntsville, Alabama, all while improving security, accelerating service delivery and reducing recurring backbone circuit costs. Over the year, Goddard's mission operations successfully supported 24 spaceflight activities.

Web Services: Goddard reached 100 percent compliance for all of its 1,150 external-facing websites with the federal mandate to secure our external connections.

Cybersecurity: Goddard made tremendous strides in protecting its IT systems against cyberthreats. Goddard continued to improve the center's security posture and better align with the agency's security protocols by achieving 75 percent compliance with both the personal identity verification mandate and the first element of Phase 1 of the Continuous Diagnostic and Mitigation Program.

Modernization of Wallops Flight Facility: New Wallops facilities like the Island Fire House and north-end Unmanned Aerial Vehicle runway were outfitted with cable plant, voice, video and network services. Cabling for the Wallops Mission Operations Control Center began. Specialized video support was also provided to the Wallops Range Control Center's video wall to transform mission operations.

NASA Strategic Objective 3.3: Provide secure, effective and affordable information technology and services that enable NASA's mission.

PORTFOLIO



- MANAGEMENT AND OPERATIONS
- INFORMATION SECURITY
- COMMUNICATIONS
- END USER SERVICES
- APPLICATIONS
- DATA CENTER



PUBLIC COMMUNICATION

BRINGING NASA TO THE WORLD

Goddard’s scientific discoveries and technological advancements have benefitted society in countless ways. The center’s commitment to outreach and communications ensures that the public—our most important stakeholder—is constantly informed and engaged in our missions and projects.



www.nasa.gov/goddard



@NASAGoddard



NASA Goddard



NASA Goddard



@nasagoddard



GSFC



NASA Snapchat

THE GATEWAY TO GODDARD

NASA Strategic Objective 3.1: Attract and advance a highly skilled, competent and diverse workforce, cultivate an innovative work environment, and provide the facilities, tools and services needed to conduct NASA’s missions.

Social Media

Goddard’s numerous social media outlets provide quick and direct lines of communication to the center’s followers, stakeholders and broader online community.

Date
9/28/16
10/4/17
Growth

The Stories We Tell

Goddard posted 620 articles to www.nasa.gov in fiscal 2017. The majority span the center’s core focus areas of astrophysics, Earth science, heliophysics, planetary science, and engineering and technology.

Top 10 Ar	
1	Novemb
2	Hurrican
3	Preparin
4	NASA M
5	New Nig

Multimedia and Television Production

A total of 168 videos were posted to Goddard’s YouTube account in fiscal 2017, helping present the center’s work in engaging visual formats.

Top 14 Vi	
1	How
2	Olde
3	Ligh
4	Traci
5	How
6	EPIC
7	Follo

Visitor Center and Tours

The Goddard Visitor Center showcases Goddard’s innovative and exciting work for space explorers of all ages.

- Total atten
- A total of programs
- A total of
- Public ecl
- James We
- Renovatio

Media Resources

Goddard’s media resources provide external news organizations and others direct access to the center’s activities, subject matter experts and products, further allowing us to communicate our work to the public.

11 Live SH	
•	Hurrican
•	Superest
•	SnowEx
•	Equinox

Outreach Events

Outreach events, organized by both Goddard and the agency, are held year-round to engage the public with NASA’s missions, programs and achievements.

- Conducted
- Coordinat
- National A
- Presented
- Celebrate

2017 PUBLIC COMMUNICATION HIGHLIGHTS

	FANS/FOLLOWERS/SUBSCRIBERS					TOTAL VIEWS	
	Facebook	Instagram	Twitter	Twitter (photo)	YouTube	YouTube	Flickr
5	1,076,233	1,664,636	341,333	291,731	364,355	122,197,225	202,925,674
7	1,143,211	2,160,183	413,845	417,570	397,538	144,460,119	236,869,939
n	6%	30%	21%	43%	9%	18%	17%

Articles	Views
er's Spectacular Supermoon	736,255
e Irma Updates	654,041
g for the August 2017 Total Solar Eclipse	490,335
oon Data Provides More Accurate 2017 Eclipse Path	352,716
ht Light Maps Open Up Possible Real-Time Applications	291,291

Top 10 Articles	Views
6 Hurricane Matthew Updates	273,844
7 Five Tips From NASA for Photographing the Total Solar Eclipse on Aug. 21	265,324
8 NASA Satellites Ready When Stars and Planets Align	209,163
9 Hurricane Harvey Updates	179,789
10 Hubble Reveals Observable Universe Contains 10 Times More Galaxies	164,057

