MARSHALL STAR

Marshall Space Flight Center — Feb. 1, 2001

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

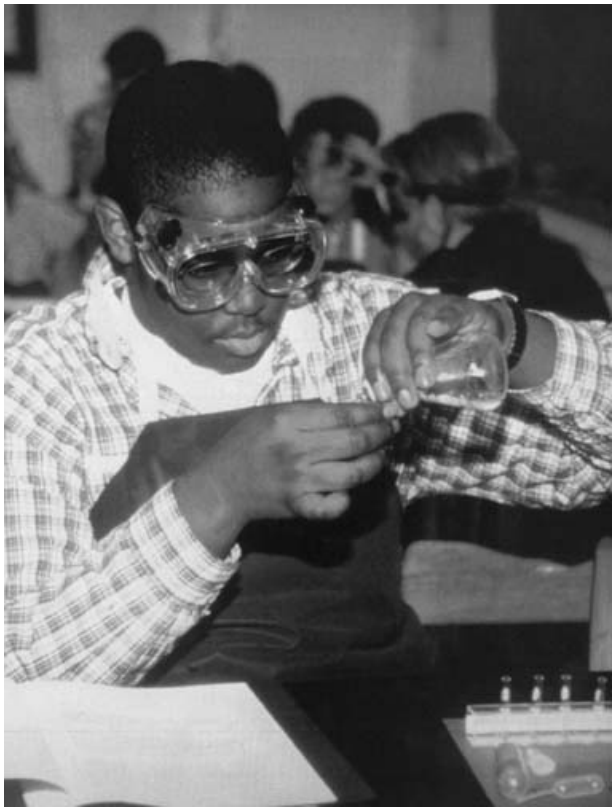

Photo by Robert Fedusenko, Alabama Science in Motion

Joey Bailey, a Huntsville student, pours a biological solution into a tube where it will form a crystal. Students are helping with experiments as part of the mission.

STS-98

Atlantis rolls out to Launch Pad 39A to await liftoff

Space Shuttle Atlantis rolled out of the Vehicle Assembly Building last Friday and returned to Launch Pad 39A, where workers began final preparations for the launch of STS-98.

Workers are slated to begin launch pad validations Friday and open Atlantis' payload bay doors Saturday in preparation for Monday's installation of the U.S. Destiny Laboratory Module. Destiny was built at the Marshall Center by the Boeing Co.

Space Shuttle program officials delayed the launch of STS-98 due to questions about Solid Rocket Booster cables. Launch of Atlantis with its five crew members is scheduled for 5:11 p.m. CST Wednesday, for the seventh construction flight to the International Space Station. The STS-98 crew will conduct three space walks to install the U.S. Laboratory Destiny, and be the second crew to visit the Expedition One crew currently living aboard the Space Station.

Also, the STS-98 astronauts will relocate Pressurized Mating Adapter 2 from the Unity Node to the forward Common Berthing Mechanism on Destiny during the nearly 11-day mission.

More than 200 students and teachers from 89 schools in six states helped with a Marshall Center biotechnology experiment that will be delivered to the Space Station next week.

Orbiting Earth in search of failure: NASA experiments subject electronic components to harsh radiation

by Jack Robertson

It's a mission where failure will be success — and that's exactly what NASA engineers are hoping for.

They anticipate failures in six experiments on the NASA Space Radiation Electronics Testbed, a payload now orbiting Earth aboard the Space Technology Research Vehicle-1-d. The satellite was launched Nov. 15 on an Ariane 5 rocket from French Guiana.

Managed by the Marshall Center, the experiments will enable engineers to better evaluate the effects of space radiation on advanced microelectronics. Radiation can cause trouble for printed circuit boards and other electronic equipment on satellites.

"It may sound strange, but we're actually hoping electronic components will fail," said Donna Hardage, project manager for the NASA Space Radiation and Electronics Testbed at the Marshall Center. "That's the best way we can accurately know their limits.

"We're monitoring and evaluating several commercial off-the-shelf electronic components to determine how they hold up under the severe exposure to radiation," Hardage said.

