

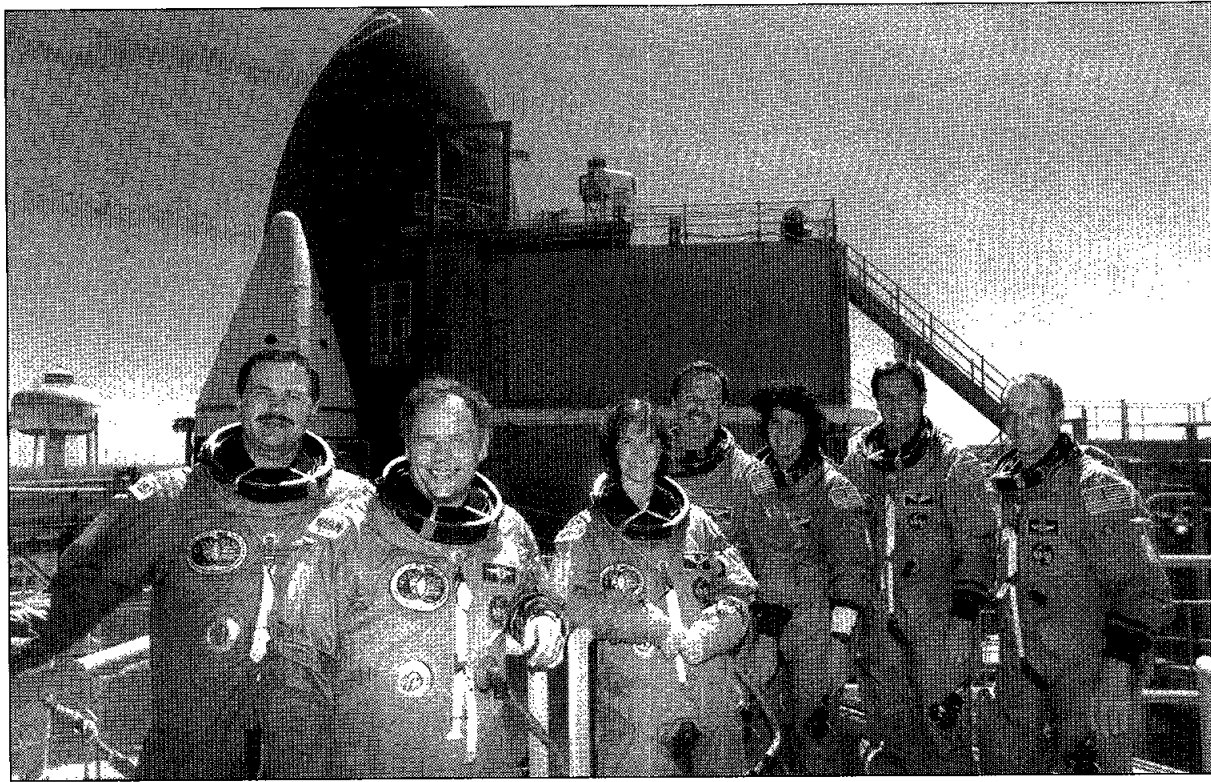


Space News Roundup

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NASA Photo

The STS-71 crew took a break during the Terminal Countdown Demonstration Test at Kennedy Space Center. *Atlantis* is scheduled to launch later this month and will be the first shuttle to dock with the Russian Mir Space Station. From left are, Mir 19 Flight Engineer Nikolai Budarin, Mir 19 Commander Anatoly Solovyev, Mission Specialist Bonnie Dunbar, Commander "Hoot" Gibson, Mission Specialists Ellen Baker and Greg Harbaugh and Pilot Charlie Precourt.

GAO reports space station on schedule

An annual report from the General Accounting Office reports the International Space Station is on track and under budget.

"The GAO's annual audit of the International Space Station program proves, once again, that the program is on schedule and under budget," said NASA Administrator Daniel S. Goldin. "The GAO has validated our cost estimates for the design, development, on-orbit assembly and operations of the International Space Station."

GAO reports that the estimate to design and build the station has remained constant at \$17.4 billion, and the estimate for 10 years of operations is still \$13 billion.

While the GAO and NASA agree on these figures, the GAO makes other assertions with which NASA does not concur. The report implies that the shuttle program will have difficulty meeting the station assembly schedule.

"I have full confidence that the shuttle program can meet the space station's launch requirements on time and within budget," Goldin responded. "The space station is not a paper program anymore. We are building it. We have completed over 48,000 pounds of hardware to date."

