



# Space News Roundup

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No. 8

## Coleman to train as back-up for Thomas

By Eileen Hawley

Astronaut Cady Coleman has begun training as a backup Mission Specialist to Don Thomas who suffered a broken right ankle on Jan. 29 following the conclusion of a routine training exercise.

"We are hopeful that Don will be cleared for flight," said David



Thomas

Leestma, director of Flight Crew Operations. "He is an experienced astronaut with the majority of his required training for this flight already complete. The decision to

assign Cady as backup was made to protect all available options."

Thomas continues to train with his crew mates to support the more



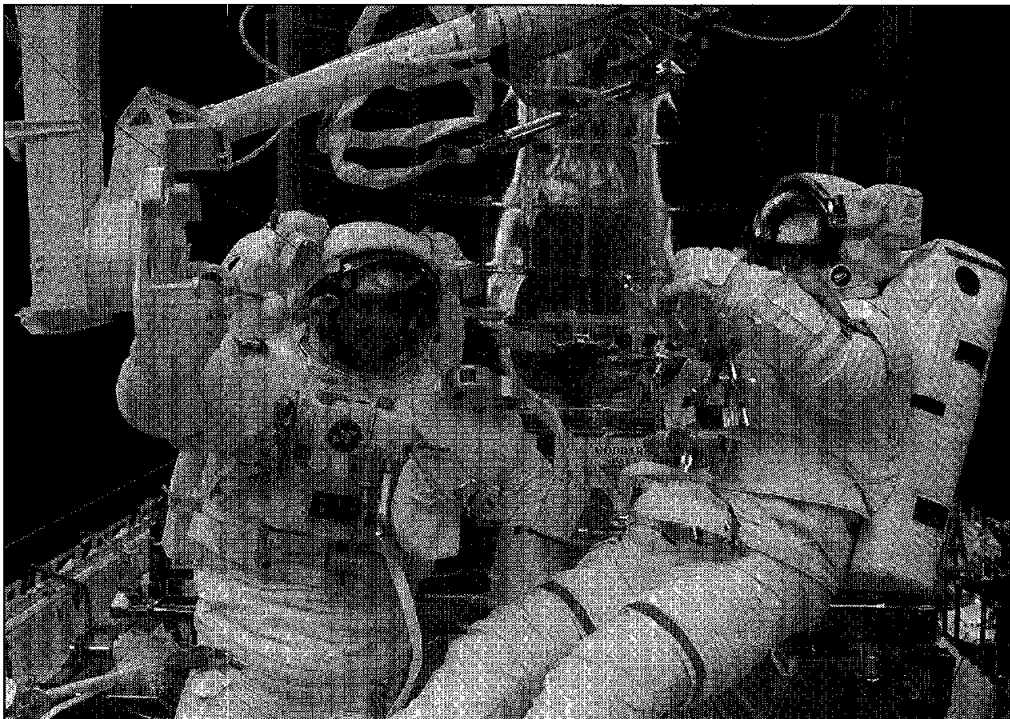
Coleman

than 25 microgravity science investigations that will be conducted on *Columbia's* 16-day flight targeted for an April 3 launch.

His training as one of two astronauts who would perform any required contingency EVA was complete before the injury occurred.

"Cady's previous shuttle experience makes the amount of training required to bring her up to speed minimal," Leestma said. Coleman, 36, has begun refresher EVA training and familiarization with the science investigations to be conducted on STS-83.

The STS-83 crew consists of Commander Jim Halsell, Pilot Susan Still, Payload Commander Janice Voss, Mission Specialist Mike Gernhardt, and Payload Specialists Roger Crouch and Gregory Binteris.



NASA Photo STS82-E-5572

From left, Astronauts Steve Smith and Mark Lee look back at crew mates inside *Discovery* during the third space walk of STS-82. In all, four space walkers logged 33 hours and 11 minutes during the five space walks required to refurbish the Hubble Space Telescope, about two hours shy of the first servicing mission. The fifth space walk, which was not in the original STS-82 flight plan, became necessary when the crew noticed tears in the telescope's multi-layer insulation.