Engineers will use telemetry data received from the satellite to improve designs for spacecraft circuitry. The experiments also will help meet NASA's goals of reducing costs, weight, power requirements and production time for future spacecraft while improving their reliability.

The experiment package is part of a joint mission involving NASA, the U.S. Department of Defense's Ballistic Missile Defense Organization, the U.S. Air Force, the United Kingdom's Defence Evaluation and Research Agency and several other international organizations.

*See **Experiments** on page 4*

Third multi-purpose logistics module to arrive at Kennedy Space Center Thursday

The last of a set of three multi-purpose logistics modules — Donatello — is expected to be delivered to Kennedy Space Center in Florida Thursday.

The three modules — built for NASA in Italy by the Italian Space Agency and named for famous Italian engineer/artists Leonardo Da Vinci, Raffaello Sanzio and Donato "Donatello" di Nicolo di Betto Bardi — will be used as "moving vans" to carry laboratory racks filled with equipment, supplies and experiments to and from the International Space Station aboard the Space Shuttle.

The Marshall team, under the direction of Jim Graves, the Johnson Space Center multi-purpose logistics module element manager at Marshall, and Randy McClendon, Marshall's multi-purpose logistics module team lead, provided design, development, test and evaluation of the three logistics modules.

The Marshall Center also is responsible for the analytical integration of the racks for the Leonardo module, scheduled to fly onboard STS-102 in March. Leonardo will be filled with equipment and supplies to outfit the U.S. laboratory module Destiny, which will be carried to the Station on STS-98 in February.

"The multi-purpose logistics modules are pressurized modules that will be used by astronauts on the International Space Station," McClendon said. "The modules will supply a pressurized environment for the transportation of payloads that will be used in the shirt-sleeve environment of the Space Station, minimizing the need for extra-vehicular activity."

Courtesy photo

Inspectors check the multi-purpose logistics module prior to shipment.

The cylindrical module is approximately 21 feet long and 15 feet in diameter, weighing almost 4.5 tons. It can carry up to 10 tons of cargo packed into 16 standard Space Station equipment racks. Of the 16 racks each module can carry, five can be furnished with power, data and fluid to support refrigerators or freezers.

The unpiloted, reusable multi-purpose logistics module functions as both a cargo carrier and a Space Station module. Mounted in the Space Shuttle's cargo bay for launch and landing, the modules are transferred to the Station using the Shuttle's robotic arm after the Shuttle has docked.

"While berthed to the Station, racks of equipment and stowage items are unloaded from the module, and racks and equipment may be reloaded to be transported back to Earth," McClendon said.

"To function as an attached Station module as well as a cargo transport, the logistics modules also can include components that provide some life support, fire detection and suppression, electrical distribution and computer functions," he said.

'Starship 2040' Web site debuts

The Marshall Center on Tuesday unveiled a Web site that will introduce space enthusiasts, educators and everyday Web surfers to "Starship 2040," a futuristic NASA exhibit that will hit the road for the first time this month.

Marshall's newest Web site — http://www.Starship2040.com — spotlights the traveling Starship 2040 exhibit: a full-sized mock-up of a commercial space vehicle as it might look four decades from now.

The site includes details of the 48-foot (14.6-meter) exhibit's development and design, complete with artist's concepts and sound files that offer a sneak preview of what visitors will experience inside the spaceship. Additional pages provide tour information and updates.

'NASAexplor es' Web site delivers innovative lessons to teachers

by Lynnette Madison

A new Web site — unveiled last Thursday by NASA — will deliver innovative and engaging lessons to teachers across the country.

"NASAexplores," a new Internet resource offering lesson plans, features two new topics each week for students in kindergarten through 12th grade.

The project — initiated by the Marshall Center — is supported by NASA's Aerospace Technology Enterprise, and Human Exploration and Development of Space Enterprise.

The Web site posts timely educational content based on real — not theoretical — research, developments and events. Developed and maintained by educators at the Marshall Center, the content meets national educational standards.