GAO's space station life cycle cost estimate of \$93.9 billion includes \$50.5 billion for shuttle transportation costs. NASA would still require funding for the shuttle if the station were canceled. Furthermore, over 50 per-

cent of the funding for research conducted under the life and microgravity sciences and applications program is included in the station budget. Prior costs for other station designs and civil service salaries also are included in the GAO estimate.

"In this time of austere budgets, we must be very careful how we characterize NASA's funding," Goldin said. "These figures are not new. They are based on the average cost of a shuttle flight. However, to suggest that these funds would be saved if station were terminated is incorrect. NASA is firmly committed to human exploration of space, and we would still fly the space shuttle if the space station program were canceled."

The GAO report did mention that the station program is under budget and on schedule. Goldin stressed that "the program has made a year of solid progress since their last report." Some of the program's accomplishments over the past year include, completing every major milestone on time; signing the Boeing prime contract for \$5.63 billion, about \$600 million less than originally estimated; building over 48,000 pounds of hardware to date, with over 75,000 to be completed by the end of 1995; signing the FGB (flight cargo module) protocol and successfully completing the FGB critical design review; flying a successful rendezvous between the shuttle and Mir and launching Astronaut Norm Thagard on his stay aboard Mir.

Mir ready to receive Atlantis

As the week drew to a close, NASA and Russian officials considered options for launch dates as the liftoff of *Atlantis* neared for STS-71, the first flight to linkup a 100-ton shuttle with the 123-ton Mir Space Station.

The final launch date was dependent on the completion work on Mir to check out a sluggish solar array on the Kvant-2 module and the possible inspection of a stuck solar array on the new Spektr science module.

Russian officials indicated that the stuck tail array on Spektr would likely have no impact on *Atlantis*' docking and could be fixed after STS-71. While NASA and Russian officials edged closer to the comple-



tion of work to prepare *Atlantis* and Mir, engineers at Kennedy Space Center repaired the external fuel tank of *Discovery* in preparation for its launch on STS-70.

Repairs were made to more than 150 holes in the tank's insulation which were made by woodpeckers at Launch Pad 39-B at KSC. *Discovery* was rolled back to the Vehicle Assembly Building last week, where technicians could gain access to the most critical areas of the tank damaged by the woodpeckers. After the tank repairs were completed, the shuttle was hauled back out to its launch pad once again.

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Goldin stresses NASA is America's future

NASA Administrator Daniel S. Goldin told agency employees last week that despite a shrinking budget, the agency must make its programs for transferring new technology into the community even more effective and called JSC an important player in that effort.

In a live question and answer session on NASA Television, Goldin expressed enthusiasm at the research institutes now being formed to bring industry, government and academia together for technology transfer.

"We are looking to NASA Johnson in forming this biomedical institute," he said, "then ultimately having an astrobiology institute when we include some of the planetary work. The people of Texas have been very, very positive. We would like to see this institute form the basis for the generation of thousands of jobs,

the start-up of a whole set of new industries."

Response from universities and industry has been positive, he said, and team members will be identified and working groups formed by the end of the summer.

The administrator also voiced hope that such institutes will provide new jobs for people who have been dislocated in recent NASA downsizing efforts.

While painful in some areas, the downsizing efforts have paid off as NASA has taken great strides in prioritizing its budget and realizing efficiencies when Americans are demanding a smaller, more effective government.

"My first message is, we are there," Goldin said. "My second message is, I respectfully agree to disagree with the next level (of cuts proposed in Congress) and enough is

enough. I know of no other government agency, I know of no other industry that has downsized so fast."

Over the five year planning period, NASA has turned back 36 percent of the budget, reducing the deficit by roughly 40 billion dollars, while at the same time increasing productivity more than 40 percent. He noted that the General Accounting Office came out with a report in 1992 that showed average cost growth in the top programs was 75 percent. He credited this to the way NASA was used to doing business. In an internal study done over the last two years, NASA's overrun was a negative 5.5 percent. Goldin credits the workforce in reducing cost while starting new programs.

"It's stunning what you have done," Goldin said. "NASA is now not just at the head of the

technological affluence in the world, you are demonstrating an ability to be the best managers and executives in the world and you are setting a standard for the rest of government and industry."

Goldin went on to explain that the nation has an obligation to the future generation to provide a space and aeronautics program. He understands the why and what Congress faces today, but it must understand how crucial NASA is to the future of America.

"We have separated our functions, we have eliminated power redundant activities, and we got ourselves focused," he said.

