National Aeronautics and Space Administration
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MARSHALL STAR

Serving the Marshall Space Flight Center Community

June 12, 2008

Astronauts heading into the home stretch of STS-124 mission

By Sanda Martel

When the STS-124 mission is completed, the International Space Station will be well on its way to completion. Landing is scheduled at 10:15 a.m. on June 14 at the Kennedy Center.

Astronauts have delivered and installed the Kibo Japanese Pressurized Module, or JPM, adding more than 600,000 pounds to the orbital outpost on the second of three Kibo assembly missions. The final components of Kibo will be assembled in space on shuttle mission STS-127. Its launch date is under review.

The module, the station's largest science laboratory, measures 37 feet long and 14 feet in diameter — about the size of a large tour bus.

Space shuttle Discovery launched from the Kennedy

See STS-124 on page 9

NASA/JSC

With the blackness of space and the Earth's horizon as a backdrop, astronaut Ron Garan completes the third spacewalk of the mission.

Marshall Center to hold 2008 annual Honor Awards ceremonies June 24

The Marshall Space Flight Center will hold its annual Honor Awards ceremonies in Morris Auditorium on June 24. Employees are invited to attend.

There will be two ceremonies, the NASA Honor Awards at 10 a.m. and the Marshall Center Honor Awards at 2 p.m., recognizing employees who have made significant contributions to America's space program over the past 12 months or longer.

NASA Associate Administrator Christopher J. Scolese will present the awards with Marshall Director David King. See pages 3-9 for this year's recipients.

Principal investigator on quest for GRAIL

By Dauna Coulter

Meet Massachusetts Institute of Technology geophysics professor Maria Zuber. She's dynamic, intelligent and intense. And she's on a quest for the grail — not the grail of mythology and legend, but NASA's Gravity Recovery and Interior Laboratory.

Zuber is lead scientist for the GRAIL mission, slated for launch in 2011 to probe the moon's gravity field and understand the gravitational forces at play under the lunar surface and learn how Earth and other terrestrial planets evolved.

GRAIL is the latest Discovery mission selected by NASA. Discovery missions are small, low-cost, focused scientific investigations that help NASA gather information to further the agency's exploration goals. Marshall Space Flight Center manages NASA's Discovery Program for the Science Mission Directorate.

See GRAIL on page 10

Butler named director of Office of Procurement


Byron Butler

Byron W. Butler has been appointed to the Senior Executive Service position of director in Marshall Space Flight Center's Office of Procurement.

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

Butler has served as acting manager of the Office of Procurement since the retirement of Steve Beale in January 2008. He has served as the office's deputy director since October 1997, and was appointed to the SES in March 2006.

As director, Butler manages the organization responsible for all stages of the center's contracting process, including solicitation, evaluation, negotiation, award and contract management – both at Marshall and at associated contractor facilities. He oversees approximately 150 civil service and contract employees, and supervises more than 900 active contracts, grants and cooperative agreements valued at more than $31 billion.

Butler has almost 30 years of federal procurement experience. As a senior contracting officer, serving as either a department-level manager or as deputy director of the Office of Procurement for the past 20 years, Butler has acquired a thorough knowledge of contractor operations, business practices, supply sources and cost factors.

He has served as a key advisor to numerous source evaluation boards, and has provided leadership in the administration of contracts for the Ares I, space shuttle, International Space Station, Chandra, and propulsion systems for research and development.

Butler earned his Certificate of Professional Contract Management accreditation from the National Contract Management Association, and holds a Level III Certification, the highest level possible, from the Office of Federal Procurement Policy.

Lavoie reassigned to Space Systems Department deputy manager

Pending final approval by NASA Headquarters, Tony Lavoie has been reassigned to the Senior Executive Service position of deputy manager in the Space Systems Department of Marshall Space Flight Center's Engineering Directorate.

