National Aeronautics and Space Administration
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MARSHALL STAR

Serving the Marshall Space Flight Center Community Aug. 25, 2005

Happy birthday, Chandra!

Six years into its mission, NASA's Chandra X-ray Observatory continues to achieve scientific firsts

By Sherrie Super

In August 1999, NASA's Chandra X-ray Observatory opened for business. Six years later, the observatory, managed by the Marshall Center, continues to achieve scientific firsts.

During Chandra's sixth year of operation, auroras from Jupiter, X-rays from Saturn, and the early days of our solar system were the focus of Chandra discoveries close to home – discoveries with the potential to better understand the dynamics of life on Earth.

Jupiter's auroras are the most spectacular

See *Chandra* on page 4

Marshall's former deputy director named Agency's associate administrator

NASA Administrator Michael Griffin has named Rex Geveden as the Agency's associate administrator.

In this capacity, Geveden has oversight for all the Agency's technical missions' areas and field center operations. He will be responsible for programmatic integration between NASA's mission directorates and field centers. He has been serving as acting associate administrator since June.

Rex Geveden

In November 2004, Geveden became NASA's chief engineer. As chief engineer, he was the independent

See *Geveden* on page 6

Mercury astronaut Walter Schirra to speak at Marshall and Von Braun Forum Friday

Walter M. Schirra, one of the original Mercury astronauts, will visit the Marshall Center and speak to employees Friday, Aug. 26, from 2 to 3 p.m., in Morris Auditorium.

He will be available following the program to sign copies of the book, "The Real Space Cowboys," which he co-authored with Ed Buckbee, a former NASA public affairs officer.

Later that evening, he will be the featured speaker at the 2005 Von Braun Forum at 7 p.m., in the IMAX Theater of the U.S. Space & Rocket Center.

The forum is free and open to the public. No tickets are required, but seating is limited.

Director's Corner:
Keeping a competitive mindset

I am pleased with the direction and progress the Center is making toward helping the Agency with the complex planning needed to enable the Vision for Space Exploration. The entire Marshall Team has worked diligently to prepare the Center to be an integral Agency partner. Although Mike Griffin has stated that Marshall will be the agency's launch vehicle center, it is important that our work force not become complacent. Marshall will have to compete for much of the rest of its work.

David King

As we go forward with building launch vehicles, we must retain the discipline the competitive marketplace imposes. We must focus our efforts, and integrate our values and abilities across the Center. Attitudes that derail success come from assuming entitlement or from poor working relationships (taking a territorial posture). There is no entitlement here, and teamwork across the Center and Agency is imperative.

Competition is a good thing. It is the driver behind keeping our skills sharp and stretching us with challenges. Competition enables us to shape our focus and alignment to achieve our goals. We have passion for what we do, and it is important that passion be combined with good business decisions. Pursuing uncompromising excellence in all our work — directed or competed — will make us a stronger team and Agency contributor.

As Mike Griffin has expressed:

"The engine of competition is the primary force behind the American economy, the greatest the world has ever known, and we plan to make greater use of this engine than has been the case at NASA in the past. NASA plans to pursue appropriate partnerships with the entrepreneurial and commercial space sector to the maximum practical extent."

Marshall is ready to serve the Agency. We have the experience — end-to-end — and the technical know-how throughout the community to get the job done.

—David A. King
Marshall Center Director

George Hopson named to Alabama Engineering Hall of Fame

By Lynnette Madison

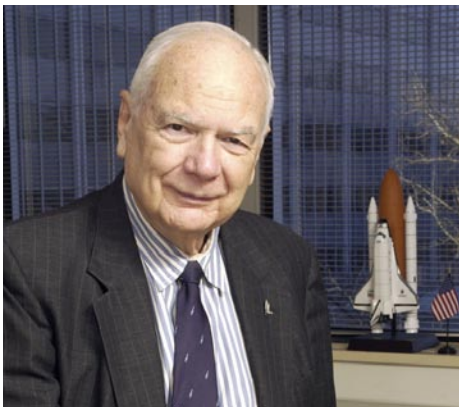
George Hopson, propulsion expert with the NASA Engineering and Safety Center at Langley Research Center in Hampton, Va., was one of six individuals inducted into the State of Alabama Engineering Hall of Fame for 2005. He joins 97 other Alabamians in the Hall.

