Marshall Star, December 7, 2011 Edition

MARSHALL STAR

In This Week's Star ⊟ (Click to Expand)

First J-2X Combustion Stability Test a Success

NASA web feature

NASA conducted a key stability test firing of the J-2X rocket engine Dec. 1, marking another step forward in development of the upper-stage engine that will carry humans farther into space than ever before.

Image right: During the Dec. 1 80-second duration J-2X test firing, NASA began characterizing the rocket engine's combustion stability to understand more about the engine's performance and robustness. (NASA/SSC)

The Dec. 1 test firing focused on characterizing the new engine's combustion stability, a critical area of development. During the test firing, a controlled explosion was initiated inside the engine's combustion chamber to introduce an energetic pulse of vibrations not expected during nominal operations. Data from this and future combustion

stability tests will help engineers understand more about the engine's performance and robustness during engine operation.

The J-2X engine was test fired on the A-2 Test Stand at NASA's Stennis Space Center. The engine is being developed by Pratt & Whitney Rocketdyne for the Marshall Space Flight Center. It will provide upper-stage power for NASA's new Space Launch System. The SLS will carry the Orion spacecraft, its crew, cargo, equipment and science experiments to space -- providing a safe, affordable and sustainable means of reaching the moon, asteroids and other destinations in the solar system.

For more information about NASA exploration, visit http://www.nasa.gov/exploration.

For information about NASA's Space Launch System, visit http://www.nasa.gov/sls.

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National Institute of Rocket Propulsion Systems Names Four Teams to Address Key Propulsion Challenges
By Kim Newton

The Marshall Space Flight Center's National Institute for Rocket Propulsion Systems, or NIRPS, named four expert teams to tackle a series of key challenges facing the rocket propulsion industrial base.

Image left: From left: At the JANNAF conference, 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)

NIRPS is being established to maintain the nation's leadership in rocket and missile propulsion that is being threatened by industry downsizing, a shortage of new propulsion programs and the ability to attract and retain fresh talent.

The initial responsibilities of the strategy teams, announced at the Joint Army-Navy-NASA-Air Force -- or JANNAF -- conference in Huntsville, include developing action plans to address the six critical focus areas, called “grand challenges,” NIRPS previously identified, as well as the long-term vision for the Institute.

"The Institute has formed teams of experienced propulsion experts representing government, industry and academia that will work to address these challenges and position NIRPS as a solutions provider," said Dr. Dale Thomas, associate director for technical issues and Marshall lead for the National Institute for Rocket Propulsion Systems. "We are pleased to have such a talented and diverse group of professionals on board."

Created after a review of more than 40 industrial base studies and assessments performed by various entities over the past decade, together with the National Space Policy, National Security Space Strategy, and an informal survey of NIRPS Planning Team members, the six NIRPS grand challenges are:

1. Reduce development and sustainment costs for missile and rocket systems
2. Support the competitiveness and resilience of the industrial base
3. Foster access to facilities and expertise across government, industry and academia
4. Develop and implement an integrated science and technology plan for propulsion systems
5. Invigorate the Science, Technology, Engineering and Mathematics (STEM) pipeline

6. Collaborate across agencies for missile and rocket propulsion system development

"These challenges are important to sustaining and advancing our future rocket propulsion capabilities and reviving U.S. global competitiveness in rocket propulsion," Thomas said. "Now is the time to turn our attention to the development of strategies that will allow NIRPS to make progress against these challenges."

The Institute created four teams to study and address these challenges, with membership across government, industry and academia. Each of the teams will address the grand challenges from very distinct perspectives from within the rocket propulsion community.

- Industrial Base - to be led by the Dr. Jamie Neidert of the U. S. Army Aviation and Missile Research Development and Engineering Center located in Huntsville, with facilitation by Dr. Rajiv Doreswamy of NASA's Marshall Space Flight Center in Huntsville. This team will formulate and recommend National Policy options and strategies that promote a healthy rocket propulsion industrial base.
- Integrated Technology Planning & Roadmapping - to be led by Dr. George Schmidt of NASA's Glenn Research Center in Ohio, with facilitation by Bill Ondocsin of the Marshall Center. This team is charged with identifying technology needs and recommending technology insertion strategies.
- Solutions Provider - to be led by Dr. Tom Brown, with facilitation by Rhonda Childress-Thompson, both of the Marshall Center. This team is responsible for maintaining relationships and awareness across the government, industry and academia to align available capacity with emerging demands.
- Cross-cutting - to be led by Jim Reuter of the Marshall Center. This team's membership, comprised of the other three team leads and facilitators, will ensure that the other three strategy teams are coordinated and that their efforts address all of the grand challenges.

