Marshall Star, January 11, 2012 Edition

MARSHALL STAR

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Director's Corner


Robert Lightfoot. (NASA/MSFC)

Happy New Year! This issue of The Star takes a look back at Marshall's 2011 as we gear up for a busy and exciting 2012.

The past year was productive, challenging, and historic as we continued our work in space transportation, human flight operations, and scientific exploration of our planet and beyond.

Among those challenges was the April tornado outbreak that damaged or destroyed the homes of several of our employees and closed the center for normal business for several days. Marshall's recovery was a testament to this agency, this state, this community, and this field center's employees. We met our commitments to an upcoming Space Shuttle launch, International Space Station science operations, and James Webb Space Telescope mirror testing without missing a beat, thanks to the larger NASA and Marshall Team.

We wrapped up the history-making Space Shuttle Program on a high note with the successful flights of STS-133, STS-134 and STS-135 in February, May and July. Our contributions to shuttle propulsion, payloads, science, operations, and technology were as significant as they were numerous. The Shuttle era leaves us with a legacy of technology, science, and operational experience that we will use to build the next era of spaceflight.

We closed out the Constellation Program and formally started the Space Launch System heavy lift program in September. We are using our investments from the Shuttle and Constellation Programs and streamlining our development and acquisition process to make this important new exploration vehicle safe, flexible, and affordable in the current constrained environment. We continued testing the five-segment solid rocket booster and the J-2X upper stage engine that will help power the SLS.

SLS was perhaps the most visible new development at Marshall but not the only one. Our Payload Operations Integration Center passed the 10-year mark of round-the-clock science operations support to the International Space Station, and we continued supporting the station's critical air and water recycling systems.

The Chandra X-ray Observatory, which we developed and manage, continued making incredible discoveries. We continued testing the mirrors for the James Webb Space Telescope, and a robotic planetary lander testbed was successfully demonstrated. Nanosail D, one of the payloads launched in 2010 aboard our FASTSAT mission, deployed in 2011 and completed its mission to demonstrate a new type of propulsion. We continued learning more about our planet and landed a new project to develop an instrument for the Solar Probe Plus mission that will be the first to come in physical contact with

the sun's atmosphere. The science community recognized two of our scientists. For his work on solar and space plasmas, Dr. Jonathan Cirtain was among four NASA researchers that President Obama named as recipients of the 2010 Presidential Early Career Award for Scientists and Engineers. Dr. Gerald Fishman received the 2011 Shaw Prize in Astronomy for his work on gamma ray bursts, the most explosive events known in the universe.

In addition, our small business advocacy program was recognized again as the agency's best. We also continued to attract students to math and science with our Great Moonbuggy Race, Student Launch Initiative, and other education programs.

We reorganized the center around capabilities critical to our future. We created a new center development function that will help us capture new work that uses our capabilities and strengths. We put new emphasis on partnerships to make best use of limited resources and assist our nation's commercial space industry.

We also took the initiative to start a new organization – the National Institute for Rocket Propulsion Systems - to address the widely acknowledged erosion of our national rocket and missile propulsion base.

Amid the many developments, we've not lost sight of our priorities of safety, diversity, collaboration, and inclusion. Our "Incident and Injury Free" workshops began last fall with top management, followed by branch chiefs, supervisors, and team leads. We plan to offer this program to the entire workforce in 2012. This takes safety to a level beyond the traditional monthly safety topic, and I hope everyone will take time to participate this year.

Likewise, center leadership last year began a dialogue about inequities in the workplace that led to a series of sessions with supervisors, managers and team leads to talk about diversity and inclusion and its impact on collaboration. Outreach is going to continue this year with additional events, roll-out of a mentoring pilot program, and new policies and procedures to improve diversity and inclusion.

I know it's been a challenging year with the tornado, federal budget deliberations, two programs ending, another starting, adjusting to a new center organization and new assignments, and valued colleagues retiring.

Yet, when you look at all we accomplished, it's clear 2011 was another inspiring, remarkable year for Marshall, the kind we've come to expect from ourselves. With a solid 2012 NASA budget in hand, we can look forward to much more exciting work ahead. Thank you for all you did in 2011, and I look forward to your many great accomplishments in 2012.

Robert

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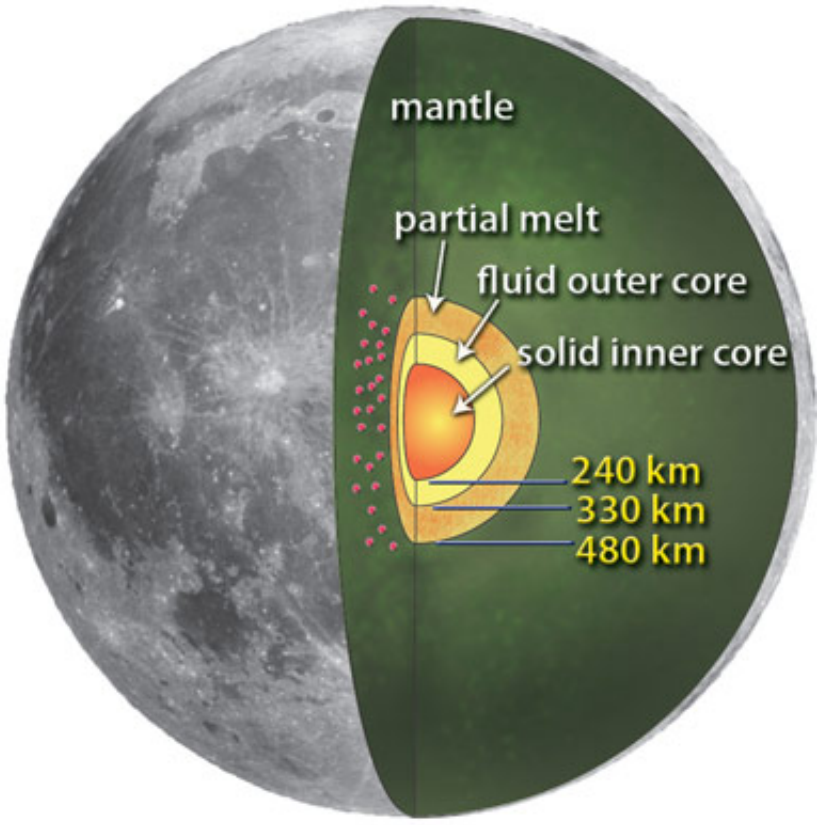
January

Marshall-led International Science Team Unveils Lunar Core Findings



(NASA/MSFC/Renee Weber)

An international team of researchers, led by Marshall Center space scientist Dr. Renee Weber, applied state-of-the-art seismological techniques to a wealth of data collected during the Apollo moon missions to credibly detect what scientists have surmised for years: Our moon has a solid, iron-rich inner core not unlike that of Earth. According to the findings, that inner core has a radius of nearly 150 miles, while the moon's fluid, primarily liquid-iron outer core has a radius of roughly 205 miles. The findings were published Jan. 6, 2011, in the online edition of "Science," the journal of the American Association for the Advancement of Science. The team included scientists from Arizona State University in Tempe; the University of California at Santa Cruz; and the Institut de Physique du Globe de Paris in France.

