

Hubble Discovers First Possible Planet Outside Our Solar System

The Marshall-developed Hubble Space Telescope has given astronomers their first direct look at what is possibly a planet outside our solar system — one apparently that has been ejected into deep space by its parent stars.

The image was released May 28 at the Space Science Update at NASA Headquarters in Washington, D.C.

The discovery, made by a team led by Susan Terebey of the Extrasolar Research Corp. in Pasadena, Calif., using Hubble's Near Infrared Camera and Multi-Object Spectrometer (NICMOS), further challenges conventional theories about the birth and evolution of planets. It also offers new insights into the formation of our own Solar System.

Located within a star-forming region in the constellation Taurus, the object, called TMR-1C, appears to lie at the end of a strange filament of light that suggests it has apparently been flung away from the vicinity of a newly forming pair of binary stars.

At a distance of 450 light-years, the same distance as the newly formed stars, the candidate protoplanet would be 10,000

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'Take Our Children to Work' Set for June 25 at Center

Children of Marshall Center employees will get a firsthand look at their parents on the job when Marshall celebrates "Take Our Children to Work Day" June 25. The day is designed for employees' children in grades 3-12.

Activities will include Center tours and children will be given the opportunity to have their photograph taken.

Employees may register their children until June 10 at the Equal Opportunity Office, Bldg. 4200, Room 220. More information is available on the "Inside Marshall" home page at Internet site: <http://inside.msfc.nasa.gov/>

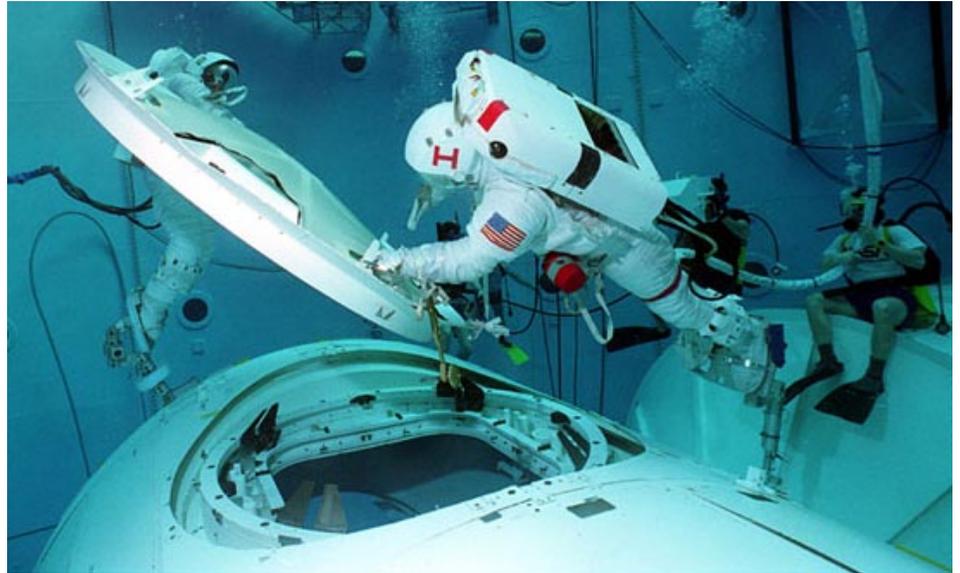


Photo by Terry Leibold

The Neutral Buoyancy Simulator, currently under negotiations to be operated commercially, provided NASA engineers, scientists and astronauts with the closest simulation available on Earth of the low-gravity environment of space.

Center's Underwater Facility to be Operated as Commercial Venture

by Steve Calatrello

At the recommendation of Marshall, NASA has selected Oceaneering Space Systems of Houston, Texas, for negotiations toward an agreement under which the firm would operate the Center's Neutral Buoyancy Simulator facility on a commercial basis, at no cost to the government.

Prior to being deactivated last year, the facility — a 75-foot diameter, 40-foot deep water tank that holds 1.3 million

gallons of water — provided NASA engineers, scientists and astronauts with the closest simulation available on Earth of the low-gravity environment of space.

