

## Testing the Metal Of the Future

*Researchers Gather for Advanced Materials Conference July 14-16 At the Von Braun Center*

Research leading to better automobile engines, aerospace alloys, new infrared sensors and faster computer chips will continue to be presented today and Thursday at the Von Braun Center during the 1998 NASA Microgravity Materials Science Conference.

At the conference's opening-day session Tuesday, Acting Center Director Carolyn Griner made opening remarks and welcomed attendees to the annual event. Dr. Donald Gillies, a material scientist in  
*See Conference on page 4*

## Russian Rocket Engine Test Delayed Due to Data Link Problem

*by Deana Nunley*

The first of three test firings of a Russian-built rocket engine at a U.S. government facility, scheduled for today at Marshall, has been postponed due to a problem with a data communication link between two test control computers.

Once the problem is resolved, a new test date will be set.

Marshall is under a Space Act Agreement with Lockheed Martin Astronautics of Denver, Colo., to provide a series of test firings of the Atlas III propulsion system configured with the Russian-designed RD-180 engine.

"This is a tremendous opportunity for Marshall to acquire knowledge about a

different engine system," said Robert Lightfoot, deputy division chief of Marshall's Propulsion Laboratory test division. "It's important as NASA's Center of Excellence for Space Propulsion for Marshall to get hands-on experience with different propulsion systems."

The RD-180 is the most powerful rocket engine to be tested at Marshall since the Apollo days when Marshall engineers were developing Saturn rockets that put humans on the Moon. The RD-180's thrust is 860,000 pounds — compared with 1.5 million pounds of thrust generated by the Saturn V rocket's first-stage engine, the F-1. A Space Shuttle Main Engine produces 375,000 pounds of thrust.

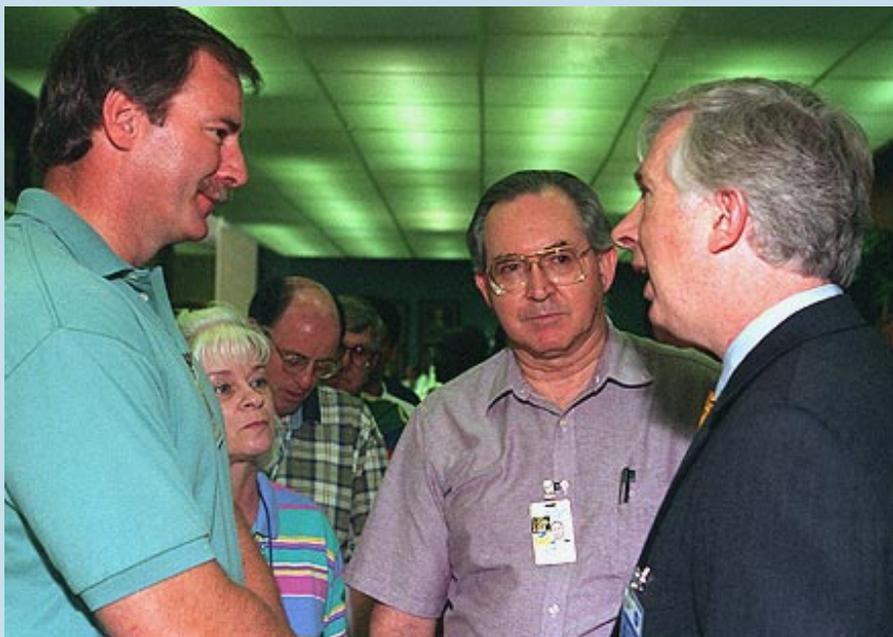
"The RD-180 is a powerful engine that is certain to make more noise than any tests we've conducted in quite some time," Lightfoot said. The test firings will make  
*See Rocket on page 5*

## AXAF Completes Tests Under Harsh, Simulated Space Conditions

NASA's most powerful X-ray observatory has successfully completed a month-long series of tests in the extreme heat, cold, and airless conditions it will encounter in space during its five-year mission to shed new light on some of the darkest mysteries of the universe.