Hopson was recognized for lifetime accomplishments, including his more than 40 years of service to NASA and the Marshall Center.

Also honored was former astronaut Ken Mattingly. Selected as an astronaut in April 1966, he is a veteran of three space flights, including Apollo 16 in April 1972, STS-4 in June 1982 and STS 51-C in January 1985.

Hopson, former manager of the Space Shuttle Main Engine Project, part of the Space Shuttle Propulsion Office at Marshall, also is a recipient of NASA's Presidential Rank Meritorious Executive Award, bestowed by the President of the United States. He received NASA's Distinguished Service Medal and has twice accepted NASA's Outstanding Leadership Medal and Exceptional Service Medal.

Hopson earned a degree in mechanical engineering in 1950 from the University of Alabama in Tuscaloosa and was inducted as a University of Alabama Distinguished Engineering Fellow in 2005.



George Hopson

He continues to maintain an office at Marshall.

The Alabama Engineering Hall of Fame was founded in 1987 in recognition of the sesquicentennial of formal engineering education in the state. It honors, preserves and perpetuates the outstanding accomplishments and contributions of individuals, projects, corporations and institutions that have brought and continue to bring significant recognition to Alabama. The office of the Board of Registration for Professional Engineers and Land Surveyors in Montgomery provides temporary quarters for the Hall of Fame display.

The writer, an ASRI employee, supports the Public and Employee Communications Office.

Marshall's Talmage Reynolds honored by federal mediation group

Talmage R. Reynolds, right, is congratulated by Scot L. Beckenbaugh, acting director Federal Mediation and Conciliation Service.

Talmage R. Reynolds, director of contractor industrial labor relations in the Integration Support Office of the Center Operations Directorate at Marshall, has become only the 20th person designated an Honorary Commissioner in the 58-year history of the Federal Mediation and Conciliation Service in Washington.

Reynolds received the honor at a recent meeting of the Area Labor Management Relations Council at the Redstone Officers' and Civilians' Club.

Reynolds was honored for his continuous and extraordinary efforts in promoting sound, innovative human resources practices and labor-management cooperative programs. He was a founding member of the local council and has been instrumental in its growth in North Alabama.

At Marshall, Reynolds supports government contracting officers, Center management, contractor management and organized labor, ensuring a continuous supply of mission-critical goods and services. He also serves as Marshall's senior technical advisor on federal contract labor standards.

The Federal Mediation and Conciliation Service is an independent agency that works to preserve and promote labor-management peace and cooperation. The organization also provides mediation and conflict resolution services to industry, government agencies and communities.

Around Marshall

New 'Inside Marshall' Web link enables organizations to communicate activities

A new Web link — "Around Marshall" — is online for Center organizations to use to share significant activities with the rest of the Center. Recognize employee accomplishments, post articles and photos of organization events, share success stories — these are just some of the ways to use "Around Marshall." For an example of how some organizations already are using the site, go to "Inside Marshall" and click on the "Around Marshall" link near the top of the page. For details on how to post information to "Around Marshall," contact Angela Storey in the Office of Strategic Communications at 544-0632, or e-mail angela.d.storey@nasa.gov

CFC T-shirts on sale

Marshall employees can order Combined Federal Campaign (CFC) T-shirts in the Building 4203 Space Shop. The last day to order is Sept. 2 at noon. Shirts will be available for pickup at the Space Shop on Sept. 14. These are also the official T-shirts for the Campaign's Community Service Days. For a T-shirt order form, go to http://www1.msfc.nasa.gov/INSIDE/announcements/2005_cfc_tshirt_of.pdf CFC is a joint effort by federal agencies to raise money for charities in Huntsville and the surrounding area. This year's campaign kickoff will be held jointly with Redstone Arsenal on Sept. 20.

ODIN WebEx Virtual Team Meeting Seat application upgraded

ODIN has upgraded the WebEx Virtual Team Meeting Seat application. The upgrade to "Meeting Center 7.0" offers enhancements to Web conferencing with a new uniform user interface, floating tool bar, power panels and notifications of attendee changes. Virtual team meetings allow Marshall employees to provide presentations, applications, files and Web sites to groups of people in real time by computer. For more information or to take online training, go to https://www.odin.lmit.com/msfc/

Marshall Center hosting Technology Expo today

Marshall Center managers, chief engineers, and industry partners are technology "shopping" today at Marshall's Technology Expo. The Expo is open from 9 a.m. to 4 p.m. at the Center Activities Building 4316. Some 76 technologies, including those developed in-house at Marshall and others developed for Marshall projects, are on display. They include technologies resulting from funding sources such as the Center Director's Discretionary Fund, Independent Research and Development, Small Business Innovative Research, the Small Business Technology Transfer Program and Technology Development Investment Projects.

