



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

Marshall playing key role in Discovery's mission

by Debra Valine

The Marshall Center is playing a key role in the success of Space Shuttle Discovery's mission STS-92 to the International Space Station.

When Discovery launches Thursday, the Marshall-built flight support equipment pallet will carry a common berthing mechanism, designed and tested at Marshall by The Boeing Co. of Huntsville, and a pressurized mating adapter. Discovery crew members who trained at Marshall will install the adapter and the Z1 Truss — the backbone of the Space Station.

The Pressurized Mating Adapter 3 is a connecting tunnel used for Shuttle docking that will facilitate attaching future components, such as the research lab, to the Space Station.

Both the pressurized mating adapter and the Z1 truss have a common interface known as the "common berthing mechanism" that will facilitate alignment, capture and structural attachment of each element.

The common berthing mechanism is an electro-mechanical interface that consists of alignment guides, capture latches, powered bolts, seals and controllers that will automate the structural attachment of pressurized elements. It has undergone



Photo by Doug Stoffer, NASA/Marshall Space Flight Center

Discovery crew members Melroy, left, and Wakata train for Shuttle mission STS-92 in Marshall's one-of-a-kind facility.

years of extensive testing and development at Marshall.

Testing and simulation have taken place at the "six degrees of freedom" test facility in Bldg. 4663 and the 20-foot vacuum chamber in Bldg. 4619. Each facility has full-scale test articles of both the active and passive common berthing mechanisms.

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NASA, Lockheed Martin agree to go forward with X-33

by George Hayward

NASA and Lockheed Martin have agreed on a plan to go forward with the Marshall-managed X-33 space plane program, to include aluminum fuel tanks for the vehicle's hydrogen fuel, a revised payment schedule and a target launch date in 2003.

The launch date is contingent on Lockheed Martin's ability to compete and win additional funding under the Space Launch Initiative. NASA and Lockheed believe it is critical to continue work to solve the last remaining barrier to low-cost, reliable access to space.

The restructured plan focuses on providing milestone payments to Lockheed Martin's industry team for completed testing and delivery of their hardware and software systems this year. Additionally,

the plan includes greater emphasis on mission safety and more ground demonstration of critical technology prior to actual flight. These steps are being taken by NASA to ensure quality and mission success. NASA is intent on ensuring that the lessons learned from other programs are taken into consideration in any go-forward planning.

The project requires no additional funding from NASA through March 2001. The project will need additional funding for completion, and Lockheed Martin can compete for those funds through the Space Launch Initiative.

The NASA/Lockheed initiative is demonstrating the most advanced breakthroughs in rocket technology in the past 30 years.

"We've demonstrated this on the

ground, and now we want to continue to work toward flight demonstration," said Marshall Center Director Art Stephenson.

Stephenson noted that the program has so far delivered a revolutionary new rocket engine; a robust, reusable, metallic thermal-protection system; and software and sensors that automatically determine and predict failures and errors before they affect the flight. This technology is applicable to the space program and eventually to the commercial aircraft industry. The program has also developed a small-scale version of a future "spaceport," at Edwards Air Force Base, Calif., which can be operated with a significantly smaller ground crew than required at traditional launch facilities.

The sub-orbital X-33 is designed to

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Marshall Institute: training for the 21st century

by Martin Burkey

No one's seen girders or beams, bulldozers or cranes, hardhats, electricians or plumbers. Yet a major construction project is complete at Marshall.

At 11 a.m. Friday, Marshall employees will be given a sneak preview of the new Marshall Institute — not a building — but a new concept for delivering training to employees. Center Deputy Director Carolyn Griner will speak.

"The Institute is an ongoing process instead of a 'place,'" explained Teresa Washington, director of the Marshall Center's Customer and Employee Relations Directorate. "It is based on a commitment to lifelong learning designed to further the Center's mission. It's particularly important to NASA that our employees get the best training possible so they can help keep the nation on the cutting edge of technology. The Institute represents a strengthened partnership between the Center and its employees."

The Institute concept will result in a clearer focus on the Center's space transportation, propulsion, optics and science missions, a better learning environment and better visibility for courses and other services, said Greg Walker, who heads the Employee and Organizational Development



Department.