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

In this role, Lavoie will help manage the department responsible for designing, developing, assembling, integrating, testing and delivering flight, ground, prototype and development products for human space flight programs. The Space Systems Department is comprised of over 600 civil servants and contractor support staff located in six divisions, 18 branches and one staff office


Tony Lavoie

Lavoie replaces Nelson Parker who was recently reassigned as the deputy director for Program Assurance in Marshall's Safety & Mission Assurance Directorate.

Raymond "Corky" Clinton, deputy manager of Marshall's Science & Mission Systems Office, will serve as acting manager of the Lunar Program & Projects Office.

Leopard named Propulsion Systems Department deputy manager


Larry Leopard

Larry Leopard has been appointed to the Senior Executive Service position of deputy manager in the Propulsion Systems Department of Marshall Space Flight Center's Engineering Directorate.

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

Leopard possesses 20 years of engineering and leadership and management experience in the fields of propulsion systems, and component design and development for space transportation technologies and flight systems.

After receiving a bachelor's degree in mechanical engineering in 1987 from the University of Alabama in Huntsville, Leopard worked for Martin Marietta as a propulsion engineer supporting Marshall's Propulsion Systems Laboratory. Since joining the center in 1990, he has served in progressively responsible leadership positions supporting numerous NASA programs and projects, including the Space Shuttle Main Engine Technology Test Bed; Rocket-Based Combined Cycle propulsion technology; Cobra and RS-83 prototype engines; Fastrac 60K engine; all shuttle propulsion elements; and the X-33 and X-34 experimental vehicle programs.

Following Leopard's selection to NASA's SES Candidate Development Program in 2006, he completed developmental assignments at NASA Headquarters, in Marshall's Shuttle Propulsion Office, and at United Launch Alliance's Delta II and IV Manufacturing and Assembly Plant.

Leopard has received numerous NASA awards, including the Medal for Outstanding Leadership, Medal for Exceptional Achievement, a Silver Snoopy Award, a Center Director's Commendation, and numerous group achievement and special service awards.

2008 NASA/Marshall Center Annual Honor Awards

Presidential Rank Awards

Rank of Meritorious Executive

Pam H. Cucarola
Office of the Chief Financial Officer

Daniel L. Dumbacher
Engineering Directorate

Joan A. Singer
Shuttle Propulsion Office

NASA Distinguished Service Medal

Thomas L. Sever
Science & Mission Systems Office
Received at NASA Headquarters on May 8

Thomas D. Wood
Shuttle Propulsion Office
Received at NASA Headquarters on May 8

NASA Distinguished Public Service Medal

James R. Bathurst
Teledyne Brown Engineering Inc./
Engineering Directorate
Received at NASA
Headquarters on May 8

NASA Outstanding Leadership Medal

David E. Beaman
Shuttle Propulsion
Office

Deborah S. Bowerman
Engineering Directorate

John S. Chapman
Shuttle Propulsion
Office

Daniel J. Davis
Ares Projects Office

James A. Elliott
Office of Center
Operations

James L. Reuter
Ares Projects Office

NASA Exceptional Engineering Achievement Medal

Katherine P. Van Hooser
Engineering Directorate

Thomas F. Zoladz
Engineering Directorate

NASA Exceptional Administrative Achievement Medal

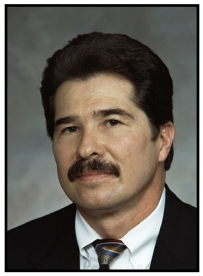
Barbara M. Shannon
Shuttle Propulsion Office

