



'We bring people to space — We bring space to people'

Marshall's Fastrac full-engine, hot-fire test successful

by Deana Nunley

NASA has begun full-engine, hot-fire testing of the Fastrac rocket engine. A 20-second, full-power test this month at NASA's Stennis Space Center, Miss., demonstrated operation of the complete engine system.

Fastrac is a 60,000-pound-thrust engine that will be used for the first powered flight of NASA's X-34 technology demonstrator. The Marshall Center designed and developed the Fastrac engine.

"This is an exciting time as we transition from testing individual pieces of the engine to hot-fire testing of the full engine," said Danny Davis, manager of Marshall's Low Cost Technologies Project. "This engine will dramatically reduce the cost of launch systems for space transportation. Last Thursday's test is a key step toward demonstrating that the engine's inexpensive parts and technologies work well together."

Marshall Center engineers are in their second year of design, analysis and component-level testing of parts such as the injector, gas generator and turbopump. This month's series of testing at Stennis marked the first time for the whole engine system to be

operated at full power. NASA engineers will examine data collected during full-engine testing to determine if engine design models and analyses are correct.

The Fastrac engine is less expensive than similar engines

because of an innovative design approach that uses commercial, off-the-shelf parts and fewer of them. Fastrac uses common manufacturing methods, so building the engine is relatively easy and not as labor-intensive as manufacturing typical rocket engines.

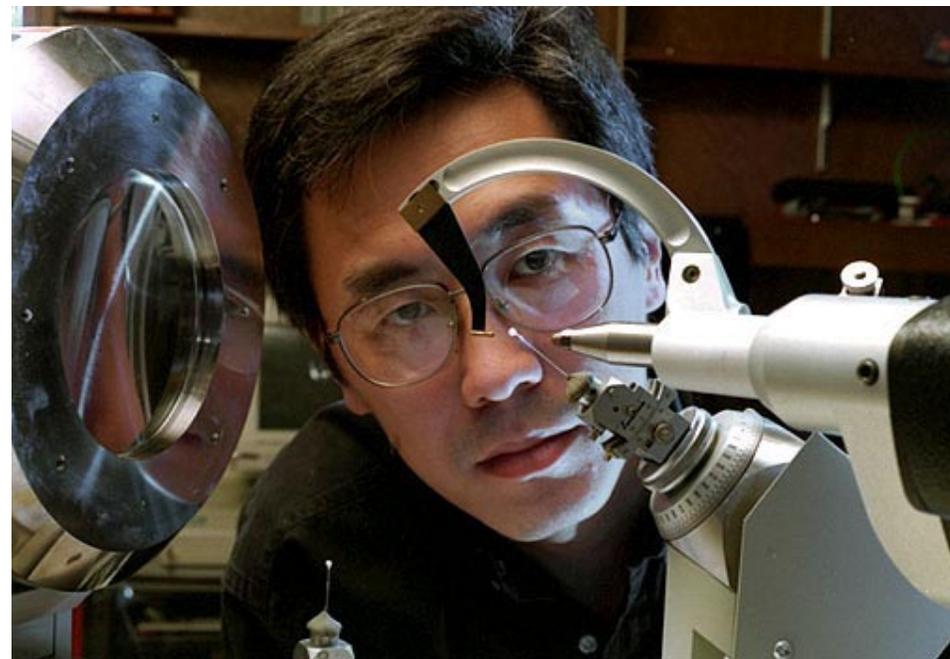
The writer, a contractor employed by ASRI, supports the Media Relations Office at Marshall.



Photo by Terry Leibold

The 60K Fastrac engine 1 test fires at Stennis Space Center, Miss.

Space research may speed *development of flu-fighting drug*



Dr. Ming Luo, associate director of the Center for Macromolecular Crystallography at the University of Alabama at Birmingham, uses an X-ray diffraction apparatus to study the molecular structure of the influenza virus neuraminidase. The research is sponsored by Marshall's Space Product Development Office.

by Tracy McMahan

Even with vaccines, 20-40 million people in the United States catch the flu each year, and thousands are at risk of dying from its complications.

Thanks to research sponsored by Marshall's Space Product Development Office, flu sufferers may have a new way to treat the virus.