## Spotlight falls on strategic plans

Dailey, Wisniewski, Abbey host all-hands briefing

The latest information about NASA's plans for the future will be in the JSC spotlight Tuesday when two of the agency's top managers join JSC Director George Abbey for an all-hands briefing.

Abbey and NASA Deputy Administrator Jack Dailey will kick off the two-hour NASA Strategic Management Handbook rollout briefing at 9 a.m. in Teague Auditorium. The presentation will include a 20-minute Walter Cronkite-narrated video on NASA's work as a leader in government strategic planning.

Next, Dailey will talk about the management and planning initiatives under way across the agency.

NASA Deputy Administrator for Space Flight Richard Wisniewski will discuss the Human Exploration and Development of Space enterprise, one of five key elements in the plan.

Following the presentations, the combined panel will answer questions posed by JSC

employees attending the briefing.

Abbey has tentatively scheduled two additional all-hands meetings for early March and April.

The first, featuring a panel of JSC program managers, will be a "State of the Program" look at activities, accomplishments, milestones and challenges expected in the coming year as they relate to the strategic plan.

The second, involving a panel of JSC project leads, will focus on future exploration initiatives—such as the X-38 and life on Mars investigations—and the activities, accomplishments, milestones and challenges they face.

All JSC supervisors will be meeting with their employees to discuss these management and planning activities and their direct relationship to each employee's daily work in preparation for the all-hands meeting with the deputy administrator.

## Five space walks update observatory

Astronauts Mark Lee and Steve Smith closed the hatch on a fifth space walk in as many days Tuesday, completing the servicing and refurbishment of the Hubble Space Telescope.

Mission Specialist Steve Hawley redeployed the orbiting observatory at 12:41 a.m. CST Wednesday at an altitude of about 385 by 370 miles, its highest orbit yet.

"Houston, *Discovery*," reported Bowersox, "HST is free to study the stars."

Scientists on the ground uplinked a heartfelt "thanks for a superb job," and immediately began calibrating Hubble's new instruments and preparing for the resumption of scientific operations.

"Our little baby is on its own," said Hubble Program Scientist Ed Weiler.

"The total recommissioning of the observatory will spread out over 16 or 18 weeks altogether," said Hubble Senior Project Scientist David Leckrone. "We hope that by about week 10 we'll have something to show."

The final 5 hour, 17 minute space walk, which was not in the original STS-82 flight plan, became necessary when the crew noticed tears in the telescope's multi-layer insulation.

Working inside *Discovery* with support teams on the ground, Pilot Scott Horowitz and Payload Commander Mark Lee had fashioned large patches from smaller contingency patches carried in the shuttle's hardware bins. Lee and Smith floated outside to tie them down over three Support Systems Module compartments containing key data processing, electronics and scientific instrument telemetry packages.

"We have pretty good confidence this will last until the next time we can go up there," said Michael Weiss, Hubble systems servicing manager, referring to the next planned servicing mission in 1999.

Lee and Smith almost received the "go" for a record sixth space walk while they were repressurizing the airlock as flight controllers evaluated a possible glitch with one of Hubble's four Reaction Wheel Assembly units that are used to maneuver the telescope for its scientific observations. After it was decided that further analysis was needed, the pair reentered *Discovery's* crew

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## Linenger says running in microgravity harder than it looks

Mir 22 Flight Engineer Jerry Linenger is knee-deep in his experiments aboard the Russian Mir Space Station and adjusting to his microgravity environment.

"The first couple of weeks it was very, very difficult to run on the treadmill," Linenger said during an interview last week. "It is a lot tougher than I thought it would be, but now I kind of feel I am back to my old [exercise] pace and I feel real good."

Linenger reported that his days are very busy and was surprised to find that he has little time to pursue his interest in the geography of the planet below.

"There is no free time to just go hang out and look out the window or do some other diversion sort of things," Linenger said. "I still have plenty of interest in looking out the window because I've only done it maybe once a day. I am not sure five months is going to be long enough up here."

Linenger and his Mir 22 crew mates—Commander Valery Korzun and Alexander Kaleri—welcomed the Mir 23 cosmonauts—Commander Vasily Tsibliev, Flight Engineer Alexander Lazutkin



and Cosmonaut Researcher Reinhold Ewald—aboard the orbiting laboratory last week. The joint crews will conduct a variety of experiments for two weeks and Korzun and Kaleri will pack up their belongings for the trip home to Russia with Ewald.

