



MARSHALL STAR

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Nov. 17, 2005

Marshall-managed science payload sets space station record

By Sherrie Super

After operating continuously for 992 days, a biological experiment managed by the Marshall Center set the record as the longest-running science payload ever on the International Space Station.

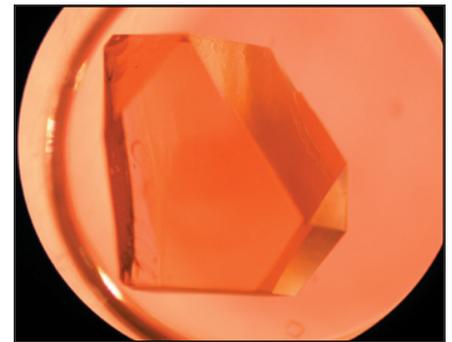
The record-setting payload — the Single-locker Thermal Enclosure System for the structural biology experiment — is an incubator and refrigerator module that can house different devices for growing

biological crystals in space.

The unit contained the Diffusion-controlled Crystallization Apparatus for Microgravity experiment, an investigation of structural biology. One of its objectives was to improve the understanding of how important macromolecules function.

"This technology has evolved over nearly two decades," said Clark Darty, a project manager for the Biotechnology Carriers Project at the Marshall Center. "Versions

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A xylose isomerase crystal grown on the space station.

NASA/New Century Pharmaceuticals/Allelyne Brown Engineering

STS-114 astronauts recount their historic Return to Flight mission during Marshall visit

By Sanda Martel

Discovery crew members visited the Marshall Center on Nov. 9 to thank employees for their work on the STS-114 mission. Commander Eileen Collins, pilot James Kelly and mission specialists Wendy Lawrence and Soichi Noguchi presented highlights of their 14-day, Return to Flight test mission, which flew from July 26 to Aug. 9. It included a number of historic firsts. The seven-member crew's mission included breathtaking in-orbit maneuvers, tests of new equipment and procedures for flight safety and a first-of-its-kind tile repair technique.



Doug Staffer/MSFC

Discovery commander Eileen Collins shows Marshall employees a pictorial memento commemorating the historic STS-114 Return to Flight mission. Fifth graders from Creekside Elementary School in Athens assisted the astronauts with a time capsule ceremony.

The STS-114 mission also delivered supplies to the International Space Station.

Following their presentation in Morris Auditorium, the astronauts answered questions from the audience and participated in a time capsule ceremony with a group of fifth grade students from Creekside Elementary School in Athens. The crew members signed a shuttle model to be placed in a time capsule and opened by future generations. They presented the pens used to sign the model to four of the students.

The writer, an ASRI employee, supports the Public and Employee Communications Office.

Rudolphi, Lightfoot named to key Marshall assignments

By Sanda Martel

Marshall Center Director David King has announced two key personnel assignments. Michael U. Rudolphi now leads Marshall's Engineering Directorate and Robert M. Lightfoot Jr. is replacing Rudolphi as manager of the Shuttle Propulsion Office. Lightfoot also assumes the duties of deputy program manager for propulsion in NASA's Space Shuttle Program.

Rudolphi, a native of Effingham, Ill., and a 17-year veteran of NASA, assumes leadership of the organization that establishes and directs Marshall's research and development capabilities, working to accomplish a broad spectrum of engineering functions associated with the design, development, testing,

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Former astronaut Coats is new Johnson Center director

Michael L. Coats has been named director of NASA's Johnson Space Center. Coats, a former astronaut, is currently vice president of Lockheed Martin Astronautics in Denver. He will become the ninth director in the center's 44-year history.

"Mike Coats brings a perfect blend of experience to his new role as the head of the nation's primary center for human space flight development and operations," said NASA Administrator Michael Griffin. "As a former pilot and astronaut, and a long-time aerospace industry executive, he knows what our next generation of manned spacecraft must be able to do, and he knows what it takes to produce them. I'm delighted to welcome Mike back home to NASA."

