



## Scientists Happy With MSL-1 Mission Results So Far

As the Microgravity Science Laboratory (MSL) mission aboard Space Shuttle Columbia marks the half-way point of its planned 16-day flight, researchers are reporting good results so far. One of the combustion science research teams, which completed its experiment Monday night, said the information it gathered on this mission is even better than hoped for.

Columbia and a seven-member crew are conducting a variety of experiments to examine how various materials and liquids change and behave in the weightless environment in space.

Payload Commander Dr. Janice Voss performed the last run of the Laminar Soot Processes experiment in the Combustion Module Monday night, and according to lead scientist from the University of Michigan at Ann Arbor Dr. Gerard Faeth, "it was gorgeous; the best of them all."

Between both missions, the one in April and this one, 17 tests were completed, three more than originally scheduled. "Every one worked and yielded good data," said Faeth. "That was beyond my wildest dreams."

MSL-1 Experiments are yielding new information in the areas of

biotechnology, combustion science, materials science and fluid physics, and researchers are optimistic their findings will yield applications for improving life



Teresa Vanhooser, Microgravity Science Laboratory mission manager, answers questions from news media after the smooth launch of Columbia on STS-94. Photo by Emmett Given

on Earth and the future of research in space.

On Monday, droplet combustion *continued on page 3*

### Fourth of July Was Banner Day — in Space, on Earth

This year's Fourth of July lived up to promise as one of the most memorable days in the history of space exploration. Topping the day was the landing of NASA's Mars Pathfinder spacecraft on the Red Planet. But, having a Space Shuttle mission in orbit, as well as a U.S. astronaut among the crew of the Russian Mir space station, added up to a real "flagwaver day" for space enthusiasts.

At Marshall Center, the full complement of operations controllers, scientists and engineers necessary to conduct a Spacelab mission were on duty — holiday notwithstanding — supporting 'round-the-clock activities of the Microgravity Science Laboratory (MSL) aboard Columbia.

With their mission-essential role to fulfill, MSL team members weren't able to pay much attention, if any, to the Mars landing. For those who could "keep one eye on Mars," however, the Pathfinder developments made for a real holiday treat.

"Although everyone here was focused on the MSL activities throughout the Fourth of July weekend, many were *continued on page 5*

### Pathfinder's Mars Photos, Data Thrill and Delight Scientists

Today is a working day on Mars. Both the Imager for Mars Pathfinder and the Sojourner Rover have their work cut out for them today."

Those opening words from a status report issued Sunday by the NASA Jet Propulsion Laboratory in Pasadena convey in a nutshell much of the significance of the first successful Mars landing in more than 20 years.

The Pathfinder spacecraft completed a seven-month-long journey through space and landed on the surface of the Red Planet at 12:07 p.m. (CDT) on the Fourth of July. Cushioned by a protective shell of airbags, it bounced and rolled to a halt. The *continued on page 3*

### Awards Ceremonies Set for Thursday

The Marshall Center Annual Honors Day ceremonies will be held July 10 in Morris Auditorium at 9:30 a.m. for the Agency Honor Awards, and at 2 p.m. for the Center Awards.

The ceremonies will recognize Marshall civil service and contractor employees who have made exceptional contributions to the Marshall Center mission and the nation's space program.

The 345 awards to be presented include NASA's *continued on page 5*

# Thirty-Year Era Ending for Marshall's NBS and Its Team

The Marshall Center's Neutral Buoyancy Simulator (NBS), a historic national landmark, has seen its active role in our nation's space program come to an end. All the programs planned for the facility have been completed, and it is being placed in inactive status.

Origins of the NBS go back to the mid-60s, when NASA needed a readily available, practical location to develop, test and refine techniques and hardware used in space. Bob Schwinghamer, currently the center's associate director-technical, and his branch in Marshall's old Manufacturing Engineering Laboratory proposed an idea. Why not develop a mockup of a typical piece of flight hardware, make it neutrally buoyant, and see how well it could be handled in water? At first, a couple of explosive forming pits were called into service at Marshall. But NASA needed something bigger, big enough to handle major portions of Skylab hardware. An existing high-bay building (4705) was chosen to house it. Design work began in June 1966 and the tank was completed in September 1967. Marshall began operating the simulator in 1968.