Mir's atmosphere and the way microgravity affects the station have been the focus of the joint experiments this week.

Once the joint operations are complete and the Mir 22 crew and Ewald leave for Earth,

Linenger and Tsibliev will begin preparations for the first joint American-Russian space walk outside Mir scheduled for April 1.

The two space walkers will mount the Optical Properties Monitor experiment. This experiment will measure the effects of space on materials, ranging from mirrors used in telescopes to coatings used on spacecraft.

"The experiment will set the stage for how astronauts and cosmonauts will work together on the International Space Station," said Steve Davis, project manager at NASA's Marshall Space Flight Center.

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## JSC prepares for ISO 9001

By Leon Blum

Activities leading to ISO 9001 registration are well under way at JSC and the ISO 9000 Office has been busy trying to increase managerial and employee awareness.

To increase everyone's knowledge about ISO 9000, a copy of the "Mini-Guide to ISO 9000" was sent to every employee at JSC in August 1996. The guide provides an easy to read explanation of the 20 elements that make up the ISO 9001 standard. It also answers basic questions about the ISO standards and guidelines. While the mini-guide is not the only source of information, it is useful and handy. The guide has

been well received, and additional copies are available from the ISO 9000 Office.

ISO 9000 informational posters are showing up in lobbies and hallways all over the center. They provide a pictorial organization of the ISO 9000 documentation processes and procedures. The posters describe what the various ISO 9000 documents cover and how the documents are related. The posters encourage greater familiarity with the ISO elements and the JSC Quality Manual.

JSC also has initiated the internal review of documented processes

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Daniel Goldin

## Quality conference to focus on change strategy

The American Society for Quality Control will host a two-day conference on Quality in the Space and Defense Industries March 3-4 at the South Shore Harbour Resort and Conference Center.

The focus of this year's conference is "Rapid Change—Using Quality as a Strategy for Success." Attendees will learn how to incorporate the new approaches and partnering ideas that are emerging between NASA and the Department

of Defense. Private organizations will learn from the government and industry leaders who are setting up new initiatives and establishing the environment of change. The conference is designed so that participants can have direct interaction with featured speakers.

The conference will be open with welcoming remarks from Charles Harlan, retired director of safety, reliability and quality

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Right: Dennis Wells of the Automation, Robotics and Simulation Division helps students unpack parts from their robot kit.

Center: From left, a student from Clear Creek Independent School District goes over a shipping list with John Schipper of Lockheed Martin while another student discusses the shipment with Brad Grebinow of Lockheed Martin and a fellow team member.



# Brain Strain

## JSC employees team up with students to participate in national robot competition

By Karen Schmidt

**W**hile most employees head to the house after their eight-hour shift at JSC, some dedicated individuals are spending their time in Bldg. 9 thinking until their brains hurt.

In six weeks, a team of 14 JSC employees will help 37 Clear Creek Independent School District high school students conceive, design, build and test a robot for the For Inspirational and Recognition of Science Technology, or FIRST, national competition. This team—named Integral for the math term that means putting together a lot of pieces—will be one of 154 competing in April for more than 16 awards and scholarships. The project is funded by an educational grant to CCISD and the team is made up of JSC employees, CCISD teachers and students from Clear Brook, Clear Lake and Clear Creek high schools.

The competition is tough, says team lead Charlie Price of the Automation, Robotics and Simulation Division, but the kids are learning a variety of skills they can use in everyday life.

"Not only are the kids learning how math and science are used in the real world, but team, communication and strategy skills as well," Price says. "We also have stirred the pot here internally. Engineers have gotten in the shops of the Manufacturing, Materials and Process Technology Division more and fabricators are working closely with the engineers and the kids seeing the project through. It's a win-win-win situation."

Price, with his team members Henry Kaupp, Todd Yao, Rob Ambrose, Lebarian Stokes, Dennis Wells, Scott Askew, Mike Goza, Ken Jenks, John

Schipper, Brad Grebinow, Roger Megason, Alan Bell and Norm Chaffee, are learning a great deal under a very tight timeline. The team received a 150-plus page rule book Jan. 11 that covers everything from the design phase to the awards banquet. The team is required to ship its robot by Feb. 28.