Image left: An artist's rendering of the lunar core as identified in new findings by a NASA-led research team.

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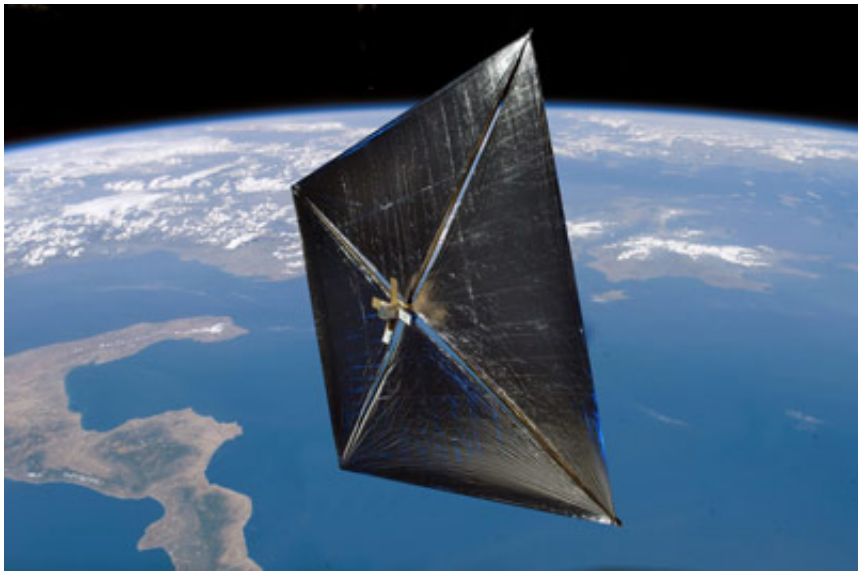
Groundbreaking NanoSail-D Nanosatellite Deploys 100-Square-Foot Sail in Space



NASA's NanoSail-D nanosatellite, launched to space Nov. 19, 2010, on the innovative FASTSAT microsatellite, successfully deployed a 100-square-foot space sail Jan. 20 -- demonstrating the value of propellantless flight technologies in deorbiting decommissioned satellites and space debris. The mission was managed by the Marshall Center; the experimental satellite was jointly designed and built by engineers at Marshall and at the Ames Research Center. Marshall managed the mission, which was jointly sponsored by the Army Space and Missile Defense Command, the Von Braun Center for Science and Innovation and Dynetics Inc., all of Huntsville. NanoSail-D orbited Earth for 240 days.

Image right: An artist's rendering of the NanoSail-D after deployment in Earth orbit. (NASA/MSFC)

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February

Space Shuttle Discovery Launches Last Time

Space Shuttle Discovery launched Feb. 24 from the Kennedy Space Center on its last mission. The 11-day STS-133 mission to the International Space Station delivered the Permanent Multipurpose Module, a large, reusable pressurized element originally used to ferry cargo back and forth to the space station. Formerly known as the Leonardo Multipurpose Logistics Module, Marshall engineers were responsible for developing and integrating the modifications to convert it from Leonardo to a permanent fixture for the orbiting facility. Before launch, Steve Cash, manager of Marshall's Shuttle Propulsion Office, thanked the Marshall and Michoud Assembly Facility teams for giving up their holidays and weekends to conduct stress analysis and stringer material and mechanical tests on Discovery's external tank. "Our readiness to launch is due to their thorough, exhaustive and exemplary work," said Cash.

Image left: The Permanent Multipurpose Module in Discovery's payload bay. (NASA)

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March

Payload Operations Center Marks 10th Anniversary at Marshall

With a ceremony and plaque hanging March 8, the Payload Operations Center at the Marshall Center celebrated a decade of round-the-clock support to the International Space Station. The Payload Operations Center went online as the science command post for the space station March 8, 2001. It links Earth-bound researchers with their experiments -- or payloads -- in orbit. The job of coordinating space station research is critical because the team manages all NASA science assets and calculates the time and space required to accommodate experiments and programs, including those of the Canadian Space Agency, European Space Agency and Japan Aerospace Exploration Agency. For 10 years, the Payload Operations Center team has supported more than 6,000 hours of science experiments and coordinated more than 1,100 experiments aboard the orbiting outpost.

Image right: Marshall Center Director Robert Lightfoot, left, assists Jenn Whitworth, a Payload Rack Officer, in hanging a plaque in the Payload Operations Center. The plaque commemorates the team's 10 years of continuous support to the International Space Station. (NASA/MSFC/Emmett Given)

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NASA 'Can Crush' Tests Aid Future Rocket Design

In March, a massive 27.5-foot-wide, 20-foot-tall aluminum-lithium cylinder, positioned between two large loading rings, was subjected to nearly one million pounds of force until it buckled. Results from this structural strength test -- dubbed the "Can Crush" -- at the Marshall Center will help future heavy-lift launch vehicles weigh less and reduce development costs. By examining the safety margins needed in the design of future, large launch vehicle structures, test results will be used to develop and validate structural analysis models and generate new "shell-buckling knockdown factors" -- complex engineering design standards essential to launch vehicle design. The current knockdown factors date back to pre-Apollo-era studies -- well before modern composite materials, manufacturing processes and advanced computer modeling. The Shell Buckling Knockdown Factor Project is led by engineers at NASA's Engineering and Safety Center and NASA's Langley Research Center.

Image left: Mark Hilburger, left, senior research engineer in the Structural Mechanics and Concepts Branch at Langley and the principal investigator of the NASA Engineering and Safety Center's Shell Buckling Knockdown

Factor Project talks with NASA Administrator Charles Bolden, center left, as he toured Marshall's Engineering Test Laboratory, the site of the March 23 "can crush" test. Mike Roberts, center right, an engineer in Marshall's structural strength test branch and the center lead for this activity, and Clint Cragg, principal engineer at the NESC, look on. (NASA/MSFC)

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Marshall Wins Second NASA Small Business Administrator's Cup Award

On March 24, NASA Administrator Charles Bolden presented the agency's Small Business Administrator's Cup Award for fiscal year 2010 to the Marshall Center -- the second time in three years Marshall earned the accolade. Sponsored by the NASA Office of Small Business Programs, the award is given annually to the NASA center that has demonstrated the most successful and effective small business program. The Marshall Center previously received the cup for fiscal year 2008, the year the award was created.