"The Marshall Institute is based on the 'corporate university' concept used today by some of the country's largest and most successful businesses," Walker said. "Those companies are using new technologies and providing more opportunities for self-paced, self-directed learning, with more people taking responsibility for their own training."

With downsizing, outsourcing, employment relationships and technology all driving change in the workplace, Walker said, companies are seeking to meet those challenges with corporate universities. By re-engineering its training function, the Marshall Institute is following the example of corporate America."

Among the key features of the Marshall Institute:

- Managers and employees for the first time will have a catalog of courses and training that will help them create a learning plan tailored to their needs — whether it's forklift safety, quantum physics or how to deal with difficult people, there will be a course for it in the catalog.

- The Institute has established an advisory council of top managers to ensure its programs are aligned with the Marshall Center's key objectives. The council will help identify and prioritize current and future training needs, link training to key business strategies and provide direction for developing a philosophy of learning.

- The Marshall Institute plans to establish and maintain partnerships with industry, academia and business to keep Marshall employees abreast of the latest and best learning processes, technologies and programs.

- Renovation of a new training center on the ground floor of Marshall's Bldg. 4200 is being completed. It will include the latest training technology and programs designed for greater impact and more accessible, accelerated, applied learning.

Other features of the Institute include a new leadership program to help the next generation of managers, a new incentive awards program to recognize individual and team performance and a comprehensive metrics program to measure results.

"What we're trying to do is create a new spirit of learning," Walker said. "This is how we're going to move the Marshall Center toward a learning culture."

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

Safety Bowl moves to Final 4 round on Safety Day, Oct. 25

Winners in the Safety Bowl's Elite 8 round held Sept. 27 now will move on to semifinal competition on Safety Day, Oct. 25.

Safety Day is a stand down, casual day. Chick-Fil-A lunch tickets — at \$2 each — are available through administrative officers through Oct. 13.

The Procurement Terminators will face the Health Nuts from the Flight Projects Directorate, and the Engineering Directorate's Elite goes against the Chief Financial Office's Allocators to determine which teams will move to the Final 4 round.

Winners of the two semifinal matches will advance to the Dynamic Duo — also

Oct. 25 — with the winner being named the Safety Bowl champion.

Sample questions:

1. At Marshall, all eyeglasses used for eye protection, including prescription glasses, shall have what?
2. What is the source of the largest methane emissions in the United States?
 - A) Decomposition of organic wastes in landfills
 - B) Incineration of rubber tires
 - C) Fumes from car exhausts
 - D) Agricultural byproducts or residues
3. What is defined as an unexpected occurrence or event that results in injury or death to an employee or visitor, or

damage to NASA equipment or property?

4. Name the drug that is seven times more potent than Valium, takes effect in as little as 15 minutes, lasts up to six hours and has been given to unsuspecting victims who later have no memory of what happened during that time.
5. In relation to a computer keyboard, one's wrist position should be:
 - A) Bent upward approximately 45 degrees
 - B) Neutral
 - C) Bent downward approximately 45 degrees
 - D) Bent sideways to the inside and slightly downward

See **Answers** on page 6

Puerto Rican cartoonist to donate statue recognizing Marshall's Hispanic heritage

by Lynnette Madison

Puerto Rican cartoonist John Rivas will present a statue of his comic strip character Bonzzo to the recipient of the first award given in recognition of National Hispanic Heritage Month Oct. 12 at Marshall. The presentation will culminate a month of activities recognizing the contributions of Hispanics.

Hispanic Heritage Month is celebrated from Sept. 15 to Oct. 14, with Oct. 12 being El Dia de la Raza — The Day of the People, recognized as the day Christopher Columbus discovered the Americas.

Rivas donated the statue to honor the work of Hispanics at the Marshall Center. Marshall Center Director Art Stephenson, Puerto Rican Gov. Pedro Rossello, and Rivas signed the statue, which depicts Bonzzo in a NASA space suit.

Presentation of the Hispanic Employment Program Award will be made at the annual food-tasting set from 1 to 3 p.m. in the courtyard of the Bldg. 4200 complex. The award recognizes managers who have made significant contributions supporting Marshall's commitment to equal opportunity principles.

