

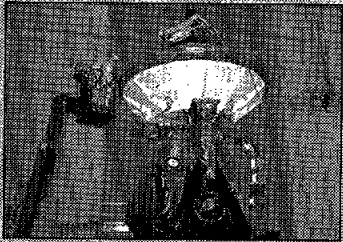
# Space News **ROUNDUP!**

VOL. 36 NO. 24

Lyndon B. Johnson Space Center, Houston, Texas

September 12, 1997

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Congressional visitors get a good look at the Neutral Buoyancy Laboratory.

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## Dynacs earns top small business award

A JSC contractor, Dynacs Engineering Co. Inc., is NASA's 1997 Small Disadvantaged Business Prime Contractor of the Year.

Dynacs President and Chief Executive Officer Ramen Singh is scheduled to accept the award from NASA Administrator Daniel S. Goldin at a Sept. 30 ceremony at NASA Headquarters.

"JSC nominated a member of its contractor family for this prestigious award," said JSC Director George

Abbey, "and I am pleased that Dynacs received this award recognizing both its technical competence and its work in the community."

Dynacs supports the International Space Station Program Office by providing complex technical and management support to the integration of Russian cooperative activities. These include systems engineering and integration for Phase 1 experiments and demonstration, subsystem evaluations, safety

assessments and shuttle and Mir systems integration and verification planning.

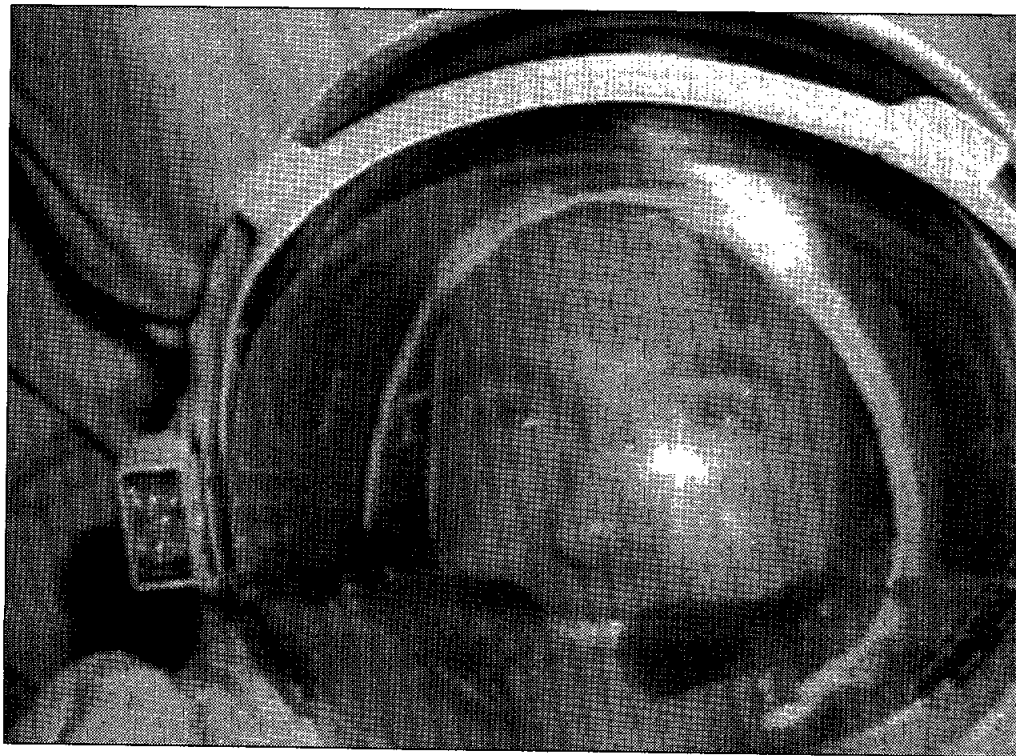
Dynacs also provides project engineering support for the Russian Space Agency-provided Solar Dynamic Power/Energy Module, Docking Mechanisms and Phase 2 and 3 Risk Mitigation Experiments.

"Technical performance by Dynacs is recognized as uniformly excellent throughout JSC and by JSC's prime contractors," said JSC

Business Management Director Jim Shannon in his nomination. "Dynacs is certainly deserving of NASA's Minority Contractor of the Year Award."

The company was evaluated on the strength of its products and services, coordination with other organizations, contract management effectiveness and efficiency, cost reduction techniques, employee development opportunities,

Please see **JSC**, Page 8



NASA Astronaut Mike Foale prepares for a space walk with Mir 24 Commander Anatoly Solovyev to inspect damage to the Russian Space Station.

NASA Photo

## Foale helps inspect Mir damage

By John Lawrence

Mir 24 Commander Anatoly Solovyev and U.S. Astronaut Mike Foale conducted a six hour space walk Friday and Saturday, Sept. 5 and 6, to inspect damage to the Spektr module resulting from the collision with a Progress resupply vehicle, but found no visible signs of a breach in the module's hull.

Solovyev and Foale conducted a thorough analysis of the damage to one of Spektr's radiators and its damaged solar array.

"We had the crew look at seven of the most serious damaged areas of the Spektr module but nothing suspicious could be found that could be named as causing the breach in the Spektr module," said Chief Flight Director Vladimir Solovyev.

The space walk began at 8:07 p.m. CDT Friday after Foale opened the hatch to the Mir's Kavant-2 airlock. At 2:07 a.m. they ended their excursion by returning to the airlock and repressurizing it prior to the removal of their space suits. After removing his space suit, Foale radioed down to Russian mission controllers, "I am really honored to take part in this space walk and I thank everyone for helping me to prepare for it."

During the first stage of the space walk, Foale maneuvered Solovyev into position at the Spektr module using Mir's Strella cargo boom. Solovyev performed a visual inspection of the damaged areas around the radiator that was crumpled by the Progress collision. Solovyev used a cutting tool to remove thermal insulation covering the struts and support beams of the damaged radiator to try to locate areas where a breach in the Spektr pressure shell might be evident. Since there was no visible breach, Russian flight controllers determined there was no need to install handrails at that site for future repair work.

Next, Foale and Solovyev moved to the damaged solar array to inspect that site. Based on the visual

Please see **FOALE**, Page 8



## JSC fights computer viruses

A relatively new form of computer virus is making it tougher for security experts to protect JSC's valuable data processing and office automation systems, but two center organizations are working together to respond to the broadening threat.

The Office of the Chief Information Officer and the Information Systems Directorate are implementing systems that allow employees to help protect their own workstations, and encouraging all computer users to help their fellow employees by reporting any suspected infections.

The number of computer viruses is growing rapidly around the world, JSC Computer Security Manager Lee Snapp said, and today some 8,000 viruses exist. They can range from benign to destructive and can come from just about anywhere.

Until the spring of 1996, computer viruses were mostly a minor nuisance. JSC kept only one virus response person fully employed. But once virus writers could make viruses spread easily via attachments to e-mail, the number skyrocketed.

Over the last year JSC has experienced an explosion in the numbers of computer viruses, Snapp said. By the end of July, JSC users had reported 3,651 virus cases.

In the past, most viruses were attached to programs that people shared with each other by exchanging floppy disks. Today these types of viruses represent only about 20 percent of the reported virus cases at JSC. The rest are the newer "macro" viruses that are embedded in attachments and spread by way of electronic mail.

Please see **VIRUS**, Page 8

## JSC Quality System makes final pre-audit push

By Leon Blum

The JSC Quality System is undergoing its third internal audit, a review designed to identify any areas of weakness in the JSC Quality System so that they can be corrected before the Independent Registration Audit in November.

"This is the final push leading up to the independent audit of our Quality System in November," said Lee Norbraten, chief of the ISO 9000 Office. "Everyone at the center needs to be familiar with the JSC Quality System and how it affects their daily activities. Using the Quality System should be as natural as answering the phone, or signing your own name."

The five-week assessment, which began Sept. 2 and will be completed by Oct. 2, is being coordinated by

the ISO 9000 Office and covers a broad range of activities necessary to assure the center that the JSC Quality System is in operation.

The audit will be performed by the staff of full-time internal lead auditors, detailed to the ISO 9000 Office. All organizations previously visited by the auditors will be re-audited during this period.

The audit will be conducted in three parts. The first portion was completed Sept. 5. The auditors focused on performing a follow-up on the areas of nonconformance identified by the JSC internal audit of June 1997. The auditors assured that corrective action was taken and that those actions were effectively implemented. In areas where correc-

tive action was not taken or effectively implemented, the non-conformance record will remain open and that directorate will be required to explain how and when the corrective action will be completed.

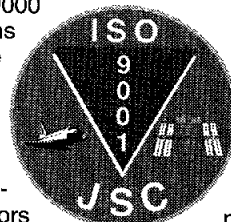
For the portion of the audit under way now, which began Sept. 8 and continues through Sept. 26, the lead auditors have been joined by a pool of internal auditors from various directorates to perform a more detailed assessment of the JSC Quality System across the center.

This assessment covers each organization's effective implementation of the quality manual, system level procedures and work instructions. All JSC directorates, in the

scope of the JSC Quality System, may be visited by the auditors. This period also will be used to follow up on corrective actions taken in response to non-conformance found by the independent registrar, National Quality Assurance, during the pre-assessment audit of July 7-11.

The final portion of the internal audit is scheduled to be completed by the lead auditors from Sept. 29-Oct. 2. The audit activities will focus on assessment of areas where there have been recent and significant changes to system level procedures.

All employees are encouraged to get involved and stay informed about the JSC Quality System. One of the best sources of current information is the ISO 9000 Home Page at: <http://www4.jsc.nasa.gov/ISO9000/>



# Shuttle program issues contracts to study avionics upgrades

Space shuttle avionics upgrade study contracts have been awarded to Space Systems Division of Boeing-North American, Lockheed-Martin Space Mission Systems and Services and McDonnell Douglas Corp. with the goal of solving obsolescence issues over the lifetime of the shuttle fleet.