The Advanced X-ray Astrophysics Facility was put through the rigorous testing as it was alternately heated and cooled in a special vacuum chamber at TRW Space and Electronics Group in Redondo Beach, Calif., NASA's prime contractor for the observatory.

*See AXAF on page 5*



NASA photo by Dennis Keim

## Rep. Cramer Speaks to Marshall Center Employees

U.S. Rep. Bud Cramer spoke to Center employees about budget and other NASA issues before Congress July 10 in Morris Auditorium. Cramer, right, speaks to, from left, Dale McElyea, Marshall's Technical Information and Operations Services Office director, Elaine Kimbrough of Accounting Operations and Joel Howell of the Advanced Systems and Technology Office at Marshall, following his address to Center employees.

## Malone Appointed Logistics Services Office Director

Roy Malone has been appointed director of Marshall's Logistics Services Office, Center Operations Directorate. Prior to this appointment, he was a technical advisor for safety and reliability in the Shuttle Integration Office. As an additional duty since June 1997, Malone served as Marshall's ISO 9000 audit manager, responsible for implementing, managing and reporting the performance of the ISO 9000 Internal Quality Audit System at Marshall. He joined Marshall in 1994.



Roy Malone

## McElyea Selected TI & O Services Office Director

Dale McElyea has been appointed director of Marshall's Technical Information and Operations Services Office, Center Operations Directorate. He began his career at Marshall in 1981 in the Professional Intern Program in the Procurement Office. In 1989, McElyea was selected as branch chief for the Special Projects programs and was assigned as branch chief and contracting officer for the Advanced Solid Rocket Motor, Iuka, Miss., in 1991. Most recently, McElyea has served as the team lead and contracting officer for the Space Shuttle Main Engine and the Space Shuttle External Tank projects.



Dale McElyea

## Discovery Channel to Feature X-33, VentureStar Programs

A 30-minute show highlighting NASA's X-33 test vehicle and VentureStar is scheduled for broadcast at 6 a.m. CDT July 16 on the Discovery channel.

"Tech 2100: VentureStar" will include interviews with X-33 Program Manager Gene Austin and X-33 Deputy Program Manager Dan Dumbacher. The X-33 program is under the Space Transportation Programs Office at Marshall. The X-33 is a vehicle that will demonstrate America's new space launch technologies and is a half-scale demonstrator vehicle of the full-scale VentureStar. VentureStar is Lockheed Martin's concept for a full-scale Reusable Launch Vehicle.

## At the Space & Rocket Center

# Exciting Activities Planned For Marshall Picnic

by Renee Reynolds  
Picnic Committee Publicity

This year's Marshall Center Picnic being held 4-9 p.m., Saturday, Aug. 22 at the U.S. Space & Rocket Center, will bring a host of exciting activities for Center employees, on-site contractors and retirees. Museum admission is free to picnic participants during those hours. To keep up with the latest information about picnic events, check out the picnic home page on the Internet. It can be accessed from the "Inside Marshall" page under "Headlines" or by typing picnic98 in your browser.

### IMAX Theater

The Space & Rocket Center will show the film "Mission to Mir" every 50 minutes during the Marshall Picnic. Because seating is limited for each show, those wishing to reserve a seat should visit the IMAX theater lobby to get a ticket for the time you prefer. There will be six showings and seating is on a first-come, first-serve basis. This is an opportunity to get an inside look at the home in space occupied by international explorers since 1986.



### Museum and Gift Shops

Picnic-goers will have a chance to escape the heat by exploring the museum and browsing through the two gift shops that will be open until 8 p.m. Also featured will be the Meteorite Exhibit, the mock-up of the Mir Space Station, military displays and the opportunity to ride the new motion-based simulator "Mars Mission."

