Quality water
JSC scientists are developing ways to recycle water for use on Space Station Freedom. Story on Page 3.

Shareware it isn’t
Employees who work with computer programs should be careful about sharing them outside the center. Story on Page 4.

Space News Roundup
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Atlantis crew deposits DRS; returns science
By Kelly Humphries
With a fourth Tracking and Data Relay Satellite (DRS) successfully deposited on orbit and volumes of science data on record, the crew of Atlantis will soon begin preparing for its first planned Florida landing in six years. Commander John Blaha, Pilot Mike Baker and Mission Specialist Shannon Lucid reacted with a thumbs-up as Pilot Mike Baker and Mission Specialist David Low congratulated her for setting a record as the woman with the greatest number of space flights — three. By the end of the mission, she should also be the woman with the most hours in orbit, about 900.

Achieving excellence in space
Panel to look at human resources perspective

Human resources managers from JSC and several of its top aerospace contractors will gather next Friday in Teague Auditorium to discuss how personnel planning and organizational development will affect the quality of work at the Space Station. By the end of the mission, the panelists will have gathered next Friday in Teague Auditorium to discuss the importance of human resources to the success of the station.

Shuttle integration combines three offices into two
By James Hursfield
To streamline operations and better suit the space shuttle launch manifest in place, the Space Shuttle Integration and Operations Office has been reorganized.

The theme of the panel discussion, sponsored by JSC’s Pacific Space Operations Program, is “Achieving Excellence in Space Activities: The Human Resources Perspective.”

Participants will include Harvey Hartman, JSC director of Human Resources; Brian E. Delain, director of Personnel Planning and Organizational Development for Loral Space Systems; Dennis Carvalho, director of Quality Systems and Human Resources for McDonnell Douglas Space Systems; Eugene H. Clay, manager of the Human Resources Program at Lockheed Engineering and Sciences; Patricia J. Dunn, director of Human Resources and Affirmative Action at McDonnell Douglas; and Dean Richman, manager of Training and Development for USN/USAF.

A cultural program, including ethnic dances, music and a presentation of traditional dress by Asian Pacific ethnic groups, will follow the panel discussion.

All JSC employees are invited to attend as their work loads permit.

Shuttle station evolution begins today, Lenoir tells conference
By Kyle Herring
As expected, the launch of the 13th Space Shuttle mission from KSC today was delayed, but so was the news that the shuttle will be carrying a new technology.

The new technology, called the Earth Observing System (EOS), is designed to allow scientists to track the Earth’s resources from space. Scientists are developing 18 sensors to measure various aspects of the Earth’s surface, including vegetation, water, and pollution.

The EOS mission will be the first time that this type of technology has been flown on a shuttle mission.

NASA scientists are developing ways to recycle water for use on Space Station Freedom. Story on Page 3.

JSC updates space station work package
By Pam Allaway
JSC has updated its agreement with McDonnell Douglas Space Systems Co., for the Space Station Freedom Work Package 2 design, development, test and evaluation contract. The most notable change is the contract to include the results of the Space Station Freedom Program review activities of 1989 and 1988. The Huntington Beach, Calif., company will also reorganize its requirements changes resulting from the Program Review of 1988, and the Program Technical Audit and Space Station Freedom Program Configuration Budget Review of 1989.

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STS-43 Mission Specialist Shannon Lucid reacts with a thumbs-up as Pilot Mike Baker and Mission Specialist David Low congratulated her for setting a record as the woman with the greatest number of space flights — three.

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Daly rates, Magdi Yassa, x38470 or 486- '84 Honda XL200R, good cond, $500. Frank, Want Yamaha "Wave Runner" dead or alive. Don, Marlin 30-30 lever

Glorilh Center News

Sign up policy—All classes and athletic activities are first come, first served. No EAA membership card. Classes tend to fill four weeks in advance. For more information call 734-6532.

Defensive driving—Course is offered from 8 a.m.-5 p.m., Oct. 15 or Nov. 17. Adult (1) $15.95; (2) $20.95; child under 4 feet, $14.95. NASA Spirit Week: Jan. 4-7, Big Sky Montana Resort includes airfare, shuttle transportation, accommodations, entry fee, and breakfast. Call 340-4799.

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When astronauts wet their whistles on space station, it'll be as pure as at home

By Billie Deason

When Space Station Freedom astronauts pause for a drink of water, they'll know it's as pure as what they drink at home on Earth.

