



MARSHALL STAR

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Sept. 7, 2006

NASA engineers complete series of parachute recovery system tests for Ares first stage

By Sheri Bechtel

NASA and its industry partners recently completed a series of tests that will aid in the design and development of the parachute recovery system for the first stage booster of NASA's Ares I crew launch vehicle. Ares I is scheduled to launch as early as 2012.

Engineers from the Marshall Center; Johnson Space Center in Houston; ATK Launch Systems of Brigham City, Utah; and United Space Alliance of Houston traveled to the U.S. Army's Yuma Proving Ground in Yuma, Ariz., to conduct two drop tests of the recovery system's pilot parachute. The tests were performed the week of Aug. 14.

See Parachute tests on page 6



NASA/MSEC/Army

A CH-47 Chinook helicopter lifts the parachute drop test vehicle to an elevation of 10,000 feet above a Yuma test range.

Space Shuttle Atlantis launch delayed

By Sanda Martel

The launch of Space Shuttle Atlantis was postponed early Wednesday, Sept. 6, for at least 24 hours because of an issue with the shuttle's fuel cell number 1. A short, or spike and drop in voltage in the fuel cell coolant motor was seen shortly after the cell was activated on the launch pad at the Kennedy Space Center, Fla.

Atlantis was to have launched Wednesday at 11:29 a.m. on its mission to the International Space Station. Launch opportunities also are available on Thursday and Friday.

For the first time since late 2002, assembly of the station will resume and construction of the space station is the goal

of the remaining space shuttle flights until the fleet is retired in 2010.

The STS-115 crew members include Commander Brent Jett, Pilot Chris Ferguson, and mission specialists Joe Tanner, Dan Burbank, Heide Stefanyshyn-Piper and Canadian astronaut Steve MacLean.

During the mission, Atlantis' astronauts will deliver and install the 17.5-ton bus-sized Port3/Port 4 integrated truss segment on the station. The girder-like truss includes a set of giant solar arrays, batteries and associated electronics. The truss segment will provide one-fourth of the total power-generation capability for the completed station.

Marshall Center engineers teamed with the Boeing Company in Huntsville to

conduct some of the advanced structural testing on the 45-foot-long P3/P4 truss segment to verify that it would perform well with launch and on-orbit structural loads during its 15-year life span.

Marshall engineers and technicians, using the Building 4619 test facility, performed two major structural tests. A modal survey test induced vibrations into the structure with mechanical shakers; and the element was struck with a large hammer-like device while various accelerometers measured the results.

Another more complex and lengthier test, called the static structural test, simulated space shuttle docking loads as well as other

See Atlantis on page 5

Biased toward action

In almost every speech I give, I tell folks that this is a great time to be a part of the space program. The presidential mandate to return to the moon, and then venture to Mars and beyond is an enormous and worthwhile undertaking. And when you really think about it, this is bigger than anything we've ever attempted. The Saturn rocket folks laid the groundwork, and we will build on the best of that program. In essence, when the world heard "the Eagle has landed," it was actually the first stepping stone for our new journey.

Since this is bigger than anything ever attempted, and since this business is very complex, the normal standard of rigor will not work. We have to be vigilant beyond anything and anyone in any other business, and it starts with me (this is especially important with the global interest in exploration, an interest rising in a dynamic way). I am honored to lead Marshall Space Flight Center as we develop new launch vehicles and scientific spacecraft. And, although the center does not make decisions for the programs and projects, Marshall is responsible for ensuring all work is managed properly. Marshall is accountable for ensuring support and resources are allocated appropriately, and for monitoring technical performance, project management and risk mitigation.



David King

A good example of Marshall's responsibility for mission success is the center's recent Constellation Program review. The review focused on technical and programmatic risk. We reviewed all dimensions to develop a baseline understanding of where we are with our assignments in the Constellation Program. We used an agenda that allowed representation from Engineering, Safety & Mission Assurance and the project teams. This was important so that all areas could report-out (this will eventually fold into a monthly review that will include all center activity). Additionally, I encouraged the group to become biased toward action, a concept I believe is applicable to all employees. Success will depend on the willingness of all employees to develop the habit of "action." If we see data that makes us ask what it means, but then we let it go, we are not being biased toward action. Some of us tend to not follow up with folks for one reason or another: this too is not being biased toward action. I want everyone to become comfortable with asking questions, seeking clarification and providing input. Often times, folks remain silent because they fear someone will think they should have already known the answer, or they are afraid of making a mistake. Reviews, discussions, debate, questioning and giving input will move us toward achievement, not away from it. Sitting on issues, blurring expectations or stifling communication are not traits for mission success. The constant pursuit of excellence, combined with a sense of ownership and bias toward action will continue to move us forward as we create the future of human and robotic space exploration.

David A. King

Director, Marshall Space Flight Center

Engineering Directorate honors Marshall team members at annual awards ceremony

By Lori Meggs

The Marshall Center's Engineering Directorate recognized more than 250 team members for outstanding contributions during the annual Engineering Directorate Awards Celebration last month. Nearly 1,200 people attended the event under tents at the Activities Bldg. 4316.