### Coloring Contest

The coloring contest is a new event for children to participate in and win great prizes. Three different space-related "scenes" to color are available to choose from and can be downloaded from the picnic homepage. Entries will be divided into three age categories: 2-4 years; 5-7 years; and 8-12 years. Contestants should color their favorite scene and submit the entries to ED62/Monsi Roman by close of business Aug. 7. A panel of judges from the Graphics Department will choose the winners which will be announced at the picnic, with one grand-prize winner selected from each category. All participants will receive a certificate of participation which they can pick up (along with their artwork) at the picnic.

### Fireworks

A fireworks display will conclude this year's picnic festivities. "We wanted to do something special for the picnic-goers as we celebrate NASA's 40th Anniversary," commented David Reynolds, picnic chairman. "The fireworks display will begin immediately following the door prize drawings. Make plans to bring your lawn chair and enjoy the event."

# Marshall Scientists Study 'What's Hot In Salt Lake City'

by Kelly McFalls

**W**hat's hot in Salt Lake City and what's not?

That, literally, is the question Marshall scientists and local school kids tried to answer July 13, when they took the city's "temperature." The answer ultimately could lead to lower air conditioning costs, improved air quality, and sustainable urban development in Salt Lake City and other major cities nationwide.

Researchers from the Global Hydrology and Climate Center at Marshall are collaborating with Salt Lake City school kids, Mayor Deedee Corradini's office, the Utah Division of Air Quality, Tree Utah, the Utah Office of Energy Services, Utah State University and Lawrence Berkeley National Laboratory in Berkeley, Calif., to study how rapid urbanization has affected climate and air quality in the urban area.

Sunday, Marshall researchers climbed to the roof-tops of three different buildings in Salt Lake City and set up instruments that measured atmospheric conditions above the Salt Lake City.

On Monday, a specially instrumented NASA plane flew over the city during the hottest part of the day to produce a thermal map of the area. Marshall researchers launched a weather balloon to measure atmospheric conditions over the city during the flight.

On the ground, the school students took part in the experiment by taking temperature readings of different surfaces around Salt Lake City in conjunction with the flight. The students' temperature measurements, as well as the atmospheric measurements from the rooftops and the balloon will be used to verify the information recorded by instruments on the plane.

Once the science team members have collected and analyzed the temperature data, they hope to work with the city to develop an urban planning tool that allows Salt Lake City to better plan for long-term sustainable development.



NASA photo by Dennis Olive

Marshall's Education Programs Office is hosting this year's national Space Sciences Student Involvement Program winner Dustin Cole and his teacher, Mary Fedderson, this week. They will spend time with Marshall scientists and engineers who are serving as mentors. From left, mentor Bill Millwood, Space Transportation Programs Office, Cole and Fedderson.

## Sioux City Student Interns at Marshall

by Joy Carter

**D**ustin Cole, a recent graduate of East High School in Sioux City, Iowa, isn't taking a vacation from learning this summer. A winner of this year's national Space Science Student Involvement Program competition, Cole is participating in a one-week internship July 13-17 at Marshall.

Nearly 10,000 students nationwide competed for honors in five categories testing their knowledge and skills in science, critical and creative thinking, mathematics and technology. Cole is one of 29 high school students selected based on a written proposal for an experiment that could be conducted at NASA.

Marshall Center's Education Programs Office is hosting Cole and his teacher, Mary Fedderson, this week. The two will spend time with Marshall scientists and engineers who are serving as NASA mentors. The mentors are Dennis Smith, Bill Millwood and Jan Monk of Marshall's Space Transportation Programs Office and Dan Woodard of Marshall's Microgravity Research Program Office.

Cole and his teacher will gain insight into the Space Transportation Office which manages development of current and future space transportation systems, including Space Shuttle propulsion,

reusable launch vehicles and advanced space transportation. They will also see the operations of the Microgravity Research Program Office, which directs studies in the near-weightless environment of space to gain a better understanding of the effects of gravity on biological, chemical and physical processes.

"I'm really glad I took part in the competition," said Cole. "Now I have the chance to learn about all the career opportunities available at NASA, and about the work being done at NASA."

