

# Space News Roundup

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No. 1

## Panel review finds space shuttle safe

The Aerospace Safety Advisory Panel concluded after a six-month review that efforts to streamline the Space Shuttle Program have not increased risks, the panel reported in December.

The review was requested on behalf of the President by the Office of Science and Technology Policy. The panel was tasked to review the issues associated with the safe operation and management of the space shuttle program arising from ongoing efforts to improve and streamline operations. These efforts include the transition to a comprehensive space flight operations contract, downsizing the shuttle workforce and reducing costs of operations and management. The study teams collected information through briefings, interviews, telephone conversations and from reviewing applicable documentation.

"I'm very pleased that the panel has given the Space Shuttle Program a clean bill of health," said NASA Administrator Daniel S. Goldin. "But the panel also pointed out some areas for continuing emphasis and the need to improve. NASA concurs with these findings and I have instructed the institutional management and the Space Shuttle Program to implement them as soon as possible. At NASA, safety is the bottom line. This report validates our actions and will guide us as we continue."

The panel's review included 22 recommendations, many of which address a need for NASA to take steps to ensure the availability of a skilled and experienced workforce in sufficient numbers to meet ongoing safety needs. The panel also noted that other activities occurring within the agency have the potential to generate safety problems. It cited specifically: a reduction-in-force during assembly of the International Space Station; and a concern that unrealistic funding levels and imposed schedules could place undue pressure on NASA and contractor management. The panel said that meeting the demands of these externally applied pressures can force decisions which increase risk.

An executive summary is available online at [http://ftp.hq.nasa.gov/pub/pao/reports/asap\\_summary.txt](http://ftp.hq.nasa.gov/pub/pao/reports/asap_summary.txt)



NASA Photo

The STS-81 crew takes a break from the Terminal Countdown Demonstration Test at Kennedy Space Center. The crew is scheduled to liftoff from Launch Pad 39B Jan. 12 for the sixth shuttle/Mir docking. The Atlantis crew will pick up Cosmonaut Researcher John Blaha and leave Astronaut Jerry Linenger for a four-month stay on the Russian Mir Space Station. From left are, Commander Mike Baker, Mission Specialist Marsha Ivins, Jerry Linenger, John Grunsfeld and Jeff Wisoff and Pilot Brent Jett.

## Managers meet Monday to set STS-80 launch

Following a reduced holiday work schedule, preparations of *Atlantis* at Launch Pad 39B are now returning to full strength aiming at a launch as early as Jan. 12 for STS-81, the fifth shuttle-Mir docking mission.

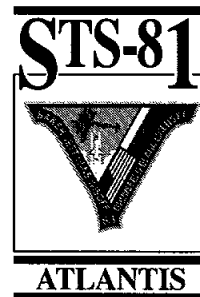
*Atlantis*' payload bay doors were shut for the final time prior to launch on Thursday, and shuttle managers will meet on Monday for a final flight readiness review, following which an official launch date will be announced. The crew of STS-81—Commander Mike Baker, Pilot Brent Jett, Mission Specialists John Grunsfeld, Marcia Ivins, Jeff Wisoff and Jerry Linenger—would travel to KSC at the end of next week for a Jan. 12 launch. The launch countdown will begin on Jan. 9. The launch window for *Atlantis* on Jan. 12 begins at 3:27 a.m. CST.

The hatch actuators on *Atlantis* were removed and internal screws in the mechanisms were checked, replaced, tightened and locked with an adhesive following the hatch actuator failure on *Columbia* during

STS-80. All of the hatch actuators had been reinstalled and retested aboard *Atlantis* by Christmas Eve.

Meanwhile, *Discovery* is being readied for the second flight of 1997, STS-82, to be launched around Feb. 13. STS-82 will be the second Hubble Space Telescope servicing mission. As work resumes on *Discovery* this week, upcoming milestones will include moving the spacecraft from the processing hangar to the Vehicle Assembly Bldg. to be mated with the STS-82 solid rockets and fuel tank on Jan. 10. *Discovery* is scheduled to be moved to Launch Pad 39A on Jan. 17.