Among those anxious to enter the tank was Marshall's first director, Dr. Wernher von Braun. In 1973, engineers and astronauts used the tank to develop procedures to repair the orbiting Skylab after the spacecraft suffered damage to its sunshield during launch. According to Schwinghamer, the NBS saved Skylab. The tank has also been used in connection with the Solar Maximum Mission, EASE and ACCESS (the first structures built in space), the Manned Maneuvering Unit, the Hubble Space Telescope, the International Space Station and others.

Some of the NBS equipment will go to Johnson Space



Marshall's Neutral Buoyancy Simulator has a 30-year history of supporting vital space programs such as the International Space Station.

Center for use in the new neutral buoyancy facility that was constructed there to accommodate the heavy workload required to prepare for assembly of the International Space Station, which requires many spacewalks by astronauts. The Marshall facility's civil service staff is being reassigned to other jobs at the Center. The Facilities Office is determining how best to preserve the tank, which still holds its 1.3 million gallons of water. From Skylab to the Hubble Space Telescope, the NBS has served its purpose well.

"The NBS has done hardware development for the Agency from Skylab to Space Station, with the Hubble Space Telescope becoming a piece of recent history to be added," said Gene

*continued on page 5*

## Goldin Proud of NASA Employees; Lauds Strategic Planning Efforts

NASA Administrator Daniel Goldin has congratulated the entire NASA Team for being recognized as a "model of excellence in strategic planning."

In a letter to directors of NASA installations, Goldin pointed out that at recent hearings with the Senate Appropriations and Government Affairs Committee, NASA was cited as the only agency which has produced an acceptable Strategic Plan to comply with the Government Performance and Results Act.

Goldin also said that Sen. Fred Thompson of Tennessee praised the NASA plan as the only one that was not too general and in need of more work.

"Our hard work in establishing a Strategic Management System," said Goldin, "is paying off. The Administration has provided clear policy direction for its goals in aeronautics and space; the Senior Management Council has united behind a viable and balanced strategic plan to carry out these policies; and the Administration's Fiscal Year 1998 budget submit provides the

*continued on page 3*



U.S. Representative Bud Cramer of Alabama's Fifth Congressional District topped the list of dignitaries Monday at the Calhoun Community College campus in Huntsville for the announcement of NASA and TVA support for a Business Technology Development Center to serve as an incubator for firms in the greater Huntsville area. Harry Craft, manager of Marshall's Technology Transfer Office, speaks at the lectern while Dick Reeves, executive director for the new Business Technology Development Center, joins Cramer in listening.

*Photo by Emmett Given*

# Spacelab Mission

from page 1

experiments were part of the second of a three phase study to map burning characteristics over a range of atmospheric pressures. The first phase, completed earlier in the mission, was conducted at one atmospheric pressure, the same as on Earth. In the second phase experiments are being conducted at one-half the Earth's atmospheric pressure. The third phase will use one-fourth Earth's atmospheric pressure.

Characterizing the results from Monday's experiments, scientist Dr. Forman Williams of the University of California in San Diego said: "The crew had a tougher time igniting the droplets at this lowered pressure -- we expected that. But, when the fuel droplets did ignite, they burned stronger and more vigorously than we expected."

Two samples of the experiment analyzing diffusion in liquid lead-tin-telluride were processed in the Large Isothermal Furnace Sunday and Monday. The study, led by Ms. Misako Uchida of



*They were not saying much then, but now, with the MSL-1 mission under way, these crew interface coordinators and alternate payload specialists have a lot to talk about. They are primary communicators with the science crew.*

*Photos by Terry Leibold*

## NASA Team Model of Excellence

from page 2

funding stability we have been requesting."

Emphasizing the significance of the strategic plan and how important it is for each employee to understand its content, Goldin concluded that "When the congressional consultation process is complete, we will go to press with the 1997 plan. I consider it the responsibility of all levels of management to communicate the plan, ensure its implementation, and recognize employee contributions to NASA's vision, mission and goals."

The Marshall Center, as well as other NASA field installations, have had a key role in the Agency's strategic planning process. Marshall provided input to the process and has developed implementation plans for each of the Agency's strategic enterprises.