In the future, a new class of prescription drugs called neuraminidase inhibitors may offer the prospect for decreasing the duration and severity of the illness and may even prevent the development of symptoms in those exposed to the virus. One of these neuraminidase inhibitors was developed through ground and space research conducted in partnership by

See Flu on page 7

"Good Safety Practices, Good Preventive Medicine"

— Safety slogan submitted by Claire Mix, HEI

Enhanced interdisciplinary research is motive for new Science Directorate

Editor's Note: This is the second in a series following article about the Marshall reorganization announced Jan. 29 by Center Director Art Stephenson.

by Mike Wright

Marshall's Jack Bullman says enhanced opportunities for interdisciplinary research and more opportunities to share resources among scientists served as the major motivations for the structure of the new Science Directorate at the Marshall Center.

The Directorate will be responsible for all work at the Marshall Center related to microgravity, space science, Earth science and optics.

Bullman served as leader of an initial group of 19 scientists, engineers and other personnel from across the Center assigned to structure the new directorate as part of Marshall's overall reorganization. "As time moved on, we also pulled in some additional people who made outstanding contributions to the efforts," Bullman said.

The new directorate will support three of the four major NASA enterprises. Microgravity is part of the Human Exploration and Development of Space Enterprise. "We are also responsible for supporting NASA's Space Science and Earth

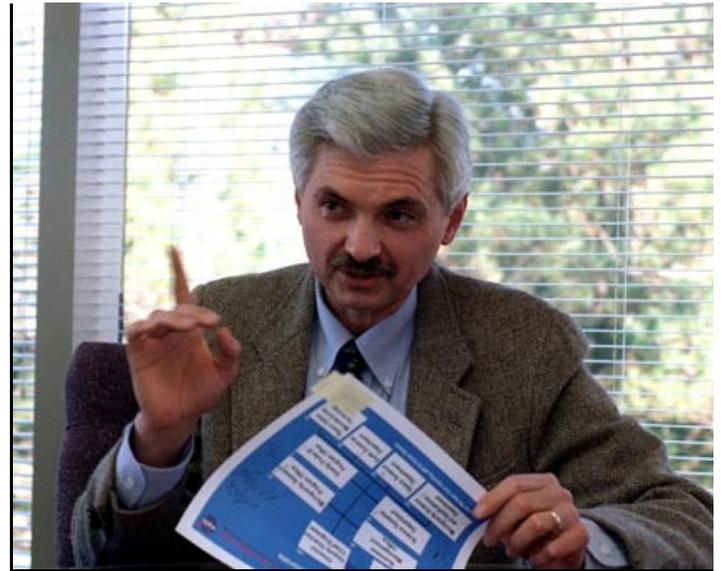


Photo by Emmett Given

Jack Bullman discusses plans to reorganize the new Science Directorate.

Science Enterprises," Bullman said.

Current estimates are that the directorate will include 439 Marshall employees mainly from the existing Space Sciences Laboratory, the Microgravity Research Program Office, the Global Hydrology and Climate Center, the Astrionics Laboratory and the Systems Analysis and Integration Laboratory.

"We have provided an organization that maintains the strengths of the Center in current science activities and also increases interaction across the scientific disciplines. We are also

See Reorganization on page 6

Marshall tests new telemetry system for Delta IV launch vehicle

by Paul Kennedy

The Marshall Center has employed its unique radio frequency and antenna

test facilities to complete tests of the telemetry system for the Delta IV Evolved Expendable Launch Vehicle.



Photo by Dennis Olive

John Haynes, an engineer in the Radio Frequency Branch in Marshall's Astrionics Laboratory, prepares for a test of the Boeing Delta IV launch vehicle telemetry system.

The tests were conducted in mid-February by personnel in the Radio Frequency Branch in Marshall's Astrionics Laboratory. The testing, performed as part of a Space Act Agreement between Marshall and The Boeing Co., provided communications antenna pattern measurements for the Delta IV program.

The Delta IV launch vehicle is the newest member of the

Delta series of expendable launch vehicles. It is being developed by Boeing in an effort to increase U.S. competitiveness in the unmanned launch services market by providing greater space transportation options while maintaining reliability and lowering operational costs.