Elsewhere, *Columbia* also resumes preparations this week for the third flight of 1997, STS-83, targeted for a March 27 launch. STS-83 will carry the Microgravity Science Laboratory-1 aloft for a 16-day stay in space. *Columbia* currently remains in KSC's Bay 1 shuttle processing hangar and stacking operations began just before Christmas on the STS-83 solid rockets in the VAB.



## Mir crew celebrates Christmas in space

Cosmonaut Researcher John Blaha took time out during the holidays to send holiday greetings from the Russian Mir Space Station and talk with reporters about plans for the holidays.

"I certainly wish everybody on the planet a very merry Christmas, a happy New Year," Blaha said. "I would like to wish all of you peace and goodwill, to all of the creatures who are living on the planet, as well as tell everybody that our planet is a very special place in the cosmos and in the universe. From space, here on the Mir space station you really see it that way, and

at Christmas time I would just like to remind everybody that all of those who have things need to share with those who don't, to make our planet a more special place.

"I would also like to say, as I give you this Christmas message, that of course the whole purpose of Christmas — and this is Christmas Eve right now on board the Mir space station in orbit — is to celebrate the birth of Jesus Christ and of course that happened

approximately 1,996 years ago, so that's the purpose of Christmas."

Before the holidays, Blaha and his crew mates Mir 22 Commander Valery Korzun and Flight Engineer Alexander "Sasha" Kaleri talked with reporters about their holiday plans.

"Certainly we have a number of things we will do on Christmas," Blaha said. "I personally have a number of Christmas presents from people on the ground that came up on the Progress and I have one or two for

Sasha and Valeri and we'll have a special meal that day. There will be a two-way video teleconference with my family on Christmas. Brenda will be there with my son Jim and my daughter-in-law and my grandson, and my daughter Caroline and my son Steven. I think my mother is going to be there as well. So we will have that, and it will be a nice and very exciting Christmas day, I think, for me."

"We're going to have an outstanding menu, a menu that will include both Russian and American products," Korzun said. "We will

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## 1996 seen as year of spectacular discoveries for NASA

A rock, a record, a rover and a new rocket were among the top NASA stories for 1996.

In an announcement that caused all humankind to take pause, NASA Administrator Daniel S. Goldin and a team of scientists revealed in August that a meteorite from Mars strongly suggested that primitive life may have existed on that planet more than 3 billion years ago. In a press conference at NASA Headquarters, a research team showed the world pictures of the first organic molecules thought to be of Martian origin; several features characteristic of biological activity, and possible microscopic fossils of primitive, bacteria-like organisms inside the ancient meteorite.

In vowing to pursue the investigation of this historic discovery, Goldin said "The evidence is exciting, even compelling, but not conclusive. It is a discovery that demands further scientific investigation. NASA is ready to assist the process of rigorous scientific investigation and lively scientific debate that will follow this discovery." Goldin invited governments from around the globe to participate in the continuing investigation of the meteorite.

Astronaut Shannon Lucid set a new record for an American living in space and broke the world's record for a woman living in space by spending 181 days aboard the Russian Mir Space Station. Lucid, who conducted microgravity and life sciences experiments aboard the Mir with two Russian cosmonauts, returned to Earth aboard *Atlantis* in November.

President Clinton presented Lucid with the Congressional Space Medal of Honor in an early December ceremony, citing Lucid "for her contributions to international cooperation in space ... Shannon Lucid is an explorer in the best tradition of those who dare to challenge the unknown."

Lucid's stay on Mir was part of continuing U.S. - Russian space cooperation, which is setting the foundation for the International Space Station.

In a continuing effort to learn more about Mars, the U.S. launched two new spacecraft to the Red Planet in 1996. The Mars Global Surveyor and the Mars Pathfinder missions were both successfully launched from NASA's Kennedy Space Center.

Mars Global Surveyor, due to rendezvous with Mars in September 1997, will spend four months dipping into Mars' atmosphere using a technique called "aerobraking." Starting in 1998, the Surveyor will begin compiling a systematic database as it surveys the Martian landscape and photographs unique features, such as polar caps and Mars' network of sinuous, intertwining river channels.

