



Welsh students spend summer at JSC learning space career options. Story on Page 3.



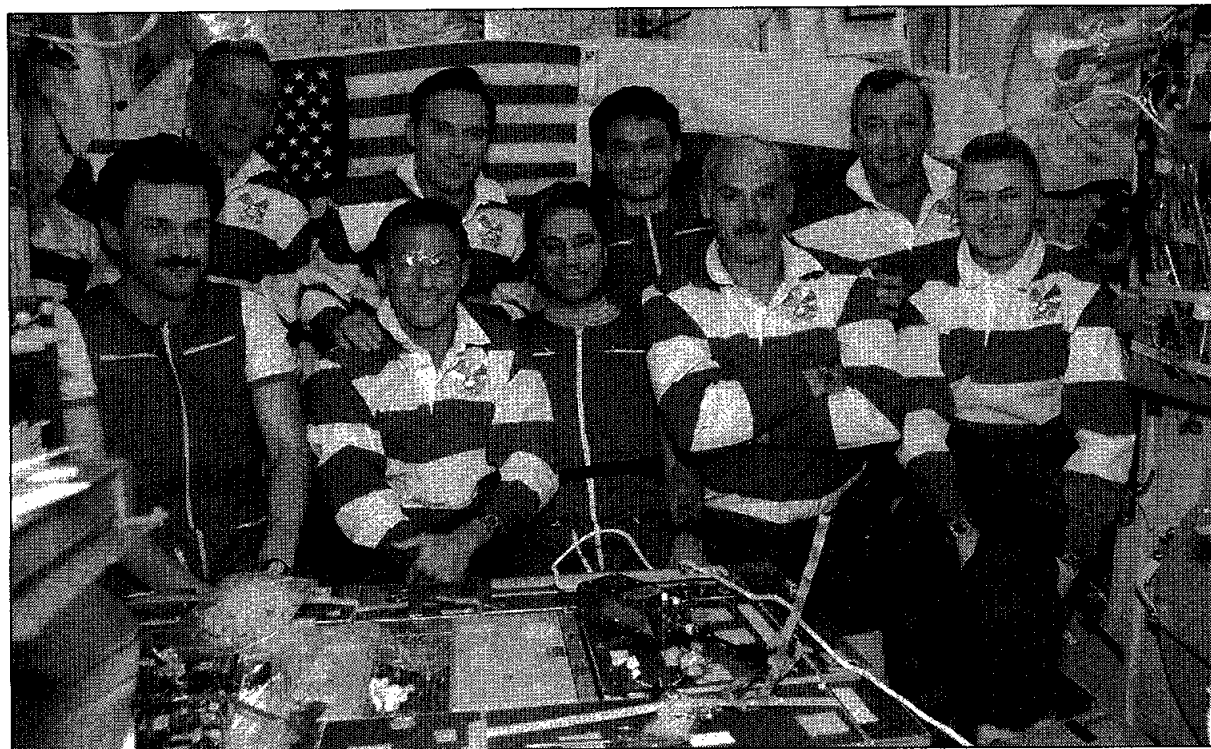
The tiny Mars traveler, Sojourner, is being prepared for launch. Photo on Page 4.

Space News Roundup

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NASA Photo

STS-79 and Mir-22 astronauts and cosmonauts pose for final group portrait aboard Mir's core module before going their separate ways in Earth orbit. Front row, left to right, are Alexander Kaleri, Jay Apt, John Blaha, Bill Readdy and Shannon Lucid. On the back row are, left to right, Tom Akers, Carl Walz, Valery Korzun and Terry Wilcutt. Note that Blaha, the new American aboard Mir, is wearing the uniform of that crew and Lucid's garment is uniform with the STS-79 astronauts.

Lucid bids Mir farewell; Blaha stays

With Shannon Lucid safely aboard the Space Shuttle *Atlantis* and fellow American John Blaha settling in on Mir, the crew of STS-79 broke formation with the Russian space station Monday and headed for home.

Lucid's six-month stay in orbit was scheduled to end Thursday at 188 days and establish her as the American duration record holder and the world's female record holder.

"Dar Vidanya," or goodbye in Russian, were Lucid's last words to her Mir 22 crewmates and Blaha.

"You look great," Blaha said "You look great," Blaha radioed back from Mir.

Lucid was expected to feel weak, nauseous, tired and heavier than normal after returning to Earth's gravity, said Dr. Roger Billica, JSC's chief of medical operations.