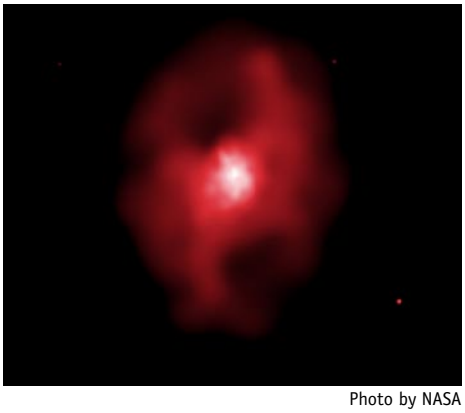


Photo by NASA

The most powerful eruption seen in the universe – generated by a supermassive black hole – was revealed by a Chandra image of the hot, X-ray emitting gas of a galaxy cluster called MS 0735.6+7421.

Chandra focuses on black holes

By Sherrie Super

In its sixth year of operation, NASA's Chandra X-ray Observatory continued to build on its growing list of discoveries involving black holes. This included finding the most powerful eruption seen in the universe, generated by a supermassive black hole growing at a remarkable rate.

The eruption — which has lasted for 100 million years and is still going — has generated the energy equivalent to hundreds of millions of gamma-ray bursts. This discovery illustrated the enormous appetite of large black holes, and the profound impact they have on their surroundings.

Other recent discoveries include confirming the existence of weight limits for supermassive black holes, finding evidence for a swarm of black holes near the galactic center and gathering more data supporting the existence of mid-sized black holes.

The writer, an ASRI employee, supports the Public and Employee Communications Office.

Chandra

Continued from page 1

and active auroras in the solar system. Extended Chandra observations revealed that Jupiter's auroral X-rays are caused by highly charged particles crashing into the atmosphere above Jupiter's poles. These results gave scientists information needed to compare Jupiter's auroras with those from Earth, and determine if they are triggered by different cosmic and planetary events.

Mysterious X-rays from Saturn also received attention, as Chandra completed the first observation of a solar X-ray flare reflected from Saturn's low-latitudes, the region that correlates to Earth's equator and tropics. This observation led scientists to conclude the ringed planet may act as a mirror, reflecting explosive activity from the Sun.

Solar-storm watchers on Earth might see a surprising benefit. The results imply scientists could use giant planets like Saturn as remote-sensing tools to help monitor X-ray flaring on portions of the Sun facing away from Earth's space satellites.

Another Chandra discovery – gleaned from the deepest X-ray observation of any star cluster – offered insights into Earth's survival in its infancy. Chandra's focus was the Orion Nebula, which contains at least 1,400 young stars, 30 that are prototypes of the early Sun.

Using Chandra, scientists learned these young stars produce violent X-ray flares much more frequently and energetically than anything seen today from our 4.6 billion-year-old Sun. This implies super-flares torched our young solar system and likely affected the planet-forming disk around the early Sun – enhancing the survival chances of Earth.

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

The writer, an ASRI employee, supports the Public and Employee Communications Office.

Marshall experts on Chandra:

Chandra Project Scientist Dr. Martin Weisskopf

"When Chandra opened its sunshade doors for the first time, it opened the possibility of studying the X-ray emission of the universe with unprecedented clarity. Already surpassing its goal of a five-year life, Chandra continues to rewrite textbooks with discoveries about our own solar system and images of celestial objects as far as billions of light years away."

Dr. Martin Weisskopf

Chandra Program Manager Keith Hefner

Keith Hefner

"Space is a harsh environment with extreme temperatures, harmful radiation and none of the protection offered by Earth's atmosphere. Ironically, the fact that our atmosphere absorbs harmful X-rays is the very reason for Chandra's existence. Getting outside the absorbing atmosphere of the Earth requires space-based observatories, and viewing the universe in multiple wavelengths is necessary to fully study cosmic events. Chandra's continued outstanding performance after six years of operation under such harsh conditions is evidence that it is, indeed, an engineering marvel."