"This is a unique pipeline for NASA to deliver its latest science and technology information directly to the classroom — at no cost to the teachers," said Jim Pruitt, manager of Marshall's Education Programs Department. "Our purpose is to help educators creatively present math, science and problem-solving skills based on NASA research and events under way at that moment."

NASAexplores lessons are easy for educators to retrieve, prepare and use. "Teachers simply sign up on a subscriber list and we e-mail notices linking them directly to the Web site where lessons, resources and materials are posted," Pruitt said.

Teachers without e-mail also can use the lessons on NASAexplores by accessing the site, located at: *http://www.nasaexplores.com*

The program — available in a variety of downloadable and print-to-use formats — includes estimated preparation time for lessons and a list of materials required.

Each week, two articles with supporting lesson plans are posted to the Web site, in versions adapted for three levels of learning: kindergarten through 4th grade, grades 5 – 8 and grades 9 – 12. The materials incorporate and support national educational standards in math, science, geography and technology and align with standard subject areas, such as chemistry, biology and algebra. Teachers certified in those areas prepare the lessons.

Since its creation in 1958, NASA has emphasized education in its mission. NASA employs its unique resources to create learning opportunities and uses the demonstrated inspirational value of the space program to fire students' imaginations.

"NASAexplores is designed to help NASA achieve its mission to support educational excellence," said Pruitt. "The information provided will be in sync with not only what's happening throughout NASA, but also with other appropriate events and milestones, to take advantage of educators' interests."

The writer, employed by ASRI, supports the Media Relations Department.

Courtesy photo

Supporting the community

Celia Lang, left, program manager for Integrated Technology Solutions for Lockheed Martin Space Operations, presents a $2,000 check to Mason West III, director of the Weed-n-Seed program in Huntsville. Weed-n-Seed is an after-school program for third- through fifth-graders at Terry Heights and West Huntsville elementary schools.

Marshall Center to hold Superfund public meeting

Another in a series of public information meetings Feb. 6 will provide an opportunity for Huntsville-area citizens to learn about and comment on NASA's plan for sites at the Marshall Center identified as part of the federal Superfund Cleanup Program.

The meeting, set for 6:30 p.m. at the Huntsville/Madison County Public Library, will be an opportunity to learn about terms of an agreement between the Marshall Center, the federal Environmental Protection Agency and the Alabama Department of Environmental Management. The agreement is the overall road map for management and cleanup of sites at the Marshall Center.

Sixty-nine Marshall sites in all have been identified under the federal Superfund program. Of that total, 17 have been determined to require cleanup action. The other 52 sites do not require any action. The areas to be cleaned up contain residual amounts of chemicals that were used in space program activity going back to at least the 1960s, before current standards for environmental protection were established.

The public meeting will be from 6:30 to 8:30 p.m. at the Huntsville/Madison County Public Library at 915 Monroe St. in Huntsville. A 30-day public comment period on the draft Federal Facility Agreement begins Feb. 4, 2001.

Since 1994, Marshall has been identifying, investigating, sampling and restoring sites where — before the potentially harmful results of such activities were known — hazardous materials were used, disposed or stored.

Continued from page 1

The mission — planned to last for at least one year — is corresponding with the solar maximum that occurs every 11 years — a period when solar and radiation activity is at its peak.

As it circles the Earth every 10.5 hours, the satellite passes through the Van Allen Belts, zones of intense radiation trapped in Earth's magnetosphere and extending several thousands of miles into space. There, the satellite encounters the trapped proton region and the inner and outer electron belts. Charged particles in these belts cause serious problems for satellite operations — such as deterioration of components and interruption of electronic signals.

The package is about the size of a 40-quart ice chest and weighs 220 pounds (100 kilograms).

The satellite is in a highly elliptical orbit to expose it to greater radiation. The orbit is 385.3 miles (620 kilometers) at perigee, its closest point to the Earth, and 24,230 miles (39,000 kilometers) at apogee, its farthest point from Earth. "We're pushing these components to their limits. If they survive, that tells us a lot. But if they fail, it tells us even more," Hardage said.