Coats joined NASA in 1978 as a member of the first astronaut class specifically selected to fly the space shuttle. He flew three shuttle missions, the first as pilot for the maiden flight of Discovery

in 1984. He commanded two subsequent shuttle missions, logging a total of more than 463 hours in space. Before joining NASA he was a distinguished U.S. Navy aviator. He logged more than 5,000 hours of flight time in 28 different types of aircraft. He retired from NASA and the Navy in August 1991.

"I look forward to returning to the Johnson Space Center, and I am honored by the trust Mike Griffin has shown in me," Coats said. "We will embrace the challenge of the new Constellation program that will take us first to the moon, and then on to Mars. At the same time, the contributions of the space shuttle and International Space Station will be critical steps in that journey and we remain committed to their success." Coats replaces Jefferson D. Howell Jr., who is on assignment as a visiting professor to the Lyndon B. Johnson School of Public Affairs at the University of Texas at Austin.

Record

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of this hardware have flown on the space shuttle, spacelab, the Russian space station Mir and on earlier missions on the International Space Station."

From the initial hand-held experiments used for protein crystal growth, the project has evolved to the Single-locker Thermal Enclosure System — a larger storage unit with refrigerator modules, temperature controls and the capability to store and record data about the experiments contained within. "With the addition of each feature, it's evolved to a more sophisticated piece of equipment," said Darty, adding that each modification helped optimize conditions to grow crystals in space.

The recent record-setting payload launched Nov. 23, 2002, on space shuttle Endeavour and returned to Earth on Aug. 9, on space shuttle Discovery. Scientists are in the early stages of analyzing the space-grown crystals and say initial results are encouraging.

"Normally, we grow crystals over a period of a few months," said the experiment's principal investigator, Dr. Dan Carter of New Century Pharmaceuticals Inc. in Huntsville. "This operated for an unusually long period of two-and-a-half years with the hardware performing perfectly. Now, we have the potential to recover science data that could someday aid in future drug design and development."

The experiment focused on the production of very large, highly ordered protein crystals for use in neutron diffraction analysis. Neutron analysis allows researchers to precisely locate hydrogen atoms within protein molecules — which can provide key insights into enzymatic activity or protein drug binding interactions.

However, this specialized method requires much larger crystals than those used in other types of analysis — a specification requiring longer-duration experiments. The solution? The International Space Station's long-term presence in space, supported



Diffusion Controlled Crystallization Apparatus for Microgravity trays mounted in the Single-locker Thermal Enclosure System.

by hardware such as the Single-locker Thermal Enclosure System.

"The counter-diffusion cells were an excellent choice for this type of research," Carter said. "An inherent passive feature of the device offered the promise of automatically preserving the crystals."

This is critical, Carter added, because protein crystals are very delicate, easily destroyed by very slight changes in their environment. "We are excited about the size and condition of some of the proteins crystals," he said.

"At New Century Pharmaceuticals, we're still in the early stages of analysis," Carter said. "Within the next few weeks, we should learn how much usable science we can recover. My hope is that we'll have crystals which survived this unusual experimental period and are of high quality, suitable for neutron diffraction. If the crystals are of superior size and quality — our principal objective — this could prove to be an important research tool in future structural biology application, including drug design and development."

The writer, an ASRI employee, supports the Public and Employee Communications Office.

Classified Ads

To submit a classified ad to the Marshall Star, go to Inside Marshall, to "Employee Resources," and click on "Employee Ads — Submit Ad." Ads are limited to 15 words, including contact numbers. No sales pitches. Deadline for the next issue is 4:30 p.m. Thursday.