Although more than 55,000 people with jobs in government and industry will be affected, Goldin said NASA has stepped up to the

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Mir crew prepares for sixth space walk

Russian cosmonauts successfully relocated the Mir Space Station's Kristall module into its final position last weekend, completing the movements required for STS-71.

Kristall was moved from the minus-Z axis to the minus-X axis Saturday. The relocation went without any problems. The station is now in the configuration it will be in when *Atlantis* docks to it later this month.

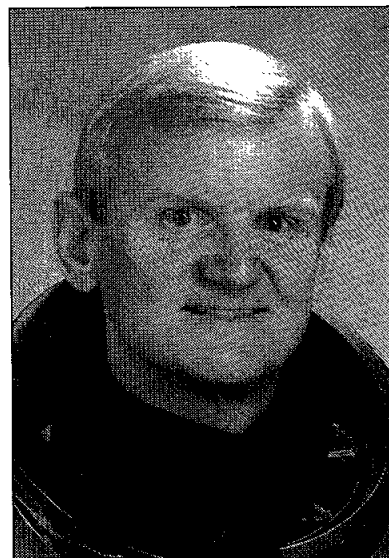
Crew members and flight controllers then turned their attention to drawing up plans for another space walk by Mir 18 Commander, Vladimir Dezhurov, and Flight Engineer, Gennady Strekalov. The extravehicular activity will be the sixth in the past two months. Dezhurov and Strekalov will take

a look at a solar array on the Kvant-2 module that is not tracking the sun properly and inspect the Z-axis seal in preparation for moving the Kristall back to that port after STS-71.

The flight control team has decided not to ask the crew members to attempt to unjam a solar array on the Spektr module to give engineers more time to develop techniques. The array did not deploy as expected, and controllers believe the mechanism used to release the array did not work as expected. Last week the Mir 18 crew tried unsuccessfully to extend the panel by sending pulses of power to the motor and by firing Mir's thrusters. The array status is not expected to impact STS-71.

Science operations aboard Mir have continued in spite of the heightened activity of module movements and space walks. Data collection has been constant throughout the mission. Astronaut Norm Thagard is collecting samples of the air, water and various surfaces to learn about the Mir microbiology environment.

Saturday, Thagard activated the USA components inside the Spektr module including the thermal electric holding facility and freezer. Both are freezers to hold biological samples. Over the next few weeks, he will activate the remaining hardware on Spektr and ensure it is functioning properly, catalog data and prepare the samples for the return trip home.



John Casper

Crew named for '96 flight

By Kyle Herring

John Casper will command a nine-day mission aboard *Endeavour* next spring to deploy and retrieve a science satellite and conduct experiments in a pressurized module in the payload bay.

Joining Casper will be Pilot Curtis Brown, and Mission Specialists Dan Bursch, Mario Runco, Canadian Space Agency astronaut Marc Garneau, and Andrew Thomas.

STS-77, scheduled for launch in the spring of 1996, will carry the Spacehab module, which nearly triples the amount of middeck locker

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First Apollo, Next *Atlantis*

STS-71 will mark the second time the U.S., Russians dock in space

By Karen Schmidt

The STS-71 mission, scheduled to launch next week, will mark the second time Americans and Russians have docked in space and culminates a 35-year-long cooperative working relationship.

The docking of *Atlantis* with the Russian Mir Space Station comes just a month before the 20th anniversary of the Apollo-Soyuz Test Project, the first joint U.S.-Russian program.

"Back in the depth of the Cold War, the ASTP was an ice-breaker for the two countries," said Vance Brand, the ASTP command module pilot. "This is a logical step in the process of cooperation."

The American-Russian space relationship has been through several presidents on both sides and has survived even the establishment of a new Russian government. But without the ASTP, today's mission may not have been possible.

The ASTP began in 1970 with talks between the two governments. Working groups were formed and by 1971 the two countries were sharing lunar samples and biomedical and weather data. ASTP working groups began meeting at JSC in July of 1972 to reconfigure drawings. Crew and flight controller training requirements were laid out as well as system checks on environmental controls and communications.

A crew for the ASTP was announced in January 1973. Commander Tom Stafford would fly with Docking Module Pilot Deke Slayton and

Brand. In May, the Soviet crew was announced with Alexei Leonov chosen as commander and Valeri Kubasov as flight engineer.

Over the next year astronauts, cosmonauts and flight controllers visited each other's countries and checked out training and mission control facilities.