Videos	Plays
to Make a Pinhole Projector to View the Solar Eclipse	3,450,375
er Arctic Sea Ice Disappearing	931,319
ts of Human Activity Shine in NASA's Image of Earth at Night	921,285
ng the 2017 Solar Eclipse	623,413
to Safely Watch a Solar Eclipse	622,070
Observations of Ice in Earth's Atmosphere	584,189
owing Carbon Dioxide Through the Atmosphere	375,770

Top 14 Videos of 2016	Plays
8 NASA's SDO Watches a Sunspot Turn Toward Earth	374,366
9 Showstopper Nov. 14 Supermoon Is the Closest Moon to Earth Since 1948	340,742
10 Get Ready for the 2017 Solar Eclipse	316,581
11 Yearly Arctic Sea Ice Age: 1984-2016	307,622
12 NASA's Van Allen Probes Find Human-Made Bubble Shrouding Earth	306,579
13 Hubble Detects a Rogue Supermassive Black Hole	301,545
14 Arctic Sea Ice Reaches Another Record Low	196,220

Attendance for fiscal 2017 was 45,602
17,501 attended tailored meetings, events and

11,775 participated in 399 group tours
Eclipse viewing on Aug. 21, 2017
James Webb Space Telescope friends and family day
Opening of the main exhibit gallery

- Temporary exhibit: "The James Webb Space Telescope: Art + Science 2017"
- New Earth science exhibits: "Neighborhood Earth" and "GLOBE Hall"
- Cassini Grand Finale celebration
- GOES-R launch viewing
- International Observe the Moon Night
- Apollo model rocket contest
- Monthly Sunday Experiments and model rocket launches

Spot Campaigns	Interviews
<ul style="list-style-type: none"> • James Webb Space Telescope • Hubble's New Image of Jupiter • Hubble Guardians • Two Months From the Solar Eclipse 	<ul style="list-style-type: none"> • One Month From the Solar Eclipse • Solar Eclipse Is Five Days Away • OSIRIS-REx Gravity Assist
	<ul style="list-style-type: none"> • 483 Satellite Interviews • 110 Radio Interviews • 21 In-person Interviews • 16 Print Interviews

and 80 VIP facility tours throughout the year, totaling 1,605 participants

attended the 18th annual Goddard Fall Reception and Lecture, presented by The Maryland Space Business Roundtable and Goddard, at the Smithsonian Air and Space Museum in Washington, D.C., on Oct. 4, 2017

highlighted NASA's missions and technology at Maryland Day 2017, organized by the University of Maryland, College Park

attended the 47th Earth Day at Union Station in Washington, D.C. Goddard contributed hyperwall presentations, demonstrations and hands-on activities.



INSPIRING, ENGAGING AND EDUCATING THE FUTURE STEM WORKFORCE

The Goddard Office of Education immerses formal and informal K-12 and higher education students and educators in NASA's education mission: "To advance high quality Science, Technology, Engineering, and Mathematics (STEM) education using NASA's unique capabilities." NASA's missions, projects, engineering and information technology services are core to Goddard's exemplary educational opportunities. The following represent a few notable highlights from 2017.

NASA Internships, Fellowships and Scholarships invest in NASA's workforce of tomorrow.

- More than 500 summer, fall and spring interns—from high schools to doctoral programs—worked alongside Goddard's scientists, engineers and technologists at the Greenbelt campus, NASA's Goddard Institute for Space Studies in New York, NASA's Independent Verification & Validation Facility in West Virginia, and Wallops Flight Facility in Virginia. They represented 46 states, Puerto Rico the U.S. Virgin Islands and one foreign country.
- Twelve Goddard undergraduate and graduate student interns were honored as 2017 Mather Nobel Scholars by the John and Jane Mather Foundation for Science and the Arts. Mather Nobel Scholars, first selected in 2008, are awarded travel grants to present their research at a professional conference.
- Goddard's Dynamic Response of the Environments at Asteroids, the Moon, and moons of Mars—or DREAM2—team hosted three undergraduate student interns—two from Howard University in Washington, D.C., and one from the University of Maryland, College Park—culminating in scientific posters and oral presentations.

Educator Professional Development connects learners of all ages with NASA's unique resources.

- In collaboration with the Hadley Institute for the Blind and Visually Impaired in Illinois, the office of education delivered a four-part, fully accessible podcast series featuring presentations on the solar eclipse of Aug. 21, air and water, the solar system, and NASA career and internship opportunities. The series generated more than 2,500 registered viewers.
- The office of education distance learning team delivered a live virtual presentation on the Global Learning and Observations to benefit the Environment, or GLOBE, Observer app and NASA citizen science opportunities to 850 middle school students in Pennsylvania. The program detailed how students can play a role in ground data validation for NASA missions and the GLOBE program.
- Wallops hosted Virginia Space Coast Scholars for the fifth year. In 2017, there were 329 high school sophomores who completed the online STEM learning experience. One hundred and twenty students participated in one of the three weeklong academies conducted at Wallops. They included an engineering design challenge,

model rocketry, and research and development of suborbital and special orbital missions presented to Wallops employees.

