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MARSHALL STAR

In This Week's Star ⊟

Marshall Engineer on the ‘Ride of a Lifetime' with SLS

By Bill Hubscher

Welding engineers at NASA's Marshall Space Flight Center have had an extremely busy winter, assembling two flight articles for Exploration Flight Test-1, or EFT-1, the test flight of the Orion spacecraft scheduled for 2014.

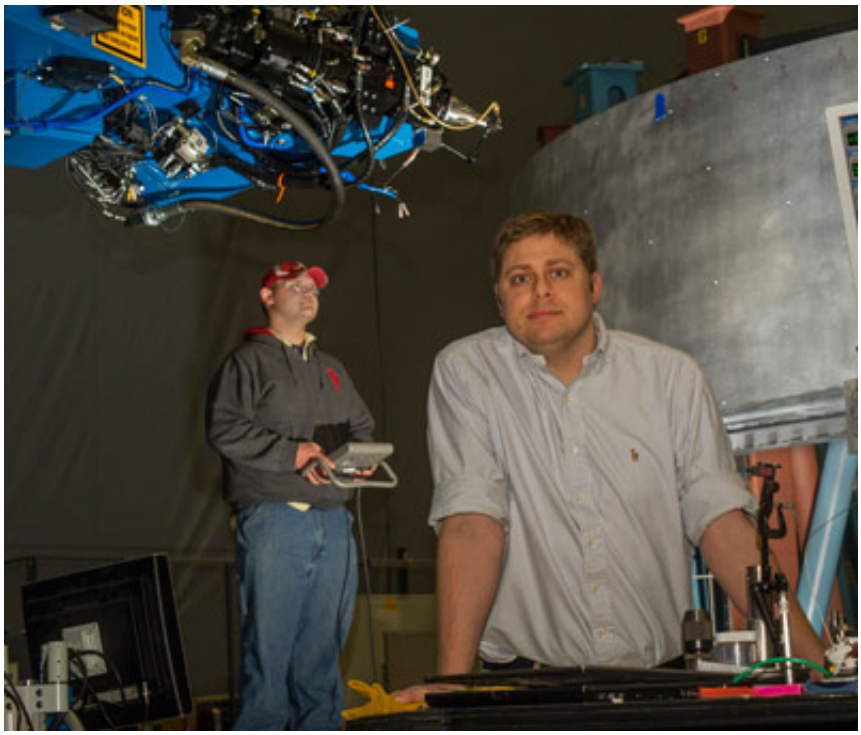


Image right: NASA mechanical engineer Justin Littell, right, inspects an adapter for the Orion spacecraft with welding technician Logan Thompson. The adapter is under construction at the Marshall Space Flight Center for the capsule's first test flight in 2014. The same design will be used for the flight test of the full-size Space Launch System in 2017. (NASA/MSFC/Emmett Given)

The team is constructing adapters that will connect Orion to a Delta IV launch vehicle for its initial test flight and later to the agency's Space Launch System, or SLS, a new rocket managed and in development at the Marshall Center that will enable missions farther into space than ever before.

For one of those Marshall Center engineers, the journey started years ago with humble beginnings in Dayton, Tenn. -- a small community between Chattanooga and Knoxville in the foothills of the Appalachian Mountains.

"I went to elementary school in a small country schoolhouse with 14 other kids," said Justin Littell, a mechanical engineer working on SLS at the Marshall Center. "I never allowed myself to dream of having a career in aerospace, but NASA's missions have always been inspiring to me. I was working for my dad's construction company right after graduating from college, literally knee-deep in cement, when I got the call to come work for NASA.

"I have always enjoyed playing with LEGOs, and now I get to do it on a much grander scale," Littell said. "Every day is exciting, faced with challenging and thought-provoking projects. I'm building parts of a rocket that will launch into space one day using these machines you find in maybe a handful of places around the world."

The machines to which Littell refers were helping build two separate flight articles for EFT-1. The vertical welding machine stitched metal panels together to form a conical cylinder, and a circumferential welding machine attached a thicker, structural support ring at the top and the bottom.

"While these adapter articles are identical and are considered flight articles, only one will actually be used for EFT-1," said Brent Gaddes, Spacecraft & Payload Integration Subsystem manager for SLS. "The other will undergo strenuous structural testing to ensure quality, while its twin will make the trip to NASA's Kennedy Space Center for integration into the rest of the test vehicle for launch."

