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Director's Corner: SLS One Giant Leap Closer

By now you have almost certainly learned of the achievement of our latest Space Launch System major milestone.

On Aug. 27, the Agency Program Management Council at Headquarters approved SLS for completion of Key Decision Point C. Following last summer's successful completion of the Preliminary Design Review, this means SLS is now cleared to advance from the formulation phase to implementation.

*See **Director's Corner** on page 2*

Patrick Scheuermann (NASA)

Marshall Announces New Enterprises Integration Office and Personnel Changes

NASA's Marshall Space Flight Center will be the primary location for the development and implementation of a new NASA Enterprise Integration Office. Its establishment will improve NASA's Information Technology infrastructure and enterprise applications, specifically those provided by the Communication Services Office, End-User Services Office and the NASA Enterprise Applications Competency Center.

Marshall Center Director Patrick Scheuermann also announced associated personnel changes. Neil Rodgers will serve as deputy director for Marshall's Enterprise Integration Office in the Office of the Chief Information Officer. He currently serves as deputy director of OCIO with responsibility for the NEACC.

In his new position, Rodgers will oversee numerous operational and management functions, including IT

*See **Personnel Changes** on page 3*

NASA Unveils World's Largest Spacecraft Welding Tool for Space Launch System

By Megan Davidson

The largest spacecraft welding tool in the world, the Vertical Assembly Center, officially is open for business at NASA's Michoud Assembly Facility. The 170-foot-tall, 78-foot-wide giant completes a world-class welding toolkit that will be used to build the core stage of America's next great rocket, the Space Launch System (SLS).

SLS will be the most powerful rocket ever built for deep space missions, including to an asteroid and eventually to Mars. The core stage, towering more than 200 feet tall with a diameter of 27.6 feet, will store cryogenic liquid hydrogen and liquid oxygen that will feed the rocket's four RS-25 engines.

"This rocket is a game changer in terms of deep space

*See **Spacecraft Welding Tool** on page 4*

NASA, Boeing and state and local officials cut the ribbon on the Vertical Assembly Center, marking the completion of the final tool to weld parts for the SLS core stage. Marshall Center Director Patrick Scheuermann, second from left; NASA Associate Administrator Robert Lightfoot, third from left; SLS Program Manager Todd May, fourth from left; NASA Administrator Charles Bolden, center; and Michoud Assembly Facility Director Roy Malone, right, were among those taking part in the event. (NASA/MSFC/Emmett Given)

Director's Corner

Continued from page 1

If you take nothing more from this news, I hope you'll take these two points:

1. **This is huge**. Please do not underestimate the significance of this milestone. For the first time in more than 40 years, a NASA human spaceflight vehicle has made it to this "stage." NASA Associate Administrator Robert Lightfoot, who oversaw the review process, declared, "After rigorous review, we're committing today to a funding level and readiness date that will keep us on track to sending humans to Mars in the 2030s -- and we're going to stand behind that commitment."

2. **You did it.** Whether you are directly involved with the SLS program or have been involved indirectly, achieving a milestone of this significance can only happen with team members and with a culture that continually concentrates on assignments, getting the job done and persevering through challenges like sequestration and furloughs. Or as the saying goes, "keeping the main thing the main thing." You have never given up.

Thanks to Marshall team members near and far, civil service and contractors, the speed of development for this vehicle has been remarkable -- just 22 months from the announcement that SLS would be America's next advanced heavy-lift vehicle to Preliminary Design Review. And now we have the KDP-C memo in hand to continue forward.

We have an exciting year ahead. In the coming months, we will:

- Start RS-25 engine testing at Stennis
- Fly our first flight hardware -- the stage adapter -- on Orion's first flight, Exploration Flight Test-1
- Conduct qualification motor testing on the new five-segment solid rocket booster
- Complete the Vertical Assembly Center welding on the liquid hydrogen structural test article
- Start Launch Vehicle Stage Adapter Flight Unit 1 production

I hope you will enjoy this success and take pride in it. I know I am proud to work with people like you who can achieve goals such as this.

Patrick

Personnel Changes *Continued from page 1*

infrastructure services and security for more than 45,000 NASA users.

Scheuermann also announced the selection of Pamela Hanes as manager of the NASA Enterprise Applications Competency Center in the OCIO.

Rodgers, who joined NASA in 1989 as a computer engineer, was appointed to the Senior Executive Service in October 2006. He has extensive experience in the planning and successful deployment of complex software and IT solutions.

Rodgers earned a bachelor's degree in applied mathematics in 1987 and a master's degree in business administration in 1988 from Auburn University in Auburn, Alabama. His awards include two NASA Certificates of Appreciation, four Special Service Awards, seven Sustained Superior Performance Awards, seven Group Achievement Awards and the Center Operations Director's "MVP" Award in 2004.