The goal of these study contracts, which run through Dec. 1, is to make better use of commercial and military off-the-shelf hardware

while combining it with modern industry architectures. The desired result is to minimize the implementation cost as well as the total program life cycle cost associated with hardware and software. The overall total value of the three study contracts is \$2.6 million.

At present, commercial and military off the shelf hardware performance exceeds shuttle hardware performance and will allow an upgrade to the system while solving

many obsolescence issues.

Specific objectives of the study are to provide a conceptual design and then to benchmark current industry experience in avionics design, upgrade and retrofit. This will lead to a recommendation on final architecture. Included in the study is a box-by-box replacement approach as well as a block approach—subsystem, core, or total. Also included is an industry design response to the rate of technology change over the

shuttle program lifetime.

The recommendations will be supported with cost and implementation schedules that meet the manifest.

A business case will be based on program lifetimes to the years 2012 and 2030. Costs will include the flight hardware and software upgrades, as required, and the costs associated with ground facilities needed to support the proposed architectures.

Avionics upgrades will aid the

Space Shuttle Program in achieving the goals of flying safely while meeting the manifest, ensuring mission support and reducing costs. Based on interim and final reports and presentations by the contractors, NASA plans to use the information and recommendations to draft a plan and schedule to support orbiter avionics upgrades in dealing with obsolescence while providing cost-effective incorporation of future advances in applicable avionics design.

## STS-86 crew gets practice on *Atlantis*

By Kyle Herring

Space Shuttle *Atlantis*' seven-member crew spent this week at the launch site undergoing a routine countdown dress rehearsal for a visit to the Russian Space Station Mir scheduled to begin with the STS-86 launch in less than two weeks.

As the crew concluded its Terminal Countdown Demonstration Test on Wednesday, shuttle program managers prepared for the traditional flight readiness review under way today at Kennedy Space Center in Florida to assess the readiness of the vehicle, crew and flight control

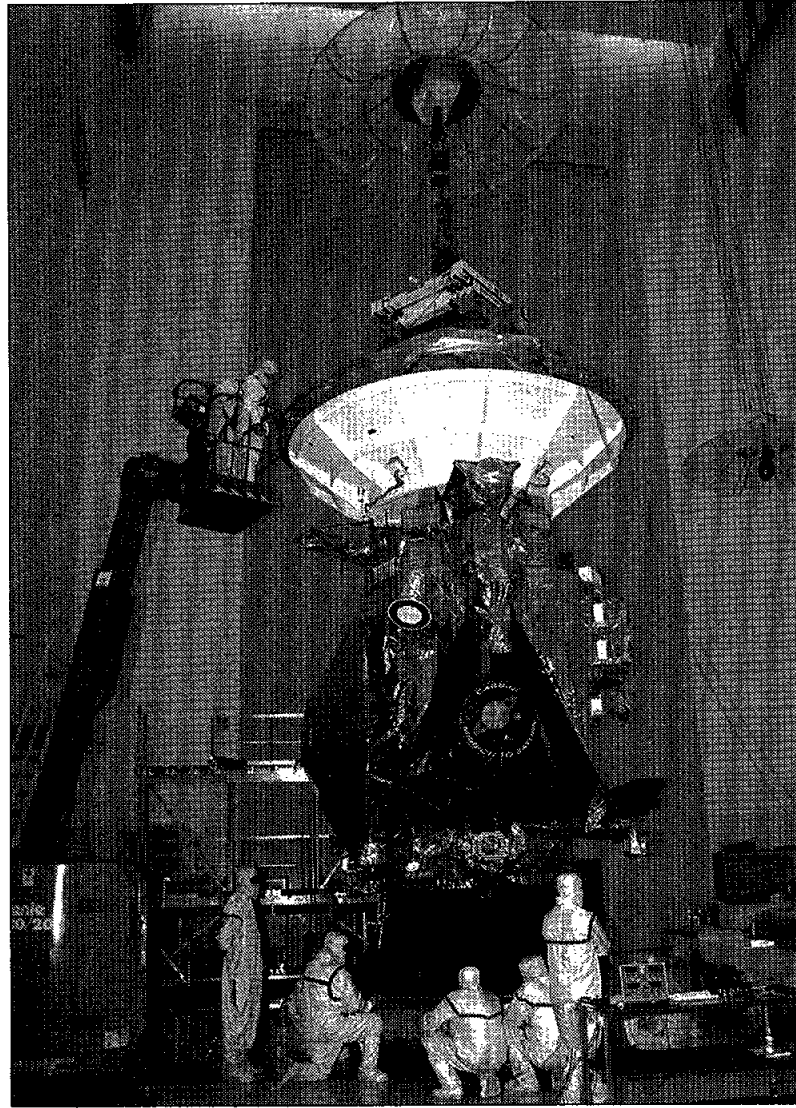
teams both here and in Russia.

Following today's meeting, managers are expected to formally target the launch date, currently expected to be Sept. 25 with the countdown

beginning Sept. 22. Liftoff on that day would be at 9:34 p.m. Houston time, at the opening of a 7-minute launch window. An on-time launch would have *Atlantis* docking with the Mir Space Station about 4:30 p.m. Sep. 27 and the hatches between the spacecraft would be opened approximately 2 hours later.

STS-86 will be *Atlantis*' seventh and last scheduled flight to rendezvous and dock with the Mir Space Station. Astronaut Dave Wolf will replace Mike Foale aboard the outpost as the permanent U.S. presence on the station continues since beginning with STS-76 and the arrival of Shannon Lucid in 1996.

Following the mission, *Atlantis* will be shipped to Palmdale, Calif., for its major modification period scheduled to begin in November. The next visit to Mir in January 1998 will be conducted by *Endeavour* which is now being readied for that mission in the Orbiter Processing Facilities at KSC.



NASA Photo 97PC-1336

Technicians at Kennedy Space Center in Florida prepare the Cassini probe for loading into a payload transfer cannister prior to its move to the Cape Canaveral launch pad. The launch period for Cassini's nearly seven-year journey to Saturn opens Oct. 6 and closes Nov. 15. The spacecraft is scheduled to reach its destination on July 1, 2004.

## Cassini cooling system malfunction slows processing

Program managers for the Cassini mission to the planet Saturn reported last week that they may postpone a planned Oct. 6 launch at least until Oct. 15 after a ground cooling system malfunctioned during processing.

Excessive pressure by the cooling system tore foam insulation encased in aluminized foil, releasing foam particles that will have to be removed.

The launch period for Cassini's nearly seven-year journey to Saturn opens Oct. 6 and closes Nov. 15. The U.S. Air Force Titan IVB/Centaur launch system will loft Cassini onto the interplanetary trajectory that will deliver the spacecraft to Saturn almost seven years later on July 1, 2004. Cassini's primary mission concludes in July 2008.

The planet Saturn, its famous icy rings, and its enigmatic moon, Titan, are the prime scientific targets of the international Cassini mission, the most ambitious and far-reaching planetary exploration ever mounted. Final preparation of Cassini is now under way for a launch from Cape Canaveral in October.

The mission marks the first time a space probe has attempted to land on the moon of another planet, providing the first direct sampling of the Earth-like atmosphere of Titan and the first detailed pictures of its previ-

ously hidden surface. Titan is Saturn's largest moon, nearly the size of Mars and bigger than either Mercury or Pluto.

Cassini, in development since October 1989, is a cooperative endeavor of NASA, the European Space Agency and the Italian Space Agency. The mission will send a sophisticated robotic spacecraft equipped with 12 scientific experiments to orbit Saturn for a four-year period and study the Saturnian system in detail. The ESA-built Huygens probe that will parachute into Titan's thick atmosphere carries another six scientific instrument packages.

"With its bright, complex rings, 18 known moons and magnetic environment, Saturn is a lot like a solar system in miniature form," said Wesley Huntress, NASA associate administrator for space science. "Saturn's family of rings and moons is a one-stop treasure trove, offering countless clues to the history of planetary and solar system evolution."

Cassini will be launched aboard a U.S. Air Force Titan IVB/Centaur launch system.

On Nov. 6, 2005, Huygens will descend by parachute into Titan's sky, providing our first direct sampling of Titan's atmosphere and the first detailed photos of its hidden surface.

## Shuttle test engine fire being investigated

A developmental space shuttle main engine being used to test new components caught fire during a test at Stennis Space Center on Aug. 27, and an investigation board has been formed to look at any impact this might have on future launches.

The fire occurred about 2:15 p.m. CDT Aug. 27 on the A-1 test stand at Stennis. There were no injuries caused by the incident.

The engine being tested at the

time, engine No. 0524, was a developmental engine used for testing new engine components. It was not a flight engine. At 568 seconds into a planned 710-second test, the engine was operating at 109 percent power when the turbine discharge temperature exceeded its limits. This caused an automatic cutoff of the engine. At that point, or subsequent to it, a fire occurred on the stand.

The space shuttle main engine

configuration used in the test was significantly different from that of the engines scheduled to lift *Atlantis* into orbit on STS-86. Shuttle managers do not know what impact, if any, this incident will have on the planned Sept. 25 launch.

NASA Headquarters Associate Administrator for Space Flight Wil Trafton has appointed a major incident investigation board to determine the cause of the fire. The chair-

man of the incident investigation board will be Sid Saucier, Propulsion Lab director, Marshall Space Flight Center, and his alternate will be Len Worlund, space shuttle main engine chief engineer at Marshall.

JSC's Carl Kotila will participate on the board, assisting with flight systems analysis.

The incident board is expected to report its findings to senior NASA managers in about 45 days.

## Hubble reveals huge crater on surface of asteroid Vesta

Astronomers have used NASA's Hubble Space Telescope to discover a giant impact crater on the asteroid 4 Vesta. The crater is a link in a chain of events thought responsible for forming a distinctive class of tiny asteroids as well as some meteorites that have reached the Earth.

The giant crater is 285 miles across, which is nearly equal to Vesta's 330 mile diameter. If Earth had a crater of proportional size, it would fill the Pacific Ocean basin. Astronomers had predicted the existence of one or more large craters, reasoning that if Vesta is the true "parent body" of some smaller asteroids, then it should have the wound of a major impact that was catastrophic enough to knock off big chunks. The observations are described in the Sept. 5 issue of Science Magazine.