In recognition of extraordinary leadership, 22 employees received the Engineering Directorate Director's Award. Employees receiving this top honor included Robyn Brick, Icle Blankenship, Sandra Elam, Brian Goode, Phillip Hall, John Hanson, Marianne Huie, Kirby Lawless, Lea Lee, Lisa Luna, Matthew McCollum, Jay Medley, Kathryn Ogle, James Owen, Charles Pierce, Terry Prickett, Michelle Schneider, Sandeep Shah, John Sharp, Gary Wentz and Renee Wilson. Mike Rudolphi, director of the Engineering Directorate, presented these awards.

"Our workforce is extremely talented, and I am just amazed at the job they do every day," Rudolphi told attendees. "I'm happy we can set aside a day like this to recognize our accomplishments."

One of Rudolphi's major philosophies involves the belief that engineering is a partner to other Marshall Center programs and projects. "A partner means we're committed to the success of the people and the organizations with which we work," added Rudolphi as he introduced a series of awards that gave other Marshall directorates the opportunity to recognize individuals in the Engineering Directorate.

Partnership Awards were given to Fred Berry and John McDougal by the Science and Mission Systems Office; John Hanson, Scott Hutchins, Ronald King and John Tepool by the Exploration Launch Projects Office; and Steven Burlingame, Charles Horne, Christopher Rosson and Mark Vacarro by the Shuttle Propulsion Office.

See Engineering awards on page 8

NASA selects Orion crew exploration vehicle prime contractor

NASA Headquarters news release

NASA announced on Thursday, Aug. 31, selection of Lockheed Martin Corp., based in Bethesda, Md., as the prime contractor to design, develop and build Orion, America's spacecraft for a new generation of explorers.

Orion will be capable of transporting four crew members for lunar missions and later supporting crew transfers for Mars missions. Orion could also carry up to six crew members to and from the International Space Station.

The first Orion launch with humans on board is planned for no later than 2014, and for a human moon landing no later than 2020. Orion will form a key element of extending a sustained human presence beyond low-Earth orbit to advance commerce, science and national leadership.

The contract with Lockheed Martin is the conclusion of a two-phase selection process. NASA began working with the two contractor teams, Northrop Grumman/Boeing and Lockheed Martin, in July 2005 to perform concept refinement, trade studies, analysis of requirements and preliminary design options. Lockheed Martin will be responsible for the design, development, testing and evaluation (DDT&E) of the new spacecraft.

Manufacturing and integration of the vehicle components will take place at contractor facilities across the country. Lockheed Martin will perform the majority of the Orion vehicle engineering work at NASA's Johnson Space Center, Houston, and complete final

assembly of the vehicle at the Kennedy Space Center, Fla.

All 10 NASA centers will provide technical and engineering support to the Orion project. The Marshall Center is a key team member in both the Launch Abort System and Service Module Systems Engineering and Integration teams in support of the Langley Research Center in Hampton, Va., responsible for leading management of the Orion Launch Abort System, and Glenn Research Center in Cleveland, Ohio, responsible for management of the Orion Service Module.

The contract is structured into separate schedules for DDT&E with options for production of additional spacecraft and sustaining engineering. During DDT&E, NASA will use an end-item cost-plus-award-fee incentive contract. This makes the award fee subject to final determination after the contractor has demonstrated that it meets the technical, cost and schedule requirements of the contract.

DDT&E work is estimated to occur from Sept. 8, 2006, through Sept. 7, 2013. The estimated value is \$3.9 billion.

Production and sustaining engineering activities are contract options that will allow NASA to obtain additional vehicles as needed. Delivery orders over and above those in the DDT&E portion will specify the number of spacecraft to be produced and the schedule on which they should be delivered.

Post-development spacecraft delivery orders may begin as early as Sept. 8, 2009, through Sept. 7, 2019, if all options are exercised. The estimated value of these orders is negotiated based on future manifest requirements and knowledge gained through the DDT&E process and is estimated not to exceed \$3.5 billion.

Sustaining engineering work will be assigned through task orders. The work is expected to occur from Sept. 8, 2009, through Sept. 7, 2019, with an estimated value of \$750 million, if all options are exercised.

For information about Orion, visit <http://www.nasa.gov/orion>.

Former Marshall director Rocco Petrone passes away at 80

By Mike Wright

Dr. Rocco A. Petrone, who served as the third director of the Marshall Center in the early 1970s, passed away Aug. 24 at his home in Palos Verdes Estates, Calif.



Rocco Petrone

Born in Amsterdam, N.Y., on March 31, 1926, Petrone graduated from the U.S. Military Academy in 1946. He served in the U.S. Army in Germany from 1947 to 1950. Upon his return to the United States, he resumed his studies at the Massachusetts Institute of Technology in Cambridge, where he earned a master's degree in mechanical engineering in 1951. In 1952, he was awarded a professional degree in mechanical engineering.

