

Space News **ROUNDUP!**

VOL. 37 NO. 4

Lyndon B. Johnson Space Center, Houston, Texas

February 27, 1998

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Thomas starts research in 'bizarre' setting

New crew celebrates Mir's 25th anniversary; old crew comes home

Astronaut Andy Thomas reports that life aboard the Russian Mir Space Station is "unusual, if not bizarre," but that he's acclimating well, getting to know his new crew mates and beginning his scientific research.

Thomas provided the status updates in a television downlink interview and via the first of his "Letters from the Outpost" that are being made available on the NASA Shuttle-Mir Web site. His first letter deals mainly with his Jan. 22 launch aboard the Space Shuttle *Endeavour* and ends with a promise to discuss rendezvous and docking next. "As I undertake this extended stay

on the Mir Space Station, I am adapting to a lifestyle that can certainly be called unusual, if not bizarre. Perhaps it even defies adequate description," Thomas wrote. "I hope to find time, over the coming months, to describe the sensations of the flight and some of the events that make this experience so unique."

In a televised Cable News Network interview, Thomas said that living aboard Mir has been a big adjustment.

"As you can imagine, learning to live and function on a day-to-day basis permanently in zero gravity is (a big adjustment). And moving in

here is a bit like, if you can imagine, moving into a new house, and you imagine you have boxes of things all over the floor and you have to step around them. Well, up here, the problem's a little different, and that difference is the problem of zero gravity. The boxes—or in our case bags—are not just on the floor, they're on the walls, on the ceiling and floating everywhere, so it was a packing nightmare for a little while to get everything stowed and to figure out what I needed to function," he said. "But once I'd done that, things settled down quite well and now I'm getting into a nice routine of life."

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U.S. Astronaut Andy Thomas participates in his first downlink interview, with CNN, from his new home aboard Mir. Thomas called his new surroundings "unusual, if not bizarre."



NASA Photo by Benny Benavides

STS-95 crew members meet the press in JSC's Bldg. 2 Teague Auditorium on Feb. 20. Mission Specialist Steve Robinson, Payload Specialist John Glenn, Pilot Steve Lindsey, Commander Curt Brown, Mission Specialists Scott Parazynski and Pedro Duque, and Payload Specialist Chiaki Mukai. Duque is representing the European Space Agency, while Mukai is representing NASDA, the Japanese space agency.

Brown says research only STS-95 goal

By Kelly Humphries

Commander Curt Brown and the rest of the STS-95 crew said last week they are excited about opening a new chapter in space physiology research with their October mission, and that they are looking forward to flying with an American hero.

Brown and the crew met the news media earlier than normal for a pre-flight briefing last Friday because of interest in Sen. John Glenn's participation as a payload specialist.

Brown said he is honored to be flying with Glenn, who made America's first orbital space flight in a tiny Mercury capsule on Feb. 20, 1962, and noted that this mission will be significantly longer. Coincidentally, the news conference occurred on the 36th anniversary of Glenn's Mercury flight.

"Without Sen. Glenn's courage back in 1962 to make that historic flight, we probably would not be here today talking about STS-95 and our exciting mission in October," Brown said. "The one thing I did promise Sen. Glenn was his second flight will be quite a bit longer than his first."

Glenn admitted he has a personal interest in making the flight, but said the primary reason is to kick off a new realm of research in cooperation with the National Institute on Aging to use the space environment as a tool to better understand the correlation between the aging process on Earth and the physiological effects of space flight on the human body.

"This is basic, fundamental research," Glenn said. "We have some 35 million Americans that are over the age of 65. If we can figure out what triggers the body's mechanisms on and off, it will help astronauts who are younger to attenuate some of these things in space, or to help older people on Earth escape some of the frailties of old age."

The flight crew's assignment to the flight was announced

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March is Women's History Month

NASA will be observing National Women's History Month in March, as well as the 150th Anniversary of the Women's Rights Movement, which will be celebrated throughout 1998.

NASA Administrator Daniel S. Goldin sent a letter to all center directors supporting the observance of the month and encouraging all NASA employees to recognize the contributions of women to the world.

"The national theme for National Women's History Month, 'Living the Legacy of Women's Rights,' refers to the many ways in which women's lives have changed because of the Women's Rights Movement," Goldin wrote. "The freedoms and opportunities women now have are the results of the risks and sacrifices of our foremothers. The Women's Rights Movement has had a profound impact on all

aspects of American life. It has opened new and well-deserved opportunities for women in all fields of endeavor, including commerce, athletics, business, education, religion, the arts, engineering, and scientific exploration.

"Today, women of all ages are living the legacy of women's rights that seven generations of women before them have given their best to achieve," he continued.

"I fully support the observance of National Women's History Month and the celebration of the 150th Anniversary of the Women's Rights Movement. "I encourage everyone at NASA to mark not only this month but the entire year with appropriate programs, ceremonies, and activities that will highlight the contributions of the unsung heroines who helped to make our nation strong and a leader throughout the free world."

School district to break ground on JSC corner

Clear Creek Independent School District will break ground March 2 for its new intermediate school on the grounds of JSC.

Dr. John E. Wilson, superintendent Clear Creek ISD; Sophia LeCour, president of board of trustees for CCISD; and JSC Director George Abbey will be among a group of JSC, school district, local government, community and business leaders attending the ceremony.

Work to prepare the site on 35 acres at the southwest corner of JSC, directly north of Space Center Houston, will begin immediately. The \$13 million bond-financed school is expected to be completed for occupancy by the fall of 1999.

The school is being erected as part of a collaborative education venture between JSC and the district. The long-term lease represents a "first of its kind" partnership between a NASA center and a local school district, and provides the opportunity to combine the scientific and technical expertise of JSC with the teaching skills of the CCISD faculty, furthering development of the science

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Drawing courtesy Clear Creek Independent School District

This architectural rendering of the site of the new Clear Creek Independent School District's intermediate school shows its location in relation to Space Center Houston, directly above in the drawing, and JSC, in the upper left hand corner. Site work is scheduled to begin immediately for the school, with construction expected to be complete by the fall of 1999.

Voyager 1 most distant man-made object in space

The Voyager 1 spacecraft has set another record and become the explorer that has traveled farthest from home.

At approximately 4:10 p.m. JSC time Feb. 17, Voyager 1, launched more than two decades ago, cruised beyond the Pioneer 10 spacecraft and became the most distant human-created object in space, at 6.5 billion miles from Earth. The two are headed in almost opposite directions away from the Sun.

"At almost 70 times farther from the Sun than the Earth, Voyager 1 is at the very edge of the solar system," said Dr. Edward Stone, Voyager project scientist and director of NASA's Jet Propulsion Laboratory.

"The reason we can continue to operate at such great distances from

the Sun is because we have radioisotope thermal electric generators on the spacecraft that create electricity and keep the spacecraft operating."

"The fact that the spacecraft is still returning data is a remarkable technical achievement," Stone said.

Voyager 1 was launched from Cape Canaveral on Sept. 5, 1977. The spacecraft encountered Jupiter on March 5, 1979, and Saturn on Nov. 12, 1980.

After a close fly-by of Saturn's large moon Titan, Voyager 1's path was bent northward by Saturn's gravity, sending the spacecraft out of the ecliptic plane—the plane in which all the planets except Pluto orbit the Sun.

Launched on March 2, 1972, the

Pioneer 10 mission officially ended on March 31, 1997. However, Ames Research Center intermittently receives science data from Pioneer as part of a training program for flight controllers of the Lunar Prospector spacecraft now orbiting the Moon.

"The Voyager mission today presents an unequalled technical challenge. The spacecraft are now so far from home that it takes nine hours and 36 minutes for a radio signal traveling at the speed of light to reach Earth," said Ed Massey, project manager for the Voyager Interstellar Mission at JPL. "That signal, produced by a 20 watt radio transmitter, is so faint that the amount of power reaching our antennas is 20 billion times smaller than the power of a digital watch battery."

Having completed their planetary explorations, Voyager 1 and its twin, Voyager 2, are studying the environment of space in the outer Solar System. Science instruments on both spacecraft sense signals that scientists believe are coming from the outermost edge of the Sun's magnetic field, known as the heliopause.