Image right: Showing off the NASA Small Business Administrator's Cup award for 2011 are, from left, Glenn Delgado, assistant administrator of NASA's Office of Small Business Programs in Washington; Byron Butler, then-director of the Marshall Center's Office of Procurement; David Brock, Marshall small business specialist; NASA Administrator Charles Bolden; and Marshall Center Director Robert Lightfoot. (NASA/MSFC/Doug Stoffer)

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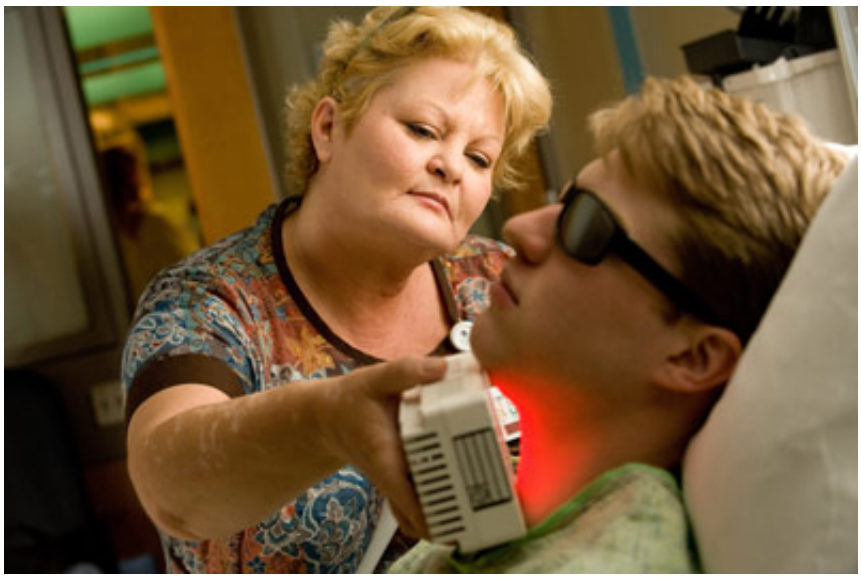
NASA Technology Lights New Path to Healing for Cancer Patients



A NASA technology originally developed for plant growth experiments on space shuttle missions has successfully reduced the painful side effects resulting from chemotherapy and radiation treatment in bone marrow and stem cell transplant patients. In a two-year clinical trial, cancer patients undergoing bone marrow or stem cell transplants were given a far red/near infrared Light Emitting Diode treatment called High Emissivity Aluminiferous Luminescent Substrate, or HEALS, to treat oral mucositis -- a common and extremely painful side effect of chemotherapy and radiation treatment. The trial concluded that there is a 96 percent chance that the improvement in pain of those in the high-risk patient group was the result of the HEALS treatment. The HEALS device, known as the WARP 75 light delivery system, could offer patients several benefits: better nutrition since eating can be difficult with painful mouth and throat sores; less narcotic use to treat mouth and throat pain; and an increase in patient morale -- all of which can contribute to shorter hospital stays and less potential for infection. The clinical trial was funded by NASA's Innovative Partnerships

Program at the Marshall Center. In March, the HEALS device was demonstrated by members of the team during a live broadcast on CNN's Headline News in Atlanta.

Image left: Mitzi Macke, RN, a nurse in the Bone Marrow Transplant and Cellular Therapy Unit at the University of Alabama at Birmingham Hospital, demonstrates use of a WARP 75 device. The device uses High Emissivity Aluminiferous Luminescent Substrate, or HEALS, which is a type of LED technology that provides intense light energy. The device was used for light therapy treatment on cancer patients during a two-year clinical trial funded by NASA's Innovative Partnerships Program at the Marshall Center. (NASA/MSFC)

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April

Puerto Rico Sweeps 18th Annual NASA Great Moonbuggy Race

Vocational High School Team II of Yabucoa, Puerto Rico, won first place in the high school division, while the University of Puerto Rico in Humacao won the college division for the second straight year. The Marshall Center plans and organizes the race each year, and keeps global audiences informed of breaking race-day news in real time via Twitter and the online video service UStream. Nearly 20,000 people around the world watched the 2011 race online at http://www.ustream.tv/recorded/13700228. Race participation has increased annually from just eight college teams in 1994 -- the high school division was added two years later -- to nearly 70 teams in 2011.

Image right: The Teodoro Aguilar Mora Vocational High School Team II races to first place in the high school division of the NASA Great Moonbuggy Race. For more images from the weekend events, visit http://www.flickr.com/photos/28634332@N05/sets/72157626399160446/. (NASA/MSFC/Emmett Given)

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Space Station Astronaut Doug Wheelock Visits Payload Operations Center

International Space Station astronaut Doug Wheelock shared highlights of his Expedition 24/25 mission and thanked the Payload Operations Center team April 11 for its support in planning and executing science activities during the 163 days he lived and worked in space. Wheelock launched aboard a Russian Soyuz spacecraft June 15, 2010, from the Baikonur Cosmodrome in Kazakhstan, and docked with the space station two days later. He served as a flight engineer on Expedition 24 and commander of Expedition 25. During his mission, Wheelock and his crew members worked on more than 120 microgravity experiments in human research; biology and biotechnology; physical and materials sciences; technology development; and Earth and space sciences. Wheelock returned to Earth aboard a Soyuz Nov. 25, 2010, landing in Kazakhstan.

Image left: International Space Station astronaut Doug Wheelock, with assistance from Payload Communicator Reagan Malone, talks to the crew aboard the station during his visit to the Marshall Center April 11. (NASA/MSFC/David Higginbotham)

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Marshall Star Marks 30th Anniversary of Space Shuttle

On April 14, a special issue of the Marshall Star commemorated the 30th anniversary of the first space shuttle launch on April 12, 1981. Included were stories about the instrumental role of the Marshall Center in designing, developing and testing the shuttle propulsion elements. This entirely new chapter ushered in a new era in human spaceflight and in the center's history. "To all who have been part of the last 30 years, I thank you and hope you will take time to reflect on your part of the great mission of the space shuttle," Marshall Center Director Robert Lightfoot said. To read the 30th anniversary issue, visit http://marshallstar.msfc.nasa.gov/4-14-11.pdf.

Image right: Front cover of the April 14 issue of the Marshall Star marking the 30th anniversary of the space shuttle. (NASA)

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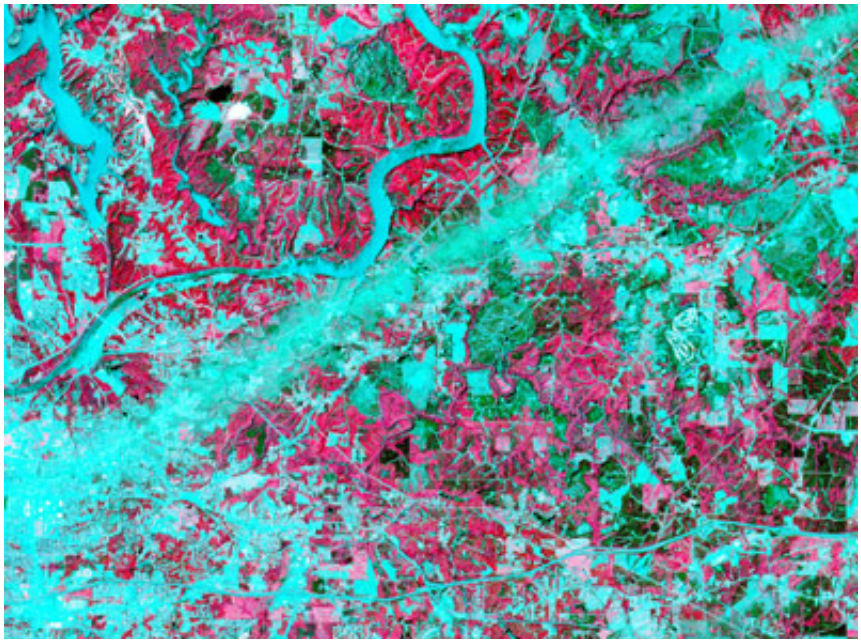
Marshall Works for Safety During, After Deadly Alabama Tornadoes



On April 27, a historic severe weather outbreak occurred across the southeastern United States -- including numerous, powerful tornadoes in Alabama, which caused billions of dollars in damages and killed nearly 250 people. With days-long power outages across the North Alabama region, the Marshall Center worked with area radio stations and used its own social media network to keep team members and their families abreast of center closure updates and other useful information. NASA's Short-term Prediction Research and Transition (SPoRT) Center at Marshall worked with the National Weather Service and state officials, providing unique NASA satellite data for observation and damage assessment. And on May 19, as cleanup continued across the state, members of the SPoRT team held a live webchat to discuss NASA weather forecasting research and their partnership with the National Weather Service.

