



MARSHALL STAR

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June 14, 2007



Moments after liftoff, Space Shuttle Atlantis rises on columns of fire from the solid rocket boosters to leap into the sky and a rendezvous with the International Space Station on mission STS-117.

Space Shuttle Atlantis launches June 8

STS-117 mission extended by two days; fourth spacewalk added

From combined reports

Space Shuttle Atlantis and its seven-member crew lifted off June 8 from NASA's Kennedy Space Center at 6:38 p.m. CDT to continue construction of the International Space Station.

Atlantis docked with the space station at 2:36 p.m. June 10. The hatch was opened at 4:03 p.m., and the space station crew welcomed the shuttle crew on board. NASA's Mission Management Team decided June 11

to extend the STS-117 mission from 11 to 13 days and to add a fourth spacewalk.

Mission specialists Jim Reilly and John "Danny" Olivas successfully completed the first spacewalk of the mission June 11. The six-hour, 15-minute excursion ended at 9:17 p.m. At press time, a second spacewalk was planned to begin the afternoon of June 13.

During the mission, the crew will add a new structural component to the station, deploy a new set of solar arrays and retract an existing array. Similar construction work was conducted on the previous two shuttle missions.

The mission also will deliver and install

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Marshall Center, NASA Headquarters sign agreement

Marshall Center continues hosting the Principal Center for Regulatory Risk Analysis and Communication

By Shelley Miller

Marshall Center Director David King has signed a memorandum of agreement with NASA Headquarters for Marshall to continue hosting the Principal Center for Regulatory Risk Analysis and Communication for NASA.

David Amidei, Headquarters Principal Center sponsor from the Office of Infrastructure and Administration, represented the agency at the signing ceremony at the Marshall Center in May. The agreement is in effect through fiscal year 2012.

"The Principal Center for Regulatory Risk Analysis and Communication, or RRAC, acts as a vital resource to the NASA community for monitoring and analyzing potential regulatory risks, both domestic and international," said Sharon Scroggins, a lead environmental engineer in Marshall's Environmental Engineering

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Center Director David King, center, signed a memorandum of agreement with NASA Headquarters. David Amidei, Headquarters Principal Center sponsor, second from right, represented the agency at the signing ceremony. Attendees included, from left, Jason Glasgow, CH2M HILL; Ted Biess, Headquarters; Sharon Scroggins, Marshall Center; and Gail Grafton, CH2M HILL.

Marshall's Advanced Video Guidance Sensor is a big success

By Dauna Coulter

Engineers at the Marshall Center are celebrating the success of a guidance sensor developed here and tested recently in space on the Defense Department's Orbital Express Mission.

"This was the first autonomous rendezvous and docking in the history of the American space program. Our Advanced Video Guidance Sensor performed like a dream," said Marshall Automated Rendezvous and Docking lead Jimmy Lee.

The Advanced Video Guidance Sensor, or AVGS, is part of the Autonomous Rendezvous and Capture Sensor System on board Orbital Express, a space mission designed to demonstrate on-orbit satellite servicing. The mission is managed by the Defense Advanced Research Projects Agency, and The Boeing Company of Huntington Beach, Calif., is the prime contractor.

The Orbital Express Mission deployed two test satellites — the Autonomous Space Transport Robotics Operations servicing spacecraft, or ASTRO, on which AVGS is mounted, and the Next-generation Serviceable Satellite, or NextSat. The plan was to conduct a series of progressively more difficult tests in which ASTRO would eventually separate from, re-approach, dock with, and service NextSat.

In April, ASTRO's robotic arm maneuvered NextSat into a variety of positions and attitudes to calibrate the AVGS and other rendezvous and capture sensors. In this operation, the AVGS performed well and was deemed ready for unmated operations.

The next step came on May 5, when ASTRO and NextSat undocked and flew in formation for about 90 minutes before re-mating. The AVGS guided ASTRO to approach and re-mate with the NextSat from a distance of about 33 feet.

The guidance sensor provided relative position and attitude data to the ASTRO spacecraft for the entire operation, continuously performing short-range target tracking. At ranges beyond about 29 feet, the AVGS provided relative position and attitude data to support both short- and long-range target tracking.

According to Lee, the data showed excellent repeatability and the guidance sensor exceeded performance specifications in all lighting conditions — all without a human operator.