Miscellaneous

Michelin LTX tires, set of 4, 215/75R15, \$50. 883-2795
 Black Futon with Mahogany trim. 289-3905
 New 308 long block engine, \$1,200. 230-9181
 2000 Starcraft Starflyer camper, used 5 times, sleeps 6, a/c, awning, \$4,200. 256-430-5485
 Schwinn Easy Tread motorless-design treadmill w/ computer and manual, \$75. 534-2368
 Broyhill traditional couch, \$100. 882-6982
 Girl's white ankle skates w/pink wheels, size 7, \$20; Royal blue beaded formal, size 4. 881-0457
 Canon ElanIIE 35mm camera, 28-80mm, 75-30mm USM zoom lenses, Sunpak PZ4000AF flash, \$300. 256-797-2668/Lamar
 Electric full-function Problem Solver, \$50; Two-track VCR w/meter recording, \$50. 256-883-9789
 Delta tool box for full-size pickup truck w/locks and keys, \$75; engine stand, strong, \$50. 534-8186
 Maxxis Buckshot tires, 32x11.50x15 mounted on factory chrome Jeep wheels, \$450. 256-777-4030
 Lab pups, male, yellow/blonde, 10 weeks old, AKC registered, \$200 each. 990-4550
 HP Laserjet 5, can deliver to Huntsville or Madison, \$100. 527-8116

Tracker convertible top, fits '99 and up, \$250. 256-355-0302
 La-Z-boy sofa and recliner, black leather, \$1,200. 539-5886
 Go-cart, two seater, \$450. 828-5602
 Mossberg 835 pump, 3-1/2", w/choke tubes, matching slug barrel and scope, \$475. 256-593-7207
 Bush corner computer desk, pullout keyboard shelf, file drawer, CPU storage, \$50. 216-1502
 Artificial Christmas tree, 7.5', used 1 year, \$75; van console w/DVD player & TV, \$150. 881-7000
 Elliptical machine, \$200. 684-2256
 Black Lab pup, 11-weeks, AKC registered, all shots, \$250; optional kennel & toys. 468-8939
 Iron Bowl tickets, seats located lower level, Sec. 28, \$250. 256-565-3672
 Light Oak entertainment center, holds 30" TV, four stereo shelves, CD/video storage, \$150. 852-5092
 Panasonic PT-51HX41E rear projection 51" TV, HDTV ready, \$575. 256-656-8054/Jim
 Approx. 50 CDs, 100 albums, rock, pop, country, \$275 for all. 890-0799
 1998 Alumacraft 14' flat-bottom boat, 42" wide w/trailer, \$500. 256-683-5793
 Ring, 1 carat, 14K gold, diamond solitaire w/baguettes, never worn, \$1,000. 852-2219
 GE electric stove, \$75; Steel cabinets, 5-drawer, \$45; computer desks, \$40. 772-1870

Vehicles

1998 Jeep Cherokee, 6-cyl., auto, 4x4, 145K miles, many options, \$3,075. 572-1867
 1999 Ford Explorer, 4x4, 81K miles, towing package, tinted windows, running boards, \$8,100. 353-3229
 2003 Nissan Sentra SER/V, black, 6-speed, 70K miles,

\$9,700. 426-5764
 1996 Dodge Ram 1500, ext. cab, \$4,500; 1991 Ranger 361 150xp flipping deck, \$6,000. 503-0964
 2005 Nissan Frontier, extended cab, low miles, under warranty, \$18,500. 837-1774
 2005 Honda ATV FourTrax Rancher, 4x4 ES, electric shift, red, less than 300 miles, \$4,500. 653-1401
 1978 TransAm, 6.6L, white, auto, ac/ps/pw, tilt, CD, garaged, titled, \$10,000. 772-7367
 1996 Dodge Ram 1500 Sport, red, loaded, new tires, \$5,400. 233-1487
 1989 Kawasaki KX125F Motocross bike, many new parts, \$1,250. 776-4741
 1999 Javelin bass boat with 1999 Evinrude 175HP motor, TM, DF, \$11,500. 837-4136
 Dodge Dakota truck, \$16,500. 828-4251
 2001 Mazda Tribute LX, black/silver, small SUV, 6-CD, cassette, new tires, 102K miles, \$9,995. 337-8424
 1992 Toyota pickup, 161K miles, 2WD, 4-cyl., new upholstery, new battery, \$2,900. 536-5136
 1999 Mercury Mountaineer, 2WD, many extras, 79K miles, \$7,000. 256-227-2538 after 5 p.m.

