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MARSHALL STAR

In This Week's Star

Shuttle Program's Linda Posey: 'I Knew I Was in the Midst of Greatness'

By Megan Davidson

When Linda Posey was asked to transition to a new office supporting the NASA Marshall Space Flight Center's Space Shuttle Program in 1972, she didn't know what was in store for her. However, she knew she was in the midst of greatness.

Image right: Linda Posey, a DP Associates Inc. employee supporting the Shuttle-Ares Transition Office, is a charter member of Marshall's Space Shuttle Program Office and is leading the program's records transition and retirement. (NASA/MSFC/Emmett Given)

More than 40 years later, Posey is now leading another transition for shuttle -- the end of an iconic era that encapsulated a nation and went beyond the boundaries of universal discovery through 132 missions to space. "To me, the end of the shuttle program is bittersweet," said Posey, a retired NASA employee who now works for DP Associates Inc., supporting the Shuttle-Ares Transition Office. "NASA has been the pioneer of space exploration and made incredible technological advances that greatly benefit mankind. I'd like to think I've made a small contribution to that success and kept the dream of space pioneers -- like Wernher von Braun -- alive."

The Start of a Long Career

"My dad, who worked at Marshall, and several of my parents' friends who also worked at the center, talked a lot about their involvement in Marshall projects. It certainly was a factor in my career decision and made me want to be a part of something that was so significant to the country," said Posey.

In the 1960s, she served as an administrative assistant for the Saturn V Program. The Marshall Shuttle Projects Office was formed in 1972, and Posey became chief of the Management Support Office, where she provided administrative support, and later program support and integration functions, for the shuttle propulsion projects.

Over the years, her responsibilities quickly progressed, and in 1990, she was appointed manager of the Shuttle Systems Business Office. After eight years of leading the shuttle systems integration business team, and serving a short stint in the Space Transportation Program, she retired from federal service in 1998.

One of the highlights of her career, she said, was in 1981. "I can't put into words how exciting it was to see the first shuttle launch, STS-1," Posey recalled. "I was holding my breath watching that shuttle climb high into the sky and thinking how amazing it was that we'd worked on the shuttle for 11 years, and now it was flying!"

The End of an Iconic Era

Posey emerged from retirement to return to Marshall in 2007 as a contractor employee to lead the shuttle program's records transition and retirement. She has developed a detailed method for the processing and archival of millions of federal records involving shuttle projects at Marshall, as well as shuttle contractors across the nation.

"Looking back on my first day at Marshall, I had no idea how lucky I was to work here. I'm so proud to be a charter member of the Space Shuttle Program Office, and to have worked with such a high caliber of professional people throughout my career.

"Working for NASA really is being part of a dream team."

Davidson, an Analytical Services Inc. employee, supports the Office of Strategic Analysis & Communications.

› Back to Top

Michoud Assembly Facility to Manufacture Liquefied Natural Gas Tanks for Lockheed Martin

The Michoud Assembly Facility in New Orleans, which is managed by the Marshall Space Flight Center and is NASA's only large-scale advanced manufacturing facility, soon will be building liquefied natural gas (LNG) tanks with commercial applications on Earth.

Image left: From front left, Michoud Assembly Facility Deputy Director Robert Champion and Michoud Deputy Chief Operating Officer Malcolm Wood escort Louisiana Gov. Bobby Jindal and Louisiana District 90 Rep. Gregory Cromer through Michoud Building 103, where Lockheed Martin will manufacture cryogenic liquefied natural gas tanks for use in the shipping industry. (NASA/Michoud Assembly Facility/Steven Seipel)

In a ceremony March 12 that included Louisiana Gov. Bobby Jindal, Lockheed Martin Corp. of Bethesda, Md., announced it is drawing on the unique experience and equipment at Michoud to manufacture the LNG tanks. Michoud also is crafting components for a new generation of NASA spacecraft that will take explorers deeper into space than they have traveled before.

"We are very pleased to add Lockheed Martin's liquefied natural gas tank production to the portfolio of advanced manufacturing work and research under way here," said Roy Malone, director of the Michoud Assembly Facility. "It is gratifying to see the manufacturing processes and capabilities developed to build large spaceflight structures being put to use in the energy industry here on Earth."