"This student internship program is outstanding," said Millwood, one of Cole's mentors. "We at Marshall are proud to be a part of it. It's a great opportunity for young people to learn about the space program and get a taste for what it's like to work at NASA."

Cole plans to attend Drake University in Des Moines, Iowa, in the fall and is interested in a career in pharmaceutical research. He will get a taste of the career field at Marshall, through a visit to the Structural Biology Laboratory, where researchers are mapping the microstructures of substances important in the development of disease fighting drugs. He will also tour New Century Pharmaceuticals, Inc., a NASA industry partner.

## Upcoming Events

### Seminar to Discuss Leadership

Marshall's Employee and Organizational Development Office is sponsoring the satellite broadcast "Managers as Mentors: Building Partnerships for Learning" from noon-2 p.m. Thursday, Sept. 3, on Marshall's Learning Channel 14.

To receive a participant notebook and credit for the course, registration is necessary. Interested participants may register via AdminSTAR or by submitting a Form 59 to F. Logston (CO20). Seminar enrollment deadline is 4:30 p.m., Aug. 19 and limited to 75 people on a first-come-first-serve basis. For more information, contact Kimberly Davis via e-mail at: kimberly.davis@msfc.nasa.gov

## NASA Lands at the NAACP Convention in Atlanta

Marshall is joining the National Association for the Advancement of Colored People (NAACP) during the organization's annual convention July 11 and continuing through Thursday at the Georgia World Congress Center in Atlanta.

Astronauts Yvonne Cagle, Joan Higginbotham and Stephanie Wilson joined a host of NASA officials to exhibit a space benefits display and a full-scale mock-up of the International Space Station, both from Marshall.

The NASA astronauts escorted through the NASA displays the Honorable Kweisi Mfume, president and chief executive officer of the NAACP.

Also featured at the convention was a Mars exhibit with a model of the Sojourner Rover, a diversity educational

exhibit highlighting some of NASA's educational initiatives, a Human Exploration and Development of Space (HEDS) enterprise wall and a 16-foot tall Space Shuttle.

The NAACP will conduct its annual national Afro-Academic Cultural, Technological and Scientific Olympics (ACT-SO) competition during the convention. African-American students from various cities across the country will compete for national honors in various categories ranging from science and engineering to dance and the cultural arts. NASA scientists and engineers will serve as judges for the scientific part of the competition. The national winners in the technical competitions will be presented certificates from NASA and a sponsored visit to a NASA field center or event.

## Conference

*Continued from page 1*

Marshall's Space Sciences Laboratory, is chairman and organizer of the conference. The Materials Science Program is managed by NASA's Microgravity Research Program at Marshall.

During the three-day conference, more than 100 microgravity investigators will present their experiment results. Discussion topics include results from a Space Shuttle experiment that mixed metals previously thought to be "unmixable," presented by Dr. Barry Andrews of the University of Alabama at Birmingham. This process — observed for the first time ever — could result in improved materials on Earth ranging from better materials for optical devices to complex semiconductors

Highlighting the conference will be early results from several Marshall-led Microgravity Science missions including the Microgravity Sciences Laboratory-1 (MSL-1) mission flown aboard the Space Shuttle in April and July 1997, the U.S. Microgravity Payload-4 (USMP-4) flown at the end of 1997 and aboard Russia's Mir space station. MSL-1 and USMP-4 were the last dedicated Microgravity Materials Sciences missions flown by the

Space Shuttle.

Dr. Roger Crouch, who flew as a payload specialist on the MSL-1 mission, will discuss science experiment questions in actual space flight.

Materials researcher Dr. Ivan Egry of the German Aerospace Research Establishment in Cologne, Germany, one of the principal investigators of the 1997 Microgravity Science Laboratory mission, opened the conference with a discussion of the unique benefits of space flight to advanced materials research.