Wanted

Large doghouse or Dogloo for German Shepherd. 479-2651
 Built-in oven, white, 24" or smaller. 656-2951
 Digital piano, high quality w/weighted keys, preferred brand Technics. 414-403-7676
 Someone who can alter a model ship. 694-0880
 Old sliding glass doors, will pick up. 874-7874

Free

Gray dwarf rabbit, approx. 2 yrs. old. 931-438-1730

Marshall at Alabama A&M High School Senior Day



Alabama A&M High School Senior Day, sponsored by Alabama A&M University in Huntsville, brings high school seniors from across Alabama and the Southeast to Huntsville each November. The Marshall Center traditionally partners with Alabama A&M for the event, contributing time, resources and volunteers to support



the day's activities. In the left photo, Marshall Deputy Director Charles Chitwood greets high school students Andretta Rhone and Maveric Mangham. In the right photo, Chitwood tosses a coin at the opening of the Alabama A&M/Jackson State University football game. A&M won the game 52-6.

Emmett Given/MSEC

Assignments

Continued from page 1

operations and evaluation of Marshall-managed projects.

The Engineering Directorate provides integrated quality products and engineering services to NASA, other government agencies



Michael Rudolphi

and the commercial space development community. The directorate and Safety and Mission Assurance Directorate make up Marshall's Independent Technical Authority, an organization of technical experts under NASA's Office of the Chief Engineer in Washington. Their mission is to partner with project teams across NASA to ensure safe, reliable operations for every flight program.

Rudolphi was manager of the Shuttle Propulsion Office from December 2003 until assigned to his current position. He was responsible for the manufacture, assembly and operation of the primary shuttle propulsion elements: main engines, external tanks, solid rocket boosters and reusable solid rocket motors.

Rudolphi led a team that performed a top-to-bottom assessment of the external tank following the STS-107 mission. Continued testing and improvements since space shuttle Discovery's launch in July are addressing tank foam insulation loss and will help further clarify the tank foam issues.

Rudolphi was interim director of NASA's Stennis Space Center in Mississippi from July to December 2003. He managed the rocket propulsion test program and also was responsible for the Applied Sciences Directorate, part of NASA's Earth Science Enterprise. He was appointed Stennis Center deputy director in December 2002.

In January 2000, Rudolphi was named manager of the reusable solid rocket motor project at the Marshall Center, where he was responsible for the design, manufacture and flight performance of the shuttle's solid rocket motors, which provide the more than 5.2 million pounds of thrust during launch. He served as manager of the solid rocket booster project in the Marshall Resident Office at the Kennedy Space Center in Florida from March 1999 to January 2000,

and was chief engineer for the project beginning in May 1996.

Rudolphi began his NASA career at the Marshall Center in October 1988 as facility manager for the advanced solid rocket motor project in Iuka, Miss., with responsibility for design, construction and operation of an ultra-modern \$700 million rocket manufacturing facility.

Before joining NASA, Rudolphi was a field engineering manager for five years at the Tennessee Valley Authority in Knoxville, Tenn.; served one year as a project engineer for Daniel International in Fulton, Miss.; and worked 11 years as a design engineering supervisor for TVA in Knoxville.



Robert Lightfoot

Lightfoot, a Montevallo native, is a 16-year veteran of NASA. He previously was assistant associate administrator for the Space Shuttle Program, serving in the Office of Space Flight at NASA Headquarters from July 2003 until selected for his present position.

Reporting directly to the deputy associate administrator for the International Space Station and Space Shuttle Program, Lightfoot was responsible for providing sound technical recommendations regarding the readiness and execution of the Space Shuttle Program. Lightfoot's first NASA position was at the Marshall Center in 1989. He was a test conductor and program manager for the space shuttle main engine's technology test bed and the Russian RD-180 engine testing project, supporting the Lockheed Martin Atlas V expendable launch vehicle program. In 1998, Lightfoot was named deputy division chief for the propulsion test division. In 1999, he became chief of propulsion test operations at Stennis.

In 2001, after managing several critical test programs, Lightfoot was named deputy director of the Propulsion Test Directorate at Stennis and elevated to Senior Executive Service status. He was named director of the Propulsion Test Directorate in 2002.

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