Despite congressional objections to the safety of the Soyuz spacecraft, The Russians and NASA launch on July 15, 1975. On July 17, the

Apollo crew rendezvoused with its Russian counterpart and successfully docked in space. For two days, both countries observed Earth, carried out scientific experiments and visited each other's spacecraft.

"It was a very successful and challenging mission. We developed a mutual

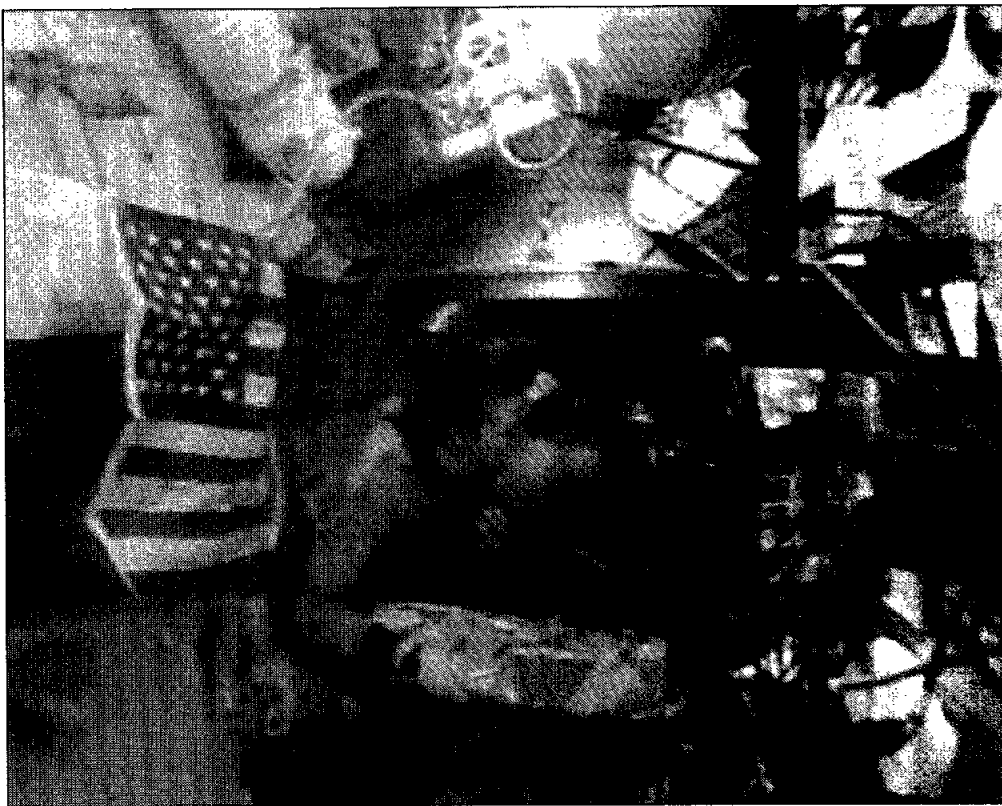
respect for both the Russian engineers and technicians," Brand said.

In the fall of 1979 amid U.S. concerns over Soviet human rights violations, no further meetings were planned until a review of the entire program was completed.

During the next 15 years, no formal agreements between the two countries are active, but several joint ventures did take place. Both countries launched a Search and Rescue Satellite that is credited for saving more than 1,000 lives. Scientists continued to exchange information and conduct experiments on both shuttle flights and Soviet biosatellites.

By 1987 the two nations signed an agreement for joint cooperation in space beginning the new era for joint missions.

In July 1990, the agreement was signed to



plan the first joint mission since the ASTP program. In 1992 the Soviet Union was dissolved, and nine former republics signed up to continue to support the space program.

Preparations began for the second U.S.-Russian docking, an American space shuttle to Mir. For the next three years engineers would work to modify the ASTP docking mechanism for the flight.

"I am real pleased the docking system and

working group concepts that came out of the ASTP mission 20 years ago are being used today," Brand said.

Brand admits engineers have an easier time today.

"They don't have the same problems as we did. With the Cold War over

and the cooperation that has developed over the last 20 years, engineers don't have to be skittish about working with the Russians," he said.

This is evident in the differences in the two docking systems. During the ASTP both countries had their own separate, complete systems. There is only one docking system today. Designed jointly, the new system has modifications. Most noticeable are the guider "fingers" that now turn inward instead of outward and the structural latches on the ASTP were internal to the pressure docking tunnel and the new system has the latches external to the tunnel.

The greatest challenge engineers face today is the size of the space vehicles and changes to both the orbiter and Mir.

"In ASTP we were working with two very small spacecraft. The shuttle and Mir are much

larger," said Brand.