Through the unique characteristics of microgravity or the near-weightlessness of space, researchers are able to study the fundamental relationships in materials solidification — seeing many processes clearly for the first time. NASA's goal is to advance fundamental materials science research so private companies can use the new technology to develop products like lighter and stronger metal alloys and metallic-electronic crystals with never-before-seen capabilities.

Other experiment results scheduled to be presented at the conference range from investigations into the arrangement of atoms in metal materials to studies of metallic properties including physical,

chemical, electronic, thermal and magnetic characteristics. More information about NASA Materials Science may be found at the following Web site:

<http://microgravity.msfc.nasa.gov/MICROGRAVITY/MS.html>

In addition, more information about the 1998 NASA Microgravity Materials Science Conference can be found at the following Web site:

[http://www.ssl.msfc.nasa.gov/colloquia/mmsm/112597\\_1.htm](http://www.ssl.msfc.nasa.gov/colloquia/mmsm/112597_1.htm)

### Mobile Canteen Service To Cease Operations July 24 at Marshall

The mobile canteen vehicle servicing Marshall Center will cease operations July 24.

The decision to discontinue the mobile canteen vehicle service is based on declining food sales and upcoming truck maintenance, according to Center Ombudsman May Wells.

# Rocket

*Continued from page 1*

a low, rumbling sound, resembling the sound of distant thunder, according to NASA acoustic engineers.

NASA has conducted environmental studies and developed stringent test criteria to ensure the noise level impact to local residents is minimized. NASA will closely monitor weather conditions, which influence the level of noise experienced off site by engine test firings. All tests will be scheduled in the afternoon.

The tests will be conducted in Marshall's Advanced Engine Test Facility, which has been used for Saturn V and Space Shuttle Main Engine tests. The facility — used to assess and validate new propulsion technologies and prototype hardware for large rocket engines — has been modified for Atlas III testing. It's one of only a few test stands in the world that can accommodate large liquid-fuel rocket engines.

The RD-180 is powered by kerosene and liquid oxygen — the same fuel mix used in Saturn rockets. The Marshall tests are designed to evaluate the performance of the Atlas III propulsion system, which includes avionics and propellant tanks and lines, and how these components interact with the RD-180 engine.

# AXAF

*Continued from page 1*

"Successful completion of thermal vacuum testing marks a significant step in readying the observatory for launch aboard the Space Shuttle in January," said Fred Wojtalik, manager of the Observatory Projects Office at Marshall.

The AXAF program is managed by Marshall for the Office of Space Science, NASA Headquarters, Washington, D.C.

"The observatory is a complex, highly sophisticated, precision instrument," explained Wojtalik. "We are pleased with the outcome of the testing, and are very proud of the tremendous team of NASA and contractor technicians, engineers and scientists that came together and worked hard to meet this challenging task."

Testing began in May after the observatory was raised into the 60-foot thermal vacuum chamber at TRW. Testing was completed on June 20. During the tests the Advanced X-ray Astrophysics Facility was exposed to 232-degree heat and 195-degree below zero Fahrenheit cold. During four temperature cycles, all elements of the observatory — the spacecraft, telescope, and science instruments — were checked out.

Computer commands directing the observatory to perform certain functions were sent from test consoles at TRW to all Advanced X-ray Astrophysics Facility components. A team of contractor and NASA engineers and scientists monitored and evaluated the results.

Commands were also sent from, and test data monitored at, the Advanced X-ray Astrophysics Facility Operations Control Center in Cambridge, Mass., as part of the test series. The observatory will be managed and controlled from the Operations