With a 37-year history of producing the giant external tank for the space shuttles, and as prime contractor for NASA's Orion spacecraft being built at Michoud, Lockheed Martin is familiar with the facility's capabilities. The agreement ultimately could lower facility costs at Michoud for government and industry users, and free up money for other space exploration goals.

Producing LNGs requires the processes and capabilities of a large-tank structure manufacturing site that Michoud is uniquely built to support. Lockheed Martin said it has received initial orders to manufacture cryogenic tanks for fueling LNG-powered vessels. As part of its longer-range business plan, Lockheed Martin will adapt production equipment used to manufacture the external tank for the space shuttle to a wide range of liquefied natural gas supply chain applications.

Michoud is a multi-tenant campus with 43 acres of advanced manufacturing space under one roof. A number of private companies and government projects take advantage of the facility's key capabilities, including large-envelope fiber placement equipment, friction stir welding systems, high-speed machining tools, material test labs and manufacturing infrastructure.

Michoud built the Saturn S-1C and Saturn S-1B boosters for the Apollo program, and the large external tank for the shuttle program. It now is building the Orion spacecraft. The facility is being modified to manufacture the core stage of NASA's Space Launch System rocket, the most powerful ever built.

For more information about NASA's Michoud Assembly Facility, visit: http://mafspace.msfc.nasa.gov

› Back to Top

Marshall, Partner Company Creating 3-D Technology to Turn Space into 'Machine Shop'
By Megan Davidson

Suppose an astronaut needed to make a repair on the International Space Station. Rather than carry a few "spares" for the voyage, what if tools and equipment could be made right there in space?

Image right: The 3-D Printer, center, will fabricate components and equipment on demand for manned missions to the space station and other destinations in the solar system as a part of the 3-D Printing in Zero-G Experiment conducted by NASA's Marshall Space Flight Center and its partner Made in Space Inc. of Moffett Field, Calif. (NASA)

It may seem like an unbelievable feat, but NASA's Marshall Space Flight Center and its partner Made in Space Inc. of Moffett Field, Calif., are currently developing just that -- the first "machine shop" to perform 3-D printing in space.

The 3-D Printing in Zero-G Experiment, or 3-D Print, has been under way since October 2012. It will fabricate components and equipment on demand for manned missions to the space station and other destinations in the solar system.

"The greater the distance from Earth and the longer the mission duration, the more difficult it is to resupply materials," said Niki Werkheiser, 3-D Print project manager in Marshall's Technology Development & Transfer Office. "The space station is an ideal platform to begin changing the current model for resupply and repair to one that is more suitable for all exploration missions."

The 3-D experiment will use extrusion-based additive manufacturing, which builds parts, objects and tools layer by layer out of plastic deposited by a wire feed through an extruder head. The plastic is melted in the extruder head and deposited through a tiny hole. Parts can be printed from data files loaded on a computer at launch, as well as additional files uplinked to the computer while in orbit.

The experiment hardware will be built by Made in Space Inc. "Our team is extremely excited to be working with NASA Marshall to perform 3-D printing in space -- something that's never been done before," said Jason Dunn, chief technology officer at Made in Space. "We feel that manufacturing in orbit, rather than on Earth, is a necessary next step toward achieving NASA's vision of sending humans to Mars and beyond."

The Marshall Center's role is to guide the design process and conduct all of the reviews for the experiment, including project design and critical design, and the environmental and qualification testing to ensure the hardware is flight certified. Testing will be done at various Marshall facilities.

"The technology to produce parts on demand in space offers unique design options that aren't possible through traditional manufacturing methods, while offering cost-effective, high-precision manufacturing," said Werkheiser. "Additive manufacturing limits the need to stockpile parts, and may alleviate a lot of structural and geometrical constraints caused by launch loads and vehicle stowage requirements.