Image left: Tornado damage in and around Tuscaloosa, Ala., as captured May 4 by the Terra satellite, part of NASA's Earth Observing Satellite system. (NASA)

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May

Endeavour Launches for Last Time

Space shuttle Endeavour lifted off May 16 from the Kennedy Space Center on the STS-134 mission to the International Space Station. "This mission represents the power of teamwork, commitment and exploration," Commander Mark Kelly said shortly before liftoff. "It is in the DNA of our great country to reach for the stars and explore. We must not stop. To all the millions watching today including our spouses, children, family and friends, we thank you for your support." Endeavour astronauts delivered the Alpha Magnetic Spectrometer, a two-ton ring of powerful magnets and ultrasensitive detectors built to track cosmic rays in a search for various types of unusual matter. "ET-122 gave a fantastic performance," said Bill Gerstenmaier, NASA associate administrator for Space Operations, in a news conference following Endeavour's launch. "The main engines and solid rocket boosters performed flawlessly, which is a good testament to all of the ground testing we do." Landing was June 1 at Kennedy.

Image right: The Alpha Magnetic Spectrometer will measure invisible cosmic rays as they traverse the universe. (NASA)

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June

Utah State University Wins NASA Rocketeering Trophy -- Again!

In June, after thorough review of flight documentation and science payload results, NASA named students from Utah State University in Logan the champions in the university division of the 2010-11 NASA Student Launch Projects rocketry challenge -- the third time in four years the school has won the competition. A record 27 teams from colleges and universities across the nation competed; 17 middle school and high school teams took part in the non-competitive high school division. Those teams, representing 25 states, took part in the all-day "launchfest" April 17, vying to see whose rocket would come closest to the 1-mile altitude goal and safely return its onboard payload. The rocketry competition is organized each year by the Marshall Center and sponsored by ATK Aerospace Systems of Salt Lake City, Utah. Bragg Farms in Toney, Ala., has hosted the launch challenge since 2008. Live streaming of launch-day activities on UStream drew more than 46,000 viewers.

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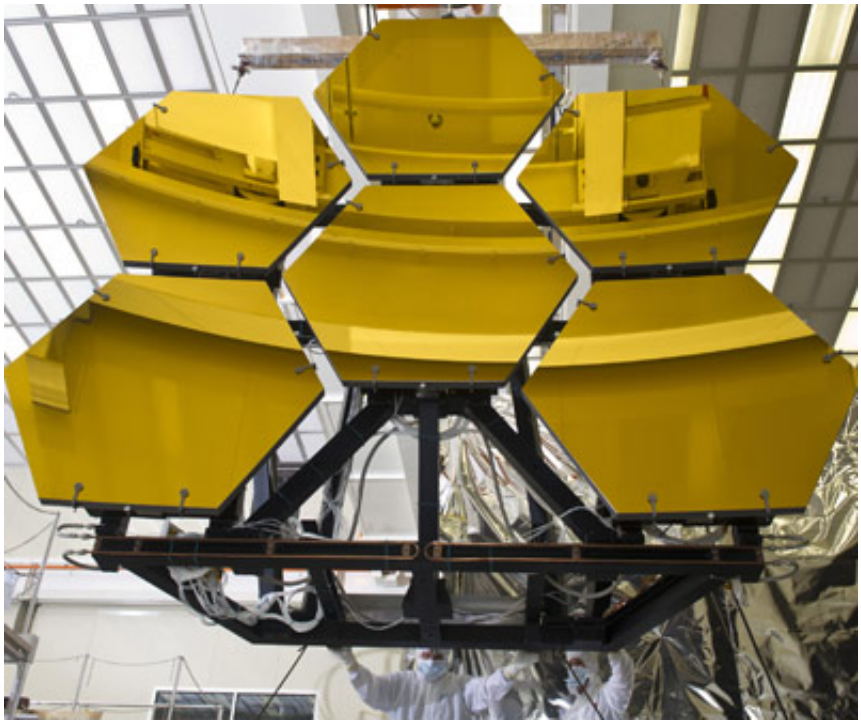
Cryogenic Testing Complete on First James Webb Telescope Mirrors



The first six of 18 segments forming the primary mirror for NASA's James Webb Space Telescope completed final cryogenic testing June 13 at the Marshall Center's X-ray and Cryogenic Facility. The work kicked off a yearlong series of tests on additional mirror assemblies for the telescope, set to launch in 2018 to study the formation of the first stars and galaxies and the evolution of our own solar system. Each 10-week test series at Marshall saw mirrors chilled down to -379 degrees Fahrenheit, then back to ambient temperature to ensure the assembled arrays will respond as expected to the extreme temperatures of space. The hexagonal mirrors -- each approximately 4.3 feet in diameter -- weigh roughly 88 pounds. They're made of a light and strong metal called beryllium, and coated with a microscopically thin coat of gold to enable the mirror to efficiently collect infrared light, permitting NASA researchers to peer so far into the universe they'll effectively be able to look at the origins of the cosmos itself. The telescope is a combined project of NASA, the European Space Agency and the Canadian Space Agency, led for NASA by the Goddard Space Flight Center.

Image left: Engineers and technicians maneuver six James Webb Space Telescope mirror segments off the rails during cryogenic testing at Marshall. (NASA/MSFC/Emmett Given)

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July

Shuttle Atlantis Launches July 8 on Final Space Shuttle Mission

July 8 was hot on Florida's Space Coast, but almost one million spectators gathered along the beaches, rivers and causeways to watch history in the making -- the launch of the final shuttle mission. Atlantis' crew of four veteran astronauts -- Commander Chris Ferguson, Pilot Doug Hurley, and Mission Specialists Sandy Magnus and Rex Walheim -- set off on the STS-135 mission to deliver a stockpile of supplies and parts to the International Space Station. "The shuttle's always going to be a reflection to what a great nation can do when it dares to be bold and commits to follow through," Ferguson said shortly before liftoff. "We're not ending the journey today; we're completing a chapter of a journey that will never end." Landing was July 21 at Kennedy.