Petrone's career in rocket development began in the early 1950s in Huntsville, where he participated in the development of the Redstone rocket, the nation's first ballistic missile. He was

in the blockhouse in Cape Canaveral, Fla., as a member of the Missile Firing Laboratory when the first Redstone was launched in 1953. Petrone was then detailed to the Army General Staff at the Pentagon in Washington, where he was assigned duties in the field of guided missiles.

In 1960, while still on active duty with the U.S. Army as a lieutenant colonel, Petrone transferred to the Kennedy Space Center to serve as Saturn Project Officer. When the United States established its goal of landing a human on the moon by the end of the 1960s, the Apollo Lunar Landing Program was established. Petrone was responsible for the planning, development and activation of all launch facilities required for the Apollo Program, including Launch Complex 39 where the Apollo/Saturn V space vehicles were launched.

The complex included the Vehicle Assembly Building, the launch towers, the tractor crawler and the Mobile Service Structure. He was

See Petrone on page 9

Marshall-managed Chandra X-ray Observatory marks seven years of stunning revelations

By Sherrie Super

Since 1999, a lot of things have come and gone — the Y2K bug, a slew of boy bands and a new Star Wars trilogy. But the Marshall-managed Chandra X-ray Observatory, which unveiled its first images just a few months shy of the new millennium, continues to make headlines seven years later.

Maybe it's because Chandra's subjects are timeless — black holes, distant galaxies, and stars that don't reside in Hollywood. And they're long-lasting — with stellar lives that span billions of years. Or maybe it's because Chandra's amazing images are proof that truth is stranger than fiction.

Imagine a black hole gobbling up material in our own galaxy. In 2000, the Chandra Observatory captured such an event live. It observed for the first time a rapid X-ray flare coming from the direction of the supermassive black hole at the Milky Way's center. By capturing the violent flare in action, Chandra gave astronomers an unprecedented view of the energetic processes that surround our galaxy's hungriest inhabitant.

Now imagine not just one, but two black holes, sitting down for a celestial feast. In 2002, a Chandra image revealed, also for the first time, two active black holes in the nucleus of a galaxy called NGC 6240, 400 million light years from Earth. The discovery showed that massive black holes can grow through mergers in galactic centers. In fact, over the next few hundred million years, the two black holes — now about 3,000 light years apart — will drift together and merge, forming an even larger supermassive black hole with a more voracious appetite.

Chandra also has been used to take a sneak-peek at galaxies 10-billion light years from Earth — contained in the most distant X-ray cluster of galaxies ever

observed. Using Chandra, astronomers observed an hourglass-shaped region of X-ray emission surrounding a known radio source within the cluster.

By confirming the radio source as the central galaxy in the massive cluster, astronomers are better able to understand what the universe was like at 20 percent of its current age. This is possible because it has taken 10 billion years for the X-rays, traveling at the speed of light, to reach Earth's vicinity. This means that Chandra, like a time machine, is peering back to a time when the universe was only two to four billion years old.

Speaking of age, Chandra recently helped astronomers verify the Hubble Constant — a critical number that tells us the universe's age, size, and how much matter it contains. How? By specifying the expansion rate of the universe at 76.9 in its traditional units of kilometers per second per megaparsec. A megaparsec is equal to 3.26 million light years. The Chandra result offered the independent confirmation that scientists had been seeking for years. In the process, the discovery helped fix the age of the universe between 12 and 14 billion years.

Marshall manages the Chandra program for NASA's Science Mission Directorate in Washington. Northrop Grumman of Redondo Beach, Calif., was the prime development contractor for the observatory. The Smithsonian Astrophysical Observatory controls science and flight operations from the Chandra X-ray Center in Cambridge, Mass.

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

See Marshall's Chandra experts on page 5



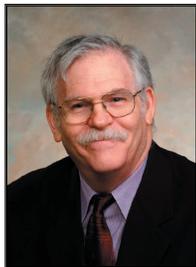
CAC/NGST

Artists concept of NASA's Chandra X-ray Observatory.

Marshall's Chandra experts

Continued from page 4

Observations from Marshall's Chandra experts



Dr. Martin Weisskopf

Chandra Project Scientist Dr. Martin Weisskopf

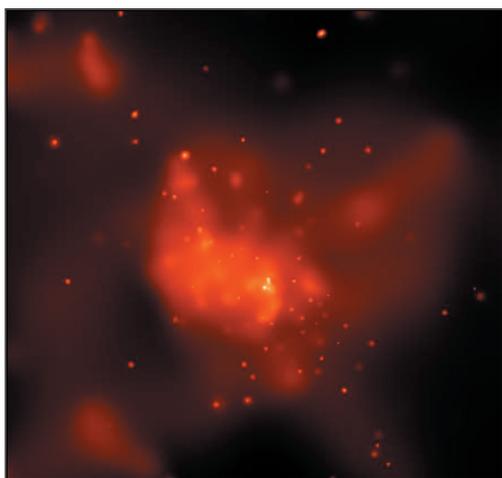
"Chandra's first groundbreaking images were unveiled in August 1999. A lot has changed since then, but Chandra continues to deliver new, exciting images that enhance our understanding of the nature and origin of our universe."

