



# MARSHALL STAR

Serving the Marshall Space Flight Center Community

May 15, 2008

## Launch targeted for May 31

## STS-124 will deliver main segment of JAXA's laboratory

By Sanda Martel

Preparations continue at the Kennedy Space Center, Fla., for the launch of space shuttle Discovery. NASA is targeting May 31 as the launch date for the STS-124 mission that will deliver the Japanese Kibo Pressurized Module to the International Space Station. Liftoff time is approximately 4:02 p.m. CDT.

The official launch date for Discovery's 14-day mission will be determined during the standard Flight Readiness Review held approximately two weeks before launch. The Space Shuttle Program review was conducted by telecon May 13-14. The joint shuttle and space station executive review will be held May 19 at the Kennedy Center.

Discovery's external tank, ET-128, is the first tank completed since Return to Flight in July 2005 with redesigned features incorporated during

production. It also is the first tank to fly with redesigned liquid hydrogen ice frost ramps and liquid oxygen feedline support brackets. Read next week's Marshall Star for the complete story on ET-128 redesigns.

The Marshall Center, the world's leader for meeting America's

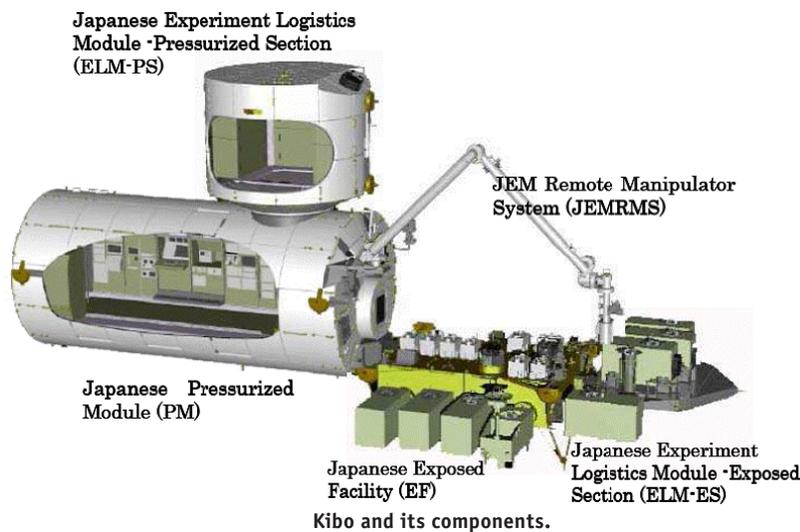
space propulsion challenges, is responsible for the space shuttle's propulsion system, consisting of the main engines, the solid rocket boosters with their reusable solid rocket motors and the external tanks. The three high-performing, reusable liquid propellant rocket engines, along with the solid rocket boosters, provide more than 7.8 million pounds of thrust to lift the space shuttle to orbit.

Discovery's mission is the

second of three flights that will launch components to complete the Japan Aerospace Exploration

Agency's Kibo laboratory. The shuttle crew will install the Japanese

**See STS-124 on page 5**



## Real world Indiana Jones William Saturno to appear in History Channel special

By Jennifer Morcone

Whip-cracking action and a charming title character have helped the Indiana Jones films become a fan favorite around the world. And when the much-anticipated fourth installment in the Indiana

Jones series airs in theaters later this month, Marshall's own charmer William Saturno will be among the real-world archeologists featured in a two-hour History Channel television special.

The History Channel special, "Indiana Jones and the Ultimate Quest," examines the ways these popular films portray archeology, religion, anthropology — and how the films have inspired some of today's archaeologists to continue the investigation of history's greatest mysteries. The program features leading archaeologists as they describe their own personal adventures in exotic locations around the globe, showcasing the latest tools they use to 'dig' for answers.

**See Saturno on page 2**

# James E. Turner appointed to deputy manager of Spacecraft and Vehicle Systems Department

James E. Turner has been appointed to the Senior Executive Service position of deputy manager in the Spacecraft and Vehicle Systems Department of Marshall's Engineering Directorate. In his new role, Turner will, in conjunction with the S&VS department manager, manage the integrated technical design, development, test, and evaluation of spacecraft and vehicle systems assigned to Marshall.