Image right: Residents and visitors crowd onto a Titusville, Fla., bridge to watch the Space Shuttle Program soar for the last time. (NASA/KSC)

Image left: Marshall team members in Building 4200 Morris Auditorium watch in excitement as the final countdown is announced for the launch of STS-135. (NASA/MSFC)

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Materials Experiments Come Home to Marshall for Analysis

It's been a decade since the first Materials International Space Station Experiment, or MISSE, was deployed on the International Space Station. Since that time, more than 4,000 materials samples have been exposed to space as part of the MISSE series of experiments. The STS-134 mission, which launched in May, brought MISSE-7A and -7B home. The MISSE-7 experiments had been soaking up the space environment since they were delivered to the station during STS-129 in November 2009. MISSE-7B was disassembled at the Marshall Center so researchers could analyze how 18 months in space affected these materials experiments. MISSE-7 included more than 700 new and affordable materials samples that could have potential use in advanced reusable launch systems and advanced spacecraft systems including solar cells, optics, sensors, electronics, power, coatings, structural materials and protection for the next generation of spacecraft.

Image right: From left, Dr. Gary Pippin of Boeing Research & Technology; Brandon Krick, a student at the University of Florida; and Marshall Center engineer Miria Finckenor open the MISSE-7B suitcase to begin disassembly and analysis. (NASA/MSFC/Emmett Given)

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Marshall Exchange Hosts Shuttle Pride Social for Endeavour Landing

Marshall team members celebrated the last space shuttle landing July 21 in Building 4200 Morris Auditorium when Endeavour touched down at Kennedy Space Center. The Marshall Exchange sponsored a "Shuttle Pride" event that featured a catered breakfast, drawing for a 1/100-scale shuttle model signed by the STS-135 astronauts and watching the shuttle land via large-screen television.

Image left: From left, Around 700 employees and family members attended the Shuttle Pride event July 21. (NASA)

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Marshall Recognizes its Own with 2010 Honor Awards

Hundreds of Marshall Center teams and team members were honored July 28 for their contributions to the work of the center and to NASA. Among those honored were Marshall physical scientist Dan Irwin and aerospace engineers Katherine Van Hooser, Kenneth Welzyn and Robert Wingate, all of whom received NASA Distinguished Service Medals -- the highest honor the agency confers -- for exemplary service contributing to NASA's mission. Honored with NASA Distinguished Public Service Medals were Gary Dempsey of COLSA Corporation in Huntsville; Charles Kopicz of ERC Inc. in Huntsville; and Robert A. Savoie, a contractor for GEOCENT of Metairie, La., supporting NASA's Michoud Assembly Facility. The Distinguished Public Service Medal, the highest honor NASA confers on a non-government individual, is awarded to contractors and other civilian workers whose distinguished accomplishments contributed substantially to NASA's mission. For a complete listing of award recipients, follow the links in the official news release.

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August

Marshall Star Pays Tribute to End of Shuttle Program

The Aug. 3 edition of the Marshall Star paid tribute to the end of the shuttle program and the team that contributed to the program's successes and "finished strong." In a message to Marshall team members, Marshall Center Director Robert Lightfoot said, "It was an incredible program. Out of all its many capabilities and its many accomplishments, which one was most important? Which one stands out most? The reusable orbiter? The launch and servicing of the Hubble Space Telescope? Construction of the International Space Station? There are lots of choices. As I stood on the runway at Kennedy Space Center for the STS-135 landing recently, I realized what I'd choose. It was the shuttle team."

Image left: The Space Shuttle Program 30-year commemorative patch. (NASA)

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Community Gathers to 'Celebrate the Ride' as Shuttle Mission Ends

The Marshall Center organized a community-wide "Celebrate the Ride" shuttle celebration Aug. 20 at the U.S. Space & Rocket Center. More than 4,400 Marshall team members, retirees, families and members of the public gathered to pay tribute to the successful conclusion of the Space Shuttle Program. Participants met astronauts, toured the museum and hands-on learning center and enjoyed live music, refreshments and fireworks.

Image right: Astronaut Lee Morin hands an autographed picture to an enthusiastic future space explorer during the "Celebrate the Ride" shuttle event Aug. 20. (NASA/MSFC/Emmett Given)

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Marshall Reorganizes to Open New Chapter in America's Story of Discovery

The Marshall Center launched a three-month restructuring effort in August, reorganizing its major business centers and program offices to more effectively align its broad range of capabilities with NASA's science, exploration and spacecraft development goals -- and to open the next chapter in America’s story of discovery. Marshall created four new organizations: the Space Launch System Office, focusing on development of the next-generation heavy lift vehicle; the Flight Programs & Partnerships Office, undertaking new, cooperative development of flight systems and mission systems and operations; the Science & Technology Office, intended to merge Earth, solar, space and planetary science research with new technology development and maturation; and the Shuttle-Ares Transition Office, which is conducting an orderly closeout of the shuttle program and Ares Projects at Marshall. Learn more about the Marshall Center's mission here, and meet the leaders of the new organizations here.

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September

NASA, ATK Conduct Successful DM-3 Test

NASA and Alliant Techsystems Inc., or ATK, conducted a full-scale test of a five-segment, solid rocket motor at the ATK Aerospace Systems test facility in Promontory, Utah, Sept. 8. DM-3 is the third in a series of development motors and the most heavily instrumented solid rocket motor in NASA history, with a total of 37 test objectives measured through more than 970 instruments. The core of DM-3 was heated to 90 degrees Fahrenheit for this full-duration firing to verify the motor's performance at high temperatures. This test will continue to advance understanding of five-segment solid rocket motor performance and specifically assess performance at the highest end of the

motor's accepted temperature range. The motor is managed by the Marshall Center.

Image left: NASA and ATK's five-segment solid rocket motor fires during the Development Motor-3 test in Promontory, Utah, Sept. 8. (ATK)

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NASA Announces Design for New Deep Space Exploration System

In September, NASA announced its design of the Space Launch System -- an advanced heavy-lift launch vehicle that will provide an entirely new national capability for human exploration beyond Earth's orbit. The Space Launch System will give the nation a safe, affordable and sustainable means of reaching beyond our current limits and opening up new discoveries from the unique vantage point of space. The SLS will be designed to carry the Orion spacecraft, as well as important cargo, equipment and science experiments to Earth's orbit and destinations beyond. Additionally, the SLS will serve as a back up for commercial and international partner transportation services to the International Space Station. SLS will be managed by the Marshall Center.

Image right: Artist concept of SLS on launch pad. (NASA/MSFC)

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Team Celebrates 10,000 hours of Microgravity Science Glovebox Operation

The Microgravity Science Glovebox team celebrated a huge milestone Sept. 13 when the science facility hit 10,000 hours of operation. The Marshall-managed glovebox, also known as MSG, launched to the station during Expedition 5 on June 5, 2002, on space shuttle Endeavour. It is located in the U.S. Laboratory, and allows astronauts to manipulate experiment hardware and samples without the risk of small parts, particulates, fluids or gasses escaping into the open.

Image left: Members of the Microgravity Science Glovebox team sit on console at the Marshall Center to monitor the glovebox experiments performed on the International Space Station. (NASA/MSFC/Emmett Given)

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NASA's Green Flight Challenge Soars

At the close of the four-day CAFE Green Flight Challenge in Santa Rosa, Calif., NASA awarded the largest prize in aviation history to innovators whose technological breakthrough could inspire the development of more fuel-efficient aircraft -- sparking the start of a new electric airplane industry. The winning aircraft, an all-electric airplane developed by team Pipistrel-USA of State College, Pa., achieved the equivalent of more than 400 mpg -- more than double the fuel efficiency requirement of the competition -- and earned the team the first-place prize of $1.35 million. The Green Flight Challenge, sponsored by Google, was the first NASA Centennial Challenge to be managed by the Marshall Center, which in 2011 assumed organizational responsibilities for the program on behalf of NASA's Office of the Chief Technologist in Washington. Centennial Challenges seek to tap the nation's ingenuity to make revolutionary advances in technology of value to NASA and the nation. Learn more about NASA's Centennial Challenges here.

