



MARSHALL STAR

Serving the Marshall Space Flight Center Community

July 14, 2005



NASA/KSC

Discovery in the spotlight

As the Marshall Star went to press, Space Shuttle Discovery was poised for launch. Lights on Launch Pad 39B put Space Shuttle Discovery in the spotlight after the rollback of the Rotating Service Structure Tuesday night. The Shuttle sits on the 8.2-million-pound Mobile Launcher Platform, which is 25 feet high, 160 feet long and 135 feet wide. At the launch pad, with a fueled Shuttle on the 6-inch-thick decks, the platform weighs about 12.7 million pounds.

Record downloads for Deep Impact Track progress of STS-114 mission on NASA's portal

It's easy to track the progress of STS-114: Return to Flight. Just log onto the NASA Web portal.

Throughout Space Shuttle Discovery's mission, visit <http://www.nasa.gov.returntoflight> for the latest news and mission details.

During the 12-day mission, Discovery's seven-member crew will test new equipment and procedures to increase the safety of the Shuttle and deliver spare parts, water and supplies to the International Space Station.

Millions of Internet users are expected to track Discovery's mission — just as they followed NASA's Deep Impact mission during Independence Day weekend.

During a 24-hour period beginning at 8 p.m. July 3, visitors to the NASA Web portal downloaded almost 80 million Web pages — a one-day record for the portal — as they monitored the progress of the Deep Impact spacecraft, which sent a projectile crashing into the Tempel 1 comet. The deep-space smash on July 4 was designed to give scientists a peek at the early Solar System.

The previous record of downloads on the portal was 30 million on Jan. 5, 2004, following the landing of the rover Spirit on Mars.

"We're extremely pleased so many people got to observe the Deep Impact mission as closely as the

See Portal on page 2

Inside: Special Return to Flight Issue

NASA Explorer school teachers see Marshall close-up



Photo by Emmett L. Givens/Marshall Center

Scottie Barnes, left, a Marshall aerospace engineering technician in the Engineering Directorate test laboratory, explains to teachers the work performed at the technology test bed. About 200 educators, including this group at the test stand area, visited Marshall recently to learn more about NASA. The teachers and administrators represent the first group of NASA Explorer Schools selected in 2003. They attended a weeklong workshop to help them continue their ties with NASA and keep the Explorer School spirit alive beyond the three-year partnership. There are 17 Explorer Schools in the six-state education area of Alabama, Arkansas, Iowa, Louisiana, Missouri and Tennessee served by Marshall. Two are in Alabama and four in Tennessee. Each year the program establishes new partnerships between NASA and 50 school teams from diverse communities across the country.

Marshall team to showcase deployed 20-meter solar sail system

By Sheri Bechtel

Marshall's In-Space Propulsion Technology Project, in collaboration with NASA's Glenn Research Center in Cleveland, Ohio, will showcase a 20-meter solar sail system July 19 for NASA officials from across the Agency.

The NASA Centers are hosting a VIP Day at Glenn's Plum Brook Station in Sandusky, Ohio, to allow program managers and invited guests the opportunity to see a fully deployed sail system developed by L'Garde, Inc., of Tustin, Calif. Technology managers from the Marshall Center and L'Garde also will be on hand to provide a project update.

Among those expected to attend are Charles Chitwood, deputy director of the Marshall Center; Dr. John Horack, assistant director of the Space Transportation Programs and Projects Office; Rae Ann Meyer, deputy manager of the In-Space Propulsion Technology Office; and Edward Montgomery, technology area manager for Solar Sail Propulsion.

Solar sails use sunlight to propel a spacecraft through space. The continuous sunlight, reflecting off giant, reflective sails, provides sufficient thrust to perform such maneuvers as hovering at a fixed point in space and rotating the craft's position in orbit.

L'Garde began conducting a series of tests in June in the Space Power Facility — the world's largest space environment simulation chamber — at the Plum Brook facility. A second company, NASA contractor ATK Space Systems of Goleta, Calif., conducted tests of its own 20-meter sail system in April and May.

The 20-meter tests are a critical milestone in the development of the unique propulsion technology that could lead to more ambitious inner Solar System robotic exploration.

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

Portal

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science team did," said David Mould, NASA's Assistant Administrator for Public Affairs. "Communicating the excitement of science and technology is one of our core missions," he said, noting that during the July 4 weekend "the portal and Deep Impact teams achieved the same level of mission success on Earth as they did in space."

Internet users tuned in early to mission coverage and stayed throughout. During the 24-hour period beginning at 8 p.m. July 3, the portal transmitted 25 terabytes of information, more than five times the previous high. That's also nearly 30 times as much data as NASA's EOS-Terra spacecraft adds to its archive daily, and 1,250 to 2,500 times as much as astronomers daily get from the Hubble Space Telescope archive. The 25 terabytes, equivalent to 25 million megabytes, would fill a stack of CD-ROMs more than 170 feet high.

The NASA Web Portal is available online at: <http://www.nasa.gov>

Marshall Financial Travel Office relocated

The Marshall Center's Financial Travel Office has relocated to Room 604 in Building 4200.