"The designers said they wanted us to think until our brains hurt," Price says. "That's exactly what they have done to us."

Team meetings are held every night from 4-9 p.m. and all day Saturday and Sunday. A practice arena has been built in Bldg. 9 to test the robot and determine what type of strategy will be used.

"We are building a protoflight. That means that everything that works on this robot will go and everything that doesn't work we are going to fix before it goes," Price says.

Design constraints are included. The team received a kit of parts from FIRST and can only purchase specific items in the building of their robot.

"The whole thing can only weigh 120 pounds and must fit in a three-by-three-by-four foot crate for shipping," says Price. "All of those constraints make it a tremendous tantalizing problem. We found procuring and keeping track of the parts was as essential as the engineering. You have to figure out how to divide the parts to build the system. I asked one of the kids what he had learned so far and he said he has learned the art of compromise."

Once the robot is built, the team must focus on how to achieve a high score. Competition will take place in a 35-foot hexagonal shaped arena with a rotating goal structure in the center. In the beginning, three teams will compete together to place brightly painted inner tubes on the goal structure. Scores are determined by how the tubes are placed on the structure. The students will operate the robot from a designated area using two joysticks while another student acts as a human player helping the

robot confiscate the other teams' tubes or holding tubes for placement on the goal. Anything goes during the two-minute competition including foiling opponents scoring attempts. Two coaches—kids or adults—will encourage the joystick operators during playing time. Teams will be eliminated until a winner is determined. The team has spent time developing strategies

and those strategies are a closely guarded secret.

"This is the first time this type of competition will be used. In previous years, the game involved balls and a robot. The inner tube concept is new, so I think we have a great shot at winning this thing since no one has tried it before," Price says.

More than 16 awards and scholarships are up for grabs during the three-day event to be held in April at Disney World's Epcot Center in Florida. The most prestigious award, the Chairman's Award, is given to the team that submits

a documentary showing how the project affected team members, their families and the community. This report also is due Feb. 28. Other awards up for grabs are the 1997 National Championship and awards for most creative design, best offensive/defensive and plays of the game, best team spirit and sportsmanship. Scholarships from industry and educational institutions also are in the mix. The 1997 National Championship trophy will be awarded to the winning team during a special ceremony at the White House.

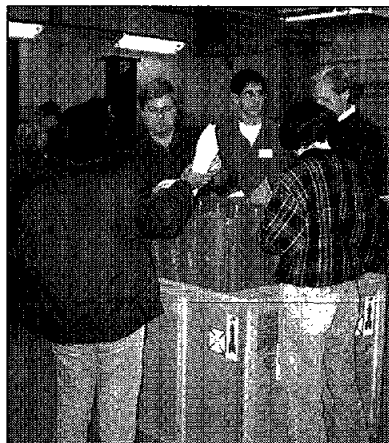
JSC is not the only NASA center entering the event. Lewis Research Center, Headquarters, Kennedy Space Center and the Jet Propulsion Laboratory each will enter one team and Ames Research Center has three teams that will compete. Overall, nine teams from NASA—including a team from Carnegie Mellon University—will meet in Orlando in April to show off their robots.

Price praised the team and the JSC family for helping make the project a success.