These four teams have all begun to function, and over the next three months will be developing a coherent set of strategies that address the grand challenges and the top-level plans to accomplish those strategies.

The National Institute for Rocket Propulsion Systems will maintain a cadre of experienced propulsion experts to maintain and align government and industry propulsion capabilities to meet current and future aerospace needs for civil and federal agencies, industry and academia. NIRPS will also provide insight and recommendations to national decisional authorities.

Newton is a public affairs officer in the Office of Strategic Analysis & Communications.

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Director's Corner

As we begin a new fiscal year and look toward a new calendar year, it's a good time to think about where we're going as a center and how we're going to get there.


Robert Lightfoot. (NASA/MSFC)

You've all seen NASA's Strategic Goals. All of these touch on Marshall's work, with the exception of aeronautics research. NASA wants to extend and sustain human activities across the solar system, expand scientific understanding of the Earth and the universe, create innovative new space technologies, enable program and institutional capabilities that support our work, and share NASA with the public in a way that fosters innovation and contributes to the national economy.

I want to share how Marshall's priorities for the coming year and beyond support these agency goals. It is important for me that every employee at Marshall understand why you are doing the work you do and how it contributes to the bigger picture. This will help keep us all engaged and excited about the work we

accomplish on behalf of the agency and the nation.

At Marshall, we're going to develop and operate vehicles and systems that promote human exploration, like the Space Launch System and the International Space Station. We're also going to close out the Space Shuttle and Ares programs efficiently so we can devote future resources to the new system. We're developing instruments and tools for studying the sun and the Earth, such as Solar Probe Plus and SERVIR. We'll also be managing numerous technologies through the new Technology Demonstration Mission Level II Program Office as well as maturing other technologies like cryogenic propellant storage and transfer, next generation life support, and others. And, we're going to continue to educate and inspire the public with outreach efforts like our Web sites, social media, exhibits, and events such as the Student Launch Initiative, and Great Moonbuggy Race.

The work we accomplish as a center is critically important. How we accomplish this work is by meeting our commitments and focusing on the capabilities that support NASA's current and future missions. We're going to be more affordable, flexible, and adaptable as a center, finding ways to improve our processes and communication both internally and externally. We're also going to nurture the partnerships and relationships that support the government and commercial space community beyond our center. And, of course, I want us to continue to pursue and improve on our center priorities of safety, collaboration, and diversity and inclusion. Our ability to work seamlessly across organizational and disciplinary boundaries, incorporate the strengths and experiences of all our employees, and provide for their health and safety will help ensure our future success.

Over the past year, we've reorganized around our capabilities. We've established a strategic development effort to capture new work. We have a 2012 budget and meaningful work to pursue. With NASA's strategic goals and our efforts to reposition our center, we have a lot to look forward to this year. I'm proud of this team and what you all have accomplished during the past couple of years. I'm also excited about working together with you to accomplish these goals.