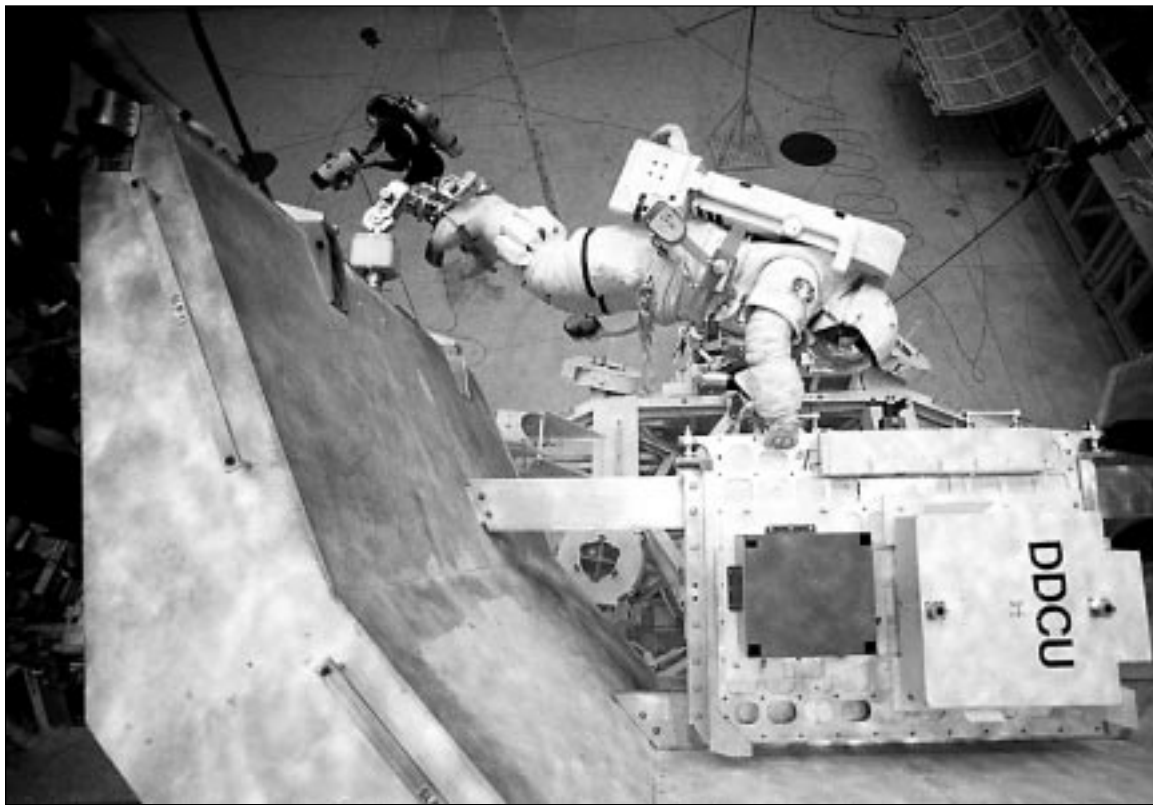
In this zone the solar wind abruptly slows down from supersonic to subsonic speed, creating a termination shock. Before the spacecraft travel beyond the heliopause into interstellar space, they will pass through this termination shock.

"The data coming back from Voyager now suggest that we may pass through the termination shock in the next three to five years," Stone said. "If that's the case, then one would

expect that within 10 years or so we would actually be very close to penetrating the heliopause itself and entering into interstellar space for the first time."

Encountering the termination shock and heliopause has been a long-sought goal for many space physicists, and exactly where these two boundaries are located and what they are like still remains a mystery.

Science data transmitted are received by the Deep Space Network antennas located in California, Australia and Spain. Both spacecraft have enough electricity and attitude control propellant to continue operating until about 2020. At that time, Voyager 1 will be almost 150 times farther from the Sun than the Earth—almost 14 billion miles away.



JSC Photo S98-00937 by Mark Sowa

ORU READY?—Astronaut Leroy Chiao evaluates one concept for a logistics carrier to deliver Orbital Replacement Units to the International Space Station. Chiao and Dan Bursch were using a Spacelab pallet mockup to see how well space walkers could work with replacement units on that particular carrier. The pair was among a number of astronauts involved in a two-week series of underwater simulations of maintenance procedures in the Neutral Buoyancy Laboratory in late January. Other simulations involved testing of methods for translating equipment along the truss assemblies of the station using the Crew and Equipment Translation Aid Cart and an Orbital Transfer Device, also known as the EVA crane, which flew as a demonstration unit on the STS-87 mission. Subjects also evaluated station maintenance work sites and tasks off two faces on one of the truss segments.

Shuttle managers delay Neurolab launch two weeks

NASA managers have decided to postpone for two weeks the launch of the STS-90 Neurolab flight, setting a new target date of April 16. The delay will permit better utilization of available shuttle resources to support shuttle processing.

Commander Rick Searfoss, Pilot Scott Altman, Mission Specialists Rick Linnehan, Dafydd Rhys Williams, Kay Hire, and Payload Specialists Jay Buckley and Jim Pawelczyk, have completed the crew equipment interface test and are continuing their training. The crew will fly to Florida for the terminal countdown demonstration test, a final dress rehearsal of the launch, March 30-31.

Technicians at Kennedy Space Center continue to prepare *Columbia* and its long Spacelab module for the 16-day flight. The Neurolab interface verification test has been completed, and the tunnel adapter was installed Monday in the Orbiter Processing Facility hangar. *Columbia's* main engines were installed Tuesday.

The external tank and solid rocket boosters were scheduled to be mated Thursday, and *Columbia* is set to roll over to the Vehicle Assembly Bldg. on March 16.

The goal of the 16-day life sciences mission is to increase the understanding of the mechanisms responsible for neurologic and behavioral changes that occur in space flight and to apply results from space studies to the health, well-being, and economic benefits of people on Earth.

The Neurolab payload consists of 26 human and non-human scientific experiments and associated hardware in a Spacelab long module and the orbiter middeck. The experiment disciplines are primarily involved with life science investigations utilizing human subjects and laboratory animals.

To support the long mission, the shuttle will be configured with an extended duration orbiter system to generate electricity and life support consumables.



Scientists view first close-ups of Martian polar terrain

Swirling bands of eroded, layered rock, reminiscent of the edges of Alaskan ice sheets blanket the frigid floor of Mars' south pole. NASA's newly named Mars Polar Lander will touch down in this uncharted territory in late 1999 to dig for traces of frozen, subsurface water.

New images of the landing zone for the Mars Polar Lander, taken by the camera aboard NASA's Mars Global Surveyor, confirm the strange, layered terrain in the south polar region. This represents a dramatic departure from the Martian landscapes observed by the Viking landers and Mars Pathfinder.

"Despite ground fog that obscures part of the surface in these images, we can see much more surface detail than we've ever seen before, which suggests that the 75-degree south latitude landing zone is quite a bit more rugged and geologically diverse than we had previously thought," said Michael Malin, principal investigator for the Global Surveyor camera and the cameras on the Mars Polar Lander and its newly named partner, the Mars Climate Orbiter.

Current images from Mars Global Surveyor show objects as small as 48 feet across can be seen. Once in

its final mapping orbit, the camera will be able to distinguish ground features as small as seven to nine feet across. This greater clarity will enable views of objects as small as boulders or as subtle as sand dunes.

Over the next year, Global Surveyor images will be used with other data to better characterize the geology of the Martian south pole. Once in its mapping orbit, data from the spacecraft's laser altimeter will measure the height and roughness of Martian surface features and will aid the final choice of landing sites.

"We have a wonderful opportunity in the next year to study this region

with data from Mars Global Surveyor, which underscores the true advantage of conducting a continuing program of Mars exploration," said Dr. John McNamee, Mars Surveyor '98 project manager at NASA's Jet Propulsion Laboratory. "We will be able to characterize the geology of the whole region and find the best spot to land, one that presents a balance between lander safety and scientific interest. This process does not have to be finalized until June 1999, five months after the lander has been launched and six months before it lands."

Piggybacking on the Mars Polar

Lander are two small 4.5-pound microprobes. Deployed before landing, they will penetrate and embed themselves beneath the Martian surface to study subsurface materials.

Mars Polar Lander and the Mars Climate Orbiter are designed to learn more about the history of Mars' climate and the behavior of volatiles, such as water vapor and ground ice. The climate orbiter, scheduled for launch Dec. 10, will profile the Martian atmosphere and map its surface. The polar lander, scheduled for liftoff Jan. 3, 1999, will search for traces of subsurface water and any evidence of climate change.

Shock wave sheds light on supernova

NASA's Hubble Space Telescope is giving astronomers a ringside seat to a never before seen titanic collision of an onrushing stellar shock wave with an eerie glowing gas ring encircling a nearby stellar explosion, called supernova 1987A.