Doctors planned a full battery of tests after landing and monitoring of her health for some time, Billica said, but that they aim to get her home with her family as soon as possible.

She said in on-orbit interviews that she is looking forward to cleaning up, sampling some "gooey treats" and sitting in her favorite chair and talking with her family.

"I haven't had a shower since March 22nd," she said "The guys say I don't smell too bad."

Landing was scheduled for 7:13 a.m. CDT Thursday at Kennedy Space Center, but because one of the shuttle's three auxiliary power units failed shortly after *Atlantis*

reached orbit, mission managers were watching weather conditions closely and were ready to land at Edwards Air Force Base, Calif., if necessary. Landing weather rules were tightened because of the failure in a redundant system that provides hydraulic power to the aerodynamic surfaces used to guide the space plane through the atmosphere.

Last week's rendezvous and docking went flawlessly, and within hours of the hatch opening, Blaha and Lucid had formally swapped places aboard Mir. Blaha is scheduled to remain on Mir for four months, until Jerry Linenger arrives to replace him in January.

"What this mission is about is ends and beginnings, and conflicting emotions that affect all of us here," Commander Bill Readdy said before undocking. "Beginnings" because it begins John's flight...and 'endings' because it ends Shannon's record-setting flight, six months on orbit.

"We'd obviously like to stay. Every time we go past a window and see the Mir, it's an awesome sight. Every time we float down one of the passageways into the hatch and see one of our Russian colleagues working together with a member of our crew, it's a joy to behold."

Readdy flew the orbiter manually through the final 2,000 feet and finished the docking at 10:13 p.m. Wednesday, within seconds of the

Please see **STS-79**, Page 4



Shuttle study holds potential for Earth-bound problems

The experiment's name conjures up images of Hollywood and the stars, but it really seeks solutions to many down-to-Earth problems.

It's called MGM because it studies the Mechanics of Granular Materials—the interaction of large numbers of such objects, ranging in size from a grain of sand to a boulder.

For decades, researchers seeking to unravel the behavior of these materials have been hampered by Earth's gravity. However, astronauts aboard *Atlantis* during the past 10 days took advantage of the micro-

gravity environment to study what happens to granular materials under low stress. Working with scientists at Marshall Space Flight Center, *Atlantis*' astronauts examined materials in simulated conditions that typically are present when granular systems deform or collapse.

One common example of MGM is a bag of vacuum-packed coffee. As air presses on the package from the outside, coffee grains are pushed together inside the package and lock each other in place. These collective forces create a brick-like object.

However, once the package is ripped open, releasing the pressures, the coffee's grain assembly becomes very weak and soft, moving about freely—much like a liquid.

Soil and other granular materials behave in much the same way, demonstrating a fundamental aspect of granular mechanics: a single shift in conditions can markedly change the properties of bulk material.

To understand how such granular materials behave under low stresses, *Atlantis*' crew and researchers Please see **EXPERIMENTS**, Page 4

NASA, JSC adopt streamlined performance appraisal system

JSC is about to implement a new two-level performance appraisal system for civil servants that takes advantage of changes in federal law to focus on objectives and results rather than the review process.

The changes cleared the way for agencies to design their own performance management systems, and NASA has adopted the Employee Performance Communication System. When revamping the system,

NASA sought to link individual performance with organizational goals.

NASA's new system also focuses more on the entire system of performance management, performance planning, career development and employee recognition and less on rating labels and cumbersome documentation requirements.

"JSC has been involved in a number of efforts within the agency to help reshape the performance man-

agement system," JSC Deputy Human Resources Director Greg Hayes said. "We're happy to see that many of the ideas we brought forward are being adopted in this new plan."

The new system, recommended by an agencywide team, still relies on critical job elements to assess employee performance. But, paperwork is significantly reduced and supervisors assign only two rating

levels, "Meets or Exceeds Expectations" or "Unacceptable." Reviews emphasize effective two-way communication rather than procedures.

To further enhance the program, employees will be appraised on their "anniversary" dates — the date they began working at JSC. This change is intended to keep supervisors from having to complete all performance appraisals once a year and allow them to conduct individually tailored

performance assessments and developmental discussions.

"This has less overhead and it is more focused on objectives and results than it is on process. It eliminates a lot of the focus that has been placed on the 'adjective rating' (outstanding, highly successful, etc.) itself and will allow us to put more emphasis on the future development of employees," Hayes explained.