"One of the ways Boeing hopes to achieve lower operational costs and even increase reliability with the Delta IV is to reduce the expense of providing vehicle health and status telemetry data during flight to an operations control center," said Leon Bell, chief of the Radio Frequency Branch. "Earlier Delta launch vehicles have relied heavily upon ground-based receiving stations with limited coverage or costly telemetry receiving aircraft for essential flight performance data. However, the Delta IV will fly a telemetry system compatible with NASA's Tracking

See Delta IV on page 7

Annual dinner at Von Braun Center honors Marshall retirees

by Debra Valine

The annual dinner honoring last year's 119 NASA-Marshall will be held Tuesday, March 23, at the Von Braun Center.

The event started in 1986 when then-Center Director J.R. Thompson decided he wanted to give NASA retirees more recognition.

"It's a night to honor the retirees," said Edwina Bressette, the retirement coordinator in the Human Resources Office. "It's like a reunion where everybody gets together to relax and have fun."

Dinners for the retiree and one guest are provided free with special seating. NASA employees and their guests, the honorees and former retirees attend. Dinner this year is prime rib or chicken cordon bleu. Cost is \$15 per plate.

Tickets for the event are on sale through office administrative channels. Thursday by noon is the last day to buy tickets. Tickets will not be available at the door. This year's event begins at 6 p.m. with a cash bar social in the West Exhibit Hall and dinner will be served at 7 p.m. in the North Hall.

One of our honorees, Judy Arnold Martin from our office, was instrumental in putting on the dinner each year," Bressette said. "She got married in April

last year and then retired in October. She now lives in Florida and is helping us from a distance, and she plans to attend the dinner. She left us reams of instructions, but it is not the same as having her here."

Following dinner, Center management, employees, on-site contractors and retirees will perform skits in this year's production of the Fabulous Follies. Rhonda Stricklin, a budget analyst in Chief Financial Officer Office, is entertainment coordinator for the event and has acts lined up.

"We have the Mississippi Squirrel Revival, the Rockettes, the Beach Boys, Earl Pitts, Ike and Tina Turner and the Temptations, to name a few," Stricklin said. "It is really fun."

Stricklin said she thinks about the entertainment for the retiree dinner all year, but it normally doesn't start coming together until after the holidays.



Courtesy photo

Marshall managers, employees, on-site contractors and retirees provide entertainment during each year's retiree dinner.

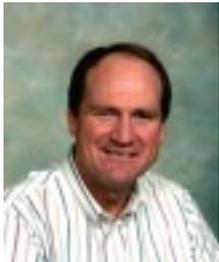
"We started pulling it together in February this year," she said. "We get music and ideas of what we want to do, and then we start putting people with the acts. Some people who have been in the show before recruit other people who want to be on the show."

If you don't already have your ticket, you may miss the party of the year. But it's not too early to get involved in next year's show, she said. To volunteer, call Stricklin at 544-2361.

The writer, a contractor employed by ASRI, is the Marshall Star editor.

Rudolphi named manager of Solid Rocket Booster Project

Michael Rudolphi has been named Manager of the Solid Rocket Booster Project in Marshall's Space Shuttle Projects Office. Rudolphi was formerly chief engineer of the Solid Rocket Booster Project.



Michael Rudolphi

Rudolphi accepted a career federal appointment at the Marshall Center in 1988 to become the facilities manager for the Advanced Solid Rocket Motor Project, in Iuka, Miss., where he directed the design, construction, and operation of an ultra-modern rocket manufacturing facility. In 1995, he accepted a special assignment as manager of the Solid Rocket Booster

Project in the Marshall Resident Office at the Kennedy Space Center, Fla. He returned to Marshall as chief engineer of the Solid Rocket Booster Project in 1996.

Stephenson speaks 'For the Record' on APT Monday

"For the Record," a public affairs program broadcast statewide on Alabama Public Television, will present an update on the Marshall Center and NASA next Monday, March 22, at 6:30 p.m.

Marshall Center Director Art Stephenson will be the featured guest for the 30-minute discussion show.

"For the Record" originates from the state network's studios in Montgomery. The Monday evening program will include an opportunity for viewers to ask questions to Stephenson by telephone.

The program is carried locally on WHIQ-TV, Channel 25.