"All of the commercial off-the-shelf items have been tested on the ground, but with exposure to only one energy range and just one energy particle," she said. "We want to see how they respond to continual radiation as well as events such as solar flares and cosmic rays."

Engineers will use the collected data to improve models for designing and manufacturing electronics for space missions. The investigators are expected to publish the results in the spring of 2002.

NASA's Space Environments and Effects program, managed by the Marshall Center, provides funding for government agencies to periodically update and validate new engineering models for electronics based on data gathered from space.

Other major participants in the program include NASA Headquarters, Washington, D.C.; Goddard Space Flight Center, Greenbelt, Md.; Jet Propulsion Laboratory, Pasadena, Calif.; Langley Research Center, Hampton, Va.; and the Aerospace Corporation, El Segundo, Calif.

The Space Technology Research Vehicle is funded by the U.S. Department of Defense's Ballistic Missile Defense Organization, Washington, D.C., with development and integration performed by the U.S. Air Force Research Laboratory, Kirtland Air Force Base, New Mexico.

The United Kingdom's Defence Evaluation and Research Agency, in Farnborough, England, was responsible for the payload integration and launch of Space Technology Research Vehicle-1-d.

The writer, employed by ASRI, supports the Media Relations Department.

Experiments test how radiation affects electronic equipment

The following experiments are among those planned for the mission:

• The dosimetry experiment measures the amount of radiation on the components. Monitoring parameters include ionizing dose, temperature, particle energy, and charging effects. The experiment also evaluates the effectiveness of composite material and conformal coating shielding technologies on the components.

• The commercial off-the-shelf analog experiment measures the impact of continual exposure to low-level radiation and of solar flares and cosmic rays (transient single event effects) on commercial analog devices – those that operate or display information continuously like a thermometer or voltmeter. Engineers hope to reduce the uncertainties regarding performance of these devices when exposed to space radiation.

• The commercial off-the-shelf digital experiment measures the impact of the radiation environment on commercial digital devices, such as stacked memories, ferroelectric memories, field programmable gate arrays and flash electrically erasable programmable read-only memories. Such devices are found in everyday items ranging from cellular telephones to the cable box connected to a television. Engineers will evaluate these microelectronic components for future space applications.

• The commercial off-the-shelf photonics experiment is a two-part study that measures enhanced proton displacement effects, single event transients and total ionizing dose/displacement damage effects on high rate, state-of the-art commercial optocouplers — devices that bridge gaps between incompatible wire communications systems. The engineers are also getting information from, and evaluating components identical to those on the Hubble Space Telescope. Hubble — one of the largest and most complex satellites ever built — has been orbiting Earth since 1990.

• The pulse height analysis experiment measures the radiation environment of the satellite. The device will monitor the amount of radiation from solar flares and cosmic rays. The data will be used to update the engineering models for electronic components in space applications and help to improve predictions about the rate of these occurrences.

Obituary

Weeks, Howard E., 82, of Huntsville, died Jan. 19. He retired from Marshall in 1973 where he worked as a supervisor in technical resource management. He is survived by his wife, Louise J. Weeks.

Medical Center offers screenings for skin cancer

You may not be thinking about skin cancer while it's still cold outside, but summer is just around the corner. And skin cancer can develop at any time.

The Marshall Medical Center is helping employees detect skin cancer early as part of an annual physical examination.

Employees may request a total body scan for potential skin cancer or an exam of routinely exposed body areas for the presence of skin cancer.

Each patient will receive information about skin cancer appropriate to his or her particular health status, age and family medical history.

Medical professionals recognize that skin cancer can be anywhere on the body, for example, on the bottom of the feet, middle of the back, or around a fingernail. Risk factors exhibited in high-risk individuals include family history, a history of other skin cancers, and fair skin, among others. If a patient has ever had an atypical or positive skin cancer finding, that patient is automatically advised to return annually to the diagnosing dermatologist. If a patient has a family history of melanoma, that patient is also considered at a higher risk of development of melanoma and is referred to a dermatologist for further examination.