The Neutral Buoyancy Simulator at Marshall was officially closed for NASA's use on July 1, 1997, since NASA's requirements could be accommodated at a new, larger tank at Johnson Space Center in Houston. However, prior to and since its closing, the question of commercial *See Neutral Buoyancy Simulator on page 5*

New Space Shuttle Fuel Tank On Discovery Mission

by Deana Nunley

A new Space Shuttle fuel tank developed to launch the International Space Station was mated to the orbiter Discovery for the final U.S. mission to dock with Russia's Mir Space Station. If the mission were launched the night of June 2 as planned, the docking is scheduled for June 5.

The Shuttle's new, super lightweight

external fuel tank is the same size as the tank it replaces - but about 7,500 pounds lighter. The weight reduction is essential for launching heavy pieces of the Space Station for assembly on orbit. Since the external tank goes all the way to orbit before it's jettisoned from the Shuttle, each pound removed from the tank equals a pound of payload that can be carried into

See External Fuel Tank on page 5

Marshall Engineers Recognized by AIAA

Several Marshall employees were honored at the American Institute of Aeronautics and Astronautics' (AIAA) 46th Annual Installation and Awards Banquet May 21 at the Bevill Center.

Paul Luz, an engineer in the Preliminary Design Office at Marshall, was awarded the Martin Schilling Award. This award was presented to Luz for his outstanding service to the AIAA's Alabama-Mississippi Section. Luz helped to organize, run and publicize events, including the Great Paper Airplane Contest, the Regional Student Conference and the Great Moon Buggy Race.

Dr. Nicholas Costes with Marshall's Microgravity Science and Applications Division, Space Sciences Laboratory, was named the Herman Oberth Award recipient. This award recognized Costes' innovative use of the microgravity environment of space in near-Earth orbit and the discovery of basic knowledge of the mechanics of soil at low effective stresses which significantly influence aerospace and geotechnical research and engineering. Costes' contributions included leading a Marshall research effort for the Space Shuttle main engines and serving as a principal investigator on lunar soil mechanics throughout the Apollo Program.

Tony Springer with Marshall's Experimental Fluid Dynamics Branch, Structures and Dynamics Laboratory, earned the Young Engineer of the Year Award. Springer is responsible for determining the aerodynamic characteristics of current and future launch vehicles. He is the tasked lead on the X-33 technology demonstrator vehicle wind tunnel testing at Marshall.

Dr. Chris Barret with Marshall's Propulsion Research and Technology Division, was honored with the Engineer of the Year Award. Barret was recognized for her research and design work on the Advanced Launch Vehicle Flight Control Augmentors which may be used on the Bantam booster, the low cost booster and future launch vehicles.

Center Engineer Receives Outstanding Teacher Award From Calhoun College

Rod Stallworth with the Structures and Dynamics Laboratory at Marshall was selected as 1997-1998 Outstanding Part Time Teacher by Calhoun College. Stallworth has served as an adjunct mathematics instructor at Calhoun since 1994. Being associated with Alabama A&M University since 1984, he is also a part time engineering technology instructor there.

Placing Message on Digital Sign Is Easy

The digital electronic signs located on Martin and Rideout Roads are operated by Marshall's Internal Relations and Communications Office. For more information on how to have a message placed on the signs, call 544-6840.

Center's Annual Honors Day Planned for June 9

NASA/Marshall Center Annual Honors Day is set for 10 a.m. and 2 p.m. Tues., June 9 in Morris Auditorium. Joseph Rothenberg, associate administrator for Space Flight, will be the keynote speaker.

Center Acting Director Carolyn Griner and Rothenberg will present Agency-level awards at 10 a.m. and Center-level awards at 2 p.m.

A total of 253 awards will be presented during the annual Honors Day.



Photos by Adeine Buyford

SHARP Students Receive Microgravity Award

During Marshall's Open House festivities May 16, local students received Marshall's Special Microgravity Award. Five of 20 1997 Summer High School Apprenticeship Research Program (SHARP) students present at the presentation are, top photo seated from left, Erica Ignont; Beminet Gabre; standing from left, Rex Noble; Annie Moon and Annie Antar. Below, three of seven recipients from Explorer Post 2001 accepted their awards. Recipients are seated from left, Josh Walker and Carl Patterson and standing, Keith Cornwell. SHARP students spent nine weeks with Marshall mentors exploring careers through on-the-job training.