Mars Pathfinder, set to land on Mars July 4, 1997, is designed to test the feasibility of a new low-cost method of delivering a spacecraft, science payload and free-ranging rover to the surface of the Red Planet. Once deployed, the lander will transmit back to Earth science data collected during descent through Mars' atmosphere. The rover, named Sojourner, will then activate an onboard camera and send back images to Earth, signifying the start of its exploration.

Mars was not the only planet to reveal startling new secrets in 1996. NASA's Galileo spacecraft, in its flyby and probe deploy at Jupiter, revealed many previously unknown facts about our Solar System's

largest planet. Galileo's Probe, which was successfully sent into Jupiter's violent atmosphere in December 1995, provided new discoveries for NASA scientists. New information on the extent of water, clouds and the chemical composition of Jupiter's atmosphere was revealed.

As Galileo sped by Jupiter's moons, new details of the satellites began to emerge. On Ganymede, Jupiter's largest moon, scientists were intrigued by three-dimensional pictures of giant, icy fissures and evidence of a magnetic field. Galileo also reported that "warm ice" or even liquid water may have existed, and perhaps still exists, beneath the cracked icy crust of the moon Europa.

Galileo found that the volcanically-active moon Io had noticeably changed since it was last observed 17 years ago by the Voyager spacecraft. In November, Galileo flew by Jupiter's moon Callisto, investigating the strange, pockmarked fourth moon, so different from its other active siblings.

Living up to its role as one of the "great observatories," the Hubble Space Telescope

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**JANUARY** Its official, NASA Administrator Daniel S. Goldin names George Abbey director of JSC after serving as acting director for several months. Abbey replaced Dr. Carolyn Huntoon after she was named to lead planning for a new sciences institute for biomedical research.



**MARCH**

STS-76 lifted off March 22 to deliver the second American to the Russian Mir Space Station. Astronaut Shannon Lucid settled into to Mir while Astronauts Linda Godwin and Rich Clifford record the first space walk while docked to the Russian Outpost.

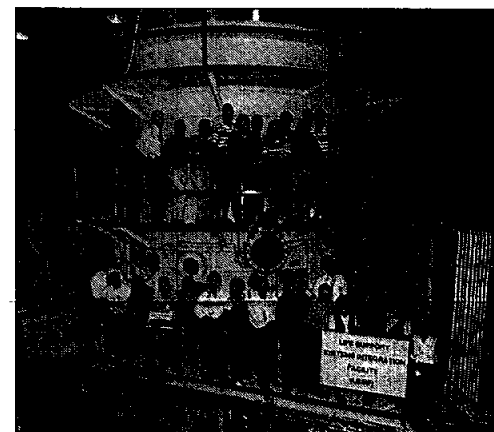


**APRIL** For the first time in history a Russian extravehicular space suit is lowered into the Weightless Environment Training Facility. The Orlan suit will remain at JSC to train astronauts and cosmonauts for the International Space Station.

