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MARSHALL STAR

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

NASA's Proud Space Shuttle Program Ends With Atlantis Landing

NASA News Release

Wrapping up 30 years of unmatched achievements and blazing a trail for the next era of U.S. human spaceflight, NASA's storied Space Shuttle Program came to a "wheels stop" July 21 at the conclusion of its 135th mission.

Image right: Shuttle Atlantis lands for the final time at Kennedy Space Center. (NASA/Bill Ingalls)

Shuttle Atlantis and its four-astronaut crew glided home for the final time, ending a 13-day journey of more than five million miles with a landing at 4:56 a.m. CDT at Kennedy Space Center, Fla. It was the 25th night landing and the 133rd landing in shuttle history.

"The brave astronauts of STS-135 are emblematic of the shuttle program -- skilled professionals from diverse backgrounds who propelled America to continued leadership in space with the shuttle's many successes," NASA Administrator Charles Bolden said. "This final shuttle flight marks the end of an era, but today, we recommit ourselves to continuing human spaceflight and taking the necessary -- and difficult -- steps to ensure America's leadership in human spaceflight for years to come."

Since STS-1 launched April 12, 1981, 355 individuals from 16 countries flew 852 times aboard the shuttle. The five shuttles

traveled more than 542 million miles and hosted more than 2,000 experiments in the fields of Earth, astronomy, biological and materials sciences.

The shuttles docked with two space stations, the Russian Mir and the International Space Station. Shuttles deployed 180 payloads, including satellites, returned 52 from space and retrieved, repaired and redeployed seven spacecraft.

The STS-135 crew consisted of Commander Chris Ferguson, Pilot Doug Hurley, and Mission Specialists Sandra Magnus and Rex Walheim. They delivered more than 9,400 pounds of spare parts, spare equipment and other supplies in the Raffaello multi-purpose logistics module -- including 2,677 pounds of food -- that will sustain space station operations for the next year. The 21-foot-long, 15-foot-diameter Raffaello brought back nearly 5,700 pounds of unneeded materials from the station.

STS-135 was the 135th and final shuttle flight, Atlantis' 33rd flight and the 37th shuttle mission dedicated to station assembly and maintenance.

Find more information about the STS-135 mission here.

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Marshall Center Director Reflects on Final Shuttle Mission
By Robert Lightfoot


Marshall Center Director Robert Lightfoot (NASA/MSFC)

Editor's Note: *Marshall Space Flight Center Director Robert Lightfoot shared the following message with the workforce in the wake of the July 21 landing of space shuttle Atlantis.*

Space Shuttle Atlantis flew home safely and landed at Kennedy Space Center today to close out an incredibly successful and accomplished era of human space flight that began more than 30 years ago.

I want to thank everyone on the Marshall team who helped make STS-135 and these final shuttle missions such a success. Your dedication and focus to finishing strong was simply amazing as we counted down the final months, weeks, and days of the Shuttle Program.

I was in the launch control room at Kennedy Space Center two weeks ago. The launch sparked different emotions in me but, overwhelmingly, feelings of pride as I watched booster separation, main engine cutoff, and external tank separation after a flawless final performance. I sensed that same pride in the Marshall members of the mission management team in the control room with me and in the people watching the launch in a jam-packed Morris Auditorium that I saw in a photo sent to me.

To the people of the Shuttle Propulsion Office, Engineering, Safety and Mission Assurance, and the many others who worked tirelessly to ensure we finished so successfully, no words can express my appreciation to you for your professionalism. You exemplify what it takes to be leaders in space exploration. I also want to salute and congratulate all those from the Marshall team across three decades who helped conceive, design, develop, test, and fly these marvelous machines.

We will remember the many proud accomplishments and the historic firsts. We will remember our colleagues here and across the nation and the teamwork it took to succeed. We will also remember the brave friends we lost in service to the nation.

Together, we created a lasting legacy of expertise, experience, and capabilities on which we will build the future of human

exploration. To all of you, past and present – without your dedication, determination, and sacrifice, this program wouldn't have happened. To you, it was never just a job. It was a passion and a way of life.

There's so much more to say, much more to celebrate. We will make time for that soon. But I will say now as I will say again when that time comes:

Indeed, we stand on the shoulders of giants from Apollo. But as I look back from the vantage point of STS-135, the last flight of the Space Transportation System, I realize that I walked every day among giants at Marshall. Generations for years to come will stand on your shoulders as they reach for the next step in our mission to explore space.

