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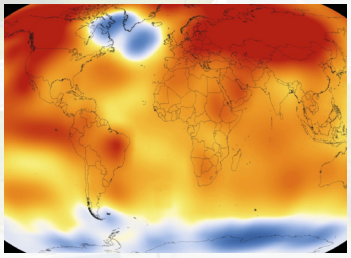
GoddardView

TRENDING

NASA Observes Annual Day of Remembrance
The Day of Remembrance honors members of the NASA family who gave their lives in the name of exploration. This year marks the 30th anniversary of the Challenger disaster, which claimed the lives of all seven crew members.

U.S. Senator From Florida Tours Goddard's Facilities
Sen. Bill Nelson toured the center's facilities on Jan. 16. In 1986, as a member of the U.S. House of Representatives, Nelson served as a payload specialist during a mission aboard the space shuttle Columbia.



2015 Is Warmest Year on Record
Independent analyses by the Goddard Institute for Space Studies and the National Oceanic and Atmospheric Administration concluded that Earth's globally averaged surface temperatures in 2015 were the warmest since modern record-keeping began in 1880.

GPM Releases Anime Comic Book
The Global Precipitation Measurement mission has released a Japanese anime comic book to encourage young students to read more about science. The comic's lead characters were selected from more than 40 entries in a 2013 competition.

GoddardView

Trending – 2
Celebrating Hubble's 25 Years of Endless Discoveries – 3
Journey to Mars Is More Than Just Fiction – 4
On Earth Day, Rock Stars and Earth Science Share Center Stage – 5
Goddard's 2015 Milestones at a Glance – 6
Open Houses Provide a Closer Look Into NASA's Work – 8
A Scientifically Enlightening Year in Heliophysics – 10
Half a Century Later, Rick Obenschain Completes His Final NASA Mission – 11
Goddard Honors Sen. Mikulski and Her Astronomical Contributions – 12

On the cover: Select Goddard milestones and accomplishments from 2015.

Cover credit: NASA/Goddard/John W. Jones

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GoddardView Info

Goddard View is an official publication of NASA's Goddard Space Flight Center in Greenbelt, Maryland. Goddard View showcases people and achievements in the Goddard community that support the center's mission to explore, discover and understand our dynamic universe. Goddard View is published by the Goddard Office of Communications.

You may submit story ideas to the editor at darrell.d.delarosa@nasa.gov. All contributions are subject to editing and will be published as space allows.

CONTENTS

CELEBRATING HUBBLE'S 25 YEARS OF ENDLESS DISCOVERIES

By Murray Hannon

Ask almost anyone at NASA's Goddard Space Flight Center, and they can likely tell you how they've supported the Hubble Space Telescope since its launch on April 24, 1990. During its time in orbit, Hubble has become an international icon of science that has uncovered some of the universe's most compelling mysteries, and its home base for operations is right here at Goddard.

Thanks to Hubble, scientists have determined the age of the universe with greater accuracy than ever before. They learned the speed at which the universe is expanding, and that this expansion is also accelerating. They gathered new information on the birth of planets. They now know that supermassive black holes likely exist in all galaxies.

"Hubble's legacy will forever be based on its incredible number of discoveries," said Jim Jeletic, Hubble deputy project manager. "To date, Hubble data have been used to produce more peer-reviewed scientific papers than from any other NASA mission. From that perspective, Hubble has been the most productive mission in history."

To celebrate Hubble's 25 years of inspiration and wonder, Goddard dedicated several events in 2015 to the telescope and the people behind its success.

The festivities began on April 23, one day prior to the launch anniversary, as social media users gathered for a NASA Social – a program that allows the agency's social media followers to learn and share information about its work and people. Attendees began the day at the Newseum in Washington, D.C., where they met with scientists, engineers and astronauts who were involved with Hubble and its repair missions. NASA also unveiled "Celestial Fireworks" – which features young stars flaring to life – as the commemorative image of the anniversary. During a visit to Goddard, guests toured the facilities where Hubble was largely built and tested, the James Webb Space Telescope clean room, and the Hubble control center.

On April 24, Robert Kirshner – science professor at Harvard University – addressed Goddard as the speaker for the 2015 John Bahcall Lecture, named in honor of the astrophysicist for his many contributions to Hubble. Kirshner described how his team has used Hubble to observe supernovas exploding billions of light-years away.

