



MARSHALL STAR

Serving the Marshall Space Flight Center Community

Nov. 19, 2009

Ares rocket named Best Invention of 2009 by Time magazine

By Craig Dunn

Headlining Time magazine's list of 50 Best Inventions for 2009, NASA's Ares I rocket, managed at the Marshall Space Flight Center, was selected as the No.1 best invention of the year.

According to the article, which is currently posted on time.com and appears in the Nov. 23 edition of Time, the Ares I rocket "is the best and smartest and coolest thing built in 2009 – a machine that can launch human beings to cosmic destinations we'd never considered before – is the fruit of a very old family tree, one with branches grand, historic..."

Teresa Vanhooser, acting manager for Ares Projects, said of the magazine's selection, "Time magazine's recognition



is wonderful acknowledgement for the Ares team. We have an amazing team of dedicated, enthusiastic engineers dedicated to designing and building Ares I," she added.

This year's top 50 list included inventions like the AIDS vaccine, NASA's Mercury Probe and Philips Electronics' 10 watt LED bulb.

But perched at the top of the list: the Ares I rocket.

"It's been a busy, challenging and successful year," said Vanhooser. "Our team worked hard and achieved many successes, including welding the first liquid

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Space shuttle Atlantis on 'delivery flight' to International Space Station



From a NASA news release

Space shuttle Atlantis and its six-member crew arrived at the International Space Station Nov. 18 to deliver spare hardware to the outpost and pick up a station crew member who's spent more than two months in space.

The 11-day mission to the space station launched Nov. 16 from the Kennedy Space Center, Fla.

Atlantis carried about 30,000 pounds of replacement parts for systems that provide power to the station, keep it from overheating and maintain a proper orientation

in space. The large equipment can best be transported using the shuttle's unique capabilities.

"We appreciate all the effort making this launch attempt possible," said Commander Charlie Hobaugh shortly before launch. "We are excited to take

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NASA 'drops' next generation robotic lander during autonomous tests

By Kim Newton

NASA has successfully completed a series of autonomous "drop" tests of a robotic lander test article – in a record 10 months – to demonstrate the ability to perform a controlled landing on the moon or other airless planetary bodies.

During recent tests at the Marshall Space Flight Center, the lander test article was suspended 10.5 feet above the landing pad. Released from its hoist,

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LCROSS twin impacts confirm water in lunar crater

From a NASA news release

Preliminary data from NASA's Lunar Crater Observation and Sensing Satellite, or LCROSS, indicates the mission successfully uncovered water in a permanently shadowed lunar crater. The discovery opens a new chapter in our understanding of the moon.

The LCROSS spacecraft and a companion rocket stage made twin impacts in the Cabeus crater Oct. 9 that created a plume of material from the bottom of a crater that has not seen sunlight in billions of years. The plume traveled at a high angle beyond the rim of Cabeus and into sunlight, while an additional curtain of debris was ejected more laterally.

"We're unlocking the mysteries of our nearest neighbor and, by extension, the solar system," said Michael Wargo, chief lunar scientist at NASA Headquarters in Washington. "The moon harbors many secrets, and LCROSS has added a new layer to our understanding."