Image right: Pipistrel-USA team lead Jack Langelaan shows off the winning aircraft, the Taurus G4, Oct. 3 at NASA's Ames Research Center. (NASA/Bill Ingalls)

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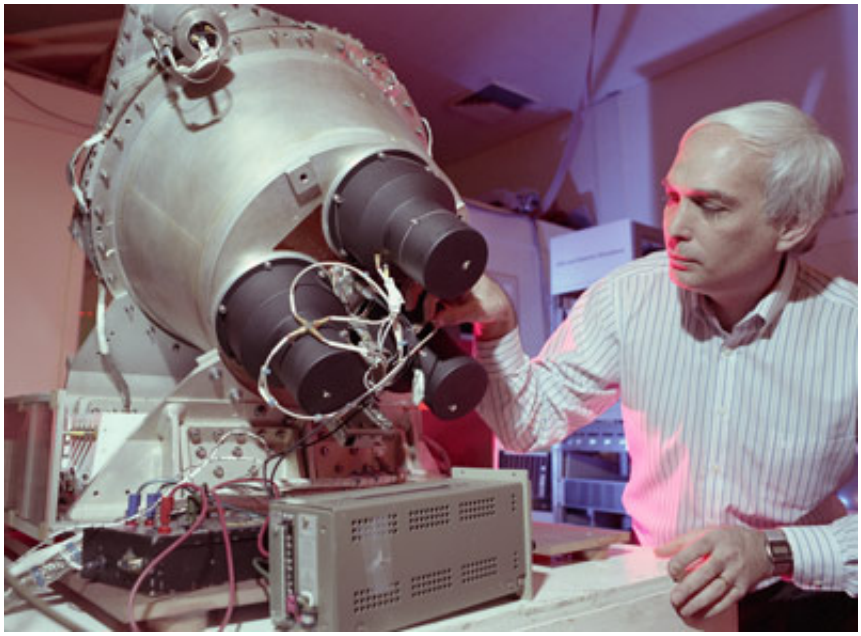
Marshall Astrophysicist Dr. Jerry Fishman Wins 2011 Shaw Prize



Marshall Center astrophysicist Dr. Gerald J. Fishman was awarded the 2011 Shaw Prize in Astronomy, for which he shared a $1 million award. Fishman was recognized for his leadership in research that shed new light on the space phenomena known as gamma-ray bursts -- the brightest, most explosive events known to occur in the universe. He received the award Sept. 28 at a ceremony in Hong Kong. Established in 2004 by media entrepreneur Sir Run Run Shaw, the Shaw Prize recognizes individuals who have achieved significant breakthroughs in science and research with a positive, lasting impact on humankind. Fishman currently is a co-investigator on the Gamma-ray Burst Monitor, a key instrument aboard the Fermi Gamma-ray Space Telescope, which was launched in 2008.

Image left: Marshall astrophysicist Dr. Gerald J. Fishman assesses the Burst and Transient Source Experiment, or BATSE, prior to its flight to space in 1991. BATSE was an extremely sensitive gamma-ray detector which flew on NASA's Compton Gamma Ray Observatory from 1991-2000. Fishman has been a NASA researcher since 1974. (NASA/MSFC)

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NASA Deputy Administrator Garver Visits Huntsville

NASA Deputy Administrator Lori Garver spent a packed day in Huntsville on Sept. 29, welcoming attendees to the agency's Space Launch System Industry Day event and talking to the Marshall Center workforce and members of the local media about Marshall's leadership role in developing NASA's new heavy-lift launch vehicle. "This is a watershed moment for NASA," Garver told the Industry Day audience of more than 500 executives and managers of large and small businesses across the Southeast United States. She later told Marshall workers that NASA is committed to its talented, diverse labor pool. "The federal workforce is where we believe we should be doing those cutting-edge things others cannot do," she said. "The hard thing. The new thing. The next thing." That's where the Marshall Center thrives, she said.

Image right: NASA Deputy Administrator Lori Garver, right, answers a question from a Marshall team member during a Sept. 29 all-hands meeting, while Marshall Center Director Robert Lightfoot looks on. (NASA/MSFC/Emmett Given)

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Marshall Industry Day Recognizes Contractor Partners, Shares SLS Opportunities

NASA Deputy Administrator Lori Garver welcomed over 500 executives and managers of large and small businesses across the Southeast United States for the annual Small Business Alliance Industry Day in September. The event included contractor and procurement team awards, as well as updates of NASA's small business programs and Marshall acquisitions. Space Launch System Program Manager Todd May and other Marshall project and procurement leaders outlined the acquisition strategy and implementation plan for the new heavy-lift launch vehicle. The event was held at the Davidson Center for Space Exploration in Huntsville.

Image left: NASA Deputy Administrator Lori Garver welcomes industry leaders and stakeholders to the Small Business Alliance Industry Day on Sept. 29 at the Davidson Center for Space Exploration in Huntsville. (NASA/MSFC)

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October

Marshall Experts, Industry, Military and Academia Share Perspectives at Wernher von Braun Memorial Symposium

In October, space industry experts gathered to collaborate at the 4th annual Wernher von Braun Memorial Symposium in Huntsville. With the theme, "Launching the Future of Space Exploration," the conference included discussions on NASA's exploration roadmap, energizing commercial space, integrating robotic and human exploration, the National Institute of Rocket Propulsion Systems, military space initiatives and space policy. The symposium was organized by the American Astronautical Society in conjunction with UAHuntsville, the Huntsville National Space Club and the Marshall Center.

Image right: Discussing NASA's exploration roadmap during an Oct. 25 panel session at the 4th annual Wernher von Braun Memorial Symposium are Deputy Associate Administrator, Exploration Systems Development Division Dan Dumbacher, left; Space Launch System Program Manager Todd May, center; and Orion Mulit-Purpose Crew Vehicle Program Manager Mark Geyer. (NASA/MSFC)

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Marshall's Dr. Jonathan Cirtain Receives Presidential Early Career Award

Marshall Center astrophysicist Dr. Jonathan W. Cirtain was among four NASA researchers named by President Obama as recipients of the Presidential Early Career Award for Scientists and Engineers, or PECASE. Cirtain, project scientist for the joint U.S.-Japanese Hinode solar research mission, was recognized for his outstanding research on solar and space plasma physics. Based on nominations by NASA's Science Mission Directorate, the PECASE awards are the highest honor bestowed by the U.S. government on scientists and engineers beginning their independent careers. They reflect recipients' exceptional potential for scientific leadership and their demonstrated commitment to community service. The awards were presented during a ceremony in October in Washington.