*Members of the TEMPUS science team applaud jubilantly as they watch Space Shuttle Columbia lift off carrying their experiment, among several research facilities on the Spacelab.*

*Photo by Emmett Given*

Ishikawajima-Harima Heavy Industries in Tokyo, Japan, is aimed at determining the diffusion coefficient -- a fundamental quantity which describes the diffusion process -- of liquid lead-tin-telluride. Diffusion is the process by which liquid metals mix without stirring -- similar to how food coloring disperses in a glass of water without stirring. Liquid lead-tin-telluride is a potential material for use in manufacturing infrared detectors and lasers. Uchida reported the completed runs were "very good."

The Microgravity Research Program at Marshall sponsors the Spacelab microgravity science research flights.

## Rover Explores Mars Surface

from page 1

spacecraft came to life as planned and within hours, its initial photographs of Mars were being received on Earth.

From that point on, interrupted by only a brief period or two of concern over possible snags, the mission has been unfolding step by step, thrilling scientists and astronomers.

Saturday night, Pathfinder's rover vehicle, named Sojourner, rolled off the lander and began exploring the Martian surface. Sojourner is equipped with instruments to analyze rocks and soil in the areas it explores, and also has a camera which is contributing to the array of Mars photos.

NASA Administrator Dan Goldin hailed the Pathfinder success as "a sign of bold science and a statement that America still is an exploring society seeking to make life better for our children."

The primary objective of the Pathfinder mission is to demonstrate a low-cost way of delivering a spacecraft and rover to Mars. Landers and rovers of the future will build on the designs and technologies first tested in the pathfinding mission.

NASA has another spacecraft currently on the way to the Red Planet. The Mars Global Surveyor is due to arrive in September, to begin a two-year period of gathering a variety of information as it circles Mars in a polar orbit.

# X-33 Draft Environmental Impact Statement Released

NASA has issued its Draft Environmental Impact Statement on the development and flight testing of the X-33 Advanced Technology Demonstrator. NASA also has announced plans to hold public meetings in 11 communities in five states to present the study's findings and seek public comment.

The environmental study examines the potential impacts of X-33 development and flight testing.

Major issues addressed in the environmental study — which began Oct. 7, 1996 — include noise and sonic booms, flight safety, and effects on airspace and air traffic patterns.

Many of the issues addressed originated from comments NASA gathered during public scoping meetings held in the same communities during the fall and early winter.

The 273,000 pound, wedge-shaped X-33 is being developed under a cooperative agreement with NASA by Lockheed Martin Skunk Works, Palmdale, Calif. As many as 15 flight tests of the X-33 are planned to originate from Edwards Air Force Base, Calif., and land at sites in Southern California, Utah, and Montana or Washington in 1999.

The X-33 is a key element in NASA's Reusable Launch Vehicle Technology Program, managed by the Marshall Center.

The proposed short-range landing sites addressed in the environmental study are Silurian Lake, Calif., and China Lake Naval Weapons Center, Calif.

The midrange landing site is Michael Army Air Field at Dugway Proving Ground, Utah. The long-range landing sites are Moses Lake, Wash., and Malmstrom Air Force Base, Mont.

The objective of the technology development and demonstration effort is to support government and private sector decisions by the end of the decade on development of an operational next-generation space launch vehicle. A full-scale, single-stage-to-orbit reusable launch vehicle will dramatically increase reliability and lower the cost of putting a pound of payload into space from \$10,000 to \$1,000. By reducing the cost associated with transporting payloads into low Earth orbit, a commercial reusable launch vehicle would create new opportunities for space access and significantly improve U.S. economic competitiveness in the worldwide launch

marketplace. NASA will be a customer, not the operator, of an industry-developed reusable launch vehicle.

The 600-page Environmental Impact Statement and its 40-page Executive Summary is being made available to the public in a number of repositories in the local communities involved in the X-33 program.

Public comment will be accepted through Aug. 17, 1997. The Final Environmental Impact Statement is scheduled to be completed in September, and Record of Decision is to be October.

The public meetings scheduled began on Monday in Moses Lake, Washington, and will conclude on July 24 in Baker, Calif.