"In hindsight we should have expected finding such a large crater on Vesta," says Peter Thomas of Cornell University, Ithaca, NY. "But it's still a surprise when it's staring you in the face." Another surprising finding is that such a large crater,

relative to Vesta's size, might have been expected to cause more damage to the rest of the minor planet.

"This is a unique opportunity to study the effects of a large impact on a small object," says Michael Gaffey of Rensselaer Polytechnic Institute, Troy, NY. "This suggests that more asteroids from the early days of the solar system may still be intact."

The collision gouged out one percent of the asteroid's volume, blasting over one-half million cubic miles of rock into space. This tore out an eight-mile deep hole that may go almost all the way through the crust to expose the asteroid's mantle (Vesta is large enough to be differentiated like Earth—with a volcanic crust, core and mantle, making it a sort of "mini-planet".)

Because of the asteroid's small diameter and low gravity, the crater resembles smaller craters on the Moon that have a distinctive central peak. Towering eight miles, this cone-shaped feature formed when molten rock "sloshed" back to the bullseye center after the impact.

One clue for a giant crater came in 1994 when Hubble pictures showed that one side of Vesta's football shape appeared flattened. "We knew then there was something on Vesta that was unusual," Thomas said.

The astronomers had to wait for a better view from Hubble when Vesta made its closest approach to Earth in a decade, in May 1996, when the asteroid was 110 million miles away.

A total of 78 Wide Field Planetary Camera 2 pictures were taken. The team then created a topographic model of the asteroid's surface by noting surface irregularities along the limb and at the terminator (day/night boundary) where shadows are enhanced by the low Sun angle.

The immense crater lies near the asteroid's south pole. This is probably more than coincidental, say researchers. The excavation of so much material from one side of the asteroid would have shifted its rotation axis so that it settled with the crater near one pole.

Unlike some other large asteroids

that have jumbled surfaces due to the asteroids' breakup and recollapse, the rest of Vesta's surface is largely intact, despite the cataclysm. This is based on previous measurements showing it has a surface of basaltic rock — frozen lava — which oozed out of the asteroid's presumably hot interior shortly after its formation 4.5 billion years ago, and has remained largely intact ever since.

Approximately six percent of the meteorites that fall to Earth are similar to Vesta's mineralogical signature, as indicated by their spectral characteristics.

Vesta's spectrum is unique among all the larger asteroids. The crater may be the ultimate source of many of these meteorites. Most meteorites are believed to come from other asteroids, but their specific objects of origin cannot be determined in most cases. Thus the distinctive mineralogical makeup of these meteorites means that Vesta is the only world other than the Earth, the Moon and Mars, for which scientists have samples of specifically known origin.

A mystery has been that the meteorites could not have traveled directly from Vesta because at Vesta's location in the asteroid belt, there are no perturbing gravitational forces that would cause pieces to fall into orbits intersecting the inner planets like apples shaken out of a tree. However, Vesta's "daughter" asteroids—literally—"chips off the block" which have color characteristics similar to Vesta—are near a "chaotic zone" in the asteroid belt where Jupiter's gravitational tug can redirect fragments into orbits that intersect Earth's orbit.

A good determination of the shape of Vesta was necessary for the next step in interpretation, which will use multi-color images of Vesta obtained with Hubble to study the detailed mineralogy of surface regions, including the region of the giant crater. Also, a team led by Don McCarthy of the University of Arizona plans to obtain additional images of Vesta at longer wavelengths this fall using the new Near Infrared and Multi-Object Spectrometer onboard Hubble.



# Community News

## Attention

### Open House Volunteers

**Next year's JSC Open House coordinators need your suggestions!**

**Thank you for working as a volunteer at this year's Open House.**

**We would like to hear your ideas and comments on how we can make Open House even better.**

**Please e-mail or send your comments to AP2/Ed Pritchard.**

**Your input is critical in helping make this event more successful.**

National Aeronautics and  
Space Administration  
**Lyndon B. Johnson Space Center**  
2101 NASA Road 1  
Houston, Texas 77058-3696



Reply to Attn: AA

#### JSC OPEN HOUSE—BEST EVER!

Dear Fellow Employees:

I want to express my most sincere appreciation for all your hard work in support of our Open House Saturday, August 23. From the comments of the visitors and the employees who participated, the third JSC Open House was the best ever. The JSC Team consisting of over 1,600 civil service and contractor volunteers greeted more than 80,000 visitors from as far away as Japan and representing many diverse cultures. Those who came out to have a look into the future and share in what we are doing here in our facilities, both onsite and off, came away with a new understanding of what NASA is all about. Many of those who had attended last year's event commented that this year there was more to see and do, and even suggested that we extend the hours of the event!

This kind of statement is as much a reflection of the pride we exhibited as it is the many products and capabilities displayed on this day. The team spirit and individual enthusiasm of our dedicated volunteers are what made the Open House a success. Many of you volunteered long hours, sometimes in uncomfortably hot, humid conditions. Even more of you spent days and weeks planning and coordinating tours, briefings and demonstrations. This dedication and spirit of cooperation was an impressive display of JSC's most valuable resource, its employees.

To all of those who contributed to the success of the Open House, my sincerest thanks for a job well done!

*George W. S. Abbey*  
George W. S. Abbey  
Director

## Open house organizers now seek feedback

By Barbara Tomaro

The final demonstration is over. The last brochure handed out. The final lost child reunited with frantic parents. Now it is time to reflect on lessons learned. Did we really accomplish what we set out to do?

For years, much of the general populace has been under the mistaken impression that the only things to come out of NASA are Tang, Velcro, and a few hundred pounds of Moon dust. The Open House was a chance for those who work here to dispel these misconceptions and demonstrate to approximately 80,000 visitors the many varied ways our work affects everyone's life. Not only might life exist on other planets, but a better life exists here on Earth due to discoveries made in this center's pursuit of that knowledge.

Organizers of this year's open house are seeking everyone's ideas and comments on how to make next year's even better. Please e-mail or send your comments to AP2/Ed Pritchard.

"Your input is critical in helping make this event more successful," said 1997 JSC Open House Chairman John Lawrence.

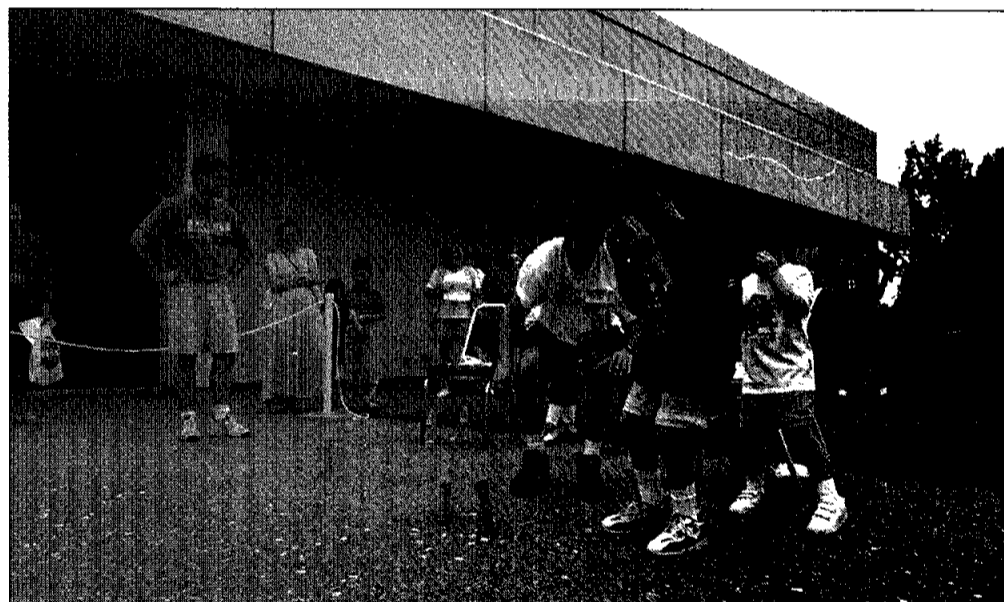
Volunteers learned there are a great number of people who may not work here, but still believe in our mission as much as we do. By demonstrating JSC's capabilities to others, volunteers developed a new sense of how important JSC's work is to our community. Just as important, they learned once again that as a team JSC employees can accomplish a great deal and still bring together all of that science and share the knowledge in a community event.

Most of us don't drink Tang, and Velcro was invented by a Swedish scientist. But for continual scientific investigation, the Moon rocks gather no dust. Scientists around the world are still learning and moving forward on that knowledge. NASA didn't invent Velcro, it just found a lot of interesting uses for it.



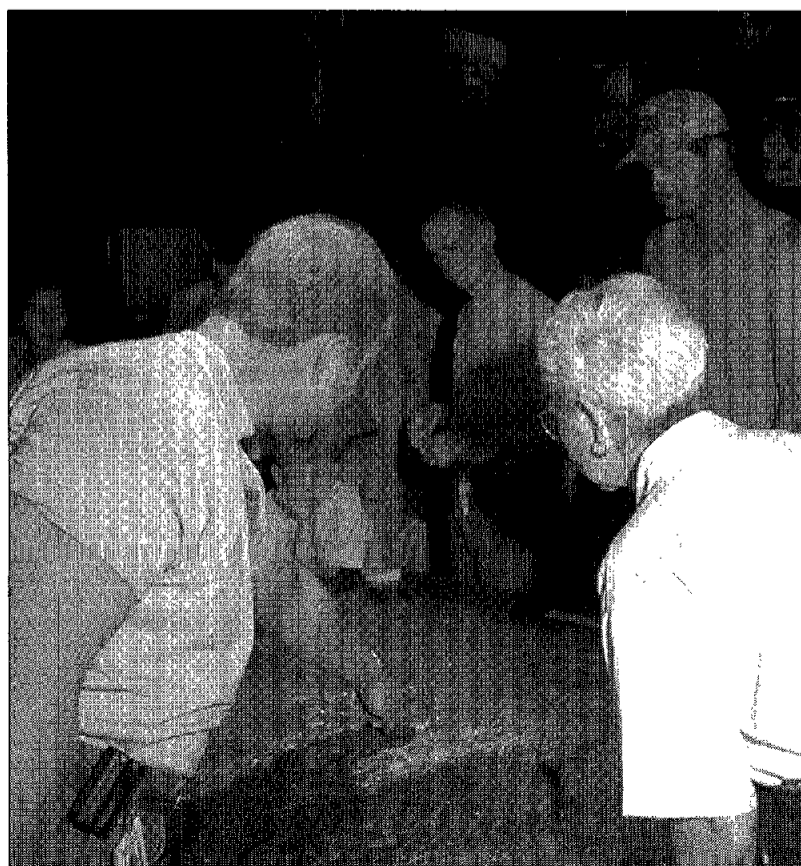
JSC Photo S97-10984

JSC volunteers strap in 3-year-old Luke Blackleghe behind the controls of a T-38 at Ellington Field.