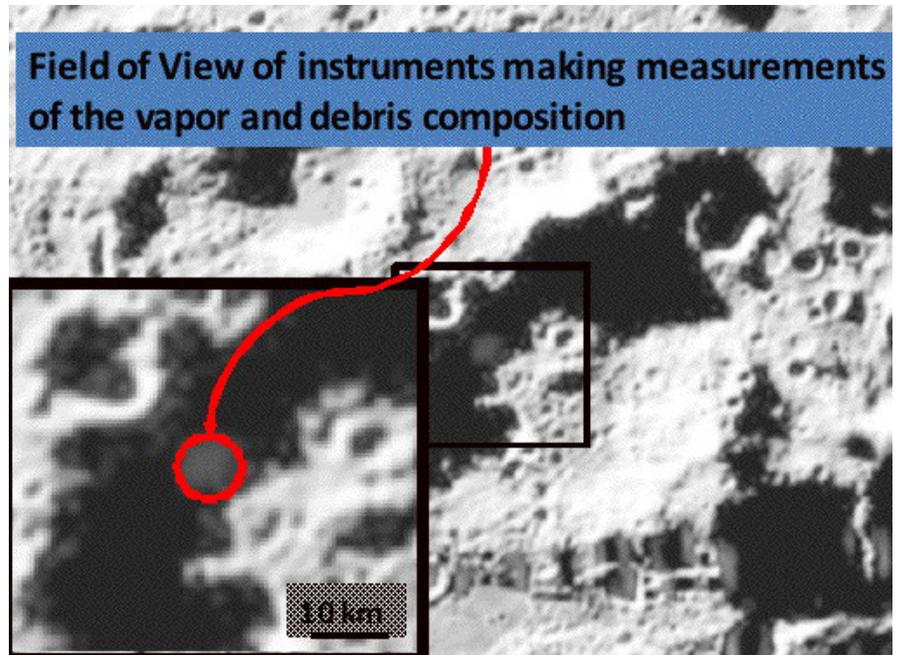
Scientists long have speculated about the source of significant quantities of hydrogen that have been observed at the lunar poles. The LCROSS findings are shedding new light on the question with the discovery of water, which could be more widespread and in greater quantity than previously suspected. If the water that was formed or deposited is billions of years old, these polar cold traps could hold a key to the history and evolution of the solar system, much as an ice core sample taken on Earth reveals ancient data. In addition, water and other compounds represent potential resources that could sustain future lunar exploration.

Since the impacts, the LCROSS science team has been analyzing the huge amount of data the spacecraft collected. The team concentrated on data from the satellite's spectrometers, which provide the most definitive information about the presence of water. A spectrometer helps identify the composition of materials by examining light they emit or absorb.

"We are ecstatic," said Anthony Colaprete, LCROSS project scientist and principal investigator at NASA's Ames Research Center in Moffett Field, Calif. "Multiple lines of evidence show water was present in both the high angle vapor plume and the ejecta curtain created by the LCROSS Centaur impact. The concentration and distribution of water and other substances requires further analysis, but it is safe to say Cabeus holds water."

The team took the known near-infrared spectral signatures of water and other materials and compared them to the impact spectra the LCROSS near infrared spectrometer collected.

"We were able to match the spectra from LCROSS data



The visible camera image showing the ejecta plume at about 20 seconds after impact. The field of view of the spectrometers are indicated by the circle.

only when we inserted the spectra for water," Colaprete said. "No other reasonable combination of other compounds that we tried matched the observations. The possibility of contamination from the Centaur also was ruled out."

Additional confirmation came from an emission in the ultraviolet spectrum that was attributed to hydroxyl, one product from the break-up of water by sunlight. When atoms and molecules are excited, they release energy at specific wavelengths that can be detected by the spectrometers. A similar process is used in neon signs. When electrified, a specific gas will produce a distinct color. Just after impact, the LCROSS ultraviolet visible spectrometer detected hydroxyl signatures that are consistent with a water vapor cloud in sunlight.

Data from the other LCROSS instruments are being analyzed for additional clues about the state and distribution of the material at the impact site. The LCROSS science team and colleagues are poring over the data to understand the entire impact event, from flash to crater. The goal is to understand the distribution of all materials within the soil at the impact site.

"The full understanding of the LCROSS data may take some time. The data is that rich," Colaprete said. "Along with the water in Cabeus, there are hints of other intriguing substances. The permanently shadowed regions of the moon are truly cold traps, collecting and preserving material over billions of years."