## NASA HQ Seeks Slogan

With the Space Agency's 40th anniversary a little more than a year away, NASA headquarters is looking for a slogan to be used in conjunction with activities and programs to commemorate its founding on Oct. 1, 1958.

Ideas should be submitted in writing to Steve Garber in the NASA office of Policy and Plans, Code ZH, or by e-mail at [steve.garber@hq.nasa.gov](mailto:steve.garber@hq.nasa.gov). The deadline for entries is July 31. The winner will receive a special illustrated book about space exploration.



NASA technologies were on the menu for the recent Technology Transfer Office's party honoring staff members born in June. Each menu item either contained or represented a NASA-derived technology that had been used in the product's manufacture. Included were Totino's Pizza Rolls; freeze dried ice cream and fruit; tortillas; fresh grapes, oranges; hard candies and coffee. Also on display were baby formula, potatoes, fast food products, and Listerine mouthwash, which uses data matrix codes originally developed by Marshall to identify and track Space Shuttle parts. *Photo by Emmett Given*

## Patent Training Class Being Offered

The Technology Transfer Office's Technology Management and Intellectual Property Workshop will be conducted by the Southern Technology Applications Center (STAC) on Tuesday, July 28 and Thursday, July 31, from 9 a.m. to 11 a.m. and 1 to 3 p.m. Each of the two-hour sessions will be held in the Building 4200 G-13 conference room.

The purpose of the course is to show NASA employees why Intellectual Property and Technology Management is an important part of Research and Development. The briefing will detail both foreign and domestic patent numbers and trends, and discuss the Federal Lab rankings, how technology partnerships have evolved, and NASA and the government trends in licensing.

It will also discuss how Technology Management is going to be implemented in the Marshall patent process, and include discussion on the three phase plan of implementation. Finally, there will be discussion on Intellectual Property basics: Patent fundamentals, trade secrets, copyrights, trademarks, the technology disclosure, inventor support to the process, the resources available to help the inventor.

# Pathfinder Insulated With Aerogel

from page 1

able to check on the Pathfinder landing and see its magnificent photographs from Mars," said MSL-1 Mission Manager Teresa Vanhooser. "It's a great time for everyone in NASA and the Spacelab team."

One of Marshall's most avid followers of the Mars mission was Richard Hoover, an astrophysics specialist in the Space Sciences Laboratory, who also has a deep and longstanding interest in microbiology — specifically the study of diatoms.

"In my opinion, this was one of the most exciting developments in decades," Hoover said of the Pathfinder landing. Even from initial data the probe has sent back, he said, it is providing "very strong, unmistakable evidence for the existence of a large amount of water on the Martian surface. That puts to rest a lot of skepticism some people have had about the makeup of the surface."

Dr. David Noever, another Space Sciences researcher, has a special reason for feeling a connection to the Mars Pathfinder mission.

"We've been working for the last three to four years on the world's best insulating material, Aerogel," said Noever. "Aerogel is a fantastic insulator and is used to protect the electronics of the rover during the cold Martian nights." Noever and his colleagues in the Space Sciences Laboratory are conducting research in an effort to make the material transparent, which would greatly expand its uses.

Noever also said that the Mars Pathfinder is a dramatic success for the "faster, cheaper, better" philosophy that Administrator Dan Goldin has established as the Agency's new way of doing business, and that future exploratory missions will result from it. "If we are going to travel to other planets," he said, "it will require major advance in chemical propulsion because it raises the bar to what can be hurdled and what we can take on as a challenge."

## Annual Honors Ceremonies

from page 1

Distinguished Service Medal, the Distinguished Public Service Medal, Outstanding Leadership Medals, Exceptional Scientific Achievement Medals, Exceptional Engineering Achievement Medals, Exceptional Service Medals, Exceptional Achievement Medals; the Equal Opportunity Medal, Public Service Medals, Group Achievement Awards, Certificates of Appreciation, Marshall Director's Commendation Certificates, Marshall Group Achievement Awards, Technology Transfer Awards, Research and Technology Awards, Marshall Patent Awards and NASA Inventors of the Year.