Though the star's self-destruction was first seen nearly 11 years ago on Feb. 23, 1987, astronomers are just now beginning to witness its tidal wave of energy reaching the "shoreline" of the light-year wide ring.

Shocked by the 40-million mile per hour sledgehammer blow, a 100-billion mile diameter knot of gas in a piece of the ring already has begun to "light up," as its temperature surges from a few thousand degrees to a million degrees Fahrenheit.

"We are beginning to see the signature of the collision, the hammer hitting the bell. This event will allow us to validate ideas we have built up over the past 10 years of observation," says Robert Kirshner of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass. "By lighting up the ring, the supernova is exposing its own past."

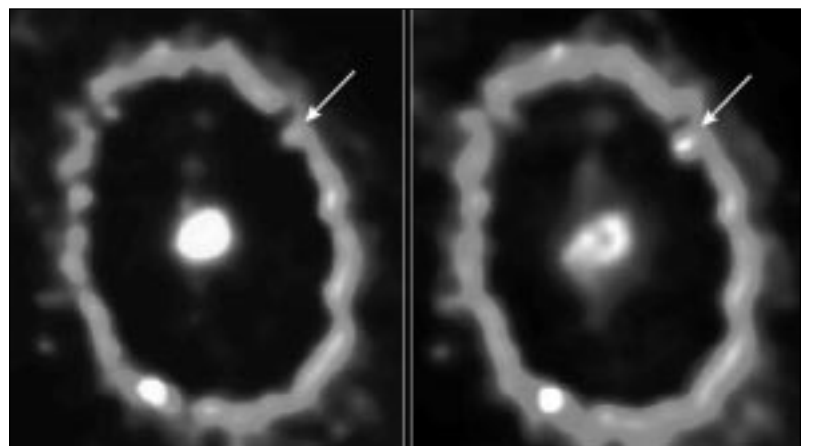
Astronomers predict it's only a matter of years before the complete ring becomes ablaze with light as it absorbs the full force of the crash.

Illuminating the surrounding space like a flashlight in a smoky room, the glowing ring is expected to shed a brilliant new light on many unanswered mysteries of the supernova: What was the progenitor star?

Was it a single star or binary system?

Are a pair of bizarre outer rings attached to an invisible envelope of gas connecting the entire system?

"We have a unique opportunity to probe structure around the supernova and uncover new clues to the final years of the progenitor star before it exploded," adds Richard McCray of the University of Colorado in Boulder, Colo. "The initial supernova flash only lit up a small part of the gas that surrounds the supernova. Most of it is still invisible. But the light from the crash will give us a chance to see this invisible matter for the first time, and then perhaps we can unravel the mystery of the outer rings."



NASA Photo

These NASA Hubble Space Telescope Wide Field and Planetary Camera 2 images show the glowing gas ring around supernova 1987A. Left, the supernova in 1994, shows a brightening knot on the upper right side of the ring. This is the site of a powerful collision between an outward moving blast wave and the innermost parts of the circumstellar ring. Right, the collision heating the gas has caused it to brighten in recent months.

Community News

Government, contractor employees join forces, share joy of engineering

By Mae Mangieri

This month, JSC celebrated seven years of observing National Engineers Week when some 200 civil service and contractor employees visited elementary and middle school classrooms to encourage students to pursue careers in engineering, science, math and technology as part of a national outreach program called Discover "E" ("E" for Engineering).

The volunteers shared their unique space-related knowledge with students and teachers as part of JSC's commitment to the local educational community.

"My goal is to demonstrate to students that the science and math concepts they study at school are used at NASA every day," said Tracy Minish of United Space Alliance. "Students are especially interested in everyday aspects of living in space, and ask a lot of 'what if' questions that deal with problem solving."

More than 200 civil service and contractor employees had the opportunity to participate in National Engineers Week through an on-going educational partnership between JSC and companies such as Barrios Technology, The Boeing Company, Hernandez Engineering, Lockheed Martin and United Space Alliance.

Since JSC began the National Engineers Week contractor partnership in 1996, there has been a 43 percent increase in the number of contractor volunteers visiting classrooms. Classroom visits were arranged through JSC's Education Outreach Program in response to teachers' requests.

"What better way to send your most talented employees into the classroom to share their knowledge with children," said Wendy Starr from Boeing's Community Relations Office. "It takes proactive companies to make a difference in our community and Boeing is one of them."

Many volunteers visited more than one classroom at their assigned school in an effort to reach as many students as possible. NASA Flight Director Rob Kelso visited a combi-

nation of three classrooms at Simms Elementary School in the LaMarque Independent School District.

"Mr. Kelso went the extra mile to give a presentation to all of our fourth grade students, wrote Simms Elementary School teacher Jan Scanlon. "Many of our students don't have the opportunity to interact with people outside of our immediate community, and for a NASA employee to spend time at our school is encouraging to the students. When he told them he also attended school in La Marque, they connected with him immediately."

During their classroom presentations, volunteers engaged students by using a variety of hands-on experiments and visual props like space suit items, food, Apollo lunar boots and gloves, and space shuttle tiles.

"The most exciting part of the day was when the students were allowed to get close and touch the space hardware," wrote Cinda Chullen, technical manager for the Science, Engineering, Analysis and Test contract for the Engineering Directorate.

The student's favorite activity was a simple experiment Chullen ran to teach the students how liquid cooling ventilation garments protect astronauts from overheating while wearing their space suits.

"I started out talking about temperature and quizzing them on how hot it might get in space when an astronaut puts on their space suit and goes out into space. They had a lot of fun guessing how hot it might get. Then, I ran an experiment whereby tubing was placed around a volunteer-student's arm and then I siphoned ice cold water through the tube from an ice chest. I explained that the coolness felt in the arm is how an astronaut would feel cooling wearing the LCVG and protecting themselves from the heat of space. They all wanted to try the experiment, however there just wasn't enough time."

In all, JSC volunteers interacted with more than 17,000 students at 115 different schools in the local educational community, and thank-



S98-01922

Photos by Steve Candler, Cinda Chullen

Above: Cinda Chullen, technical manager for the Science, Engineering, Analysis and Test contract for the Engineering Directorate, demonstrates the various components of space suits to students at College Park Elementary School in the La Porte Independent School District. Left: NASA Flight Director Rob Kelso gives his National Engineers Week presentation to students at Simms Elementary School in the LaMarque Independent School District. Below: Simms Elementary School teacher Jan Scanlon shows her students a space suit glove brought to the classroom by visiting engineer Kelso. For more information or to volunteer, employees may call Mae Mangieri at x32929.



S98-01828

you letters are pouring in from teachers. "The students were obviously interested in what Betsy had to say," wrote Jonica Mangieri, a fifth grade teacher at Hughes Road Elementary School in Dickinson, about Betsy Kluksdahl of JSC. "When she invited them to ask questions, almost every question showed their comprehension and curiosity about the subject."

National Engineers Week is an annual event to increase public awareness and appreciation of engineers and their work. More than 3 million engineers, teachers, and students participated nationwide.

JSC's Education Outreach Program provides volunteers for local schools year round, and new volunteers are always needed. As a vol-

unteer, employees can help educators inspire students by participating as guest speakers, career day speakers, science fair judges, tutors and mentors. Time spent participating in an approved event is official duty time, and with supervisory approval civil service employees may charge their volunteer time to a special education labor code.



S98-01829

JSC Safety Alert

Excessive Use of Hydraulic Elevators

What Happened

Recently, there have been at least two incidents at JSC in which hydraulic elevators failed while raising or lowering equipment. The most recent of these involved Elevator No. 5 at the Sonny Carter Training Facility on Oct. 24 and 25. This event involved the moving of a large amount of equipment in the elevator during a motion picture filming activity at the SCTF. The heavy loads coupled with the extensive transporting activity resulted in the overheating of the hydraulic system. On both occasions, people were stuck in the elevator when it failed.

Safety Implications

Overloading an elevator or long continuous use of a hydraulic elevator may result in: (1) damage to the elevator; (2) damage to equipment or materials being transported; and (3) entrapment or injury to personnel.

What You Can Do

If you are planning an activity or have knowledge of an activity that may involve overloading or long continuous operations of a hydraulic elevator (typically three stories or less), consult with the facility manager of the building where the elevator is located and provide him/her with all pertinent information on the activity. Never overload the elevator. Know the weight of your load for each operation of a hydraulic elevator. Look for the elevator's capacity posted inside the elevator and if your load exceeds the elevator's capacity, get approval from JJ14/ Michael Scott (33206) before using the elevator.