Image left: Dr. Jonathan Cirtain, left, receives the PECASE award from Chuck Gay, Acting Associate Administrator for NASA's Science Mission Directorate. (NASA/Carla Cioffi)

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Marshall on Facebook: 12,000 Strong and Growing

In October, the Marshall Center's official presence on Facebook added its 12,000th user. The friend page continues to spotlight Marshall news and local and internal events for the workforce and friends and family across the Tennessee Valley, while the fan page extends its coverage of Marshall, NASA and related space and science news to a worldwide audience. Marshall Center team members are encouraged to post news and images of their own to the twin pages, helping to spread the word about Marshall's accomplishments.

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November

Seven NASA Center Directors Take Stage at Marshall

Marshall Center team members got a unique opportunity to converse with NASA leaders Nov. 9 when seven agency field center directors gathered for an all-hands meeting. Joining Marshall Center Director Robert Lightfoot were Bob Cabana, director of Kennedy Space Center; Mike Coats, director of Johnson Space Center; Ray Lugo, director of Glenn Research Center; David McBride, director of Dryden Flight Research Center; Lesa Roe, director of Langley Research Center; and Patrick Scheuermann, director of Stennis Space Center. The joint visits -- Lightfoot's idea, according to several of the directors -- gave them a forum to urge organizations to pursue new, joint business opportunities that will accomplish the nation's goals for science, engineering and space exploration.

Image left: Among the NASA field center directors participating in the all-hands are, from left, Stennis Director Patrick Scheuermann, Dryden Director David McBride, Kennedy Director Bob Cabana and Marshall Director Robert Lightfoot. (NASA/MSFC/Emmett Given)

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November

Successful J-2X Engine Completes 500-second Test Firing

In November, NASA and Pratt & Whitney Rocketdyne conducted a successful 500-second test firing of the J-2X rocket engine at the Stennis Space Center. The engine is a key component of NASA's Space Launch System, which will carry the Orion spacecraft, its crew, cargo, equipment and science experiments beyond Earth orbit. J-2X is a highly efficient and versatile liquid-oxygen/liquid-hydrogen fueled rocket engine which will power the vehicle’s upper stage, producing nearly 300,000 pounds of thrust in a vacuum. The J-2X engine design leverages 50 years of experience in human spaceflight with state-of-the-art technology in design processes, materials and manufacturing to enable further human exploration. The Marshall Center manages the J-2X engine project.

Image right: NASA conducted a successful J-2X 500-second test firing on Nov. 9 at the A-2 test stand at Stennis Space Center. (NASA/SSC)

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November

NASA's Pegasus Barge Sets Sail on Last Scheduled Mission

NASA's Pegasus barge, which transported space shuttle external tanks from NASA's Michoud Assembly Facility to the Kennedy Space Center during the space shuttle era, set sail Nov. 10 on a different mission. Departing on a journey scheduled to be its last, Pegasus delivered space shuttle main engine ground support equipment from Kennedy to NASA's Stennis Space Center, where both the barge and shuttle equipment will remain in storage until their specific future uses are determined. Pegasus arrived at Stennis on Nov. 16. The barge and equipment relocation are the responsibility of the Shuttle-Ares Transition Office at the Marshall Center.

Image left: Tugboats maneuver the Pegasus barge through Port Canaveral after leaving Kennedy on Nov. 10. (NASA)

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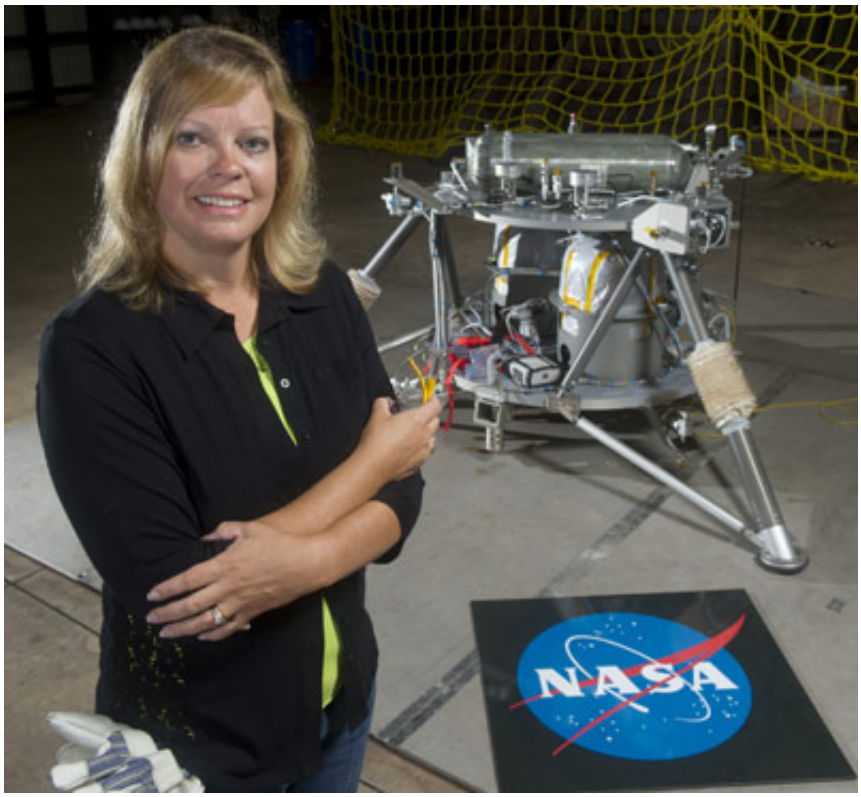
Robotic Lander Development Project Team Flies 'Mighty Eagle' Prototype



The Robotic Lander Development Project team at Marshall spent much of 2011 putting an innovative new robotic lander prototype dubbed "Mighty Eagle" to the test -- and in November wrapped the latest phase of testing with a 100-feet autonomous flight at a U.S. Army test area on Redstone Arsenal. The team spent approximately two years designing, developing and testing Mighty Eagle -- one of two robotic lander prototypes that could aid in the development of a new generation of robotic landers that will ease an automated spacecraft onto the surface of the moon, near-Earth asteroids or other airless bodies. To date, the team has conducted approximately 160 total tests of the two prototypes. Marshall engineers' partners on the project include researchers at Johns Hopkins University's Applied Physics Laboratory in Laurel, Md., and the Von Braun Center for Science and Innovation in Huntsville. The Planetary Science Division of NASA's Science Mission Directorate in Washington directs the project.

Image right: Julie Bassler, manager of the Robotic Lunar Lander Development Project at Marshall, shows off "Mighty Eagle," the sturdy lander prototype her team put through its paces in 2011. (NASA/MSFC/Emmett Given)

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Marshall Director Lightfoot, Other NASA Leaders Address Senate Subcommittee

NASA Administrator Charles Bolden, Marshall Center Director Robert Lightfoot, Johnson Space Center Director Michael Coats and Kennedy Space Center Director Robert Cabana testified before a U.S. Senate subcommittee Nov. 17 to outline the agency's continuing mission of exploration and discovery. They spoke before the Subcommittee on Science and Space about NASA's near- and long-term plans for human space exploration and the value of those efforts to the nation's economic and technological leadership. Archived video of the subcommittee hearing, titled "NASA's Human Space Exploration: Direction, Strategy, and Progress," is available here. Lightfoot's comments begin at the 93:48 mark in the video.