An even more impressive demonstration took place in mid-May. An ASTRO flight computer glitch caused a test to abort at 33 feet, before the vehicles re-mated. Over the next few days, ASTRO and NextSat drifted nearly four miles apart. On May 19, the AVGS locked on to NextSat and began to track it from a distance of approximately 500 feet — greater than any distance ground-tested

for Orbital Express and greater than the distance planned for this test. NASA's AVGS became the primary sensor in use during the remainder of the recovery operations.

"AVGS was very helpful in getting the two spacecraft back together once we got near the 150-meter regime," said Fred Kennedy, DARPA's Orbital Express Program manager. "The Orbital Express mission operations team spent long days diagnosing sensor and navigation anomalies, and was finally able to manually reposition ASTRO within a kilometer of NextSat. It was then a matter of returning guidance control to ASTRO, which performed a series of autonomous maneuvers to get us within AVGS's fully operational range so the two spacecraft could re-mate," Kennedy said.

As in the second test, the AVGS data showed outstanding performance and repeatability while tracking with both the short- and long- range targets, exceeding the short-range specification.

The Advanced Video Guidance Sensor on ASTRO works by bouncing infrared laser beams off retro-reflectors installed on NextSat. The sensor analyzes the reflections and sends relative position and attitude data to the ASTRO guidance system, which in turn modifies the approach angle and speed to complete a precise and gentle docking with NextSat.

Ricky Howard, chief AVGS technologist, likened the laser beams to a camera's flash. "The AVGS camera sees how big the target looks, and it knows how big the target is in reality, so it can use geometry and trigonometry to compute the relative positions and attitudes," Howard said.

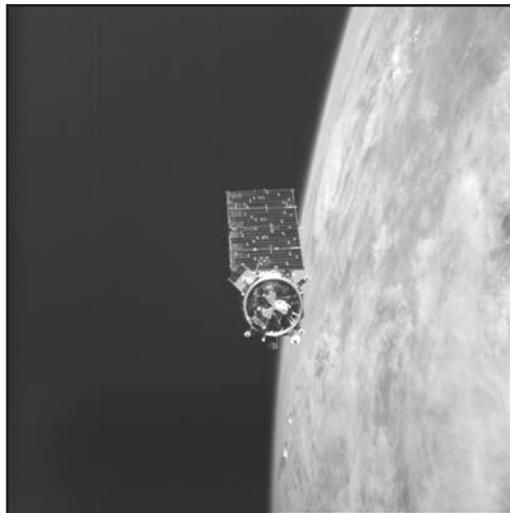
The Orbital Express Mission accomplishments will enable future on-orbit operations such as refueling, reconfiguration, component and fluid exchange, and repair of satellites and other spacecraft. These capabilities will reduce operations costs, increase spacecraft life cycle, and enhance the development of new space system architectures.

Possible future uses for automated rendezvous and docking technologies include enabling robotically operated cargo missions for the International Space Station, autonomous assembly in space of space structures and exploration space vehicles, and satellite and telescope servicing and repair.

"With Marshall's strong flight heritage, the success of AVGS is no accident," Lee said. "AVGS, like its predecessors, is a building block for the future, opening doors for continuing development. The next generation AVGS is already building on the current system's flight-proven capabilities and experience."

The sensor's predecessors include the Video Guidance Sensor that

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Orbital Express accomplished unmated operations to 33 feet.

For 25 student teams, the road to NASA begins with Team America Rocketry Challenge

By Sherrie Super

For 25 student teams from schools and organizations across the United States, the road to NASA began in Virginia as they competed in the Team America Rocketry Challenge, the world's largest model rocket contest.

The annual contest, which culminated in the launch of their model rockets May 19, drew thousands of students. For the top performers, the journey continues at the Marshall Center for an

advanced rocketry workshop this summer and an invitation to submit proposals for the NASA Student Launch Initiative in the upcoming academic year.

Managed by the Marshall Center, the NASA Student Launch Initiative is a hands-on engineering project that challenges students to design, build and test a reusable vehicle and payload to be launched to an altitude of one mile.



Vince Haegele

Scott Horowitz, the associate administrator of NASA's Exploration Systems Mission Directorate at NASA Headquarters, and his son, Alexander John Horowitz, watch a rocket take to the sky.