"Marshall is a colorful melange of cultures and rich traditions. Events such as this offer an opportunity to share them," said Charles Scales, Marshall Center Employment Opportunity director.

Latin Rhythms — a band featuring Marshall Center employees Luis Trevino, Jose Matienzo and Norman Pabon — will entertain at the food-tasting event. Other band members are George West, Jairo Quintana, John Huff and Ramon Rivera.

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X-33

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demonstrate advanced technologies that will dramatically increase launch vehicle reliability and lower the cost of launching payloads to low Earth orbit from \$10,000 to \$1,000 per pound. The government-industry partnership began in July 1996.

A composite fuel tank structurally failed after a series of tests Nov. 3, 1999, at Marshall. An investigation team found that the unexpected severity of a condition called microcracking was instrumental in the failure of the tank's composite skin, a small portion of which split following the tests.

Work on the X-33 has continued at the Palmdale, Calif., assembly facility during the tank investigation and subsequent

negotiations between NASA and Lockheed Martin. Vehicle assembly is currently 75 percent complete, and more than 95 percent of the vehicle's components have been fabricated, tested and delivered to Palmdale. All of the X-33's hardware except the new hydrogen tanks is expected to be completed by the end of 2000. NASA and Lockheed Martin are now proceeding with design of aluminum liquid-hydrogen tanks for the X-33, replacing the experimental composite tanks originally planned.

"The switch to aluminum tanks recognizes that the X-33 program is a commercial challenge as well as a technical challenge," said Gene Austin, X-33 program manager for Marshall. "X-vehicle programs are about taking risks and

pushing the envelope. That is how we break through barriers that previously held us back. While composite technologies are a promising part of future space transportation, they require further research. The aluminum tank design still permits us to realize our near-term vision of demonstrating the technologies for a reusable, single-stage next-generation launch vehicle.

"We applaud Lockheed Martin and its industry partners for continuing to move forward on all the critical components of this program," said Austin. "All the partners remain committed to the goals of increasing the safety and reliability of space flight, and reducing the cost."

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Key Personnel Announcement

Dr. Paul M. Munafa has been reassigned manager of the Materials, Processes and Manufacturing Department in Marshall's Engineering Directorate.

Prior to this appointment, he served as deputy manager of the department. Munafa replaces Dr. Ann Whitaker who was recently named Marshall's deputy director for Science.

Munafa spent the early years of his career with the Boeing Co. and Chrysler Corporation Space Division, prime contractor for the Saturn S-1C and S-1B stages. During that time, he developed a strong rapport with NASA and joined the Agency in 1975.

He has been team leader of the Mechanical Metallurgy, Materials and Processes Laboratory, and chief of the Metallurgical and Failure Analysis Branch.

Among his many administrative accomplishments at Marshall, he has established a capability for hardware failure analysis that is foremost of its kind in the nation.

In 1963, he earned a bachelor's degree in mechanical engineering at the Massachusetts Institute of Technology in Cambridge. He earned a master's from Tulane University in New Orleans and a doctorate from Auburn University in mechanical engineering, specializing in materials science.

Munafa has received two NASA Medals for Exceptional Achievement, and numerous other NASA awards.



Munafa



Care Enough to Share Enough

Speaker Series brings agency reps to Marshall

Each year, as part of Marshall's Combined Federal Campaign, speakers from local agencies visit Marshall to discuss their organizations.

This year the Speaker Series begins Oct. 10 and continues through Nov. 3. The following agencies are represented:

