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MARSHALL STAR

Serving the Marshall Space Flight Center Community March 1, 2007

Orbital Express scheduled to launch March 8

Marshall-developed automated rendezvous and docking technology to be tested in space

By Rick Smith

On March 8, the Defense Advanced Research Projects Agency, the Boeing Company of Huntington Beach, Calif., and NASA are scheduled to launch the Orbital Express satellite servicing demonstrator — an innovative solution to the long-sought automated rendezvous and docking capabilities that could dramatically enhance government, military and commercial missions in space.

"The goal of Orbital Express is to demonstrate on-orbit refueling, component exchange and satellite repair, all without a human operator," said Marshall engineer James Lee. He's the project manager at the Marshall Center for NASA's Orbital Express Advanced Video Guidance Sensor, or AVGS, the compact, state-of-the-art system that will substitute for a human pilot during portions of the

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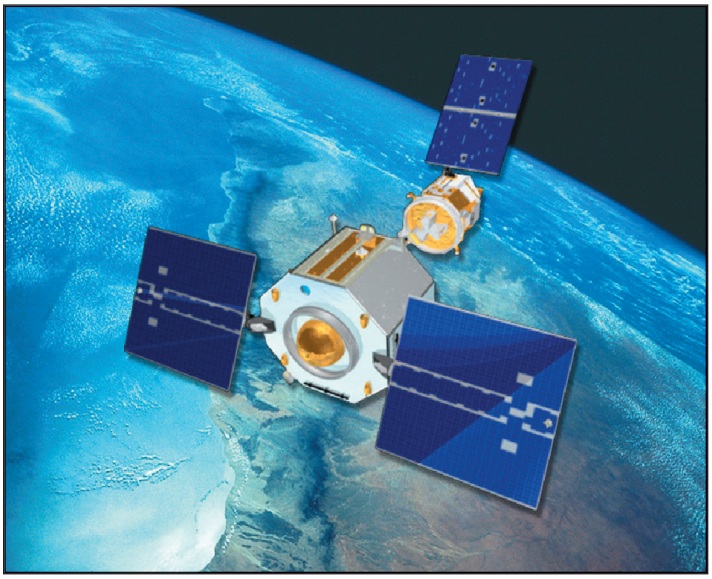

Photo courtesy of The Boeing Company

The two satellites that form the Orbital Express satellite servicing demonstrator are depicted in this artist's rendering. The larger Autonomous Space Transport Robotic Operations service vehicle, bottom, is guided toward the smaller next-generation serviceable satellite by the Advanced Video Guidance Sensor. The sensor is an automated rendezvous and docking system that could enhance future NASA, military and commercial space missions.

Hail damage forces Space Shuttle Atlantis off launch pad

NASA Headquarters news release

On Tuesday, Feb. 27, NASA decided to roll the Space Shuttle Atlantis off its launch pad and back inside the Vehicle Assembly Building at the Kennedy Space Center, Fla. Managers made the decision after a hail storm Monday, Feb. 26, damaged the orbiter's external tank. A new target launch date has not been determined, but teams will focus on preparing Atlantis for liftoff in late April.

A severe thunderstorm with golf-ball-size hail caused what could be 1,000 to 2,000 divots in the giant tank's foam insulation and minor surface damage to about 26 heat shield tiles on the shuttle's left wing. Further evaluation of the tank is necessary to get an accurate accounting of foam damage and must be done in the Vehicle Assembly Building, where the entire tank can be more easily accessed. The shuttle is expected to be moved off the pad by early next week.

Once an up-close look at the damage is complete, the type of repair required and the time needed for that work can be determined. Atlantis' flight, STS-117, to the International Space Station will be scheduled sometime after a Russian Soyuz spacecraft returns from the station. The Soyuz is delivering new station crew members and returning others to Earth in late April. Adequate time is needed between the Soyuz undocking and the shuttle's arrival to

See STS-117 on page 4

Students to climb behind the wheel for out-of-this-world ride in NASA's 14th Great Moonbuggy Race on April 13-14

By Bill Hubscher

This is no ordinary driving test and drivers won't have to parallel park. But future astronauts will learn what it might take to drive on the surface of the moon in NASA's 14th annual Great Moonbuggy Race.