If you are the facility manager, be aware that excessive elevator use in your facility can cause a hazard. Consult with JJ14/Mike Scott on planned activities involving excessive use or overloading of the elevator.

For additional information, contact John Stanford/NA3 at x31347.
http://www4.jsc.nasa.gov/safety/alert/

Good Earth Day fest won't be hard to find

By Sandy Parker

Planning is under way for JSC's annual Earth Day celebration, scheduled for Friday, April 17, at the Gilruth Center.

This year's theme is, "A Good Planet is Hard to Find." In addition to the numerous exhibits by local organizations and environmental agencies, many new activities are in the planning stages, including a children's program presented by the child care center, a scavenger hunt and local science fair exhibits.

United Space Alliance is partnering with JSC to promote JSC/USA "Recycles Day" on Wednesday, April 22. Employees are encouraged to use this day as an office "spring cleaning" and to recycle excess paper, cardboard and possibly overhead transparencies.

Once again, coloring pages will be available for employees' children, and the popular photography contest will be open to all JSC civil service and contractor employees. All entries will be displayed at the event. Prizes will be provided for each col-

oring page and awarded for the best photos.

JSC also will host the Federal Executive Board fun run planned for April 18. Watch for the details, rules and registration form on the Earth Day home page by early March.

Free prizes, give-aways and astronaut autographs once again will be available. Some of the exhibitors will include the Sierra Club, the Galveston Bay Estuary Program, the Government Services Administration, Army Corps of Engineers and the Environmental Protection Agency, to name a few.

This year, information booth experts will be available to answer questions about recycling, composting, gardening, and attracting birds and butterflies to your yard.

Employees who would like to volunteer for the Earth Day Planning Committee or would like information regarding the fun run, should contact Jo Kines at x33218. Employees who would like to volunteer to help with the many Earth Day activities should contact Bob Gaffney at x34249.



Above: Technicians prepare to lift *Atlantis* off of its Shuttle Carrier Aircraft following a November ferry flight from Kennedy Space Center to Palmdale, Calif. Right: Manufacturing engineer Darrell Trojan, center, meets with members of his Palmdale, Calif., major modification team. Below: Mark Allison, a Boeing employee, examines the flight deck of *Atlantis*. The cockpit will change significantly during this major modification period with the installation of "glass cockpit" liquid crystal displays to replace the old mechanical cockpit displays.



Photos courtesy Boeing



Veteran mechanics, technicians, engineers enjoy keeping shuttle fit

By Bob Howard

[Editor's note: This article was originally printed in Boeing News.]

THERE'S MAJOR EXCITEMENT in the air at Boeing's Palmdale, Calif., Orbiter Major Modification Facility. And it's as welcome as the aroma of sage after desert rain. The space shuttle is here!

Atlantis is back in Palmdale for a series of major modifications and state-of-the-art improvements that will allow her to carry greater payload weight into orbit, navigate with unprecedented accuracy and give astronauts new, digital instrument displays with which to fly.

This team of veteran space mechanics, technicians, engineers and support staff is about to tackle one of the most ambitious shuttle modification and inspection periods to date. And, they can't wait to dive in.

Darrell Trojan's job as a manufacturing engineer means resolving work flow problems to help keep things running smoothly. To him working on the shuttle is the greatest thing going. "It's great because it's world renowned. You feel like somebody who's really in the middle of the ball game. It's a special piece of equipment," Trojan said.

"And it's unprecedented as far as its accomplishments go."

What's a major mod like? "It's constantly go," explains Jerry Stone who, with his team, will remove, inspect and reinstall 3,000 white insulation blankets covering the cargo bay interior. These blankets protect critical systems from the intensely hot and cold conditions of space.

What's his job like? "The days go by so fast I can't believe it. I love it," Stone says. "I really enjoy coming to work. I can look at that beautiful spaceship, and say, 'Hey, I did that.'"

Mark Allison soon will be hip deep in one of the most complex mods, changing from mechanical instruments to digital displays.

For Allison and team, their big moment is making the late April deadline for electrical powerup. "That's like one of the glory times," said Allison. "When you know you're done and you did a good job."

Neil McCabe is one of the team that is removing and rebonding 3,000 square feet of thermal protection system blankets to the vehicle's exterior. They will install a newer, lighter blanket material that will remove some 1,500 pounds from the spacecraft.

"Every day is a new adventure,

because of the complexity of the system," McCabe says. "It's all very interesting because of the interfaces between the different kinds and thicknesses of materials and the science of the TPS itself."

You can see Jeff Lewis light up when he talks about "pushing the button." Lewis often operates the crane to remove large parts from the shuttle—with, of course, all eyes on him. "Believe me, you've got to be smooth, in spite of the pressure," Lewis says. "But it's such a big thrill to me. What we do, the world sees it, and we take a lot of pride in that. We are the best of the best. We never forget we are preparing this vehicle for the next three years of service in space."

Jim MacCurdy is an electrical tech with experience all the way back to the *Enterprise*, which came before the first shuttle, *Columbia*. "Every time we hear something on the news, something that the astronauts are doing, we feel very much a part of it," MacCurdy says.

Mods are tough. It takes going the extra mile and it takes a lot of drive.

"Our job has been to prove we're the best place to do these mods," MacCurdy explains. "And we're not letting up now." □

Upgrade Downtime

Atlantis gets new cockpit, navigation systems during refit

By Alan Buis

[Editor's note: This article was originally printed in Boeing News.]

TWENTY SUCCESSFUL MISSIONS and more than 60 million miles under its belt, America's Space Shuttle *Atlantis* is back at the Boeing Orbiter Major Modification Facility for a nine-month, approximately \$70 million makeover highlighted by the installation of a new, state-of-the-art cockpit and a cutting-edge satellite-based navigation system.

During its once-every-three-year orbiter major modification, *Atlantis* will receive a comprehensive structural inspection and more than 100 modifications designed to reduce program maintenance costs and improve operations, safety and reliability. Included are upgrades that will enable *Atlantis* to support construction of the International Space Station.

This refurbishment will be the most extensive yet performed. *Atlantis*, arrived in Palmdale, Calif., atop a Boeing 747 Shuttle Carrier Aircraft on Nov. 14, is to return to Kennedy Space Center in August.

Under contract to United Space Alliance, a team of more than 350 Boeing technicians and engineers—many of whom built *Atlantis*—are literally taking apart and reassembling the vehicle. Inspectors will survey every nook and cranny of the 12-1/2 year-old ship, using their eyes, borescopes, X-rays, ultrasonic waves, and other techniques to search for possible fatigue, corrosion, or broken rivets or welds.

The maintenance period also provides NASA and USA an ideal opportunity to install major modifications aimed at better, safer and more efficient vehicle performance and expanded mission capabilities.

A highlight of this refit—*Atlantis*' second—will be the shuttle fleet's first installation of the Multifunction Electronic Display Subsystem, commonly called the "glass cockpit." MEDS will replace *Atlantis*' four existing cathode ray tube screens, mechanical gauges and instruments with full-color flat-panel displays like those currently in use on modern commercial and military aircraft. These glass screens—the only space-qualified, flat-panel displays in the world—also will provide shuttle crews with information such as attitude-display, Mach-speed and horizontal-situation indicators.

"The change to MEDS is necessary because present electro-mechanical devices are becoming obsolete and increasingly expensive to maintain," said Russ Turner, Boeing Reusable Space Systems vice president and general manager. "Besides reducing maintenance costs, MEDS will reduce vehicle weight and power consumption, improve shuttle reliability and performance and be capable of expansion for future applications."

When MEDS is installed, *Atlantis*' forward flight deck will have nine displays, while two MEDS displays will be installed in the aft flight deck to support payload operations. Information will be interchangeable between screens depending upon mission needs, allowing crews to

select the display format that best suits their needs. MEDS hardware was developed by Honeywell Satellite Systems Operations, Glendale, Ariz.

Atlantis also is set to become the first orbiter to be guided solely by satellite-based navigation. The current TACAN navigation system will be removed and replaced with a triply-redundant system that operates through signals from the Boeing-built Navstar Global Positioning System satellites, the world's most accurate navigation system. The three-string GPS system will provide accurate vehicle attitude and location data. It promises to reduce shuttle program costs by eventually allowing removal of several ground stations at KSC as well as at the trans-Atlantic abort landing sites, which are becoming obsolete and costly to maintain. Together with other planned navigation enhancements, the three-string GPS system could one day enable shuttle landings in poor visibility conditions.