Spacelab: Research successes put space to work for life on Earth

by Bob Thompson

Spacelab researchers gathered in Washington, D.C., recently to discuss the many successes of more than a decade of scientific research and look forward to continuing research aboard the International Space Station.

Marshall's Microgravity Research Program Manager Joel Kearns led a discussion panel highlighting past and future commercial research projects aboard the Space Shuttle. The commercial discussion panel was joined by Dr. Louis Stodieck, manager of the Bioserve Commercial Space Center at the University of Colorado at Boulder; Dr. Weija Zhou of the Wisconsin Center for Space Automation and Robotics in Madison, Wis.; and Dr. Al Sacco, payload specialist of the second U.S. Microgravity Laboratory and current manager of the Center for Microgravity Materials Processing.

Other Center managers also led discussion panels at the Spacelab forum. Alex Roth, acting manager of the Flight Projects Office, led an international discussion panel about the history and development of Spacelab. Roth's panel was joined by former Flight Projects Office Manager Harry Craft, who provided insight into the early process for planning science operations aboard Spacelab.

"Basic and applied scientific research is the foundation of our high-technology



Courtesy photo

Marshall Center's Michelle Schneider, crew interface coordinator, receives the first ever call to Huntsville from the Space Shuttle. The historic greeting, "Huntsville, this is Astro," occurred at 4:56 a.m. CST Dec. 2, 1990.

economy," Kearns said. "The results already gained from missions in space make it clear that space research can provide unique and valuable knowledge for America. The pace of accomplishments will increase on the International Space Station."

Research in microgravity, or the near-weightless environment of space, allows scientists to gain new scientific understanding previously obscured by the forces of gravity.

Microgravity research in the last decade has yielded significant results for both university researchers and industry.

Since Spacelab 1 in 1983, more than a half-dozen joint microgravity and life sciences missions have been conducted.

threatening diseases. Some technologies developed for space research have been used successfully at the National Institutes of Health in Bethesda, Md., to study HIV, bacterium responsible for lyme disease and prostate cancer. Also, NASA's "biotechnology" research has enabled advances in the understanding of heart disease and hepatitis.

- During Spacelab experiments, NASA science teams investigated the growth of dendrites — tiny, tree-like structures that form as liquid metals solidify. This research is an important first step toward improving metal products used in homes, automobiles and aircraft, making them less expensive, safer and more durable.

Developed by the European Space Agency, Spacelab has carried hundreds of experiments sponsored, funded and managed by NASA's Microgravity Research Program at Marshall.

Also, the European Space Agency and the Japanese Space Agency low-gravity research programs have participated in numerous Spacelab missions, building the future partnership aboard the Space Station.

"Near-weightlessness can allow us to look at old questions in a new way," said Kearns.

"This new field of research is adding considerably to our basic scientific knowledge and should lead to a better quality of life here on Earth."

Because of Earth's gravity, many of nature's processes are difficult — if not impossible — to observe clearly on the ground. But aboard a spacecraft orbiting the Earth, the apparent weight of an object is minimal.

Space flight gives scientists a unique opportunity to study liquids and gases — and how these change to solids — and the forces and processes that affect them.

The writer, a contractor employed by ASRI, supports the Media Relations Office at Marshall.

Spacelab materials researchers achieved the fastest dendritic growth rate ever measured and highest level of undercooling ever obtained for pivalic acid — a transparent material used by the researchers to model metals. Sales of metal-cast parts in the United States alone total \$25-30 billion a year, according to the American Foundrymen's Society in Des Plaines, Ill.

- Spacelab experiments have resulted in new understanding of how to manufacture materials used for semi-conductors and metallic-electronic crystals for X-ray and infrared detectors. Mercuric-Iodide crystals, important for use in radiation

See Experiments on page 5

Experiments improve quality of life on Earth

In the more than 10 years that experiments were conducted on Spacelab, discoveries have added significantly to the quality of life on earth. Some of the discoveries discussed recently at a gathering of Spacelab researchers in Washington, D.C., include:

- Spacelab experiments have revealed a better understanding of the molecular structure of diabetes, the flu and respiratory syncytial virus, basic information to be used in new treatments of these life-

Experiments

Continued from page 4

detection, were studied during a Spacelab experiment and showed improved electronic properties over crystals grown on Earth.