- The IV&V education program provided 8,156 K-8 students across West Virginia an opportunity to participate in a rocket competition at their schools. Participating students and teachers learned how they can engage in IV&V's more STEM-intense and formalized educational services, such as robotic competitions, STEM education workshops, the equipment loan program and the Team America Rocketry Challenge.
- The Remote, In Situ, and Synchrotron Studies for Science and Exploration—or RIS4E—science journalism program connected seven journalism students from Stony Brook University in New York with Goddard scientists in a semester-long science journalism course. Four students and two instructors then joined the scientists on an immersive 10-day field campaign to Potrillo volcanic field in New Mexico, spending time observing and reporting on the scientists as they conducted their research. The participants' work is presented at ReportingRIS4E.com.
- Eighty-four students from academic institutions across West Virginia participated in IV&V's Space Flight Design Challenge program to build scientific payloads and operate them in space.

Institutional Engagement provides unique NASA STEM content and hands-on learning experiences for in-service, preservice and informal educators.

- More than 50 educators from Woonsocket and Hopatcong Borough public schools in Rhode Island and New Jersey, respectively, participated in a live week-long online series coordinated by Goddard's distance learning studio. NASA scientists and engineers provided content and presented hands-on engineering design challenges.
- The Goddard Astrophysics Science Division education team conducted professional development workshops on two space science curricula tailored for informal educators: the NASA Family Science Night program and Afterschool Universe. The team introduced resources and activities to provide academic enrichment opportunities for out-of-school programs.
- Fourteen science educators, grades 6-9, participated in the weeklong DREAM2Explore Educator Professional Development Workshop at Goddard. The workshop focused on the moon, near-Earth asteroids and the moons of Mars. Participants engaged in hands-on activities

that they could take back to their classrooms, went on a field trip behind the scenes of the Antarctic Meteorite Collection at the Smithsonian National Museum of Natural History in Washington, D.C., and engaged in conversations with Goddard scientists and engineers.

- The IV&V Educator Resource Center trained 765 formal, informal and preservice educators on unique NASA resources; loaned classroom kits to 232 classrooms, impacting 12,275 students; connected with 454 students through on-site STEM engagements; and conducted 20 robotics tournaments across West Virginia for more than 200 teams of students.

STEM Engagement builds academic and research capacity for increasing the participation of minorities and underrepresented groups in NASA-related STEM activities.

- The NASA Minority University Research and Education Other Opportunities project—an educational partnership between How-

ard University; the University of Maryland, Baltimore County; and Goddard—exposes underrepresented STEM university students to cutting-edge Earth- and space science-focused research under the expert guidance of seasoned Goddard scientists throughout the academic year and summer.

- In partnership with the Maryland State Department of Education, the Eastern Shore of Maryland Educational Consortium of Superintendents and the nine science supervisors from the rural school districts of the Eastern Shore of Maryland, Goddard provided two years of STEM Education and Accountability Project Educator Professional Development programming. This included an online learning management system and regional consulting support for the continuous scaffolding of NASA-related science content directly related to state STEM education initiatives. This resulted in the mapping of NASA products and services to the Next Generation Science Standards that the state has adopted.

NASA Strategic Objective 2.4: Advance the nation's STEM education and workforce pipeline by working collaboratively with other agencies to engage students, teachers and faculty in NASA's missions and unique assets.