JSC Photo S97-10972

Scott Lazaroff helps future rocket scientists launch water-seltzer rockets outside Bldg. 2.



JSC Photo S97-10973

In the Bldg. 2 television studio, Charles Boehl helps a visitor find her home in a shuttle photo of Houston.

## JSC Safety Alert

### Uneven Stair Riser Heights

#### What Happened

An employee was walking down a flight of stairs. At the bottom of the stairs the employee misstepped and twisted his ankle. The worker had to seek medical help for the badly injured ankle, which began to swell significantly soon after the accident.

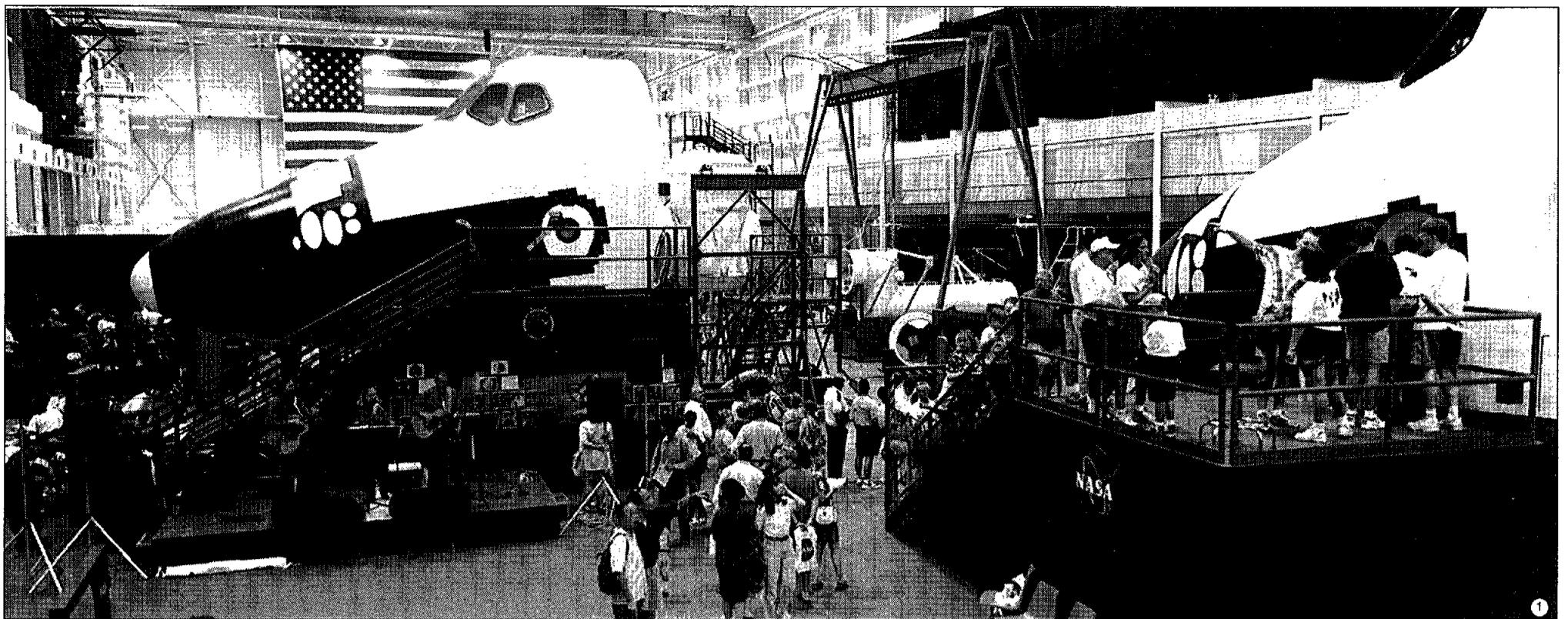
#### Outcome of the Investigation

It was determined that the worker was unaware of the need to hold the handrail when reaching the final flight of the stair risers. Also, the last riser (the one at the bottom of the stairs) was three inches higher than the previous risers. All risers down the stairs were the same except for the first and the last. The last riser had the largest difference in height from the other, more uniform, risers in the flight of stairs. It was this last significant change in riser height, coupled with the fact that the person was not holding the hand rail, that contributed to the worker's twisting the ankle.

#### What You Can Do

Always hold the stair railing when going up or down a flight of stairs. Anyone can lose their balance, and the stair railing is your best bet to avoid a fall. The most common accidents in the workplace are tripping and falling accidents. Some of these have been life-threatening or resulted in permanent crippling injuries.

Facility Managers should inspect all stairs to ensure a uniform height. All out of compliance stairs should be brought to the attention of the Occupational Safety Office (NA3). Occupational Safety and Health Administration regulations require that all stair risers and treads be uniform throughout the flight of the stairs. National Fire Protection Association Life Safety Code regulations require that no adjacent riser height vary more than 3/16 of an inch, and the largest variance in riser height, from the tallest to the smallest riser, in the entire flight of stairs is 3/8 of an inch.



JSC Photo S97-10985

# JSC Goes Public at Open House 97 with 'Space...for All People'

1 The band Southern Cross performs for crowds among the mockups in Bldg. 9.  
 2) More than 50 balloons fill the skies at JSC.  
 3) Exploring Mars in Bldg. 31 a family looks at a Martian landscape panorama photographed by Mars Pathfinder.  
 4) Charles Salkowski, chief of Engineering's Integration and Technology Branch, demonstrates the toughness of Fiberglas-graphite epoxy composite materials that will

form the hull of the new X-38 spacecraft.  
 5) A family tries out a glovebox display in an International Space Station mockup trailer.  
 6) Canadian visitors, from left, Jennifer Mongraia, Lyne Yokys and baby John Alexander Yokys sit in the 747 Shuttle Carrier Aircraft cockpit.  
 7) Young visitors inspect the consoles in the old Mission Control.  
 8) Astronaut Candidate Dan Tani gives an autographed picture to William West of the Woodlands in

the Bldg. 11 cafeteria.  
 9) Chris Johnson straps Daniel Hart of Santa Fe, N.M., into a new lightweight shuttle seat in Bldg.13.  
 10) Visitors file into the Shuttle Carrier Aircraft at Ellington Field for an inside look at the modified Boeing 747 that is used to ferry the shuttle.  
 11) Former astronaut Mike Lounge describes Spacehab in the Bldg. 2 media room.  
 12) Public Affairs Office educators prepare model rocket kits for young guests.



JSC Photo S97-10980



JSC Photo S97-10989



JSC Photo S97-10987



JSC Photo S97-10975



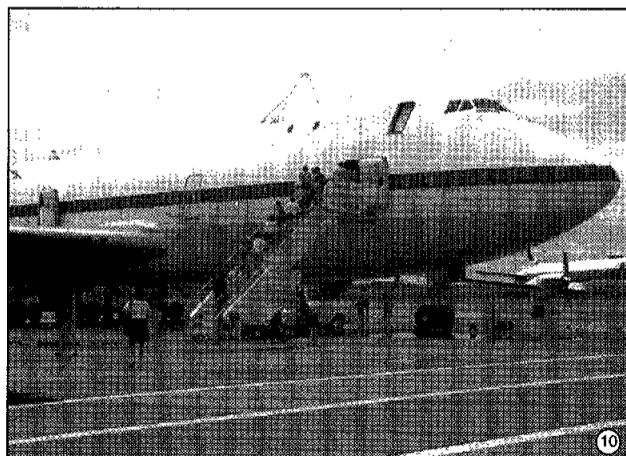
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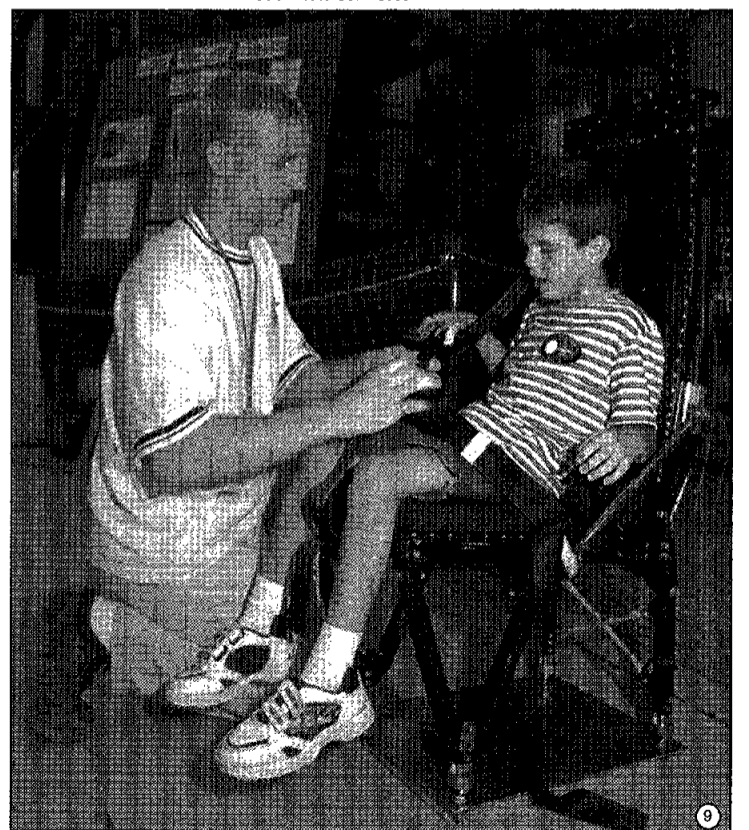
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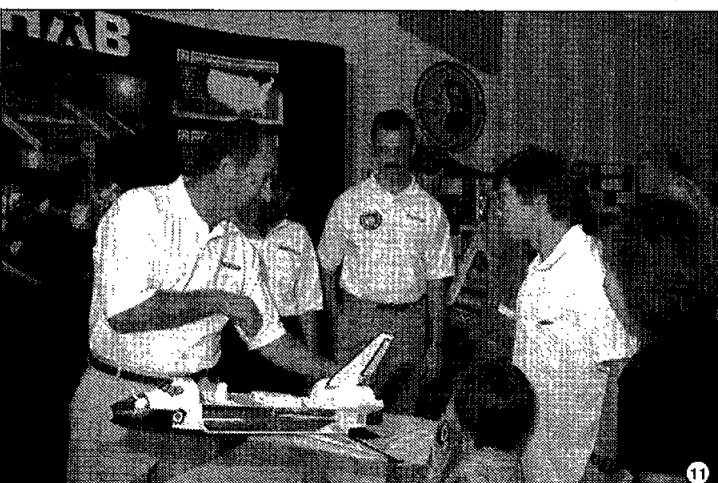
JSC Photo S97-10976