- The most precise temperature measurement ever made in space was recorded during a Spacelab mission, and may have a direct impact on the design of thinner, smaller computer chips for tomorrow's computers.

- Science experiments concerning the effect of low-gravity on the behavior of fluids focused on the interaction of gases, gas bubbles and liquid drops exposed to varying temperatures. Research gathered from these experiments could lead to advances in material processing, including the processing of new high-strength metals and temperature-resistant glasses and ceramics.

- Marshall-managed Spacelab missions have produced several scientific firsts in the field of combustion: floating balls of flame (one of the most simple models of burning known), the weakest fuel mixture ever burned and the first observations of gravity-free flames simulating flames in furnaces, aircraft engines and diesel engines. This combustion research has resulted in new understanding of weak combustion processes and new ideas to reduce emissions for cleaner, more fuel-efficient internal combustion engines and improved spacecraft safety.



Photo by Emmett Given

Seated on right, Dennis Smith, manager of the Planning and Operations Office for Space Transportation, chairs the initial Space Transportation Committee Roundtable meetings.

Communications meetings boost programs

Each week, Marshall's Space Transportation Office hosts a communications roundtable designed to improve communication about its programs and events.

Participants in the roundtable include the Space Transportation Office Program/Project managers; representatives of the offices of Media Relations, Education, Technology Transfer, Legislative Affairs and Internal Communications; as well as scientists and engineers as needed, and representatives of supporting centers and contractors.

"The roundtable will help us provide a

consistent story to the public and our stakeholders," said Dennis Smith, manager of the Planning and Operations Office for Space Transportation.

The Space Transportation Office oversees a diverse family of technologies in various stages of development, many already being developed for use by U.S. firms for commercial application.

"By leveraging technologies and commercialization opportunities, the potential of new technology and its contribution to the national economy will be maximized," Smith said.

New Marshall Star editor named; reader contributions sought

Debra Valine, a contract employee with AI Signal Research Inc., has been named editor of the Marshall Star. She brings to the position 20 years of public affairs experience that includes print journalism, media relations and photography.

The Star is published by Marshall's Internal Relations and Communications Office.

Valine said she plans to put her experience to work by helping to make the Marshall Star a newspaper that reflects not only the exciting programs developed at Marshall, but also the people who make

those programs happen. She also plans to help broaden the newspaper's content with stories about community activities, sports and entertainment.

The Marshall Star welcomes readers' comments and suggestions: stories and topics readers want to see; events of interest to Marshall employees, on-site contractors and retirees; and stories on co-workers with interesting hobbies or claims to fame.

Readers are invited to write short stories or news briefs for the Star. Please coordinate them with Valine in advance and submit the stories by noon on Monday

for that week's paper. Articles selected for publication will be based on timeliness, news and information value. The preferred format for submitting articles is e-mail with the items saved as text files. Please send items or suggestions to: debra.valine@msfc.nasa.gov or to intercom@msfc.nasa.gov. or call 544-0030.



Debra Valine



Photo by Doug Stoffer

Marshall, Sandia team for nuclear propulsion

A multiagency/multicenter engineering team works on the nuclear electric propulsion option for an interstellar precursor mission in the propulsion laboratory at Marshall. Standing from left are Mike Houts and George Schmidt of the Propulsion Research and Technology Division; and Roger Lenard, Ron Lipinski and Steve Wright of Sandia National Laboratory, N.M. Seated from left are Ivana Hrbud, Boise Pearson and Steve Tucker of the Propulsion Research and Technology Division.

Spacelink wins Website award, also recognized as 'hot site'

Spacelink, NASA's Website designed specifically for use by educators and students, has been awarded the Curriculum Administrator Web Site Award.

The award recognizes the schools, companies and organizations that have developed exemplary sites for K-12 education.

Spacelink was chosen under the award category of Science for links to online space-related interactive projects, multimedia resources, news and live events. Spacelink is also recognized for the extensive library on topics such as astronauts, space missions and the Hubble Telescope.

Spacelink shares the award with Quest, a NASA education Website developed by Ames Research Center in Mountain View, Calif., that provides "interactive education projects" for teachers and students.