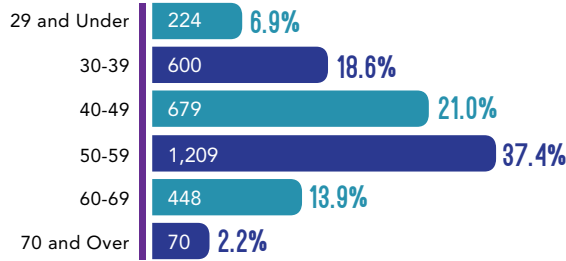




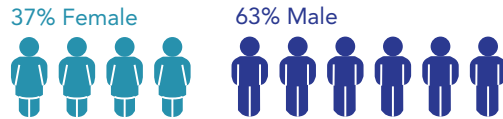
OUR PEOPLE

CURRENT STATE OF THE WORKFORCE 2017

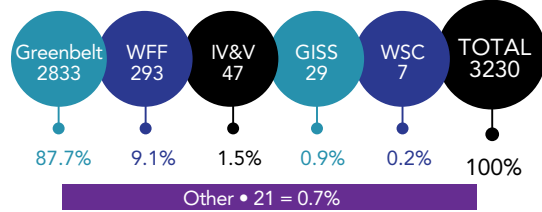
GODDARD CIVIL SERVANTS by Age Group



GODDARD CIVIL SERVANTS by Gender



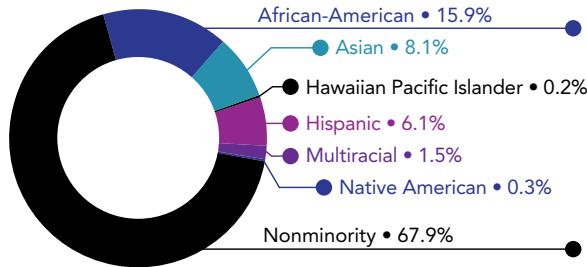
GODDARD CIVIL SERVANTS by Duty Location



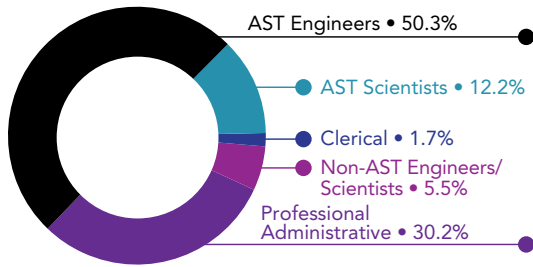
GODDARD CIVIL SERVANTS by Disability



GODDARD CIVIL SERVANTS by Ethnicity



GODDARD CIVIL SERVANTS by Skill Mix



BEST PLACES TO WORK IN THE FEDERAL GOVERNMENT

<http://bestplacestowork.org>

Compiled by the Partnership for Public Service. Scores are based on an index measuring employee engagement. Rankings are in relation to other federal agency subcomponents.

Rankings and Scores by Category	2017 Rank	2017	2011	2005
Overall	2 of 150	83.5	77.1	73.9
Teamwork	6 of 148	82.5	77	79.6
Innovation	2 of 148	83.4	78.3	N/A
Effective Leadership	4 of 147	76.3	69.8	64.6
Support for Diversity	2 of 148	80.7	76.4	76.5
Training and Development	8 of 149	80.1	74.7	72.5
Employee Skills-Mission Match	2 of 149	87.3	84.9	80.5
Work-Life Balance	12 of 148	74.1	66.1	67.8
Performance-Based Rewards and Advancement	1 of 147	70.5	62.5	60.9

NASA ranked No. 1 in 2017 among all large federal agencies. Goddard ranked highest among all NASA centers in overall agency subcomponent rankings.