Please see **PERFORMANCE**, Page 4

Vehicle decal deadline approaching quickly

Employees who have not obtained a new vehicle decal will not be able to gain access to JSC after Monday's deadline without first making a stop at Bldg. 110.

Employees may request a maximum of three decals by presenting a completed JSC Form 1572, Vehicle Registration Record, available at the badge offices in



Bldgs. 30, 110, the reception desk in Bldg. 1 and contractor security offices. A valid permanent badge and driver's license will be required to obtain new decals, along with the year, make, model, color, license plate number and state in which the

vehicle is registered.

New decals are available at Bldg. 110 from 7:30 a.m.-5 p.m., Monday-Thursday and from 7:30 a.m.-noon on Friday. Temporary decal passes are issued from 6:30 a.m.-11 p.m. daily at Bldg. 110. After these hours, employees may obtain temporary vehicle passes from the security officer at

Gate 1.

Beginning Oct. 1, current decals will be obsolete. Employees no longer will be able to show a badge or display an obsolete decal to gain entry into JSC. For more information call x32112.



NASA Photo

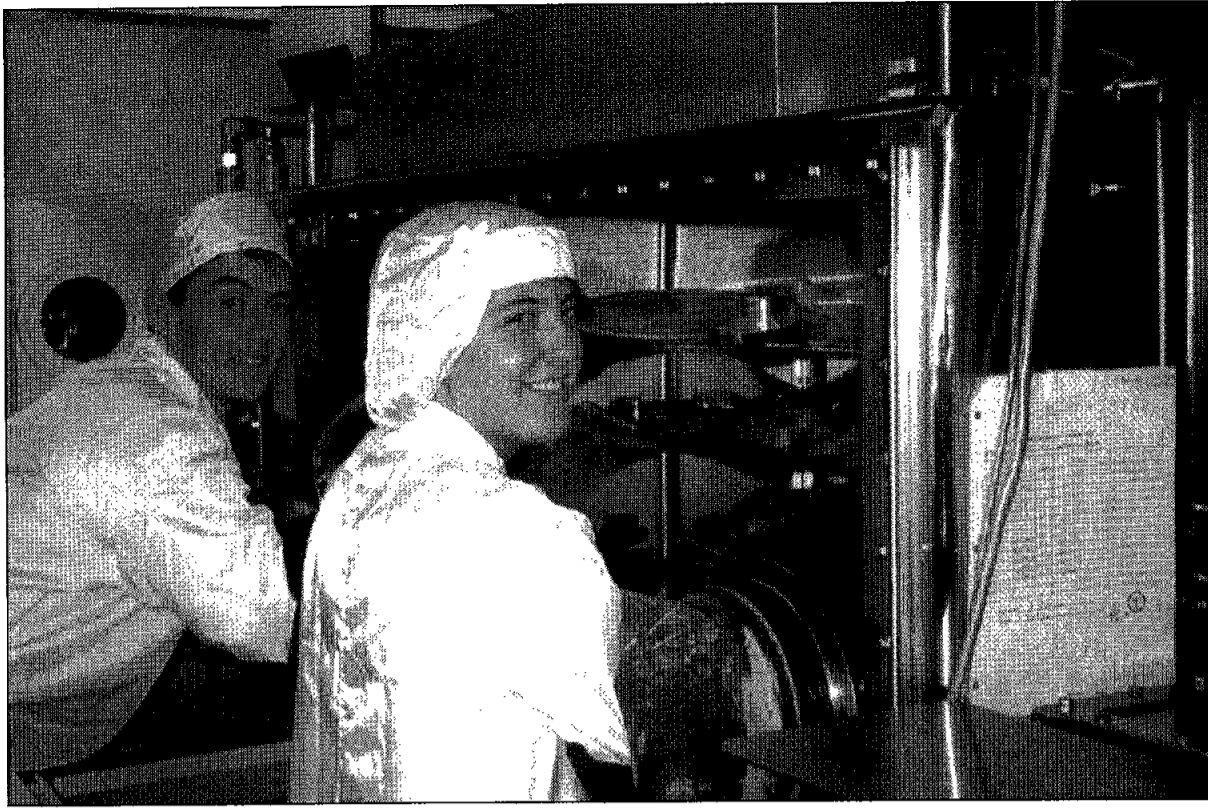
STS-79 Mission Specialist Shannon Lucid checks wheat plants growing on the Russian Mir Space Station. Lucid returns to JSC today after spending more than 180 days in space aboard the Russian outpost.