- 9-10 a.m., Oct. 10, Bldg. 4200, room P110, Camille Solley, Habitat for Humanity of Madison County
- 9-10 a.m., Oct. 11, Bldg. 4200, room 715, Gloria Batts, North Alabama Sickle Cell Foundation
- 1-2 p.m., Oct. 11, Bldg. 4200, room 600, Phyllis Brown, Harris Home for Children
- 10-11 a.m., Oct. 12, Bldg. 4202, room 406, Capt. Glenn Riggs, Salvation Army
- 1-2 p.m., Oct. 12, Bldg. 4203, room 3002, Ann Anderson, CASA of Madison County
- 9-10 a.m., Oct. 13, Bldg. 4202, room 326A, Joe McNulty, Children's Hospital
- 1-2 p.m. Oct. 30, Bldg. 4610, room 2081, Lori Laird, St. Jude's Hospital, Research Hospital
- 9-10 a.m., Oct. 31, Bldg. 4487, room C209, Sharon Ball, Hospice Family Care Home
- 9-10 a.m., Nov. 1, Bldg. 4200, room 409, Cheryl Smith, United Cerebral Palsy of Huntsville and Tennessee Valley Inc.
- 1-2 p.m., Nov. 1, Bldg. 4203, room 5002, Laura Richardson, American Cancer Society
- 9-10 a.m., Nov. 2, Bldg. 4612, room 1008, Gerri Mills, Christmas Charities Year-Round Inc.
- 9-10 a.m., Nov. 3, Bldg. 4201, room 437, Mary Lou Kraatz, Alzheimer's Association, North Alabama Chapter

Community Service Days

Marshall team to help local agencies

by Marianne Higgins

Marshall employees are dressing down to gear up as volunteers at local non-profit organizations during the Center's sixth annual Community Service Days Oct. 10-13 and Oct. 16-20.

"This year's event has been expanded from one day to two weeks, to allow opportunities for more employees to participate," said Rachel Kamenetzky, Marshall's co-chair for Community Service Days. "We've also expanded the number of agencies where Marshall Center volunteers can work, to broaden our scope of giving back to the community."

This year, work by Marshall volunteers will range from reading to children to helping build a house for a low-income family. Volunteer work also will include building and painting wheelchair ramps, visiting hospitalized cancer patients, planting a garden, and tutoring youngsters.

Center Director Art Stephenson has authorized up to four hours of administrative leave for employees who volunteer.

Agencies benefiting from Marshall's Community Service Days are the Girl Scouts

of North Alabama; United Cerebral Palsy; Boys and Girls Club; Harris Home for Children; Huntsville Hospital Foundation; Care Assurance System for the Aging and Homebound (CASA); Habitat for Humanity; Christmas Charities; and Girls Inc.

Community Service Days has been expanded to include the area's entire federal community, so different government agencies, such as the Army, will work with other non-profit organizations.

To make Marshall employees easily identifiable, Community Service Day T-shirts are available at \$7 each. The order form is on the Web at:

<http://cfc2000@msfc.nasa.gov>

Community Service Days coincide with the annual Combined Federal Campaign fund drive, as a way for federal employees and on-site contractors to learn more about how different agencies serve the community year-round.

The campaign, themed "Care Enough to Share Enough," begins Thursday. Marshall's goal is to raise \$435,000.

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Tennessee Valley CFC holds auction

The Tennessee Valley Combined Federal Campaign (CFC) of Redstone Arsenal is conducting a silent auction as part of this year's campaign.

Being auctioned are items signed by Auburn college football coach Tommy Tuberville; items signed by Alabama football coach Mike Dubose; a Kentucky football, autographed by coach Hal Mumme; a Kentucky basketball, autographed by coach Tubby Smith; a signed photo of Tennessee coach Phil Fulmer and team poster; hand-painted Auburn and Alabama footstools; two Tennessee Valley Viper caps; a NASCAR cap and photo signed by No. 60 Geoffrey Bodine;

signed photos of NASCAR drivers No. 1 Steve Parks and No. 25 Jerry Nadeau; three unsigned NASCAR photos from Petty Enterprises; a gift basket of newborn baby items; and a signed lighthouse print by country music star Steve Wariner.

Bidders can mail bids to the CFC office, ATTN: AMSAM-CFC, Bldg. 3197, Redstone Arsenal, Ala. 35898-5795 or drop the bid off at that office.

The highest bid will be posted daily at Bldg. 3197. The auction ends at 7:30 p.m. Nov. 9, and the highest bid will win.

For more information, call 876-9143.



Care Enough to Share Enough

Computer Sciences Corp. to sponsor ARC golf benefit

by PrISMS CSC Human Resources

Computer Sciences Corp. (CSC) will sponsor an open-invitation, four-person team golf scramble at Redstone Arsenal Golf Course Oct. 20 to benefit the Madison County Association for Retarded Citizens (ARC).