United Launch Alliance, or ULA, which makes the Delta IV rocket in nearby Decatur, Ala., will deliver a full-size section of the rocket later this spring for engineers to test the fit of the adapter made at the Marshall Center.

Littell and the team of expert welders attack this new work with fervor.

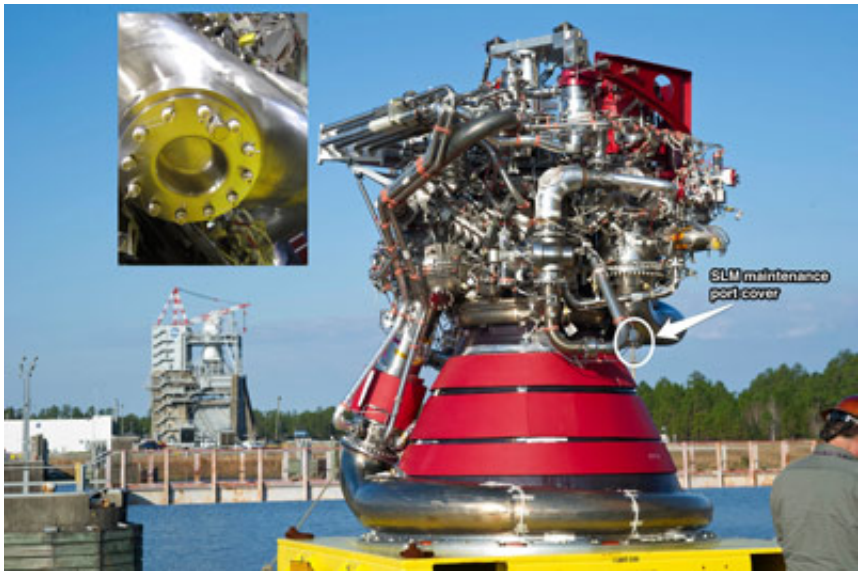
"Even if I never get to leave the ground on this rocket," said LIttell, "it has been the ride of a lifetime. I feel honored and blessed to be a part of it."

To see the friction stir welds in action, visit the NASA video gallery here.

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

› Back to Top

The Future of Exploration Starts with 3-D Printing
By Bill Hubscher



The latest in cutting-edge manufacturing is already making a significant impact in the future of space exploration.

Image left: The J-2X engine before installation at the Stennis Space Center. The engine's new turbo pump exhaust port cover (detailed inset) was recently built by Pratt & Whitney Rocketdyne of Canoga Park, Calif., using a pioneering manufacturing process called Selective Laser Melting. (NASA/SSC)

Pratt & Whitney Rocketdyne of Canoga Park, Calif., the prime contractor for the J-2X engine, recently used an advanced 3-D printing process called Selective Laser Melting, or SLM, to create an exhaust port cover for the engine. SLM uses lasers to fuse metal dust into a specific pattern to build the cover, which is essentially a maintenance hatch for the engine's turbo pumps.

On March 7, this part was exposed to the intense temperature and exhaust of a rocket engine firing during a test at NASA's Stennis Space Center, and will be a part of the rest of this test series. The J-2X is undergoing rigorous testing in support of the agency's Space Launch System Program, or SLS, managed at NASA's Marshall Space Flight Center.

"The successful test of this part built with new technology helps prove the concept of selective laser melting," said Todd May, SLS Program manager. "As we pursue America's next heavy-lift rocket, our engineers are proactively looking for methods like SLM that will make the rocket more affordable. For example, the new part cost 35 percent of what it would cost to make the same part using conventional methods."