Crew returns this afternoon at Hangar 276

The STS-79 crew is scheduled to return home today at Ellington Field, but employees planning to attend need to note that the ceremony will not be at the usual location.

Today's ceremonies will be at the NASA Aircraft Operations Hangar 276, at the south end of the Ellington runway, instead of Hangar 990.

STS-79 Commander Bill Readdy, Pilot Terry Wilcutt, Mission Specialists Jay Apt, Tom Akers, Carl Walz and Shannon Lucid will return to Houston early to mid-afternoon on Friday. Lucid will return with her crewmates, but her participation in the event will depend on her condition. The crew return activities will be carried live on NASA Television. For details, call x36765.



Space Students

High school students from Wales visit JSC, learn space science

By Natasha Calder

Employees around JSC opened their doors this summer to Welsh students as part of the International Space School Foundation's space scholarship program, and provided an insight into space to future scientists.

The ISSF program is a cooperative project intended to share the tangible scientific benefits of NASA's space programs with the international high school community in an attempt to get students excited about the benefits of space travel and related educational spin-offs. The program has attracted attention from local space related institutions and organizations, as well as the JSC community.

The enthusiastic endorsement of the program gave Mary Fairclough and Gordon Smith, seniors at Stanwell high school in Penarth, South Wales, the opportunity to observe the day-to-day operations of JSC, its contractors and Space Center Houston for a week in August. Both said the experience was enjoyable as well as inspiring.

"I feel incredibly fortunate to have had the opportunity to visit the Clear Lake area and its space community," Fairclough said. "The visits to the Johnson Space Center and the various contractors allowed me to see first hand the workings of such an effective and sophisticated organization such as NASA. During my three weeks in Houston, I have learned a tremendous amount which will be of great value to me, both immediately in my current studies, and also, perhaps more importantly, of use to me in higher education and future employment."

"I am extremely pleased to have taken part in what I feel to be the most exciting and stimulating three weeks of my life," Smith said. "I am grateful to the program

for inspiring me to continue my studies with even greater enthusiasm."

Fairclough and Smith had the added pleasure of being present at JSC at a time when the announcement of possible life on Mars was released. The students sat in on the press conference Aug. 7, and were given the opportunity to visit the lunar sample labs and examine various moon rocks and Martian meteorites.

"It was tremendous for me to have witnessed after so long, science fiction becoming science fact," Smith said. "We

were able to be at the press conference, where we learned close hand how much new information a fist-sized rock could yield to our understanding of Mars."

Another highlight for the foreign visitors was a presentation by Astronaut John Young on his experiences and hopes for the future of space travel. "Young seemed to personify the

general excitement all NASA workers feel for the current work they are doing, and the plans they have for the future," Fairclough said.

The students were able to experience other areas of NASA with the help of other students working on site as cooperative education students. By shadowing various co-op students throughout the week, Fairclough and Smith were given some in-depth tours into various areas of interest around the center, like the Biology Laboratories, the Crew and Thermal Systems Division and the Regenerative Life Support Area.

"The combination of these experiences has helped me put together in my mind the values of my schoolwork and how it has a relevance and application in the real world," Smith said.

"Of the most practical use to me in my current studies was the visit to the Biochemistry department," Fairclough said. "I was fascinated by the hands-on

research being carried out both there and in many other departments at NASA as well."

Other areas that opened doors to the students were the Plasma Rocket Propulsion Laboratory, Robotics Laboratory, Manufacturing Workshops, Life Support System Laboratory, the new Weightless Environment Training Facility, Ellington Field and Mission Control, among others.

"I was particularly impressed by the attitude of the employees that I saw at NASA, both the workers and the co-op students," Fairclough said. "The sense of teamwork was particularly strong. Everyone who I met showed a real delight in their work and a pride that every task is part of the whole that makes the

space program work. The working atmosphere was one that I had never experienced before — friendly and welcoming, yet extremely efficient and conducive to working."

Fairclough and Smith also found time to enjoy some of the local culture around the JSC area, learning how to row in Clear Lake, and compare the latest in music, movies and sports during a co-op lunch off site. The two also had the opportunity to work as camp councilors at Space Center Houston and visit the Natural History Museum, among other activities.