Chandra Program Manager Keith Hefner

"Dubbed an engineering marvel when it launched, Chandra produces X-ray images 25 times sharper than previous X-ray telescopes. In spite of this, Chandra uses very little power. The electrical power required to operate the Chandra spacecraft and its on-board instruments is just two kilowatts — about the same power as a hair dryer. Yet it delivers an average of 1,000 observations a year, shedding new X-ray light on some of the most powerful events in the universe."

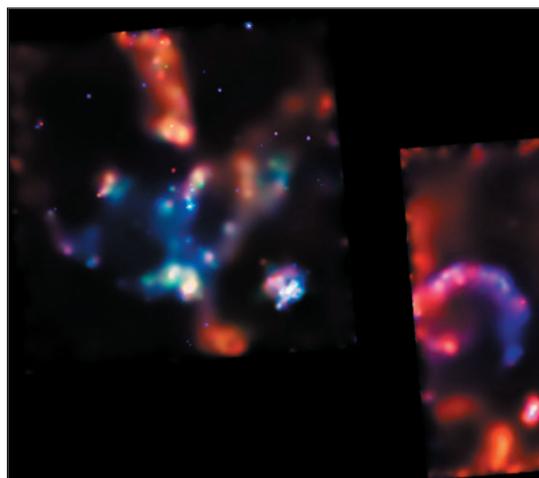


Keith Hefner



NASA/MIT/F. Baganoff et al.

A Chandra X-ray image shows the central region of our Milky Way Galaxy. The bright, point-like source at the center of the image was produced by a huge X-ray flare that occurred in the vicinity of the supermassive black hole at the center of our galaxy.



NASA/CXC/Penn State/L. Townsley et al.

A Chandra X-ray image of the Tarantula Nebula gives scientists a close-up view of the drama of star formation and evolution.

Atlantis

Continued from page 1

launch and on-orbit events.

Atlantis' last mission was STS-112 in October 2002.

In preparation for STS-115, Atlantis was moved into Kennedy's Vehicle Assembly Building on July 24. Atlantis then was attached to its modified external tank and solid rocket boosters and rolled out to the launch pad on Aug. 2. The initial launch date of Aug. 27 was

postponed to evaluate the shuttle and its systems after a lightning strike at the launch pad. A partial rollback to the Vehicle Assembly Building took place Aug. 29 due to concerns about Tropical Depression Ernesto.

For information about the STS-115 crew and mission, visit www.nasa.gov/shuttle .

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

Parachute tests

Continued from page 1

The pilot parachute, measuring approximately 11.5 feet in diameter, was packed and mounted inside a 1,500-pound drop test vehicle, approximately 12 inches in diameter and 12 feet long. The test vehicle included a pointed front end and tail fins, providing the weight and velocity required to simulate the desired test "load" experienced by the parachute during deployment and descent. In addition, a comprehensive array of instruments and a data recorder were mounted inside the drop test vehicle to record real-time data, such as speed, weight on the parachute lines and pressure during descent.

An Army UH-1 Huey helicopter and a CH-47 Chinook helicopter were used during the tests to lift the drop test vehicle above a Yuma test range and release it from an elevation of 10,000 feet. To protect the instruments inside the vehicle, a second larger parachute was deployed near the end of the test to safely land the vehicle on the ground.

The pilot parachute is the first element to be deployed in a three-stage parachute recovery system being designed and developed by NASA for the Ares I first stage booster. The system, which includes a pilot, drogue and three main parachutes, is derived from the space shuttle's solid rocket booster recovery system.

During the launch, the first stage booster separates from the launch vehicle's upper stage at approximately 130 seconds into flight at an elevation of 195,000 feet. After separation, the booster free falls, re-entering the atmosphere. At approximately 15,000 feet, the booster's nose cap is jettisoned, releasing the pilot parachute and beginning the recovery system deployment sequence that will deliver the booster to a safe water splashdown and recovery.

As the pilot parachute deploys, this in turn releases the 65-foot-diameter drogue parachute, which is used to maneuver the booster into a vertical position and slow its descent. Once the booster is slowed, a cluster of three main parachutes, each 150 feet in diameter, is deployed. The main parachutes continue to slow the booster to splashdown.

The pilot, drogue and main parachutes for the Ares I recovery system are larger and stronger than those used for the space shuttle boosters. This is because the more powerful Ares I five-segment booster is heavier and falls faster from a much higher altitude after separation from the launch vehicle.

The Ares I first stage booster Recovery System Development Test Program will last approximately two years. Six additional pilot parachute tests will be conducted through 2008. Drogue parachute testing is scheduled to begin in summer 2007, and will consist of approximately seven tests. Testing of the main parachutes will begin in early 2007 and will consist of both individual and cluster tests.

The Marshall Center is responsible for project management of the Ares I first stage and leads the design and development of the solid rocket booster recovery system. ATK Launch Systems is the prime contractor for the first stage booster, and their subcontractor, United Space Alliance, is responsible for the design, development and test of the parachutes at their facilities at NASA's Kennedy Space Center, Fla.