"This finding is significant and has many tangible benefits for future lunar exploration," said Todd May, former manager of the Marshall Space Flight Center's Lunar Precursor

See LCROSS on page 4

Center donations exceed \$400,000

CFC volunteerism: Seeing good work that results from Marshall contributions

By Rick Smith

The Marshall Space Flight Center's Combined Federal Campaign bus tours are over for 2009 – but the hard work continues among the charitable organizations Marshall supports during the annual federal fundraiser.

That was evident Nov. 10 to more than 40 Marshall team members who visited the Regional Neo-natal Intensive Care Unit and the St. Jude Clinic, both part of the Huntsville Hospital for Women & Children.

None left unmoved.

The 45-bed Neo-natal Intensive Care Unit, or NICU, is a colorful, softly lit hive of life-saving technology artfully disguised as a storybook nursery. More than 30 hospital personnel – nurses, physicians, therapists, orderlies and other support staff – are on duty. And they're busy: Most of the "Giraffe beds" – futuristic-shaped "micro-environments" for premature and ill newborns – are occupied by patients just days or weeks old. Warm, blue phototherapy light tables help others recover from jaundice, the not-uncommon build-up of bilirubin in babies' bloodstreams before birth.

"It's a lot of hard work for our doctors and nurses, but they love it," said Cathy Hubler, director of children's services at the hospital.

"Of course," she added, "we need all the support we can get."

The state-of-the-art NICU expanded to its current size in 2004 to serve a growing sector of North Alabama and the Tennessee Valley – and it was already full the day the new unit opened, said Jennifer Godwin, a 20-year veteran of neo-natal intensive care at the hospital. In 2008 alone, the unit received more than 1,000 admissions. Further expansion is planned, she said. In time, the hospital hopes the unit will house 75 beds.

On the other side of the sprawling hospital complex, the St. Jude Clinic, which serves children and teens

undergoing treatment for leukemia and other pediatric cancers, is also busier than facility managers ever anticipated. When the Huntsville clinic – one of six St. Jude affiliates that support the primary hospital based in Memphis – opened in 2007, the staff anticipated they might see as many as 12 patients in the clinic's first year, said Pam Gill, practice administrator and data manager. More than 100 were treated.

Today – after its move in September to more spacious, kid-friendly offices and treatment facilities – the clinic serves more than 400 patients. It provides chemotherapy and other treatments, offers information and support for families of sick children and contributes samples and data aiding St. Jude research into new therapies and potential cures for pediatric cancers. Most importantly, Gill said, the staff concentrates on the emotional and physical needs of their young charges, helping them endure the challenges of treatment – and celebrating their successes with uplifting events such as "No Mo Chemo" parties at treatment's end.

"You've got to speak the right language when you're dealing with sick kids," Gill said. "We speak 'children.'" The pictures on the walls – some of them beaming faces of patients, others artwork contributed by the children themselves – bear her out.

"I did not know Huntsville Hospital had a satellite facility for St. Jude," said bus tour participant Stephanie Lacy-Conerly, a management analyst and administrative officer in Marshall's Shuttle Propulsion Office. "It was heartwarming to find out the facility is here, providing care and support to

See CFC on page 5



Huntsville Hospital charge nurse Traci Conley, left, demonstrates to CFC bus tour participants how a "Giraffe bed" is used to protect and permit care for a premature newborn in the hospital's Neo-natal Intensive Care Unit.

Keeping Marshall safe: radon monitoring to collect average concentration at 72 Marshall buildings

By Amie Cotton

The Marshall Space Flight Center is taking a proactive approach to protecting against radon – a radioactive chemical element found in soil.

Marshall's Environmental Engineering & Occupational Health Office has placed radon monitors in 72 buildings at the center with basements or slab foundations. After a year of measurements, the monitors will be collected and their data analyzed to obtain the average radon concentration.

Radon – odorless, colorless and tasteless – comes from the decay of Uranium-238 and Thorium-232, naturally occurring elements in soil. Radon gas from natural sources can accumulate in buildings, especially in confined areas such as basements. Levels of radon are typically higher in the Tennessee Valley due to the geology.