NASA Exceptional Achievement Medal

Judy L. Ballance
Engineering Directorate

Joel B. Best
Engineering Directorate

Nathaniel A. Boclair III
Engineering Directorate



Jeppy L. Clayton
Engineering Directorate

Joan G. Funk
Ares Projects Office

Roslin K. Hicks
Safety & Mission Assurance Directorate

Donald W. Holder
Engineering Office

John W. Horack
Science & Mission Systems Office

Clyde S. Jones III
Office of the Director

Timothy O. Kelley
Shuttle Propulsion Office

Meta S. Latham
Office of Center Operations

Andrew L. Mackenzie
Office of the Chief Information Officer

Roy W. Malone Jr.
Safety & Mission Assurance Directorate

Patrick B. McDuffee
Engineering Directorate

Steven C. Miley
Engineering Directorate
Nominated by NASA Headquarters

Charles L. Nola
Ares Projects Office

Emil L. Posey
Office of Procurement

Paul A. Teehan
Safety & Mission Assurance Directorate

NASA Exceptional Service Medal

Kent T. Chojnacki
Engineering Directorate

Charles C. Delano
Safety & Mission Assurance Directorate

Maninderpal S. Gill
Engineering Directorate

Vincent J. Guarin
Office of Center Operations

Elaine W. Hamner
Office of Procurement

Mary P. Harris
Engineering Directorate

See NASA Exceptional Service Medal on page 6

NASA Exceptional Service Medal (continued)

Thomas L. Holden
Office of Human Capital

Mark W. James
Engineering Directorate

Stephen B. Johnson
Engineering Directorate

Gerald K. Langford
Ares Projects Office

Donnie R. McCaghren
Ares Projects Office

David L. McGaha
Engineering Directorate

Daniel J. Mullane
Safety & Mission Assurance Directorate

Terry L. Prickett
Engineering Directorate

Melvin L. Scruggs
Office of Center Operations

James R. Sheppard
Shuttle Propulsion Office

Jeffery S. Sparks
Engineering Directorate

Ela M. Washington
Office of Human Capital

Catherine H. White
Engineering Directorate

Michael D. Wright
Office of Strategic Analysis & Communications

Not pictured: *Christi Dame, Office of the Chief Counsel*

NASA Exceptional Public Service Medal

Nick Bornas
COLSA/Engineering Directorate

Jason K. Glasgow
CH2M Hill/Office of Center Operations

Thom E. Schrimsher
SAIC/Office of the Chief Financial Officer

Cynthia A. Snoddy
USA/Shuttle Propulsion Office

NASA HONOR AWARDS

NASA Group Achievement Award

Ares I Use Altitude Test Stand Trade Study Team
Ascent Risk Analysis Team
AVGS/OE Flight Software Development Team
Avionics Thrust Vector Control Testing Team
Cryogenic Fluid Management Liquid Methane Team
ET-124 Hail Damage Repair Team
Exploration Water Recovery System Test Team
External Tank Flight History Assessment Team
First MSRR Development Team
Freedom Star Mishap Recovery Team
GLAST Burst Monitor Project Support Team
International Partner ORR Integration Team
ISS Node 2 Integration Team
ISS Oxygen Generation System Activation Team
Laboratory on a Chip Application Development Project Support Team
Liftoff Pad Debris Team
Lunar Impact Monitoring Team
Mechanical Ground Support Equipment Design Team
MSFC Property Validation Team

NASA HONOR AWARDS

Group Achievement Award

Continued

NASA Account Management System Integration Team
NASA Operational Messaging and Directory Service Team
NASA Student Opportunities Podcast Team
Orbital Express Advanced Video Guidance Sensor Team
Orbital Express Engineering Team
PDL Foam Replacement Team
Sea State and Landing Site Assessment Team
Shuttle Transition Environmental Engineering Support Team
Software Engineering Process Improvement Team
Software Engineering Process Team
Structural Modeling/Integration Team
Water Recovery System Mishap Investigation Team

Public Service Group Achievement Award

Michoud Assembly Facility - State of Louisiana Team
National Environmental Policy Act Team
Paperwork Reduction Education Clearance Team