In July, Goddard hosted a day of talks in which those who have supported the mission over the years shared their stories, challenges and hopes for the telescope in the years to come. John Mather, senior project scientist for the Webb telescope, also discussed the expectations for Webb as Hubble's successor. NASA Administrator Charles Bolden closed the event by recalling his days as an astronaut aboard STS-31, which used the space shuttle Discovery to deploy Hubble in 1990.

On Sept. 26, more than 20,000 came for the Explore@NASAGoddard open house, which highlighted the theme "Celebrating Hubble and the Spirit of Exploration."

After a quarter-century of countless achievements, and celebrations to boot, Hubble is expected to continue producing breathtaking images and making discoveries in the coming years. "We are using the telescope to the fullest extent and hope that the telescope will operate at least until 2020 and probably many years beyond that," said Jennifer Wiseman, NASA's senior project scientist for Hubble.

As Goddard looks back on Hubble's success and moves forward with new endeavors, the telescope continues to inspire the scientific community and the public by revealing the staggering potential that exists within the universe.

"Hubble will go down as a story of inspiration that has mesmerized people around the world," added Jeletic. "Hubble has fulfilled that original promise of discovery and exceeded everyone's expectations." ■

Above: NASA scientists, engineers and astronauts discuss the Hubble Space Telescope during a 25th anniversary celebratory event at the Newseum in Washington, D.C.

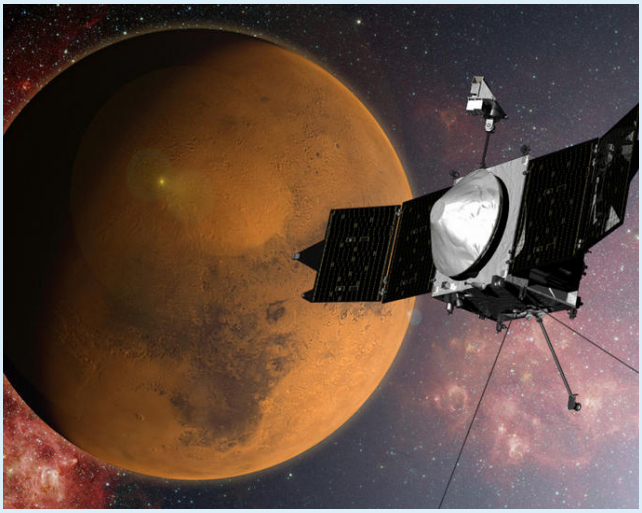
Photo credit: NASA/Aubrey Gemignani

JOURNEY TO MARS IS MORE THAN JUST FICTION

By Jenny Hottle

While astronaut Mark Watney was planning his escape from Mars in the 2015 science fiction film "The Martian," NASA's Goddard Space Flight Center was hard at work helping develop the capabilities needed to send real-life astronauts to Earth's neighbor. And when the New Horizons spacecraft completed its historic flyby of Pluto in July, scientists took it as an informative moment for NASA's overarching goal of developing a long-awaited expedition to the Red Planet by the 2030s.

In the past year alone, as part of the agencywide Journey to Mars endeavor, Goddard's brightest minds made groundbreaking discoveries about how the planet evolved from being warm, wet and potentially habitable billions of years ago to becoming a dry and cold environment today. In addition, the center's scientists and researchers have been studying how to get astronauts to Mars and survive the planet's harsh environment, how communications systems between Earth and Mars could work, and what kind of scientific research Mars-bound astronauts will undertake and what technologies they'll use.



"I've been waiting my whole life to get the opportunity to participate at NASA and make sure we're clear and focused on the journey to Mars," said Dava Newman, NASA's recently appointed deputy administrator, during her visit to Goddard in August. "We're on a journey to Mars. It's not theoretical."

To help play its part, Goddard has managed the Mars Atmosphere and Volatile Evolution mission since it launched in November 2013. The mission recently hit several major milestones as it continues to study the planet's upper atmosphere. In April, MAVEN completed 1,000 orbits around Mars. By the time it celebrated one year on the planet in September, the mission had carried out 10 months of observations and completed four Deep Dip campaigns, which enable the spacecraft to take measurements near the lower end of the Martian upper atmosphere.

In November, NASA announced that data collected by MAVEN revealed that the once-thick Martian atmosphere appeared to have been warm enough to support liquid water — a key ingredient for life. But over time, solar winds stripped away gas and eroded the atmosphere, according to researchers.

"We know there had to have been lots of liquid on the surface in ancient Mars," said MAVEN scientist Jared Espley. "We see the dry river beds, the dry lakes and the types of minerals that only form in the presence of water."