"Because radon levels vary by time of day, season and weather, we want to monitor the average concentration," said Philip Brown, Marshall's radiation safety officer and an employee of Wyle Integrated Science and Engineering of Houston. In addition to the yearlong monitors, Marshall has a continuous radon monitor for real-time analysis of levels in Marshall buildings. This real-time monitor is used to take "snap shots" of the building environment in order to see the dynamics of radon levels.

The Environmental Engineering & Occupational Health Office, which has been actively monitoring radon levels at Marshall since 1989, maintains radon data for all Marshall

buildings. The information is available at <http://eemo.msfc.nasa.gov/environmental/health/default.asp>.

Occupational limits for radon are set by two federal agencies: the Occupational Safety and Health Administration and the Nuclear Regulatory Commission. OSHA's current limit on radon exposure is 100 picocuries per liter of air, or pCi/l. When a level of 25 pCi/l is reached, OSHA requires the employer to start tracking the radiation dose for affected employees. The Nuclear Regulatory Commission's limit is 30 pCi/l, with a mitigation action required at a level of 9 pCi/l.

The average for all buildings at Marshall is below 4 pCi/l.

The Environmental Protection Agency radon guideline is 4 pCi/l for homes. In September, the World Health Organization released a new handbook on indoor radon that proposed new levels for homeowners at 2.7 pCi/l or lower to further minimize health hazards due to exposure. The handbook also recommends that homes not exceed 8.1 pCi/l.

It is important to note that the EPA and WHO guidelines are for homes, not businesses, Brown added. They are based on a person being exposed to a constant concentration 70 percent of the time over their entire lifetime. These guidelines are less than the occupational radon exposure limits, given the greater amount of time a person spends at home than at work over his or her lifetime.

Brown's team continues to proactively ensure the safety of the Marshall work force. The Marshall Environmental Engineering & Occupational Health Office is working with NASA Headquarters to develop an agency-wide policy on radon.

"Our mission is to provide a safe work environment for every employee at Marshall," Brown said. "Our office works in conjunction with facilities management to monitor each Marshall building and keep radon levels as low as possible."

Cotton, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.

LCROSS *Continued from page 2*

Robotic Program Office. "Launching all the resources humans need to live and work in space is very expensive and a significant consideration in any exploration architecture. If we learned to mine the resources that exist on the moon, we'd have room for more science or exploration experiments – allowing us to do other scientific research."

The Lunar Precursor Robotic Program Office located at the Marshall Center was responsible for overall program management responsibility for the LCROSS project up through impact

– providing mission oversight, technology planning and flight assurance.

LCROSS was launched June 18 from NASA's Kennedy Space Center in Florida as a companion mission to the Lunar Reconnaissance Orbiter, or LRO. Moving at a speed of more than 1.5 miles per second, the spent upper stage of its launch vehicle hit the lunar surface shortly after 6:31 a.m. CDT Oct. 9, creating an impact that instruments aboard LCROSS observed for approximately four minutes. LCROSS then impacted the surface at approximately 6:36 a.m.

LRO observed the impact and continues to pass over the site to give the LCROSS team additional insight into the mechanics of the impact and its resulting craters. The LCROSS science team is working closely with scientists from LRO and other observatories that viewed the impact to analyze and understand the full scope of the LCROSS data.

For information about LCROSS, visit <http://www.nasa.gov/lcross>.

Newton is a public affairs officer in the Office of Strategic Analysis & Communications.

STS-129 *Continued from page 1*

this incredible vehicle for a ride to another incredible vehicle, the International Space Station."

The flight will include three spacewalks and the installation of two platforms to the station's truss, or backbone. The platforms will store the spare parts needed to sustain space station operations after the shuttle fleet is retired.