Let the journey continue!

Robert Lightfoot is the director of the Marshall Center.

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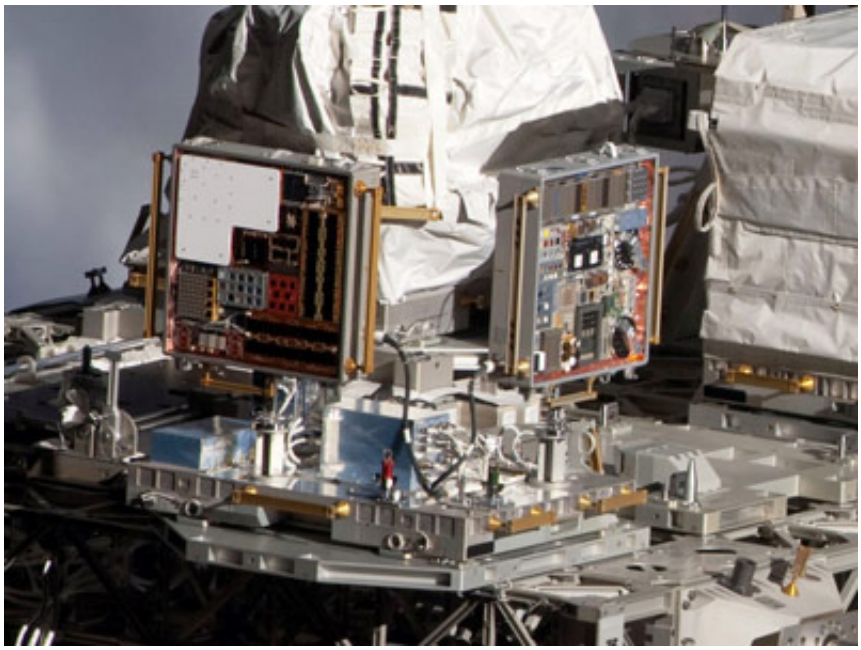
Materials Experiments Come Home to Marshall for Analysis
By Lori Meggs



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, the space station has been fully assembled and more than 4,000 materials samples have been exposed to space as part of the MISSE series of experiments.

Image right: MISSE-7 suitcases were attached to the outside of the International Space Station for 18 months. (NASA)

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 is now being disassembled at the Marshall Space Flight Center so researchers can see how 18 months in space has 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. The development of the next generation of materials and material technologies able to withstand the harsh environment of space is essential to missions beyond low-Earth orbit.

Image left: 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)

Marshall Center engineer Miria Finckenor, a MISSE investigator, has been conducting ground tests of thermal control coatings and thermal protection materials in Marshall's Atomic Oxygen Beam Facility in Building 4711. "Many of these materials have only been exposed to simulations of the space environment," said Finckenor. "Having real flight data not only gives confidence in the durability of these materials on-orbit, but also helps improve our models and ground testing."

Marshall's Parts, Packaging and Fabrication Branch of the Engineering Directorate's Space Systems Department also had a small lead-free experiment on MISSE-7B, which will provide data on the reliability of lead-free electronics technology in the extreme environments of space. The Lead-Free Technology in Space Environment, or LTESE, flight package is one small, active box weighing less than a pound and containing nearly 4,400 test solder joints whose performance will be compared to an identical unit operating in parallel on the ground.

Other investigators represent NASA's Glenn Research Center in Cleveland; Naval Research Laboratory in Washington; Air Force Research Laboratory at Wright-Patterson Air Force Base, Ohio; Boeing Research & Technology in Seattle; Aerospace Corporation in El Segundo, Calif.; Cornerstone Research Group in Dayton, Ohio; the University of Florida in Gainesville; and the Air Force Academy in Colorado Springs, Colo. These investigators had materials experiments attached to MISSE-7B and will further analyze them in their laboratories. Huntsville businesses AZ Technology and Nexolve Corporation also had samples aboard.

Chip Frohlich, manager of metallic materials at Boeing Research & Technology, is extremely proud of the performance of MISSE-7. "This MISSE mission, like previous ones, has allowed researchers from industry, government and academia to fly experiments in a low-Earth orbit environment," Frohlich said. "We look forward to the analysis phase for MISSE-7 so we can see the full detail of how the experiments performed, and how we can apply lessons learned to future space design."