Marshall contractor wins Family Friendly Business Award

Qualis Corp. — a Marshall Center on-site contractor — was presented the Family Friendly Certificate of Achievement Award on Aug. 2 at the Huntsville/Madison County Chamber of Commerce. Qualis Vice President Mary Engel, far left, and Qualis President Elizabeth Morard, far right, accept the award from Debbie Wallace, second from left, executive director of the Corporate Foundation for Children, and Justice Mark Kennedy, chairman of the board for the Corporate Foundation for Children. The foundation, an Alabama nonprofit agency formed to address the issues of child abuse and neglect, presents the award to recognize businesses that take special interest in children and families. Qualis Corp. is a technical services company established in 1993 by Morard and Engel. Qualis was featured last year in the NASA publication, "Women Subcontractors at NASA," which profiled women-owned businesses contributing to America's space program.

NASA awards engineering, science, technical services contract to Jacobs Sverdrup

NASA has awarded a contract to Jacobs Sverdrup, a subsidiary of Jacobs Engineering Group, Inc., to provide engineering, technical, science, propulsion, program management and business services.

The contract begins Oct. 15, with a one-year base period, followed by four one-year options that may be exercised at NASA's discretion. It is a performance-based, cost-plus performance fee and award fee, indefinite-delivery, indefinite-quantity contract. It has a minimum order quantity value of $50 million and a maximum order quantity value of $500 million, if all options are exercised.

Under the contract, Jacobs Sverdrup will perform a wide range of engineering, technical, science, propulsion, program management and business services in support of the Marshall Center and at NASA Headquarters. The company will furnish all resources, including management, personnel, equipment and supplies, unless specific exceptions are made by the government.

Spotlight on People

Born in Yucatan, Mexico, Edward (Ed) Adams is an AST, Technical Management, in the Space Transportation Program/Project Office. Adams came to the United States as a teenager, attending high school in Pontiac, Mich. He returned to Yucatan to study engineering, but moved back to the United States to complete his education at Auburn University. He also attended the University of Alabama at Birmingham and the University of Alabama in Huntsville. Adams came to Marshall in 1979, and began work in the Materials and Process Lab. Married for 33 years, he and his wife have two daughters and two grandchildren. In 2004, Adams was honored with an "Award of Distinguished Citizen of Merida, Yucatan."

Marshall Association awards two freshmen scholarships

The Marshall Association recently awarded two $1,600 scholarships to dependents of Marshall Civil Service employees. The Association awards two scholarships each year to freshmen entering college. A technical scholarship is awarded to a student pursuing a technical degree in fields such as science, engineering or mathematics and another to a student studying in a non-technical field such as business, teaching or other areas.

Brennan Gamwell, son of Connie and Wayne Gamwell of Huntsville, received a business scholarship. He graduated from Lee High School in 2005 where he maintained perfect attendance and a 4.287 grade-point average. Brennan will enter Tulane University in New Orleans as a freshman, majoring in communications and international business. Wayne Gamwell works in the Materials and Processes Laboratory in the Engineering Directorate.

Emily Ricks, daughter of Dave and Polly Ricks of Huntsville, received the technical scholarship. She graduated from Huntsville High School in 2005 with a 4.221 grade-point average. Emily will be a freshman at the University of Virginia in Charlottesville majoring in physics and music. Dave Ricks is a member of the Solid Rocket Booster Project in the Shuttle Propulsion Office.

Selection was based on grades, an essay, extracurricular activities, honors, awards and ACT/SAT scores. The Marshall Association received 31 scholarship applications.

Van Strickland, Association scholarship selection committee member, and Nelson Parker, Marshall Association president, made the presentations at the Association luncheon at the Redstone Arsenal Officers' and Civilians' Club.

Photos by Emmett Given, NASA/MSFC

Brennan Gamwell, 2005 Marshall Association Scholarship winner, with his parents, Connie and Wayne, displays the certificate signifying his scholarship. Van Strickland, left, Association scholarship selection committee member, and Nelson Parker, far right, Association president, made the presentation.

2005 Marshall Association Scholarship winner Emily Ricks is joined by her parents, Polly and Dave, for the scholarship presentation. Van Strickland, left, and Nelson Parker, far right, presented the award.