Teams of high school and college students from across the country and around the world are hard at work designing and building their own lunar vehicles in preparation for the event, sponsored by Northrop Grumman Corp. The race, open to the public, will be held April 13-14 at the U.S Space & Rocket Center in Huntsville.

Entries from the United States, Puerto Rico, Canada and Germany — 60 teams in all — will converge on the space museum for the ultimate learning experience. The co-ed teams will race their human-powered vehicles in time trials across a half-mile, simulated moon surface.

"The students are challenged to design and build their own version of a lunar rover and bring it to Huntsville to race against the clock," said Frank Six, university affairs officer with Marshall's Academic Affairs Office. "In the process of preparing for this exciting event, they learn valuable lessons in science, technology, engineering and math in a real-world situation. Events like the Great Moonbuggy Race help NASA foster learning environments that will inspire young people to set their sights on venturing to the moon, Mars and beyond."

Awards are given to the three teams that complete the course with the best times in both high school and college divisions. Awards also are presented for most unique moonbuggy, most improved from previous competition, best overall design, fastest first-year contestant and the vehicle with the safest design.

Success in the Great Moonbuggy Race, however, is not so much about winning as it is about participating.

"The trial and error process involved in designing, developing and testing a Moonbuggy is not unlike the struggles, failures and ultimate successes that accompany great breakthroughs in science and technology," said Doug Young, vice president of Space Exploration Systems for Northrop Grumman's Integrated Systems sector. "Students involved in this event will learn valuable lessons in teamwork, engineering and creative problem solving — all lessons that can be applied to future careers in space exploration or any other technically challenging field."

The excitement of driving a moonbuggy won't stop with the competitors. This year, race organizers will give spectators a chance to discover the rigors of controlling a vehicle first-hand. Visitors to the Space & Rocket Center will have the opportunity to drive a moonbuggy created by the University of Alabama in Huntsville.

The race is inspired by the lunar rover vehicles astronauts drove on the moon during the three final Apollo missions in the 1970s. The original lunar rovers were designed and tested by engineers at the Marshall Center. The first Great Moonbuggy Race was held in 1994, commemorating the 25th anniversary of the Apollo 11 lunar landing. Eight college teams participated that first year, and in 1996 the race was expanded to include high school teams.

Many volunteers from both the Marshall Center and the space industry ensure the success of the event. This is the second year Northrop Grumman Corp. is sponsoring the Great Moonbuggy Race. Other contributors include the American Institute of Aeronautics and Astronautics, ATK Launch Systems Inc., CBS affiliate WHNT Channel 19 of Huntsville, Jacobs Technology, Morgan Research Corp., Science Applications International Corp., the Tennessee Valley Chapter of the System Safety Society Inc. and the United Space Alliance, LLC.

With this program, NASA continues its tradition of investing in the nation's education programs. It is directly tied to the agency's goal of strengthening NASA and the nation's future workforce. Through this and other agency high school, college and university programs, NASA is identifying and developing the critical skills and capabilities needed to achieve the Vision for Space Exploration.

For more event details, race rules, information on the course and photos from previous competitions, visit http://moonbuggy.msfc.nasa.gov.

The writer, an ASRI employee, supports the Office of Strategic Analysis and Communications.

NASA/MSFC

The moonbuggy team from Pittsburg State University in Pittsburg, Kan., powers its way to a first place finish at last year's Great Moonbuggy Race at the U.S. Space & Rocket Center in Huntsville, Ala. The team will defend its title at the 14th annual event April 13-14.

'Focus on Marshall' highlights wind tunnel testing and SERVIR lab

By Lori Meggs

The Marshall Center's wind tunnel has a long and storied history testing the designs of many NASA spacecraft since the creation of the agency. This facility is just one of the capabilities featured on the March episode of "Focus on Marshall."