Spacelink has been recognized also as a "hot site" by "USA Today," MSNBC and Kids Online.com.

can be found at this address:

<http://spacelink.nasa.gov>

Reorganization

Continued from page 2

providing expanded opportunities for Marshall scientists to share the resources that they need to do their research," Bullman said.

Beyond the first level of directorate management, the new organization includes the Microgravity Research Program Office, Gravity Probe-B Program Office, Science Systems Department and Business Management Office.

"The Microgravity Research Program Office really manages all of the microgravity research and technology activities for NASA. This includes work at Marshall, at the John H. Glenn Research Center at Lewis Field, and at the Johnson Space Center," Bullman said. The office also focuses on space product development. "This group really leads the effort to commercialize microgravity research activities in such fields as pharmaceuticals," Bullman said. A third element of the office involves microgravity projects associated with the International Space Station.

The Gravity Probe-B Program Office will have responsibility for a relativity

gyroscope experiment being developed by NASA and Stanford University to test some unverified predictions related to Albert Einstein's general theory of relativity.

The Science Systems Department represents an expansion of a current division in the Space Sciences Laboratory. It primarily provides functions related to systems engineering, project management, experiment definitions and data systems to the research areas, Bullman said.

Also linked to the first level of Science Directorate management are future plans for a National Center for Space Science and Technology, a type of research institute that would include the existing Global Hydrology and Climate Center. Such an institute might also bring together researchers from Marshall, private industry and universities to focus on microgravity materials science, physics and astronomy, and optics, Bullman said.

The organizational structure for the directorate includes a Space Optics Manufacturing Technology Center and departments devoted to microgravity science and applications, space science and Earth science. "These are the implement-

ing arms of this directorate. They represent the four major business lines," Bullman said.

The Space Optics Manufacturing Technology Center will respond to challenges by NASA Administrator Dan Goldin to greatly reduce the weight of space optics used in current space observatories.

"These reductions are critical if we are going to meet NASA's goals in space optics," Bullman said.

The Microgravity Science and Applications Department implements the Marshall areas of responsibility under the Microgravity Research Program Office.

The Space Science Department will house Marshall's X-ray and gamma ray astronomers, astrobiologists and physicists who study space plasma, cosmic rays and solar science. The Earth Science Department will house experts in atmospheric science and other disciplines.

Bullman said Center Director Art Stephenson had established a direction in regard to the overall Marshall reorganization that is "right on target."

The writer works in the Internal Relations and Communications Office.

Flu

Continued from page 1

NASA and the Center for Macromolecular Crystallography at the University of Alabama at Birmingham.

The compound was synthesized by BioCryst Pharmaceuticals in Birmingham, Ala., and is now under development by The R.W. Johnson Pharmaceutical Research Institute in Raritan, N.J., a Johnson & Johnson company.

“With the aid of NASA support for space and ground-based research, we successfully mapped the molecular structure of the influenza virus — exposing its weaknesses,” said Dr. Larry DeLucas, director of the Center for Macromolecular Crystallography.

Sponsored by the Space Product Development Office of NASA’s Microgravity Research Program at Marshall, DeLucas’ organization is chartered as a NASA Commercial Space Center — encouraging private

The writer, a contractor employed by ASRI, supports the Media Relations Office at Marshall.



Photo by Dennis Olive

Sayonara NASDA

Scott Croomes, right, of Marshall’s Flight Projects Office, briefs executives from the National Aeronautics Space Development Agency (NASDA) on Environmental Control Life Support Systems during their farewell tour March 15. NASDA is closing its Huntsville office.



Courtesy photo

Exhibit showcases medical patents

Marshall’s Technology Transfer Office led the NASA Commercial Technology Program’s participation in the recent Medical Design and Manufacturing Show in Anaheim, Calif. New technologies relating to the medical industry were highlighted, such as Marshall’s patented work on birthing forceps, knee braces and other medical advances.

Delta IV

Continued from page 2

and Data Relay Satellite System,” Bell said.

“The system will provide global coverage at a reduced cost,” he said. However, since Delta series launch vehicles have never employed a Tracking and Data Relay Satellite System-compatible telemetry system before, it was very important, of course, for Boeing to understand key system performance issues prior to placing a large order for the associated telemetry flight hardware.