Awards External to NASA

2007 Federal Women's Program – Women's Equality Day Awards

Paulette A. Davy, Administrative Service
Office of Human Capital

Mary A. Hovater, Professional Service
Science & Mission Systems Office

Joan A. Singer, Supervisor of the Year
Shuttle Propulsion Office

2007 Women of Color Technology Awards

Marceia A. Clark-Ingram, Technology All Star
Engineering Directorate

Lorna G. Jackson, Technology All Star
Engineering Directorate

Karen P. Oliver, Technology All Star
Engineering Directorate

Tawnya P. Laughinghouse, Technology Rising Star
Engineering Directorate

2008 Rotary National Award for Space Achievements – Stellar Awards

MSFC Impact Testing Team, Engineering Directorate

MSFC HONOR AWARDS

Director's Commendation Honor Award

Jeffrey A. Apple, Engineering Directorate
Rebecca C. Caneer, Office of Chief Information Officer
Robert W. Carter, Engineering Directorate
Stephen Cato, Engineering Directorate
William J. Cooke, Engineering Directorate
Anita E. Cooper, Engineering Directorate
Mark G. D'Agostino, Engineering Directorate
Charles A. Darby, Engineering Directorate
Stephan R. Davis, Ares Projects Office
Daniel J. Dorney, Engineering Directorate
Gregg M. Eldridge, Safety and Mission Assurance Office
Diane J. Fleming, Shuttle Propulsion Office
Teresa A. Foley-Batts, Office of Procurement
Samuel B. Fowler, Ares Projects Office
James R. Hawkins, Engineering Office
Jeffrey B. Holmes, Northrop Grumman/Science & Mission Systems Office
Marianne F. Huie, Engineering Directorate
Betty B. Humphery, Office of Strategic Analysis & Communications
Brian S. Johnson, Safety and Mission Assurance Office
David L. Martin, Office of Center Operations
Jeffrey L. Martin, Engineering Directorate
Annie D. Matisak, Office of Chief Financial Officer
John M. McDougal, Engineering Directorate
Patrick D. McManus, Engineering Directorate
Daniel W. Mitchell, Ares Projects Office
Donald W. Monell, Science & Mission Systems Office
Roger K. Parisa, Engineering Directorate
Michael L. Reynolds, Office of Center Operations
Jim K. Russell, Science & Mission Systems Office
Jerry A. Shelby, Engineering Directorate
Rhonda S. Simms, Office of Chief Financial Officer
David A. Smith, Engineering Directorate
Dennis A. Smith, Engineering Directorate
Mark K. Smith, Engineering Directorate
George T. Story, Engineering Directorate
Pablo D. Torres, Engineering Directorate
Rhoney Triplett, Office of Procurement
Jason B. Turpin, Engineering Directorate
Neil W. Tyson, Engineering Directorate
Emanuel J. Walker, Engineering Directorate

Certificate of Appreciation Honor Award

Eric H. Alexander, Qualis/Engineering Directorate
Bryan L. Barley, Science & Mission Systems Office
Brent L. Beabout, Engineering Directorate
Brian E. Blair, Engineering Directorate
Wayne J. Bordelon, Engineering Directorate
Paul J. Brzeski, PWR Inc./Shuttle Propulsion Office

Certificate of Appreciation Honor Award

Continued

Erica D. Carter, Office of Procurement
Cynthia H. Chapman, Engineering Directorate
Jimmy D. Compton, DCI/Engineering Directorate
Renee I. Cox, Science & Mission Systems Office
Samuel E. Davis, Engineering Directorate
Thomas K. Delay, Engineering Directorate
Suzanne M. Dorney, Engineering Directorate
Michael R. Effinger, Engineering Directorate
Gary L. Enochs, SEI Group Inc./Office of Center Operations
Michelle E. Erbach, Mainthia/Office of Human Capital
Mark L. Hamilton, Digital Fusion Inc./Shuttle Propulsion Office
Kazuo B. Hayashida, Engineering Directorate
John D. Isom, Gray Research/Engineering Directorate
Martin L. Johnson, Engineering Directorate
Steven R. Jones, Engineering Directorate
Heather M. Koehler, Engineering Directorate
Matthew D. Lansing, Engineering Directorate
Jamie M. McMillon, United Space Alliance/Shuttle Propulsion Office
Mona N. Miller, USRA/Office of Human Capital
Craig R. Murdoch, EG&G/Office of Center Operations
Jeremy D. Myers, Engineering Directorate
Mahmoud R. Naderi, Office of Strategic Analysis & Communications
Melinda H. Naderi, Engineering Directorate
Elizabeth K. Nunn, Engineering Directorate
Jerald D. Oakley, Engineering Directorate
Maurice J. Prendergast, Engineering Directorate
Joan B. Presson, Science & Mission Systems Office
Michael S. Purvey, Safety & Mission Assurance Directorate
Nola V. Royster, DFS/Office of the Chief Financial Officer
Robbie L. Saint, EG&G/Office of Center Operations
David A. Schaefer, Safety & Mission Assurance Directorate
Brenda G. Sparks, Engineering Directorate
Rosalynne L. Strickland, Safety & Mission Assurance Directorate
Thomas H. Whitt, Engineering Directorate