While MAVEN examines the Martian air, NASA's rovers on the ground are studying the planet's geology and minerals that possibly formed in the presence of water. NASA's Curiosity rover conducted experiments to study changes in Martian environmental conditions. Curiosity's Sample Analysis at Mars instrument suite, which Goddard developed, detected the release of nitrogen from the surface during the heating of planetary sediments. The discovery, announced in March, further suggests that Mars was once capable of supporting life.

Goddard's contributions extend far beyond planetary research. The center is also developing the technologies and instruments that will help make the journey possible. Several projects were discussed during a panel event in October.

David Israel, an architect for exploration and space communications, spoke about a communications network that will allow Mars-bound astronauts to communicate with Earth. He also outlined Goddard's GPS-Enhanced Onboard Navigation System, which allows spacecraft to process GPS data in order to self-navigate.

Engineer Mark Lupisella discussed the development of low-latency teleoperations that facilitate the exploration of Mars without landing on or contaminating its surface. One such project could enable astronauts to control rovers on the surface while orbiting the planet.

Planetary geologist Jake Bleacher and his team have been working on and testing instruments on orbiters that astronauts will potentially use on the surface. They are also conducting habitability tests to determine how long humans can live in a rover, similar to how Watney survived in a fictional Ares III vehicle.

And once a Mars spaceflight becomes a reality and more than just a storyline in a Hollywood blockbuster, it may just be the beginning of what's to come next.

"Once we get to Mars, we can refocus our questions on Earth about other planets, other moons around Mars and deeper space," Bleacher said. "If we can get bootprints on the moons of Mars, on Mars' surface, we'll be turning the key on a really big door." ■

Center: Artist rendering of MAVEN's approach to Mars.

Photo credit: NASA

ON EARTH DAY, ROCK STARS AND EARTH SCIENCE SHARE CENTER STAGE

By Clare Skelly

Last April, hundreds of thousands of people gathered around the Washington Monument on the National Mall in Washington, D.C., to listen to some of their favorite musical acts during the Global Citizen 2015 Earth Day event. Artists such as No Doubt, Usher, Mary J. Blige, Fall Out Boy and Train were among those who took the stage in observance of the 45th anniversary of Earth Day, but they weren't the only prominent voices heard. In between sets, government officials discussed the work being done to tackle some of the world's most pressing issues.

Following a recorded message from astronaut Scott Kelly aboard the International Space Station, in which he encouraged people to learn more about NASA's work in Earth science, NASA Administrator Charles Bolden – standing alongside hip hop artist will.i.am – highlighted how the agency uses the vantage point of space to better understand our home planet.

"An important part of NASA is using space to better understand Earth," Bolden said. "We want to know how our planet works, how we affect it and how it might change in the future."

As part of the festivities, NASA's Goddard Space Flight Center showcased some of its most recent work in Earth science on the mall. Many of the same exhibits were on display at Washington's Union Station throughout the week, accompanied by presentations given by NASA and Goddard scientists.

One such exhibit featured Soil Moisture Active Passive, a satellite mission which launched last January, just three months prior to Earth Day. SMAP monitors soil moisture data, which have a similar set of applications as precipitation measurements. Global maps of soil moisture help forecast natural disasters such as floods and droughts, thereby aiding emergency planners in preparing for troublesome outcomes such as food shortages. Goddard developed the satellite's advanced radiometer instrument, which detects this hidden moisture from space using naturally emitted microwave energy from the ground.

Eleven months prior to the SMAP launch, NASA launched the Global Precipitation Measurement Core Observatory. Dalia Kirschbaum, GPM applications scientist at Goddard, discussed how the satellite provides observations of rain and snow worldwide every three hours and improves the forecasting of extreme weather events. The mission produced its first global map of rainfall and snowfall in February. In 2015, GPM observed and monitored several hurricanes, typhoons and other large storms as they developed over oceans, approached land and made landfall.

Similar to how it monitors weather events, NASA also keeps a close eye on the sun's ultraviolet radiation. Bryan Duncan, Goddard's deputy project scientist for Aura, spoke about how the mission studies Earth's ozone layer and air quality. In May, using data gathered by Aura, Goddard scientists released a new study predicting the extinction of big ozone holes by 2040 due partly to the reduction of ozone-depleting chemicals in the atmosphere.

Throughout 2015, Goddard scientists published additional studies assessing the frequency of droughts, hurricanes and other weather-related events. In January, the Goddard Institute for Space Studies and the National Oceanic and Atmospheric Administration released separate analyses ranking 2014 as Earth's warmest year on record since record-keeping began in 1880.