JSC Photo S97-10982



JSC Photo S97-10971



JSC Photo S97-10974



JSC Photo S97-10981

**JSC Photos by  
 Steve Candler,  
 Hector Gongora,  
 Robert Markowitz  
 and  
 Karen Schmidt**



# Eyeing Earth's Envelope

**STS-85 astronauts study atmosphere, test space station technology, techniques**

The crew of *Discovery* returned enough data on the Earth's atmosphere and ozone layer to keep scientists busy for years trying to better understand climate change. The six astronauts also put a new, small robot arm through its paces, and used the shuttle's larger arm and a small satellite to go through the motions of putting together two International Space Station modules.

Oncology researchers have colon cancer tissue samples grown in the Bioreactor Demonstration System to study, and microgravity scientists have a wealth of test data on the effectiveness of a new system designed to isolate sensitive experiments from everyday crew and station activities.

In addition to performing the work, the crew also took time to record the activities on board with cameras:

1) STS-85 crew members pose for the traditional crew portrait. At top, from left, are Canadian Space Agency Payload Specialist Bjarni Tryggvason, Mission Specialist Steve Robinson, and Commander Curt Brown. On bottom, left to right, are Mission Specialist Bob Curbeam, Payload Commander Jan Davis, and Pilot Kent Rominger.

2) Curbeam, a member of the 1995 astronaut class on his first space flight, handles a Bioreactor Demonstration System-3 specimen on *Discovery's* middeck. BDS-3 took advantage of microgravity to grow three-dimensional tissue pieces impossible to grow on Earth. The device flew previously on STS-62 and STS-70, and investigated the assembly of cardiac and smooth muscle cells in microgravity.

3) Payload Commander Davis performs Manipulator Flight Demonstration operations from the flight deck. Testing the five-foot arm gathered data for the Japanese Experiment Module Small Fine Arm development program.

4) *Discovery's* 50-foot mechanical arm grapples the Cryogenic Infrared Spectrometers and Telescopes for the Atmosphere-Shuttle Pallet Satellite-2 over Seattle and Puget Sound. The SPAS subsatellite carried the German-sponsored CRISTA and the Middle Atmosphere High Resolution Spectrograph Investigation, two Mission to Planet Earth Enterprise payloads. They gathered high-resolution data on summer atmospheric conditions in high northern latitudes and polar night at high southern latitudes.

5) Brown performs Biological Research in Canisters-10 operations on *Discovery's* middeck. BRIC-10 life sciences experiments looked at the effects of microgravity on higher-order plants, insects, spiders, centipedes, and crustaceans.

6) Rominger deactivates the Protein Crystal Growth experiment near the end of the 12-day STS-85 flight. The experiment, which included 630 specimens in 10 cylinders, grew crystals for later examination on Earth.

7) Robinson performs Southwest Ultraviolet Imaging System observations of Comet Hale-Bopp through *Discovery's* hatch window. The seven-inch imaging telescope also can be used for terrestrial airflow and shuttle glow and plume studies.

8) Tryggvason uses a laptop computer to input Microgravity Vibration Isolation Mount data on *Discovery's* middeck. Iceland-born Canadian Tryggvason was principal investigator in MIM development. Another MIM supports several Canadian and U.S. materials science and fluid physics experiments on board Russia's Mir space station.



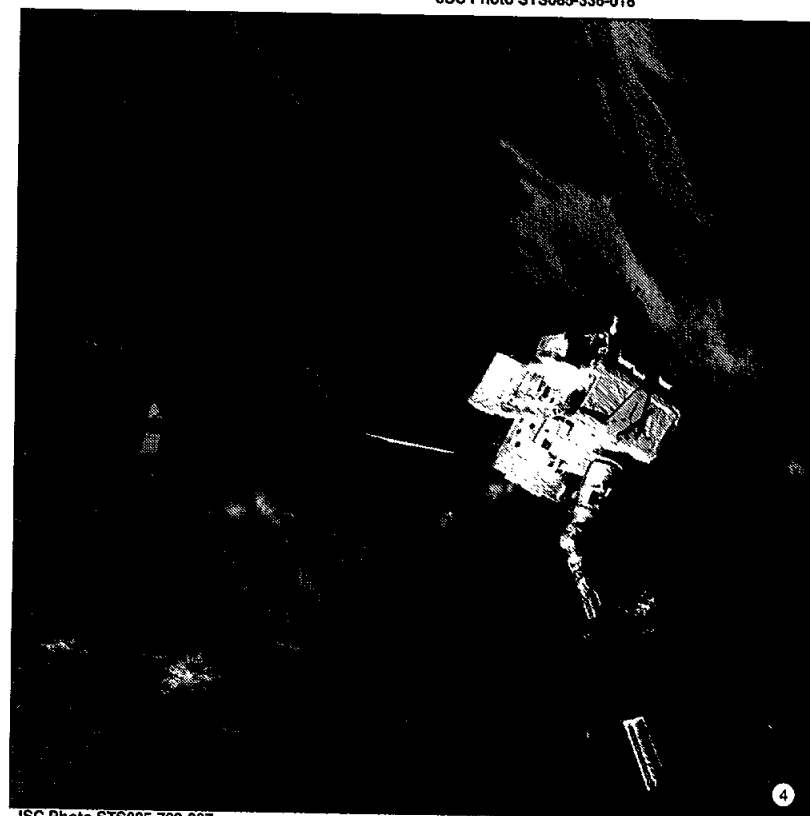
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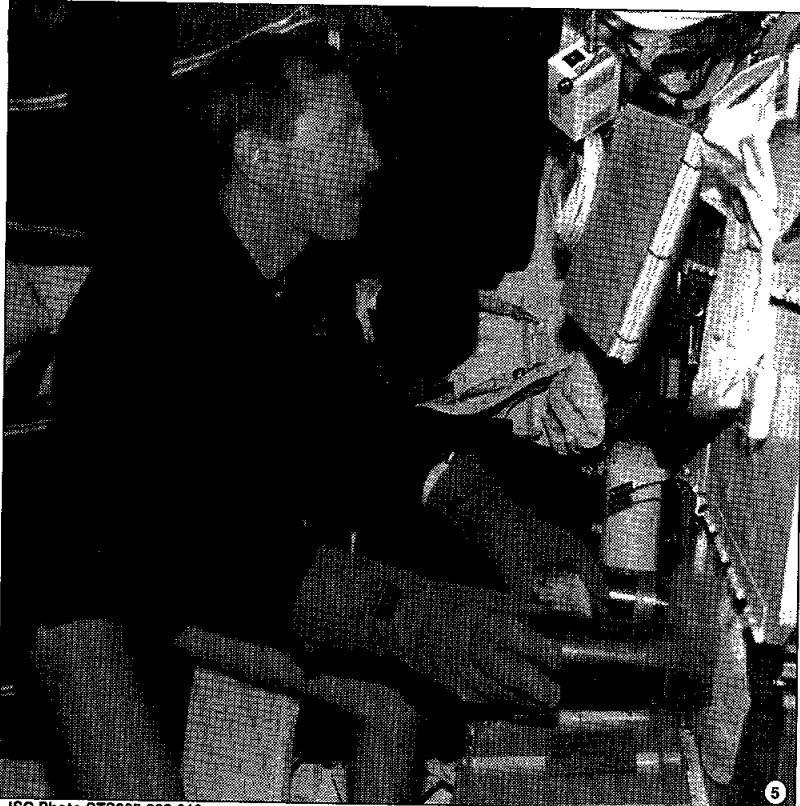
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JSC Photo STS085-316-026



JSC Photo STS085-722-087



JSC Photo STS085-333-013



JSC Photo STS085-324-007



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# 21 Years Ago at JSC

## Shuttle orbiter rolls out next Friday

New era of space transportation beginning

Reprinted from the Sept. 10, 1976, Space News Roundup

The flagship of a new era of space transportation will be unveiled by NASA, Sept. 17, when Orbiter 101, the first reusable Space Shuttle vehicle, is put on public display in Palmdale, Calif.

As many as 600 invited guests, including national, state, local and foreign officials, are expected to attend the rollout ceremonies beginning at 9:30 a.m. PDT, at Rockwell International's Space Division assembly plant.

A welcome will be extended by U.S. Sen. John Tunney of California. Scheduled to give brief remarks at the ceremony are NASA Administrator Dr. James C. Fletcher, U.S. Sen. Barry Goldwater, U.S. Rep.

Olin Teague and Willard F. Rockwell Jr. of Rockwell International.

Acting as master of ceremonies for the event will be John F. Yardley, associate administrator for the Office of Space Flight.

Music will be provided for the ceremony by the Air Force Band of the Golden West from March AFB.