The Senior Executive Service is the personnel system covering top managerial positions in approximately 75 federal agencies.

Throughout his 25-year NASA career, Turner has made significant contributions to NASA's space exploration and manned space flight programs. He began his career at Marshall in 1981 as an engineering aide in the Reliability and Quality Assurance Office. In 1983, Turner became a full-time quality engineer assisting in the investigation of nozzle erosion on shuttle solid rocket motors. He also served as the onsite quality representative for the Hubble Space Telescope Project at Lockheed's Sunnyvale, Calif., facility.

Turner joined the Materials and Processes Laboratory in 1985 and has held increasingly challenging technical and managerial positions

including executive assistant to the Marshall Center director from 1991 to 1993; Space Shuttle Main Engine Project engineer from 1993 to 1996; chief engineer of the Advanced Reusable Transportation Technologies, ARTT, Project from 1996 to 1999; and ARTT project manager from 1999 to 2000. In June 2000, Turner was selected to serve as the deputy manager of the Subsystem and Component



James Turner

Department, and in 2005 was named as chief of operations for the Propulsion Systems Department, supervising approximately 400 civil servants and contractor employees and managing a budget in excess of \$30 million.

As lead engineer for the agency's Constellation Launch Abort System Smart Buyer Team, he led a team of 40 engineers from across the agency charged with the development of a clean sheet government design of a launch abort system for the Ares I crew launch vehicle.

Turner received a bachelor's degree in chemical engineering and a master's degree in materials engineering, both from Auburn University. He has received numerous awards, including NASA's Medal for Outstanding Leadership, Space Flight Awareness Award, and two Invention Awards. Turner is a graduate of NASA's SES Candidate Development Program and has completed high-level management courses at the University of Texas at Austin Institute for Managerial Leadership, the Brookings Institution in Washington, Harvard University in Cambridge, Mass., and the Government Affairs Institute at Georgetown University in Washington.

## Saturno

*Continued from page 1*

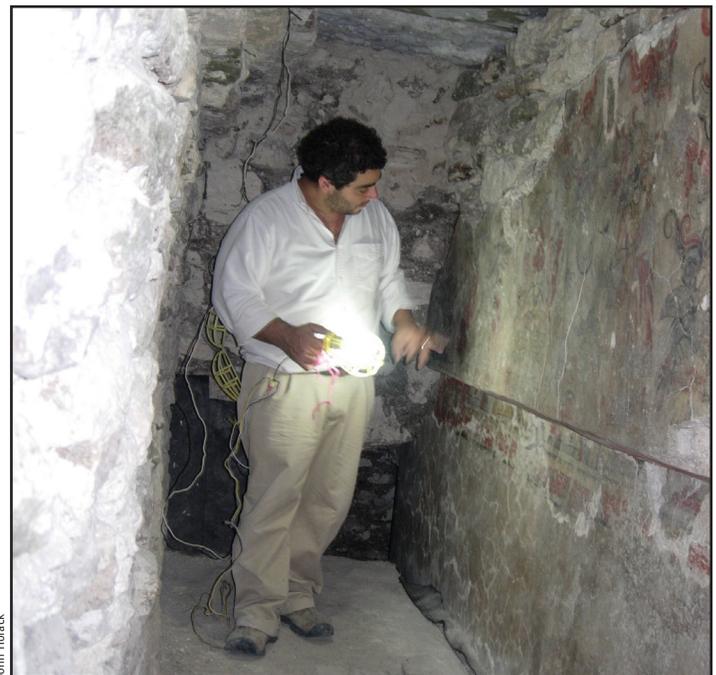
Saturno, one of only two NASA archeologists and an assistant professor of archeology at Boston University, specializes in Maya archeology and remote sensing. He is currently working in Guatemala directing a project to excavate and conserve the San Bartolo murals he first discovered in 2001.

A screenwriter could not come up with a more dramatic tale than what actually led Saturno and his team to the site of the San Bartolo murals, the oldest known wall painting of Maya mythology. Saturno admits, "It was pure chance we found this amazing site. We had trekked more than 20 hours through dense jungle, were out of food and water, and needed to find relief from the stifling heat. If the fate of the world had been hanging in the balance, it would have been right out of Indy."