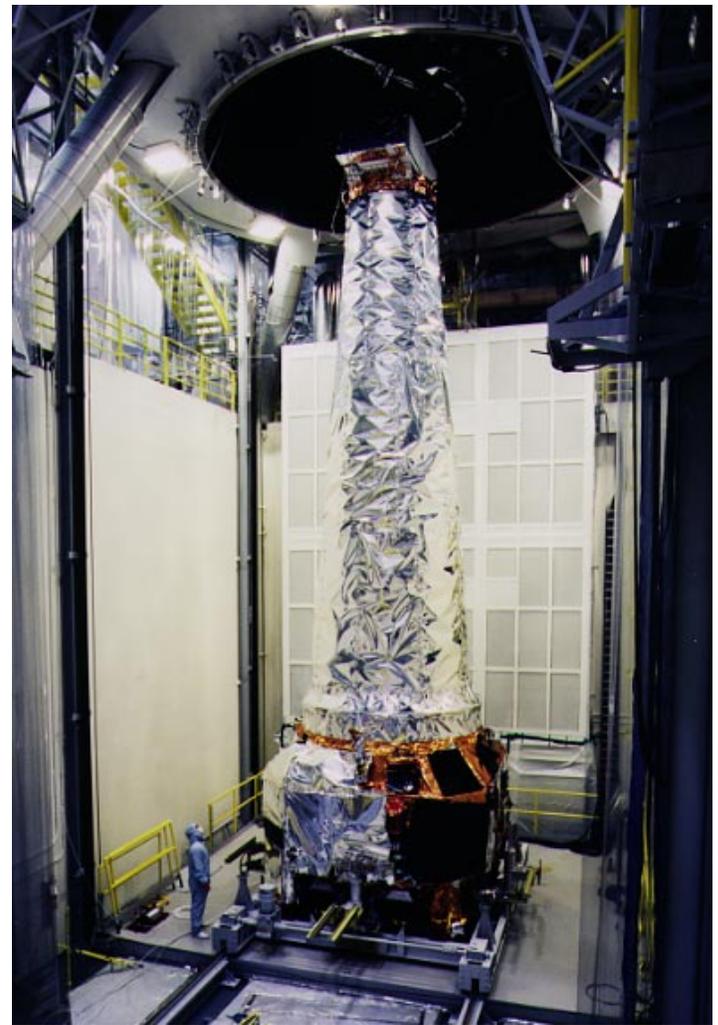


Photo courtesy of TRW

**NASA's Advanced X-Ray Astrophysics Facility (AXAF), a project under Marshall's Observatory Projects Office, is lowered from a vacuum chamber in which it spent about a month being tested under alternate conditions of extreme heat and cold. AXAF is scheduled for launch in January 1999 aboard the Space Shuttle Columbia.**

Control Center after launch.

"As is usually the case, we identified a few issues to be resolved before launch," said Wojtalik. "Overall, however, the observatory performed exceptionally well."

The observatory test team discovered a mechanical problem with one of the primary science instruments, the Imaging Spectrometer. A door protecting the instrument did not function when commanded by test controllers.

"We do these tests to check and double check every aspect of satellite operation that could affect the ultimate success of the science mission," said Craig Staesinich, TRW AXAF program manager. "Discovering a problem now is a success. Discovering a problem later, after launch, would be a failure."

A team of NASA and contractor engineers are studying the mechanical problem and developing a plan to correct it. The instrument will be sent back to its builder, Lockheed-Martin Astronautics in Denver, Colo., where it will be repaired while the rest of the observatory continues other testing. This should still allow an on-time delivery of the observatory to Kennedy Space Center, Fla., in August, where it will be readied for launch in January.