“When Boeing approached us last year to negotiate a Space Act Agreement for antenna pattern measurements using our antenna test facilities, they also asked for our help in designing a method for testing the performance of their telemetry system concept,” said Bell. “We attempted to model their telemetry system as accurately as possible including the construction of a full-scale mockup of the section of the Delta IV vehicle where the antennas will be mounted.”

It took many months to build the model, assemble the components and coordinate the involvement of three different NASA centers for a complete end-to-end test of the Delta IV telemetry system. But Marshall engineers were able to validate Boeing’s design.

The writer works in Marshall’s Astrionics Laboratory.

Employee Ads

Miscellaneous

- ★ Older whitewater canoe, \$200 obo. 539-4335
- ★ Sears exercise bike, speedometer, timer, \$25. 883-2948
- ★ China, Buenavista Noritake. 828-2462
- ★ Minn Kota, Model 565, foot control trolling motor, 28 lbs. thrust, \$50. 837-5782
- ★ Hay, fescue and mixed grasses, baled in October 1998, \$2 per bale in barn. 837-2461
- ★ Reel-to-reel tape player. 881-4566
- ★ Jane's Combat Simulations F-15. 3D-FX, Interactive. Windows 95, CD-ROM, \$30 obo. 461-8237
- ★ Yamaha jet ski, 85 HP, yellow and white, safety features, GP760, \$5,000. 837-2461
- ★ Jacuzzi tub, 72X42, \$300. 461-0476
- ★ Computer desk, \$65. 464-8933 after 5 p.m.
- ★ Bernina 1530 Inspiration sewing machine, computerized, 3 yrs. old, many decorative stitch pattern groups. 723-4983
- ★ Hotpoint washer, \$100; coffee and end table set, \$175; pillow-back sofa, \$100. 830-4304
- ★ Two tickets to Diehard 500 at Talladega, April 25, Anniston Grandstand, face value \$130. 784-9099
- ★ 30-gallon aquarium, all accessories included w/ wrought iron stand, \$60. 851-6425
- ★ 55-gallon, tall aquarium, all equipment, black cabinet stand, \$200. 544-1765
- ★ Garage door opener, chain drive, light, attach brackets, 1/3 hp, \$25. 539-0094
- ★ Antiques: hall tree, sewing machine, potty chair, oak dining table, rocker, wall phone. 880-8134

Vehicles

- ★ 1991 VW Fox, 4-door, 4-speed, 73K miles, \$1,950. 922-5727
- ★ 1996 Pontiac Transport van, PDL/PW, cruise, 7/8 passenger, \$10,500 obo. 564-6225
- ★ 1986 Honda, CRX-Si, 126K miles, A/C, radio, power roof, \$3,950. 883-2948
- ★ 1998 Honda Prelude, 5-speed, black, loaded, 9K miles, \$19,500. 350-1084
- ★ 1988 Honda Accord LXi, 5-speed, 2-door, 145K miles, \$4,900. 751-0682
- ★ 1987 Mazda 626 LX (luxury sedan), 4-door, 5-speed, 135K miles, tilt, cruise, air, all power, \$2,400. 721-9601

Wanted

- ★ Wheelbarrow, metal, medium to large capacity. 895-0148
- ★ Swing set with slide. 232-8311
- ★ Backpacking gear, especially packs. 233-4680

Free

- ★ Landscape rocks. 881-4566

Lost

- ★ Jade look scarab bracelet in the vicinity of Bldg. 4201, sentimental value only. 582-0869

Center Announcements

- ☛ **Easter Egg Hunt** — The annual NASA Exchange-sponsored Easter Egg Hunt will be held Sunday. Registration begins at 2 p.m. followed by the hunt at 2:30. Children of Marshall employees and on-site contractors may participate. In case of rain, the event will be held March 28 at 2 p.m. For more information, call Gena Marsh at 544-0128 or Donna Mahieux at 544-7511.
- ☛ **NASA Scholarships** — NASA employees who wish to apply for one of six college scholarships available to their dependents for the 1999-2000 school year are reminded that completed paperwork must reach Johnson Space Center by March 31. The six \$2,000 scholarships will be awarded to full-time students seeking undergraduate degrees in science or engineering. Forms are available in Room 312F, Bldg. 4200, or at the NASA Exchange office, Bldg. 4752.
- ☛ **NARFE** — The National Association of Retired Federal Employees (NARFE) Decatur-Morgan County Chapter 736 will meet Wednesday, March 24 at Morrison's Cafeteria in Decatur. After lunch at 11 a.m., the program will begin with a guest speaker. All retired federal employees are welcome and encouraged to attend. For more information, call 355-2874 or 773-4826.
- ☛ **MESA Meeting** — All members are invited to the monthly MESA membership meeting at 11:30 a.m., March 18, Bldg. 4471, room C-105. Refreshments will be served.
- ☛ **American Express Travel** — American Express Travel office at Marshall will close 40 minutes early Thursday, March 18. Emergency travel situations should be referred to 1-800-242-4006. Regular office hours, 7:30 a.m.-4:30 p.m. will resume on March 19.