With a fleet of spacecraft and tools committed to gathering Earth science data, NASA has never been better positioned to see the changes taking place across all of Earth.

"This is the first time in history that we can really see and hope to understand how a planet lives and breathes," added Bolden. "It's a tall order, but NASA's on it." ■

Above: NASA Administrator Charles Bolden (left) and hip hop artist will.i.am discuss the importance of the agency's work in Earth science during the Global Citizen 2015 Earth Day concert in Washington, D.C.

Photo credit: NASA/Joel Kowsky

GODDARD'S 2015

January

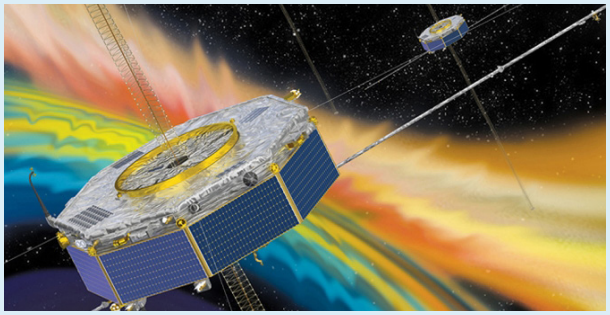
Scientists Find 2014 to Be Warmest Year on Record: The year 2014 ranks as Earth's warmest since 1880, according to two separate analyses by NASA and the National Oceanic and Atmospheric Administration. The 10 warmest years in the instrumental record, with the exception of 1998, have now occurred since 2000.

February

SDO Celebrates Five Years of Sun-gazing: NASA's Solar Dynamics Observatory marked five years of providing detailed images of the sun 24 hours a day. Capturing an image almost once per second, SDO has provided an unprecedentedly clear picture of how massive explosions on the sun grow and erupt ever since its launch on Feb. 11, 2010. Coincident with the anniversary, the "Solarium" exhibited debuted at the Goddard Visitor Center. "Solarium" taps into the vast reservoir of SDO imagery to put viewers directly in the heart of the sun's mesmerizing displays of giant loops, waves and eruptions.

March

MMS Satellites Set Out to Explore Magnetic Reconnection: The Magnetospheric Multiscale mission launched into orbit from NASA's Kennedy Space Center in Cape Canaveral, Florida. The quartet of identical spacecraft studies magnetic reconnection, which occurs when magnetic fields connect, disconnect and reconfigure explosively around Earth.

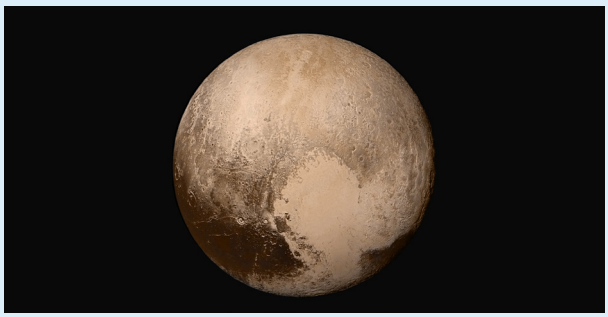


April

Goddard Celebrates 25 Years of an Iconic Observatory: The Hubble Space Telescope, which launched into orbit in April 1990, has unraveled some of the greatest mysteries in astronomy and astrophysics, transforming our understanding of the universe and our place within it. "Celestial Fireworks" – the commemorative image of the 25th launch anniversary – features a tapestry of young stars flaring to life.

June

NASA's Wallops Flight Facility Marks 70 Years With Open House: In commemoration of the 70th anniversary of its first rocket launch on June 27, 1945, NASA's Wallops Flight Facility welcomed more than 7,000 visitors for an open house event that featured more than 60 exhibits, special presentations and static display aircraft, as well as a 5k run.

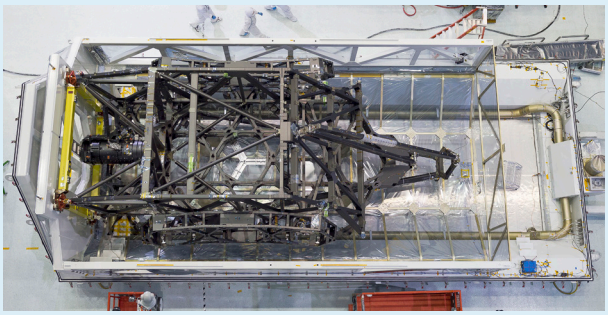


July

New Horizons Completes Historic Pluto Flyby: The New Horizons spacecraft, which was tested at Goddard in 2005 prior to its launch, achieved its closest approach to Pluto and its moons on July 14. The mission has provided the clearest images ever of the dwarf planet. Since setting off into space in early 2006, New Horizons has also crossed through the orbits of Mars, Jupiter, Saturn, Uranus and Neptune.