Robert

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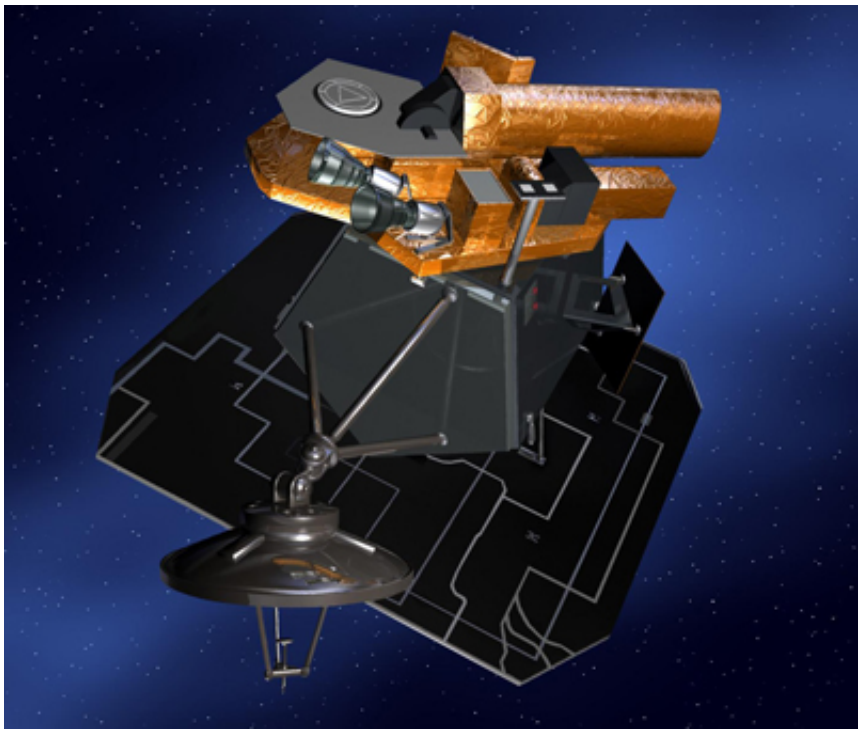
NASA's Deep Impact Spacecraft Eyes the Future



NASA's Deep Impact spacecraft completed a 140-second firing of its onboard rocket motors Nov. 24. The rocket burn was performed to keep the venerable comet hunter's options open for yet another exploration of a solar system small body.

Image left: Artist concept of NASA's Deep Impact spacecraft. (NASA)

"The burn was right on the money," said Tim Larson, Deep Impact project manager from NASA's Jet Propulsion Laboratory in Pasadena, Calif. "Not bad for a spacecraft whose prime mission successfully concluded in 2005. We've logged a lot of miles and at least one comet flyby since our '05 encounter with comet Tempel 1. With this burn, we keep the door open for Deep Impact logging even more miles and exploring more small worlds before all is said and done."

The Deep Impact mission is part of the Discovery Program managed at the Marshall Space Flight Center.

"The Discovery Program Office looks forward to working with the Jet Propulsion Deep Impact team regarding exciting science opportunities that will result from the successful burn," said Brian Key, Deep Impact mission manager at Marshall.

Larson and his Deep Impact team watched from their mission support area at the Jet Propulsion Laboratory as their spacecraft began the maneuver at 6 p.m. CST. The spacecraft's two-minute, 20-second burn changed its velocity by 19.7 mph. If NASA approves a third mission extension for Deep Impact, a second rocket burn will be executed next fall.

Launched in January 2005, Deep Impact traveled about 268 million miles to the vicinity of comet Tempel 1. On July 3, 2005, the spacecraft deployed an impactor that was essentially "run over" by the nucleus of comet Tempel 1 on July 4. Sixteen days after comet encounter, the Deep Impact team placed the spacecraft on a trajectory to fly past Earth in late December 2007. This extended mission of the Deep Impact spacecraft culminated in the successful flyby of comet Hartley 2 on Nov. 4, 2010.

The Jet Propulsion Laboratory, a division of the California Institute of Technology, manages the Deep Impact mission for NASA's Science Mission Directorate in Washington. The spacecraft was built for NASA by Ball Aerospace & Technologies Corp. in Boulder, Colo.

For more information about Deep Impact, visit http://solarsystem.nasa.gov/deepimpact.

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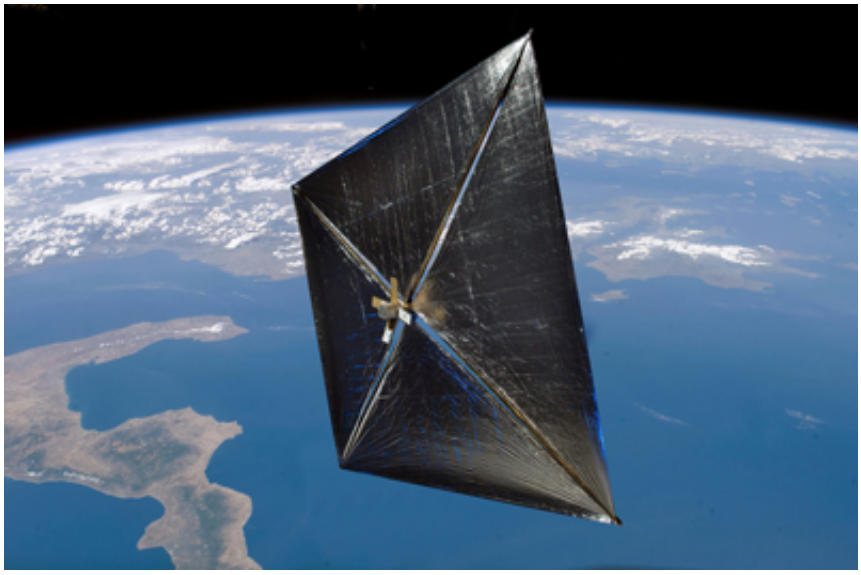
NASA's Nanosail-D 'Sails' Home -- Mission Complete
By Janet Anderson