Group Achievement Award

2007 Take our Children to Work Day Team
Accounting Operations Leadership Team
Applications Inventory Module Information Technology Security Center Team
Ares I Avionics Reference Architecture Team
Ares I Cost Risk Analysis Team
Ares I Design Analysis Cycle 2 Checkpoint Review Team
Ares I GN&C Design and Analysis Team
Center Financial Process Support Team
Conflict Management Initiative Pilot Team
Detent Roller Crack Team
Earth Science Applications Public Health Team
Education "Pipeline" Recruiting Team

Group Achievement Award

Continued

First Stage Expendability Assessment Team
Governance and Performance Management Team
J-2X Igniter Test Team
J-2X Nozzle Sideload Test and Analysis Team
JWST BBSTA and ISIM MSFC Test Team
MSFC Government Credit Card Property Team
MSFC Personnel Security Investigation Team
SDOS to SEPS BPA to Transition Team
Short Term Prediction Research and Transition Center Team
SRB BSM Nozzle TPS Debris Team
SSME Advanced Health Management System Team
UPAE Development Team
Upper Stage Common Bulkhead Analysis Team

Research and Technology Award

Chris C. Dobson, Engineering Directorate

Technology Transfer Award

Dean C. Alhorn, Engineering Directorate
Sam Dougherty, ERC/Engineering Directorate
Greg A. Dukeman, Engineering Directorate
Sami Habchi, CFD Research Corp./Engineering Directorate
David E. Howard, Engineering Directorate
Lisa R. Hughes, Office of the Chief Counsel
Hilary L. Justh, Engineering Directorate
Carl G. Justus, Morgan/Engineering Directorate
Raj K. Kaul, Engineering Directorate
Anthony R. Kelley, Engineering Directorate
Fred W. Leslie, Engineering Directorate
Peter A. Liever, CFD Research Corp./Engineering Directorate
William N. Myers, Engineering Directorate
Kevin W. Pedersen, Engineering Directorate
Barry C. Roberts, Engineering Directorate
Matt Slaby, CFD Research Corp./Engineering Directorate
Dennis A. Smith, Engineering Directorate
Ronnie J. Suggs, Engineering Directorate
Jeff S. West, Engineering Directorate
Sopo Yung, Morgan/Engineering Directorate

Patent Awards

Mustafa A. G. Abushagur, University of Alabama in Huntsville
Douglas B. Bearden, Kennedy Space Center
John P. Butas, Engineering Directorate
Robert W. Carter, Engineering Directorate
Richard W. Dabney, Retired
Susan V. Elrod, Engineering Directorate
Jennifer M. English, University of Alabama in Huntsville

Patent Awards

Continued

Cynthia K. Ferguson, Engineering Directorate
Richard T. Howard, Engineering Directorate
Todd C. MacLeod, Engineering Directorate
Gregory P. Nordin, University of Alabama in Huntsville
Lewis N. Payton, Auburn University
Paul D. Van Buskirk, Quality Monitoring & Control

Invention of the Year Award

Thomas K. Delay, Engineering Directorate

Software of the Year Award

John Matthew Hammond, Engineering Directorate
Jana Couch, Jacob Sverdrup, Engineering Directorate
Michael Childress, SAIC, Engineering Directorate
Tim McCarley, (HTSI) Honeywell, Engineering Directorate

Moving toward NASA's 50th anniversary ...