The program will show how high-pressure air flowing over scale-models in the wind tunnel helps engineers understand the behavior of flight vehicles, engines and rockets during flight. Engineers use this type of scale testing to aid in the design of space hardware. This episode takes a look at some of the systems the wind tunnel is helping test now, including the Ares I launch vehicle design.

The "Focus on Marshall" team also visits the SERVIR lab at the National Space Science and Technology Center. SERVIR uses NASA satellites and models over Central America to transmit real-time environmental and disaster information to decision makers in the region. This extensive monitoring and visualization system is being used to detect wildfires, respond to floods and keep an eye on the health of the rainforest.

Viewers will learn more about NASA's only archaeologist, and how he used SERVIR to detect Mayan ruins buried deep in the forests of Central America.

"Focus on Marshall" airs on Marshall TV and on Desktop TV the first and third Tuesday and Thursday of each month at 11 a.m., noon and 1 p.m. The program also will be posted on Inside Marshall and the Marshall home page within the NASA portal Web site.

Orbital Express

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Orbital Express mission.

Orbital Express will deploy two test satellites: the Autonomous Space Transport Robotic Operations service vehicle, known as ASTRO, and the next-generation serviceable satellite, known as NextSat.

Mounted on the service vehicle, the AVGS shoots infrared laser beams, which bounce off a pattern of reflective targets on NextSat. The imager uses the position of these sensors to assess NextSat's distance, direction and speed. Guided by this real-time data, ASTRO adjusts its speed and angle of approach, safely closing the distance to dock with the client satellite.

The AVGS system is most accurate at close range. To seek out NextSat from 3-4 miles away, ASTRO also carries a sensor suite, the Autonomous Rendezvous and Capture Sensor System, or ARCSS, that includes long-, mid- and close-range sensors. ASTRO will use data from the ARCSS guidance sensors, comparing it to AVGS data to help verify accuracy of approach.

Seven test series will be conducted during the three-month mission. ASTRO and NextSat will conduct approach and docking maneuvers from starting points up to 4.3 miles away. Once mated, they'll also swap propellants and trade and install a functional battery and computer — the first unassisted component exchange in space history. Tests also will be conducted at different times of day, to see if the darkness on Earth's night side confuses the imaging system.

If Orbital Express is a success, use of autonomous rendezvous and docking systems could become a viable alternative to some human-piloted missions in the next decade, said Keith Cornett, flight software project lead at Marshall.

"Automated systems will take ship-to-ship mating duties off the hands of busy flight crews," Cornett said. "They can solve issues associated with tricky repairs, and provide cost-effective options for placing and servicing permanent satellites in orbit around the moon or Mars."

They also could benefit surface operations on the moon, Lee noted, where global positioning systems are not available. An automated "sensor highway," dotting the surface with reflective markers to shine the way, could one day guide robots from place to place — surveying, sampling and laying the groundwork for human expeditions to come.

"When it comes to exploring new worlds, robots can't beat human beings for capturing the experience," Lee said. "But to make those human missions possible, we need to set the stage as completely as we can. Automation is crucial."

Orbital Express is scheduled to launch between 8:37 p.m. and 10:42 p.m. CST, March 8, from Cape Canaveral Air Force Station in Florida. It will be lifted to space by a Lockheed Martin Atlas V rocket.

The Boeing Company of Huntington Beach, Calif., is DARPA's prime contractor for Orbital Express, which includes the ASTRO and NextSat satellites. NextSat was built by subcontractor Ball Aerospace of Boulder, Colo. The AVGS system was built by Orbital Sciences Corp. of Dulles, Va. The Marshall Center developed the AVGS flight software and conducted performance testing.

The ARCSS system was developed and built by the Boeing Company, with integrated testing conducted by Marshall. DARPA, the central research and development organization for the U.S. Department of Defense, manages the Orbital Express Program.

The writer, an ASRI employee, supports the Office of Strategic Analysis and Communications.

Marshall introduces new Environmental Hero Award

The Environmental Engineering and Occupational Health Office is introducing a new Environmental Hero Award in preparation for Earth Day 2007.