After spending more than 240 days "sailing" around the Earth, NASA's NanoSail-D -- a nanosatellite that deployed NASA's first-ever solar sail in low-Earth orbit -- has successfully completed its Earth orbiting mission.

Image right: An artist's conception of how NanoSail-D looked fully deployed in orbit. (NASA)

Launched to space Nov. 19, 2010, as a payload on NASA's FASTSAT, also known as Fast, Affordable, Science and Technology Satellite, NanoSail-D's sail deployed Jan. 20. FASTSAT is NASA's first microsatellite designed to create a capability that increases opportunities for secondary, scientific and technology payloads, or rideshares, to be flown at lower cost than previously possible.

The flight phase of the mission successfully demonstrated a deorbit capability that could potentially be used to bring down decommissioned satellites and space debris by re-entering and totally burning up in the Earth's atmosphere. The team continues to analyze the orbital data to determine how future satellites can use this new technology.

A main objective of the NanoSail-D mission was to demonstrate and test the deorbiting capabilities of a large, low-mass, high-surface-area sail.

"The NanoSail-D mission produced a wealth of data that will be useful in understanding how these types of passive deorbit devices react to the upper atmosphere," said Joe Casas, FASTSAT project scientist at the Marshall Space Flight Center.

"The data collected from the mission is being evaluated," said Casas, "in conjunction with data from FASTSAT science experiments intended to study and better understand the drag influences of Earth's upper atmosphere on satellite orbital re-entry."

The FASTSAT science experiments are led by the Goddard Space Flight Center and sponsored by the U.S. Department of Defense Space Experiments Review Board, which is supported by the Department of Defense Space Test Program.

Initial assessment indicates NanoSail-D exhibited the predicted, cyclical deorbit-rate behavior that was only previously theorized by researchers.

"The final rate of descent depended on the nature of solar activity, the density of the atmosphere surrounding NanoSail-D and the angle of the sail to the orbital track," said Dean Alhorn, principal investigator for NanoSail-D at Marshall. "It is astounding to see how the satellite reacted to the sun's solar pressure. The recent solar flares increased the drag and brought the nanosatellite back home quickly."

NanoSail-D orbited the Earth for 240 days, performing well beyond expectations and burned up during re-entry to Earth's atmosphere Sept. 17.

NASA formed a partnership with spaceweather.com to engage the amateur astronomy community to submit images of the orbiting NanoSail-D solar sail during the flight phase of the mission. NanoSail-D was a very elusive target to spot in the night sky -- at times very bright and other times difficult to see at all. Many ground observations were made over the course of the mission. The imaging challenge concluded with NanoSail-D's deorbit. Winners will be announced in early 2012.

For more information, visit http://www.nanosail.org/.

The NanoSail-D experiment was managed at the Marshall Center, and designed and built by engineers in Huntsville. Additional design, testing, integration and execution of key spacecraft bus development and deployment support operation activities were conducted by engineers at NASA's Ames Research Center. The experiment is the result of a collaborative partnership between NASA, the Department of Defense Space Test Program, the U.S. Army Space and Missile Defense Command, the Von Braun Center for Science and Innovation, Dynetics Inc. and Mantech Nexolve Corp.

For more information about NanoSail-D visit http://www.nasa.gov/mission_pages/smallsats/nanosaild.html.

Anderson is a public affairs officer in the Office of Strategic Analysis & Communications.