The Medical Center will follow guidelines established by the American Cancer Society, specifically, the simple ABCD rule regarding skin cancer (**A**symmetry, **B**order Irregularity, **C**olor (changes — or two or more colors), **D**iameter (greater than 6mm — about the size of a pencil eraser). This rule will be reviewed with each patient.

Considerable scientific evidence exists to support the role of sunlight in the development of skin cancer, including malignant melanoma. Cutaneous cancers including melanoma tend to occur in a well-defined subset of the population, presently characterized as having fair skin that burns rather than tans, light-colored eyes, and red or blond hair.

Other associated factors include heredity and the environment. If sun exposure cannot be limited because of occupational, cultural, or other factors, a sunscreen that is either opaque or that blocks UVA and UVB should be used.

To reduce the risk of skin cancer, the American Cancer Society recommends that people (1) limit or avoid exposure to the sun between 10 a.m. and 3 p.m. during peak ultraviolet light exposure, (2) when outdoors, cover as much skin as possible with hats and protective clothing, and (3) use a sunscreen with a sun protection factor (SPF) of 15 or higher.

NASA remembers Challenger accident

On Jan. 28, NASA remembered the 15th anniversary of the Space Shuttle Challenger accident. To help researchers and others interested in the accident, the NASA History Division has updated its Web site at:
http://www.hq.nasa.gov/office/pao/History/sts51l.html

Links on this page include a series of significant NASA sites containing information about the mission and the accident. These include the STS-51L Challenger mission profile, sequence of major events of the Challenger accident, an image library of the Challenger mission at Johnson Space Center, and the Report of the Presidential Commission on the Space Shuttle Challenger Accident, chaired by William P. Rogers.

In addition, there are links to numerous other sites on the Web relating to the Challenger accident. Items in this listing include former President Reagan's speech on the Challenger disaster, Jan. 28, 1986; Life Magazine on Challenger; Challenger Remembered: A brief montage of images and sounds from the Challenger accident, from the CNN video vault; and "The Challenger Shuttle Disaster: A Failure in Decision Support System and Human Factors Management."

The Challenger accident remains the most tragic episode in the evolution of NASA, and it is important to understand how and why it took place.

Marshall to host Student Involvement Program Feb. 21

NASA's Student Involvement Program is coming to Marshall Feb. 21 for a one-day competition involving students from schools within Marshall's six-state region of responsibility.

The Marshall Center and Stennis Space Center in Mississippi alternately sponsor the annual event.

Students in grades 3-4, 5-8 and 9-12 submit projects in one or more of four categories: Design a mission to Mars; watching Earth change; my planet Earth; and aeronautics and space science journalism. These projects are judged by panels made up of scientists, engineers, educators and scientists at NASA's field centers.

Marshall volunteers are needed as judges for this competition. Interested scientists, engineers, educators and journalists should send an e-mail to Alicia Beam. For more information, call 544-2849.

The Student Involvement Program is a national competition that helps students learn science by doing science. The program recognizes all participants and honors excellence.

Photo by Dennis Olive, NASA/Marshall Space Flight Center

Getting ready for spring

Jimmy Clemons, left, and Mike Smith of Excell Management, plant wildflower seeds that will add color around Marshall come spring.

Center Operations initiating chemical pharmacy concept

by Debra Valine

If you are ill, and a doctor prescribes medication for you, chances are you head to the local pharmacy to have the prescription filled in the quantity you'll need.

In an industrial situation, a similar pharmacy handles toxic chemicals. Organizations can order only the quantity needed from the chemical pharmacy in much the same way you would order medication at a drug store.

Many of the chemicals used at the Marshall Center can only be ordered in bulk, even if the ordering organization only needs a small quantity. Each organization that needs a small quantity of a chemical currently purchases the item in bulk. In the long run, the chemical pharmacy saves organizations money and time because chemicals do not have to be ordered in bulk and later disposed of in bulk from several locations when the chemical expires.