Photographs of those being honored for individual Agency-level awards, Research and Technology awards, Technology Transfer awards and those employees awarded for receiving patents will appear in the July 16 issue of the Marshall Star.



Richard Kale, of the Materials and Processes Laboratory demonstrates a process for cleaning catalytic converters. Watching from left, are Marilyn Mabry and Chester Harris of New Futures, Benita Hayes of the Technology Transfer Office and Ronnie Akins of the Materials and Processes Laboratory. Mabry and Harris, children of the founder of the Harris Home, the late Chessie Harris, are negotiating with a catalytic converter manufacturer for a contract that may mean employment for homeless mothers and children. Photo by Emmett Given

## Neutral Buoyancy Simulator

from page 2

Hartsfield, Marshall's NBS supervisor. "Johnson Space Center asked us to do the Hubble training for them because their existing Weightless Environmental Training Facility was not equipped. In the past, Marshall had been responsible for mostly hardware training, while Johnson was responsible for crew training. Now," says Hartsfield, "Johnson will take on both."

### Obituaries

- Anderson, Alvin, 77**, Athens, died Dec. 30. He retired from Marshall in 1972 where he worked as an electronics technician.
- Andrews, Henry, 88**, Athens, died June 23. He retired from Marshall in 1971 where he worked as an engineering technician. He is survived by his wife, Una Andrews.
- Dill, Glenn, 65**, Pass Christian, Miss., died June 10. He retired from Marshall in 1992 where he worked as an aerospace engineer. He is survived by his wife Pamela Dill.
- Sanderson, Arthur, 77**, Huntsville, died June 23. He retired from Marshall in 1979 where he worked as an equal opportunity officer.
- Shriver, Edward, 74**, Huntsville, died June 18. He retired from Marshall in 1981 where he worked in the Space Sciences Laboratory. He is survived by his wife Margaret Shriver.
- Vibbart, Charles, 58**, Huntsville, died June 21. He retired from Marshall in 1996 where he worked in EP52 as an aerospace engineer. He is survived by his wife Francis Vibbart.

## Employee Ads

### Miscellaneous

- ★ 200amp meter base with 7' mast, weatherhead and conductors \$15. 859-9856
- ★ Golden Retriever puppies, AKC registered, 6 weeks \$250. 837-2461
- ★ "Silk" pink Dogwood tree \$35. 859-6475
- ★ Beanie babies \$13; new \$18; magic \$25; Disney \$15; may trade. 881-7000
- ★ Soloflex with butterfly and leg attachments \$495; Fender Stratocaster Ultra, USA made \$750. 350-7461
- ★ New Dunlop Talon II golf club set with bag \$75 firm. 350-7461
- ★ Cover for mini van new, never used. JC Whitney \$50. 882-9417
- ★ 18m compatible Soundblaster, 16 bit sound card with speakers and Wingman Extreme joystick \$95. 882-1780
- ★ Previa van front end mask \$35, Whistler radar detector \$35. 881-5411
- ★ DP Skier \$70; Nordic Trak performance skier \$180. 721-0764
- ★ Stereo in glass cabinet with CD player, dual cassette, 100 watt speakers \$150. 837-9717
- ★ Night vision goggles, Russian 3rd generatoin, 1X, carrying case and batteries, 2 years old. 534-8186
- ★ 8 foot wide, sliding patio door section \$100 o.b.o. 883-2948
- ★ Marshall combo amp, 50W, all tube, two channels \$300. 852-3133
- ★ Coleman 4-ton Horizon II air conditioning unit with a frame included; approx. 9 years old \$500. 880-6335
- ★ Card table and two chairs \$30. 650-0789
- ★ Barbies and Beanies reasonably priced. 464-0449

### Vehicles

- ★ 1991 Ford Escort LX, 5-speed, am/fm cassette, air, 4-door hatchback, 91K miles \$3,500. 534-8186
- ★ 1966 Chevy C10 pickup 350 S.B., V8, new tires \$1,195 o.b.o., lv. msg. 772-7343

### Vehicles

- ★ 1981 Buick Regal \$550; dog pen/fence \$150. 852-8325
- ★ 1992 GMC Safari SLE extended van, ABS, dual A/C luggage rack, full power \$9000. 880-0896
- ★ 1995 Chevrolet Lumina LS, blue, 36K miles, PW, PS, cruise, am/fm cass., \$13,000. 751-2131

### Wanted

- ★ Cassette tapes with music on them, no hard or acid rock. 881-6040

### Found

- ★ Power tape found in parking lot at Building 4481, call 4-4758 to identify.