This year marks NASA's 50th anniversary. Twenty five years ago this month, astronaut Sally Ride became the first American woman to fly in space. She flew during the space shuttle Challenger's STS-7 mission. At age 32, she was also the youngest American astronaut in space.

STS-124

Continued from page 1

Space Center, Fla., May 31, for a 14-day mission to the space station. Mark Kelly is commander of the seven-member crew, which includes Pilot Ken Ham, and 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.

Shuttle Discovery's launch was a very successful milestone for the Marshall Space Flight Center's space shuttle team. Discovery's external tank, ET-128, was the first tank to fly with all Return to Flight modifications added during the production process and also the first to fly with redesigned ice frost ramps and liquid oxygen feedline titanium brackets. There was no foam loss from the redesigned hardware. While some foam loss occurred, it came after the critical time frame — the early phase of the flight to orbit.

Following launch, Steve Cash, manager of the Marshall Center's Shuttle Propulsion Office, commended the team for a "spectacular" launch. Marshall is responsible for the space shuttle's propulsion system: the space shuttle main engines, reusable solid rocket boosters and external tanks.

For complete details of the STS-124 mission, including the three spacewalks, visit http://www.nasa.gov/mission_pages/shuttle/main/index.html.

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

Space & Rocket Center continues free admission for NASA civil service

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 Building 4203 Space Shop.

For more information, call Ola Metcalfe at 544-7093.

GRAIL

Continued from page 1

"We're going to study the moon's interior from crust to core," Zuber said during her May 6 lecture at the National Space Science and Technology Center in Huntsville. "It's very exciting."

Zuber proposed the concept for the GRAIL mission in response to a 2006 Announcement of Opportunity for NASA's Discovery Program. NASA selected her proposal from among 24 submissions. She hand picked a science team to carry out the investigation, and she chose the Jet Propulsion Laboratory in Pasadena, Calif., to support the mission, with Dave Lehman as project manager. The Marshall Center will oversee the mission, with Bryan Barley as mission manager.

GRAIL will fly twin spacecraft, one behind the other, around the moon for several months to make highly detailed measurements of the moon's gravity field needed to understand the moon's structure and dynamics. GRAIL will use a microwave ranging system to precisely measure the distance between the two satellites and how the distance changes between them.

"How distance changes with time is velocity, how velocity changes with time is acceleration and gravity has units of acceleration," Zuber said. "If you very, very precisely measure the tiny gravitational accelerations of the two satellites at various locations, and then put all those measurements together for the whole moon, you get a gravity map."

But according to Zuber, it's not as simple as it sounds. Like any valiant quest, this one has its challenges. For starters, in making all these calculations, Zuber and company will have to correct for a number of factors: the gravitational pull from other planets, the pressure of solar photons on the spacecraft, and relativity, to name a few.

The general lumpiness of the moon's gravitational field presents another challenge. That uneven gravity field tugs on satellites in various directions, and without course corrections, orbiters inevitably meet their doom nose down in the lunar surface. In fact, all five of NASA's Lunar Orbiters (1966-1972), four Soviet Luna probes (1959-1965), two Apollo sub-satellites (1970-1971), Japan's Hiten spacecraft (1993) and NASA's Lunar Prospector (1999), found their final resting places there.

Scientists blame the moon's gravitational quirkiness, in part, on the huge mascons (short for mass concentrations) abundant under the lunar surface. The gravitational pull of these mascons, which correspond to flat "seas" of lunar lava, is stronger than that of the surrounding areas. To minimize the tugs and pulls on a spacecraft caused by the mascons, satellite orbits have to be carefully chosen.

But according to Zuber, the biggest challenge to GRAIL is operating two spacecraft at the same time.

"They are launched together, but they have separate trajectories," said Zuber. "At some point they have to line up and range to each other. This requires great precision and causes complications. We'll do a lot of testing, simulations and such to make sure everything is ready."