The ISSF which made Fairclough's and Smith's experiences possible is the brain child of local business owners Geoff and Annette Mules, who also originate from Penarth. The Mule's non-profit foundation, now in its third year, aims to provide pre-collegiate students, selected by open competition, with an understanding of the space industry through work shadow, class room sessions and site visits. The program also promotes an appreciation for the international collaboration neces-

sary for penetrating the expansive opportunities of space exploration and research. To this end, the Mules intend to expand the program next year to accommodate 32 young adults from 16 countries for three weeks each summer.

The Mules hope to expand the program to include local universities and additional institutional resources. Currently, the three week program is broken down into a week spent in core lectures with industry field trips, a second week spent in specialized lectures and a hands-on

design/research project, and a third week spent with the students taking a turn at teaching elementary school children about space at Space Center Houston.

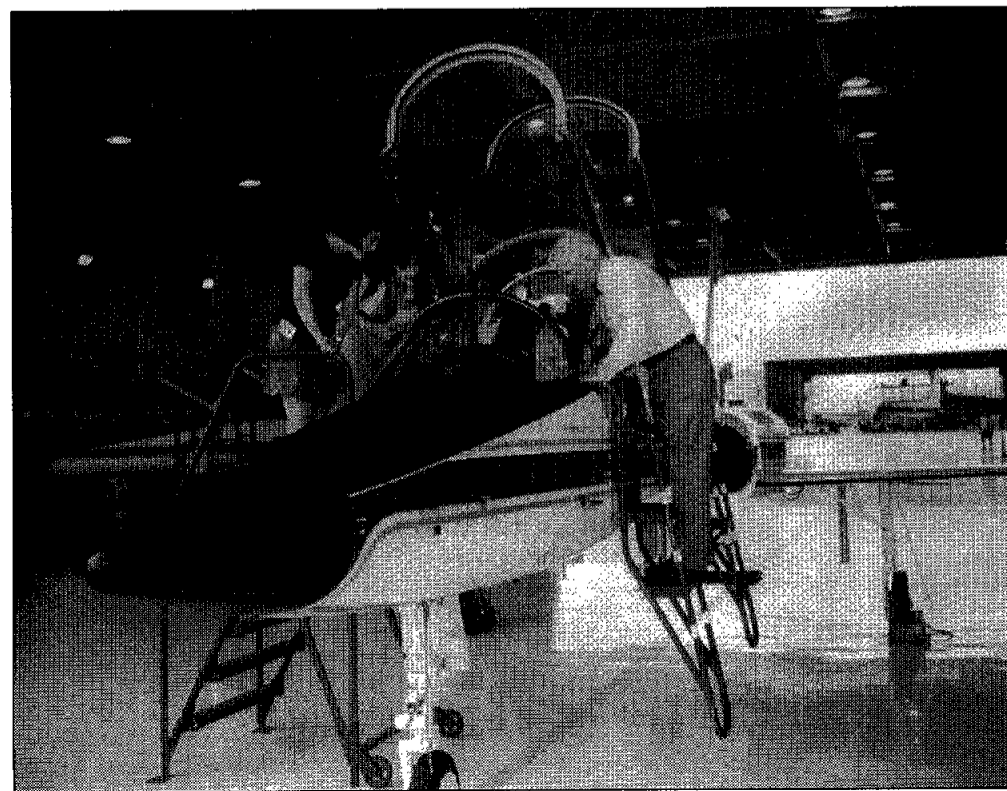
As for Fairclough and Smith, they have returned to South Wales after

their three weeks in the program with a fresh and well informed perspective on the nature and importance of NASA, together with a new sense of purpose in their own lives. The students will never forget their experiences at JSC, and it could well inspire them both to work for a career in space research and space technology.

"I am aware how few students of my age have the opportunity to observe so many different components of the space program in action," Fairclough said. "My experiences have really opened my eyes to the exciting and vital practical applications of science and technology."

"These three weeks have given me not only a greater understanding into the working's of NASA's scientists, but also the most memorable and exciting time of my life," Smith said. "I know how fortunate I am to have been part of this program, and only hope that future students will enjoy the experience as much as I have."

For more information on the ISSF program, call Geoff Mules at 472-7114. □



From top to bottom, left to right: 1) From left, Welsh students Gordon Smith and Mary Fairclough check out lunar samples. The students spent two weeks at JSC learning career options of the space industry. 2) Fairclough examines the Mars meteorite. The students were able to take part in the announcement of possible life on Mars by attending press briefings in Bldg. 2. 3) Tours include a hands-on tour of Ellington Field. From left Fairclough and sponsor Anya Richards examine a T-38 while Doug Bratt of Dynacorp explains the cockpit layout. 4) From left, sponsor Geoff Mules, Fairclough, Bratt, sponsor Annette Mules, Richards and Smith take time out during the Ellington Field tour.