Space Station Exhibit Tours Under Montana's Big Sky

by Steve Calatrello

More than 40,000 Montanans — roughly 5 percent of the state's population — caught a glimpse of the future when NASA's International Space Station exhibit docked in six Montana communities in May. NASA took its full-scale, walk-through mock-up of the Station's science laboratory and crew living quarters to Montana at the invitation of U.S. Sen. Conrad Burns, whose office was instrumental in coordinating and supporting the tour.

"This tour was a team effort from the beginning," said John Dumoulin, Marshall's exhibits manager. "Working with Senator Burns' office and the Education Office at Ames, we were able to provide the people of Montana far more than if we each had been working individually."

In addition to touring the Space Station exhibit, visitors got an up-close look at a 1:50 scale model of the X-33, NASA's subscale technology demonstrator designed to make space flights much more affordable, reliable and frequent. "With NASA having selected Malmstrom Air Force Base, Mont., as a landing site for some flight tests of the X-33," said Dumoulin, "the tour was a perfect opportunity to educate Montana on both the Space Station and X-33 programs."

As part of the tour, NASA education specialist Don Scott of Ames visited local schools in selected cities. During general assemblies, classroom visits and teacher in-service workshops, Scott discussed space exploration past and present and the importance of Montana's role in the future of America's space program.

The team effort paid enormous dividends, according to Karen Sodomick, a Marshall public information associate who traveled with the exhibit.

"The tour was extremely well-received by the public and the Montana news media," Sodomick said. "We couldn't have asked for better attendance or media publicity."

A large number of federal, state and local elected officials toured the exhibit, including Sen. Burns, Lt. Gov. Judy Martz and former Gov. Tim Babcock. The tour's true success story is that more than 100 school groups from Montana and Wyoming had the opportunity to walk through the exhibit and experience what it will be like to be an astronaut aboard the Space Station, according to Sodomick. "We had one school group travel 500 miles to see the exhibit," said Sodomick. "This tour provided NASA the opportunity to interact with Montana communities in a way it had never done before. We were able to educate tomorrow's leaders on the importance of the Space Station and how it will benefit life here on Earth."

The Space Station is considered to be the largest scientific cooperative program in history, drawing on the resources and scientific expertise of 16 nations: the United States, Canada, Japan, 11 European countries, Russia and Brazil.



Courtesy photo

Montana residents gather to view a banner picturing the X-33, NASA's subscale technology demonstrator designed to make space flights much more affordable, reliable and frequent. NASA selected Malmstrom Air Force Base, Mont., as a landing site for some flight tests of the X-33. The X-33 display was part of a NASA exhibit that toured six Montana communities in May.

TO: All Employees

FROM: DA01/Carolyn S. Griser

SUBJECT: Policy Statement on Sexual Harassment

The Marshall Space Flight Center is committed to implementing NASA's policy that discrimination on the basis of color, race, religion, sex, national origin, age or disability (mental or physical) is unlawful and, therefore, unacceptable. Sexual harassment is a form of sex discrimination and, thus, is a prohibited personnel practice. Disciplinary action in accordance with Federal regulations will be taken against those who participate in sexual harassment, as well as any supervisor who knowingly allows such conduct to continue after becoming aware of its existence.

I strongly support this policy and wish to emphasize that sexual harassment, like other forms of discriminatory behavior, will not be tolerated. There are a number of established channels through which employees may raise the issue of sexual harassment, including the Director, Equal Opportunity (EO) Office, Center Director, the Associate Administrator for Equal Opportunity Programs, or the NASA Administrator. Other channels are:

- Agency internal grievance system.
- Negotiated grievance procedures.
- Office of Special Counsel, if a prohibited personnel practice is involved.
- Merit Systems Protection Board, if an appealable adverse action is involved.
- EO complaint system, if discrimination is alleged.
- Agency Inspector General.