The tournament will begin with an 8 a.m. shotgun-start.

Everyone is invited to contribute or participate in the tournament. You can bring your own team, or be placed on a team in accordance with your handicap or average score.

Team prizes will be awarded for first through fifth place, with a special prize for the team that "didn't bring their 'A'-game that day."

Four hole-in-one prizes ranging from \$10,000 cash to a set of Wilson Fat Shaft Irons will be awarded. The entry fee of \$55 — of which some is tax-deductible — includes a round of golf, golf cart, golf balls and a golf umbrella.

A barbecue lunch and awards ceremony will follow the tournament. In addition to the hole-in-one prizes, more than \$3,000 in team and individual prizes will be awarded, along with a special presentation to the Association for Retarded Citizens and its clients.

The association will receive all tournament proceeds and other special contributions.

The Madison County Association for Retarded Citizens is one of 33 such organizations in Alabama. It sponsors five development/training programs for adults with mental retardation and children with developmental disabilities:

- The Opportunity Center provides 140 people with individual training for enhancing independence and quality of life.
- The Adult Activity Center employs 45 clients who work, under supervision,



Courtesy photo

Dave White, CSC PrISMS program manager, center left, and ARC Board President Robert Culver, center right, join CSC employees and ARC clients on a tour of the Opportunity Center.

on tasks contracted from local area businesses and government organizations, including NASA. These clients earn wages for their work.

- The Supported Employment Program enables local businesses and government organizations to hire clients who work independently and directly for the hiring organizations. Association staff members assist employers in training and coaching the client and conduct follow-up supervision.

- The Early Intervention Center focuses on early development of children with developmental disabilities.

- The Association for Retarded Citizens operates two resident group homes, one for men and one for women. Clients manage their group home, with oversight from full-time resident staff. There are plans to purchase additional group homes this year, if funding is available.

"Computer Sciences Corp. has chosen to promote this very special event because CSC has a real commitment to the Huntsville community's needs and a

strong desire to share our time and resources to help promote causes such as the Association for Retarded Citizens," said Dave White, Computer Sciences vice president and PrISMS program manager.

"This Combined Federal Campaign agency, along with others in our community, provides valuable support to our employees and it's only right that we should return this support in the same spirit that it's given."

The Association for Retarded Citizens has a fund-matching agreement with a federal program that will pay \$3 for each \$1 of charitable contribution. To kick off this event, Computer Sciences has pledged \$10,000. This will become at least \$40,000 once matching funds are received.

To register or learn more about the ARC golf benefit, call Andy Drummond at 544-8184, Bob Rieger at 544-0247 or Lana Cowan at 544-8195.

Registration forms are available at all Huntsville Area Golf Shops and the Redstone Arsenal Golf Course.

Discovery

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"It will be great to see years of dedication and teamwork come to fruition with this flight," said Brian Mitchell, subsystem manager for the common berthing facility. Mitchell has spent 16 years working on the project.

"The test facilities at Marshall are 'one of a kind,'" Mitchell said. "The facilities have given us the opportunity to conduct hardware and software integrated testing that is invaluable in developing this hardware. Marshall, the Boeing Co., and BD Systems have demonstrated tremendous expertise in the development of these test facilities."

The STS-92 mission is the first time two major parts manufactured in the United States will be joined and attached to the Space Station. Shuttle Pilot Pamela Melroy and mission specialist Koichi Wakata trained at Marshall to prepare for this mission.

The astronauts practiced dry runs of the flight procedures using a computer joystick to position the payload with the remote manipulator system and commanded the common berthing mechanism with the personal computer system displays that will be used on board the Shuttle.

During practice runs, video feeds of the test articles were used to familiarize the crew with the hardware. But when the final simulation was performed, the video was turned off. In official test runs, the astronauts joined the components using only the personal computer system, which is exactly the way it will be done in space during the mission.

"This is an opportunity to see the system — the real hardware — work end-

to-end," said Melroy. "The commands from my computer will go to the main Space Station computer, which will then go to the real hardware.