In time, NASA's work in recycling water could help increase the world's supply of clean drinking water and extend to other worlds when humans begin inhabiting lunar and Mars bases.

"Our standards for the recycled water on Space Station Freedom emulate the Environmental Protection Agency's requirements for potable, or drinking, water in the United States," said Dick Sauer, JSC's water quality manager in Space and Life Sciences' Medical Sciences Division.

Water quality is JSC's responsibility in the Work Package 2 Environmental Health System, one of three major components of Freedom's Crew Health Care System. JSC has established agencywide purity and monitoring requirements for all water systems used in the space program.

In partnership with Work Package 1, JSC's water experts reviewed test protocols and evaluated the procedures from medical and bioenvironmental engineering perspectives.

The Marshall Space Flight Center's Work Package 1 is responsible for developing and building the water recycling system itself as part of its overall role to develop a total Life Support System for the space station.

During the recently completed restructuring effort, the water system for Space Station Freedom was converted from a two-loop system that kept drinking water separate from humidity condenser water.

"The structure combined those two loops so that now we have only one water quality," Sauer said. "It's all potable quality. The closed-loop water recycling system will take humidity condensate — the moisture recovered from human breathing and perspiration — urine, and wash water and process them streams into one type of water.

"Urine is pre-processed by running it through a vacuum compression distillation unit, which is actually a rotating still. The distillate from that process is blended with humidity condensate and wash water and put through multimedia absorption beds which include filtration, ion exchange and granular activated carbon. Iodine is then added to provide microbiological control. Prior to consumption, the water stays in a tank for a specified time. That product water is edible," Sauer said.

As part of the planned Water Recovery Test, MSFC and its Work Package 1 prime contractor, Boeing, recently conducted taste tests of the potable product water recycled from humidity condensate.

Tasters rated two water samples without knowing whether they were testing recycled water, tap water or samples of both.

The recycled water earned high marks with at least one tester rating it higher than his tap water sample.

"Test subjects were medically screened before the project began to ensure they were without significant medical problems and physically able to participate in the exercise program we require," said Dr. Paul Hornyak, JSC's medical officer overseeing the Water Recovery Test.

Over the past several months, volunteers have tasted and washed in reprocessed water that they "donated" to the program in a special facility at MSFC built to simulate conditions on Freedom.

The to-be-recycled waste water was generated daily by volunteers participating in strenuous exercise, washing their exercise clothing and showering. The humidity within the facility is condensed and used as the source water for the potable water.

"The next phase of testing, called stage savers, will implement the single closed loop that puts urine, hygiene water and humidity condensate together to become potable water," Hornyak said. "We don't expect any major problems. We've been able consistently to meet most specifications of the two-loop system.

"For the psychological concerns, we have presented information to crew representatives and they have no reservations about drinking the water.

"The Denver, Colorado, municipal water department has done some work where they used waste water as a source for potable water. Their surveys indicated that if you show the water is equivalent to what they're using at home — not better, just equivalent — customers have a fairly good level of acceptance," Hornyak said.

"After all, we're all drinking the same water dinosaurs drank 65 million years ago. There's no new water being made."

— Dick Sauer
JSC water quality manager

A car camping trip provides a fascinating view of the water recycling system in operation. MSFC's work involves the design and construction of two closed-loop systems, which will have to perform up to levels that meet EPA procedures designed to find compounds that you'd find on Earth resulting from agricultural runoff and industrial processes.

"So the types of potential chemicals that end up in potable water on the ground are probably entirely different from the ones we might find in space flight because the source water — humidity condensate, urine and hypurene water — will be so much more concentrated than the source water used for terrestrial potable water.

The microbial quality of the water might be entirely different as well because of the closed loop environment we have," Sauer said.

Sauer expects the intensive testing of the closed-loop system in the early PMC phase may turn up some unexpected findings. Work Package 1 is responsible for the on-line instruments that will continuously analyze the water as it is recycled.

"It's like process control information. It immediately tells you if you have a problem," Sauer said.

Work Package 2 is developing the off-line instruments that perform thorough, medically oriented analyses.

"We laid that initial on-orbit operation of the closed-loop system as the critical period," said John Straub, water quality engineer for Krug Life Sciences, the support contractor for Medical Sciences Division's water laboratory.

"During the early checkout of the closed-loop system, in-depth water analyses will be conducted daily. Once the medical experts learn how well the equipment is operating and have reliable data proving its ability to meet water purity standards, the detailed testing and reduced daily testing will become a regular maintenance task on Freedom."