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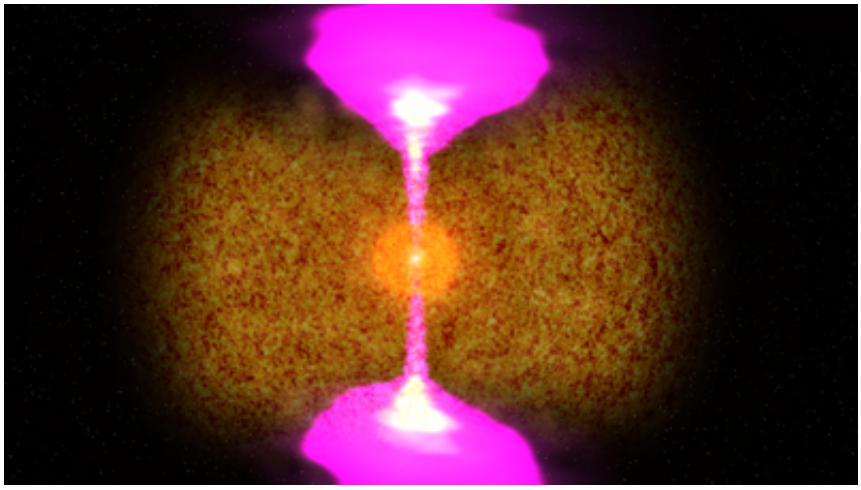
NASA's Swift Finds a Gamma-Ray Burst with a Dual Personality
NASA news release



A peculiar cosmic explosion first detected by NASA's Swift observatory on Christmas Day in 2010 was caused either by a novel type of supernova located billions of light-years away or an unusual collision much closer to home, within our own galaxy. Papers describing both interpretations appear in the Dec. 1 issue of the journal Nature.

Image left: Artist concept of neutron star falling into its neighbor. (NASA)

Gamma-ray bursts are the universe's most luminous explosions, emitting more energy in a few seconds than our sun will during its entire energy-producing lifetime. What astronomers are calling the "Christmas burst" is so unusual that it can be modeled in such radically different ways.

"What the Christmas burst seems to be telling us is that the family of gamma-ray bursts is more diverse than we fully appreciate," said Christina Thoene, the supernova study's lead author at the Institute of Astrophysics of Andalusia in Granada, Spain. "It's only by rapidly detecting hundreds of them, as Swift is doing, that we can catch some of the more eccentric siblings."

Common to both scenarios is the presence of a neutron star, the crushed core that forms when a star many times the sun's mass explodes. When the star's fuel is exhausted, it collapses under its own weight, compressing its core so much that about a half-million times Earth's mass is squeezed into a sphere no larger than a city.

The Christmas burst, also known as GRB 101225A, was discovered in the constellation Andromeda by Swift's Burst Alert Telescope at 12:38 p.m. CST on Dec. 25, 2010. The gamma-ray emission lasted at least 28 minutes, which is unusually long. Follow-up observations of the burst's afterglow by the Hubble Space Telescope and ground-based observatories were unable to determine the object's distance.

Thoene's team proposes that the burst occurred in an exotic binary system where a neutron star orbited a normal star that had just entered its red giant phase, enormously expanding its outer atmosphere. This expansion engulfed the neutron star, resulting in both the ejection of the giant's atmosphere and rapid tightening of the neutron star's orbit.

Once the two stars became wrapped in a common envelope of gas, the neutron star may have merged with the giant's core after just five orbits, or about 18 months. The end result of the merger was the birth of a black hole and the production of oppositely directed jets of particles moving at nearly the speed of light, followed by a weak supernova.

The particle jets produced gamma rays. Jet interactions with gas ejected before the merger explain many of the burst's signature oddities. Based on this interpretation, the event took place about 5.5 billion light-years away, and the team has detected what may be a faint galaxy at the right location.

"Deep exposures using Hubble may settle the nature of this object," said Sergio Campana, who led the collision study at Brera Observatory in Merate, Italy.

If it is indeed a galaxy, that would be evidence for the binary model. On the other hand, if NASA's Chandra X-ray Observatory finds an X-ray point source or if radio telescopes detect a pulsar, that goes against it.