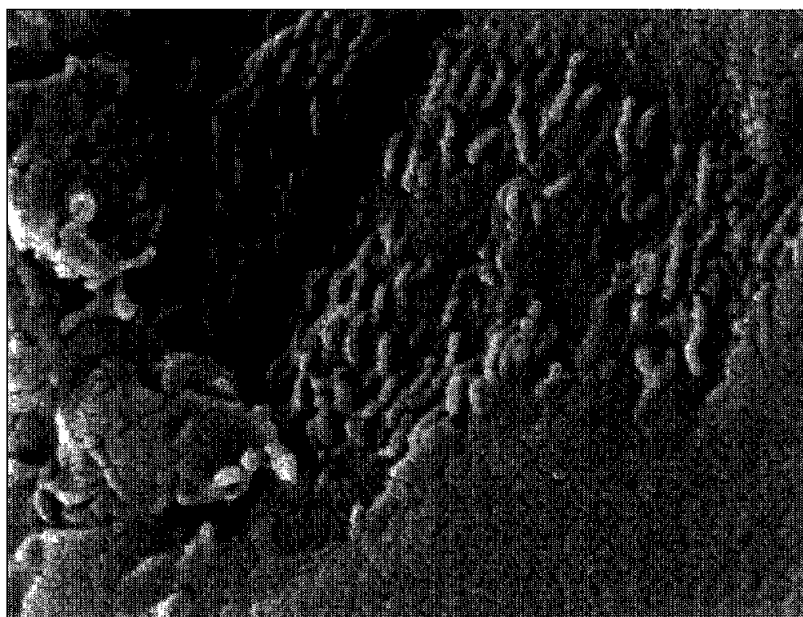


**MAY**

Bill West of Rockwell International carries the Olympic torch through the streets of Houston. West and Paula Vargas of Taft Broadcasting were selected to carry the torch because of their voluntary contributions to the community.

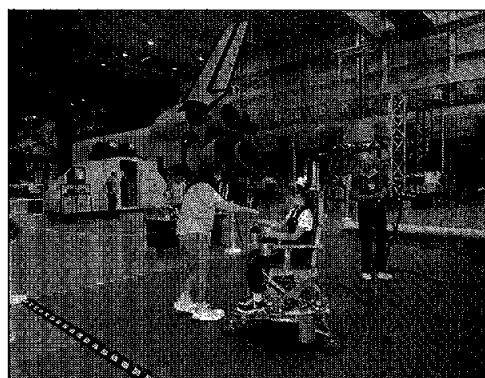


**JUNE** The Advance Life Support team takes a moment outside the regenerable life support test chamber before saying good-bye to co workers Doug Ming, John Lewis, Katy Hurlburt and Pat O'Rear who spent 30 days sealed inside the chamber.



**JULY**

JSC and Stanford University scientists announce that this electron microscope image of a Mars meteorite strongly suggest primitive life may have existed on Mars more than 3.6 million years ago.



**AUGUST** While the weather may have kept large crowds away from JSC's Open House, the visitors who did brave the weather praised JSC employees and the space program.

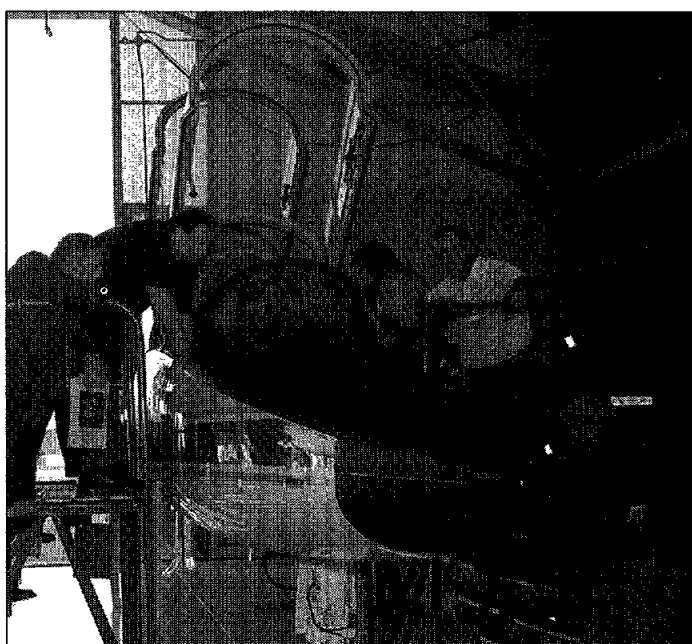


**SEPTEMBER** President Bill Clinton welcomes home the STS-79 crew and Astronaut Shannon Lucid. Lucid shattered all space endurance records posting 188 days in orbit including 179 days on the Russian outpost.

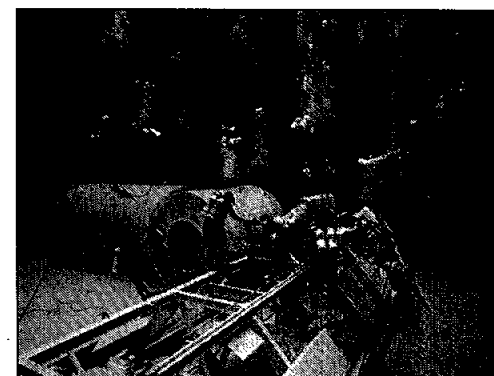


**OCTOBER**

Bo Atkinson and other members of the Ellington Field Fire Department give live demonstrations on the best techniques for extinguishing fires during Safety and Total Health Day. Under blue skies and pleasant temperatures, JSC employees spent the day learning a variety of safety and total health issues.