Geveden

Continued from page 1

technical authority, with responsibility for establishing and maintaining technical requirements and standards across the Agency's programs and projects. Additionally, he was responsible for Agency engineering and project management policy, training and tools.

Geveden was named deputy director of the Marshall Center in July 2003. At Marshall, Geveden shared responsibility for one of the Agency's largest field installations. He previously served as deputy director of Marshall's Science Directorate, leading research and development projects in space science, materials science, biotechnology, Earth science and space optics.

He also led NASA's Gravity Probe B program, steering development of sophisticated hardware designed to test two features of Albert Einstein's Theory of General Relativity. Geveden also was project manager for several other successful efforts, including the Optical Transient Detector and Lightning Imaging Sensor satellites, which produced data for the world's first global map of lightning.

As manager of the Microgravity Science and Applications Department at Marshall, Geveden led a team of 350 scientists and engineers in the development of flight experiments for the microgravity environment. His organization delivered many of the early payloads to the International Space Station.

Geveden joined NASA in 1990. A native of Mayfield, Ky., he is a graduate of Murray State University and earned his bachelor's degree in engineering physics in 1983 and his master's degree in physics in 1984. In 2004, Geveden earned the school's Distinguished Alumnus Award. Geveden is also a graduate of the Program Management School at the Defense Systems Management College in Fort Belvoir, Va., and an Associate Fellow of the American Institute for Aeronautics and Astronautics.

He is married and has two children attending college.

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

AKC yellow Lab male puppies, 12 weeks old, 2nd shots, $100. 350-2901

1992 NASCAR McDonald's MAXX cards, complete sets, 37 cards, $10 per set. 256-592-7207

Lexmark color cartridge, #20, for Lexmark X4270, new in box, $20. 541-1788/Irene

Bicycle w/automatic transmission, helmet, gloves and water bottle, $150. 883-9509

Whirlpool window A/C, 11,600 BTU, used one summer, $150. 259-5140

Multi-exercise weight training bench, $70. 881-1249

Matching glass top coffee table and end tables, $470. 658-3901/leave message

Rattan wicker pedestal square rounded-corner glass top table w/4 chairs, blush, $300. 772-7262

Pampered Chef items, pre-owned and new, call for list. 256-520-4838

Two TV stands on rollers w/two shelves, walnut finish, $30 each. 881-0457

China cabinet, $250; glass-top table w/two chairs, $300; kitchen table w/4 chairs, $200. 534-0939

Hand-fed Quaker parrots, 12 weeks old, sweet disposition, $150. 230-9380

Sleigh-style solid cherry baby crib w/matching changing table, $250 for both. 723-2627

Jacuzzi corner tub, white, 60"Wx60"L with 24" insets, 6 jets, new, never installed, $575. 420-2906

Sofa, solid oak frame, light blue multi-colored, $150. 353-0370

Infrared wall heater, thermostat controlled, 30K BTU, new in box, $160. 256-247-3929

Wood & glass curio shelf and sofa table, $135 each. 922-9311

Cherry baby bed, boy/girl clothing and toys, 0-4 years; women's clothing, size 0-8. 464-3300

Wooden student desk, 42Wx42Hx19D, 3-drawers on one side, shelf w/light, $75. 882-0461

Boy's jeans, size 6R, some never worn, $10 each. 772-9805

Amana washer, $150; Kenmore dryer, $75; both for $200. 533-1172

Sears Model 149.23871 turning lathe, 36", on stand with faceplate. 859-1188

Remington Model 7400 30-06 rifle, 3x9x30 Bushnell scope and sling, wood stock, blued barrel, $380. 682-9088

Aluminum extension ladder, 40', heavy duty, used twice, $150. 256-852-5394

Wheel chair, Breezy 510 w/Jay Cushion, never used. 722-8086

Wooden clarinet master model, Buffet Crampon, recently reworked, $600; Bundy alto sax, $350. 256-757-5989

La-Z-Boy recliner, $35; den chair, $10; boy's 16" bicycle, $15. 722-8570

Canon ElanIIe 35mm camera, 28-80mm, 75-300mm USM zoom lenses, Sunpak PZ4000AF flash, $375. 256-797-2668/Lamar

Memory stick Pro DUO, 1 gigabyte, high speed, new-in-box, PSP ready, $110. 655-1986