Saturno, in an engaging interview, shares the dramatic story of the discovery of the San Bartolo murals in the Guatemalan jungle and how NASA remote sensing data is revolutionizing archeology as a discipline.

"Indiana Jones and the Ultimate Quest" airs on the History Channel on May 18.

*Morcone is a member of the Public & Employee Communications Office in the Office of Strategic Analysis & Communications.*



John Horack

William Saturno examines the San Bartolo murals he discovered in 2001. These murals are the earliest extensive Maya wall paintings ever found. They are widely considered one of the most significant finds in Maya archaeology in the last several decades.

# Celebrating NASA's 50 years of accomplishments

## Lunar Roving Vehicle was key to lunar surface exploration

*From combined reports*

As part of NASA's upcoming 50th anniversary on Oct. 1, 2008, and Marshall's upcoming 50th anniversary in 2010, the Marshall Star is featuring a series of articles on the center's significant contributions to the space program. This week's feature focuses on the Lunar Roving Vehicle.

"Okay, we're moving forward, Joe. Whew, hang on. We're coming around left, heading directly south right now to miss some craters off to our right." Thus began man's first ride on the lunar surface in 1971 using the Lunar Roving Vehicle developed by the Marshall Center. Apollo 15 astronaut Jim Irwin, in the passenger seat of the small, four-wheeled rover, was speaking to astronaut Joe Allen at NASA's Mission Control Center in Houston, as astronaut David Scott drove.

The Marshall Center was responsible for directing the development of the Saturn V launch vehicle that powered the first astronauts to the moon in 1969. Before the decade of the 1960s ended, however, the center was also extending its capabilities in another direction. The Lunar Roving Vehicle was designed to transport astronauts and materials on the moon. By 1969, Marshall was responsible for the design, development and testing of the new vehicle. Boeing was selected for the contract award and work began in 1970 on the open-space vehicle, which was about 10-feet long with large mesh wheels, antenna appendages, tool caddies and cameras.

Powered by two 36-volt batteries, the Lunar Roving Vehicle had four-horsepower drive motors, one for each wheel and was collapsible for compact storage until needed. Marshall built the navigation system and performed tests in 1970, first in fields surrounding the center and later in the lunar-like desert near Flagstaff, Ariz. Marshall navigators imitated a rover using a Jeep with masked windows, a television camera on the hood and the navigation system. The jeep driver found his way using a TV monitor, a map, navigation readouts and a radio. A station wagon followed the Jeep. The wagon's driver could see ahead but its passengers could not. Imitating mission control, the passengers used TV pictures and the navigation device and communicated advice to the Lunar Roving Vehicle driver in the Jeep. Another major technical obstacle that Marshall engineers managed to overcome involved designing the wire-mesh wheels that would operate on the moon.

The Apollo 15 mission began with the launch of a Saturn V rocket on July 26, 1971. During their 67-hour stay on the moon, the

astronauts used the Lunar Roving Vehicle to make three separate motor trips. The comments of the astronauts showed their delight over man's first wheeled ride on the moon's surface.

At the beginning of the first traverse, Scott said, "The rover handles quite well. We're moving at an average of about eight kilometers (five miles) an hour ... The steering is quite responsive ... It does quite well. There's no accumulation of dust in the wire wheels."

On the return trip to the Lunar Module, Scott remarked, "This is a super way to travel ... This is great ... and it's easy to drive. No problem at all. This rover is remarkable," Scott blurted as he and James Irwin rode the Lunar Roving Vehicle up a steep slope on the moon.