## Employee Ads

### Miscellaneous

- ★ Set of 12 1998 McDonald's teenie beanie babies. Still in bag. \$110 895-9520
- ★ Refrigerator, washer, dryer, Hide-A-Bed, paint sprayer, two interior doors. Moving. 351-6806
- ★ GE dryer, white, \$95; undercounter dishwasher, \$80. 881-6040
- ★ Rainbow vacuum cleaner, \$385. 772-7842
- ★ Murray riding lawnmower, needs front tire and battery, \$100. 890-0297
- ★ Sofa w/loveseat, neutral colors, \$400; Voit gravity rider, \$50; GE white microwave, .9 cubic ft., 800 watts, \$60. 350-6477
- ★ Futon mattress and couch frame, \$150. 881-5389
- ★ Bedroom suite, KS waterbed, dresser, night stand, \$300; dinette table w/4 chairs, \$75. 721-9101
- ★ Reloading press, Lee Pro 1000 with 9mm dies and accessories, \$75. 722-0882
- ★ Sumter cabinet, solid oak full/queen headboard, triple dresser, mirror, chest-on-chest, two night stands, \$1,500. 881-1005
- ★ Red metal bunk bed, \$50; Lane cedar chest w/ cushioned seat top, \$200. 881-9419
- ★ Powerlift for outboard motor, 0-90 hp, \$250; LeBra car mask for Talon, Eclipse, Eagle, \$30. 837-4136
- ★ Turntable system, Technics, model SL-B210, \$45. 881-8953
- ★ Hardwood desk \$75; Sailboard Mistral Competition, \$300. 880-3765
- ★ Weslo cross Country Arc Skier plus folds for easy storage, \$100. 536-9792
- ★ 5-piece bedroom suit, \$400. 539-4508

### Vehicles

- ★ 1986 Dodge Caravan mini-van, 3-dr., sky blue, seats seven, FM/AM cassette, \$3,000. 883-5886
- ★ 1993 Mazda MX 6, V6, 5-spd. 67K miles, AC, cruise, sunroof, power, cassette, \$9,500 obo. 518-9020
- ★ 1996 Pontiac Trans Sport, equipped, \$12,500 obo. 772-7842
- ★ 1991 Buick LeSabre Limited, 58K miles, equipped, \$7,900. 837-3129
- ★ 1989 Honda LXi, power, cruise, \$4,850. 722-8064
- ★ 1986 Bronco, gray, red interior, 84K miles, equipped, \$5,500. obo. 883-3026
- ★ 1985 Mazda 626, 5-spd, 98K miles, \$1,500 negotiable. 837-2783
- ★ 1990 LeBaron convertible, dark blue, 74K miles, automatic, PS, PB, \$5,200 obo. 721-3383
- ★ 1997 Pontiac Bonneville SE, luxury package, silver taupe, leather, CD, power, 44K miles, \$17,750. 891-1762 after 6 p.m.
- ★ 1983 Buick Electra Park Avenue, automatic, cruise, air, power, cassette, 62K miles, \$1,750. 650-5375
- ★ 1996 Chrysler Neon, 40K miles, \$7,600. 586-7246

- ★ 1984 Dodge, 15-passenger van, 73K miles, \$2,300. 420-2444
- ★ 1983 Volkswagen Rabbit GTI, black, \$800. 851-6014
- ★ 1993 Nissan 300ZX, 5-spd, 52K miles, equipped, \$15,900. 830-4477
- ★ 1995 Pontiac Firebird, \$12,500. 776-9118
- ★ 1983 Chevrolet Suburban, \$2,000. 880-3765
- ★ 1990 Acura Legend LS, automatic, leather, sunroof, CD, ABS, \$8,490 880-7204
- ★ 1978 Pace Arrow Motor Home, low mileage, low generator hours, sleeps 6 - 8, \$5,000 851-7255

### Boats

- ★ 1990 Astro bass boat, 16 ft, 115 hp Mercury, 50 lb trolling motor, trailer, \$5,300. 721-1495
- ★ 1986 24 ft. Sweetwater pontoon, 88 Mercury 60 hp engine, tandem axle trailer included. \$4,200. 582-4051
- ★ 1984 Bomber Scout bass boat, 40 hp Mercury, depth finders, trailer, \$2,500. 851-6014
- ★ Canoe 17 ft Lowe aluminum boat, Sportyak, 7ft sail, motor. 837-6328

### Wanted

- ★ National Geographic 18" globe from 1964, type that globe can be removed from stand. 881-5389
- ★ Reasonable priced go-cart, 6 - 10 hp. 721-7835
- ★ Female roommate for 3-bedroom house in NE Huntsville, \$300/month, washer, dryer included. Non-smoker preferred. 551-0276

### Free

- ★ Young neutered tabby cat, litter trained, all shots, and Huntsville license. 837-2386