Hobaugh is joined on Atlantis' STS-129 mission by Pilot Barry E. Wilmore and Mission Specialists Leland Melvin, Randy Bresnik, Mike Foreman and Bobby Satcher. Atlantis will return with space station resident Nicole Stott, marking the final time the shuttle is expected to rotate space station crew members. Wilmore, Bresnik and Satcher are first-time space fliers.

Atlantis' first landing opportunity at Kennedy is scheduled for Nov. 27 at 8:43 a.m. CST.

STS-129 is the 129th space shuttle flight, the 31st to the space station, the 31st for Atlantis and the fifth in 2009.

NASA is providing continuous television and Internet



Space shuttle Atlantis launches Nov. 16.

coverage of Atlantis' mission. NASA Television features live mission events, daily mission status news conferences and 24-hour commentary. For NASA TV streaming video, downlink and schedule information, visit <http://www.nasa.gov/ntv>.

CFC *Continued from page 3*

children and their families."

The Neo-natal Intensive Care Unit visit "really was an emotional trip" for Lacy-Conerly. Her niece was a patient there 18 years ago. Born prematurely, the child weighed just 1.5 pounds. Last May, she graduated from Lee High School in Huntsville.

Irene Taylor, Marshall's CFC executive chairperson, said Lacy-Conerly's reaction is typical among Marshall CFC bus tour participants, who visit charitable organizations that support the community in a variety of ways.

"Monetary contributions are important to ensure charitable organizations can operate effectively," Taylor said, "but you really feel the impact of CFC when you take part in Community Service Days and CFC bus tours – when you see firsthand the good work that's being done as a result of our contributions."

The Marshall Center continues to march toward this year's CFC donation goal of \$625,000. As of Nov. 15, the center has raised approximately \$405,144.

The 2009 fundraising drive ends Dec. 11. For more information or to volunteer for CFC Community Service Days, go to Inside Marshall and click on the CFC logo. To learn more about the Regional Neo-natal Intensive Care Unit and the St. Jude Children's Research Clinic, visit <http://www.huntsvillehospital.org/womenchildren/childrenservices>.

Smith, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.



The Marshall Center's 2009 Combined Federal Campaign runs through Dec. 11. So far, Marshall's work force has contributed \$405,144 toward the center's \$625,000 goal.

the lander simultaneously received a command to activate its onboard thrusters to carry it to a controlled landing using a preprogrammed descent profile. These tests demonstrate the test article's capability to perform autonomous descent, and soon will be used to checkout landing control algorithms for the next generation of lander missions.

"Demonstrating autonomous flight and descent in this short amount of time is a major accomplishment," said Julie Bassler, Robotic Lunar Lander Development Project manager in Marshall's Science & Mission Systems Office. "The proven capability of this test platform reduces our technical risks and brings us one step closer to building a flight robotic lander capable of carrying both scientific and exploration payloads to the lunar surface."

The test article uses compressed air for safe operations and quick turn-around times, allowing engineers to perform multiple tests in a day and make adjustments as necessary. The test article is compact – standing at 3 feet tall and weighing 270 pounds. The article is roughly the same size as the actual flight lander, designed to operate through long lunar nights, and capable of landing on the near or far side of the moon and inside or on the edge of craters.

The project team also is working on a "warm gas" test article, using a more energetic propellant than compressed air. The warm gas test article will add to the functionality of the cold gas article by demonstrating performance of flight avionics and sensor components as well as software based on the spaceflight vehicle. The warm gas test article will provide longer flight time -- approximately one minute -- and will operate at greater altitudes. It is expected to be operational next summer.

"The moon is a fascinating, complex world," said planetary scientist Barbara Cohen of Marshall's Science & Mission

Systems Office. "This new generation of small robotic landers will be capable of carrying scientific instruments to the lunar surface that could perform a variety of investigations,

including those that enhance our understanding of the moon's deep interior, surface geological processes, and the existence of lunar ice and water at the poles."