MILESTONES AT A GLANCE

August

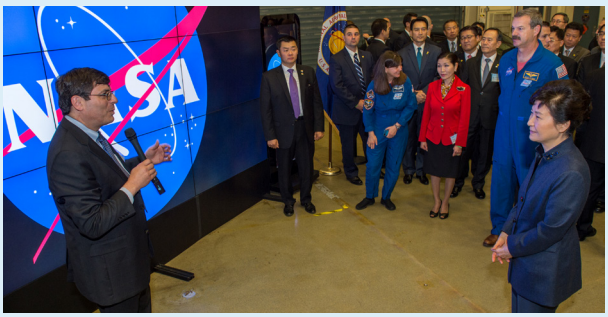


Webb Telescope Backplane Arrives: The James Webb Space Telescope will be the most powerful space telescope ever built upon its completion. The telescope's flight backplane, a crucial piece which holds 18 hexagonal mirror segments together to form its primary mirror, arrived on Aug. 25. The first segment was installed in November.

September

Goddard Open House Draws 20,000: The center's first open house since 2011, Explore@NASAGoddard on Sept. 26 featured more than 130 exhibits, presentations and tours in all of Goddard's science areas. In commemoration of the 25th launch anniversary of the Hubble Space Telescope, the event highlighted the theme "Celebrating Hubble and the Spirit of Exploration."

October



President Park Geun-hye of South Korea Visits Goddard: As part of her four-day trip to the United States, President Park Geun-hye of South Korea came to Goddard to learn more about the center's work and discuss potential synergies between NASA and her country's space program. Her visit was the first by a sitting head of state since Queen Elizabeth II of England arrived in 2007.

November

MAVEN Results Indicate Stripped Atmosphere on Mars: Results released from the Mars Atmosphere and Volatile Evolution mission indicate that solar winds have stripped away much of the Red Planet's atmosphere, transforming its climate from one that could have supported life billions of years ago into its present cold and barren state.

Operation IceBridge Completes Twin Polar Campaigns: Using a fleet of research aircraft, Operation IceBridge images Earth's polar ice in unprecedented detail to better understand processes that connect the polar regions with the global climate system. The mission finalized two overlapping campaigns at both of Earth's poles. Down south, it observed a big drop in the height of two glaciers situated in the Antarctic Peninsula. In the north, it collected much needed measurements on land and sea ice at the end of the Arctic summer melt season.

December

Engineers Test ICESat-2's Laser Aim: An elevation-measuring instrument slated to fly aboard the Ice, Cloud and land Elevation Satellite-2 – a planned mission for measuring ice sheet mass elevation, sea ice freeboard as well as land topography and vegetation characteristics – was tested for its pinpoint accuracy. The instrument, the Advanced Topographic Laser Altimeter System, will send laser pulses to the ground 300 miles below and then catch the handful of photons that bounce off the surface and return to its telescope mirror. ■

Photo credits: Johns Hopkins University Applied Physics Laboratory, NASA, NASA/Goddard/Chris Gunn and Bill Hrybyk

OPEN HOUSES PROVIDE A CLOSER

By Ashley Morrow

As a pioneer in space exploration, NASA is admired the world over. But it's not often that the public gets to venture beyond a center's gates and see the inner workings of America's space agency. In 2015, however, two NASA centers in Maryland and Virginia gave visitors the rare opportunity to witness firsthand everything they're doing to push the limits of scientific discovery.

In Greenbelt, for the first time in four years, NASA's Goddard Space Flight Center opened its gates to the public on Sept. 26.

Under the theme "Celebrating Hubble and the Spirit of Exploration," the Explore@NASAGoddard open house welcomed more than 20,000 guests on center, up from 15,000 during the last such event in 2011. More than 130 exhibits, presentations and tours provided an exclusive look at the center's work in astrophysics, Earth science, heliophysics, planetary science, and engineering and technology.

"NASA does this work on behalf of and for the benefit of the American people," said Center Director Chris Scolese during his opening remarks, referring to the importance of holding an open house. "It is an awesome responsibility, one that we take very seriously."

Guests could get an up-close glimpse into the management and operations of the Hubble Space Telescope, which celebrated its 25th launch anniversary in April. Since 1990, the observatory has made countless observations that have led to groundbreaking discoveries about our universe.