Currently, NASA has only one chemical pharmacy, at Dryden Flight Research Center at Edwards Air Force Base, Calif. Executive Order 13148 asks all federal facilities to examine the feasibility of establishing a chemical pharmacy.

Sheila Cloud, director of the Center Operations Directorate, has made establishment of a chemical pharmacy at Marshall one of her top priorities. "The pharmacy will improve employee safety, provide cost savings and reduce the amount of toxic chemicals stored and used on the Center," Cloud said.

To help meet this objective, Dan Adams, Marshall's pollution prevention coordinator, formed a Pollution Prevention Team to investigate bringing a chemical pharmacy to the Marshall Center. The team includes representatives from environmental, procurement, recycling, energy, safety, materials and processes, property, and environmental health.

By establishing a chemical pharmacy that handles ordering, storing, dispensing and disposing of expired chemicals, one central location would have bulk chemicals and dispense them as needed to the ordering organizations. "In the long run, the chemical pharmacy would save the Marshall Center money by using just-in-time ordering chemicals as needed, and we would reduce the disposal of unused chemicals once they reach expiration dates," Adams said.

The next steps are to select a location for the pharmacy, define its initial scope, and select a pharmacy software tracking system utilizing bar codes and scanners. The team has evaluated three tracking systems and will make a recommendation on the software best suited to Marshall's needs.

A chemical pharmacy should return Marshall's investment in time and efficiency, as well as reduce the amount of toxic chemicals at Marshall. The pharmacy will also create a safer environment for Marshall employees.

Currently, Marshall has to annually inventory all toxic chemicals stored, used and released to the environment. For the last two years, Marshall has reduced its environmental releases more than 50 percent since the 1994 baseline. "The pharmacy will allow us to continue this trend and meet the even more stringent environmental protection regulations required in the next five years," Adams said.

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

Center Announcements

Leadership forum

A leadership forum from 1-2 p.m. Thursday in Morris Auditorium kicks off Black History Month. Panelists will discuss family, church, politics and culture in the African-American community.

POC grand opening

Employees are invited to watch the grand opening of Marshall's Payload Operations Center at 10 a.m. Friday on Centerwide television.

Lunch and learn

A lunch and learn program — being held in conjunction with Black History Month — will be from 11 a.m.-noon, Feb. 8 in Bldg. 4203, room 4002. The topic is short- and long-term investment strategies.

Emergency phone numbers

A list of emergency phone numbers has been added to Marshall's online phone directory. Visit *http://inside.msfc.nasa.gov/PB/* for the new listing. Also, these phone numbers have been added to the Safety Information page at: *http://msfcsma3.msfc.nasa.gov/Virtual%20S&MA/safety_information.htm* Other valuable information such as Safety, Health and Environmental program documents and a list of personal protective equipment and safety items are available at the substore.

Visitors and vendors

NASA and contractor employees must ensure all visitors, to include family members, and food or supply services personnel, are properly badged when visiting the Marshall Center. Foreign nationals must have prior approval before being admitted to the Center. Any foreign national without this approval will not be allowed entrance to Redstone Arsenal. Employees should ask visitors to first stop by Bldg. 4312 or Bldg. 4200, 1st floor lobby, to be properly badged and briefed. If a delivery is inside a fenced or restricted area, the escort should meet them at the gate, or another agreed upon designated area, and escort the visitor or take delivery at that time.

ISO 9000 surveillance audit

A National Quality Assurance ISO 9000 surveillance audit of Marshall will be conducted Feb 6–8. This audit will focus on six specific ISO elements — management responsibility, quality system, corrective and preventative action, control of quality records, internal quality audits and design control. Employees should visit the ISO Web site and review the "Audit Preparation Questions & Answers."

CFC applications

The Tennessee Valley Combined Federal Campaign is accepting applications from non-profit organizations for participation in the 2001 fund-raising campaign. Under federal law, an organization must have 501 (c) (3) status, proof of human health and welfare services, an annual audit/IRS 990 Form, and a board of directors. The open period for acceptance of application packages will be March 1-April 6. For more information, call Melinda Seigler at 536-0745, ext. 108.