Emmett Given/MSFC

Dr. Maria Zuber addresses an audience at the National Space Science and Technology Center about the internal structure and dynamics of the terrestrial planets.

Through all the careful planning and hard work, GRAIL scientists plan to provide gravity maps that will greatly facilitate NASA's planned human and robotic landings on the moon in the next decade. The moon's poles and far side, where future moon landings are targeted, are the least understood areas in a gravitational sense.

"If you don't know the gravity field, it's very difficult to target a spacecraft where you want it to go," Zuber said. "Gravity perturbs spacecraft. You can manually adjust your spacecraft's trajectory over and over again, but that's very expensive. It takes a lot more time and fuel. If you know the gravity field, it greatly assists in precision navigation and landing."

The GRAIL team aims to map the moon's gravity field as completely as possible. Zuber said, "After GRAIL, it will be possible to navigate anything you want anywhere on the moon. This mission will give us the most accurate global gravity field to date for any planet, including the Earth."

GRAIL will also help students learn about gravity, the moon and space. Each satellite will carry up to five cameras dedicated to public outreach and education. Undergraduate students supervised by trained professionals will operate the cameras at a facility at the University of California, San Diego.

Middle school students from all over the country will have the opportunity to join in the excitement of lunar exploration. "We'll have an interactive Web site where the middle school students can make recommendations for targets to photograph and then view the pictures of their suggested targets," said Zuber. "This just has incredible potential to engage students."

Zuber and NASA are counting on GRAIL's success to help blaze the trail back to the moon and deeper into the solar system — perhaps inspiring new exploration legends.

The writer, a Schafer Corporation employee, supports the Office of Strategic Analysis & 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, June 19, is 4:30 p.m. Thursday, June 12.

Miscellaneous

John Deere 190C riding lawn mower, 54-inch cut, less than 30 running hours, $2,350. 337-7243

Kenmore 15 cubic-foot chest freezer, lockable, $125. 858-5552

2007 Holiday Barbie, $45. 837-5578

Glass pet cage, 2 feet tall, wide granite stand, $150-$175. 797-3502

Toshiba 15.4-inch laptop, 200GB HD, 2GB-DDR2, Web cam, direct-disc labeling, four USB ports, $775. 684-2606

Standard-size pool table, 1-inch slate, $400. 883-0795

Total Gym, $850 obo. 631-6289

Four American Racing wheels, silver, seven spoke, 5X115, Dunlop tires 225-50-16, $550. 503-8040

GE side-by-side refrigerator/freezer, 25 cubic feet, black, water filter, ice/water in door, $250 obo. 881-8674

Large trampoline, $50. 508-5031

Nintendo DS, silver, five games, charger, $150; Gameboy Color, case, purple, one game, $30. 656-9590

Vinyl Tonneau bed cover, for 1999 Ford Ranger, fits 4 1/2- by 6-foot beds, $75. 603-4250

Jumpking 14-foot trampoline, needs safety pad, has posts for enclosure net, $100. 325-3556

Picture framing equipment, chopper, mat cutter, mats, supplies, $400. 683-3397

Lane sofa, loveseat, built-in recliners, $600. 880-6146

Lawn mower, 22-inch blades, 5 HP, rear bagging, large rear wheels, $30 obo. 348-1878

G.W. Lyon by Washburn electric bass guitar, black, four string, $150. 658-0327

Brass torch lamp, $8; in-line skates, women's size 7 1/2-8, pads, helmet, $15. 859-9165

Casement windows, some 3-feet wide by 4-feet high, bathroom fixtures, sliding glass tub door. 536-1787

Kenmore console fold-away sewing machine, pinking scissors, $125; Craftsman bench grinder, $25. 881-7953

Baldwin piano, black, upright. 338-9840

Lapidary equipment, rock-cutting cabochon unit, gem-cutting faceting unit. 883-8257