Neil Rodgers (NASA)

Hanes, who will serve as manager of the NEACC in the OCIO, is returning to the Marshall Center from NASA Headquarters, where she has served since July 2012 as NASA's deputy chief financial officer responsible for agency financial operations.

A 32-year NASA veteran, Hanes previously was Marshall's chief financial officer, responsible for managing an annual budget of approximately $2.6 billion, along with the development, implementation and administration of integrated resources management.

Hanes, who was appointed to the SES in December 2002, earned a bachelor's degree in accounting in 1985 from the University of Alabama in Huntsville. Her NASA awards include Manned Flight Awareness; six Sustained Superior Performance Awards; two Special Service Awards; a NASA Outstanding Leadership Medal; and the NASA Exceptional Service Medal. In 2007, President George W. Bush honored Hanes with a Presidential Rank Award for Meritorious Executives.

Pamela Hanes (NASA)

She will assume her new role Nov. 16. In the interim, Rodgers will serve as both deputy director, OCIO, for the Enterprise Integration Office, and of NEACC.

Blair, an ASRC Federal/Analytical Services employee, supports the Office of Strategic Analysis & Communications.

Spacecraft Welding Tool *Continued from page 2*

exploration and will launch NASA astronauts to investigate asteroids and explore the surface of Mars, while opening new possibilities for science missions as well," said NASA Administrator Charles Bolden during a ribbon-cutting ceremony Sept. 12 at Michoud.

The Vertical Assembly Center is part of a family of state-of-the-art tools designed to weld the core stage of SLS. It will join domes, rings and barrels to complete the tanks or dry structure assemblies. It also will be used to perform evaluations on the completed welds. Boeing is the prime contractor for the SLS core stage, including avionics.

"The SLS Program continues to make significant progress," said Todd May, SLS program manager. "The core stage and boosters have both completed critical design review, and NASA recently approved the SLS Program's progression from formulation to development. This is a major milestone for the program and proof the first new design for SLS is mature enough for production."

Work is well underway on several additional welding tools. Engineers recently completed welding all the rings for the first flight of SLS using the Segmented Ring Tool. Ten barrels also have been welded for the SLS core stage using the Vertical Weld Center. The rings connect and provide stiffness between domes and barrels, which will make-up the five major core stage structures: the forward skirt, the liquid oxygen tank, the intertank, the liquid hydrogen tank and the engine section.

The tools use a friction-stir welding process that makes flight hardware stronger, because it seamlessly fuses materials without melting and introducing impurities found in conventional welding. For SLS, friction-stir welding is extremely important for manufacturing the massive core stage. The process brings together barrel panels into whole sections, and whole sections into a cylinder that holds the SLS fuel tanks.

Jeff Ding, an aerospace engineer with the Materials and Processes Laboratory at NASA's Marshall Space Flight Center, introduced the friction-stir-welding process to NASA. Ding now holds numerous U.S. patents for this process, and was presented with the Friction Stir Weld Tool Award at the Sept. 12 event for his efforts on the innovative manufacturing technique.

Also at the event, Patricia Key, a Boeing Co. employee and project manager for the Vertical Assembly Center, was presented with a NASA Silver Snoopy award by NASA astronaut Patrick Forrester for her outstanding achievements related to human flight safety or mission success.

The Vertical Assembly Center, which qualifies as a skyscraper at 170 feet tall, is unveiled Sept. 12 at NASA's Michoud Assembly Facility. (NASA/MAF/Eric Bordelon)

The Marshall Center manages the SLS Program and the Michoud Assembly Facility for the agency.

For more information about NASA's SLS, visit here.

Davidson, an ASRC Federal/Analytical Services employee, supports the Office of Strategic Analysis & Communications.

Marshall Center, Space & Rocket Center Host U.S. Secretary of Education

From left, U.S. Space & Rocket Center CEO Dr. Deborah Barnhart and Marshall Center Director Patrick Scheuermann discuss NASA's high-quality educational activities with U.S. Secretary of Education Arne Duncan and the newly appointed NASA Associate Administrator of Education, Donald James. The secretary's visit to the Space & Rocket Center was part of his fifth annual Back-to-School Bus Tour and included an educational town hall meeting with local students, teachers and parents. (NASA/MSFC/Emmett Given)

U.S. Secretary of Education Arne Duncan, along with NASA astronaut Ricky Arnold and other guests, answer students' questions during an educational town hall meeting at the Space & Rocket Center. The secretary's visit was part of his tour to promote education, with stops in Georgia, Alabama and Tennessee. (NASA/MSFC/Emmett Given)