If you are a Bargaining Unit employee, you have the option of contacting your respective union representative (i.e., APGE Local 3434 or IFPTE, MESA Local 27) for additional information and/or representation.

As EO counselor or EO staff member can provide further information on the complaint process.

Enclosed for your information is the Center's policy statement and definition of sexual harassment.

Carolyn S. Griser
Carolyn S. Griser
Acting Director

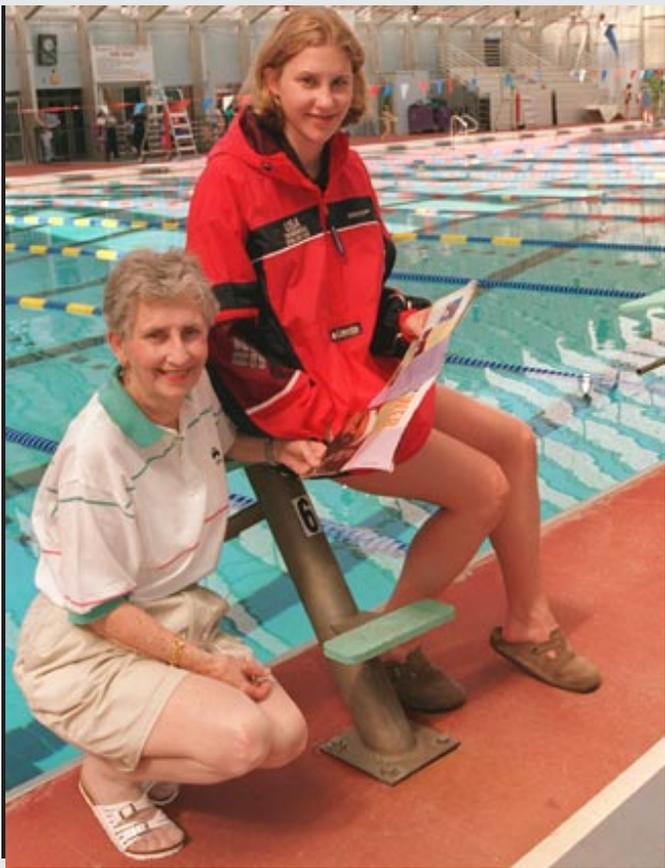


Photo by Adeline Byford

Marshall Employee's Granddaughter Earns Place on U.S. Junior National Swim Team

Huntsville's Margaret Hoelzer recently earned a place on the U.S. Junior National Swim Team. Hoelzer is the granddaughter of Marshall's Sylvia Thomas, staff assistant to the director in the Human Resources Office. The 15-year-old Hoelzer traveled with the Junior National Swim Team to Sheffield, England, last week where she represented the United States at the British Grand Prix International. Her times in the butterfly rank her 17th nationwide and 75th in the world. Hoelzer, who attends swimming practice six times per week, recently completed her freshman year at Huntsville High School with a 4.0 average.

Planet

Continued from page 1

times less luminous than the Sun. If the object is a few hundred thousand years old, the same age as the newly formed star system which appears to have ejected it, then it is estimated to be two-three times the mass of Jupiter, the largest gas giant planet in our Solar System. Also possible is that the object is up to 10 million years old, the same age as other young stars nearby, in which case it may be a giant protoplanet or a brown dwarf star.

The candidate protoplanet is now 130 billion miles from the parent stars and predicted to be hurtling into interstellar space at speeds up to 20,000 miles per hour — destined to forever drift among the Milky Way's starry population.

"If the results are confirmed, this discovery could be telling us gas giant planets are easy to build. It seems unlikely for us to happen to catch one flung out by the stars unless gas giant planets are common in young binary systems," said Terebey. "The results don't directly tell us about the presence of any terrestrial planets,

like Earth," she adds. "However, we believe gas giants do influence the formation of much smaller rocky planets."

Current models predict that very young giant planets are still warm from gravitational contraction and formation processes. This makes them relatively bright in infrared light compared to old giant planets such as Jupiter. Even so, young planets are difficult to find in new solar systems because the glare of the central star drowns out their feeble glow.