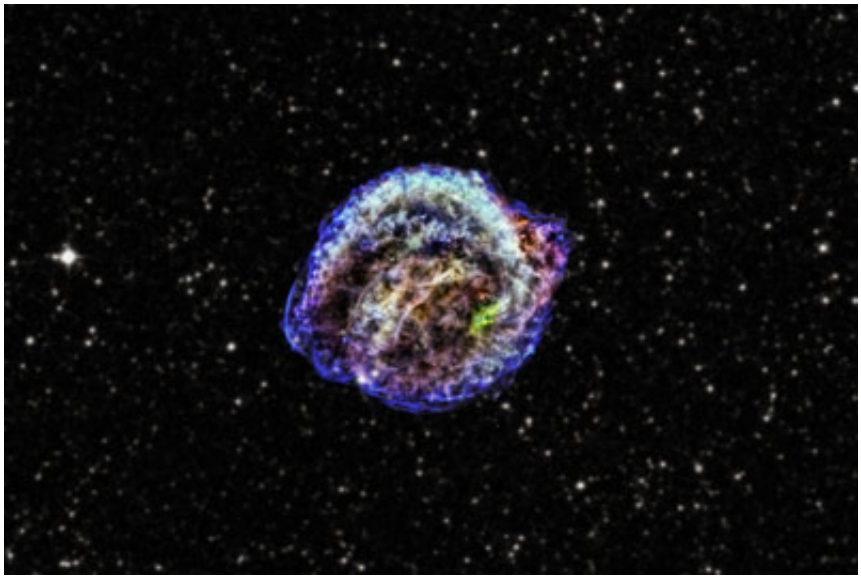
"We also look forward to using this technology as an educational tool -- offering students the opportunity to design and build parts for missions," she added. The 3-D Print hardware is scheduled to be certified and ready to fly in June 2014. A technology demonstration mission for the 3-D Printing payload is planned for October 2014 aboard a Space Exploration

Technologies (SpaceX) vehicle.

Davidson, an Analytical Services Inc. employee, supports the Office of Strategic Analysis & Communications.

› Back to Top

Kepler Supernova Remnant



A new study has used the Chandra X-ray Observatory to identify what triggered the famous explosion that was discovered by Johannes Kepler in 1604 creating Kepler's supernova. It had already been shown that the type of explosion was a so-called Type Ia supernova, the thermonuclear explosion of a white dwarf star. These supernovas are important cosmic distance markers for tracking the accelerated expansion of the universe.

Image left: This is the remnant of Kepler's supernova, the famous explosion that was discovered by Johannes Kepler in 1604. The red, green and blue colors show low, intermediate and high-energy X-rays observed with NASA's Chandra X-ray Observatory, and the star field is from the Digitized Sky Survey. (NASA/CXC/NCSU/M.Burkey et al; Infrared: NASA/JPL-Caltech)

However, there is an ongoing controversy about Type Ia supernovas. Are they caused by a white dwarf pulling so much material from a companion star that it becomes unstable and explodes? Or do they result from the merger of two white dwarfs?

The new Chandra analysis shows that the Kepler supernova was triggered by an interaction between a white dwarf and a red giant star. The crucial evidence from Chandra was a disk-shaped structure near the center of the remnant. The researchers interpret this X-ray emission to be caused by the collision between supernova debris and disk-shaped material that the giant star expelled before the explosion. Another possibility was that the structure is just debris from the explosion.

The disk structure seen by Chandra in X-rays is very similar in both shape and location to one observed in the infrared by the Spitzer Space Telescope. This composite image shows Spitzer data in pink and Chandra data from iron emission in blue.

This composite figure also shows a remarkably large and puzzling concentration of iron on one side of the center of the remnant but not the other. Authors of a new Chandra study speculate that the cause of this asymmetry might be the "shadow" in iron that was cast by the companion star, which blocked the ejection of material. Previously, theoretical work has suggested this shadowing is possible for Type Ia supernova remnants.

The authors also produced a video showing a simulation of the supernova explosion as it interacts with material expelled by the giant star companion. It was assumed that the bulk of this material was expelled in a disk-like structure, with a gas density that is 10 times higher at the equator, running from left to right, than at the poles. This simulation was performed in two dimensions and then projected into three dimensions to give an image that can be compared with observations. The good agreement with observations supports their interpretation of the data.