SCH wages war against waste with new exhibit

Space Center Houston will open a new exhibit Saturday designed to teach kids and their parents how to make Earth a greener, cleaner, safer place to live.

EarthQuest will take visitors on an interactive adventure through today's environment from inside a giant video game. Children who visit the exhibit will walk through a 10-foot television screen, step into video games and use lasers to fight a battle against the red-eyed, evil waste monster Toxicus, a villain composed entirely of garbage.

EarthQuest presents children and adults with many ideas for making everyday environmentally friendly choices in an effort to protect our most precious resource — planet

Earth. The exhibit teaches children to begin making conscious choices to protect not only the environment today, but their future on Earth as well.

EarthQuest visitors are immediately met by J.D., a friendly robotic junkyard dog who enlists their help to defeat Toxicus. To win the game, visitors must travel through each of EarthQuest's five zones: neighborhood, home, shopping, transportation and recycling. Each zone is a realistic simulation containing actual environmental problems and suggestions on how the problems can be solved.

The Neighborhood Zone depicts a residential street on trash pick-up day, with

examples of how much garbage an individual produces in an average day or week, and a scavenger hunt locates recyclable "treasures" which can be recycled.

The Home Zone demonstrates how a household can run more efficiently and with less waste of Earth's natural resources by showing how certain products use more energy than others, while the Shopping Zone teaches visitors which products are Earth-friendly in terms of packaging, content and recycling. In the Transportation Zone, interactive video selections teach guests about alternative fuels that can be used to save the Earth's resources and create less pollution.

The Recycle Zone features a hands-on recycling activity that teaches kids how to sort glass, plastic, aluminum and paper. A video teaches the principles of how these used materials are turned into recycled products. Visitors finish their EarthQuest experience in the End Zone, where they are faced with the challenge of destroying Toxicus, by challenging visitors to identify and zap landfill items that could have been reused, reduced or recycled.

EarthQuest will be showcased at SCH through January 1997, and admission into the exhibit is free with the cost of admission. For more information call Space Center Houston at 244-2100.

JSC awards translation contract

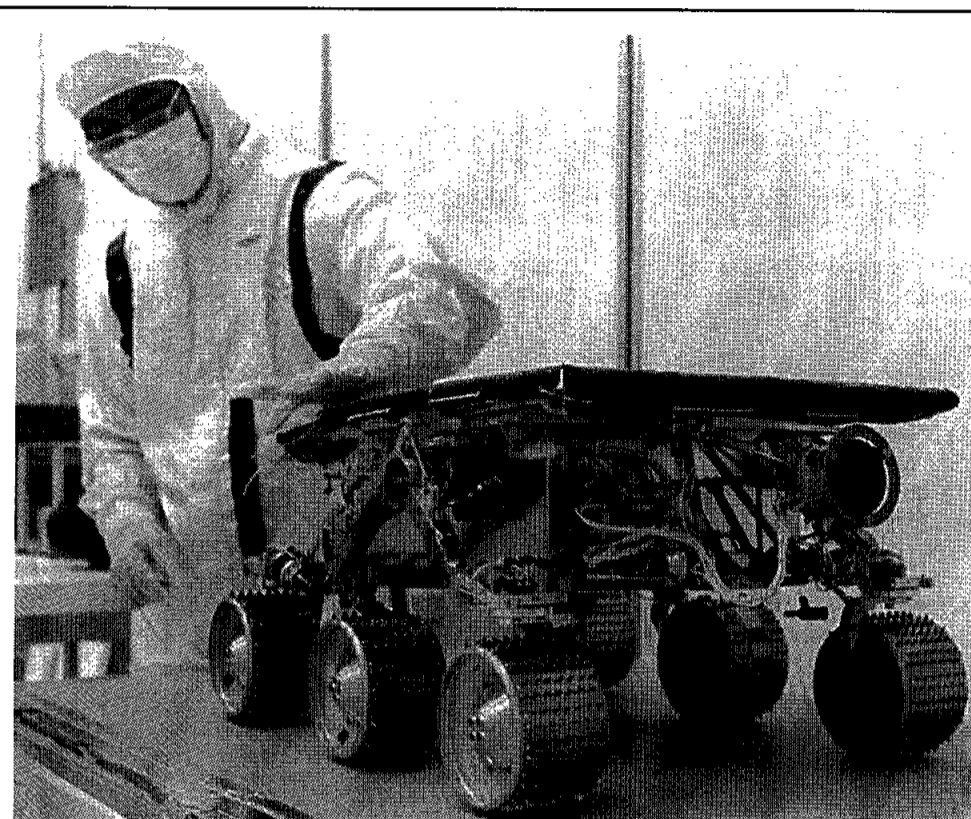
JSC has selected TechTrans International, Inc., for a six-year, \$39 million contract to provide Russian language and logistics services.