**NOVEMBER** JSC engineers, scientists and managers showcase their technical advances in Bldg. 9 during the first NASA JSC Inspection. More than 1,200 top executives from companies in 28 states took advantage of the opportunity to learn about JSC's mission, technologies and facilities.



**DECEMBER** Astronauts Jerry Ross and Linda Godwin make the first suited dive in JSC's spacious new Neutral Buoyancy Laboratory in the Sonny Carter Training Facility.



**FEBRUARY**

The first JSC trail ride brings out several horse-riding employees lead by a traditional covered wagon. The trail ride was one of many activities around the center during "Go Western" days. Look for expanded rodeo events around the center this year.

# 1996 THE Year IN Pictures

## Hubble returns dynamic images of other galaxies, stars during '96

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showed images of galaxies colliding, the surface of Pluto and the birth of stars during 1996.

In April, Hubble sent back dramatic images of gigantic tadpole-shaped objects surrounding a dying star. The "cometary knots" are probably the result of a dying star's final outbursts, seen in the Helix nebula. The Space Telescope continues on track for measuring the expansion of the universe, sending back information that fine-tunes the Hubble Constant. Scientists are using the telescope to try and place the Hubble Constant to within a ten percent accuracy.

Compiling a "cosmic movie" of the Crab Nebula, Hubble found the Nebula even more

dynamic than previously understood. Hubble measured the diameters of a special class of pulsating star called Mira variables, which rhythmically change size. At 11 billion light-years away, they existed during the epoch when it is commonly believed galaxies started to form. Hubble concluded the gigantic, old stars are not round but rather egg-shaped. That discovery may preview the fate of our Sun five billion years from now.

Hubble also surveyed the "homes" of quasars, showing that they live in a remarkable variety of galaxies, many of which are violently colliding. The complicated image Hubble sent back suggests there may be a variety of mechanisms for "turning on" quasars, the universe's most energetic objects.

Hubble introduced us to images of what may be galaxies under construction in the early universe, being made out of a long sought ancient population of "galactic building blocks." Those images show a grouping of 18 gigantic star clusters that appear to be the same distance from Earth, and close enough to each other that they will eventually merge into a few galaxy-sized objects.

In October, Hubble followed the spectacular dance of Jupiter's aurora, allowing astronomers to map Jupiter's immense magnetic field and better understand how it generates such phenomena.

In a quest for a faster, better, cheaper access to space in the 21st Century, Vice President Al Gore and Goldin announced

that Lockheed Martin was selected to build the X-33 technology demonstration vehicle, a one-half scale prototype of the Reusable Launch Vehicle which will be used to demonstrate advanced technologies that will dramatically increase reliability and lower the costs of putting payloads into space.

Lockheed Martin will design, build and conduct the first test flight of the X-33 test vehicle by March 1999, and conduct up to fifteen flights by December 1999. NASA has budgeted \$941 million for the project through 1999, with Lockheed Martin contributing over \$200 million. Called "Venture Star," the unpowered vehicle will launch vertically like a rocket and land horizontally like an airplane.

## Test subjects needed for blood analysis

The Human Test Subject Facility at JSC is currently recruiting volunteers to participate in astronaut and cosmonaut blood-draw training sessions.

This activity, approved by the JSC Medical Sciences' Institutional Review Board, provides crew members with the opportunity to gain proficiency in venipuncture blood collection techniques. Crew members on future shuttle missions as well as cosmonauts participating in the joint U.S./Russian endeavors will participate in these training sessions if in-flight blood collections are required during their mission.

Volunteers must be in good health and pass the required physical exam. Volunteers should be healthy individuals, 21-50 years old, height/weight proportionate that are not taking any medications, and have no major health problems.