The roll-out program was still being firmed up at Roundup press time.

Although Orbiter 101 is the first vehicle off the assembly line, it will not be the first to fly into space.

Its first job in 1977 will be as a test vehicle for Approach and Landing Tests (ALT) to verify its aerodynamic

characteristics. These will be conducted at NASA's Dryden Flight Research Center, Edwards AFB, Calif.

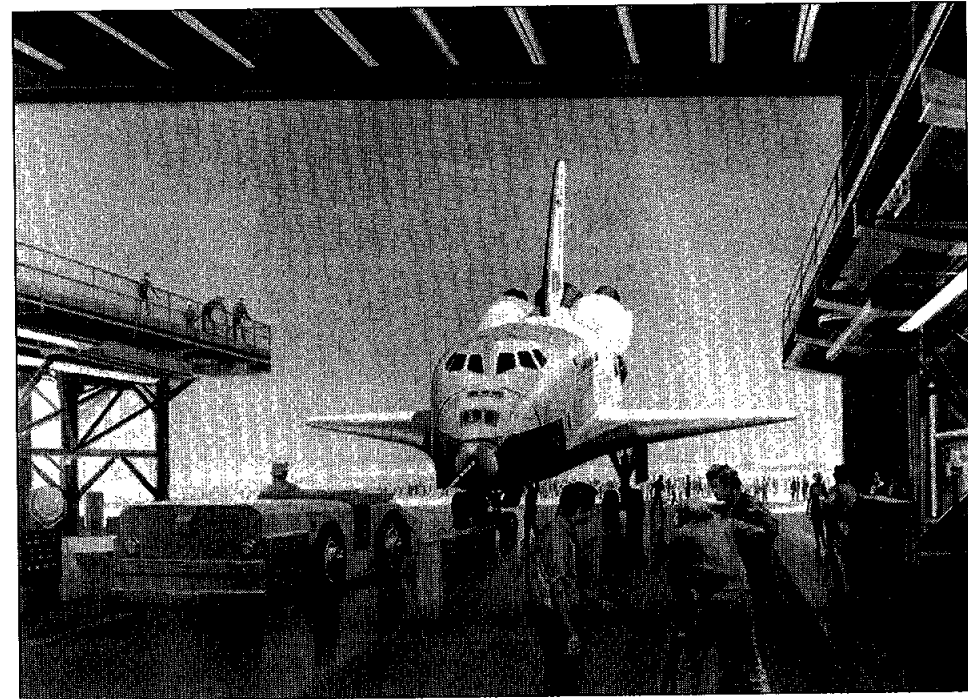
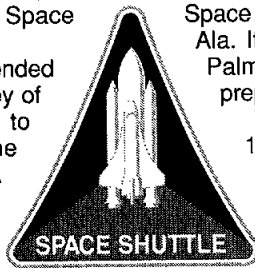
First flights will be unmanned and manned captive flights with the Orbiter attached to the top of a 747 jetliner. In July, 1977, the Orbiter will be released from the 747 carrier for the first manned free flight.

Following ALT, extensive ground vibration tests will be conducted on the vehicle at NASA's Marshall Space Flight Center, Huntsville, Ala. It will then be returned to Palmdale for modifications to prepare it for space flight.

The second Orbiter, OV-102, is scheduled for final acceptance rollout in July, 1978, and will make the first manned orbital Space Shuttle flight in March, 1979.

The Orbiter is designed to be used up to a minimum of 100 times. It is 122 feet long, weighs 75 tons and has a wingspan of 78 feet. The Space Shuttle Transportation System consists of the Orbiter, two solid rocket boosters and an external fuel tank which feeds the Orbiter's three main engines.

The Orbiter and solid rocket boosters are reusable. Only the external tank is jettisoned and not recovered. Orbiter is capable of carrying inside its 60 foot by 15 foot cargo bay a 65,000-pound payload into low earth orbit (about 200 miles altitude).



Above: The Space Shuttle *Enterprise* rolls out of the hangar for the first time at Rockwell International's Space Division assembly plant in Palmdale, Calif., on Sept. 17, 1976. Left: This artist's concept of the rollout accompanied the Sept. 10, 1976, story on the front page of the Space News Roundup.

JSC Photo S76-27636

## Clear Lake to participate in American Heart Walk next month

Participants in this year's American Heart Walk will help fight heart disease and stroke, which kill 950,000 Americans each year, by raising funds for the American Heart Association. The walk is Saturday, Oct. 25, at venues throughout the Houston area.

The Clear Lake walk, which honors former NASA employee Al Jowid, begins at 8:30 a.m. at the University of Houston Clear Lake.

"Heart disease is America's number one cause of death, and stroke is the leading cause of disability," said event chairman Bob McDonald of Smith Barney. "The American Heart Walk will benefit the American Heart Association's research, education and community service programs aimed at eradicating these killers. This year's even will continue the Clear Lake tra-

dition of honoring the memory of Mr. Al Jowid."

The American Heart Association, the largest voluntary health organization in the fight against heart disease and stroke, spent \$236 million on research and programs last year.

Besides raising funds, the walk is designed to stress the benefits of exercise

for everyone regardless of age or physical condition. Health professionals believe that even moderate levels of exercise, such as taking a walk or washing a car, can reduce the risk of heart disease, high blood pressure, and diabetes.

For more information call the American heart Association at (713) 610-5000 or 1-800-AHA-USA1.

## Gilruth Center News

**Hours:** The Gilruth Center is open from 6:30 a.m.-10 p.m. Monday-Thursday, 6:30 a.m.-9 p.m. Friday, and 9 a.m.-2 p.m. Saturday.

**Sign-up policy:** All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a yellow Gilruth or weight room badge. Classes tend to fill up two weeks in advance. Payment must be made in full, in exact change or by check, at the time of registration. No registration will be taken by telephone. For more information, call x30304.

**Gilruth badges:** Required for use of the Gilruth Center. Employees, spouses, eligible dependents, NASA retirees and spouses may apply for photo identification badges from 7:30 a.m.-9 p.m. Monday-Friday; and 9 a.m.-2 p.m. Saturdays. Cost is \$10. Dependents must be between 16 and 23 years old.

**Hatha Yoga:** A stress relieving, stretching and breathing exercise routine to unite body, mind and spirit. Classes meet from 5:30-6:30 p.m. Thursdays. Cost is \$40 for eight weeks.

**Nutrition intervention program:** A six-week program to learn more about the role diet and nutrition play in health, including lectures, private consultations with a dietitian and blood analysis. Program is open to all employees, contractors and spouses. For more information call Tammie Shaw at x32980.

**Defensive driving:** One-day course is offered once a month. Pre-registration required. Cost is \$25. Call for next available class.

**Stamp club:** Meets at 7 p.m. every second and fourth Monday in Rm. 216.

**Weight safety:** Required course for employees wishing to use the weight room will be offered from 8-9:30 p.m. Next class is Sep. 25. Pre-registration is required. Cost is \$5. Annual weight room use fee is \$90. Additional family members are \$50.

**Exercise:** Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$24 for eight weeks.

**Aikido:** Introductory martial arts class meets from 5:15-6:15 p.m. Tuesday and Wednesday. Cost is \$35 per month. New classes begin the first of each month.

**Step/Bench aerobics:** Classes meet from 5:15-6:15 p.m. Mondays, Tuesdays and Thursdays. Cost is \$32 for eight weeks. Kristen Maidlow, instructor.

**Ballroom dancing:** Beginner classes meet from 7-8:15 p.m. Thursdays. Intermediate and advanced classes meet from 8:15-9:30 p.m. Cost is \$60 per couple.

**Country and western dancing:** Beginner class meets 7-8:30 p.m. Monday. Advanced class (must know basic steps to all dances) meets 8:30-10 p.m. Monday. Cost is \$20 per couple.

**Fitness program:** Health Related Fitness Program includes a medical screening examination and a 12-week individually prescribed exercise program. For more information call Larry Wier at x30301.

**Gilruth Home Page:** Check out all activities at the Gilruth online at: <http://www4.jsc.nasa.gov/ah/exceaa/Gilruth/Gilruth.htm>

## Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday and in the Bldg. 3 Exchange Store from 7 a.m.-4 p.m. Monday - Friday. For more information call x35350 or x30990.

**Astroworld:** \$22.75. Two-day \$37.50.

**Astroworld:** \$19 Blue Light Special, valid only in Houston, thru 1-4-98.

**Moody Gardens:** Tickets are \$9.50 for two of four events.

**Seaworld:** Adult \$27.25; children (3-11) \$18.25.

**Schlitterbahn:** Adult \$20.25; children (3-11) \$17.50.

**Space Center Houston:** Adult \$8.95; children (4-11) \$6.40 JSC civil service employees free.

**Splashtown:** Adult \$14.50; children (3-9) \$11.50.

**Waterworld:** \$11.50.

**Movie discounts:** General Cinema, \$5.25; AMC Theater, \$4.50; Sony Loew's Theater, \$4.75.

**Shirts:** JSC logo T-shirt, \$10, Polo style, \$23. Mars T-shirts.

**Stamps:** Book of 20, \$6.40.

Metro tickets available.

## Roundup Deadlines

The Space News Roundup is published every other Friday. Story ideas should be submitted as far in advance as possible, but no later than two weeks prior to the date of publication.

The deadline for Dates & Data calendar items is three weeks prior to the date of publication.

Stories and ideas should be submitted to Acting Managing Editor David Portree in Bldg. 2, Rm. 181, or via e-mail to [david.s.portree1@jsc.nasa.gov](mailto:david.s.portree1@jsc.nasa.gov)



## People on the Move

Human Resources reports the following personnel changes as of August 30:

### New Management Assignments

Stan Schaefer has been selected as a branch chief in the Systems Division in the Mission Operations Directorate.

### Additions to the Workforce

Jane Hutchison joins the Public Affairs Office as a Public Affairs Specialist.

Ronald Robinson joins the Medical Sciences Division in the Space and Life Sciences Directorate as a Medical Officer.

### Promotions

Patricia Collier was selected as a secretary in the Mission Operations Directorate.

Geraldine Martisek was selected as a computer specialist in the Management Services Office, Mission Operations Directorate.