Deputy Director Hosts Panel Highlighting Women and Leadership

Marshall Space Flight Center Deputy Director Teresa Vanhooser, right, hosted a panel discussion at the center Sept. 9 titled "Women in Leadership: The Door is Open." Participants shared their experiences as women who lead and discussed changing roles for women at Marshall. The panel featured Carolyn Griner, bottom left, the first woman appointed to serve as deputy director of the center; Albanie Bolton, top left, of Marshall's Engineering Directorate; as well as Lisa Watson-Morgan of the Office of the Chief Engineer; and Karen Huerta-Knight of the Flight Programs and Partnerships Office. Also joining the conversation was Marshall veteran Ann McNair, bottom right, of the Mission Operations Laboratory. (NASA/MSFC/Fred Deaton)

Orion's First Crew Module Complete

The Orion spacecraft crew module is covered by protective foil as it and the service module are lifted for the installation of the Orion-to-stage adapter ring at the Neil Armstrong Operations and Checkout Facility at NASA's Kennedy Space Center. The adapter, designed and built at NASA's Marshall Space Flight Center, will connect the Orion to a Delta IV heavy rocket for Orion's first test flight, Exploration Flight Test-1, scheduled for December. The Marshall Center has provided critical support to the flight, including the fabrication of more than 975 pieces of Orion flight hardware, conducting structural testing of the service module and crew module elements, and management oversight of the launch abort system propulsion elements. The LAS, positioned on a tower atop the crew module, activates within milliseconds to propel the crew module to safety in the event of an emergency during launch or climb to orbit. The crew and service modules were integrated Sept. 11 and were transferred to another facility for fueling, before moving again for the installation of the launch abort system. At that point, the spacecraft will be complete and ready to stack on top of the Delta IV heavy rocket. The Orion Program is managed by NASA's Johnson Space Center. The Launch Abort System is managed out of NASA's Langley Research Center, in partnership with the Marshall Center. (NASA/KSC)

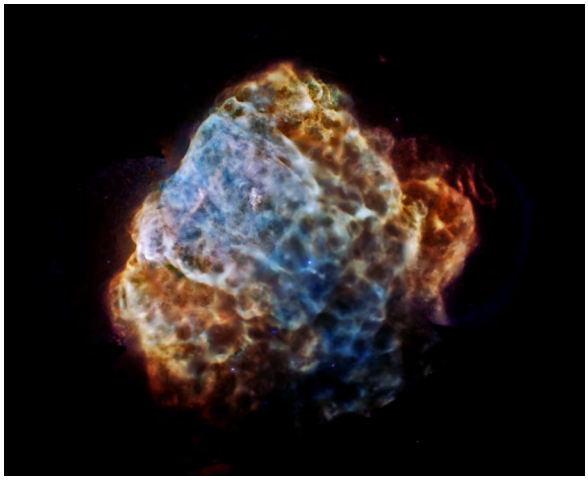
Unprecedented X-ray View of Supernova Remains

The destructive results of a powerful supernova explosion reveal themselves in a delicate tapestry of X-ray light, as seen in this image from NASA's Chandra X-Ray Observatory and the European Space Agency's XMM-Newton.

The image shows the remains of a supernova that would have been witnessed on Earth about 3,700 years ago. The remnant is called Puppis A, and is around 7,000 light years away and about 10 light years across. This image provides the most complete and detailed X-ray view of Puppis A ever obtained, made by combining a mosaic of different Chandra and XMM-Newton observations.

These observations act as a probe of the gas surrounding Puppis A, known as the interstellar medium. The complex appearance of the remnant shows that Puppis A is expanding into an interstellar medium that probably has a knotty structure.

Supernova explosions forge the heavy elements that can provide the raw material from which future generations of stars and planets will form. Studying how supernova remnants expand into the galaxy and interact with other material provides critical clues into our own origins.



Low-energy X-rays are shown in red, medium-energy X-rays are in green and high energy X-rays are colored blue. (NASA/CXC/IAFE/G.Dubner et al & ESA/XMM-Newton)

A paper describing these results was published in the July 2013 issue of Astronomy and Astrophysics and is available online.

NASA's Marshall Space Flight Center manages the Chandra program for NASA's Science Mission Directorate. The Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, controls Chandra's science and flight operations.

Ribbon Cutting for Vertical Assembly Center at Michoud Featured on NASA-TV

The ribbon-cutting ceremony for NASA's new Vertical Assembly Center -- housed at the Michoud Assembly Facility and managed by the Marshall Space Flight Center -- is featured in the latest edition of "This Week @NASA," a weekly video program broadcast nationwide on NASA-TV and posted online.

On Sept. 12, NASA Administrator Charles Bolden and other NASA representatives viewed the 170-foot-high Vertical Assembly Center -- the world's largest spacecraft welding tool -- which will assemble parts of the Space Launch System -- NASA's next heavy-lift launch rocket that will carry astronauts on long-duration missions to Mars, asteroids and beyond.

The Vertical Assembly Center will be used to join domes, rings and barrels segments to complete the SLS fuel tanks. The tool will also perform evaluations of the completed welds.

This and previous episodes of "This Week @NASA" are available for viewing at the NASA-TV YouTube channel.