Scott said he and Irwin had just driven up the slope "without realizing it." Scott added, "This rover is really something!" The astronauts voiced the opinion that they could never have covered the distance and done the work they got done without the vehicle. Astronaut Joseph P. Allen, capcom for the mission, also called it a "terrific little vehicle" adding, "I really hate to leave it up there." Flight Director Gerald D. Griffin described the vehicle's capabilities as

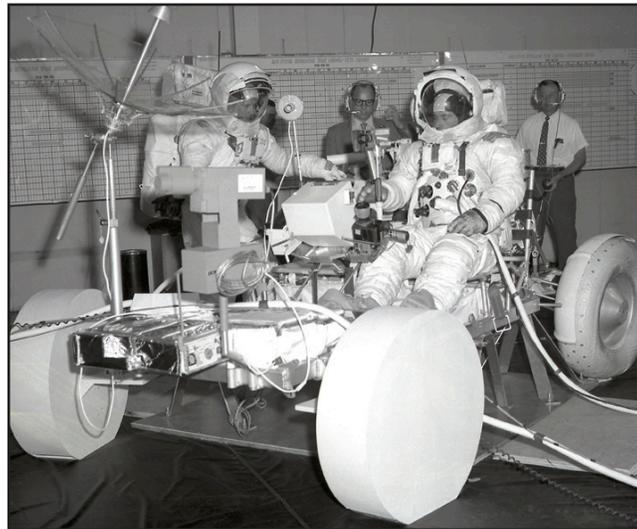
"fantastic" and "probably even greater than even the designers thought."

Delco Electronics Division of General Motors was subcontractor for the mobility system. Marshall's S. F. Morea, now retired, was project manager. Writing in 1988, Morea recalled that dreams of driving a vehicle on the moon stretched all the way back to 1901 and Polish science fiction writer Jersz Zulawski in his story entitled "On a Silvery Globe." The final concept employed as part of the Apollo program proceeded "a series of more pragmatic contractor and government studies conducted primarily during the 1950s and 1960s," Morea wrote.

Only one glitch developed during the mission in connection with the Lunar Roving Vehicle. When Scott climbed on the vehicle shortly after it was deployed, he radioed that the front wheels did not steer.

Since the vehicle has both front and rear wheel steering, the decision was made to proceed using only rear wheel steering. A team of engineers at the Marshall Center, working around the clock, tackled the problem. Scott performed the operation and reported joyfully that front wheel steering was "beautiful!" Scott asked Allen if "those Marshall people came up here during the night and worked on it [the LRV]." Allen replied, "They've been working, all right."

Astronauts also employed the Lunar Roving Vehicle during missions to the moon on Apollo 16 and Apollo 17.



**From right are Apollo 16 mission astronauts John Young and Charles Duke in pressure suits during a final crew training on the Lunar Roving Vehicle at the Marshall Center in Building 4619.**

# Marshall's Impact Testing Team wins 2008 Stellar Award

By Lori Meggs

The Marshall Center's Impact Testing Facility Development Team has received a Rotary National Award for Space Achievement Foundation Stellar Award for its efforts to expand test capabilities covering weather, launch debris and micrometeoroid impacts to spacecraft.

The foundation was established in 1985 to recognize outstanding achievements in space and create greater public awareness of the benefits of space exploration.

"Our four-member team has provided NASA with the most versatile impact test capabilities in the country to support materials investigations for space, atmospheric and ground environments," said Andy Finchum, a physicist for the Impact Testing Facility in Marshall's Engineering Directorate. "It's an honor to be recognized for all the hard work that has gone into our improvements, and we look forward to achieving more success in the future."

The Marshall Center has tested orbital debris shields for various spacecraft since the early 1960s, and partnered with the Johnson Space Center in Houston to develop the micrometeoroid and orbital debris shielding used on the International Space Station to protect the spacecraft from damage to its exterior.

The Impact Testing Facility's unique capabilities include a micro-light gas gun — a two-stage gun that relies on helium or hydrogen



Emmett Given/MSFC

Members of the Marshall Center's Impact Testing team include, from left, Steve Evans, Whitney Hubbs, Mary Hovater and Andy Finchum.

to launch single projectiles at high speeds. The gun is used to test simulated micrometeoroid single particle impacts — the only known gun of its kind in the nation.

Recently, the team obtained additional impact testing capabilities from across the country. Marshall's collaborative efforts and local synergies with neighboring national security organizations helped create a new opportunity with the U.S. Department of Defense. The team helped relocate a critical national asset from Santa Barbara, Calif., to the Impact Testing Facility — the hydrometeor gun. This gun tests materials against a single drop of water to simulate impacts from rain or other precipitation.