- ☛ **Shuttle Buddies** — The Shuttle Buddies will meet for breakfast at 9 a.m. Monday, March 22, at Shoney's on University Drive West.
- ☛ **MOO Retirees** — The Management Operations Office (MOO) retirees will meet for breakfast lunch on Thursday, March 25, at the Cracker Barrel in Madison at 10 a.m. The group meets the fourth Thursday each month. All present or former MOO employees are welcome. Call 539-0042 if you have any questions.
- ☛ **Redstone Toastmasters** — Learn to speak before a group with confidence and vitality. Visit and join Redstone Toastmasters which meets weekly at 6 p.m. on Tuesday at Morrison's Cafeteria, in Madison Square Mall. For more information, call Joe Jones, 461-0476.
- ☛ **Panoply Volunteers Needed** — Panoply, Huntsville's Festival of the Arts, is being held April 23-25. Volunteers are needed for concessions, entrances, and Panoply money booths. To volunteer, visit <http://inside.msfc.nasa.gov/INSIDE/panoply/volunteer.html>

Job Opportunities

- CPP 99-27-CL, Management Support Assistant (OA)**, GS-303-7, Space Transportation Programs Office. Closes March 19.
- Reassignment Bulletin 99-2-RE, AST, Reliability & Quality Assurance**, GS-861-13, Safety and Mission Assurance Office, Shuttle Integration Office. Duty Location: Kennedy Space Center, Fla. Closes March 22.
- Reassignment Bulletin 99-3-RE, AST, Reliability & Quality Assurance**, GS-861-12/13, Safety and Mission Assurance Office, Space Station Assurance Office. Duty Location: Marshall Center. Closes March 22.
- Reassignment Bulletin 99-4-RE, AST, Reliability & Quality Assurance**, GS-861-12/13, Safety and Mission Assurance Office, SSME Assurance Office. Duty Location: West Palm Beach, Fla. Closes March 22.
- Reassignment Bulletin 99-5-RE, AST, Reliability & Quality Assurance**, GS-861-12/13, Safety and Mission Assurance Office, RSRM Assurance Office. Duty Location: Brigham City, Utah. Closes March 22.
- Reassignment Bulletin 99-7-RE, AST, Reliability & Quality Assurance**, GS-861-13, Safety and Mission Assurance Office, Observatory Assurance Office. Duty Location: Canoga Park, Calif. Closes March 22.
- CPP 99-23-JB, Contract Specialist**, GS-1102-13, Procurement Office. Closes March 23.
- CPP 99-26-CL, AST, Technical Management**, GS-801-13, Customer and Employee Relations Directorate, Technology Transfer Office. Closes March 23.

MARSHALL STAR

Vol. 39/No. 27

Marshall Space Flight Center, Alabama 35812
(256) 544-0030
<http://www.msfc.nasa.gov>

The Marshall Star is published every Thursday by the Internal Relations and Communications Office at the George C. Marshall Space Flight Center, National Aeronautics and Space Administration. Contributions should be submitted no later than Monday noon to the Marshall Internal Relations and Communications Office (CO40), Bldg. 4200, room 101. Submissions should be written legibly and include the originator's name. Send electronic mail submissions to: intercom@msfc.nasa.gov The Marshall Star does not publish commercial advertising of any kind.

Director of Internal Relations
and Communications — Norman Brown
Editor — Debra Valine

U.S. Government Printing Office 1999-733-111-80052

BULK RATE
Postage & Fees PAID
NASA
Permit No. G-27