Goddard hosted tours inside the Hubble control room and inside an exact duplicate of Hubble's Vehicle Electrical System Test Facility. Several Hubble experts also spoke about the observatory's achievements.

"It is important for us to interact with the public and share the incredible discoveries and technological advancements that Goddard has done on its behalf," said Jim Jeletic, Hubble deputy project manager. "The Hubble mission is a great example of a NASA success story, and the Explore@NASAGoddard event gave us a forum to talk directly with the public and answer questions."

More than 10 buildings on center were open to visitors. On one of the most popular self-guided tours, guests walked through the Goddard Integration and Testing Facility, where spacecraft are put together and tested to withstand the rigors of space.

Right next door, attendees got an elevated view of Goddard's high bay clean room. In this facility, the largest of its kind in the world, engineers are currently constructing the James Webb Space Telescope, successor to Hubble and set to become the most powerful space telescope ever built upon its completion in 2018.

"You could see the amazement in everyone's eyes when they saw the size of our test facilities and found out what they could do," said Ed Packard, associate head of the Goddard Environmental Test Engineering and Integration Branch. "Anybody that wasn't a space enthusiast before they got here is certainly more likely to be one now!"

In addition to exhibits and tours, the center scheduled some worthy speakers — including Nobel physics laureate John Mather, renowned climate scientist Claire Parkinson, and NASA Science Mission Directorate Associate Admin-

LOOK INTO NASA'S WORK

istrator John Grunsfeld — to explain how NASA accomplishes its many objectives.

Jim Green, director of the NASA Planetary Science Division, also delivered a presentation on how the Mars expedition in the film "The Martian" compares with work being done at Goddard and throughout the agency in preparation for a human spaceflight to Mars by the 2030s.

Visitors primarily came from Maryland, Virginia and Washington, D.C., but others came from hundreds of miles away, such as Nancy Curran from Indianapolis.

"It's totally amazing. It's wonderful to see so many families here," she said. "The social media tent was cool because kids could wear astronaut helmets and take pictures with inflatable planets."

Just months earlier on June 27, many of these same visitors joined about 7,000 others during the open house a few hours down the coast at NASA's Wallops Flight Facility in Virginia.

Held in celebration of the 70th anniversary of the first rocket launch at Wallops in 1945, the event featured more than 60 exhibits, special presentations and static display aircraft, as well as a 5k run.

Rep. Scott Rigell, from Virginia's Second Congressional District, spoke during the opening ceremony and highlighted Wallops' contributions to America's space program and its economic impact in the state.

Goddard's Scolese read a certificate from U.S. Sen. Barbara Mikulski of Maryland that recognized Wallops as "a world class international launch site celebrating 70 years of science and innovation."

Virginia state Sen. Lynwood Lewis and state Del. Rob Bloxom read proclamations from the Virginia General Assembly and Gov. Terry McAuliffe that praised Wallops for 70 years of excellence.

In addition to engaging the public in NASA's work, a core objective of both open houses was to inspire the country's next generation of space explorers.

"STEM programs here like the Virginia Space Coast Scholars, the Virginia Space Flight Academy, the Eastern Shore Community College work experience, as well as the Summer Institute in Science, Engineering and Research, are helping to inspire and grow the next generation," said Wallops Director Bill Wrobel during his address for his facility's open house.

Scolese, meanwhile, echoed similar thoughts at the Goddard event. "For the young people that we have with us today, it is especially important that we take on challenges," he told those in attendance. "Our lasting legacy to you is to leave you a healthy, sustainable planet that will be home base for spacefaring generations to come." ■

Above, left: Attendees look into the James Webb Space Telescope clean room during the Explore@NASAGoddard open house on Sept. 26. Photo credit: NASA/Goddard/Debora McCallum

Above, right: Visitors line up to see one of the several aircraft on display at the Wallops open house on June 27. Photo credit: NASA/Wallops/Terry Zaperach

A SCIENTIFICALLY ENLIGHTENING YEAR IN HELIOPHYSICS

By Sarah Frazier

No star is more crucial to our well-being than the sun. As its name implies, heliophysics explains the forces at work in this giant star, but it also provides a broader understanding of the nature of space itself.

This year, the Goddard Heliophysics Science Division embarked on new endeavors to further examine the complex interactions of the sun, while current missions and projects continue to shed light on its effects on our solar system.