The discovery also challenges conventional theories that predict gas giant planets take millions of years to coagulate from dust in space. Instead, it favors more recent ideas that large, low-density planets may condense out of gas very quickly, at the same time their parent star does.

"This observation pushes back the clock on planet formation and offers short time scales which allow us to see how things form. This provides valuable new clues to the origin of our Solar System," says Terebey.

The candidate protoplanet was accidentally discovered by Terebey and her colleagues while studying Hubble infrared images of newly formed protostars in a molecular cloud in Taurus. The exquisite sensitivity and sharpness of NICMOS clearly revealed the object's pinpoint image. However, it might have been dismissed as a background star if not for the presence of a bizarre 130-billion-mile-long filamentary structure that bridges the space between the binary pair and the candidate protoplanet.

"I said to myself, 'This is really weird, what in the world could it be?'" recalls Terebey. She speculates it could be a tunnel the runaway object burrowed through a dust cloud surrounding the stars. This created a "light tube" which channels light from the stars deep inside their dusty cocoon — like a light beam traveling through a length of fiber optic cable.

This brought Terebey to the tantalizing possibility that the planet had been flung into deep space by a gravitational "slingshot" effect from its parent stars. This could have happened if the planet's orbit allowed it to rob momentum from the stars and pick up so much speed that it escaped the system, similar to the way spacecraft perform gravitational "slingshot" maneuvers to pick up speed by flying close by a planet.

Future observations call for images taken at a later date to confirm the object's predicted movement across the sky. In addition, the spectrum of the object will tell whether it is a background star, brown dwarf, or something whose spectrum is less easy to predict, such as a giant protoplanet.

"We will just have to wait and see if future observations confirm this picture," said Terebey. "However it turns out, we have come to appreciate that protoplanet ejection by young binary stars ought to happen, and it offers a new way to search for giant planets."

"These future observations will be critical in verifying that this object is truly a planet and not a brown dwarf," said Dr. Ed Weiler, director of the Origins Program at NASA Headquarters in Washington, D.C. "We are sharing this preliminary data with the public at a very early stage in the research process because of its potential importance and because of the compelling nature of the image. If the planet interpretation stands up to the careful scrutiny of future observations, it could turn out to be the most important discovery by Hubble in its eight-year history."

Images and information about this discovery can also be found at Internet site: <http://opposite.stsci.edu/1998/19>

Upcoming Events

Bookfair's Last Day Is Thurs.

Thursday is the last day for NASA Exchange's semi-annual bookfair. A variety of hardback books will be offered at substantial discounts including bestsellers, cookbooks, gardening, sports and children's selections 8 a.m.-4 p.m., today and Thursday in Bldg. 4200, room G-13.

Emergency Warning System Test Set For 3 p.m. Thursday

The monthly test of the Emergency Warning System has been scheduled for 3 p.m. Thursday. This is an audio test only. **DO NOT** evacuate to protective areas. If severe weather is occurring at this time, the test will be rescheduled to a later date.

Safety coordinators and monitors should send reports of malfunctioning speakers to: AB11/ Emergency Preparedness Officer at 544-5187 as soon as possible.

Systems and Software Expo At Marshall Thursday

"Tech Expo '98," a walk-through table-top technology exposition, is planned for 10 a.m.-2 p.m. Thursday in the lobby of Bldg. 4203. Activities include hands-on demonstrations of the latest information systems, products and services. Admission is free and all Marshall employees, contractors and friends are invited.

Lt. Gov. Siegelman to Speak At Update Luncheon June 11

The Huntsville/Madison County Chamber of Commerce is sponsoring an Alabama Update luncheon with Lt. Gov. Don Siegelman at noon June 11 at the Huntsville Hilton. Siegelman will present his assessments of the last legislative session and possible future legislation vital to Alabama's economic health.

Tickets are \$20 each and the reservation deadline is Thursday. Call Mary Rutledge at 544-5252 for more information.

Neutral Buoyancy Simulator

Continued from page 1

viability of the facility had been raised. In response to a congressional and NASA request, Marshall issued an announcement seeking industry commercialization plans in December 1997.