### Found

- ★ Black female cat and her 8 week old (male orange) kitten. Go together. 536-7541

## Center Announcements

- ✦ **NARFE** — The National Association of Retired Federal Employees will meet July 12 at the Senior Center on Drake Avenue. Probate Court Judge Frank H. Riddick will discuss the importance of having a will. Judge Riddick also will answer questions related to the probate process. Refreshments at 9:30 a.m., program at 10 a.m. For more information call 837-0382 or 881-3168.
- ✦ **Toastmasters**— Redstone Toastmasters International will meet every Tuesday at 6 p.m. in the Morrison's Cafeteria in Madison Square Mall. For more information call 461-0476.
- ✦ **STOP ABUSE:** — Aware of waste, fraud or abuse? Telephonically contact the MSFC Office of Inspector General at 4-9188 or send complaints to Mail Stop M-DI. Confidentiality will be maintained.
- ✦ **Public Service Announcement** — The program "Exploring the Red Planet" will be held July 26 at 7:30 p.m. at the Von

Braun Astronomical Society Planetarium in the Monte Sano Park. Admission per person for nonmembers is \$2 for adults (12 and up), \$1 for children (6-11 years). Members are admitted free.

- ✦ **MESA**— The Marshall Engineers and Scientists Association IFPTE Local 27 will meet June 19 at 11:30 a.m. in bldg. 4471, room C105. Refreshments will be served and all members are invited.

## Job Opportunities

- CPP 97-66-CV, Program Analyst, GS-343-11/12**, Microgravity Research Program Office, Program Planning and Control Office. Closes July 9, 1997.
- REASSIGNMENT BULLETIN: 97-12-CP**, Budget Analyst, GS-560-11/12, Office of Chief Financial Officer, Resources Management Office, (2 vacancies). Closes July 11, 1997.
- CPP 97-51-CL, AST, Technical Management, GS-801-14**, Technology Transfer Office, Technology Development & Investment Office. Closes July 11, 1997.
- CPP 97-67-DC, AST, Aerospace Flight Systems, GS-861-14**, S&E, Transportation Systems Chief Engrs, Advanced Space Transportation Engr. Closes July 10, 1997.
- REASSIGNMENT BULLETIN: 97-13-CV**, Office Services Clerk, GS-303-6, Microgravity Research Program Office, Office of the Manager. Closes July 7, 1997.
- CPP 97-70-PL, Secretary (OA), GS-318-05**, S&E, Structures & Dynamics Lab, Structural Design Div, Structural Development Br. Closes July 14, 1997.
- CPP 97-68-JB, Contract Price/Cost Analyst, GS-1102-13**, Procurement Office, Planning Analysis and Review Division. Closes July 18, 1997.
- CPP 97-71-DC, AST, Liquid Propulsion Systems, GS-861-14**, S&E, Space Transportation System Chief Engineers, Space Shuttle Main Engine, Requirements & Integration. Closes July 18, 1997.
- CPP 97-79-JB, Property Disposal Officer, GS-1104-12**, Human Resources & Admin Support Office, Management Operations Office, Property Management Division. Closes July 18, 1997.

# MARSHALL STAR

Marshall Space Flight Center, Alabama 35812

The Marshall Star is Published every Wednesday by the Public Affairs Office at the George C. Marshall Space Flight Center, National Aeronautics and Space Administration. Contributions should be submitted no later than Friday noon to the Marshall Public Affairs Office (CA10), Building 4200. Submissions should be written legibly and include the originator's name. The Marshall Star does not publish commercial advertising of any kind.

Writer-Editor — Angela D. Storey  
Editorial Assistant — Betty Humphery  
Director, Media Services — David B. Drachlis  
Director of Public Affairs — John B. Taylor  
U.S. Government Printing Office 1997-532-111- 60019

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