### Resassignments Between Directorates

Kathleen Moser moves from the International Space Station Program Office to the Mission Operations Directorate.

Rhonda Hyland moves from the Human Resources Office to the Technology Transfer and Commercialization Office.

Scott Hutchins moves from the EVA Project Office to the Space Shuttle Program Office.

Willie Williams moves from the Mission Operations Directorate to the International Space Station Program Office.

### Reassignments to Other Centers

Jonathan Gal-Edd of the International Space Station Office moves to Goddard Space Flight Center.

Rita Svarcas of the International Space Station Office moves to NASA Headquarters.

### Retirements

Story Musgrave of the Flight Crew Operations Directorate.  
Roger Sanders of the Engineering Directorate.

### Resignations

Wilson Miles of the Flight Crew Operations Directorate.  
Michael Kallberg and Paul Kemp of the Engineering Directorate.  
James Gooding, Cory Logan, Rebecca Pokrefke and Steven Siconolfi of the Space and Life Sciences Directorate.



Astronaut Story Musgrave's helmet fit is checked prior to a training session for STS-80 emergency bailout and survival procedures in JSC's Weightless Environment Training Facility. Musgrave retired Sept. 2.

## Musgrave concludes career that spanned Apollo, space station

Veteran Astronaut F. Story Musgrave retired from NASA Sept. 2 to pursue private interests in the communications industry.

Musgrave's NASA career spanned the Apollo era into the Space Shuttle Program to initial development of extravehicular activity strategies for the International Space Station.

Musgrave, 61, joined NASA in 1967 and is a veteran of six space shuttle flights, spending more than 1,281 hours in space.

He first flew on STS-6 in 1983, the maiden voyage of *Challenger*. During that flight, Musgrave and fellow Astronaut Don Peterson conducted the first extravehicular activity of the shuttle era.

He was a mission specialist on STS-6 in 1983, STS-51F/Spacelab-2 in 1985, STS-33 in 1989 and STS-44 in 1991, was the payload commander on STS-61, the first Hubble Space Telescope servicing and repair mission, in 1993, and a mission specialist on STS-80 in 1996.

Musgrave reached a career total of four space walks on STS-61. With STS-80, he became the oldest person ever to fly in space.

"Throughout the shuttle program, from its earliest stages to the present, Story has been instrumental in developing the techniques crew members use to perform EVAs,"

said David Leestma, director of Flight Crew Operations. "His knowledge, expertise and friendship will be sorely missed."

Musgrave was selected as a scientist-astronaut by NASA in August 1967. He worked on Skylab Program development, then was back-up science-pilot for the first Skylab mission and a CAPCOM for the second and third Skylab missions as well as numerous shuttle missions. Musgrave participated in development of all space shuttle extravehicular activity equipment. From 1979 to 1982, and from 1983 to 1984, he was assigned as a test and verification pilot in the Shuttle Avionics Integration Laboratory at JSC.

Musgrave received a bachelor of science degree in mathematics and statistics from Syracuse University in 1958, a master of business administration degree in operations analysis and computer programming from the University of California at Los Angeles in 1959, a bachelor of arts degree in chemistry from Marietta College in 1960, a doctorate in medicine from Columbia University in 1964, a master of science in physiology and biophysics from the University of Kentucky in 1966, and a master of arts in literature from the University of Houston in 1987.

## Blaha retires, joins USAA

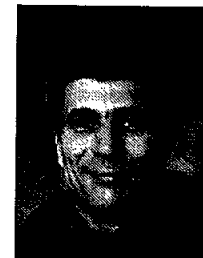
Shuttle astronaut and Mir Space Station veteran John Blaha will retire from NASA on Sept. 26 to become the assistant vice president of integration engineering for USAA Corp. in San Antonio.

"Brenda and I have thoroughly enjoyed the past 17 years with NASA," Blaha said. "We are looking forward to our new opportunity in San Antonio.

We appreciate all the support we have received over the years."

Selected as an astronaut in 1980, Blaha has extensive flight experience, having flown on six shuttle missions. He was the pilot on *Discovery* for STS-29 in March 1989, and flew again on *Discovery* as pilot for STS-33 in November 1989. Blaha, a retired Air Force colonel, commanded two shuttle missions, STS-43 in August 1991 on *Atlantis* and STS-58 on *Columbia* in November 1993.

Following extensive training at the Gagarin Cosmonaut Training Center outside of Moscow, Blaha worked aboard Mir from September 1996 to January 1997.



John Blaha

## Allen retires to join foundation

Three-time shuttle astronaut Andrew Allen will retire from NASA on Oct. 1 to become president of the FIRST Foundation, based out of Manchester, N.H.

The FIRST Foundation works with youth to foster their interest in science and engineering. The group sponsors an annual robot-building competition, in which area high school students and JSC engineers participated this year.

"I am truly thankful, and have enjoyed my experiences at NASA and will miss the people I have been privileged to work with," Allen said. "I hope this new challenge will give some young folks the same opportunities I have had in my life."

Allen, a Marine lieutenant colonel, is a veteran of three space flights, having flown as pilot on STS-46 in 1992 and STS-62 in 1994. He was commander for STS-75, the second Tethered Satellite System mission in 1996.



Andrew Allen

## JSC, contractors earn Houston Minority Business Council award

JSC received the Houston Minority Business Council's Corporate Commitment Award last week at the council's annual awards ceremony.

JSC earned the award for demonstrating its commitment to minority business development.

In addition, JSC Assistant Director of Business Management Debra Johnson and George Abbey Jr. and

Angel Carr, both of United Space Alliance, were recognized as the Advocates of the Year for their distinguished service in support of the minority business community in the Houston area.

Raynor Computer Services and Syscom Development Inc., both JSC contractors, received awards as the Suppliers of the Year.

## Apollo, Skylab, shuttle experiment manager dies in Tennessee

Former JSC employee Don Gerke, 63, who was serving as NASA representative to the Air Force's Arnold Engineering Development Center at Tullahoma, Tenn., died suddenly at his home in Manchester, Tenn., Aug. 23.

Gerke was the Apollo Lunar Surface Experiment Package manager during the Apollo Program, and experiments manager during the

Skylab and Space Shuttle Programs. He also served as chief of the Experiments System Division in the Engineering and Development Directorate at JSC. Gerke later had management assignments with the Space Station Program at JSC and NASA Headquarters.

Memorial services were Aug. 30 at St. Paul Catholic Church in Nassau Bay.

## Dates & Data

### Sept. 12

**Astronomers meet:** The JSC Astronomical Society will meet at 7:30 p.m. Sept. 12 at the Lunar and Planetary Institute, 3600 Bay Area Blvd. For more information call Chuck Shaw at x35416.

**Thermal and fluids workshop:** The Engineering Directorate continues its eighth annual Thermal and Fluid Analysis Workshop through Sept. 13 at the University of Houston Clear Lake. For more information call Carlos Ortiz at x38879.

### Sept. 13

**Registration deadline:** Registration is under way for Gilruth Center Fall Soccer League which will start the week of Sept. 20. Registration ends Sept. 13. For more information call x33345.

### Sept. 16

**Registration deadline:** Registration is under way for Gilruth Center Flag Football Leagues which

will start the week of Sept. 22. Registration ends Sept. 16. For details call x33345.

### Sept. 17

**Astronomy seminar:** The JSC Astronomy Seminar will conduct an open discussion meeting at noon Sept. 17 in Bldg. 31, Rm. 129. For more information, call Al Jackson at x35037.

**Spaceland Toastmasters meet:** The Spaceland Toastmasters will meet at 7 a.m. Sept. 17 at the House of Prayer Lutheran Church. For more information, call Jeannette Darcy at x45752.

**Communicators meet:** The Clear Lake Communicators will meet at 11:30 a.m. Sept. 17 at the Lockheed Martin, 555 Forge River Road. For more information, contact Richard Lehman at 281-538-1854.

**Spaceteam Toastmasters meet:** The Spaceteam Toastmasters will meet at 11:30 a.m. Sept. 17 at United Space Alliance, 600 Gemini. For details, call Patricia Blackwell at

281-282-4302 or Brian Collins at x35190.

**Scuba club meets:** The Lunarflins will meet at 7:30 p.m. Sept. 17 at the Redfish Restaurant under the Kemah/Seabrook bridge, Seabrook side. For more information call Fred Toole at x33201.

**Industry presentation:** OcÈ USA Inc., will give an overview and demonstration of their latest high-end digital printing system from 9 a.m.-3 p.m. Sept. 17-18 in the Bldg. 111 Conference Center. Slide show presentations will be at 10 a.m., noon and 2 p.m.

### Sept. 20

**NTA meets:** The National Technical Association will meet at 10 a.m. Sept. 20 at Texas Southern University School of Technology, Rm. 316. For additional information call Pam Denkins at x35272.

### Sept. 18

**Directors meet:** The Space

Family Education board of directors will meet at 11:30 a.m. Sept. 18 in Bldg. 45 Rm. 712D. For more information on this open meeting call Gretchen Thomas at x37664.

### Sept. 24

**Astronomy seminar:** The JSC Astronomy Seminar will meet at noon Sept. 24 in Bldg. 31, Rm. 129. A videotape from Rice Space Physics Colloquium will feature Dr. Patrick Shopbell of Caltech discussion observations with the Keck Telescopes. For more information, call Al Jackson at x35037.

### Sept. 25

**Radio club meets:** The JSC Amateur Radio Club will meet at 6:30 p.m. Sept. 25 at Piccadilly Cafeteria, 2465 Bay Area Blvd. For more information call Larry Dietrich at x39198.

### Oct. 2

**Warning system test:** The site-

wide Employee Warning System will undergo its monthly audio test at noon Oct. 2. For more information call Bob Gaffney at x34249.

### Oct. 14

**NPMA meets:** The National Property Management Association will meet at 5 p.m. Oct. 14 at Robinette and Doyle Caterers, 216 Kirby in Seabrook. Dinner costs \$14. For additional information call Sina Hawsey at x36582.