Oceaneering Space Systems is an advanced applied technology company that provides engineering services and hardware to customers who operate in marine, space and other harsh environments. Its services and products are often combined to offer complete project solutions and are marketed worldwide to oil and gas companies, government agencies and firms in the telecommunications, aerospace and civil engineering and construction industries.

Oceaneering has indicated the tank will provide a unique, controlled simulation environment for underwater research, development and training. From 1968 to 1997, NASA performed a wide range of operations in the facility to develop, test

and refine techniques and hardware for use in space. By attaching a system of floats and lead weights to people and objects, engineers simulate weightlessness by making a subject "neutrally buoyant" — neither sinking nor floating.

The Neutral Buoyancy Simulator facility has supported a number of successful space missions. It was designated a National Historic Landmark in 1985, in recognition of its important role in support of the U.S. space program.

The simulator was used to evaluate techniques used to assemble the International Space Station and to test the Hubble Space Telescope. It also helped in developing procedures that saved Skylab after the spacecraft suffered damage to its sunshield during launch in 1973.

For more information on the Neutral Buoyancy Simulator facility at Marshall, see its Internet site at:

<http://techtran.msfc.nasa.gov/nbs/nbexplore.html>

External Fuel Tank

Continued from page 1

space. The tank is the largest single component of the Space Shuttle. Standing 154 feet tall, the gigantic external tank is taller than a 15-story building and is as wide as a silo with a diameter of about 27 feet.

The external tank holds the liquid hydrogen and liquid oxygen propellants in two separate tanks to fuel the Shuttle's three main rocket engines. The external tank program is managed by Marshall.

The super lightweight tank features major changes in materials and design. Both the liquid hydrogen tank and the liquid oxygen tank are constructed of aluminum lithium — a lighter, stronger material than the metal alloy used to manufacture the previous external tanks.

The tank's structural design also has been improved. The walls of the redesigned hydrogen tank are machined in an orthogonal waffle-like pattern, providing more strength and stability than the previous design.

"The first flight of the super lightweight tank culminates four-and-a-

half years of very intensive effort to bring this brand new material, aluminum lithium, to flight status," said Parker Counts, manager of Marshall's External Tank Project. "It was a tremendous challenge that demanded the best from our team of very dedicated individuals." About 40 government and contractor employees who developed and produced the new external tank were invited to attend the STS-91 launch as Space Flight Honorees.

At least 25 super lightweight tanks will be required for Space Station assembly missions. About a dozen tanks are currently in various stages of processing and assembly. The new design does not affect the assembly process in which the Shuttle orbiter is mated to the external tank and solid rocket boosters.

The external tank is manufactured by Lockheed Martin at the Michoud Assembly Facility in New Orleans. In addition to the external tank, Marshall provides the main engines and solid rocket boosters, including the reusable solid rocket motors, for every Shuttle flight.

Employee Ads

Miscellaneous

- ★ Old roof-mounted bicycle rack, \$25. 880-2761
- ★ Health Rider, \$50; Fitness Flyer, \$75; top10 trainer with video, \$40; row machine, \$40. 650-0086
- ★ Swingset \$60; Infinity speakers \$60; 20" girl's bike, \$40; men's bike, \$40. 830-4201
- ★ Gas grill w/tank and gauge, \$25; ceiling fan, \$25. 351-6806
- ★ Stihl weed eater, \$30. 722-0417
- ★ Two bookcases 72x30x16, TV/VCR stand, cherry finish, \$30. each, or all for \$80. 256-232-8311
- ★ German schrank, \$900. 830-8339
- ★ Maytag dryer, heavy duty, \$175. 881-0551
- ★ Multi-family yard sale, Sat., June 6, Thomas Manor Subdivision off Old Monrovia Road.
- ★ Big Bertha clone driver with Aldila HP-35 graphite superlite shaft, \$50. 883-5114
- ★ Teenie beenie babies set of 12, still in bag, \$60. 653-4266

Boats

- ★ 1992 Chaparral 1800 SL ski boat Volvo 110hp, dry docked, bow rider. \$7,300. 837-0150