Prior to participation, a volunteer will receive a briefing so he/she fully understands what will be happening. An average crew training session takes 15-30 minutes per volunteer, and volunteers may be compensated for their time.

To volunteer or for details, contact Linda or Rori at x37284.

## Computer fair prices still available

The vendors who recently participated in JSC Exchange's Computer Fair have agreed to extended their offer for special deals on computers.

"The computer fair was a big hit with all who participated," said organizer Karl Schuler. "Over 85 computers were sold, and the Exchange has received a number of inquiries from folks asking if they can purchase a computer after the fair. In response, we're shifting to a "virtual" fair and will keep the Computer Fair's home page running until mid March."

Schuler said that the vendors agreed not to raise prices for the next 90 days. Buyers will need to reference the computer fair when they follow-up with the vendors.

"We're also forming partnerships with other agency Exchanges and will be auctioning two computer systems sometime in January if all goes according to plan," he added.

M and A Technology and Applied Computer Technologies—two of the vendors who have been involved with the center's recent computer block buys—are offering special deals to employees through March. In addition, the JSC Federal Credit Union has special provisions for loans on electronic equipment.

These special prices are open to all NASA civil servants, contractors and retired personnel. For more information, reference the recent computer fair's home page at the following URL: [http://hro.jsc.nasa.gov/hro/ea/The\\_EAA\\_Computer\\_Fair.HTML](http://hro.jsc.nasa.gov/hro/ea/The_EAA_Computer_Fair.HTML) or call the Exchange or Schuler at x33031.



From left, Neha Mehta, a senior at South Houston High School accepts congratulations from chief judge Mark Morgan after winning the American Free Enterprise Speech contest.

## Local students cash in during speech contest

A South Houston senior took home a \$300 savings bond last month and a chance to win another \$10,000 bond.

Neha Mehta took first place with a speech about the American dollar bill in the American Enterprise Speech Contest hosted by the Lockheed-Martin National Management Association last month at the Gilruth Center. Mehta will represent the NMA chapter at the Texas Gulf Coast Council competition in March. Mehta has been to the National's as an ambassador and has experience in speech and math competitions and varsity tennis.

The second place \$200 bond went to Shane Carter and the third place \$100

bond went to Kevin Held, both seniors at Friendswood High School.

The Clear Lake Communicators, Toastmasters International judged the eight entrants. The students were judged on speech development, purpose and value of the speech, delivery and language. The purpose of the contest is to promote a better understanding of the American Enterprise System among high school students. Involving youth in research, writing and delivery of a speech on the economic system can increase awareness in the importance of a free economy and helps develop communication skills that are vital to individuals entering the workforce.

## Blaha vows to help build space station in '97

(Continued from Page 1)

have traditional cakes and other dishes, lamb, pork and a wonderful dessert, as well as Italian food, macaroni and cheese, and other things."

Reporters asked Blaha whether he would make any New Year's resolutions.

"I haven't thought about that, but you ask me the question so I'll do my best to answer." He said. "I think any New Year's resolution I would make is that I hope the space program and this space station and a replacement for it, which we call the International Space Station, we continue to build. It's certainly the right thing to do. Space plays a vital role in our society, so my New Year's resolution would be that I wish we continue pressing forward with this. From a personal note, I've learned a lot up here. Maybe when I return to Earth I'll try to apply some of it to try and be a nicer human being."

Before the holidays the crew spent time performing housekeeping and maintenance chores. Science activities included monitor-

ing of the BioTechnology System, including the visual inspection of the growth of bovine cartilage cells, as well as sampling of the media in the BTS. The crew performed a direct feed of the growth media to the cartilage cells and sampling of the media in the BTS.

The BioTechnology System is a facility that will be used throughout joint U.S. - Russian flights to grow tissues in microgravity. On this mission, bovine, or cow cartilage is being grown. By growing cartilage in microgravity, researchers will obtain a better three-dimensional model which they can compare to cells grown on the Earth, helping to determine how cells grow in different environments. Researchers say this kind of research, not possible because of the gravity on Earth, eventually may lead to development of new drugs or medical procedures.