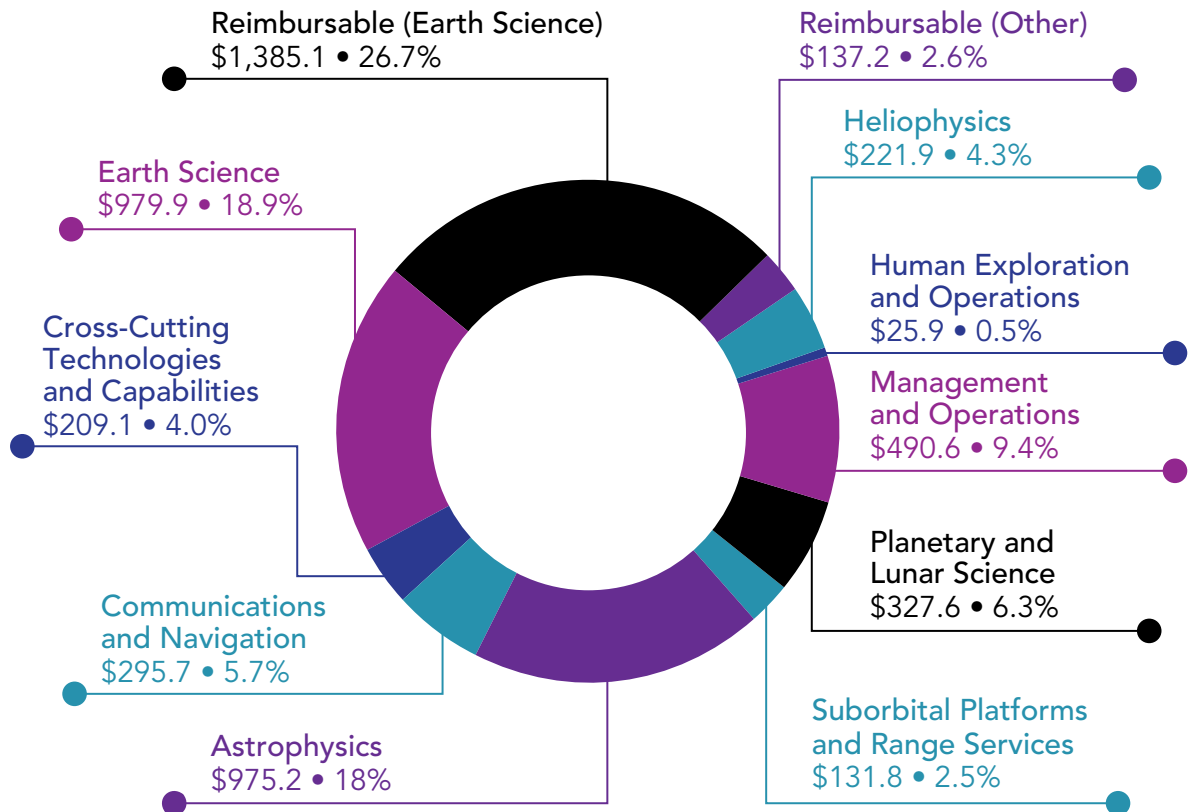


BUDGET: \$5.2B

DIRECT GSFC BUDGET: \$3.7B
 REIMBURSABLE GSFC BUDGET: \$1.5B

Goddard Program Year 2017 BUDGET Categorized by Lines of Business (as of Sept. 30, 2017)

Chart is in \$Ms





ECONOMIC IMPACT

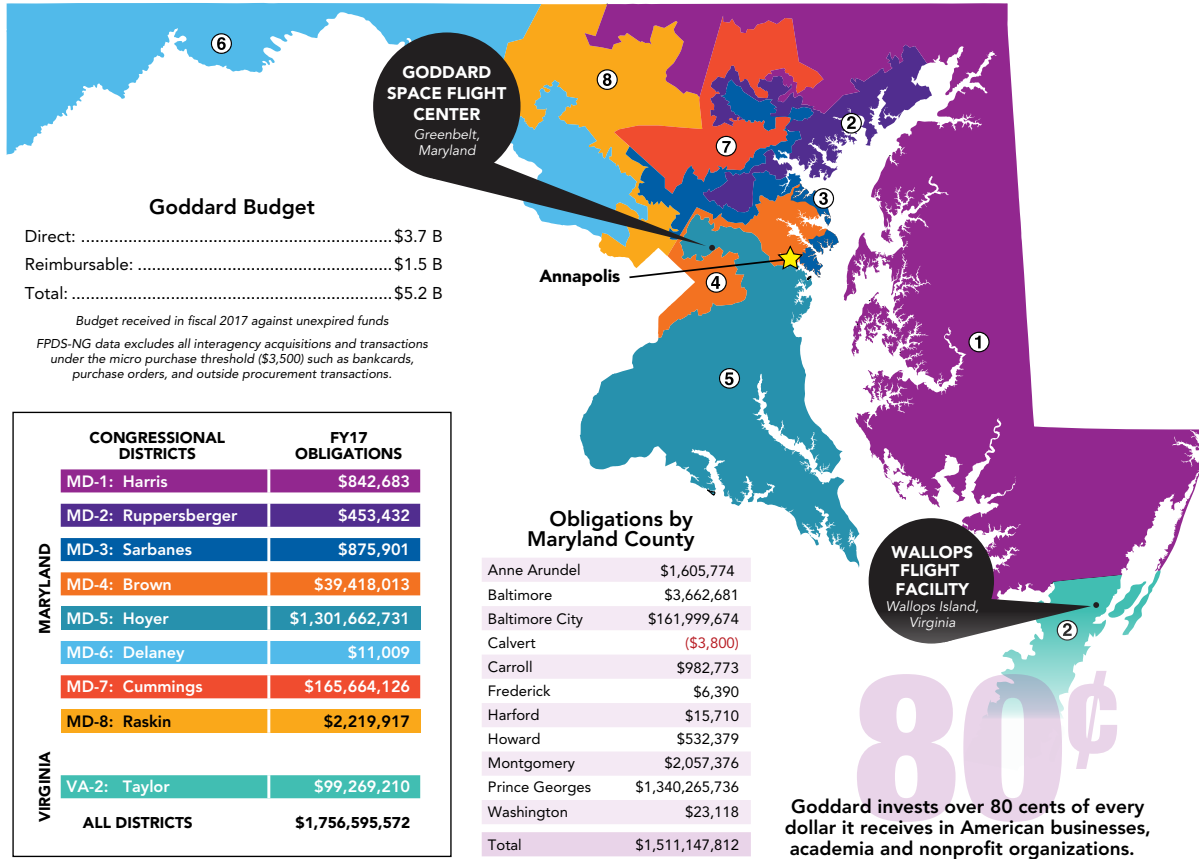
Goddard's success in enabling NASA missions and applying these scientific achievements to society is evident. Each of Goddard's locations supports the center's ability to

stimulate and strengthen economic activity by:

- Expending goods and services to perform its mission.
- Generating technology transfer

and spinoff activities.