To drop off travel receipts, pick up passports, or meet with travel staff, employees should follow signs from the former location of Room 610, to the new offices in the northwest corner of the sixth floor.

Classified Ads

To submit a classified ad to the Marshall Star, go to Inside Marshall, then go to "Employee Resources," and click on "Employee Ads — Submit Ad." Ads are limited to 15 words, including contact numbers. No sales pitch, i.e., "like new" or "excellent condition." Deadline for submissions for the next issue is 4:30 p.m. Thursday.

Miscellaneous

Pine 6-drawer desk w/hutch and twin bunk beds, \$400; Cambridge king mattress set \$250. 971-9710

Spinet piano, maple, \$700; Sofa & Loveseat, sage tweed, 5 yrs. old, \$250. 457-3355

Antique Dining Room Mahogany Table and 6 chairs, \$500. 922-1980.

533 mhz desktop computer, 17" monitor, printer, speakers, MS Office, \$120. 508-0691

Large parrot cage \$200, Large parrot perch on casters, \$50. iRiverH320 20g mp3 player, \$175. 417-2654

Holton Trombone with F-attachment (TR602F)/music stand/trombone stand/case, \$600. 721-1359

Trek Alpha Series 1000 Touring Bike, \$400. 256-227-7156

Ashley Cherry Queen Anne living room table set (1 cocktail 2 end tables) with inlay design \$200. 880-3737.

Diamond cluster heart-shaped ring, \$80. 683-1279

Baby stroller, blue Kolcraft Free-Stand 1-Hand Fold with tray, \$20; Umbrella stroller, \$5. 883-7657.

Frigidaire Refrigerator 21 cu ft, white, approx 4 years old, \$300. 883-1003

ABLounge2, with video, \$50. 828-5260

Gateway Computer and Printer, CRT Monitor; Windows XP PRO; Pentium II. 64MB, \$150. 864-0413.

Sunbeam gas grill, 2 full gas tanks, and 19 inch G.E. TV. All for \$70. 895-9520/Philip.

Medical back brace worth \$400. Yours for \$50 or best offer. 881-3581.

The Firm Complete Workout System, \$50. 837-3562

Left-Handed Golf Clubs XPC2000 2-W Irons, XP200 Yonex Driver and Bag, \$200. 881-5455

East German Makarov, 9x18, 2-8 round magazines, 2 grips, holster, 100 cartridges, instructions, \$190. 256-518-9900

Rattan wicker pedestal square rounded-corner glass top table w/4 chairs, blush, make offer. 772-7262

Yamaha YSL356R Trombone w/F-Attachment, \$500. 652-6587.

Living Room sofa, coffee table, lamp. 256-353-7200.

Treadmill - ACCU Smart Pro-Form Cross Walk, \$100. 880-2761

Refrigerator, Whirlpool 25 cu.ft. side by side, almond, ice and water in door. 859-6636

Taylor 210 acoustic guitar w/hardshell case \$675. Call 256-652-3809.

150 8-inch blocks w/4 bags mortar \$100. Two window A/C's \$25/ea. Room dehumidifier \$20. 256-859-7809.

Broyhill Sofa, removable cushions, scalloped back, \$200. 882-6982

36 volt golf battery charger \$150, Six golf cart batteries, \$35 each or best offer. 828-3896.

White Formal sofa 9 ft long, \$70. 430-6842.

Memory Stick PRO DUO 1-Gigabyte. High Speed. New In-Box; Sony PSP Ready, \$119. 655-1986

Pearl snare drum with case, sticks, pad, stand, key, lesson books, \$150. 882-6449

Riding mower, Craftsman, Tecumseh 7hp, runs, mows, needs work, \$100. 256-797-1012

Pennsylvania House video cabinet holds up to 30" TV, VCR/DVD, \$750. 931-427-2059

Trundle "day" bed, maple wood, 2 twin mattresses, 4 yrs old, \$90. 890-0755.

AKC registered yellow lab puppy, male, 12 weeks old, \$100. 651-7524.