TTI will provide Russian language interpretation, translation, language training and logistics services to JSC. The cost and fee awarded in the six-year contract is divided into a three-year base period and three one-year option periods. NASA and the Russian Space Agency are currently cooperating in an international program leading to the development of the International Space Station.

Halloween dance tickets on sale

The Employee Activities Association will host a Halloween dance Oct. 26 at the Gilruth Center.

The Southern Cross Band will perform and costumes are encouraged. Tickets are on sale through Oct. 23 at the Exchange Store at a cost of \$15, which includes dinner. For more information contact Mavis Ikenhans at 244-9644.



NASA Photo
MARS TRAVELER—Sojourner, the small 25-pound, six-wheeled robotic explorer is now being readied for launch at Kennedy Space Center's spacecraft assembly and encapsulation facility. The Mars Pathfinder is expected to launch Dec. 2. The 11-inch rover will be deployed to roam across an ancient Martian flood plain after the Mars Pathfinder lander touches down on the planet's surface July 4, 1997.

Seminars offer look at ISO 9000 standards, plan

A series of four one-hour ISO 9000 awareness seminars are being offered to help acquaint NASA and contractor employees with the quality standards and the ISO implementation effort at JSC.

All NASA and contractor employees are welcome to attend one of the Teague Auditorium sessions, which will be from 8:30 -9:30 a.m. and 10-11 a.m. Oct. 7 and from 8:30-9:30 a.m. and 10-11 a.m. Oct. 9.

"These short seminars will help build awareness about what ISO is and the center's implementation plan," said Glen Van Zandt of the Human Resource Development Branch. "In the weeks following, we'll be providing further training in areas such as auditing and documentation for those that need it."

The training courses follow on the heels of the establishment of the ISO 9000 Project Office. This office—headed by Director Charlie Harlan—brings a top-level focus to the center's effort to become certified to the ISO 9000 family of standards. The new office will be responsible for managing JSC's transition from the current NASA Quality Management System to the internationally recognized ISO 9000 standards, with third party certification expected in about one year.

There is no need to "sign-up" to attend a session. For more information about the seminars, call Glen Van Zandt at x33069.

Retirement program deadline approaches

The Careers Plus+ Retirement Program, designed to give retirement eligible employees more options to consider when making retirement decisions, is scheduled to end on Thursday.

Employees who wish to take advantage of one of the Careers Plus+ options must make all preparations to retire by Thursday. However, to accommodate as many retirement eligible workers as possible, employees who have signed work/service agreements in place before Thursday may establish actual retirement dates as late as Jan. 3.

The program, which has been in place since last February, has received positive feedback from those eligible to retire and, to date, 27 employees have retired under one of the Careers Plus+ options. For more information contact a Human Resource representative at x36251 or Employee Services at x32681.

NASA instrument snaps global ozone image

Daily global mapping of the Earth's ozone layer from space has resumed with the acquisition of the first image from the U.S. Total Ozone Mapping Spectrometer instrument aboard the Japanese Advanced Earth Observing Satellite earlier this month.

"We are extremely pleased with the quality of this first image" said P. K. Bhartia, TOMS project scientist at Goddard Space Flight Center. "We're looking forward to continuing our monitoring of the global ozone situation and especially the upcoming season in the Antarctic."

ADEOS continues the series of TOMS total ozone and volcanic sulfur dioxide observations that began with the Nimbus-7 satellite in 1978 and continued through the

operation of a TOMS on a Russian Meteor-3 satellite, until that instrument ceased functioning in December 1994.

Data from another TOMS flying on the launched NASA TOMS-Earth Probe complements the global ADEOS data by providing imagery of atmospheric features related to urban pollution, biomass burning, forest fires, desert dust and small volcanic eruptions, in addition to ozone measurements.