Additional capabilities transferred to Marshall include a multi-particle environmental gun that tests materials against single or multiple small projectiles to simulate rain fields, sand erosion or dust impingement; two ballistic guns, used to launch simulated hail stones and launch debris on full scale hardware; and an exploding wire gun which is capable of shooting a large range of projectiles — from a few hundred meters per second to over 8 kilometers per second — and can accommodate a variety of target types and sizes.

Each year, people who have made a preeminent contribution to space exploration are nominated by government, industry, professional organizations and individuals for the Stellar Award. The nominees are voted on by the foundation's board of advisors, which is made up of leaders who are intimately involved in the space program.

*Meggs, an ASRI employee, supports the Office of Strategic Analysis and Communications.*



NSA

The Marshall Center's Andy Finchum, left, accepts the Rotary National Award for Space Achievement Foundation Stellar Award from NASA astronaut Leland Melvin at the foundation's recent awards ceremony in Houston.

# STS-124

*Continued from page 1*

Pressurized Module, which will be the station's largest science laboratory. Measuring 37 feet long and 14 feet in diameter, it is about the size of a large tour bus.

The crew also will deliver the lab's robotic arm — the remote manipulator system, or RMS — which supports operations outside of Kibo. The main arm can handle up to 14,000 pounds of hardware and the small fine arm, when attached to the main arm, handles more delicate operations. Each arm has six joints that mimic the movements of a human arm.

The final components of Kibo will be assembled in space on shuttle mission STS-127. The launch date is under review.

Mark Kelly will command the seven-member crew, which includes Pilot Ken Ham; mission specialists Karen Nyberg, Ron Garan, Mike Fossum, Japan Aerospace Exploration Agency astronaut Akihiko Hoshide and Greg Chamitoff. Chamitoff will replace Expedition 16/17 Flight Engineer Garrett Reisman and remain aboard the station as a member of the Expedition 17 crew. Reisman will return to Earth with the STS-124 crew.

The mission features three spacewalks, each lasting approximately 6.5 hours. On flight day 4, Garan and Fossum will transfer the orbiter boom sensor system back to the shuttle from its temporary location of the station's truss, or backbone. The crew will then prepare the module for its removal from the shuttle's payload bay. Later that day, the module will be installed on the port side of the Harmony module.

On flight day 6, Garan and Fossum will install covers and external television equipment on the module and remove covers on the



From left, STS-124 astronauts Greg Chamitoff and Mike Fossum, mission specialists; Ken Ham, pilot; Mark Kelly, commander; Karen Nyberg, Ron Garan and Japan Aerospace Exploration Agency's astronaut Akihiko Hoshide, mission specialists.

remote manipulator system, which will be deployed on flight day 8. The spacewalkers also will prepare for the flight day 7 relocation of the Japanese logistics module.

On flight day 9, Garan and Fossum will primarily work to replace a failed nitrogen tank assembly on the station's truss with a spare that was temporarily stored on one of the space station external stowage platforms. They also will retrieve a failed camera system on the truss.

STS-124 is the 123rd space shuttle flight, the 26th flight to the space station, the 35th flight for Discovery and the third flight in 2008.

*Martel, an ASRI employee, supports the Office of Strategic Analysis and Communications.*

## 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, May 22, is 4:30 p.m. Thursday, May 15.*

### Miscellaneous

- 350-watt JBL subwoofer, wood-grained case, black front, volume/crossover frequency controls, \$350. 541-0627
- Dinette table, six chairs, off white, \$150. 489-1673
- Atlanta Braves tickets, three each day, May 25-26, section 134R, Row 22, Seat 1. 509-8836
- Kenmore washer, dryer, needs water hose, \$100 for set. 603-0466