1969 Aria bass guitar, "High–flyer" Mosrite-style, Sunburst, w/case, low action, P90-style pickups, $450. 303-3702

Spyder Imagine paintball gun w/automatic electronic trigger w/mask hopper & two air tanks, $125. 755-1327

Sofa and love seat, beige, $150. 205-243-0140/leave message

Dunlop mud rovers, 33x12.50x15, 35ead on 15x10 aluminum wheels, 6-lug, $250. 426-3355

Trampoline, $75; bicycle jump ramp, $10; aluminum cable, 70', 100 amp, $20. 864-2629

Multi-exercise weight training bench, $60 or make offer. 881-1249

Rifle w/scope, 270 Remington, $400; PSE inforcer bow, all accessories, $500. 931-703-8935

Antique maple/steel school desk, ink well, folding seat, $50. 883-2795

Soloflex w/attachments, $25; girl's Schwinn Frontier mountain bike, $40; microwave, $20. 256-498-5575

Aluminum boat, 14', 18HP motor, $1,000; double wheel trailer, 14' long, $800. 828-5246

Australian Shepherd puppy, male, 16 weeks, 2nd shots, $50. 256-561-2287

Matching end tables & coffee table, $50; dining table with 4 chairs, $40. 837-8897

Vehicles

1994 Plymouth Grand Voyager, rear air, Quad seats, 150K miles, $1,100. 603-6306

1988 Jeep Cherokee Limited, 4WD, $1,500. 881-6847

2004 Toyota Tacoma, 18K miles, extended warranty, $18,000. 773-0125

1999 Lexus ES300, V6, leather, moon-roof, 5-disc CD, 72K miles, rebuilt title, $9,900. 895-6640

2003 KIA Sorento, dark blue/gray, 83K miles, luxury package, V6, $12,300. 256-233-6157

2001 Chevy Venture, Warner Bros. Edition, maroon, power door, VCR, leather, 103K miles, $8,300. 206-0792

1973 Corvette, 350CID, auto, air, T-tops, matching numbers, white w/black leather interior, $11,000. 964-5312

1962 Chevy pickup, step-side bed, V8, $1,500; 2001 Suzuki Intruder, 13K miles, garage kept, $3,800. 931-937-8680

1978 AMF Crestliner Norseman 2, 165HP, 6-cyl., inboard motor, 5-yrs. old, Outboard, $2,000. 256-679-6707

Gulfstream, 36', 30K+ miles, generator, jacks, VCR, camera, awning, bath, kitchen, bedroom, $36,000. 256-931-0177

2001 Ford Expedition, Eddie Bauer Edition, 51K miles, new tires. 256-468-0170

1991 Isuzu Rodeo, 4x4, new tires, new motor, $3,500. 256-828-4502

2001 Tundra Limited, dark green/tan leather, 54K miles, off-road package, new tires, $16,500. 851-9159

2002 Ford F250 Super-duty crew-cab Lariat, 7.3 diesel, 4x4, 136.7K miles, white, $19,950. 256-497-3518

2000 Volvo GLT SE sedan, 4-door, 5-cyl., 2.4L Turbo, automatic, white, 106K miles, $12,000. 256-714-2917

1996 Chrysler Town & Country LXi, hunter green, leather, 97K miles, $5,700. 256-355-6858

2001 Ford Focus SE, gold, 90K miles, $5,000. 865-567-8862

2001 Kawasaki KLR650, 4K miles, 55mpg, helmet, gloves, bag, $3,150. 882-9407

1994 Mercury Cougar, 3.8L/V6, PS/PB/PW, automatic, good tires, recent overhaul, $3,000. 931-438-2625

1986 Nissan 300ZX, T-top, manual transmission, dark blue, 165K miles, $1,500. 468-8708

2003 Honda CRV EX, silver, 40K miles, all wheel drive, $16,000. 350-7461

2001 Suzuki Intruder, 800cc, all accessories, $4,000; 1962 pickup, V8, $1,500. 931-703-8935

1987 300 ZX, needs work, $500. 828-5246

1999 Chevrolet K3500 4x4 dually crew-cab, manual transmission, Leer topper, leather, winch, 75K miles, $17,900. 683-9364

2003 Polaris Sportsman 700 4-wheeler, auto transmission, 240 miles, includes helmet, $6,200. 694-1217

2001 Subaru Outback, 46K miles, hunter green, automatic, am/fm, cassette/CD, all power, non-smoker, $13,500. 468-8406

Wanted

Someone to do some carpentry work, remove/replace sub-floor and install hardwood floor. 828-9099

Four Auburn football tickets, not upper deck, for 9/17, 9/24, 10/1, or 10/29. 430-6897

Six tickets to Alabama vs. Middle Tennessee football game. 895-9520/Philip

Obituary

Arlon R. Moss, 72, of Madison, died Aug. 16. He retired from the Marshall Center in 1990 as an electronics technician. He is survived by his wife, Stella Moss; two sons, Alan Moss and Richard Moss; and two daughters, Carol Edmondson and Laura Moss.