**Aero club meets:** The Bay Area Aero Club will meet at 7 p.m. Oct. 14 at the Houston Gulf Airport clubhouse at 2750 FM 1266 in League City. For additional information call Larry Hendrickson at x32050.

### Oct. 15

**Safety day:** JSC Safety and Total Health Day will be Oct. 15. All JSC organizations will stand down for discussions and presentations about safety and employee health and well-being.

## NASA Briefs

### NASA hosts Sputnik impact retrospective

NASA's Office of Policy and Plans/History Office will co-sponsor a symposium on Sept. 30-Oct. 1 to examine the impact of Sputnik. Speakers will include Sergei Khrushchev, a professor of international studies at Brown University and Nikita Khrushchev's son, and Eileen Galloway, one of the Congressional staff members involved in NASA's creation. On Oct. 4, 1957, the Soviet Union lofted the first artificial satellite, Sputnik 1, into Earth orbit. This 184-pound, basketball-sized sphere ushered in the era of the space race. Attendance at the symposium is open to the public but seating is limited and early registration is strongly encouraged. There will be a \$30 registration fee. For further information, check the Internet at <http://www.hq.nasa.gov/office/pao/History/sputconf.htm>.

### Ames plans first open house this month

For the first time in its more than 55-year history, NASA's Ames Research Center is opening its doors to the public for a festive Open House on Sept. 20. Visitors to the center will be able to chat with NASA astronauts, take a nine-minute virtual trip across the Martian planetary surface; participate in interactive Mars exploration using the 360-degree images recently returned by the Pathfinder mission; view both a lunar and Mars rock; sign up to send their names to the Moon on the upcoming Lunar Prospector mission; and observe robotics competitions and a Mars rover demonstration. Also featured will be tours of the world's largest wind tunnel; aircraft flybys and stationary displays; a variety of videos and talks about space, Earth and life sciences; and tours of U.S. Space Camp, California.

### NASA tests runway, taxiway safety systems

NASA is demonstrating aircraft technology on the runways and taxiways of Hartsfield-Atlanta International Airport that promises to keep commercial airplane traffic moving safely and efficiently day or night, regardless of visibility. The technology actually is many technologies integrated into one overall system. On the ground is a system of ground surveillance sensors and other equipment developed by the Federal Aviation Administration. On NASA's Boeing 757 research aircraft are the airborne systems and displays. The research program calls for 53 flight tests and demonstrations at Hartsfield-Atlanta to be completed by the end of August. Demonstrations will be to various airline and industry executives, officials of the FAA, and other agencies.

# Major Earth science craft achieves milestone

The first of NASA's Earth Observing System spacecraft, EOS AM-1, has reached a critical milestone with the delivery of its last science instrument, allowing completion of module testing and integration of the instruments and the spacecraft. The last instrument arrived Aug. 25.

EOS AM-1 begins a new generation of Earth science—one that studies the Earth as a global system. EOS will carry a complement of five synergistic instruments. "We're absolutely thrilled to reach this milestone," said Dr. Robert Price, direc-

tor of NASA's Mission to Planet Earth Program Office at Goddard Space Flight Center. "We're now well on our way to having the spacecraft ready for its June 1998 launch."

The next critical step for EOS AM-1 is to complete systems tests that validate the ability of the integrated spacecraft to withstand the harsh environment of space and to work with its ground system. Following that, the spacecraft will be delivered to Vandenberg Air Force Base, Calif., for launch processing.

The EOS AM-1 spacecraft is being assembled and tested by

Lockheed-Martin at its Valley Forge, Pa., production facility.

The EOS series spacecraft are the cornerstone of NASA's Mission to Planet Earth Enterprise, a long-term coordinated research effort to study the Earth as a global system and the effects of natural and human-induced changes on the global environment. EOS AM-1 will use this unique perspective from space to observe the Earth's continents, oceans and atmosphere with five state-of-the-art instruments with measurement capability and accuracy never flown before. This unique

approach enables scientists to study the interactions among these three components of the Earth system, which determine the cycling of water and nutrients on Earth.

"EOS AM-1 will study simultaneously clouds, water vapor, aerosol, particles, trace gases, terrestrial and oceanic properties, the interaction between them and their effect on atmospheric radiation and climate," said Dr. Yoram Kaufman, EOS AM-1 project scientist.

A polar-orbiting spacecraft, EOS is to launch in June aboard an Atlas-Centaur IIAS from Vandenberg AFB.



JSC Photos 97-10909, 97-10907  
**CONGRESSIONAL VISIT**—Members of the Houston Science Committee visit JSC on Aug. 25, inspecting among other things the newly dedicated Neutral Buoyancy Laboratory at the Sonny Carter Training Facility. Top: Rep. Sheila Jackson Lee, (right) D-Texas, receives a briefing from Astronaut Bonnie Dunbar. Bottom: JSC Director George Abbey (left) shows Rep. Vernon Ehlers, R-Mich., the viewing room vantage of the pool used to train astronauts for International Space Station space walks. NASA Deputy Associate Administrator for Legislative Affairs Lynn Heninger accompanied the congressional group, which also included committee staffers Bob Cook, project director; Todd Schultz, chief of staff; and Bob Palmer, minority staff member. NBL Project Manager Cliff Robinson briefed the group.

## JSC contractor earns award for technical, community efforts

(Continued from Page 1)

compliance with equal opportunity regulations, mentoring other small firms, membership in advocacy groups and community outreach.

Dynacs, with offices in Houston and Clearwater, Fla., was formed in April 1985 by Singh, a renowned force in the development and application of advanced technologies to America's space program. Initial research and development concentrated on analytical and computational mechanics, multibody dynamics and advanced control sciences.

By 1988, Dynacs began to support NASA with state-of-the-art multiprocessor-based computer and software technologies, including symbolic equation processing, graphical user interfaces and computer animation. During the 1990s,

Dynacs has expanded its research, development and engineering efforts to include more broad-based engineering services.

Today, the company's NASA work under the Russian Integration, Technical and Administrative Support contract is worth more than \$2.5 million and helps support an employment base of more than 300 workers. The contract's major areas of work include International Space Station Phase 1 Risk Mitigation and advanced technology development, Russian segment engineering and administration, Vehicle Analysis Team and Vehicle Integration Team engineering and administration, business management administration and International Partners Office engineering and administration.

## Foale becomes first American to walk in both U.S., Russian suits

(Continued from Page 1)

inspection, Solovyev indicated that some distortion now exists at the base of the array, which is canted to one side. He confirmed that observation by using a measuring tool to collect data on gaps around the circumference of the base of the array. Flight Director Solovyev said later that the base of the solar array could be a suspect for leakage as a result of the collision. Video of the damaged solar array base taken by Solovyev will provide Russian analysts an opportunity to further study its condition. The crew installed handrails in the vicinity of the damage for use on a possible future space walk.

Solovyev and Foale also moved two of Spektr's undamaged solar arrays to increase their ability to collect solar energy. Solovyev used an extendible pole with a hook on the end to slowly pull the Spektr's fan tail solar array in to an improved orientation. The commander then slowly pushed the main array opposite the damaged array.

Due to time considerations, the

Russians deleted a task designed to cap off a valve on the outside of the Core Module for the future installation of a second carbon dioxide removal system. But Foale was able to retrieve a U.S. radiation detection monitor just before reentering the airlock. The dosimeter was installed by Foale's predecessor, Jerry Linenger, during a space walk he conducted outside the Mir on April 29.

Foale, who is completing his seventeenth week aboard Mir, became the first American to perform EVAs in both Russian and American space suits. He is scheduled to be replaced by Astronaut David Wolf in late September, who will be launched to the Mir with the STS-86 crew aboard *Atlantis*.

The Spektr module lost pressure and was sealed off June 25 after the collision with a Progress resupply vehicle during docking tests.

On Aug. 20 an internal space walk was conducted during which the cosmonaut crew reconnected power cables which had been uncoupled when the Spektr hatch was closed.

## Virus software, signatures available for download

(Continued from Page 1)

One of the best ways to stop the spread is prevention through the installation of virus protection software, Snapp said.

"It's far better to take a conservative approach and kill viruses before they spread," Snapp said.

The Information Systems Directorate provides antivirus software for both Windows and Macintosh computers. The current supported software is Norton Antivirus for the PC and Symantec Antivirus for Macintosh. The current software versions are Norton Antivirus 2.01 for Windows 95, Norton Antivirus 3.10 for Windows for Workgroups, and Symantec Antivirus for Macintosh 4.5.1

On a regular basis, new virus "signatures" are made available for downloading and installation. These

signatures allow the virus software to detect the latest viruses. The signature files for August 1997 are now available.

The current software version for Windows 95 is obtainable from the JSC Information Technology Security web page at <http://www.jsc.nasa.gov/security/alerts/jsconly/virusinfo.html>. Instructions for obtaining the current Macintosh software version is provided on the Information Technology Security web page. Current antivirus software for Windows for Workgroup workstations is not available at this time via the web.

Instructions for installing the software and the latest signature files are provided on the web page.

Although the vendor has a web site that can be connected to directly obtain signature file updates, Snapp

recommended that JSC users not use that site. In the past year, on at least two different occasions, the files being released via the vendor web site had problems that were detected and remedied in the quality acceptance test at JSC.

In addition, ISD is working to have the latest virus software and signature files automatically installed on all Windows computers through the new Systems Management Server.

In spite of these efforts, viruses will continue to be found on JSC computers. And even though about 19 percent are false alarms, Snapp encouraged all users to report any suspected infection.

"Don't be afraid to report a virus if you think you have one," Snapp said. "We would far rather respond and find that you don't have a problem than ignore a real virus. These

days with macro viruses, one user can infect a lot of people merely by sending an infected E-mail attachment."

A recent change to the JSC baseline configuration of JSC antivirus software has made it possible for most users to avoid lengthy delays waiting for assistance. Now, when the software detects a virus, the user has the option to repair the virus. It is important for users repairing their own viruses to report to the virus response team that they have done so. This report can be made easily by sending an E-mail message to VRT. The only information that is needed in the E-mail is the name of the virus, the user's name, phone number, and organization.

Virus reports also may be phoned in to the ISD Help Desk at x34800.



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