Campana's team supports an alternative model that involves the tidal disruption of a large, comet-like object and the ensuing crash of debris onto a neutron star located only about 10,000 light-years away. The scenario requires the break-up of an object with about half the mass of the dwarf planet Ceres. While rare in the asteroid belt, such objects are thought to

be common in the icy Kuiper belt beyond Neptune. Similar objects located far away from the neutron star may have survived the supernova that formed it.

Gamma-ray emission occurred when debris fell onto the neutron star. Clumps of cometary material likely made a few orbits, with different clumps following different paths before settling into a disk around the neutron star. X-ray variations detected by Swift's X-ray Telescope that lasted several hours may have resulted from late-arriving clumps that struck the neutron star as the disk formed.

In the early years of studying gamma-ray bursts, astronomers had very few events to study in detail and dozens of theories to explain them. In the Swift era, astronomers have settled into two basic scenarios, either the collapse of a massive star or the merger of a compact binary system.

"The beauty of the Christmas burst is that we must invoke two exotic scenarios to explain it, but such rare oddballs will help us advance the field," said Chryssa Kouveliotou, a co-author of the supernova study at the Marshall Space Flight Center.

NASA's Swift was launched in November 2004 and is managed by Goddard Space Flight Center. It is operated in collaboration with several U.S. institutions and partners in the United Kingdom, Italy, Germany and Japan.

For more information and video associated with this release, visit http://www.nasa.gov/swift.

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Marshall Center to Host Alliance of More Than 350 Local, Regional and National Small Business Owners in Huntsville Dec. 8

The Marshall Space Flight Center will host its Small Business Alliance meeting from 7:30 a.m. to 1 p.m. Dec. 8 at the Davidson Center for Space Exploration. More than 350 local, regional and national business owners and managers are expected to take part in the meeting.

Sponsored by the Marshall Center's Office of Procurement and Small Business Office, the Small Business Alliance was established in 2007 to help small businesses pursue NASA procurement and subcontracting opportunities. With a strong emphasis on technology innovation and partnership, the alliance connects small businesses with the Marshall technical community, government agencies, industry prime contractors and other organizations to share procurement information and insight on how businesses can more effectively market their capabilities to NASA and Marshall.

Huntsville Mayor Tommy Battle and Madison Mayor Paul Finley will welcome participants. Speakers will include Mike Ward, vice president of governmental affairs of the Chamber of Commerce of Huntsville/Madison County; Glenn Delgado, associate administrator of NASA's Office of Small Business Programs in Washington; and, from Marshall, Kim Whitson, deputy director of the Office of Procurement; Johnny Stephenson, deputy director of the Office of Strategic Analysis & Communications; Andrew Keys, center chief technologist; Lynn Garrison, small business technical advisor; Chris Crumbly, Space Launch Systems Program Office; Billy Kauffman, contracting officer technical representative; Kathy Christy, contracting officer; and David Brock, small business specialist.

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Audrey Robinson Appointed to SES Position of Chief Counsel

Audrey D. Robinson has been appointed to the Senior Executive Service

position of chief counsel for the Marshall Space Flight Center's Office of the Chief Counsel. Robinson will lead the office responsible for addressing legal and regulatory issues affecting the Marshall Center and its organizations. Since January 2005, she has served as director of Marshall's Office of Diversity and Equal Opportunity and is responsible for managing, planning, directing and implementing a comprehensive diversity and equal opportunity program at the center.


Audrey Robinson. (NASA/MSFC)

From 1996 to 2005, she served as assistant chief counsel for litigation and attorney advisor in Marshall's Office of the Chief Counsel. She represented NASA in litigation matters and provided Marshall management with legal advice and representation on personnel law, federal ethics standards, contracts and agreements and other matters. From 1994 to 1996, she was an attorney in the Office of the Chief Counsel at the Kennedy Space Center.

Robinson joined the Marshall Center in 1986 as a materials engineer in the Professional Intern Program -- a training opportunity that pairs recently graduated engineers and business professionals with professional mentors. Following rotations in several areas of the Marshall Center, she joined the Analytical and Physical Chemistry Branch of the Materials and Processes Laboratory in 1988 to perform research and analysis on space-related topics such as gases given off by materials used onboard the space shuttle. Her first work experience with NASA was in 1981 as a participant in the Summer High School Apprentice Research Program. She served in the Chemicals and Non-Metals Processes Branch of the Materials and Processes Laboratory, assisting in developing and testing protective spray coatings applied to parts of the space shuttle solid rocket boosters.