Preparation for the next Student Launch Initiative begins in July, with one faculty member from each qualifying team invited to a NASA workshop in Huntsville, where educators can tour Marshall facilities and talk rocketry with NASA scientists and engineers.

Launch

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the 17.5-ton S3/S4 truss segments. This latest addition to the station's backbone will extend the right side of the truss and includes a new set of solar arrays. When unfolded, the 240-foot arrays provide additional power to the station in preparation for the arrival of new science modules from the European and Japanese space agencies. The crew also will retract a solar array to allow for the rotation of the new arrays to track the sun.

"Partnering with the Team America Rocketry Challenge is one way that NASA encourages student exploration of science, technology, engineering and mathematics," said Tammy Rowan, interim manager of Marshall's Academic Affairs Office. "But it's more than seeing scientific and mathematical principles come to life. It's also about teamwork, and selling your ideas — skills needed in virtually any career."

Sponsored by the Aerospace Industries Association, based in Arlington, Va., May's Team America Rocketry Challenge in Virginia encourages each team to design, build and fly a model rocket carrying one raw egg. The goal was to fly to 850 feet, stay aloft for 45 seconds and return the egg safely to Earth.

About 7,000 students participated in the qualifying rounds, with some 600 students competing in the finals at Great Meadow in The Plains, Va. A team from Newark Memorial High School in Newark, Calif., took first place, beating out 99 other squads with a near-perfect score.

Participants also had the opportunity to see a "real" NASA rocket launch as a 1:100 scale model of the Ares I crew launch vehicle took to the sky. The full-size Ares I, being developed by the Exploration Launch Projects Office at the Marshall Center, will launch NASA's Orion spacecraft and its crew of astronauts to space no later than 2015.

It was the fifth year of the Challenge, which Aerospace Industries Association sponsors with the National Association of Rocketry. Along with NASA, sponsors include the U.S. Department of Defense, the American Association of Physics Teachers and 38 member companies of the Aerospace Industries Association.

The NASA Student Launch Initiative is managed by the Marshall Center with support from the Huntsville Area Rocketry Association.

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



Chuck Pierce

A rocket takes flight at the Team America Rocketry Challenge on May 19.

Astronauts present 18 Silver Snoopy Awards

Silver Snoopy Awards were recently given to 18 Marshall team members. Presenting were astronauts Ricky Arnold, Terry Virts and Barry Wilmore. The Silver Snoopy is the astronauts' personal award to members of the workforce for outstanding and exemplary work.

The Snoopy emblem reflects NASA's and the industry's sense of responsibility and continuing concern for astronaut flight safety. Less than one percent of the space program workforce receives the award annually.



Doug Stoffer/MSFC

Ron Daniel of Pratt & Whitney Rocketdyne and astronaut Wilmore.



Emmett Given/MSFC

From left, David Myers and Robert Stowell, both of Lockheed Martin; Doug Wingard, Engineering Directorate; astronaut Terry Virts; and Ron Beshears and Steve Burlingame, both of the Engineering Directorate.



Emmett Given/MSFC

Astronaut Wilmore and Jerry Wayne Crook of Jacobs ESTS.



Doug Stoffer/MSFC

From left, Kevin Takada, Science & Mission Systems Office; Daris Borden, Chickasaw Nations Inc.; astronaut Wilmore; Andrew Tygielski, TecMaster Inc.; and Kevin Depew, Science & Mission Systems Office.



Emmett Given/MSFC

Astronaut Wilmore and Charmein Johnson of SAIC-UNITES.



Doug Stoffer/MSFC

Astronaut Wilmore and Don Clark of SAIC.



David Higginbotham/MSFC

From left, Matthew Marsh, Brian Goode, Mike Danford, astronaut Ricky Arnold, Robert Polsgrove and Daniel Dorney. The recipients are employees of the Engineering Directorate.

Signing

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and Occupational Health Office. Scroggins has led Marshall's efforts as the RRAC Principal Center, formerly known as the Clean Air Act Principal Center, since 2003.

The agreement continues the success of NASA's involvement and input, which spans more than a decade, to the Environmental Protection Agency in the development of regulations affecting the aerospace industry. NASA provides technical guidance and expertise during the regulation development process.