NASA Exchange

On-site physical therapy

Beginning Feb. 5, Huntsville Hospital Outpatient Therapy Services will provide physical therapy for Marshall employees at the Physical Fitness Center in Bldg. 4752. If you have seen your physician and have been prescribed therapy, call 517-7101 to set up an appointment.

Barber shop rates

Beginning Feb. 5, the price for a regular haircut at S&H Barber Shop will increase from $8 to $9.

Clubs and Meetings

Photo Lab retirees

Photo Lab retirees meet the first Tuesday of each month at 9:30 a.m. at Shoney's on University Drive and Memorial Parkway. For more information, call Carl Dow at 461-8181.

BIG meets

Blacks in Government (BIG) will meet for leadership training at 6:30 p.m. Thursday at 520 Wynn Dr. in Huntsville.

Training

Composite materials course

A course on the theory and application of composite materials will air from 10 a.m.-4 p.m. Feb. 12 and 13 on Marshall's continual Learning Channel 14. this course is aimed at employees with a technical background, but with no experience with composite materials. To register, e-mail your first and last name to: *edtec@msfc.nasa.gov*

Listening, coping workshops

Two workshops will be held March 15-16 in Bldg. 4200, room G-13D. Improving listening and speaking skills is from 8-11:30 a.m. Turning negatives into positives will be from 12:30-4 p.m. For more information, call Chrissa Hall at 544-5468. Civil servants may register via AdminSTAR.

Data, image compression class

Fundamentals of Data and Image Compression will be held for civil servants and contractors from 10 a.m.-4 p.m. Feb. 2. Registration is now being accepted for this seminar. Send name, phone number and employer or organization to *edtec@msfc.nasa.gov*. This course examines techniques used to compress data and images for faster, more efficient transmission and storage.

Employee Ads

Miscellaneous

★ NESCO roast-air oven 12, $49. 931-433-0004
★ "1950 era 8" Craftsman table-saw; 48" Craftsman lathe; 4" Delta edger/planer; all on stands; 18" jig-saw; not working; $250. 721-9132
★ Pecan oriental coffee and end table, $150; Pennsylvania House sofa, $175; deacon benches, $75. 881-9404
★ MTD tiller, 5HP, rear tine, $500 firm. 256-586-7424
★ Texas Instrument laser printer, MicroLaser Pro 600, 4 trays, new toner cartridge, $250. 536-6460
★ Baby crib w/mattress and bedding, $150; changing table, $50. 461-8359
★ Queen Anne chairs, $75 each; antique end tables and sofa; male figure skates, size 10, $75. 837-7209
★ The Junior Phonics game, complete set, $75 obo. 776-9165
★ Aquarium, 55-gallon, lights, hood, pump, filter, stand, rocks and heater, $300. 720-8606
★ 11th Edition Merck Index, 1989, $20; 56th Edition CRC, 1976, $10. 722-9483
★ Supra Express 56K external modem for Macintosh, in box, $40. 882-1780
★ Sears Kenmore dryer, older model, works, $75; rolling stand for small TV, $10. 534-3393
★ Sofa, recliner, TV, shelves/cupboard, cedar chest, coffee table, other household items. 772-9319
★ Antique Smith-Corona typewriter, $100. 722-9483
★ White bedroom set; double bed, dresser w/ mirror, $145. 880-1862
★ This-End-Up bookcases/shelves, $90 to $150. 534-7981
★ Oriental-style polished/lacquered brass/ beveled glass dining table, 71x39x29, $350. 355-3089
★ Power Mac 8100/80, 1.2GV HD, 170,336k memory, 7.5.5 OS, 56K modem, 17" monitor, touchpad keyboard, $550 obo. 533-0444
★ Columbia ski jacket, Bugaboo shell, red/ black, $85; Technics stereo speakers, two, large, $50. 797-6173/880-8008
★ RC airplane (1970s), 5-ft. wingspan, 75 percent complete, 3-engines, radio controls, etc., $125. 828-6213
★ Dinette set, table, four cushioned chairs, $100. 533-2287
★ Golf clubs, 1, 3 & 5 metal woods, 3-pw and bag, $250. 232-1171
★ Taurus PT945 DAO .45ACP SS, $375; MAD K6-2, 375Mhz, 128Mb, 2.5Gb, HD, 56K modem, no monitor, $250. 851-8085
★ Pennsylvania House dining table, 2 leaves, cherry, $350. 882-1097
★ Murray riding mower, rear engine, 30" cut, electric start, 2 yrs. old, $200 obo. 464-5819