An additional series of modifications will enable *Atlantis* to join sister ships *Discovery* and *Endeavour* in supporting International Space Station construction, which begins this summer. The docking system *Atlantis* has used for seven missions to Russia's Mir space station will be modified to become a fully functional airlock complete with space suit services and crew communications capabilities and will be relocated within *Atlantis*' payload bay to provide adequate structural clearance with the ISS exterior. Additional station-related modifications will increase the orbiter's cooling and power capacities to support station payloads and upgrade the ship's UHF space communications system.

Operational enhancements include increasing the vehicle's load carrying capability, a series of measures to reduce the orbiter's weight and upgrades to the ship's thermal protection system tiles and blankets.

Safety and reliability enhancements include provisions to protect the orbiter's cooling system and wing leading edges from space debris, a structural beef-up of the crew module floor and enhancements to the vehicle's auxiliary power units and hydraulic system.

For the first time ever, Boeing Palmdale orbiter modifications personnel also will perform preflight vehicle checkouts. The move is expected to reduce the time required to process the vehicle for its next flight by up to two months.

The fourth operational orbiter, *Atlantis* rolled out of the Boeing Palmdale facility on April 6, 1985, and made its debut flight on mission STS-51J on Oct. 3, 1985. Among its accomplishments have been five missions for the Department of Defense; deployment of the Magellan, Galileo and Gamma Ray Observatory spacecraft; and seven missions to dock with Russia's space station Mir. *Endeavour* docked with Mir last month.

Atlantis' next scheduled mission will be STS-92 in January 1999, an International Space Station assembly mission to deliver station hardware, including a DC-to-DC power conversion unit. □



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S98-01738

Riders through the storm

THE TEXAS INDEPENDENCE TRAIL RIDERS made their way through driving rain to reach JSC Feb. 23 on their way to the Houston Livestock Show and Rodeo.

In spite of the bad weather, they arrived on time and were joined by five JSC Circle Riders. The group wound through the center and set up camp overnight at the Gilruth Center.

Later that evening, the NASA/Clear Creek/Friendswood Subcommittee of the Houston Livestock Show and Rodeo's Metro Go Texan Committee sponsored a dinner and dance at the Gilruth Center ballroom.

"There were well over 400 guests," said Larry Neu, Rodeo Planning Committee chairman. "For a first year, that was a good crowd."

1) Rose Gardner of the JSC Travel Office, center, rides with the Independence Trail Riders as they enter JSC at Rocket Park.

2) Traci Williams, daughter of JSC's Dawn Williams, pets a horse, as Cara Clayton, daughter of Ron Clayton, waits her turn.

3) A lone rider guides his horse through JSC on the way to the Gilruth campground.

4) At the end of a long day, Ben Posey still has a friendly smile as he unsaddles his horse Charlotte for the night. Posey and Charley Carey, right, were the only riders who pitched tents each night of the trail ride, foregoing the comfort and luxury of large campers.

5) Parents and children of all ages welcome the riders to JSC as they enter Rocket Park.

6) Two Longhorn Ranch "Dance Hall Girls" turn in to Rocket Park, carrying a shuttle model that almost became airborne during the windy storms earlier in the day.

7) Walter Walls holds his horse, Salt, as a youngster pets it at the JSC Child Care Center.

8) Leo and Laura Salkowski, children of Engineering's Charles Salkowski, judge two chili recipes made by employees of the JSC Child Care Center during Rodeo week.

9) Employees in Bldg. T-585 welcome the riders as they parade through JSC. □



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36 Years Ago at MSC

John Glenn orbits Earth three times

Mercury Atlas 6 flight proves man is able to perform tasks during weightlessness

Reprinted from the Feb. 21, 1962, issue of Space News Roundup.

Astronaut John Glenn, Jr., yesterday became the first American to orbit the Earth. The spaceflight, often postponed because of weather and technical difficulties, finally became a reality after a sudden change in weather and Glenn's name is certain to go down into history alongside the names of Astronaut Alan B. Shepard and Virgil I. "Gus" Grissom, who completed sub-orbital space flights last year. The flight started at 9:47 a.m. EST and was concluded at 2:43 p.m. EST when he splashed down in the Atlantic Ocean. The Friendship 7 with its now famous astronaut pilot was picked up by the USS Noa at 3:01 p.m. and set on the destroyer's deck at 3:04 p.m. Glenn reported by radio to the Noa's crew, "My condition is excellent."

The near perfect weather and the outstanding performance of the spacecraft and launch vehicle systems seemed a fitting reward for the remarkable patience with which Glenn had shrugged off what seemed to be endless delays to others. Both Glenn and his back-up pilot, M. Scott Carpenter, have repeatedly stated that the delays would only serve to increase the sharpness of the crew and Glenn's performance during the flight seemed to give credence to this view.

The flight took an elapsed time of slightly more than four hours and 56 minutes, during which time John Glenn had traveled more than 80,000 miles. Following his pickup by the Noa the side hatch of the Mercury spacecraft was blown and Glenn performed a side egress.

Glenn was in voice contact with fellow astronauts at Mercury tracking stations during his history making flight, and in typical Glenn fashion many of the remarks were of a light nature.

In addition to reporting on his physical condition and the spacecraft's systems, he continually gave other impressions as to the view, etc. Shortly after lift-off Glenn said that the "view was tremendous." When passing over the coastline of Australia on the first of his three trips around the Earth, he was conversing with Astronaut Gordon Cooper and he saw lights to the south. When Cooper informed him that the lights were turned on as a salute by the citizens of Perth, he said, "the lights show very well and thank everybody for turning them on."

On his last orbit Glenn requested Cooper to send a message to the Commandant of Marines, General D.M. Shoup, notifying him that he had attained his necessary four hours of flight time and was requesting flight pay.

After his re-entry, at which time the spacecraft attained a temperature of about 3,000 degrees and the cabin temperature was in excess of 130 degrees, when queried about his condition, Glenn said he felt fine and speaking of the experience of re-entry said, "boy, that was a real fireball."

National radio and television coverage of the event started at 6:30 a.m. and lasted far past the time of recovery. The media not only covered the activities at Cape Canaveral but also those at the Glenn home in Arlington, Va., at the hometown of his parents, New Concord, Ohio, at the White House in Washington, and



A camera aboard the "Friendship 7" Mercury spacecraft photographs Astronaut John H. Glenn Jr. during the Mercury-Atlas 6 space flight.

in the recovery area.

Following the completion of the flight and the recovery President Kennedy appeared on camera and spoke briefly concerning the success of the mission. He said in part, "I know I express the great happiness and thanksgiving of all of us on the completion of Colonel Glenn's trip. I also want to thank all of those who participated at Cape Canaveral who faced many disappointments and delays but kept their heads and made a judgment and today that judgment has been vindicated. Some time ago, I stated that all men should serve their country. Today Colonel Glenn served his country."

At New Concord, Ohio, many activities were held to mark the biggest day in the life of the town's hero. At T minus 15 minutes the sirens in the town were sounded to give the citizens notice to gather at Muskingum College Auditorium to view the launch.

Following the flight, Glenn's moth-

er said that most tense moment for her and Mr. Glenn were those moments just after the launch and before the successful orbit was announced. She said that in a telephone conversation on Tuesday night John had told her that he had "packed his bag for a little trip."

At Arlington, where media representatives stood by all day, Glenn's wife said that this was the "most wonderful day for my family. We're all so proud of everyone on the Mercury team who made it such a success."

It was reported that one of the happiest men in the Mercury Control Center at the successful completion of the mission was Astronaut Donald K. "Deke" Slayton, who has been named to pilot the Mercury-Atlas 7 mission with Walter Schirra, Jr., as a back-up pilot and Gus Grissom as technical advisor.

More than 500 media representatives followed the Mercury spacecraft as it circled the Earth three times and kept the free world in constant con-

tact with the progress of the mission. It was further reported that Soviet Union factual reports were broadcast from time to time. One of the facilities at the Cape press site was a Voice of America van through which messages in many languages were transmitted to all parts of the world.

Glenn rose shortly after 2 a.m., breakfasted with steak, scrambled eggs, toast, orange juice, and coffee. Following his physical examination and the attachment of bio-sensors, he was suited at 4:30 a.m., the pressure check was completed at 4:38 a.m., he left the crew quarters and was transferred to Complex 14 in the Transfer Van, arrived at the launch pad at 5:59 a.m., and entered the spacecraft at 6:03 a.m. At that point no one could know that he would spend nine hours and 21 minutes in that spacecraft before emerging on the deck of the Noa. During the trip he traveled around the Earth at altitudes ranging from 100 to 160 statute miles.