The Principal Center supports NASA's Environmental Management Division in the management of environmental regulatory risks and related activities. Representatives proactively detect, analyze and communicate environmental regulatory risks to NASA programs and facilities, and negotiate and participate in the mitigation of such risks. Responsibilities span federal and state environmental

regulations as well as Clean Air Act related regulations. The new agreement further broadens the Principal Center's responsibilities to include Clean Water Act and Resource Conservation and Recovery Act regulations.

"The Ares I Project depends on the RRAC Principal Center for information on environmental regulations that could result in future materials obsolescence and schedule risks," said Dan Dumbacher, director of Marshall's Engineering Directorate. "The Principal Center has also been instrumental in petitioning EPA for permission to use a phased-out material for Ares I research and development to find an environmentally friendly replacement."

To receive regulatory summaries provided by the RRAC Principal Center, subscribe at <https://lists.nasa.gov/mailman/listinfo/rrac>. Archived information can be accessed at www.rracpc.org.

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

Guidance sensor

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flew on the space shuttle in 1997 and 1998, and the Demonstration of Autonomous Technology AVGS that flew in 2005.

Marshall's AVGS is a prime example of, as NASA scientist

Christopher McKay put it, science making human exploration "safer, sooner, and more capable." It's a symbiotic relationship — humans supply the dream, and science supplies the tools.

The writer, a Schafer Corp. 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 is 4:30 p.m. Thursday.

Miscellaneous

Dining room table with four chairs, \$75. 205-310-5643
Graco baby swing, 6 speed, 15 songs, green/white, Winnie the Pooh theme, \$40. 216-0467
Exhaust system from 2005 F150 XLT, \$400 negotiable. 637-0633 after 5 p.m.
Pride Legend 3-Wheel Mobility Scooter, \$700. 653-5654
Sony 36-inch flat-screen Trinitron TV, \$300. 509-0256
Solid hardwood flooring, Russian birch, 3-1/2-inch by 3/4-inch, 300 sq. ft., will deliver. 656-1178
Toddler Firetruck bed with mattress, sheets; 2T/3T boys clothes; \$70 for all, separates negotiable. 426-4552
16x7 aluminum 6-lug wheels with Goodyear Wrangler tires from 2001 GMC 1500 pickup, \$200. 655-5483
Swimming pool, blue vinyl, 15-foot diameter, 42 inches deep, accessories, \$120. 828-5326
Nordic Trac CX-938 elliptical, you pick up, \$450. 859-338-2649
Little Tykes Tugboat sandbox, cover \$20; MTD riding mower for parts or repair, \$25. 325-2919
Panasonic 53-inch HDTV projection monitor, still under warranty, \$400 obo. 503-4661
Pair of MTX TP112 300W floor speakers, \$100. 698-1350
Bike M (50cm), Fuji Finest, triple crankset, electric blue, \$375. 461-3803

Kincaid dinette table, seats four, cherry finish, \$150. 508-3408
Daniel Moore framed print, "The Tradition Continues," No. 4154/19920, \$350. 891-1073
Super Chip for 2004-2005 Dodge, Hemi, \$250. 468-9377
Jacuzzi tub, \$150; four oak kitchen chairs, \$80. Aleta, 882-1930
Powercaddy walk-behind golf cart, battery operated, new battery, \$130. 247-1122
Family Fitness Center (Madison) 1-year full membership, \$200. 777-0606
Colt Python, 6 inch, blue, little wear on cylinder, \$850. 232-0246
Large dog house, 10-foot-by-10-foot-by-6-foot kennel, \$300 for both. 682-7165
Four plots, Tri-Cities Memorial Gardens, Florence, \$4,000 for all four. 436-1106
2007 Acura TL Type S aluminum alloy wheels w/ Michelin 235/45R17 tires, \$1,950. 509-9765