This award recognizes excellence in environmental stewardship through efforts to preserve and protect the environment. To be eligible to win, a nomination form must be filled out and submitted to Sharon Scroggins at sharon.t.scroggins@nasa.gov by April 6. Self nominations will be accepted. The environmental hero nomination form can be downloaded from the MSFC Earth Day Web site at http://eemo.msfc.nasa.gov/environmental/eday/index.asp.

Winners will be awarded at Marshall's Earth Day Celebration on April 17.

For more information, go to "Inside Marshall."

STS-117

Continued from page 1

the station.

STS-117 Commander Rick Sturckow, pilot Lee Archambault and mission specialists Jim Reilly, Patrick Forrester, Steven Swanson and John "Danny" Olivas will continue training at NASA's Johnson Space Center, Houston, as they await a new target launch date.

During the 11-day mission, the astronauts will work with the station crew and ground teams to install a new truss segment, unfold a new set of solar arrays and retract one array on the starboard side of the station.

Space Shuttle Program managers are gathered at the Kennedy Center for the traditional Flight Readiness Review for the mission. During the two-day meeting, NASA managers and engineers assess any risks associated with the mission and determine whether the shuttle's equipment, support systems and procedures are ready for flight. The meeting will continue as planned.

For information about the STS-117 crew and mission, visit http://www.nasa.gov/shuttle.

NASA/KSC

At Launch Pad 39A, the external tank, attached to Space Shuttle Atlantis, shows damage from hail bombardment during a strong thunderstorm.

Obituaries

John Q. Miller, 77, of Perdido, Fla., died Feb. 4. He retired from Marshall in 1988 as an engineer. He is survived by his wife, Jane Ellen Miller.

Donald H. Grace, 84, of Hulaco died Feb. 8. He retired from Marshall in 1981 as a photographer. He is survived by his wife, Lavis Grace.

Harley R. Hope, 86, of Huntsville died Feb. 10. He retired from Marshall in 1983 as a contract specialist. He is survived by his wife, Louise Hope.

Jack M. Kendall, 77, of Huntsville died Feb. 15. He retired from Marshall in 1981 as an engineer. He is survived by his wife, Edna Dodd Kendall.

2007 Software of the Year Award open to Marshall employees

The call for submissions for the 14th Annual NASA Software of the Year Award is underway. The award is designed to give recognition to developers of exceptional software created for or by and owned by NASA.

The award includes the NASA Software Medal, a certificate signed by Administrator Michael Griffin and as much as $100,000. Winners may also be eligible for publication in the "Innovation in Systems and Software Engineering" NASA journal. For more information, go to "Inside Marshall." For questions, contact James McGroary at 544-0013 or Lisa Hughes at 544-0018. The deadline is April 13.

MARS Soccer 2007 begins March 13

MARS Soccer will begin March 13. Participation is open to all Marshall employees. There will be a few informal pickup games prior to that date.

For more information, call Andy Heaton at 544-3839.

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

Antique 'Cabinet Grand" player piano, 20 rolls, needs repair, $100; treadmill w/heartbeat monitor, $150. 883-8664

AKC Boxer puppies, 7 weeks old, 1st shots, wormed, ready now. 883-6065

Golf club, Adams Idea A2OS Hybrid 4 iron, S Graf alloy, $125. 683-3397

Three matching modern style wood, stainless, glass top coffee, end tables, $100. 604-8434

Klipsch Heresey II speakers, oak finish, cane grilles, original boxes, $475. 256-536-3390.