During ASTP the spacecraft could dock at a much higher relative speed than can be accomplished with the shuttle/Mir.

"Mir has a lot of acreage in the way of solar arrays. The shuttle will have to come in more slowly so it doesn't blow around the panels," Brand said.

A new external airlock was required on the orbiter in order to make the docking work. The

airlock will be a permanent fixture in *Atlantis*.

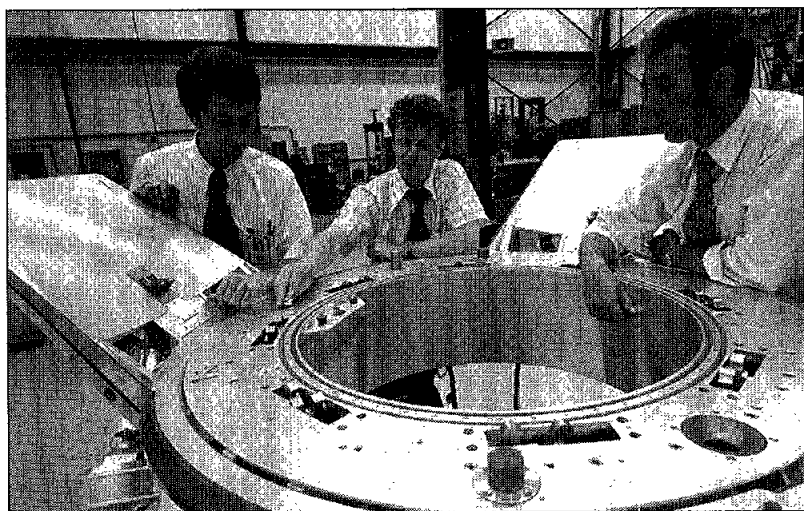
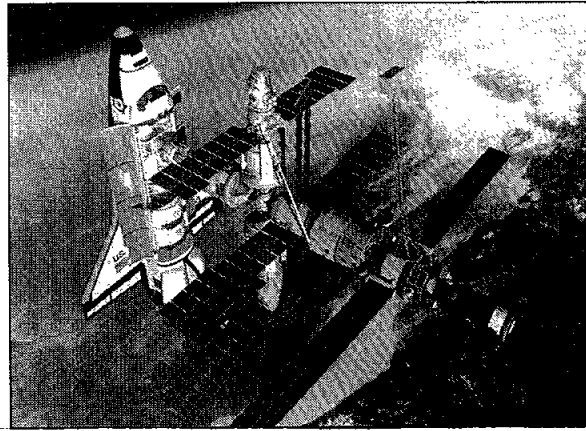
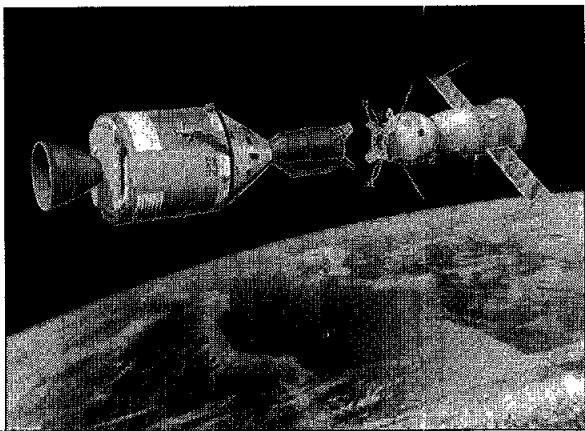
"We have qualified a major new system for the shuttle to use for the Mir docking missions as well as over the long-haul in the building of the International Space Station," said Denny Holt, STS-71 flight manager.

On Mir, cosmo-

nauts have performed several extravehicular activities to reposition modules and adjust solar arrays to make way for *Atlantis*.

The STS-71 mission will mark the second time two countries have joined space vehicles, but cooperation has been ongoing. At present, Astronaut Norm Thagard resides in the Mir waiting for *Atlantis* to come and take him home. His Mir 18 crewmates, Vladimir Dezhurov and Gennady Strekalov will travel back with Thagard and the Mir 19 crew Commander Anatoly Solovyev and Flight Engineer Nikolai Budarin will take their place onboard the Russian outpost.