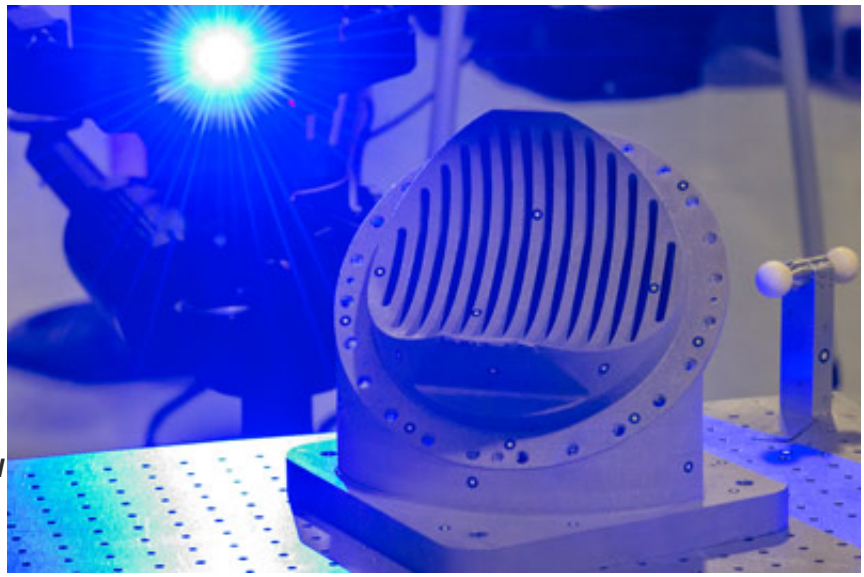


Image right: A pogo z-baffle for an RS-25 engine, built using state-of-the-art Selective Laser Melting, is inspected with a structured light scan. The part was created at NASA's Marshall Space Flight Center, which also manages the agency's Space Launch System, or SLS, which will use RS-25s to reach beyond low Earth orbit. (NASA/MSFC)

Test conductors opened this cover after the test to check the torque on the turbo pump and visually inspected the cover, which performed exactly as expected.

"This is the first time a SLM part has been hot-fire tested during a full-scale engine test," said Mike Kynard, manager of the SLS Liquid Engines Office. "Though it is a relatively simple part of a complex liquid engine, the cover allows us to develop design standards, inspection techniques, and materials characteristics, leading us to the ultimate goal of using a SLM manufactured part on a human-rated liquid rocket engine: the RS-25 on SLS's first flight in 2017."

The Marshall Center also recently proved how this technology would save on the SLS budget by shaving months off the construction of certain engine parts. One such part is the pogo z-baffle of the RS-25 engine. Four RS-25s will help drive the core stage of the SLS into orbit and the baffles help reduce the potentially violent vibrations the engine experiences during flight.

Image left: Andy Hardin, SLS subsystem manager for liquid engines, compares the process of creating a rocket engine part using traditional manufacturing and welding, at right, and making one using Selective Laser Melting, or SLM, at left. The new z-baffle for the RS-25 engine was created by fusing metal dust with a high-power laser using the machine in the background. (NASA/MSFC)

"Traditionally, the forming, machining and welding of this baffle would take nine to 10 months," said Andy Hardin, SLS subsystem manager for liquid engines. "After creating the part using computer-aided design, we built this baffle with SLM in nine days, obviously significant time and cost savings. The lack of a traditional weld also makes this part more structurally sound."

Selective Laser Melting is one of several cutting-edge technologies and concepts being studied by the SLS Advanced Development Office, which is researching ways to evolve SLS into the world's most powerful launch vehicle safely, affordably and sustainably. For more on the SLM technique, visit here.

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› Back to Top

First Light for ISERV Pathfinder, Space Station's Newest 'Eye' on Earth

From the Earth-facing window of the International Space Station's (ISS) Destiny module, nearly 95 percent of the planet's populated area is visible during the station's orbit. This unique vantage point provides the opportunity to take photos of Earth from space. With the installation and activation of the ISS SERVIR Environmental Research and Visualization System (ISERV), NASA will be able to provide even higher resolution images of Earth.

Image right: This "first light" image from ISERV shows the mouth of the Rio San Pablo in Veraguas, Panama, as it empties into the Gulf of Montijo. This wetland supports an important local fishery and provides habitat for many mammals and reptiles, as well as several species of nesting and wintering water birds. The image was captured Feb. 16. (SERVIR)

The ISERV camera system's mission is to gain experience and expertise in automated data acquisition from the space station. ISERV is expected to provide useful images for disaster monitoring and assessment and environmental decision making. A system like ISERV could aid in delivering imagery and data to help officials in developing nations monitor impacts of disasters such as floods, landslides and forest fires. Its images also could help decision makers address other environmental issues.

The instrument recently transmitted its first images to scientists on Earth from its location in the Window Observational Research Facility (WORF). ISERV is a commercial camera, telescope and pointing system operated remotely from Earth by researchers at NASA's Marshall Space Flight Center.

This "first light" image, captured Feb. 16, shows the mouth of the Rio San Pablo in Veraguas, Panama, as it empties into the Gulf of Montijo. This wetland supports an important local fishery and provides habitat for many mammals and reptiles, as well as several species of nesting and wintering water birds.