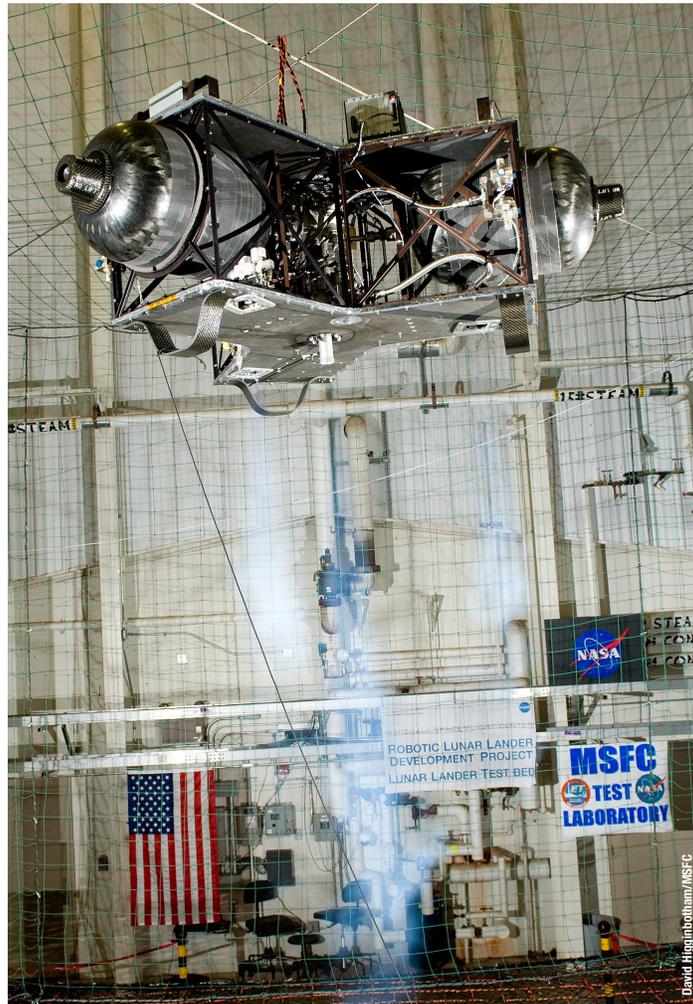
Another significant milestone for the Robotic Lunar Lander Development Project was the successful hot-fire thruster testing of a candidate descent thruster at NASA's White Sands Test Facility in Las Cruces, N.M., using technology developed for the nation's ballistic missile defense system. The thruster was put through a 16-minute, full-duration firing sequence to simulate a lunar landing, including continuous burns up to 10 times longer than typically required for missile defense systems. Test data is currently being analyzed to better understand the complexities of performing a safe moon landing.

"This important thruster test demonstrates the potential to leverage an existing government investment for a new and exciting application,

reducing our technical risk and saving taxpayer dollars at the same time," said Marshall engineer Danny Harris of the Engineering Directorate.

The Robotic Lunar Lander Development Project is a team of industry, government and not-for-profit collaborators, including the Marshall Center, Johns Hopkins University Applied Physics Laboratory in Laurel, Md., and the Von Braun Center for Science and Innovation in Huntsville. This team is designing and building the next generation of robotic landers that can carry a broad range of science payloads and devices, including geophysical measurement instruments, volatile measurement instruments or possibly lunar sample returns.

For more photos and video of the test, visit www.nasa.gov/roboticlander.



The robotic lunar lander test article is released from its hoist, while simultaneously receiving a command to activate its onboard thrusters to carry it to a controlled landing, using a pre-programmed descent profile.

Ares *Continued from page 1*

hydrogen fuel tank demonstration dome, test firing the ullage settling motor, conducting the development motor 1 ground test and Ares I-X flight test.