While STS-71 is a new era in space science and technology, the history of the cooperative effort and the ASTP served to enhance the current flight and the future of space exploration. □



From top to bottom, left to right: Mir Flight Engineers Elena Kondakova greets the first American, Norm Thagard to board the Russian Mir Space Station. An artist's concept illustrating the docking of the Apollo space craft to the Soyuz space craft. An artist's concept of *Atlantis* docking with Mir. Apollo-Soyuz Test Project engineers look over the docking system. From left are Robert White, Vladimir Syromyatnikov and Yevgeniy Bobrov. Syromyatnikov is working on the new orbiter docking system to be used on STS-71. Apollo Commander Thomas Stafford, left, and Soyuz Commander Aleksei Leonov in the hatchway leading from the Apollo docking module. Managers from JSC and Kennedy Space Center check out the orbiter docking system. From left are Loren Shriver, shuttle launch integration manager; Gary Crawford of KSC, Frank Buzzard, manager of the shuttle chief engineer office and Brewster Shaw space shuttle program manager. The significant difference in the two docking systems is that the new system the guider "fingers" turn inward and structural latches are external.

Russian docking module, solar arrays arrive in Florida

A Russian cargo plane has delivered equipment for the second shuttle/Mir docking mission — a major exchange of space flight components between the United States and Russia. During assembly of the International Space Station, this type of cooperative exchange will take place frequently.

The delivered cargo included a shuttle-to-Mir docking module, the module's ground support equipment, a portion of the docking module training mockup for use in crew contingency space walk training, and two solar arrays for the Russian Mir Space Station.

"This is a major operational hardware exchange between the United States and Russia," said Tommy Holloway, manager of NASA's International Space Station Phase One Program Office. "As we move into the space station era, these equipment exchanges will become almost commonplace.

This particular hardware also is very important to the reconfiguration of Mir for future joint operations."

The docking module, which will be carried to space aboard *Atlantis* on the STS-74 mission later this year, is designed to improve the clearances for the shuttle during future docking operations with Mir.

During STS-74, *Atlantis* astronauts will use the orbiter's robotic arm to place the docking module onto the Orbiter Docking System. On the third day of that flight, Commander Ken Cameron will ease the orbiter up to Mir so that a link-up occurs with the docking module serving as a bridge between the two space vehicles. When *Atlantis* leaves Mir after three days of joint operations, the undocking procedures will disconnect the Orbiter Docking System from the docking module, leaving it attached to

the station for use on future missions.

Before the docking module is loaded onto *Atlantis*, it will be prepared for flight in the Space Station Processing Facility at Kennedy Space Center; it is the first piece of hardware to be processed in the SSPF. The docking module will undergo a complete systems checkout and the two solar arrays and a trunion assembly will be attached to the module. The activity will be monitored by a team from the Russian organization RSC Energia.

The two solar arrays will be used to extend Mir's lifetime and support U.S. science and technology research. One of the arrays was built as a cooperative project between the U.S. and Russia, combining proven Russian structures and mechanisms with advanced U.S. solar array modules. The second array is composed of all Russian components. The solar arrays will be stowed on the side of the

docking module for transport to Mir and will be installed some time after the completion of STS-74.

After SSPF processing, the docking module and solar arrays will be transferred to the Operations and Checkout Bldg. at KSC. The module will then undergo a series of tests to verify electrical and mechanical compatibility with the orbiter.

The docking module training mockup will be shipped JSC. Astronauts will use it for extravehicular activity training. No space walk is planned for the STS-74 mission, but crew members will practice several backup procedures that will be employed if problems occur with the module during the flight. The remaining sections of the training mockup will be shipped from Russia later this year to support space walk training for STS-76, the third docking mission.

Administrator outlines center missions, duties

The Office of the Administrator put together an outline for each NASA center.

Johnson Space Center

Mission: Human exploration and astromaterials. Science: Biomedical research, aerospace medicine, astromaterials science and extraterrestrial sample curation and geochemistry. Technology: Robotics, life support and extravehicular mobility unit. Aeronautics: None.

Stennis Space Center

Mission: Propulsion test. Science: Selected land remote sensing. Technology: Engine testing and commercial remote sensing. Aeronautics: None.

Marshall Space Flight Center

Mission: Transportation systems development and microgravity. Science: Materials science, biotechnology, global hydrology and climate science and selected astrophysics and space physics. Technology: Propulsion, avionics, space environmental effects and space mirrors. Aeronautics: None.

Kennedy Space Center

Mission: Space launch. Science: Payload integration and test support. Technology: Ground control and processing. Aeronautics: None.

Jet Propulsion Laboratory

Mission: Planetary Science and Exploration. Science: Planetary system science, extrasolar planets, ocean and solid Earth science, advanced Earth science instrumentation and low temperature physics. Technology: Deep Space and Planetary spacecraft. Aeronautics: None.