"We're not able to test on the ground under microgravity conditions. Why that's critical during that system start up point to do the kind of monitoring we have planned," Straub said.

Both Hornyak and Sauer foresee benefits for the general public from the water recycling system.

"Krug believes that recycling companies could effectively use direct water recycling techniques while Sauer sees NASA as the leader in applying direct water recycling techniques thereby creating acceptance for re-used water here on Earth.
Abbey returns to JSC after Headquarters stint

George W. Abbey, former director of Flight Crew Operations, has rejoined JSC as Director of Commercial Space Programs, after a period at NASA Headquarters in Washington, D.C., where he was Deputy Associate Administrator for Commercial Space, and then as deputy for operations of the Space Shuttle Program. Abbey’s most recent assignment was as the senior director for civil space programs in the National Space Council in Washington, D.C.

Womack accepts position in Space and Life Sciences

W. Dan Womack has been appointed assistant to the director for space shuttle in the Space and Life Sciences Directorate.

Belt tightening closes JSC Supply Warehouse

The JSC Supply Warehouse closed Monday because of budget uncertainties and severe restrictions that have been imposed, warehouse officials said. It will remain closed until Oct. 1, start of the next fiscal year. Center Operations Deputy Director Grady McNight said that with the exception of standard-sized copy paper, all requests will be returned to originators without authorization. Any exceptions must be considered on a case-by-case basis, and must have the approval of the user's organization director and the director of the Center Operations.

People

Sciences Directorate activities in the Space Shuttle Program. His most recent assignment was as mission manager for Spacelab Life Sciences-1 on STS-40, the first mission dedicated to life sciences.

Another experiment that added to "Sea Dolly" was "Just this morning, John and I were looking out the window, and I noticed a spectacular television measurement of the atmosphere’s emissions. We turned the camera on site and captured a view as we turned the camera on site."

The Four Tracking and Data Relay Satellite in the communications constellation, 100 miles away from the Johnson Space Center, has received its first full deployment since its launch.

The fourth Tracking and Data Relay Satellite is in geosynchronous orbit at 174 degrees west longitude.

Computer programs developed at JSC aren’t share-ware

By Pam Alloway

JSC and contractor employees who work with JSC computer programs should be careful to not talk about sharing programs with non-JSC organizations, according to a computer program director.

Computer programs that are likely to be useful to organizations other than NASA should not be submitted to CSSM or CSSM for the division, and as the lead training coordinator for the SMAC Office.

JSC offers programming from Computer Channel

Starting today, the Human Resources Development Branch, the Information Systems Directorate and the Telecommunications Office will begin offering educational programming from The Computer Channel.

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STS-43 crew photographs hurricanes

(Continued from Page 1)

Shifting with the technolog-advancements of the space program and we’ve applied them to improving the lives of people and improving the lives of the people human beings on the Earth," he said. "The JSC Supply Warehouse had been in space a third time, just in time, just in time, just in time, I remind me as I watch David and Bakes, Shannon and Jim go up to the space station. It’s been so long, but they’re doing, how important space flight is, but I think that’s the lesson that we could learn if we could be here for a full-time basis," he added. "Of course, in the next decade we plan to do that with our space station in partnership with the Japanese and the Europeans. With all those international organizations working together, who knows what the world looks like in 2020, that might occur in that decade?"

Another experiment that added to the know the JSC Supply Warehouse is the "Sea Dolly" shuttle flight, but it was called the "Sea Dolly" flight. The JSC Supply Warehouse was up to the space station, and they were doing, how important space flight is, but I think that’s the lesson that we could learn, if we could be here for a full-time basis."

This program is real and it’s moving

(Continued from Page 1) and we’re looking at what’s happened to the people we have seen, but I have said that through the past year or so the space station and the space shuttle programs have been very successful," Cohen added.

On completion of the preliminary design review in July and station facilities construction projects coming on-stream, Center Operations Deputy Director Grady McNight said, "This is not a paper program. It’s a real program. It’s moving and it’s going to be done."

"The goal was to get a shot at getting started and then let’s go. We’re going to discover the questions early in the program, evolve and answer them," Lenor said.

"Freedom will help maintain United States leadership, he said, warning that we are in danger of giving away what was handed down to us."

"I want to thank the Space Station Program Office, and the television monitors that have been installed."

"We were headed a position of leadership from our parents and our parents in the 1960s, and we will consume it and hand our kids to leadership, and they may want to have ideas on how to get it back," Cohen said.

"They will find out how to do the job and get better. That is what evolution is all about."

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