"In Houston, we only have models to train with," she said. "We are limited by the models because they are designed to perform flawlessly. Marshall is the only place where we get to see what it is like to perform the berthing on orbit.

"We do not want to come up against any surprises because if we do, everything has to come to a halt while we figure out what it is," Melroy said. "This training dramatically increases our chances of mission success."

Wakata, of the National Space Development Agency of Japan in Tsukuba, will use a joystick to manipulate the robotic arm to enable the berthing of the Z1 Truss and the Pressurized Mating Adapter 3. The remote manipulator system will maneuver the payloads to the "ready-to-latch" position and will hold while Melroy initiates the common berthing mechanism operations. Once capture is accomplished and the two common berthing mechanisms are together, the bolting operations will proceed.

"During the mission, the training facility at Marshall will be powered up and ready to recreate and troubleshoot any problem the crew encounters," Mitchell said. He will be monitoring the mission's progress from the Mission Evaluation Room in Houston.

Launching of the Pressurized Mating Adapter 3 would not be possible without the Marshall-developed Spacelab pallet and flight support equipment that will carry the docking adapter to the Space Station. This is the first time the pallet has

been used for a Space Station mission.

"We designed, developed and certified the pallet upon which the mating adapter will be transported," said Elaine Duncan, project manager for Marshall's Spacelab pallet Flight 3A in Marshall's Flight Systems Department. "

The pallet also will hold extra-vehicular tool storage boxes and cameras that will attach to the growing Space Station.

"We will support the mission from the Huntsville Operations Support Center Engineering Room," she said.

Building on more than 20 years of successful experience in integrating and operating unpressurized carriers, the International Space Station Program Office selected the Spacelab Pallet to transport Space Station assembly hardware.

Marshall's Flight Projects Directorate and Boeing, the Spacelab integration contractor, provide all analytical integration, sustaining and hardware development services for a series of Space Station assembly flights.

"This pallet has been in use for nearly 20 years," said Lanny Upton, the team group lead. "And we plan to re-use the flight support equipment pallet on future Space Station assembly flights. It has flown on 17 missions, totaling 140 days in space."

The pallets and carriers all evolved from Spacelab, which evolved into the payload carrier program. "It was nice to be able to take that part and use it again," he said.

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

Job Opportunity

SES Announcement ES-12-00 — Deputy manager, Materials, Processes and Manufacturing Department, Engineering Directorate. Closes Oct. 26.

**"My Name is Safety —
And I Never Get a Day Off"**
— Safety slogan submitted by
David Harvey, EG&G

Answers

Continued from page 3

1. Fixed side shields
2. A) Decomposition of organic wastes in landfills
3. A mishap
4. Rohypnol (also: "Date Rape" drug, "Roofies," "ecstasy" is also used in this manner. These drugs are in use in our community.)
5. B) Neutral

October is Disabilities Awareness Month at Marshall Center

To help mark Disabilities Awareness Month, Marshall's Equal Opportunity Office will sponsor vendors from various Alabama organizations on Safety Day, Oct. 25. Safety plays a vital role in disability awareness.

Vendors from Alabama Institute for the Deaf and Blind, Mobility Plus, Alabama Industry for the Blind, and Technology Assistance for Special Consumers will participate in Safety Day activities.

The Marshall Center focuses on providing physical accommodations for individuals with disabilities in the workplace, and is committed to promoting the sensitivity and accommodations of all people.

Equal opportunity is a concept rooted in the idea of creating an environment where each individual can fully participate in the activities of an organization to his or her greatest ability without facing unnecessary obstacles.

Center Announcements

- ✦ **Mentor workshops** — Marshall's Education Programs Department will hold workshops Oct. 11, 19 and 24 for research mentors/advisers. Topics include roles, responsibilities, policy changes, timelines and processes related to higher education programs. For more information, call Pamala Heard at 544-0776. Register online at: http://www1.msfc.nasa.gov/education/registration_form.html
- ✦ **Ethics training** — Ethics training sessions will be offered at 9 a.m. Oct. 18 and 19 in Bldg. 4200, room P-110. Federal regulations require that filers of public and confidential financial disclosure reports receive annual ethics training. Employees who are required to receive ethics training were notified at the beginning of September by an e-mail message that contained a link to the training. For more information, call Lonia Moore at 544-0023.
- ✦ **Facility Office breakfast** — Facility Office retirees will meet for breakfast at 8 a.m. Oct. 10 at the Shoney's on University Drive and Memorial Parkway. For more information, call Carl Gates at 232-2950.
- ✦ **Safety Shoe Van visit** — The safety shoe van will be on site Oct. 11, to assist civil service and contractor personnel with safety shoe needs. The mobile van will be located at the southwest end of Bldg. 4471 from 8 a.m. to 2 p.m.