Image right: Marshall Center Deputy Director Gene Goldman, second from right, listens as Marshall engineer Miria Finckenor, right, explains the work being done with the MISSE-7 hardware in Building 4711. (NASA/MSFC/Emmett Given)

The first six MISSE flight experiments, at a cost of $20 million, have benefited NASA more than $600 million in cost savings and cost avoidance, including two spacewalks. One of the spacewalks was avoided during a Hubble Space Telescope servicing mission, since data from MISSE showed that some of the multilayer insulation did not need to be replaced and was not a concern for the telescope. "By not having to make time for that spacewalk and all the training that would have required, astronauts were able to fix other things on Hubble," Finckenor added.

MISSE-8, filled with the next series of materials experiments, launched to space aboard STS-134 in May. It was attached to the outside of the space station where it will remain for more than a year.

Meggs, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.

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Chandra Observes Pulsar's Mysterious Tail
NASA News Release

A spinning neutron star is tied to a mysterious tail -- or so it seems. Astronomers using NASA's Chandra X-ray Observatory have found that this pulsar, known as PSR J0357+3205 or PSR J0357 for short, apparently has a long, X-ray-bright tail streaming away from it.

Image left: Pulsar PSR J0357+3205 and its mysterious tail. (X-ray image: NASA/CXC/IUSS/A.De Luca et al; Optical image: DSS)

This composite image shows Chandra data in blue, and Digitized Sky Survey data in yellow. The position of the pulsar at the upper right end of the tail is seen by mousing over the image. The two bright sources lying near the lower left end of the tail are both thought to be unrelated background objects located outside our galaxy.

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

PSR J0357 was originally discovered by the Fermi Gamma Ray Space Telescope in 2009. Astronomers calculate that the pulsar lies about 1,600 light years from Earth and is about half-a-million-years old, which makes it roughly middle-aged for this type of object.

If the tail is at the same distance as the pulsar, then it stretches for 4.2 light years in length. This would make it one of the longest X-ray tails ever associated with a so-called "rotation-powered" pulsar, a class of pulsar that gets its power from the energy lost as the rotation of the pulsar slows down. Other types of pulsars include those driven by strong magnetic fields and still others that are powered by material falling onto the neutron star.

The Chandra data indicate that the X-ray tail may be produced by emission from energetic particles in a pulsar wind, with the particles produced by the pulsar spiraling around magnetic field lines. Other X-ray tails around pulsars have been interpreted as bow-shocks generated by the supersonic motion of pulsars through space, with the wind trailing behind as its particles are swept back by the pulsar's interaction with the interstellar gas it encounters.

However, this bow-shock interpretation may or may not be correct for PSR J0357, with several issues that need to be explained. For example, the Fermi data show that PSR J0357 is losing a very small amount of energy as its spin slows down with time. This energy loss is important, because it is converted into radiation and powering a particle wind from the pulsar. This places limits on the amount of energy that particles in the wind can attain, and so might not account for the quantity of X-rays seen by Chandra in the tail.

Another challenge to this explanation is that other pulsars with bow-shocks show bright X-ray emission surrounding the pulsar, and this is not seen for PSR J0357. Also, the brightest portion of the tail is well away from the pulsar and this differs from what has been seen for other pulsars with bow-shocks.

For more information about Chandra, click here.

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Obituaries

Earl Hoard, 85, of Huntsville died June 27. He retired from the Marshall Center in 1986 as an aerospace technologist and technical manager. He is survived by his wife, Shirley Weber Hoard.

William Whitt, 90, of Toney died June 29. He retired from the Marshall Center in 1986 as an engineering technician. He is survived by his wife, Doris Whitt.

Charles King, 87, of Huntsville died July 8. He retired from the Marshall Center in 1983 as an aerospace technologist and technical manager. He is survived by his wife, Martha Newman King.

Randolph Rush, 84, of Huntsville died July 16. He retired from the Marshall Center in 1979 as a painter. He is survived by his wife, Marie Tipton Rush.

Wilson Corder, 92, of Mount Rozell died July 16. He retired from the Marshall Center in 1978 as an aerospace technologist and flight systems test engineer. He is survived by his wife, Arnette Corder.

David Rex Javins, 68, of New Market died July 20. He retired from the Marshall Center in 2009 as an aerospace engineering technician. He is survived by his wife, Sue Javins.

Find this article at:

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