Acting on commands from the ground, ISERV can photograph specific areas of the Earth's surface as the space station passes over them. The goal for ISERV is to help scientists gain operational experience and expertise and to influence the design of a more capable system for future space station expeditions.

"ISERV's full potential is yet to be seen, but we hope ISERV or a successor will really make a difference in people's lives," said ISERV Principal Investigator Burgess Howell, a scientist at the Marshall Center. "For example, if an earthen dam gives way in Bhutan, we want to be able to show officials, via our images, where the bridge or a road is washed out, or where a power substation has been inundated. This kind of information is critical to focus and speed rescue efforts."

Image left: Canadian Space Agency astronaut and Expedition 34 Flight Engineer Chris Hadfield sets up the ISS SERVIR Environmental Research and Visualization System (ISERV) in the Destiny laboratory of the International Space Station. (NASA)

"ISERV could become a tool to enhance and expand NASA's hazard and disasters work across the whole disaster management cycle," added Frank Lindsay, manager of the NASA Applied Sciences Disasters Program at NASA Headquarters. "The bottom line is that this camera opens up some opportunities we did not have before and clearly is a pathfinder for more assets on the space station for our applications."

ISERV's software maintains knowledge of the space station's exact location and attitude in orbit at any given moment. With this information, it calculates the next chance to view a particular area. If there's a good viewing opportunity, the SERVIR team will send instructions to the camera. ISERV will take a series of high-resolution photographs of the area at rates of three to seven frames per second, totaling as many as 100 images per pass.

"The camera's nominal resolution is about 10 feet," Howell explained. "That's about the size of a small car -- and potentially valuable for disaster assessments."

After proving itself, ISERV could be made available to the broader disaster-response community and the NASA science community.

› Back to Top

William 'Bill' Hicks Named Marshall Center's Chief Financial Officer

William "Bill" Hicks was appointed to the Senior Executive Service position of Chief Financial Officer, or CFO, of NASA's Marshall Space Flight Center on March 19.


William Hicks (NASA/MSFC)

As Marshall's CFO, Hicks is responsible for providing executive leadership and management of the planning, analysis, accounting and control of center resources for one of NASA's largest field centers. This includes assuring reliability and accuracy of financial management activities and records, oversight of budgeting for all project and organizational plans, distribution of financial resources, evaluation and implementation of Marshall financial policies and procedures, assurance of management controls, and center financial accounting and reporting.

Hicks brings a wealth of diverse experience to the role of CFO, having dedicated over 32 years to financial and resources management at Marshall. His experience and contributions span all of Marshall's product lines and multiple integration functions.

Hicks has served as acting CFO since July 2012 and deputy CFO since August 2011. Earlier in his career, he served as chief of the Research & Development Programs Office in Marshall's Comptroller Office (1995 to 1996), directing the integration and consolidation of all Marshall program and project plans, budgets and resources. He has also served as the comptroller's chief of the Requirements Analysis Division (1988-1994), where he established a new technical resources independent assessment capability and developed personnel and processes in the focus areas of performance measurement, metrics and formal independent reviews.

Prior to re-joining the Office of the CFO, he was Program Planning and Control, or PP&C, manager for Marshall's Shuttle Propulsion Office from 2008 to 2011. He coordinated, integrated and supervised personnel in programmatic planning, budgeting, performance assessment and review, and administrative and management operations functions during final shuttle flight operations and planning for transition and retirement.

From 2006 to 2008, Hicks was a contributing founding member of the Office of Strategic Analysis & Communications, where he served as manager of the Performance and Capabilities Management Office. In this position, he oversaw assessment and planning of resources, earned value management policy and process, management systems development, and PP&C capability improvement. He also created and established new program analysis and evaluation functions directly supporting the center director and senior leadership.

He has held senior management roles in Marshall's Science and Payloads portfolio, including chief operating officer of the National Space Science and Technology Center, or NSSTC, from 2004 to 2006 and deputy manager of Marshall's Science Directorate Business Management Office from 2000 to 2004. He served in program management roles in Marshall's Microgravity Research Program during 1996 to 2000 where he was team leader of the Research and Technology Office and the Microgravity Research PP&C manager. From 1994 to 1995, he was PP&C manager for Spacelab and Space Station Payloads and Mission Support functions.