### Found

- ★ Swiss Army knife, Bldg. 4203 call 4-8982 to claim

## Center Announcements

- ☛ **MOO** — The Management Operations Office (MOO) retirees will meet for breakfast/lunch at 10 a.m. July 23 (4th Thursday each month) at the Cracker Barrel in Madison. Current or former MOO employees are invited. **Contact:** 539-0042
- ☛ **NASA Business Cards** — The NASA Exchange offers 500 two-color cards for \$20.50; 1,000 two-color cards for \$21.50; 500 three-color cards for \$40.50 and 1,000 three-color cards for \$41.50. The two-color card has the vector logo and blue printing and the three-color card includes the vector logo with black printing. Five format styles are available. **Contact:** 4-7564.
- ☛ **Blacks in Government** — A Blacks in Government general meeting is set for 11 a.m. July 21 at the Sparkman Bldg, 5309, room 9128. All members are invited to attend.
- ☛ **Astronomical Society** — The Von Braun

Astronomical Society will host a "Summer Skies" program at 7:30 p.m. Saturday, July 25 at the Von Braun Astronomical Society Planetarium in the Monte Sano State Park. Following the planetarium show, telescopes will be available to view constellations. Admission for nonmembers is \$2 ages 12 and up, \$1 for ages 6-11 and free for ages 5 and under. Members are admitted free. **Contact:** Mitzi Adams, 544-3026

☛ **Open House Surplus Sale** — Cases of 24 20-ounce Diet Pepsi are available for \$11 per case at the NASA Exchange in Bldg. 4752. **Contact:** 544-7564

☛ **Engineering Seminars** — The Societies of American Military Engineers, American Professional Engineers and American Civil Engineers will host four seminars 5-9 p.m. July 21 at the Tom Bevill Center, rooms 268-269. **Contact:** Gerri Rogers, 955-6600 or Pat Allen, 876-2423

☛ **Lunch & Learn** — Marshall's Employee Assistance Program will host a Lunch & Learn seminar noon-12:45 p.m. Thursday in Bldg. 4200 Morris Auditorium. The topic will be "Planning for Retirement" and all Marshall employees, on-site contractors and family members are invited. **Contact:** Gail Ralls, 4-3268

☛ **MARS Flag Football** — The MARS Flag Football League will meet at 11 a.m. Thursday in Bldg. 4752, all purpose room. All Marshall employees, family members, on-site contractors and specified off-site contractors interested in playing or entering a team in the men's or women's league are invited. **Contact:** Scott Tillery, 544-8651.

☛ **Shuttle Buddies** — The Shuttle Buddies will meet for breakfast at 9:15 a.m. June 27 (each fourth Monday) at Shoney's on University Drive West. **Contact:** Deemer Self, 881-7757

## Job Opportunities

- CPP 98-73-RE, Administrative Officer, GS-341-9**, Program Development. Closes July 20.
- CPP 98-89-PL, AST, Mission Operations Integration, GS-801-14**, S&E, Mission Operations Laboratory, Operations Integration Office. Closes July 20.
- CPP 98-93-DC, AST, Electronic Instrumentation Systems, GS-855-14**, S&E, Astrionics Laboratory, Instrumentation & Control Division, Instrumentation Branch. Closes July 16.
- CPP 98-96-CP, AST, Flight Systems Test, GS-861-14**, S&E, Systems Analysis and Integration Laboratory, Systems Test Division, Payloads & Experience Test Branch. Closes July 22.
- CPP 98-97-CP, AST, Flight Systems Test, GS-861-14**, S & E, Systems Analysis and Integration Laboratory, Systems Test Division, Payloads & Experiments Test Branch. Closes July 21.
- CPP 98-98-RE, AST, Electronic Instrumentation Systems, GS-855-14**, Program Development, Preliminary Design Office, Avionics & Propulsion Systems Division. Closes July 16.

# MARSHALL STAR

Marshall Space Flight Center, Alabama 35812

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