Vehicles

2006 Lexus RX330 SUV, LT green, leather, front heated seats, sunroof, 24K miles, \$34,000, 882-9053
2006 dirt bike, 110cc, 4 speed, semiautomatic 4 stroke, \$350. 858-5552
2004 Xterra, burgundy, CD player, power windows, extended warranty, 43K miles, \$16,250. 652-6817
2004 Suzuki XL7, light bronze, third row seat, 5-year warranty, \$15,500 obo. 694-0388
2004 Yamaha scooter, 50cc, \$1,350 obo. 828-3896
2004 Jeep Wrangler Sport X, navy blue, 5 speed, 4WD, 50k miles, \$14,500. 464-5850
2004 Nissan Frontier ExtCab XE, light brown, automatic, 38K miles, \$11,800. 355-5870/654-6870
2003 Harley Davidson XLH1200 Sportster, black, 100th anniversary edition, \$7,300. 233-8505
2003 Ford Expedition, 5.4L, beige, leather, towing, DVD, third row, 101k miles, \$15,500. 503-1486
2003 Harley-Davidson Ultra Classic Electra-glide, 100th

anniversary edition, extended warranty, \$13,500. 683-1846
2002 fifth-wheel camper, sleeps eight, bathroom, oven, microwave, stereo, ac/heat, \$16,500. 721-1260
2002 Kia Sedona minivan. 233-6197
2001 Honda Civic, a/c, mp3 player, 108k miles, \$3,900. 534-6036
2001 Yamaha VStar 1100 Classic, accessories, 20k miles, \$5,000. 851-8038
2001 Polaris Scrambler ATV, \$1,000; 2000 Coleman Tacoma camper, sleeps nine, AC, fridge, \$4,250. 325-0711
2000 Mitsubishi Galant, sunroof, 132k miles, \$4,500 obo. 651-3415
2000 GMC Sonoma, 4x4, 87k miles, off-road, fully loaded, green, \$9,000. 931-967-7307
1999 Mazda Miata, dark blue, leather, Bose, power, 44k miles, \$7,900. 332-9298
1999 Chrysler Town & County minivan, 87k miles, \$7,900; 2000 VW Jetta, 77k miles, \$8,400. 508-8246
1997 Toyota Avalon XLS, 153k miles, \$6,000. 653-2732
1996 Dodge Grand Caravan, rear air, needs two tires, 190K miles, \$2,500. 830-1445
1995 Cadillac Seville, V8, 102k miles, \$3,500. 881-3173
1994 Chevrolet Caprice Classic, V8, rebuilt transmission, new radiator/shocks/distributor, \$3,995 obo. 206-1870
1994 Jeep Grand Cherokee, 4WD, tow package, \$3,000 obo. 656-3333
1994 BMW 325iS, 5 speed, leather, am/fm/CD, 26 mpg, 92k miles, \$5,400. 837-5580 / 655-4052
1994 Lexus LX400, 4 door, black, tan leather interior, new timing belt, 140k miles, \$8,000. 797-6173
1989 Ford Mustang LX 5.0, power, 20k miles on rebuilt engine, \$2,500 obo. 880-2001

Wanted

Portable electric piano. 665-3422
Cardboard boxes for moving and storage. 656-2514 before 8 p.m.
Suspended ceiling tiles, need 2-foot cross-pieces (20-plus years old) to augment ceiling system. 233-0705

Students enjoy the heat at Marshall's 'Take Our Children to Work Day'



Doug Staffer/MSFC

Heather Roden, an instructor from Sci-Quest — a Huntsville hands-on science center that encourages exploration of the sciences through educational exhibits and programs — turns up the heat at the "Freeze Flame" class on Marshall's "Take Our Children to Work Day," June 5. Roden taught the children and Marshall employees about the states of matter with dry ice demonstrations and film canister explosions. More than 850 children in grades 3-12 attended the day's events to learn more about space exploration and NASA.

At a class for "Take Our Children to Work Day," Gabriella West, left, and her mother, Loria West with Marshall's Budget Integration & Analysis Office in the Office of the Chief Financial Officer, make a Saturn model using everyday items such as computer disks and plastic foam. According to co-chairs of the event Abbie Johnson and Phyllis Olinger with Marshall's Office of Diversity & Equal Opportunity, children such as these will be the next generation of space adventurers and will be a part of realizing this year's event theme of "Revolutionizing the Workplace."



Marshall Association announces call for scholarship applications

The Marshall Association will grant two college scholarships, one for a student pursuing a technical degree in a field such as science, engineering or mathematics, and another scholarship for a candidate pursuing a non-technical degree. Scholarships will be awarded in August. All applicants must be entering their freshman

year of college in fall 2007.

To be eligible, an applicant must be the dependent of a 2007 Marshall Association member who joined the association no later than June 29. Scholarship applications must be received by 4 p.m. on June 29. For more information, go to "Inside Marshall."

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