AKC Lab puppies, all colors, parents DNA certified, $200. 256-729-1871

Corner computer armoire, poplar wood, light oak finish, must pick up, $175. 829-0285

Tickets to Harry Connick Jr. on March 8, 2, 3, or 4 seats. 256-503-7060

Cradle, cherry color w/mattress, pad, 3 sheets and bumper pads, $25. 882-3326

Adult-owned ice hockey goalie helmet, price negotiable. 256-777-8229

Golf clubs, men's left-handed: woods 1/3/5; irons, 3-9, PW, SW, putter, no bag, $100. 882-3983

Ceiling fan, 42", polished brass, wooden blades, $15. 881-8849

Two adjacent 5th Row Broadway Theatre League tickets to 'Wonderful Town," March 30, 8 p.m., $108. 325-0085

Sony Vega Trinitron 36" flat screen color TV w/PIP silver, $600. 256-772-6569

Uncirculated states quarters, fifty-seven rolls, $10/roll; Saq dollars, 3 rolls, $25 each. 679-1232

Siemens C61 cell phone w/manual and charger, $10 plus $10 shipping. 256-655-6348

6' chest freezer, you haul, $20; gas grill, used little, $40. 837-6776

Vehicles

1983 Ford Ranger on k5 4x4 Blazer frame, rebuilt, engine, transfer and transmission. 931-308-1238

2002 Polaris Sportsman 700 4-wheeler, gray, $3,500. 881-2939

1996 Honda Gold-Wing Aspencade, 1500cc, pearl green, 29K miles, $7,750. 859-0729

1999 Chrysler Sebring LXI, teal, leather, automatic, 123K miles, $4,500. 256-828-3530 after 5 p.m.

Triumph Spitfire 1500, 62K miles, 4SPw/OD, luggage rack, new tires/battery, $2,700. 256-489-9560

1993 Jeep Cherokee Sport, white, automatic, 140K miles, $1,500. 931-703-5956

1997 Jeep Grand Cherokee Laredo leather, red, 4.0L, 6-cyl, 191K highway miles, 23 mpg, $3,700. 256-599-3094

1981 Corvette, White with tan leather interior, automatic, 350 4bbl, 82K miles, $10,500. 882-1566

BMW 530i, certified pre-owned satellite radio, 63K miles, $23,000. 318-0436

1991 Mazda 626, gold, 4 door, auto, air, $600. 604-8434

1999 Oldsmobile Silhouette Premiere van, one owner, leather, entertainment, 149K miles, $3,800. 534-5336

1996 Ford XL Ranger truck, black, 91K miles, $1,500. 880-7950

2003 Ford F150 SuperCab Lariat, white, ext. warranty, 5.4L V8, auto, leather, CD, $15,900. 256-520-5791

2000 Windstar LX, maroon color, 2 sliding doors, 140K miles, $3,500. 256-637-0633

1984 Ford Ranger, 4x4, Chevrolet motor, transmission and running gear. 1-931-308-1238

2004 Yamaha V-Star 1100 Classic, black, windshield, engine guard, saddlebags, low miles, $6,000. 256-306-9882

1981 Chevrolet Citation, 64K miles, 4 door hatchback, auto, A/C, $1,500. 830-9406/Steve

1995 Cadillac DeVille, Concours, black, rims, loaded, $2,300; 1996 DeVille, loaded, green, $3,200. 256-520-2802

Wanted

Female blue and gold Macaw. 772-0364

Old British motorcycle, any condition considered. 653-0800/leave message

Utility van for work, 2000 or newer with ladder rack. 233-5033

Golfers interested in joining established teams, playing Mondays at Redstone. 881-6094/Jim. Leave message.

Lost

Car door handle for 1969 VW Beetle. 227-0339/Dave

Found

Gray Staples Relay memory stick w/lanyard in Bldg. 4200 North parking lot

Free

Heathkit GR 2000 color TV w/cabinet, for parts only. 883-8664

You tear down and remove existing structure for the lumber and asphalt roofing panels. 503-8000

Golden Retriever/Sheltie mix, 10 months old, to good home, all shots up to date, spayed. 256-431-2728

NASA Advisory Council member Mark McDaniel earns NASA Public Service Medal

Emmett Given/MSFC

Mark McDaniel, NASA Advisory Council member and Huntsville attorney, was presented the NASA Public Service Medal in recognition of his leadership, dedication and commitment to NASA as a member of the advisory council. The ceremony took place at the National Space Science and Technology Center. From right, McDaniel; Bud Cramer, Alabama 5th district congressman; David King, Marshall Center director; and Henri, McDaniel's wife.

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