"We have learned a great deal which will help to validate our models and refine Ares designs going forward. These are major technical accomplishments for this team which is doing what they've been asked to do and what the Marshall team has always done best – designing and building space transportation vehicles like the Ares rocket. The Time article is a fitting tribute to this teams' many accomplishments," she said.

Dunn, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.



The Ares I-X test rocket soars in to orbit.

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, Nov. 26, is 4:30 p.m. Thursday, Nov. 19.

Miscellaneous

Gentron Pro Series 3500RV Generator, electric start, \$400. 679-5734

Browning Ambush compound bow, 60-pound draw wt, \$100. 776-7399

Two upholstered swivel chairs, ottoman, \$75; pair of twin wooden headboards, metal frames, \$65. 714-4651

Queen-size waterbed, light pine head/footboards, heater, liner, padded rails, mattress, \$200. 714-1357

Shopsmith multi-purpose woodworking machine, 1970-80s eras. 677-5217

Boston acoustics TV soundbar, wireless subwoofer, \$150;

Dell Inspiron 40GB OS-Linux, \$75. 457-5173

Snapper high-vacuum riding mower, 30-inch cut, needs new 12.5-hp engine, \$100. 325-0085

King-size waveless waterbed, 6-drawer pedestal, bookcase headboard with mirror, linens, \$175 obo. 652-2978

Treadmill with incline, max speed 8 MPH, \$125; Broyhill white kitchen hutch, glass sides/doors/shelves, \$350. 975-1667

Nintendo Wii console, two controllers/nunchucks, sensor bar, cables, 10 games, \$310. 724-1980

Futon bunk bed, mattresses, custom futon cover, ladder, \$500. 881-0551

La-Z-Boy cream leather sofa, recliner at each end. 722-9455

Sonor drum set, five pieces, black, lots of accessories, \$500. 205-394-1307

Computers, new and used, \$99 to \$325. 830-6799

Garmin 750 GPS, universal dash mount, \$175 obo. 883-2982

Electric bass, black, GW Lyon by Washburn, \$110 or make offer. 361-9796

Two Jim Brickman concert tickets, 11/30/09, fourth row, \$120. 851-7406

Two tickets to the SEC championship game on 12/5/2009 in

Atlanta. 508-3038

Sofa/loveseat, \$300. 232-6072

Vehicles

2007 Honda Civic SI, 23,800 miles, \$17,900. 506-7352

2004 Dale Jr. Special Edition Monte Carlo SS, supercharged, loaded, 51k miles, \$11,495 obo. 652-2978

2003 Ford Mustang convertible, loaded, leather, V6, 123k miles, \$6,500. 599-0629

2003 Club Car, Auburn University colors, new batteries, windshield, charger, 36V, \$1,950. 682-6326

1999 Toyota Tacoma Prerunner, 91k miles, \$9,500. 355-5811 or 654-5455

1995 Cadillac Sedan Deville, 94k miles, leather, Kelley Blue Book SRV, \$4,500. 830-1455

1993 F350 XLT crew cab, long bed, 460(7.5ltr) motor, \$2,500. 723-8877

1982 Toyota Landcruiser, straight six, four speed, new tires, many new parts, 167k miles. 658-8241

Free

Three outside dogs, two female Chow-mixes, both 11; one 2-year-old male yellow lab mix. 303-6253

'On my honor, I will try' to be a future space explorer



More than 150 Girl Scouts from across Alabama visited the Marshall Space Flight Center and the U.S. Space & Rocket Center on Nov. 6-7. The girls talked with Marshall scientists and engineers, toured some of the center's key facilities and participated in workshops designed to encourage them to study science, technology, engineering and mathematics – fields

crucial to NASA missions. During a tour of the Lab Training Complex in Building 4663, Robert Powell, right, a Teledyne Brown Engineering Inc. employee supporting Marshall's Mission Operations Laboratory, explains to the Scouts the day-to-day activities of astronauts who live and work at the International Space Station.

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