Marshall tests membranes for future space structures



Photo by Dennis Olive, NASA/Marshall Space Flight Center

Marshall engineers Bob Engberg, left, and John Lassiter examine the structure, supported by a test stand.

by Martin Burkey

Engineers at the Marshall Center have completed tests on an experimental lightweight, inflatable structure that one day might lead to optical, solar power or propulsion uses in space.

A similar structure has potential applications as a communications antenna, a solar energy collector, a concentrator for a solar-powered rocket engine or a telescope mirror.

Compact, thin-walled membranes hold the promise of being used for very large structures in the weightlessness of space. They would weigh a fraction of traditional metal and composite structures and, when deflated, could be packed into a much smaller volume — making them much cheaper to launch.

The gold, 21-foot (6.4-meter) inflatable ring and its silver, 16.4-foot (5-meter) inflatable reflector — manufactured by SRS Technologies of Huntsville — weigh less than 8 pounds (3.6 kilograms). The super-light plastic membrane is one-third as thick as a sheet of paper. The tests at Marshall were aimed at developing reliable methods of testing ultra-light structures.

The monthlong series of vibration tests is being followed with more tests of the structure at NASA's Langley Research Center in Hampton, Va. Marshall and Langley engineers are jointly funded by NASA's Cross Enterprise Technology Development Program to collaboratively advance this technology. This is the sixth inflatable structure tested by Marshall in an effort to test, model, analyze and develop applications for thin film structures.

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

Employee Ads

Miscellaneous

- ★ Ambassador fireplace insert, \$250 obo. 830-6584
- ★ Bug deflector for 93-98 Jeep Grand Cherokee, \$25. 325-5646
- ★ Pine straw, clean, no leaves/twigs, \$3 per 40-gallon bag. 880-2290
- ★ Pet porter, large size, \$15; range hood, almond color, \$10. 852-3501
- ★ Mahogany dining table, 40"x60", 15" fold-out leaf, needs minor repair, \$150. 776-0024
- ★ Industrial pressure blower, Model 1506A5, 5HP, direct drive, 140V, 3600 rpm motor, never used, \$600. 881-5118
- ★ Talladega tickets, Oct. 15, OV Hill North, Section BB, Row 22, Seats 1-3, \$80 each. 721-3945
- ★ Ammunition, 600 rounds of 6.62 x 39 non-corrosive for AK-47 or SKS rifles, make offer. 726-0243
- ★ Majestic fireplace insert screen, brass hood, glass door, blower, \$150; Stereo, 8-track, am/fm, w/stand, \$100. 883-1686
- ★ Jon boat, 12', "V" bottom w/10HP Johnson outboard motor and trailer, \$400 obo. 882-0461
- ★ Italian chairs, 2, green leather w/wood legs, \$250; glass top table w/4 chairs, flora design, bamboo pedestal, new, \$750. 859-5694
- ★ Audio shelf unit, black w/glass door, \$20. 830-9507 after 5 p.m.
- ★ Mac Quadra 605 w/monitor & LaserWriter, \$300; Ruger M96/44 .44 lever action, \$300; Sega Dreamcast, accessories, w/4 games, \$275. 851-8085
- ★ Nordic-Track Walkfit 4000 treadmill, \$100 obo. 722-4767
- ★ Aluminum camper shell, black, for full-size short wheelbase truck, \$250 obo. 722-4767
- ★ Ruger "Single Six" .22 revolver, Mag/LR cylinders included, blue/6" barrel, \$275. 325-6000
- ★ Ruger pistol, single-six, 22LR, blue w/wood grips, extra 22 WMR cylinder, adj. Sights, \$200. 379-3606