- Broadening small business opportunities through its robust contracting program.



Goddard's Top Contractors

1. NORTHROP GRUMMAN SPACE AND MISSION SYSTEMS CORPORATION	\$408.7 M	9. AS AND D, INC.	\$132.7 M
2. RAYTHEON COMPANY	\$345.1 M	10. ATA AEROSPACE, LLC	\$116.7 M
3. LOCKHEED MARTIN CORPORATION	\$318.3 M	11. KBRWYLE TECHNOLOGY SOLUTIONS, LLC	\$85.8 M
4. HARRIS CORPORATION	\$276.0 M	12. GENERAL DYNAMICS MISSION SYSTEMS, INC.	\$83.8 M
5. ORBITAL ATK	\$248.5 M	13. SCIENCE SYSTEMS AND APPLICATIONS, INC.	\$76.5 M
6. BALL AEROSPACE AND TECHNOLOGIES CORPORATION	\$164.0 M	14. INUTEQ, LLC	\$73.9 M
7. ASTRONOMY INCORPORATED	\$161.6 M	15. LJT & ASSOCIATES, INC.	\$58.6 M
8. SGT, INC.	\$138.6 M		

All numbers are based on NPDV and FPDS obligation data for fiscal 2017 as of Oct. 23, 2017. Not based total contract value.



GREEN GODDARD

Goddard implements the NASA Strategic Sustainability Performance Plan that addresses the objectives in White House Executive Order 13693—“Planning for Federal Sustainability in the Next Decade.”

- ObseRvations of Aerosols above CLouds and their intEractionS (ORACLES)
 - This Wallops Flight Facility-based mission investigates the climate impacts of African biomass-burning aerosols over five years.
- Goddard Living Laboratory for Coastal Resilience
 - NASA’s largest shoreline protection program is preparing for its second beach renourishing project on Wallops Island to protect the agency’s only launch range. The Goddard-led Mid-Atlantic Coastal Resilience Institute will continue to study the impacts of storms and rising sea levels in the area.

A leader in Earth and atmospheric science, Goddard is committed to executing its mission without compromising the planet’s resources. Sustainability practices have been implemented across all operations and levels of management. The center’s four sustainability objectives, along with select accomplishments, are listed below:

- 1 Reduce energy consumption, associated air emissions and other environmental impacts**
 - Reduced greenhouse gas emissions by 25 percent from 2008 to 2016.
 - Produced 27.7 percent of energy from landfill gas and renewable electricity.
- 2 Increase the number of sustainable buildings**
 - Designed Goddard’s first building capable of zero energy emissions. Construction will begin in 2018.
 - Certified one building to meet the Leadership in Energy and Environmental Design’s gold standard, and constructed two buildings earning silver status.
- 3 Reduce potable water consumption and improve stormwater management**
 - Surpassed the federal water intensity reduction requirement by 18 percent to achieve an overall 33.8 percent reduction.
 - Reduced vehicle traffic and untreated stormwater runoff.
- 4 Pollution prevention and waste reduction**
 - Diverted more than 300,000 pounds, or 68 percent, of construction debris away from landfills.
 - Reused, repurposed or recycled more than 1.5 million pounds, or 46 percent, of solid waste in 2016.
 - Added green purchasing requirements to all procurement contracts on center.

LOOKING FORWARD ▶

To reduce energy consumption in the long term and satisfy renewable electricity requirements, Goddard is already planning or pursuing several projects. These include:

- Improving heating and cooling systems in several buildings.
- Potentially adding solar panels on Wallops Island, helping meet on-site renewable energy goals at Wallops Flight Facility.
- Installing meters to help identify additional energy conservation opportunities.



CHAMPIONING DIVERSITY, INCLUSION AND EQUAL OPPORTUNITY



Employees are the greatest assets at NASA's Goddard Space Flight Center. Its organizational culture values the diversity of viewpoints, experiences, talents and ideas embodied by its personnel. In pushing the boundaries of what is possible in the universe, diversity, inclusion and equal opportunity are not merely organizational goals or moral obligations. They are business imperatives that drive innovation and creativity, both of which are critical to mission success.