Gilruth Center News

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

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

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

Weight safety: Required course for employees wishing to use the Gilruth weight room. The next classes are scheduled for at 8 p.m. March 12 and March 26 (must be on time to receive credit for class). Pre-registration is required. Cost is \$5. Annual weight room use fee is \$90. Additional family members are \$50.

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

Stamp Club: Meets every 2nd and 4th Monday at 7:00 p.m. in Rm. 216.

Akido: Introduction to Aikido beginning classes start every month. Class meets Tuesday and Wednesday from 5:15 p.m. to 6:15 p.m. Instruction by 4th Degree Black Belt. Learn to defend yourself and get a great aerobic workout. Cost is \$35 per month.

Step/bench aerobics: Low impact cardiovascular workout, classes every Monday, Tuesday & Thursday from 5:15 p.m. to 6:15 p.m. Cost is \$32 for eight weeks- Kristen Taragzewski instructor. x36891

Ballroom dance lessons: Classes meet every Thursday from 7 p.m. to 8:15 p.m. for Beginner Advanced Classes and classes for Beginner-Intermediate and Intermediate are from 8:15 p.m. to 9:30 p.m. Cost is \$60 per couple.

Fitness Program: Health Related Fitness Program includes medical examination screening, 12 week individually prescribed exercise program. Call Larry Wier at x30301 for more information.

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

Defensive Driving Course: Class is offered once a month at the Gilruth Center. Interested parties must pre-register. Cost \$25.

Nutrition Intervention Program: Would you like to learn more about the role diet and nutrition play in your health? Open to all NASA Civil servants, contractors and spouses, this 6 week program includes private consultation with the Dietitian, a lecture series and blood analysis to chart your progress. Contact: Tammie Shaw x32980.

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

Ticket Window

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

Moody Gardens: Tickets are \$9.75 for two of four events

Space Center Houston: Adults, \$10.25; children (4-11), \$7. JSC civil service employees free.

Movie discounts: General Cinema, \$5.50; AMC Theater, \$4.50; Sony Loew's Theater, \$5.

Stamps: Book of 20, \$6.40

1998 Franklin Planners: Replacement refill orders being taken now.

Sweetwater Pecans: Orders are being taken now; cost is \$5.75 per pound.

Metro passes: Tokens and value cards available.

Book available: *Suddenly Tomorrow Came: A History of Johnson Space Center.*

Balloons: Balloon bouquets for all occasions, prices vary.

Roundup Deadlines

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

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

Stories and ideas should be submitted to Editor Kelly Humphries in Bldg. 2, Rm. 180, or via e-mail to kelly.o.humphries1@jsc.nasa.gov.

Retirees should submit change of address notices to the distribution group at Mail Code BT552 or call Ignacia Ramirez at 281-483-6161.



Seated, from left: Heidi Glaisyer, Nora Rinehart, Marcy Kerr, Rose Garza, Debbie Human, Bea Lowe, Laura Duvall, Tonya Sivilis, Kelli Graham, June Bennett-Larsen, Jan Pacek, and Vicki Coburn. Second row, from left: Tom Munoz, Joe Galate, George Remnet, John Trahan, Michael Dagerath, Randy Roberts, James Dunn, Sinh Nguyen, Don Allison and Chris Lupo. Third row, from left: John Ngo, Roger Megason, David McLeroy, Dale Painter, Larry Busch, Bob Gaffney, Mike Schattel and Wilber Boykin.

Thirty JSC workers earn award; see 'breathtaking' STS-89 launch

Thirty Space Flight Awareness launch honorees from JSC were recognized at Kennedy Space Center's Banana Creek viewing area to watch the breathtaking night launch of STS-89. Recipients of NASA's Space Flight Awareness Honoree Award, given to a select few who make significant contributions and improvements to the human space program, also received a VIP tour of KSC and were guests of honor at a reception where astronauts, NASA and contractor management applauded their work and dedication to the space program. Astronaut Joan Higginbotham



presented each honoree with a framed certificate and lapel pin at JSC's awards breakfast held during the event. The Space Flight Awareness Honoree Award is the highest tribute paid to government and industry workers to recognize their work on flight systems and other critical mission support tasks that contribute to astronaut safety and mission success. The next Space Flight Awareness Honoree event is scheduled to be held in conjunction with the launch of STS-91 in late-May. For more information concerning the SFA Program, contact Lois Walker at x38425.

JSC offers limited buyout option to retirement-eligible employees

JSC is offering buy-outs for a limited number of retirement-eligible employees if they leave by April 3. The buyout is intended to help NASA reach its long-range work force reduction targets as soon as possible. Buyouts of up to \$25,000 are available for up to 100 retirement-eligible JSC permanent civil service employees who leave voluntarily between now and April 3. The buyout is a lump sum incentive payment based upon years of service and salary history up to a maximum gross amount of \$25,000.

There are no organizational limits, except for secretaries and clerks (NASA Class Code 500). Only one retirement-eligible secretary per directorate level organization—a total of five centerwide—will be allowed to take the buyout. Priority will be given to employees based on their retirement eligibility status and length of service. First priority will go to optional retirement eligible employees, followed by all other retirement eligible employees. Grade level will not be a factor. To apply for the buy-out, employees must submit applications no

later than March 20 to AH6/Employee Services, Bldg. 45, Rm. 140. Employees will be notified of the disposition of their application no later than March 24. Employee services representatives are available to provide detailed retirement calculations and individual counseling at x32681 or by visiting the Employee Services Office in Bldg. 45, Rm. 140. Information also is available on the Human Resources web site at: <http://hro.jsc.nasa.gov/announce/hotnews.htm>

People on the Move

Human Resources reports the following personnel changes as of Feb. 14:

Additions to the Workforce

Irene Bibyk joins the EVA Project Office as a project engineer.

Promotions

Mary Lee Meider was selected as a management analyst in the Safety, Reliability, and Quality Assurance Office.

Reassignments Between Directorates

Tom Cremens moves from the International Space Station Program Office to the Office of the Associate Director.

Larry Dyer moves from the International Space Station Program Office to the ISO 9000 Office.

Daryl Peltier moves from the Engineering Directorate to the Space Shuttle Program Office.

Sharon Castle moves from the Phase 1 Program Office to the International Space Station Program Office.

Hahn Nguyen moves from the Mission Operations Directorate to the International Space Station Program Office.

Resignations

Cynthia Hernandez of the Engineering Directorate..

Test chamber volunteers to brief employees

Four volunteers who spent 91 days in a sealed chamber in Bldg. 7 late last year will brief employees, their families and friends at 1:30 p.m. March 10 in the Bldg. 30 Auditorium. Dr. Nigel Packham, crew commander; Laura Supra, life support systems specialist; John Lewis, systems specialist; and Vickie Kloeris, science commander, will show a video and slides documenting their stay inside the chamber during the fourth phase of the Advanced Lunar-Mars Life Support Test Project. JSC Director George Abbey and Engineering Director Leonard Nicholson will be on hand to recognize the crews' achievements and to share with employees plans for future life support activities. All JSC civil service and contractor employees are invited. For more information contact Helen Harris at x38413.

Center Operations seeks rigging, heavy hauling cooperation

JSC's Center Operations Director has issued a policy statement emphasizing the importance of communication between the JSC rigging and heavy hauling support contractor and their customers. Center Operations Director Jim Hickmon issued the policy in late February. "It is a joint responsibility of the

customer and the rigging and heavy hauling support contractor to obtain and ascertain all information and unique characteristics of a lift prior to accomplishment of that task," Hickmon wrote. Information required includes but is not limited to: special handling requirements, identification of electrical or chemical hazards, restric-

tions regarding the accessibility of the facility during missions, physical access limitations of the job site which the customer has knowledge of but which may not be readily obvious otherwise, and correct weight and center of gravity. A job survey is conducted by the rigging and heavy hauling support contractor for all rigging tasks. The

customer or his designated alternate must actively participate in this survey. All information obtained from the job survey is documented by the rigging and heavy hauling support contractor. This information, as well as all details pertaining to the task, are provided to the rigging crew prior to beginning the work process. Modification or reconfiguration of

an article to be lifted or hauled is strictly prohibited once the job survey has been completed unless the proper notification is given to the rigging and heavy hauling support contractor. Contact the Transportation Branch at x36503 if you have questions or require clarification regarding this policy statement.

Dates & Data

March 3

Grand rounds: Laurence Young, director of the National Space Biomedical Research Institute will present the Space Medicine Grand Rounds at 8:30 a.m. March 3 at the Center for Advanced Space Studies, 3600 Bay Area Blvd. The topic will be "Space and the Vestibular System." For more information, call Kay Nute at 244-2019.