- Garmin GPS Map 60, City Select v.6, \$150. 278-1974
- Kenmore 15-cubic foot chest freezer, \$100. 858-5552
- Valhalla Masonic Garden, four plots, \$1,000 each, plus transfer. 881-9421
- Strapless ivory wedding dress, size 6, will e-mail pictures. 615-225-7364
- Bisque Top refrigerator, freezer/icemaker; floral couch/loveseat, two lamps, \$200 each. 539-4449
- 7- by 16-foot dual axle trailer, \$685; La-Z-Boy "Van Buren" floral recliner, \$125. 325-2919
- Sand Dollar pool pump motor, 1 HP, filter, \$50; two filter heads, \$25 each. 498-3452
- Five-stock steel wheels for 2005 Jeep Wrangler, \$50. 723-3803 or 572-3567
- Maple dining table, six chairs, \$200. 230-6819
- 2004 Cannondale IM 800 triathlon bike, black with gold/silver, \$700. 461-3803
- Matching washer/dryer, dresser, chest of drawers, full-size bed, full-size mattress/foundation. 509-6913
- AKC Golden Retrievers, seven males, five females, shots, wormed, \$300. 830-1011 or 603-6700
- Broyhill four-poster queen bed, caramel, steps, \$200; camel back sofa, cushions, \$200. 426-8003
- Dell Computer, 5600 CPU, 1Gb RAM, DVD/-RW, GeForce 8300 graphics, XP, \$325. 417-4828
- Lily Flagg pool membership, includes 2008 dues, \$1,000. 881-5809

### Vehicles

- 2005 Lexus RX330, warranty, 25 MPG, factory chrome rims, black on black, 43k miles. 603-3988
- 2004 Toyota Tundra Crew Cab, new tires, remote entry, step rails, 50k miles, \$17,500. 714-1941
- 2003 Mitsubishi Galant GTZ, leather, power doors/locks, sunroof, spoiler, \$6,900 firm. 586-0013
- 2003 Jeep Cherokee Laredo, 2WD, 59k miles, \$11,000. 655-6701
- 1999 Honda Odyssey, gray, 168k miles, \$4,999 obo. 468-9219
- 1999 Porsche 911 convertible, six speed, red/tan leather, \$27,500. 520-9318
- 1999 Toyota 4-Runner Limited Edition, white, brown interior, sunroof, CD, A/C, \$7,000. 694-1260
- 1998 Winnebago Adventure, 32-foot Class A, 454 Vortec engine, workhorse chassis, warranty. 931-433-5695
- 1989 Dodge Grand Caravan, runs, head gasket leaks, 130k miles, \$900. 227-0339.
- 1988 Yamaha Terrapro, 350cc, runs, needs tune up. 783-3428
- 1987 Toyota Supra, black, automatic, A/C, CD player, \$1,850. 931-307-9426

### Wanted

- Acoustic slow jam, novices welcome, bluegrass, folk. 417-5265
- Portable DVD player. 777-8229
- Car pool, from Muscle Shoals area, work schedule is 7 a.m. to 3:30 p.m. 436-1106

### Marshall Center honors 2007 Contractor Excellence Award winners



Marshall Center Director David King, left, presents the NASA Marshall Contractor Excellence Award in the large business service category to Randy Lycans, vice president and general manager of the Jacobs Engineering, Science and Technical Services Group, at the Center Director's Breakfast on May 6 at The Westin Huntsville hotel. More than 400 community leaders and Marshall contractor partners attended the annual event, which honors companies who have made significant contributions to the center's mission. Companies selected for this year's awards included Jacobs ESTS Group of Huntsville; Lockheed Martin Space Systems Company – Michoud Operations of New Orleans; and Gray Research Inc., of Huntsville.

Doug Stoffler/MSC

Manny Zulueta, right, vice president and site executive for Lockheed Martin Space Systems at Michoud, accepts the NASA Marshall Contractor Excellence Award in the large business product category from King. Each awardee was evaluated against six comprehensive criteria: contract technical performance, schedule and cost performance, leadership, quality improvements, customer satisfaction and innovative technology breakthroughs.



King honors Cindy Gray, chief executive officer of Gray Research Inc., with the NASA Marshall Contractor Excellence Award in the small business service category. The 2007 award winners are eligible to become the 2008 Marshall nominees for the NASA George M. Low Award, the agency's most prestigious honor for quality and performance in the aerospace industry.

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