The crew also monitored a second wheat crop growing in the Mir greenhouse. Air being drawn into the greenhouse returned to normal temperatures, approximately 25 degrees Celsius, and will be monitored daily for fluctuations that

could affect plant growth. The sprouts that were planted on Dec. 6, were around 12 centimeters in height, showing somewhat rapid growth rate.

A Mir Structural Dynamics Experiment studying the night to day transition vibrations of Mir was performed. Several more sessions measuring the vibrations of Mir during exercise, and the docking and undocking of space shuttles are planned.

Throughout his four-month stay on Mir, Blaha exercises daily and explained his regime to reporters.

"I do an exercise regime here daily that the Russians have been doing on this space station for now 11 years," Blaha said. "That is, we have a treadmill here [in the base block] and a treadmill in the Kristall module. You set a particular load on there and run for a certain period at different paces, you walk, you run.... In between you use expanders for different muscle groups in your legs, neck, arms, shoulders, and waist. It's a program they have developed over the years. It's a very good program.

That's one exercise, and it takes about an hour to accomplish.

"Another thing we do on the same day, about six hours later we ride on the bicycle. We do that for our cardiovascular systems. We ride a different schedule of times and loads and we do that for a period of about 45 minutes and that also is very good. So one of the exercises is for muscles and the other is for cardiovascular health.

"I might say, I think it's an excellent program and I highly recommend that we start with that program on the [International] Space Station. As to how I think I will feel when I return to Earth, I don't know. That's a very individual thing and different people have different reactions to returning to Earth. That's why we continue to do [cardiovascular] experiments, to try to understand why there are differences in different people when they come back to Earth. In the past on shuttle flights I haven't had a problem, but I may have a vestibular problem when I return this time. I don't know; we'll have to wait and find out."

## Changes to effect Gilruth, cafeteria

Changes to fee structures and services at the Gilruth Center and JSC cafeterias recommended last year by the JSC Exchange Council are now in effect.

Employees will need badges to use the Gilruth Center weight room, gym, tennis courts, leisure classes or to participate in organized sports. Existing badges will be honored until they expire except for use of the weight room. The annual fee for badges except for the weight room is \$10. Badges may be purchased by NASA/contractor employees; their dependents or spouses; retirees and spouses; and other government employees with NASA issued badges. Outside users also may purchase badges that will allow them to participate in organized sports and leisure classes only at a cost of \$25.

The annual fee for use of the weight room will be \$90. There will not be an additional \$10 badge charge. The fee for a second, or more, family member will be \$50 each. Badges/membership for use of the weight room are available to NASA employees, retirees and contractors and their spouses and eligible dependents. Weight room badges/memberships may be used for all Gilruth activities.

Fees for league sports will be \$315 for basketball; \$175 for volleyball; \$335 for flag football; \$275 for soccer; \$275 for softball; and \$200 for recreational softball. There will be a single fee structure for all teams and each participant will be required to have purchased a Gilruth Center badge. All badges and membership fees may be purchased at the Gilruth Center office in Bldg. 207. Questions can be directed to the Gilruth Recreation Director, Eddy Rodriguez at x35789, or the EAA Vice President for Athletics, Bob Musgrove at x33057.

In addition the cafeteria will change its hours of operations in the new year. The cafeteria will be open from 7-10 a.m. for breakfast and 11 a.m.-1:30 p.m. for lunch. The Gilruth Center will be open 6:30 a.m.-10:00 p.m. Monday - Friday, and 9 a.m.-1 p.m. on Saturday.

Other changes in the near future include:

- Remodeling of the cafeterias to improve lighting, reduce noise and update the serving and seating areas at both cafeterias;
- Reopening the JSC Exchange Store in the Bldg. 3 cafeteria and broadening the inventory of store items;
- Increasing the choice and availability of event tickets offered through the stores;
- Opening up food service at the Gilruth Center to off-site commercial caterers and restaurants to broaden choices for groups planning events;
- Increasing the opportunities for organizations to use the Gilruth Center facilities for "pot luck" dinners;
- Providing contractor involvement and input through representation on the Exchange Council; and
- Adding new "heart healthy" items on the cafeteria menus.