March 4

Spaceland Toastmasters meet: The Spaceland Toastmasters will meet at 7 a.m. March 4 at the House of Prayer Lutheran Church. For more information, call George Salazar at x30162. **Communicators meet:** The Clear Lake Communicators will meet at 11:30 a.m. March 4. For information and location, contact Henry Duke at 281-280-4403 or Melissa Sommers at 281-332-0698. **Spaceteam Toastmasters meet:** The Spaceteam Toastmasters will meet at 11:30 a.m. March 4 at United Space Alliance, 600 Gemini. For details, call Chuck Kubricht at 282-3908 or Brian Collins at x35190. **Astronomers meet:** The JSC Astronomy Seminar will meet at noon March 4 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For more information, call Al Jackson at x35037.

March 5

Warning System Test: The site-wide Employee Warning System will perform its monthly audio test at noon March 5. For more information, call Bob Gaffney at x34249. **Airplane club:** The MSC Radio Control Airplane Club will meet at 7 p.m. March 5 in the Clear Lake Park building. For more information, call Bill Langdoc at x35970. **NCMA meets:** The National Contract Management Association will meet at 11:30 a.m. March 5 at the Clear Lake Golf Club. The speaker will be Dee Lee, the NASA associate administrator for procurement. For information call, Nancy Liounis at x31865. **March 10** **NPMA meets:** The National Property Management Association will meet at 5 p.m. March 10 at Robynette and Doyle Caterers, 216 Kirby in Seabrook. Dinner costs \$14. For more information call Sina Hawsey at x36582. **Aero club meets:** The Bay Area Aero Club will meet at 7 p.m. March 10 at the Houston Gulf Airport clubhouse at 2750 FM 1266 in League City. For more information call Larry Hendrickson at x32050. **March 11** **PSI meets:** The Clear Lake/NASA Chapter of Professional Secretaries International will meet at 5:30 p.m. March 11. For information and location, call Elaine Kemp at x30556.

March 12 **MAES meets:** The Society of Mexican American Engineers and Scientists will meet at 5 p.m. March 12 at Mario's Pizza in Webster. For more information, call Gerard Valle at x38835. **SSQ meets:** The Society for Software Quality will meet at 6:45 March 12 at the Holiday Inn. Registration and social begin at 5:30 with dinner at 6 p.m. To make a reservation, call Earl Lee at 335-2322 or Herb Babineaux at x34263. **March 13** **Space Society meets:** The Clear Lake chapter of the National Space Society will meet at 6:30 p.m. March 13 at the Radisson Hotel, 9100 Gulf Fwy. in the Deer Park room. For more information, call Murray Clark at 367-2227. **Astronomers meet:** The JSC Astronomical Society will meet at 7:30 p.m. March 13 at the Center for Advanced Space Studies, 3600 Bay Area Blvd. For more information, call Chuck Shaw at x35416. **March 17** **Solar Energy in Texas video:** Local members of the Texas Solar Energy Society will show a new video narrated by Dan Rather entitled "The Infinite Power of Texas" at 11:30 March 17 in Bldg. 7, Rm. 141. For more information call Mike Ewert at x39134.

March 18 **Spaceland Toastmasters meet:** The Spaceland Toastmasters will meet at 7 a.m. March 18 at the House of Prayer Lutheran Church. For more information, call George Salazar at x30162. **Communicators meet:** The Clear Lake Communicators will meet at 11:30 a.m. March 18. For information and location, contact Henry Duke at 281-280-4403 or Melissa Sommers at 281-332-0698. **Spaceteam Toastmasters meet:** The Spaceteam Toastmasters will meet at 11:30 a.m. March 18 at United Space Alliance, 600 Gemini. For details, call Chuck Kubricht at 282-3908 or Brian Collins at x35190. **Astronomy seminar:** The JSC Astronomy Seminar will meet at noon March 18 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For more information, call Al Jackson at x35037. **Scuba club meets:** The Lunarfans will meet at 7:30 p.m. March 18 at the Redfish Restaurant under the Kemah/Seabrook bridge, Seabrook side. For more information, call Mike Manering at x32618. **March 19** **Child Care directors meet:** The Space Family Education board of directors will meet at 11:30 a.m. March 19 in Bldg. 45, Rm. 712D. For details on this open meeting, call Gretchen Thomas at x37664. **NCMA seminar:** The Space City-

Houston Chapter of the National Contract Management Association is sponsoring a national education seminar on electronic contracting on March 19 at the University of Houston-Clear Lake Campus. Registration begins at 7:45 a.m. and the seminars begin at 8:30 a.m. This seminar will explore the latest innovations in acquisition and contracting for beginners as well as experts. All attendees will receive a copy of the 1998 Electronic Contracting Manual, CD-ROM and a resource book. The cost is \$145 members, \$195 non-members until March 9, \$195 members, \$215 non-members after March 9. For information and registration call Laura Bankey at 228-7658 **March 24** **Grand round:** The March Space Medicine Grand Rounds will be held at 8:30 a.m. March 24, at the Open Gates Telecommunications Center, UTMB, 2419 Sealy, Galveston. The speaker will be Jeffrey R. Davis, M.D., director, Aerospace Medicine Residency Program, UTMB at Galveston. The topic will be "Medical Issues for a Mars Mission" Van transportation is available from JSC. For reservations, call x30452 **March 25** **Spaceland Toastmasters meet:** The Spaceland Toastmasters will meet at 7 a.m. March 25 at the House of Prayer Lutheran Church. For more information, call George Salazar at x30162.

NASA Briefs

Goldin to keynote climate conference

NASA Administrator Daniel S. Goldin will deliver the keynote address at "Tilting the Balance, Climate Variability and Water Resource Management in the Southwest," a conference to be held at the University of Texas at El Paso, March 2-4. The conference is part of an in-depth investigation of regional climate variability and its effect on the availability and quality of water resources critical to the region. Rep. Silvestre Reyes, D-Texas, and 10 other members of Congress will co-chair the event. The goal of the conference is to provide farmers, ranchers, industry leaders, planners, utility managers and others whose livelihoods are affected by climate change with practical information about climate variations and how they can affect regional decision making.

Children may send names to Mars

NASA invites children of all ages to send their name to Mars. On December 3, 1999 the Mars Polar Lander will enter the Martian atmosphere encased in a protective shell and traveling at hypersonic speed. Its parachute will open and it will rendezvous with the planet's surface at a predetermined spot within 500 miles of the Martian south pole. NASA has created a website to collect 1 million names of school children from around the world, and combine these names on a CD-ROM that is going to be included in the payload of the Mars Polar Lander. To join the program and have their names added to the CD-ROM, children should fill out the form on the website at: <http://spacekids.hq.nasa.gov/mars/details.html>

First major X-33 piece at Palmdale

NASA and Lockheed Martin saw their X-33 technology demonstrator move from drawing board to plant floor as the first major flight component arrived at the Lockheed Martin Skunk Works vehicle assembly facility in Palmdale, Calif. The liquid oxygen tank design is one of a number of challenging technology areas that are key to the X-33, including the vehicle's two cutting-edge composite liquid hydrogen tanks, two linear aerospike engines, a rugged metallic thermal protection system and advanced avionics systems, all of which will be arriving at Palmdale during the coming year. Assembly is to be completed in late spring 1999, with the first flight in July 1999.

School open house to follow construction

(Continued from Page 1)
and mathematics curriculum. Possibilities for educational program development are still in the planning stages. School officials are planning a public open house when construction is complete, with JSC employees invited to attend. In announcing the effort last June, Abbey said he expects JSC to work with the school to teach its students about the importance of engineering and science and what it means to them in terms of potential careers. The school will house grades 6, 7 and 8, and may also be used as a magnet for science, math and engineering students throughout the school district. A final decision on the name of the school has not been made yet.

Space Center Houston offers learning camps

During the month of March, Space Center Houston is offering several Spring Break Day Camps for children ages 5-14. The camps will be offered in a hands-on, educational environment covering a wide variety of subjects:

- Rocket Engine-uity—March 9 and 16: This camp is designed for 8-11 year olds and will investigate Sir Isaac Newton and his three laws of physics through rocket activities. Students will explore the aerodynamics of launch vehicles while building a rocket to launch in NASA's Rocket Park (weather permitting). Children can take home their rocket and a

book about rockets and space flight.