The Johnson Center, responsible for project management of the Orion crew exploration vehicle, is providing test instrumentation and support personnel. Yuma Proving Ground is providing the test range; support facilities and equipment, such as ground-to-air video recording, photography and radar tracking; and the aircraft and flight crew.

The Ares I launch vehicle effort includes multiple project element teams at NASA centers and contract organizations around the nation, led by the Exploration Launch Projects Office at the Marshall Center. The office is part of the Constellation Program at the Johnson Center. Constellation is a key program implemented by NASA's Exploration Systems Mission Directorate at NASA Headquarters in Washington.

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



NASA/MSFC/Army

Data is gathered as the pilot parachute and its payload, the drop test vehicle, descend.

Marshall to support orbital transport systems commercial partners

The Marshall Center will provide key support to two separate aerospace companies selected last week by NASA to develop and demonstrate possible solutions for commercial orbital transportation services. These services have the potential to open new markets in space and pave the way for the commercial industry to launch and deliver crew and cargo to the International Space Station.

On Aug. 18, NASA signed separate Space Act Agreements with SpaceX of El Segundo, Calif., and Rocketplane Kistler of Oklahoma City, Okla., offering seed money totaling up to \$485 million. The agreements establish milestones and objective criteria to assess their progress throughout Phase 1 of the competitive project. Each company is challenged to demonstrate a combination of four capabilities: external, unpressurized cargo delivery and disposal; internal, pressurized cargo delivery and disposal; internal cargo delivery and return; and an option for crew transportation.

Marshall Center management has committed to support both companies' development efforts, said Freida Lowery, business development manager for industry

in Marshall's Business Development Office. "NASA sees itself as an investor in this commercial endeavor," Lowery said, "because it's good for the space industry as a whole and NASA certainly has something to gain from their success."

Scott Horowitz, associate administrator for NASA's Exploration Systems Mission Directorate, concurred. "When commercial enterprises turn the journey to low-Earth orbit into a profit-making business model, NASA will be free to focus on goals that are more appropriate for government, such as exploration of the moon and Mars," Horowitz said in a recent agency release.

Lowery is leading negotiations with SpaceX and Rocketplane Kistler to determine specific areas of Marshall support. Those tentatively include advanced video guidance system technologies and expertise; a variety of wind tunnel testing, engine testing and docking and berthing system support; and manufacturing and office space at NASA's Michoud Assembly Facility in New Orleans, for which Marshall maintains oversight functions.

"These two companies are very excited about this work," Lowery said. "As they

figure out the path ahead and determine how they want to proceed, we at Marshall will establish how best to support them. We want them to be successful."

Once Rocketplane Kistler and SpaceX demonstrate systems capability, NASA plans to issue an open Request For Proposals to purchase crew and cargo delivery services competitively in Phase 2. Phase 1, which specifically covers demonstrations of transportation to and from space station orbit, is separate from the potential Phase 2 contract award to provide resupply services for the space station.

If the Commercial Orbital Transportation Systems demonstrations are successful, Lowery said, that award could be made around the end of the decade, as the space shuttle completes its career.

The Commercial Orbital Transportation Systems project is managed for NASA by Johnson Space Center in Houston. For more information, visit <http://procurement.jsc.nasa.gov/cots/>.

Rick Smith, an ASRI employee who supports the Office of Strategic Analysis and Communications, contributed to this article.



Marshall helps teachers get a 'Head Start'

Mary Allison, left, education manager for the Head Start Program of Huntsville, Madison County and Limestone County, joins teachers in singing and acting out songs about space to teach to pre-school-aged children. The Educator Resource Center, part of the Marshall Center's Academic Affairs Office, and the U.S. Space & Rocket Center co-hosted 58 teachers and staff at the Education Training Facility last month as part of a professional development workshop for Head Start. Head Start is a child development and social services program benefiting disadvantaged children. Teachers were exposed to different methods of showing young children the value of science and math and how the subjects are vital to space exploration. Activities included a tour and informational scavenger hunt inside the Space & Rocket Center.

Emmett Given/MSFC

Engineering awards

Continued from page 2

Peer Awards were given to 147 individuals nominated by their co-workers.

Group Achievement Awards were presented to the following:

- NASA Technical Standards Program for developing the only integrated technical standards system within the government or aerospace industry.
- Combustion Devices Injector Technology Program Team for developing combustor technology and analysis tools to improve reliability and durability of upper-stage and in-space liquid propellant rocket engines.
- Nuclear Surface Power — Advanced Thermal Simulator Design and Test Team for the design, fabrication, test and thermal modeling of high fidelity thermal simulators for use in space nuclear surface power systems.
- Crew Launch Vehicle Metals Engineering Development Team for generating the strategy and baseline development program for the crew launch vehicle upper stage manufacturing and assembly work breakdown structure element. The crew launch vehicle, Ares I, will transport the Orion crew exploration vehicle and deliver cargo payloads to space.
- Floating Potential Measurement Unit Investigation Team for exceptional efforts as co-investigators to support the July flight of

the Floating Potential Measurement Unit to study and measure charging levels on the International Space Station.