Hicks began his NASA career in 1980 as a cost estimator for Marshall Program Development's Engineering Cost Group – notably serving as the center's lead estimator for the International Space Station Program. From 1986 to 1987, he was a deputy manager contractor for a strategic defense initiative cost-estimating contract with Applied Research Inc.

Hicks earned a bachelor's degree in industrial engineering in 1980 from Tennessee Technological University in Cookeville. Throughout his career, he has received a number of awards recognizing his outstanding performance, including NASA's Exceptional Service Medal for accomplishments in program control initiatives for microgravity research and space product development programs and an Exceptional Achievement Medal for outstanding performance on the independent

assessment team for the Space Station Freedom Program.

Hicks is a native of Chattanooga, Tenn. He and his wife, the former Janice Nelson of Decatur, Ala., have two daughters and reside in Madison, Ala.

› Back to Top

Marshall Center to Commemorate Women's History Month on March 28
By Megan Davidson

NASA's Marshall Space Flight Center will celebrate Women's History Month with a special program and panel discussion from 8:30-11 a.m. March 28 in Building 4200, Morris Auditorium.

Image left: Michelle D. Bernard

The panel discussion, with the theme "Women Inspiring Innovation through Imagination: Celebrating Women in Science, Technology, Engineering and Mathematics," will be led by Marshall Deputy Director Teresa Vanhooser. Panelists include Lisa Watson-Morgan, chief engineer in Marshall's Flight Programs & Projects Office; Lakiesha Hawkins and Erika Alvarez, both engineers in Marshall's Propulsion Systems Department; and Caroline Wang, an engineer in Marshall's Avionics and Software Branch, part of the Safety and Mission Assurance Directorate. Wang, who also is an artist, has donated four of her watercolor prints to be given away as door prizes at the program. Team members must be present to win.

Following the panel chat, keynote speaker Michelle D. Bernard will discuss "The Power of Women." She is the chairman, founder, president and chief executive officer of the Bernard Center for Women, Politics & Public Policy in Potomac, Md. She also is an author and frequent political and legal analyst on MSNBC and other television networks.

More information about the program -- including pictures of the watercolor prints -- can be found on ExplorNet.

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

› Back to Top

Executive Chats to Kick Off in April
By Janet Anderson

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.

Image right: Marshall Center Science & Technology Director Dan Schumacher will conduct the first ExplorNet Executive Chat with Marshall team members beginning the week of April 1. (NASA/MSFC)

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.

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

› Back to Top

Reid Gower: 'Defining the Frontier: Sciences in Social Media'
By Jena Rowe

On April 2, Reid Gower, a 27-year-old Canadian filmmaker and space blogger, will speak on "Defining the Frontier: Sciences in Social Media" at a luncheon in Building 4316 at 11 a.m. The event is sponsored by the Marshall Association.

Image right: Reid Gower

Gower dropped out of college as a philosophy major to promote science and space exploration using social media. His most noted film project, "The Sagan Series," received over 2 million views on YouTube combining stunning cinematography and a mesmerizing soundtrack with Carl Sagan's narration from his hit television series "Cosmos: A Personal Voyage."

Gower's passion for educating the public on space exploration is immeasurable. In 2011, he spoke about "The Sagan Series" at TEDxVancouver with a speech entitled "The Frontier" and again at TEDxVictoria in 2012. Recently, he was featured in the Huffiington Post discussing a time-lapse film he created.

Lunch options from Newk's Express Café will be available for $10 for Marshall Association members and $12 for non-members. If you are interested in attending the event, please RSVP no later than March 29 at https://explornet.msfc.nasa.gov/docs/DOC-11210.

The Marshall Association seeks to provide an open, creative and stimulating forum for the exchange of ideas and information. Membership is open to all members of the Marshall community. To learn more about the Marshall Association events, activities and membership, visit ExplorNet here.

Rowe, an Analytical Services Inc. employee and the Marshall Star editor, supports the Office of Strategic Analysis & Communications.

› Back to Top

NASA Great Moonbuggy Race to be Featured on Stacey David's 'GearZ'

Stacey David -- host of the television show "GearZ" on the SPEED channel -- will explore the space program's gearhead roots during an episode filmed at the 2011 NASA Great Moonbuggy Race.

The premiere of the moonbuggy segment aired March 26, but will replay at 9 a.m. March 30 and 7:30 a.m. March 31 on SPEED.

The 20th annual NASA Great Moonbuggy Race will be held April 26-27. More information about the event is available here and will be featured in an upcoming issue of the Marshall Star.

Find this article at:

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