February 2017, the Goddard African American Advisory Committee hosted a panel discussion in which several of the center's so-called "Modern Figures"—or African-American executive leaders—spoke about their own personal journeys and challenges.



This past year, the Hollywood blockbuster "Hidden Figures" reaffirmed the importance of a diverse NASA workforce, highlighting the contributions of three African-American women during the early days of human spaceflight. Several of Goddard's African-American female engineers spoke at screenings in Greenbelt, Maryland. In

Goddard extended its efforts beyond the walls of the center, underscoring the benefits of a more inclusive scientific community to its mission. Leveraging the success of an initial forum in 2016, Goddard partnered with Lockheed Martin and Northrop Grumman to organize a similar event in September 2017, bringing together thought-leaders to discuss how men can play a more engaging role in sustaining women in STEM fields. Earlier in November 2016, Goddard partnered with The Maryland Space Business





Equal
Accessibility
Advisory
Committee



New and
Developing
Professionals
Advisory
Committee



Veterans
Advisory
Committee



Native
American
Advisory
Committee



Women's
Advisory
Committee



Asian Pacific
American
Advisory
Committee



Hispanic
Advisory
Committee
for
Employees



Roundtable to host a STEM-themed sleepover on center for local high school girls.

Other advisory committees organized events throughout the year to highlight the center's commitment to diversity, inclusion and equal opportunity. Several of their activities are as follows:

- The Goddard LGBT Advisory Committee hosted LGBT Pride Month social events in June 2017 and engaged center managers throughout the year in discussions on inclusive work environments.
- The Goddard Equal Accessibility Advisory Committee hosted a panel during National Disability Employment Awareness Month in October 2016, discussing such topics as reasonable accommodations, depression and hiring processes.

- The Goddard Veterans Advisory Committee held a panel discussion with two of the center's female senior leaders, both of whom have also served as captains in the U.S. Navy.
- The Goddard Native American Advisory Committee participated in several career fairs to promote NASA internships and career opportunities. A representative attended the 2017 Inter-Tribal Youth Climate Leadership Congress to encourage Native American youth participation in STEM. The committee hosted center events on Native American history during National Native American Heritage Month in November 2016.
- The Goddard Women's Advisory Committee facilitated several "lean in" chats at Goddard and NASA's Inde-

pendent Verification & Validation Facility in Fairmont, West Virginia, encouraging women to make themselves heard in the workplace.

- The Goddard Asian Pacific American Advisory Committee invited several Asian-American speakers who had executive roles at the White House and Department of Homeland Security to discuss their career trajectories. It also co-sponsored the centerwide Taste of Asia and the Pacific Islands.
- The Goddard Hispanic Advisory Committee for Employees hosted a Cinco de Mayo cultural celebration in May 2017 and sponsored relief efforts for victims of Hurricane Maria in Puerto Rico and the central Mexico earthquake, both occurring in September 2017.



SOCIAL MEDIA SNAPSHOTS

NASA's Wallops Flight Facility • 2016 • 9 new photos
 The wait is over: The Tarble Improved Midrange launched this morning June 26, at 4:25 a.m. An early Independence Day fireworks display, the mission was a test of a new multi-carrier rocket system for orbital missions in low-orbit or orbits supporting rocket missions. Vapor about that were formed during the flight were seen from New York to North Carolina.
 Reference proved key: it was this mission's 11th launch attempt. It took off, and clouds grounded the launch during previous attempts. nicknamed by some as "Aurora" during the launch to the highly anticipated arrival of April the Grifter's call, the launch was indeed similar as it too proved worth the wait. We may not have a quite grifter But we do have quite awesome launch photos.

2016 Artist Event - Final Works
 Images of the art created as a result of the November 2016 Artist Event. You'll find all 6 panels at the NASA Goddard Visitor Center through April 18, 2017. You'll also see a gallery with more animation, digital art, and making-of photos.

NASA Goddard • @NASAGoddard
 14% Bigger, 30% Brighter. Don't miss the 2016 Supermoon tonight! It won't be this again until 2034. Read more: go.nasa.gov/2eZ1XsY

Hubble • @NASASpace
 His Majesty King Carl XVI Gustaf of Sweden & the Royal Swedish Academy of Engineering Sciences visiting the #Hubble STOCC today @NASAGoddard

NASA GISS • @NASAGISS
 May 2017 was the second warmest May in 137 years of modern record-keeping: data.giss.nasa.gov/gistemp/news/201705

NASA Goddard • @NASAGoddard
 Older Arctic Sea Ice Disappearing
 Arctic sea ice has not only been shrinking in surface area in recent years, it's been getting thinner as well. In this animation, where the ice cover almost looks gelatinous through the seasons, a yepheric scientist Dr. Matt Meier of NASA Goddard Space

NASA Goddard • @NASAGoddard
 How to View an Eclipse with a Cereal Box
 How do astronomers do it? They use special equipment to watch one of the most awe-inspiring events in our solar system. With just a few simple supplies, you can make a simple version that allows you to view the event safely and easily.