Vehicles

2007 Tahoe Q6 boat, 20 feet, full factory warranty, $23,000. 990-3162

2006 Harley Davidson Fatboy, black pearl, extras, $14,500. 233-8505

2005 Lexus RX330, warranty, factory chrome rims, black on black, 44k miles, $27,000 firm. 603-3988

2004 Kawasaki Ninja 500R Galaxy, silver/black, all records, upgrading, $3,000. 797-2668

2004 Ford Explorer XLT, leather, power seats/ windows, sunroof, third-row seating, V8, 85k miles, $11,000. 762-5584

2003 Jetta TDI wagon, automatic, 40 MPG, leather seats, sunroof, 65k miles, $15,200 obo. 828-6213

2003 Jeep Cherokee Laredo, 2WD, 59k miles, $11,000. 655-6701

2002 Acura RSX-S, leather seats, moonroof, alloy wheels, six-speed manual, 93k miles, $12,500 obo. 652-1882

2002 Nissan Xterra SE, white, 72,200 miles, $10,500. 558-6667

2001 Honda CRV LX, black/gray, 102k miles. $7,900. 883-6894 or 468-6894

2001 Mazda Miata MX-5, red, black top, extras, 72k miles, $9,500. 881-0520

1999 Toyota 4-Runner Limited Edition, white, brown interior, sunroof, CD, A/C, $7,000. 694-1260

1999 Honda Magna 750 motorcycle, red, many options, 9k miles, $4,200. 489-8031

1997 Sea-Doo Jet Ski, 787cc, trailer, needs work, $600. 586-0013

1987 300ZX, rare turbo edition, five speed, T-tops, black, new tires, $2,800. 684-0543

Carpool

From Guntersville/Albertville to Marshall, between 7 a.m. - 3:30 p.m. 878-4524

From Weatherly/Edgehill area to Building 4600, schedule flexible. 880-6146

From Athens, working compressed schedule. 431-4477

From Muscle Shoals. 436-1106

Free

Black Lab puppies. 777-4030

Found

Ladies' bracelet, gold clasp, Building 4200; U.S. currency, Building 4200, south parking lot. 544-4680

Lost

Sunglasses, Building 4316. 544-3332

Shuttle Buddies to meet June 23

The Shuttle Buddies will meet at 8:30 a.m. May 26 at Mullins Restaurant on Andrew Jackson Way. For more information, call Deemer Self at 881-7757.

Marshall kids play, learn at annual 'Take Our Children to Work Day' event

David Higginbotham/MSFC

Marshall Center team members and their children crowd around Lockheed Martin Information Technology engineer Terry Abel as he demonstrates how a scale-model hybrid rocket works. Abel, who works in the Propulsion Test Branch of the Engineering Directorate's Test Laboratory, was one of dozens of Marshall team members who shared "cool science" — and NASA's mission — with visiting young people June 4 during "Take Our Children to Work Day."

Doug Stoffer/MSFC

Oscar the Robot welcomes kids to "Take Our Children to Work Day" on June 4. More than 1,000 children of Marshall Center team members spent the day doing science experiments, experiencing the power of a space shuttle launch and touring facilities such as the Payload Operations Center, where they saw how International Space Station science and communications are managed around the clock by Marshall personnel.

Doug Stoffer/MSFC

Kyrra Dailey, left, and her mother Terri, a Mainthia employee, a technical coordinator in the Facilities Management Office, work together to fashion a model of the planet Saturn out of household items during "Take Our Children to Work Day." The annual event, which celebrates Marshall Center families and seeks to excite young people about NASA's mission and careers in science, math and engineering, is organized by the Office of Diversity and Equal Opportunity.

David Higginbotham/MSFC

The Marshall Center wrapped up its annual "Take Our Children to Work Day" event with smoke and fire — the launch of a 1:50 scale model of the Ares I rocket. By the time the youngest of the day's visitors enter college, NASA could be well on its way to using the Ares I and its sister rocket, the Ares V, to send human explorers to the moon to set up a permanent lunar outpost.

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