Nordic Track, \$100. Nordic Flex Gold exercise equipment, \$200. Call 489-3867

Vehicles

1987 Plymouth Voyager SE Minivan. Roof rack. 111K miles, \$300. 256-230-8269

1987 Mercedes 300E sedan, 3.0L/auto, 220K, needs AC, PW work, \$2,250. 885-1640.

1996 Seadoo GTX, Green & White, Trailer, Cover, Low Hours, \$2,500 OBO. 256-325-3684.

1993 Toyota truck, 4/4 130,000 miles new timing chain & tires, \$5,000. 931-438-7229

2002 F-250 Superduty Crewcab: Lariat, 7.3 Diesel, 4x4, White, 136,500k miles, \$21,000. 256-497-3518

2003 Yamaha V-Star 650 Silverado cruiser, 3k miles, windshield, saddle bags, \$5,900. 350-2782

1999 Ford Explorer, red, Eddie Bauer, 4x4, 98k miles, \$9,200 obo. 776-9636.

1988 Mercury Cougar, 3.8L, 142K miles, original owner, black. \$1,200 OBO. 256-352-6996

1993 Chevy G20 high top, white, Sherrod van. Leather, TV/VCR, etc. \$7,600 OBO. 882.2076

1999 BMW 328iC Convertible, white, gray leather, 5-speed, premium/sport & H-K, 86k miles, \$17,995. 837-1035

1998 BMW 740iL, hunter green, tan leather, 106k miles, new tires, 682-0888

1995 CAD Deville Concours BLK, Tinted Windows, ALL PWR, Leather, Rims, \$4,400. Ron 520-2802.

Wanted

Wooden Bunk Beds. Full size on bottom with twin on top. 256-784-9339

Australian Cattle dogs. 682-0888

Free

Silver tabby cat, 4 yrs old, chubby, loving, best as only cat. 457-3355

Lost

White Apple iPod Shuffle Memory Stick in Bldg. 4200 complex or Bldg. 4207, July 1. 544-3311

Space & Rocket Center continues free admission for NASA civil servants

The U.S. Space & Rocket Center continues to offer free admission for NASA civil service employees, spouses, retirees and dependent family members under 21 living in the same household. Free admission includes the museum and all attractions except for IMAX movies, which are half-price. To receive free admission and the IMAX discount, civil service employees and retirees must show their NASA badge at the museum ticket counter. Marshall Center guests and contract employees can get discount U.S. Space & Rocket Center admission tickets at the Bldg. 4203 Space Shop. For more information, call Ola Metcalf at 544-7093.

Working with Marshall engineers**Students demonstrate mechanism for future space tether**

By Sheri Bechtel

A team of university graduate students and faculty from Tennessee, with the help of Marshall engineers, have "launched" a subscale spacecraft model and caught it in mid-air with a unique rendezvous or "catch" mechanism.

Their successful demonstration of this mechanism that could grab a payload or craft traveling in space marks a critical milestone in development of a tether-based propulsion system.

The professors and graduate students at Tennessee Technological University in Cookeville designed, built and recently tested the subscale tether catch mechanism in a university laboratory.

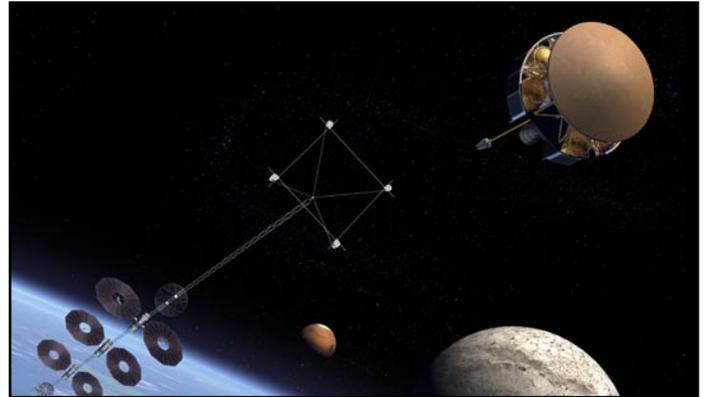
Tether technology, as potentially implemented in space, transfers energy and momentum — called momentum exchange — from the tip of a fast-moving, spinning tether to a slower-moving object, dramatically increasing the object's speed. As the tether — a cable approximately 60 to 90 miles in length — spins end-over-end in space, it catches a payload in low Earth orbit via a catch mechanism, carries it for a half-rotation, and throws the payload toward its final destination.

To restore the energy and momentum transferred to the payload, the tether then uses sunlight collected by onboard solar panels to drive electrical current

through electrically conductive portions of the tether.

The magnetic field generated by this current pushes against the Earth's magnetic field and slowly returns the tether to its original orbit. This technique, called electrodynamic reboost, restores the tether's momentum and energy, and prepares it for the next payload. Together, momentum exchange and electrodynamic reboost are keys to the Momentum Exchange/Electrodynamic Reboost or MXER tether, an emerging propulsion technology being studied by NASA.

The catch mechanism test project was directed by Dr. Stephen Canfield, a mechanical engineering professor at Tennessee Tech. Canfield has investigated tether technology as a faculty researcher at the Marshall Center each summer since 2001, working with the In-Space Propulsion Technology Project. In 2003, his team and Lockheed Martin Astronautics of Denver, Colo., were awarded research contracts to develop catch mechanism designs for tether-based propulsion systems. Engineers from Marshall's In-



A concept image of a MXER tether system in Earth orbit as it prepares to catch a payload traveling in space.

Courtesy: NASA/MSFC

Space Propulsion Technology Office participated in design and development of the technology.

Canfield's team conducted nearly 50 successful payload catch demonstrations of the lightweight mechanism — capable of handling payloads 10 times heavier than its own weight. The mechanism caught a free-flying, 25-pound simulated payload, launched from the laboratory floor. While in a free-fall condition — similar to the weightlessness of orbit — the payload was grabbed in mid-air by the catch mechanism, which hung from the ceiling.

The test sequence accurately simulated the timing and acceleration of a real space-based tether system — crucial capabilities for ensuring a successful catch in orbit. *The writer, an ASRI employee, supports the Public and Employee Communications Office.*

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