In March, Goddard added to its fleet of orbiting heliophysics missions with the launch of the Magnetospheric Multiscale mission, which creates three-dimensional maps of the particles and magnetic fields in near-Earth space. These maps provide key information for understanding the dynamic magnetic system around our planet and an explosive process known as magnetic reconnection, which can send particles hurtling through space at dramatic speeds.

Similarly, a team of scientists – including several students – launched six mini-balloons from Sweden in August and September as part of the Balloon Array for Radiation-belt Relativistic Electron Losses campaign. Funded by a program at NASA's Wallops Flight Facility, BARREL studies the electrons raining down on Earth from the huge swaths of charged particles magnetically trapped in the Van Allen belts, which are nested donut-shaped regions around Earth. By understanding the complex space environment above, scientists can better understand the effects of space weather on satellites and radio communications.

As scientists begin to gather data from MMS and the BARREL balloons, the Solar and Heliospheric Observatory continues to make solar observations after celebrating its 20th launch anniversary in December. It has provided the basis for more than 5,000 scientific papers, and it discovered its 3,000th comet in September.

Another observation mission – the Solar Dynamics Observatory – celebrated its fifth year in space in February. SDO provides detailed around-the-clock images of the sun by capturing an image once per second. Since its launch in 2010, SDO has provided an unprecedentedly clear view of how explosions on the sun grow and erupt.

Its fifth anniversary coincided with the release of a new art installation based on SDO imagery. Produced by Goddard's heliophysics multimedia team, "Solarium" uses a stream of high-quality SDO data to give viewers a detailed look at the constantly dancing solar atmosphere.

In addition to its permanent display at the Goddard Visitor Center, "Solarium" has appeared at the Center for Creative Photography in Tucson, Arizona; the Louisiana Art and Science Museum in Baton Rouge; and the World Science Festival in New York.

And "Solarium" was just one visually stimulating product produced in 2015. Prior to the epic flyby of Pluto by the New Horizons spacecraft in July, Goddard's space weather laboratory partnered with the mission's team to map the space environment around the spacecraft as it approached the dwarf planet. The information sent back by New Horizons will help heliophysicists better produce such visual simulations in the future.

As the new year begins, the heliophysics projects on the horizon promise to shine just as bright as the ones in 2015. New missions are already being brought into the fold, while current missions show no signs of slowing up.

The Gamma-Ray Imager/Polarimeter for Solar flares balloon has already been sent toward the stratosphere over Antarctica to study the high-energy radiation released by solar flares. In May, SDO will see Mercury transit the sun – the first time the observatory has captured the event. ■

Above: Members of the Solar Dynamics Observatory mission celebrate the spacecraft's fifth launch anniversary in February.

Photo credit: NASA/Goddard/Bill Hrybyk

HALF A CENTURY LATER, RICK OBENSCHAIN COMPLETES HIS FINAL NASA MISSION

By Ashley Morrow

When Rick Obenschain had the opportunity in college to work at NASA's Goddard Space Flight Center in 1962, he jumped at the chance. The agency was established just four years earlier, and the center just celebrated its third anniversary. At the time, the majority of Goddard employees were not even on location in Greenbelt.

Fast forward to 2015 and Obenschain – who went from summer engineering aide to eventual deputy center director – will tell you his career is largely attributed to luck, chances given and learning from his mistakes. "It actually proved a blessing that I wasn't very bright," he joked.

After more than 50 years of service to NASA and Goddard, Obenschain hung up his badge for the last time in March.

"We'll miss Rick's mentorship and leadership," Center Director Chris Scolese said. "He is too humble to say so himself, but his intense dedication and ability to tackle hard problems have benefitted Goddard, NASA and the nation for over 50 years."

In the early days of space exploration, NASA made its share of mistakes, which was only natural in that new field. Employees bounced back from mistakes out of necessity, learning as much as they could before moving on. Over the years, Obenschain learned to ask the right questions and became known as a problem solver. That reputation followed him through five project management roles, including a stint in the early 1990s on the Geostationary Operational Environmental Satellite project during a troubled period.

"A terrible thing happened in 1990," he said. "Saddam Hussein invaded Kuwait. The only other thing above the fold in The New York Times that day was an article on the left that said, essentially, the GOES project is a disaster."

Scientists had discovered flaws on the newest GOES instrumentation, which would further delay the spacecraft's launch. NASA Headquarters in Washington charged John Klineberg, then-Goddard center director, with finding a new project manager, and he knew who to call.