- Mission: Space Mobilization—March 10 and 17: Students 8-11 years old can be a special agent on an exploration mission. Teams of children will have the opportunity to design and build an exploratory space vehicle using LEGOs bricks. Once built, the vehicle will be used to explore and investigate an unknown planet. Campers will discover robots, why they are vital to the space program and will take home a space book and a LEGOs vehicle.
- Space Crafts and What Planet Are You From—March 11 & 18: Children 5-7 years old will create a UFO

from scratch, fly a paper rocket toward a target, and travel through the solar system to learn about their favorite planet. They will design a spacesuit for an adventure into the solar system, create their own solar system necklace and take home two space books.

- If It Suits You—March 12 and 19: Campers will explore the actual spacesuits of the astronauts and discover how they train for space walks. This workshop is designed for children 8-11, and will explore and discover how the vacuum of space affects the astronauts. Participants will meet a scientist who designs

space suits and can take home a picture of themselves wearing a spacesuit and a space suit poster.

- Aviation Adventure - March 13 and 20: Students 12-14 years old can explore some of the challenges that pilots and astronauts encounter. Campers will build and launch a model space shuttle rocket and will conduct experiments related to Bernoulli's principles.

Day camp prices range from \$45 to \$65 each and include all materials and lunch. For registration applications and additional information on any of Space Center Houston Day Camps call 244-2148 or 244-2131.



JSDC Photo by Benny Benavides

RETIREMENT PARTY—Joseph Atkinson Jr. of JSC's Equal Opportunity Programs Office, accepts a plaque from former Astronaut Bernard Harris and his daughter, Alex. The plaque, a collage of pictures of the nine groups of astronauts Atkinson helped to select between 1978-1996, was in recognition of his 49 years of service. Music was supplied by the Texas State University jazz ensemble.

Robot competitors face off next week

Beach balls will be flying in all directions March 5-7 at Space Center Houston as robots compete against one another in the Southwestern Regional Tournament of the FIRST Foundation. The JSC community is invited to come out and see the fun.

FIRST (For Inspiration and Recognition of Science and Technology) is an educational foundation that conducts an annual series of regional and national tournaments in which robots built by teams of high school students and their industrial sponsors compete against one another to score points in a unique game-type setting.

This is the seventh year of FIRST competitions, and each year's game is different. This year's game requires the student-controlled robots to pick up beach balls and place them in scoring positions along ladder-like structures within a 35-foot competition arena, while attempting to prevent others from scoring. Andy Allen, retired astronaut and president of the FIRST Foundation, was instrumental in working with JSC and Space Center Houston to bring the tournament to Houston.

The JSC-Clear Creek ISD team will be competing against as many as 20 other teams from around the country, including JSC-mentored teams from Houston ISD and Pasadena ISD.

March 5 will feature team practice sessions, while seeding rounds will be held March 6, and the final competition will be held Saturday morning, March 7.

STS-95 commander to focus on science

(Continued from Page 1)

Feb. 13 following NASA Administrator Daniel S. Goldin's announcement that Glenn would be making his second space flight.

Joining Brown, an Air Force lieutenant colonel, and Glenn on *Discovery* will be Pilot Steven Lindsey, an Air Force major, and Mission Specialists Scott Parazynski, M.D.; Stephen Robinson, Ph.D.; and Pedro Duque, as well as Payload Specialist Chiaki Mukai, M.D., Ph.D.

The 10-day flight will support a variety of research payloads including deployment of the Spartan solar-observing spacecraft, the Hubble Space Telescope Orbital Systems Test Platform, and investigations on space flight and the aging process. The primary objectives of STS-95 are to deploy the Spartan spacecraft for two days of free flight during which it will study the Sun's corona, and to conduct research with the Hubble Space Telescope Orbital Systems Test Platform and the International Extreme Ultraviolet Hitchhiker-3 payloads. The Spartan spacecraft was

previously carried on board the STS-87 mission in November but did not activate properly following its deployment from the shuttle.

The bulk of questions posed during the news conference related to Glenn's participation in the flight and whether any special accommodations are being made because of his age.

Brown said Glenn will be a full working member of the crew with assignments in the Spacehab module and middeck that deal primarily with aging research, including experiments that will look at the effects of space flight on sleep, the body's internal clock, and protein turnover and processing. Glenn also will be ingesting a variety of hormones to test their effect on his body during space flight.

"My job is to make sure the science we have manifested on STS-95 gets done," Brown said. "I have a very qualified crew to do that. We're excited about the flight, we're excited to fly with Sen. Glenn. It is a great honor for us, but my job is to get the science done."

"I'm here to be a member of this crew and work with everybody else,"

Glenn added. "I'll be doing some of the experiments myself. I'll be backing up some of the other people. I'm here as a working crew member, and that's it."

Brown said Mukai's selection for the crew preceded Glenn's. Parazynski, also a physician, added that the shuttle will be carrying its standard medical kit, with no additions.

Glenn, whose training began last week with familiarization briefings on the shuttle, launch and entry suits and a run in the centrifuge at Brooks Air Force Base, San Antonio, said he is impressed with the advancements that have been made since his seminal flight. He said the shuttle has an "amazing safety record" and he's confident in the vehicle and its support.

"It's been a rigorous week, but it's been exhilarating, too, and I've loved every minute of it. I even enjoyed the centrifuge run yesterday. This is just a start. We'll be training all this year and I'm looking forward to learning everything we need to know to really get the best return out of this flight," Glenn said. "The Mercury spacecraft could be tucked away in one little corner of

the payload bay," Glenn said. "Back 36 years ago today, I didn't get out and float in the cockpit—there wasn't any place to float to. Here, you'll be able to get out and do things, conduct basic research and you don't have to stay in the seat to do that, in fact you have to get out of the seat to do that."

STS-95 will mark Brown's fifth space flight, and his second as commander. He flew on STS-47 in 1992, STS-66 in 1994, STS-77 in 1996, and STS-85 in August 1997.

STS-95 will be the second flight for both Lindsey and Robinson. Lindsey flew on *Columbia* in November/December 1997. Robinson was a member of the STS-85 crew. Parazynski will be making his third flight, after STS-66 in 1994 and STS-86 in 1997.

Duque, a member of the 1996 astronaut class, will be making his first space flight. Selected by the European Space Agency in 1992, he was the alternate payload specialist for STS-78 in 1996. Mukai will be making her second journey into space during STS-95. She flew previously as a payload specialist on STS-65 in July 1994.

Space News **ROUNDUP!**

The Roundup is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for all space center employees. Deadline for the submission of articles is Friday, three weeks before the desired date of publication.

The Roundup office is in Bldg. 2, Rm. 181. The mail code is AP3. The main Roundup telephone number is x38648, and the fax number is x45165. Electronic mail messages may be directed to kelly.o.humphries1@jsc.nasa.gov or leslie.eaton1@jsc.nasa.gov.

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Thomas settling in on new home

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Thomas said he and his Mir 25 Commander Talgat Musabayev and Flight Engineer Nikolai Budarin have been talking a lot as they work together in the Priroda module. The ability to communicate both technically and socially is important, he said, but so far interaction with his Mir crew mates is going well.

"We spend a lot of time together in a confined space, not just working as professionals, but around the dinner table and this environment here and talking about things and sharing experiences of the day, and looking out the window and observing things together, so you obviously want to be able to have a discourse together and talk freely about things, and we're doing that," Thomas said. "We're getting there."

Thomas said he has activated a number of the experiments, but the one he finds most captivating is the growth of cellular tissue in a bioreactor, an attempt to grow human cancer cells in an artificial environment.

"It's going to take a long time to do this of course, because the growth process is very slow, but so far indications are that it's going quite well and we're quite pleased," Thomas said.

The Mir-24 crew of Commander Anatoly Solovyev and Flight Engineer Pavel Vinogradov returned home last week after 198 days in space. They were joined by French researcher Leopold Eyharts, who spent three weeks doing experiment work.

On Feb. 20, Mir 25 Commander Talgat Musabayev, Flight Engineer

Nikolai Budarin and Thomas were congratulated on the 12th anniversary of the launch of the Mir's Core Module in 1986. They then boarded their Soyuz TM-27 craft and backed away from Mir. Musabayev manually flew the spacecraft back to a smooth docking with Mir, freeing the Kvant-1 port for the Progress resupply craft redocking to Mir late Monday morning. It had been in a parking orbit since Jan. 30.

Thomas has completed four weeks on Mir since becoming a station crew member Jan. 25. He is scheduled to return to Earth in early June aboard Space Shuttle *Discovery* during the STS-91 docking mission to the Mir.

He is the seventh and final NASA astronaut scheduled to live and work aboard Mir.