Vehicles

★ 1970 Lotus Europa, complete drive train rebuild w/less than 1K miles, all new parts, $8,750. 990-1633/837-2162
★ 1993 Cougar, V-6, auto, all-power, leather & cloth, tilt/cruise, am/fm cassette, Michelin tires, alloy wheels, 118K miles, $5,750. 931-937-675
★ 1979 Chevy pickup, 95K miles, tool box, good tires, 8' bed, automatic, $1,750. 650-0677
★ 1998 Acura Integra, 2-door hatchback, 34K miles, $13,500. 256-498-3279
★ 1997 Buick Park Avenue, white, 48K miles, $14,000 obo. 837-5113
★ 1969 Cadillac convertible, 34,341 miles, restored (+engine), one-owner, $10,000, 582-5210
★ 1992 Acura Integra, 2-door hatchback, red, 5-speed, sunroof, am/fm/cassette, a/c, 108K miles, $4,400 obo. 757-3320
★ 1998 Honda Accord EX sedan, automatic, new tires, one-owner, non-smoker, 46K miles, $15,500 obo. 881-9233
★ 1984 Toyota Corolla 4-door liftback, high mileage, $850. 721-1512
★ 1989 Buick Park Avenue, beige, 127K miles, all power accessories, $4,250. 534-7791/656-8676
★ 1995 Toyota Camry LE, V-6 engine, A/T, CD, cruise, white, one-owner, 134K miles, $6,500 obo. 518-9869
★ 1987 Mazda pickup truck, B-2200 SE-5, camper shell, bedliner, custom wheels, $2,100. 859-0729
★ 1996 Plymouth Grand Voyager, dual air/ sliding doors, auto, 85K miles, $9,500 obo. 582-4927
★ 1992 Dodge Caravan van, low miles, new tires, $4,800. 461-8182

Wanted

★ Plane geometry textbook, Schaum's outline, etc. 881-6040
★ Little Tykes roadster toddler bed or little Tykes sports car twin bed. 961-9441
★ Portable, adjustable basketball goal and/or fold-up ping pong table. 828-5840
★ Honda Civic or Accord, 94-96, low miles, garage kept, never been wrecked. 883-2757

Found

★ One key, Bldg. 4200 North parking lot. Call 544-4758 to identify/claim
★ Ladies gold pin, Bldg. 4200 area. Call 544-4758 to identify/claim

Exercise Tips

You should never wait until you are thirsty to drink. If you've waited to drink until you feel thirsty, it's too late.

Thirst is a symptom of dehydration. Dehydration decreases plasma volume. With less blood getting to the skin, the systems that control heat dissipation fail. Once this happens, an athlete overheats even more quickly. Performance levels drop. And things can get dangerous.

Symptoms of dehydration include muscle cramping, excessive sweating, dark urine or infrequent urination, weakness, nausea, rapid heart rate, headache, light-headedness, increased body core temperature, heat exhaustion and heat stroke. In extreme cases, the consequences of dehydration can be fatal.

MARSHALL STAR
Vol. 41/No. 20

Marshall Space Flight Center, Alabama 35812
(256) 544-0030
http://www1.msfc.nasa.gov

The Marshall Star is published every Thursday by the Internal Relations and Communications Department 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 Department (CD40), 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.

Manager of Internal Relations and Communications — Robert Champion
Editor — Debra Valine

U.S. Government Printing Office 2001-633-095-20033

PRE-SORT STANDARD
Postage & Fees PAID
NASA
Permit No. G-27