Marshall Center's Auxiliary Propulsion Project to test new breed of propulsion engine and system

By Sheri Bechtel

The Marshall Center is playing a critical role in developing advanced technologies and systems applicable to the next generation of space transportation and propulsion.

One such effort is NASA's Auxiliary Propulsion Project (APP), an advanced development effort using non-toxic propellants to further state-of-the-art orbital maneuvering and reaction control systems. Research in this area is aimed at eliminating environmental and toxic hazards of current propellant combinations. It could also result in development of future vehicles that consolidate system and subsystem components, such as tanks and plumbing, to reduce weight.

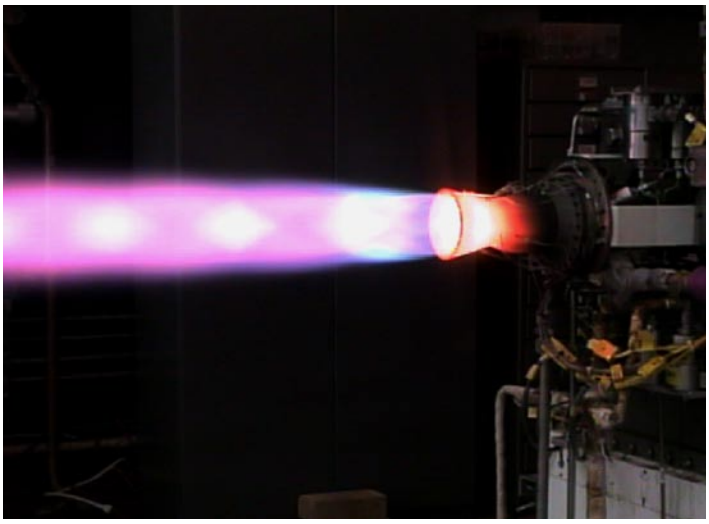


Photo by Aerojet

A Reaction Control Engine puts out a steady stream of fire during testing at Aerojet Corp., in Sacramento, Calif. The engine's non-toxic propellants — liquid oxygen and ethanol — put out a blue flame as they burn.

The project is managed by the Exploration Systems Mission Directorate at NASA Headquarters and implemented by Marshall's Exploration and Transportation Technology Office in the Space Transportation Programs and Projects Office.

In September, Marshall engineers will test an environmentally friendly propulsion engine and propellant-fed system — the Reaction Control Engine (RCE) and Auxiliary Propulsion System (APS) — at NASA Johnson Space Center's White Sands Test Facility in Las Cruces, N.M. Designed, developed and tested by Aerojet of Sacramento, Calif., the engine is a prototype reaction control thruster used for maneuvering a vehicle in space.

Used for maneuvering, alignment and attitude control while the spacecraft is in orbit, the Reaction Control Engine is unique in its use of non-toxic chemicals — liquid oxygen and ethanol — as propellants. Inexpensive and easily vaporized, the propellants have the potential to create a safer work environment for ground operators, to lower launch costs and to increase launch efficiency. Other significant benefits would be lower maintenance and quicker turn around between missions.

The Auxiliary Propulsion System, designed by NASA's Johnson Center, simulates the tanks, propellant feed lines and other components of an integrated spacecraft propulsion system. The system includes integration of the three Aerojet Reaction Control Engines.

The tests at White Sands will be performed in a vacuum chamber to simulate the space environment, and will include individual and combined hot-fire tests of the three engines using the NASA-developed tank and feed system. The tests will deliver data to advance auxiliary propulsion system design and modeling for future flight demonstration.

Research of this nature is vital to support the Vision for Space Exploration — to return humans to and from the Moon and Mars.

The writer, an ASRI employee, supports the Public and Employee Communications Office.

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