Born in Montgomery, Ala., Robinson earned her bachelor's degree in chemistry in 1986 from Oakwood University in Huntsville. She received her master's degree in management in 1989 from the Florida Institute of Technology in Huntsville and her Doctor of Law degree from Emory University School of Law in Atlanta in 1993. Robinson is licensed to practice law in Georgia, Florida and Alabama.

Robinson is a 2007 recipient of NASA's Outstanding Leadership Medal, awarded for sustained contributions and effective leadership that advance the agency's mission and values. In 2004, she received NASA's Exceptional Service Medal, recognizing significant and sustained performance characterized by unusual initiative or creativity. She is a graduate of NASA's Senior Executive Service Candidate Development Program, which prepares qualified employees for job openings in NASA's Senior Executive Service, the personnel system covering most top managerial and policy positions in the executive branch of the federal government.

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Only Nine More Days to Contribute to CFC!

The Marshall Center's 2011 Combined Federal Campaign runs through Dec. 16. So far, Marshall's work force has contributed $540,178 toward the center's $700,000 goal.

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Marshall Center Celebrates Holidays with Songs, Lights and Jolly Ol' Saint Nick

Santa and his cheerful helper hand out treats to children at the Marshall Space Flight Center's rocket-lighting ceremony Dec. 1. Dozens of children and holiday celebrants from Team Redstone -- which includes the Marshall Center and U.S. Army organizations on Redstone Arsenal -- came out to Marshall's Rocket Park to enjoy music, cookies and hot chocolate while Marshall Center Deputy Director Gene Goldman and Santa officially lit strands of colored lights adorning the Saturn I. (NASA/MSFC/Emmett Given)

Children from Marshall's Child Development Center sing holiday classics, including "Jingle Bells," at the rocket-lighting ceremony. The event was sponsored by the Marshall Exchange. (NASA/MSFC/Emmett Given)

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Marshall Association holding Toy Drive

The Marshall Association in coordination with ERC Inc. of Huntsville will be conducting a toy drive until Dec. 15 for Toys for Tots. Collection boxes are located in Buildings 4203, 4202, 4200 and 4601 lobbies near the elevators. Toys also will be collected daily by Marshall Association officers in front of the 4203 cafeteria during lunch. Please consider contributing new, unwrapped toys for babies up to teenagers.

For questions, contact Marshall Association Toys for Tots coordinator Whitney Young at 544-0615, or ERC Inc. representative Gilda Battista at 544-6328.

For more information about the Marshall Association, team members can visit http://inside.msfc.nasa.gov/marshall_association/index.html or stop by 4203 during lunch to speak with an officer.

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Obituaries

Julian RuDell Brannon, 98, of Arab died Nov. 20. He retired from the Marshall Center in 1976 as a contract specialist.

Robert R. Fisher, 80, of Huntsville died Nov. 21. He retired from the Marshall Center in 1995 as an aerospace engineer supervisor. He is survived by his wife, Myrtle "Rae" Fisher.

Jacky Walker, 76, of Huntsville died Nov. 21. He retired from the Marshall Center in 1994 as an aerospace engineer. He is survived by his wife, Dorothy Houk Walker.

Ellery May Jr., 87, of Huntsville died Nov. 23. He retired from the Marshall Center in 1979 as the deputy manager of the Shuttle Projects Office. He is survived by his wife, Gilda Martin May.

William Orth Simmons, 81, of Decatur died Nov. 25. He retired from the Marshall Center in 1997 as a mechanical engineer.

He is survived by his wife, Kathryn Lynch Simmons.

Bobby Funderburk, 77, of Huntsville died Nov. 26. He retired from the Marshall Center in 1995 as an aerospace engineer.

Homer E. Jones, 84, of Manchester, Tenn., died Nov. 27. He retired from the Marshall Center in 1984 as a program analyst. He is survived by his wife, Juanita J. Jones.

Editor's note: Skeet Vaughn, retired NASA engineer, wanted to share that Dr. Nicholas C. Costes of Psychiko, Greece, died April 28, 2009. He retired from the Marshall Center in 1998 as an aerospace engineer.

Find this article at:

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