- Environmental Control and Life Support System Oxygen Generation System Integrated Test and Verification Team for support resulting in the successful delivery of the ECLSS Oxygen Generation System.
- Engine Cut-Off Sensor Anomaly Investigation for exhaustive failure analysis and testing to isolate the cause of the external tank engine cut-off sensor anomalies.
- Engineering Assessment Team — External Tank Return To Flight Issue Resolution Team for successfully evaluating and supporting the External Tank Project 's certification of the Protuberance Airload Ramp removal design change for the external tank 119, leading to the successful flight of STS-121 in July.
- Integrated Operations, Logistics and Risk Base Design Team for development and implementation of a design capability in support of NASA's exploration initiative.
- X37 Flight Assessment Team for technical excellence in support of the X37 Flight Test through modeling, analysis, test and evaluation of the X37 flight vehicle.

Guests also participated in an "Engineering Showcase" where each department and laboratory hosted a booth displaying the group's capabilities and accomplishments and the names of

their award winners. The booths included videos and animations of both current and past projects, static displays of hardware and interactive exhibits. Managers and engineers from the departments and labs were on hand to discuss the latest projects and technologies being developed within the Engineering Directorate.

For more information and to view pictures of the complete 2006 Engineering Awards Celebration Day, go to <http://ed.msfc.nasa.gov/edinside/highlights/awards/index.html>.

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



Robyn Brick, left, executive support assistant in Marshall's Engineering Directorate receives a Director's Award from the organization's director, Mike Rudolphi, at the Engineering Awards Celebration last month.

David Higginbotham/MSFC

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

Hot tub, 4-Winds, 56 jets, seats 6, \$3,400. 256-434-0499
Antique sofa, red velvet and walnut, \$400. 256-772-9768
Bernette 334DS serger machine, \$300. 256-505-3363
Round wooden drop-leaf table, \$75. 772-1989
Magazine tables, \$20; swivel rocker, \$20; twin bed set, \$20; Artist's How-To books, \$10-\$25. 534-0939
Golf clubs, men's left-handed, woods 1/3/5, irons 3-9, PW, SW, putter, no bag, \$150. 882-3983
Michelin MX4 radial tire, 215/60R-17, 8/32 tread above wear indicators, \$15. 256-828-1234
Cherry wood plant stand w/marble top, \$15; serving cart on wheels, \$15. 256-603-3558
Household items: Oak oval pedestal table/chairs, entertainment center, office chair, stroller, baby toys/clothes. 880-9025
Chest of drawers, dark wood, 5-drawers, \$75. 353-0370
Riding mower and tiller, use for parts, engine good, \$150 for both. 828-5246
Sherwood receiver, \$75; Teac CD player and Panasonic Thrusters speakers, \$20 each. 682-8692
Platinum wedding band w/scroll design, size 8, \$250. 874-0885/Belinda
Wood desk w/hutch, white and stained wood, keyboard tray, \$60. 468-6016
AKC registered yellow/white Labrador puppies, born 7/31/06, \$250. 256-200-4362
"Hit-A-Way" tennis/baseball practice pole with tennis kit, new in box, \$200. 337-2534

Kawai Ebony Grand piano, \$10,000; couch, chair and loveseat, \$200. 837-2604
Chipper/shredder, large capacity, 5HP Briggs, \$150. 967-8972
Phillips 26" flat-screen HDTV w/remote, \$700. 464-9854
Auburn vs. Buffalo, Tulane (homecoming), Arkansas State football tickets, 2 tickets to each game, \$30 each. 256-536-6436
1999 GE TV, color, 26", \$50; personal trampoline, \$15; camera tripod, \$20. 837-1006
Pair of Alabama football tickets to LA Monroe and Vanderbilt games. 830-6584
Aquarium w/stand w/access, 25-gallon, \$100; 5 adult corner sectional, \$150; Dell computer w/21" monitor, \$125. 256-658-5685
Turntable, amplifier, speakers, 33-1/3 records, \$100; Smith Corona typewriter, \$25; household safe, \$15. 256-881-4067
Boxes of Canna lilies, red and yellow, \$25; XF-7b 17" monitor, owner's manual, \$40. 256-773-5051
Electrolux canister vacuum cleaner w/Powermate attachment, \$90. 837-6776
Chandelier, 5-light, \$70. 509-2536
Graphite golf woods: Adams Tight Lies 3, \$40; Tour Edge 4, \$35; Acer driver, \$20. 536-8692
Tappan smooth top electric stove, white, 6-months old, under warranty, moving, must sell, \$350. 256-278-8962
Oak entertainment center w/storage, adjustable shelves, recessed lights, holds 36" or smaller TV, \$500. 829-0285
Alabama vs. Louisiana-Monroe football tickets, two in Section N and 3 in N2, \$35 each. 216-1645
Glass aquarium, glass w/Oak base, 60"Lx46"Hx19"W, \$300. 256-721-7751
Four tickets to Eric Clapton in Birmingham, upper level, \$75 each. 232-0246
Canon digital camera, A80, w/swivel LCD screen, \$180; computer monitor, 17" CRT, \$38. 655-1986
Telescope, 12.6", ST80 finder, filters, fans, dew heaters, laminated charts, portable design, more, \$1,200. 883-9361
Boss TU-2 tuner, \$80; Digitech RP50, \$40; Boss BE-5B, \$40. 655-6293