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

These results were published online and in the Feb. 10 issue of The Astrophysical Journal.

› Back to Top

Partnerships Build Bridges Between NASA and Industry
By Shannon Ridinger

Sometimes dreams do come true, no matter how big they seem.

Such is the case with Leigh Anne McMahon, special assistant to the director of Space Systems at NASA's Marshall Space Flight Center. McMahon graduated from Tennessee Tech University in Cookeville, Tenn., in 1988 with a degree in electrical engineering and started to work for Marshall shortly thereafter. Through a career that has spanned almost 25 years, McMahon's experiences within various organizations have helped her build the relationships that have become critical in her latest role as liaison between the Engineering Directorate and the Flight Programs and Partnerships Office.

McMahon's assignments across the center have allowed her the opportunity to work on many projects. Among those was an opportunity to be on the team that designed the master controller for the Materials Science Research Rack, or MSRR, that performs research on material samples in space aboard the International Space Station. She counts her work on the MSRR as one of the highlights of her NASA career.

"From the time I was six years old, I wanted to work for NASA," said McMahon. "I watched the launch of a Skylab crew at school, and then my parents told me my uncle worked for Johnson Space Center. Those two things pretty much sealed the deal for me. When I was watching the launch of the shuttle that took the MSRR to space, I just kept thinking the whole time, I've actually touched something that is going to the International Space Station! It really was such an exciting and rewarding experience."

Because of her work on projects like the MSRR, and her desire to build strong relationships, her assignment as liaison between the Engineering Directorate and the Flight Programs and Partnerships Office made perfect sense.

"I've been a part of the Engineering Directorate Partnerships Working Group for a little over a year," said McMahon. "The group is made up of representatives from all of the engineering departments and labs across the center. Our job is to act as the front door into our organizations so when the partnerships group has a request or question about a specific capability at the center, its team members have a knowledgeable person who knows the ins and outs and who can get them the information."

McMahon recently completed NASA's Mid-level Leadership Program, the agency's leadership development program for individuals with a high potential for assuming greater leadership responsibilities. As part of the program, she was given the opportunity to complete a rotational assignment to help develop her leadership and managerial skills. Starting in July 2012, she worked on Redstone Arsenal for the Army's Armed Scout Helicopter Project Management Office, or ASH PMO, under the Program Executive Office - Aviation. In addition to participating in the activities of the program office, she was able to continue looking for avenues of collaboration.

"Successful partnerships come down to relationships, and being with each other face to face," said McMahon. "This assignment has turned out to be highly beneficial as I have been able to continue the relationships I made while working in the ASH PMO. My goal is to continue to build our partnership so that we can work with each other in the future on mutually beneficial projects."

Since completing her rotational assignment in December, McMahon has continued her role in the Engineering Directorate Partnerships group. She continues to look for ways Marshall engineering capabilities can benefit industry, academia and other government organizations, including Army organizations like ASH PMO. Because of her time spent cultivating those relationships during her detail, she feels like she has an even deeper understanding of how to make those partnerships happen.

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

› Back to Top

Executive Chats to Kick Off in April

Dan Schumacher, Science & Technology director at NASA's Marshall Space Flight Center, will conduct the first ExplorNet Executive Chat with the Marshall workforce beginning the week of April 1.

The Office of the Chief Information Officer, or OCIO, has teamed up with the Office of Strategic Analysis & Communications to enable the discussion to take place on ExplorNet, Marshall Center's collaborative intranet. OCIO has established a group on ExplorNet for this purpose at https://explornet.msfc.nasa.gov/groups/executive-chat.

All members of the Marshall Team are invited to join the group and view comments provided by Schumacher about himself, his Science & Technology team, and other topics and to submit questions to him in that group beginning April 8 and continuing throughout that week.

Schumacher's answers to all of the questions will be available on the ExplorNet site on April 15. The goal of this Executive Chat is to help keep the Marshall workforce informed about what is happening across the center and to foster the exchange of information and ideas via ExplorNet, which is a powerful collaboration tool for the center. All Marshall team members are encouraged to share their ideas, opinions and/or questions in this Executive Chat.

Find this article at:

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