Goddard Space Flight Center

Mission: Earth science/physics and astronomy. Science: Earth system science, Earth observing system data and information system, astrophysics/space physics and rocket and balloon program management. Technology: Earth orbiting spacecraft. Aeronautics: None.

Lewis Research Center

Mission: Aeropropulsion. Science: Combustion science, fluid physics and ground-based microgravity research. Technology: Commercial communications and power and on-board propulsion. Aeronautics: Air-breathing propulsion.

Langley Research Center

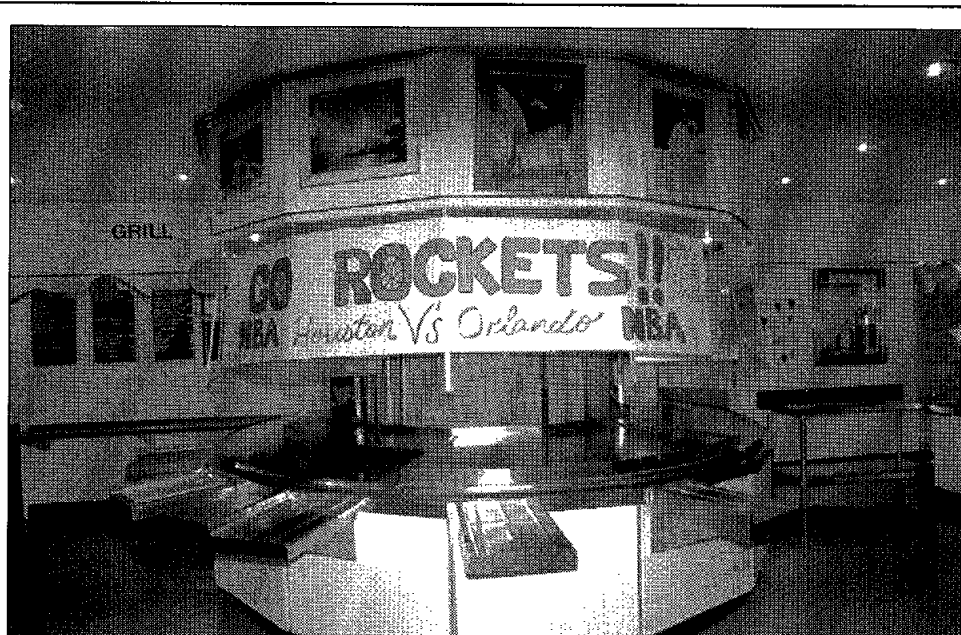
Mission: Airframe systems, aerodynamics and atmospheric science. Science: Global radiation budget atmospheric chemistry. Technology: Vehicle aerodynamics and aerothermodynamics, vehicle materials and structures and health monitoring sensors. Aeronautics: Airframe systems.

Dryden Flight Research Center

Mission: Flight research. Science: Airborne science support including host science support. Technology: None. Aeronautics: Flight Research.

Ames Research Center

Mission: Airspace operations and systems/astrobiology. Science: Astrobiology and astrochemistry, gravitational biology/biocomputational, human factors research and ecology. Technology: Information technology and thermal protection systems. Aeronautics: Airspace operations.



JSC Photos by Andrew Patnesky
ROCKET MANIA — JSC employees show their support for the Houston Rockets during the 1995 World Finals with memorabilia in several locations across the center. Top: Bldg. 3 cafeteria workers show support by decorating the turnstile. Middle: Bldg. 2 employees sacrifice sunshine to promote the team. Bottom: Shirley Martin of Mason Hanger decorates her desk in Hakeem Olajuwon motif. JSC Director Dr. Carolyn L. Huntoon also showed her spirit in a good-natured wager with Jay Honeycutt, director of Kennedy Space Center. Honeycutt will wear a Rockets T-shirt if they become the World Champions and Huntoon will wear an Orlando Magic T-shirt if they should win.

Astronaut selection process begins

NASA is accepting applications for mission specialists and pilot astronaut positions effective immediately.

Interested individuals may apply until the cut-off date of June 30. Applications received after the deadline will be eligible for consideration in the next selection cycle.

Successful pilot applicants typically have extensive piloting experience in high performance jet aircraft and flight test experience. Successful applicant for the mission specialists positions typically have significant backgrounds in the sciences (material, Earth, medical and space) or engineering.

After a six-month process including screening applications and conducting interviews and medical evaluations, selections will be announced in the spring with the new astronaut candidates reporting to JSC in the summer of 1996.