Vehicles

- ★ 1993 Mazda MX6, green, leather, gold package, 10 CD changer, 37K miles, \$9,500. 880-3181.
- ★ 1997 Honda Civic DX hatchback, warranty, 18K miles, \$10,500. 539-4335
- ★ 1991 Jeep Laredo, 4x4, 4.0L, AT, PW/PL, green, 115K miles, \$6,600. (205) 230-0503
- ★ 1987 Dodge Shelby Daytona, 4 cyl., turbo, 5 spd., sunroof, alloy wheels, 125K miles, 27m.p.g. \$1,950. 753-2278

- ★ 1996 Pontiac transport van, \$12,500. 830-8339
- ★ 1995 Nissan Maxima SE, leather, sun roof, spoiler, blue, 38K miles. \$15,800. 539-0094
- ★ 1990 Acura Legend LS, leather interior, sunroof, 12 disc CD changer, \$8,650. 880-7204
- ★ 1986 Mercury Cougar, \$1,650. 757-2442
- ★ 1982 Yamaha Vision 550, 12,500K miles, \$1,699. 256-233-7207 after 6 p.m.
- ★ 1994 Mustang Cobra, black w/black leather, 5-spd., new tires, 22K miles. 726-2529

Center Announcements

- ☛ **Alumni League** — The NASA Alumni League MSFC Chapter will sponsor a dinner June 11 at the Valley Hill Country Club. A social will begin at 6:30 p.m. with a dinner buffet at 7:30 p.m. Tickets are \$16 each and payable to Ed Buckbee, 811 Esslinger Road SE, Huntsville, AL 35802. Reservation deadline is June 5.
- ☛ **Travel Office** — The Vacation Office at American Express Travel will be closed June 5. It will reopen on June 8.
- ☛ **AGFE** — The next monthly meeting for the AGFE Local 343 will be held 11:30 a.m.-12:30 p.m. Tues., June 9 in Bldg. 4200, room P-106.
- ☛ **Toastmasters** — The NASA Lunar Nooners Toastmasters Club will meet on Tues., June 9 at 11:30 a.m. in the Bldg. 4610 cafeteria conference room. All Marshall employees, contractors and friends are invited to attend. For more information, contact Debbie Hagar at 539-4499 or Lee Johns at 544-5142.
- ☛ **Stamp Show** — The Huntsville Philatelic Club will sponsor a stamp show June 6-7 at the Beville Center. Show hours are 10 a.m.-5 p.m. Admission is free.

Job Opportunities

CPP 98-39-CL, AST, Technical Management, GS-801-14, Space Transportation Programs Office, Planning and Operations Office. Closes June 8.

CPP 98-56-JB, Contract Specialist, GS-1102-12/13, Procurement Office, Research and Development Support Division. Closes June 8.

CPP 98-62-JB, AST, Aerospace Flight Systems, GS-861-14, S&E, Space Systems Chief Engineers, Microgravity Experiment Project Engineering. Closes June 8.

Reassignment Bulletin: 98-20-CV, AST, Aerospace Vehicle Design and Mission Analysis, GS-861-12/13 (2 vacancies), S&E, Structures and Dynamics Laboratory, Guidance and Control Systems Division, Flight Mechanics, Guidance, Navigation, and Control Systems Branch. Closes June 12.

Reassignment Bulletin: 98-21-CV, AST, Technical Management, GS-801-12/13, S&E, Structures and Dynamics Laboratory. Closes June 12.

CPP 98-65-DC, AST, Data Systems, GS-854-14, S&E, Astrionics Laboratory, Software & Simulation Division, Software Management & Test Branch. Closes June 5.

CPP 98-67-DC, Program Analyst, GS-343-13 (2 vacancies), Microgravity Research Program Office, Program Planning and Control Office. Closes June 11.

CPP 98-72-CP, Supv. AST, Aerospace Flight Systems, GS-861-14, S&E, Space Science Laboratory, Science Systems Division, Experiment Development Branch. Closes June 5.

CPP 98-74-JB, Legislative Affairs Specialist, GS-301-13, Customer & Employee Relations Directorate, Government & Community Relations Office. Closes June 11.

MARSHALL STAR

Marshall Space Flight Center, Alabama 35812

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