Vehicles

2001 Honda trail bike, XR50 88 Big Bore kit, many extras, \$1,500. 883-1874
1998 Nissan Maxima, V6, sunroof, all options, keyless entry, one-owner, 148K miles, \$5,500. 527-8116
2002 camper, 5th wheel, 30' with slide-out, sleeps 8, kitchen, bath. 721-1260
1998 GMC Yukon SLT, maroon w/tan leather, heated seats, auto, 4WD, \$8,900. 682-6326
1995 Isuzu Rodeo, new belts, timing belts, water pump, tune-up, \$3,000. 652-5902
1992 Acura Vigor, 5-speed, 153K miles, \$3,000. 520-6846
1978 Corvette, silver w/red interior, \$13,000. 852-5628
1994 Toyota Camry, 119K miles, \$3,800. 497-3260
1996 Chrysler Town & Country van, hunter green, leather interior, 170K miles, \$3,600. 256-776-9118
2001 Suzuki 80 4-wheeler, \$800. 684-6271
1998 XR400 motorcycle, never raced, \$1,950. 461-9404
1986 Cadillac Eldorado, red, 2-door, power sunroof, touring package, 58K miles, \$11,000. 885-2293
2003 100th Anniversary Harley Sportster XL1200C, lots of extras, \$8,800. 256-729-0525
2001 SeaDoo GTI, 85HP, two stroke, three seater w/trailer and cover, \$2,500. 683-3745
Jayco camper, 18', full kitchen, full bathroom, sleeps 6, new tires. 891-1550
2001 Ford Windstar SE, leather, left-sliding door, rear a/c, rear bucket seats, 97K miles, \$8,950. 256-497-3951

Wanted

Used refrigerator in good shape. 355-5870
Baritone/euphonium for 3rd year student, must be in good shape and play properly. 230-9410
Alabama or Auburn home tickets at regular price. 256-878-0124/Dan
Football tickets, 4 seats together, Auburn vs. Arkansas. 256-828-1234
Cherry nightstand in good condition. 379-3887

Lost

Small blue hearing aid in or near Building 4203. 256-726-2795

Petrone

Continued from page 3

directly involved in all successful launches of the Saturn I and IB vehicles.

Following his retirement from the Army in 1966, Petrone became director of Launch Operations at the Kennedy Center. He was responsible for the management and technical direction of pre-flight operations and integration, test, checkout and launch of all space vehicles, both manned and unmanned.

Petrone personally directed the first five crewed Apollo launches, culminating in the Apollo 11 lunar flight. In 1969, he was named director of the Apollo Program for NASA with overall responsibility for the direction and management of the Apollo Space Flight Program.

In 1972, he was assigned additional responsibilities as program director of the NASA portion of the U.S. and the former Soviet Union joint Apollo Soyuz Test Program.

Petrone was named Marshall Center's director in 1973. During his tenure, he presided over the center's role in Skylab, America's

first crewed space station. In three successful missions, including a dramatic rescue, the Marshall Center, under Petrone's direction, demonstrated convincing expertise in scientific and crewed systems. As Marshall's director, he also oversaw a major center restructuring to accommodate Marshall's changing roles and responsibilities in the 1970s.

In 1974, Petrone left Marshall to accept an appointment as NASA Associate Administrator at NASA Headquarters in Washington. He directed Headquarters' program offices, including Manned Space Flight, Space Science, Aeronautics and Space Technology, and Tracking and Data Acquisition.

In 1975, Petrone retired from NASA and became the president and chief executive officer of the National Center for Resource Recovery, a joint industry/labor effort to develop and encourage ways to recover materials and energy from solid waste. In the 1980s, Petrone held senior posts at Rockwell International.

The recipient of numerous awards and honors, Petrone is survived by his wife of 50 years and four children.

The writer, Mike Wright, is the Marshall Center historian.

Silver Snoopy Awards presented to 33 Marshall team members

Silver Snoopy Awards were presented to 33 Marshall team members Aug. 8-9 by astronauts Dr. C. Michael Foale, Lt. Col. Timothy L. Kopra, Lt. Col. James P. Dutton Jr. and Richard R. Arnold II.

of the workforce for outstanding and exemplary work. The Snoopy emblem reflects NASA and the industry's sense of responsibility and continuing concern for astronaut flight safety.

Less than 1 percent of the space program workforce receives the award annually.

The Silver Snoopy is the astronauts' personal award to members



Adeline Byford

From left, astronaut Richard R. Arnold II; Steve Terry, Science & Mission Systems Office; Phillip G. Bryant, Tec Masters Inc.; Ginger N. Flores, Science & Mission Systems Office.



Adeline Byford

From left, Kenneth Schrock, Fawn Glenn, astronaut Richard R. Arnold II, Michael Tinker, Terry Prickett and James Richard. The recipients are members of the Engineering Directorate.