The principal mission of TOMS/ADEOS is to monitor global ozone trends during the period when CFC-related depletion is predicted to be near its maximum.

"Stratospheric concentrations of chlorine from CFC's are expected to peak near the end of the century and then decline as a

result of the Montreal Protocol," said Arlin Krueger, principal investigator for TOMS/ADEOS. "TOMS/ADEOS will help us track this prediction. It also will continue to measure the concentrations of sulfur dioxide in the atmosphere in the wake of volcanic eruptions, thus extending the existing database of more than 100 eruptions."

TOMS complements Japanese instruments on ADEOS. The Improved Limb Atmospheric Sounder measures the vertical profiles of ozone and other gases in polar regions, while the Interferometric Monitor for Greenhouse Gases measures ozone beneath the orbital track, and the Retroreflector In Space determines trace gas profiles as it passes over laser stations.

Performance review to take place on anniversary dates

(Continued from Page 1)

Supervisors immediately will begin establishing new performance plans. Since employees must be under performance plans for 90 days before they may be appraised and supervisors have just completed appraisals for all employees, there will be no appraisals for the remainder of this year. Employees with anniversary dates that fall between Aug. 1 and Dec. 31 will be appraised

on their anniversary dates in 1997. Starting Jan. 1, employees may be appraised according to their anniversary dates once they have been under the new performance plan.

"We've been given the option of how we phase this in, and we want to get on with the implementation," Hayes said. "We have been successful in working out details with the union, and we are going to work together over the next few months to

make sure it is successful."

Employees still will receive a written narrative summary every year, and will sign the performance planning and appraisal form with their supervisors, documenting the planning discussion (at the beginning of the rating period), the progress review (in the middle of the rating period) and the final rating (at the end of the rating period).

"Performance appraisal changes

are only one aspect of this," Hayes added. "What we intend to do is take a broader look at performance management. We intend to come up with some new features in career development and rewards and recognition over the next several months."

To help employees learn more about the new system, representatives from the Human Resources Office will conduct organizational briefings over the next few weeks.

In addition, employee briefings will be held in the Bldg. 30 Auditorium from 1-3 p.m. Wednesday, 9-11 a.m. Friday, and 9-11 a.m. Oct. 17.

Anyone who has questions about the new system should contact their Human Resources Representative at x36251, or call the Human Resources Hotline at x30616. Answers to commonly asked questions are available via the Internet at <http://hro.jsc.nasa.gov/hr>

Experiments may improve Earth soil sites

(Continued from Page 1)

back on Earth studied three dry soil specimens under different pressures. The insights offered may be far-reaching. The results of the set of experiments aboard *Atlantis* and later missions could lead to improved selection and preparation of building sites, better management of undeveloped lands, and improve handling of materials in chemical, agricultural and other industries.

Space News Roundup

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Editor Kelly Humphries
Managing Editor Karen Schmidt
Associate Editor Natasha Calder

STS-79 experiments to help scientists on Earth

(Continued from Page 1)

pre-planned time. Soon after the crew members completed their welcoming ceremony, they went to work, hauling bags of water and other supplies from the shuttle's Spacehab module into the Mir. More than 4,000 pounds of equipment and supplies were transferred to Mir, and another 2,000 pounds of experiment samples were being returned to Earth. Among the equipment transferred were three experiments, the Biotechnology System, the Material in Devices as Superconductors and the Commercial Generic Bioprocessing Apparatus.

Readdy and Pilot Terry Wilcutt released hooks and latches holding *Atlantis* to Mir at 8:33 p.m. CDT Monday, ending the five days of docked operations. After performing a fly-around of the Russian outpost at a distance of about 400 feet, they fired the shuttle's maneuvering jets to separate the two vehicles until *Atlantis*' return in January. Readdy told flight controllers that it was "kind of sad" to be leaving Mir behind.

Throughout the flight, Mission Specialists Jay Apt, Tom Akers and Carl Walz worked with a number of experiments in the first double Spacehab module. Among them

were the Active Rack Isolation System, a prototype of a system designed to dampen the effects of crew movements and thruster firings on sensitive experiments. STS-79 also work with the Mechanics of Granular Materials experiment, which is designed to help scientists understand the effects of compressing and decompressing granular materials. The Extreme Temperature Translation Furnace studied the influence of microgravity on liquid phase sintering of metals at 1,600 degrees Celsius. The experiment could lead to the development of purer alloys.