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December

National Institute of Rocket Propulsion Systems Tackles Key Technology Challenges

In December, the National Institute for Rocket Propulsion Systems, or NIRPS, assembled four strategy teams to assess the key challenges facing the nation's rocket propulsion industry. The institute -- a joint creation of NASA, the Federal Aviation Administration, the Department of Defense, the aerospace industry and academia -- seeks to maintain and steward America's propulsion capabilities, recognizing their vital place in national security, economic competitiveness and the continued exploration of space. The NIRPS strategy teams initially will develop action plans to address six critical focus areas: reducing development costs for missile and rocket systems; supporting the competitiveness of the industrial base; fostering access to facilities and expertise across government, industry and academia; presenting an integrated science and technology plan for national propulsion systems; collaborating across agencies for missile and rocket propulsion system development; and invigorating the science, technology, engineering and mathematics, or STEM, educational pipeline.

Image left: At the JANNAF conference, from left, Dr. Dale Thomas announces the four NIRPS team leads: Dr. Jamie Neidert, Dr. George Schmidt, Dr. Tom Brown and Jim Reuter. (NASA/MSFC/Emmett Given)

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Gamma-ray Burst Monitor Detects Dramatic Change in Crab Nebula

Startling changes in emissions from the Crab Nebula -- the wreckage of an exploded star, the light from which reached Earth in 1054 -- were detected in 2011 by the Gamma-ray Burst Monitor aboard NASA's Fermi Gamma-ray Space Telescope. One of the most studied objects in Earth's sky, the Crab's X-ray emissions were previously considered so stable astronomers used them to calibrate space-based instruments. Using Gamma-ray Burst Monitor observations collected from 2008 to 2010, researchers detected a steady decline in that previously unchanging X-ray energy, and say further study of the nebula will be necessary to identify the source of the decline. The discovery was so dramatic Astronomy Magazine named it No. 2 among its Top 10 Space Stories of 2011. The Gamma-ray Burst Monitor was built and tested at the Marshall Center.

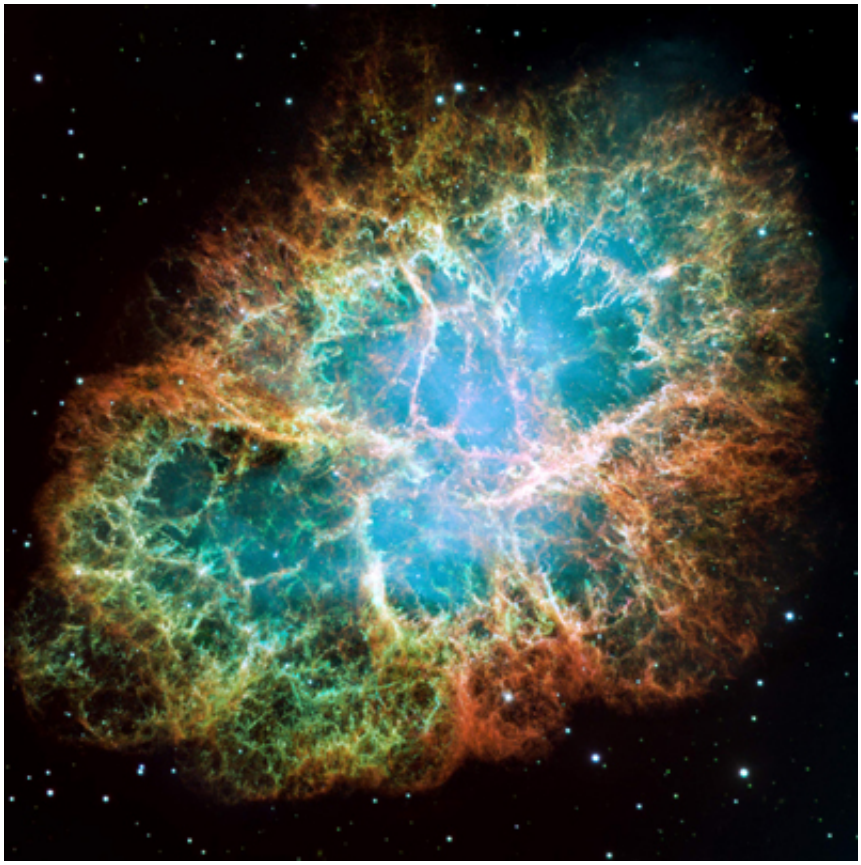

Image right: The Crab Nebula, 6,500 light-years away in the constellation Taurus, as photographed by the Hubble Space Telescope. (NASA/ESA/ASU/J. Hester)

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Marshall raises $728,398.50 for 2011 Combined Federal Campaign

Marshall exceeded its 2011 fundraising goal for the Combined Federal Campaign, raising a total of $728,398.50 during the goodwill drive, which ran from Sept. 30 to Dec. 16. Marshall Center Director Robert Lightfoot had challenged team members to raise $700,000 for local, regional and national charitable organizations. Marshall's effort is part of the Tennessee Valley campaign, a joint effort between Marshall, the Army's Aviation and Missile Command and other federal agencies at Redstone Arsenal and in surrounding Alabama and Tennessee counties. To learn more about CFC, visit http://cfc.msfc.nasa.gov.

Image left: CFC rally speaker Siran Stacy, at center right, joins Marshall Center Deputy Director Gene Goldman, center left, for the National Anthem. Stacy, who played football for the University of Alabama in Tuscaloosa from 1989-1991, lost his wife and four of his five children in 2007 when a drunk driver collided with their family van. Now he travels as a motivational speaker, sharing the importance of family and community as healing forces in the face of tragedy. (NASA/MSFC/Emmett Given)

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NASA, Industry Leaders Discuss New Booster Development for Space Launch System

On Dec. 15, aerospace industry leaders from more than 70 companies attended the Space Launch System's Advanced Booster Industry Day held at the Marshall Center. The event focused on a NASA Research Announcement for the Space Launch System's, or SLS, advanced booster. For explorations beyond the first two test flights, the SLS vehicle will require an advanced booster with a significant increase in thrust over existing U.S. liquid or solid boosters. Through this research announcement, NASA is seeking proposals for engineering demonstrations and/or risk reduction strategies for advanced booster concepts. The aim is to reduce risks while enhancing affordability, improving reliability and meeting performance goals during an initial 30-month phase prior to the full and open Design Development Test and Evaluation, or DDTE, competition. The total award value for the research announcement is $200 million with multiple awards anticipated. Marshall is leading the design and development of the SLS on behalf of the agency. The new heavy-lift launch vehicle will expand human presence beyond low-Earth orbit and enable new missions of exploration across the solar system.

Image right: Chris Crumbly, chair of the NASA Research Announcement Evaluation Team, addresses industry and center representatives at the Space Launch System's Advanced Booster Industry Day Dec. 15. (NASA/MSFC)

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Marshall's Twitter Feed Doubles in Size (And Then Some) in 2011

More than 10,000 new users joined the Marshall Center's Twitter feed in 2011, boosting the total to more than 17,600 by year's end. The 140-character Web communication tool enables Marshall communicators to share daily updates and real-time breaking news about center team members, milestones and events.

Find this article at:

http://www.nasa.gov/centers/marshall/about/star/index.html