Why Do We Study Ice?
 Discover why scientists study ice and how this research benefits Earth.

NASA Goddard • @NASAGoddard
 Lights of Human Activity Shine in NASA's Image of Earth at Night

NASA Goddard • @NASAGoddard
 NASA's satellite has just revealed the first ever global map of Earth at night. The image shows the lights of human activity around the globe. It's striking.

NASA Goddard • @NASAGoddard
 Older Arctic Sea Ice Disappearing
 Arctic sea ice has not only been shrinking in surface area in recent years, it's been getting thinner as well. In this animation, where the ice cover almost looks gelatinous through the seasons, a yepheric scientist Dr. Matt Meier of NASA Goddard Space

IN MEMORIAM



As we celebrate our collective achievements, we also honor all of those who have contributed to Goddard and are no longer with us.

Your dedication and talent will never be forgotten.

*Active civil servants who passed away from October 2016 through September 2017 include:

WOLFGANG N. CLAYTON
CORNELIS GEHRELS
PIERS J. SELLERS
HILDA M. THIEN
CRAIG R. TOOLEY
YUN ZHENG

‡Contractors, former civil servants and others whose reported passing occurred from October 2016 through September 2017 include:

RALPH L. ADAMS
ARTHUR C. AIKEN JR.
RICHARD J. ALLENBY
LEONARD ARNOWITZ
YOUN Y. BAE
JAMES W. BAILEY
ELEANOR J. BARBER
JOHN H. BERBERT
OTTO E. BERG
EDWARD W. BISONE
NINO L. BONAVITO
CHARLES P. BOYLE
JOHN W. BRYAN

ALFRED M. CATANZARITI
JAMES A. COOKRO
WILLIAM W. COOPER
DAVID A. CRISTOFALO
HARRY D. CYPHERS
PAUL B. DAVENPORT
MARTIN A. DAVIS
VIOLET M. DAWES
RUSSELL EMMONS
AI CHUN FANG
MICHAEL B. FELDMAN
ELISE R. FISHER
ROBERT J. FLICK
JOHN E. FUCHS
DAVID C. GLEASON
ARTHUR J. GOBLE
ADOLPH GOODSON
LARRY GREEN
GEORGE H. HARRIS
DAVID J. HAYKIN JR.
RICHARD HEALY
GEORGE H. HONEYCUTT
KATHRYN M. ISHAM
WILLIAM C. ISLEY
RUTH JOHNSON
FREDERICK F. KOLB
NANCY KUPPERIAN
HERBERT L. KYLE
RONALD L. LASSITER
SOLOMON LEVINE

HAN-SHOU LIU
JOHN W. LOVELACE JR.
HAROLD E. MAURER
HARRY V. MEYER JR.
CARY F. MILLINER JR.
SCOTT A. MILLS
GERALD G. MORRIS SR.
JOHN E. MOYE
JOHN D. OOSTERHOUT
ROBERT E. ORFF
ROBERT W. O'STEEN
GILBERT W. OUSLEY SR.
WALTER PAROBY
JAMES C. PERRY JR.
DAVID C. PFENNING
CARL O. ROBERTS JR.
GEORGE A. ROBINSON JR.
JAMES W. RYAN
PHILLIP A. SABELHAUS
LESLIE M. SALTER
CHARLES A. SCAFFIDI
WANDA L. SIMPSON
JOHN E. THOMSON
WALTER F. TRUSZKOWSKI
LEO J. VEILLETTE
ROBERT F. WARREN JR.
JOHN H. WOLSH JR.
SAID W. ZEWARI

*NASA does not have access to this information for former NASA civil servants. The report authors have been informally notified of such individuals who have been added to the list under contractors and others.

‡NASA does not have access to this information for contractors and others affiliated with Goddard. An earnest attempt was made to manually collect this information. However, the nature of the process could result in the list being incomplete.

Please email omissions to Darrell Dela Rosa at darrell.d.delarosa@nasa.gov. The electronic version of this report will be updated accordingly.



Goddard

SPACE FLIGHT CENTER

Just remember - when you think all is lost, the future remains.

– Robert H. Goddard



For more information, please visit our website:
www.nasa.gov/goddard