An application package may be obtained by calling the Astronaut Selection Office at x35907 or writing at Mail Code AHX.

Veteran crew for STS-77

(Continued from Page 1)

space available for experiments. The Shuttle-Pointed Autonomous Research Tool for Astronomy satellite will be deployed and retrieved during the mission.

Casper, 51, has flown three previous shuttle missions—STS-36, STS-54 and STS-62. Brown, 39, flew on STS-47 and STS-66. Bursch, 37, will be making his third flight on the shuttle. His two previous missions were STS-51 and STS-68.

Runco, 43, flew on STS-44 and STS-54. Garneau, 46, flew as a Canadian astronaut on STS 41-G. Thomas, 43, will be making his first flight aboard the shuttle.

Discovery returns to pad

(Continued from Page 1)

The prime payload for STS-70, the Tracking and Data Relay Satellite, was removed from *Discovery's* cargo bay and delivered to a processing facility to be reser- viced. It will be reinstalled in the cargo bay at the pad.

The TDRS-G satellite is scheduled to be deployed from *Discovery* a little more than 6 hours after launch, which is targeted for 8:41 a.m. JSC time July 13. STS-70 is commanded by veteran Tom Hendricks.

While *Atlantis* and *Discovery* swapped places in the launch schedule, workers at KSC continued to put the final touches on *Endeavour* in advance of STS-69, which is targeted for blastoff at 9:40 a.m. July 30. The launch was delayed about 10 days to enable the STS-70 mission to be scheduled in the earliest possible time frame following the STS-71 mission.

Goldin opens hotline to keep employees informed

(Continued from Page 1)

challenge. He said he will work with Congress to ensure it understands that any more cuts will severely hinder the agency's ability to affect the future of the country. Work in free operating robotics and aeronautics can lead the country into getting its fair market share, he said.

"NASA is on the cutting edge of field robotics. This is an industry that can go from \$1 billion to \$15 billion a year. If we impact just that one industry, we can more than pay for the NASA budget," Goldin said.

"We feel such a commitment to this country. The people around NASA come in and work long hard hours because they are about the future. And I hope you all understand as we go through these stressful times that we are doing the right thing for America," he added.

To give employees a better feel about what is going on he proposed a hotline to keep employees up to date and he answered questions from both Headquarters and field centers.

Goldin was asked if he thought

NASA would have an extremely difficult time in the next budget battle. Goldin pointed out that while the country is facing difficult problems, he is going to focus on the investment of science and technology to Congress. He emphasized that if the country should lose technology knowledge for more than five years it could not recover. He believes that Congress understands how critical NASA's role is in the future of America and is cautiously optimistic that the next budget battle will lean in NASA's favor. He said he will not even consider looking at other cuts unless forced to do so.

When asked about downsizing, Goldin stressed that he wants to go very slowly and be very deliberate and plan what is accomplished and do anything to avoid a reduction in force. No plans include eliminating specific jobs, the focus was to look at science and technological programs and how to transfer functions to private industry and increase efficiency all across the agency.

"I don't think it hurts the industrial base to transfer full responsibility and

accountability of functions that NASA doesn't have to perform anymore so that we can focus on what we want to do in research and development," Goldin said.

A question was asked about why employees are now able to apply for jobs at other centers and how employees can keep up morale. Goldin stressed that everyone must look at NASA as a whole and must be flexible to avoid a RIF. He said this is essential to maintain the skill mix that now exists. He recognized employee dedication to the program and country and stressed focusing on positive attitudes and pride as NASA employees. When asked about transferring personnel with functions to private industry, Goldin said he is holding Human Resources responsible for ensuring that details are worked out to benefit employees before transfers are complete.

Goldin was asked what plans are in the works for co-op students. He said there are plans to hire some co-ops next year but priority is on the people that are already here and to

do anything to avoid a RIF, including not hiring co-ops.

When questioned about eliminating duplicate efforts, Goldin emphasized that it will be done.

"We would like to have a level budget in 1996 so we can take the time to fully understand each and everything we are doing, take the time to stop and make sure we are not imposing a safety problem and we are going to also make sure that as we downsize the people have the right tools so those that remain behind don't have an undo workload on them, and then we are going to act," he added.

As part of an Agency-wide effort to keep employees informed about the latest developments regarding changes in NASA, JSC has established a hotline.

Employees may call x30616 and leave name, phone number and question or concern and a member of the Human Resources staff will call back. Non-Human Resources-related questions will be forwarded to the appropriate JSC office for response.