Klineberg called Obenschain into his office. Obenschain worried he might be fired, thinking he had bantered too much at a budget meeting. Instead, he was offered the GOES project manager position. "To be given a project with national importance with 15 months' project management experience because I didn't have enough sense to keep my mouth shut was pretty cool," Obenschain said. "You're talking about someone who was really lucky."

From there, his career took off. He turned the GOES project around. It launched four years after he began its management and provided critical data for weather forecasting until it was retired in 2004.

He managed three more projects before entering senior leadership at Goddard as the deputy director of engineering. After eight combined years in that position and other senior leadership roles, he became deputy center director, serving for an additional seven and a half years.

Being a leader is simpler than people think, according to Obenschain. "There's one overarching rule," he said. "Have fun. If work is not the most fun you're having during the week, do something else."

Obenschain dedicated almost his entire career to Goddard because of his immense respect for the agency, the people and the work. Nonetheless, he insists it's time to hand over the mission to the next generation. "I've had a wonderful career. I was given all these opportunities," he said. "Sometimes I failed, and sometimes I didn't. I learned from my mistakes, or at least enough of them. Now I'm moving forward." ■

Above: Friends, family and colleagues honor Rick Obenschain (foreground, left) during his retirement celebration at Goddard in March.

Photo credit: NASA/Goddard/Bill Hrybyk

Goddard Honors Sen. Mikulski and Her Astronomical Contributions

By Jenny Hottle and Clare Skelly

U.S. Sen. Barbara Mikulski of Maryland first came to Congress as a member of the U.S. House of Representatives in 1977. Last year, she announced plans to retire at the end of her current term in 2017. In between it all, for nearly 40 years, Mikulski has learned about our planet and worlds beyond through her unwavering support of NASA's Goddard Space Flight Center and its people.

"What I saw at Goddard, every time I visited, was people who dare, discover and are willing to risk their careers for an idea for the good of science and mankind," Mikulski told a crowded audience during her latest visit to the center on Jan. 6. "It's always been all about you."

Since her election to the U.S. Senate in 1986, Mikulski has served on the Senate Appropriations Committee and its Subcommittee on Commerce, Justice, Science, and Related Agencies – whose oversight includes NASA. In that role – including stints as chairwoman and ranking member – Mikulski has made her mark as an influential leader in space policy through her advocacy for the NASA budget and the agency's projects and missions.

"Sen. Mikulski has been a true champion of the space program and a true champion of Goddard Space Flight Center," said Center Director Chris Scolese during his opening remarks. "She has supported us over many years and over many projects."

During the early 1990s, when a flawed mirror threatened to derail the Hubble Space Telescope, Mikulski led efforts to secure funding for the first servicing mission. Once the corrective optics were restored, Mikulski proclaimed on the Senate floor, "The trouble with Hubble is over!"

More than two decades later, she continues to appreciate the telescope's significance. "I believe that Hubble is one of the greatest contributions America has made to mankind," Mikulski said. "Any rich nation can build a space telescope, but only a great nation gives its information away to the world to be used for the common heritage and betterment of mankind."

And she's been equally instrumental in fighting for full funding for Hubble's successor – the James Webb Space Telescope. Most recently, she helped increase NASA funding for the current fiscal year through the Consolidated Appropriations Act of 2016, which was signed into law.

Prior to her town hall meeting, Mikulski toured the center to see some of the fruits of her labor. She viewed the clean room where engineers and scientists continue to assemble the Webb telescope. Project Manager Bill Ochs shared his team's progress and upcoming milestones, including the installation of the primary mirror's 18 segments.

She also participated in a ribbon-cutting ceremony to officially open the Goddard Robotic Operations Center, where scientists will test technologies and operational procedures for science and exploration missions. While touring the facility, Mikulski saw an early version of a robotic arm that is testing the ability to grasp and refuel a satellite in orbit. And she saw the machine's human element as well.

"Behind every technology is a human being that invented it, tested it and got it going. Behind every new idea there is a human," Mikulski added. "Right here at Goddard, 9,000 people are working in a unique partnership with innovation and discovery."

After leaving office early next year – as the longest-serving woman in congressional history, no less – Mikulski promises to remain engaged with NASA and Goddard. When the Webb telescope launches in 2018, she hopes to be a part of it all, just like she has for the past four decades.

"I am so proud of what you do, and I hope I'm invited back for the Webb telescope launch," she said to Goddard employees. "I won't be far." ■

Center: U.S. Sen. Barbara Mikulski of Maryland addresses Goddard employees during a town hall meeting as part of her latest visit to the center.

Photo credit: NASA/Goddard/Bill Hrybyk