Vehicles

- ★ 1996 Dodge Intrepid ES, V-6, 3.5L, black w/gray interior, all power, CD, integrated child seat, 63K miles, \$7,900. 882-7350
- ★ 1999 Chevy Z71 extended cab pickup, charcoal gray, all-power, CD player, keyless entry. 883-6724
- ★ 1996 Ford Explorer, 4x4, XLT, white/silver, 4-door, leather, AM/FM CD, 69K miles, \$15,300. 551-9060
- ★ 1985 Oldsmobile Delta 88 Royale Brougham sedan, gray, 4-door, V-8, 137K miles, \$1,300 obo. 772-0558
- ★ 2000 Toyota Tundra, 4x4, 13K miles, 8-year/80K mile warranty, \$29,000. 658-7679
- ★ 1997 Mercury Tracer LS, 4-door wagon, <26K miles, automatic, pw/pd, a/c, abs, am/fm tape, cruise, keyless entry, \$11,000. 883-9875
- ★ 1998 Ford Windstar GL, integrated child seats, \$12,250. 883-9339
- ★ 1984 Toyota Cressida S/W, white, original owner, 96K miles, \$2,750. 881-4229
- ★ 1988 Nissan Maxima, 4-door, white w/tan interior, needs work, \$800 obo. 256-586-2288
- ★ 1997 Ford F-250 XLT pickup truck, 4x4, alloy wheels, 40K miles, towing package w/gooseneck ball, automatic, \$17,950 obo. 931-732-4742
- ★ 1997 Ford Mustang, 6-cyl., automatic, alloy wheels, new tires, pw/ps/pb, \$7,950 firm. 256-753-2278
- ★ 1977-1/2 Porsche 924, 138K miles, make offer. 828-6213
- ★ 1994 Dodge caravan SE, 103K miles, dual air, child seats, new tires, \$7,000 obo. 837-5590
- ★ 1987 Nissan Stanza GXE, all power, Michelin tires, 5-speed. 837-3746
- ★ 1998 Chrysler Sebring Lxi, 25K miles, 6-cyl., auto, sunroof, warranty, metallic red, \$16,400. 881-6955
- ★ 1991 Mazda Protégé DX, blue, a/c, 5-speed, high miles, asking \$2,950. 851-2929
- ★ 2000 Mitsubishi Galant ES, metallic beige, <14K miles, keyless entry, CD, \$17,500. 726-5865/830-5016

Found

- ★ Pager, near Bldg. 4200. Call 544-4758 to identify
- ★ Women's ring in Ladies room in basement of Bldg. 4200. Call 544-4758 to identify
- ★ Autographed copy of "The Last Man on the Moon" book in lobby area of Bldg. 4203. Call 544-2485 to identify
- ★ Cigarette case. Call 544-4758 to identify/claim

Lost

- ★ Silver and blue bracelet, between Bldg. 4203 and Credit Union. 544-0215

Wanted

- ★ Used piano in good condition. 721-9749
- ★ Bedliner for 1989 Chevrolet pickup, full-size, long wheelbase. 227-4522 (Decatur)
- ★ Double stroller (front/back type). 882-0909
- ★ Ride from Bldg. 4755 to Euclid Circle off Oakwood Avenue, 2 or 3 p.m.. 961-4788

Free

- ★ Steel pipe, 1", 21'; 5 concrete splash blocks; firewood (walnut tree for cutting). 883-0503
- ★ Black Lab mix dog, doghouse included, must find home. 883-9339

To the Marshall Space Flight Center Family,
 On behalf of the Marshall Career Transition and Assistance Program Center's staff, I wish to express my appreciation for the way the CTAP Center has been received these past 5 1/2 years. It has been our goal to provide the best career services program possible to you, our client. We did our best. I wish I could answer all the e-mails and return all the telephone calls of the last couple of days, but time does not permit. Thank you all for your kind words and best wishes.

Personally, I have greatly enjoyed my association with Marshall Space Flight Center, it has been fun and I consider working here to be a high point in my professional life. You have all been great to work with and to work for.
 Sincerely, Bob Norwood

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