Emmett Given/MSFC

From left, Paul Julino, Jacobs Sverdrup; Jeff Martin, Engineering Directorate; astronaut C. Michael Foale; Mark Beujter, SLI; Terry Rolin, Engineering Directorate.



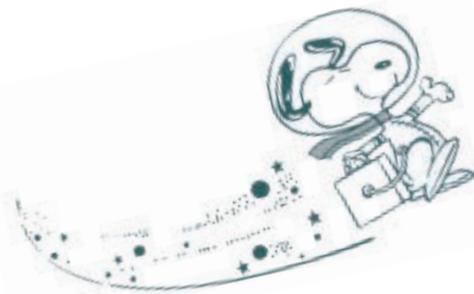
Gordon Carey

From left, James Mankoski, ERC; astronaut Lt. Col. Timothy L. Kopra; Donnie Smith, Jacobs Sverdrup.



Emmett Given/MSFC

From left, Russell Parks, astronaut C. Michael Foale and Jerome Pitt. The recipients are members of the Engineering Directorate.



*See page 11
for additional Silver
Snoopy Awards*

Silver Snoopy Awards continued



From left, Jerry W. Hicks, EG&G; Greg Bass, EG&G; astronaut Lt. Col. James P. Dutton Jr.; Dave Yerdon of Yang.

Doug Stoffer/MSFC



From left, Craig Murdoch, EG&G, and astronaut Lt. Col. James P. Dutton Jr.

Doug Stoffer/MSFC



John Miller

From left, Chuck Thompson, Paul Gibbons, Paul Armbruster, astronaut Lt. Col. Timothy L. Kopra, Anthony Scaffardi, Andy McClendon and Dave Patterson. The recipients are employees of Teledyne Brown Engineering.



Doug Stoffer/MSFC

From left, Judy Hyde, Office of Center Operations; astronaut Lt. Col. James P. Dutton Jr.; Patty Fundum, Engineering Directorate.



Doug Stoffer/MSFC

From left, Howard Bozeman, astronaut Lt. Col. James P. Dutton Jr. and Carol Elder. The recipients are members of the Office of Center Operations.



Emmett Givney/MSFC

From left, Tom Sheil, astronaut C. Michael Foale, Daniel Brett and Jason Dukes. The recipients are employees of SAIC.

3 Marshall employees receive Women's Equality Day awards

By Bill Hubscher

The Marshall Center, as a part of Team Redstone, recently honored three Marshall employees for outstanding performance, dedication and innovation in carrying out their duties during the Women's Equality Day luncheon and awards ceremony.

The women, selected by a panel of their peers, are Lisa Carr, senior reliability and quality engineer in Marshall's Safety and



Lisa Carr

Mission Assurance Directorate; Teresa Vanhooser, deputy director of Marshall's Engineering Directorate; and Libby Youmans, management and program analyst in the Engineering Directorate.

They were honored Aug. 24 at the Redstone Officers' and Civilians' Club.

Carr was cited for outstanding achievement in the professional category. She joined

NASA in 1983 as a manufacturing engineer, where she soon became the team lead for nondestructive evaluation in the Materials and Processes Laboratory. She leads the Safety and Mission Assurance group that developed the Non-Oxide Adhesive Experiment. Tested on the Space Shuttle Discovery during its mission in July, the experiment provided astronauts on orbit with materials to repair any cracks found in the leading edge of the shuttle's wing.

Recognized for her outstanding achievement in a supervisory role, Vanhooser came to Marshall in 1980 as an engineer in the Ground Systems Analysis Branch, where she developed and documented requirements for integration and testing of payloads for the Spacelab carrier, used to conduct science experiments in the shuttle payload bay. She also served as the mission manager



Teresa Vanhooser

for ATLAS-2 in 1993 and the first Microgravity Science Laboratory mission in 1997. Today, she helps lead the Engineering



Libby Youmans

Directorate in the design, test, evaluation and operation of science instruments, spacecraft systems and payloads under development at Marshall.

Youmans was awarded for outstanding achievement in the administrative category. She started her NASA career in 1988 as a program analyst in the Associate Directorate for Engineering. She is now team leader in

the business office of the Engineering Directorate's Instrument and Payload Systems Department, where she is responsible for managing resources and personnel.

At the awards ceremony, Audrey Dixon was announced as the winner of the Women's Equality Day essay contest. Dixon is a technical coordinator with Mainthia Technologies, Inc. supporting the Propulsion Component Design and Development Division in Marshall's Engineering Directorate. The essay will be posted on the Office of Diversity & Equal Opportunity's Web site.

Dr. Amanda H. Goodson, former director of the Safety and Mission Assurance Directorate at Marshall and currently the senior manager of Mission Assurance at Raytheon Missile Systems in Tucson, Ariz., was the keynote speaker.

This annual event is sponsored by Team Redstone, an organization comprising many federal agencies located off-site and on Redstone Arsenal, to recognize outstanding women during Women's Equality Day. The day marks the passage in 1919 of the 19th Amendment to the U.S. Constitution, recognizing women's right to vote.

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

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