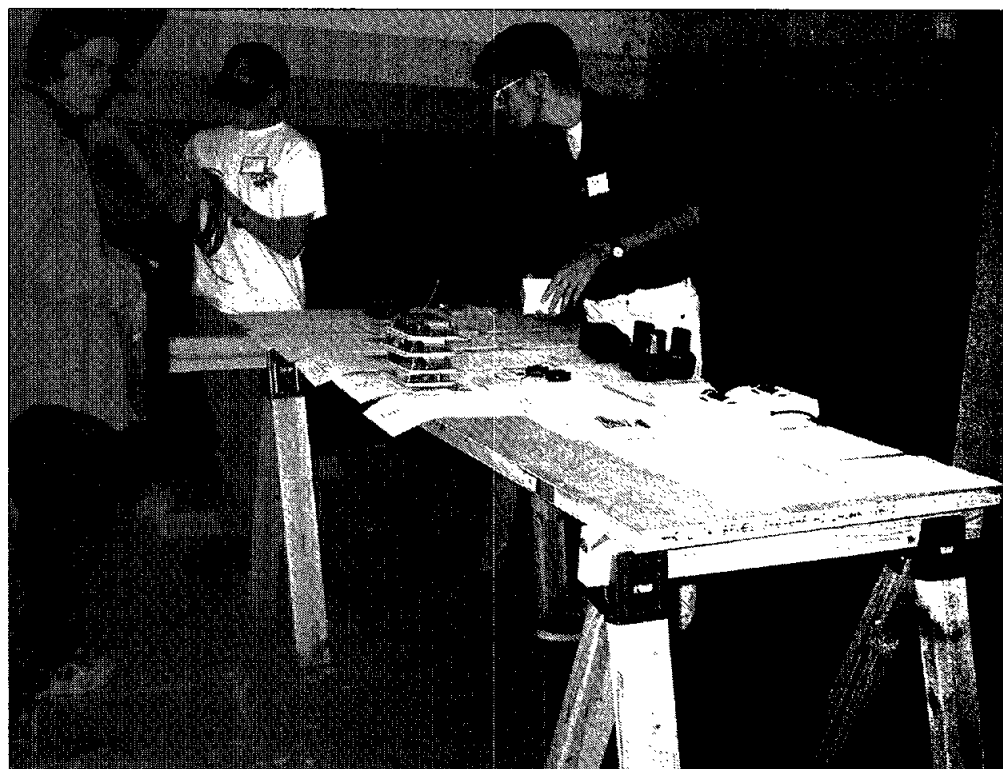
"The Manufacturing, Materials and Process Technology Division have really come through and they are very enthusiastic and cooperative. The JSC graphics folks came up with a terrific logo and the kids are working hard to make this project a success," Price says.

The most important aspects of the competition are teaching kids about math and science and showing how the project affected team members and its community. But it's also fun, Price says.

"Make no mistake, we want to inspire these students and show them the fun and excitement of a real world time constraint engineering design project, but we are in this to win," Price says. □



In order to identify parts, the students and their mentors laid out descriptions of the parts and students matched them up. Since the robot must be built using only the parts sent and the ones on the approved purchase list, procuring and keeping track of the parts was as essential as the engineering. Students learned how to compromise to



get the job done. In six weeks, a team of 14 JSC employees will help 37 high school students conceive, design, build and test a robot for the For Inspirational and Recognition of Science Technology, or FIRST, national competition.

JSC Photos by Norm Chaffee

# Hubble's new instruments will give expanded view of universe

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cabin. That analysis eventually showed the pointing assembly to be in excellent shape.

The final space walk followed two each by Lee and Smith and fellow Mission Specialists Greg Harbaugh and Joe Tanner. In all, the space walkers logged 33 hours and 11 minutes during the five space walks, about two hours shy of the time recorded during the five space walks for the first servicing mission. The two teams installed two new spectrometers and eight replacement instruments, as well as the insulation patches.

"We've completed all of the tasks we outlined prelaunch, more even than what we considered fully successful," said NASA Mission and Payloads Development Director Ken Ledbetter. "We're at maybe 120 percent of what we planned."

With the servicing work complete, Commander Ken Bowersox and Pilot Scott Horowitz fired small maneuvering jets on

*Discovery* to finish boosting Hubble to an orbit about 9 miles higher than it had been when retrieved last week.

Smith and Lee began the service calls at 10:34 p.m. CST last Thursday, slightly later than had been planned. Ground controllers needed time to assess unexpected movement by one of Hubble's solar arrays, which tilted apparently as a result of a gust of air from airlock depressurization.

Once outside, the first team of space workers replaced the Goddard High Resolution Spectrograph and the Faint Object Spectrograph. The telephone-booth sized instruments slid out of their compartments and were replaced by two brand new instruments, the Space Telescope Imaging Spectrograph and the Near Infrared Camera and Multi-Object Spectrometer. The STIS will take light gathered by the telescope and separate it into spectral components so that the composition, temperature, motion, and other chemical and

physical properties of astronomical objects can be measured. NICMOS will allow Hubble to take infrared observations of the universe, giving astronomers the capability to view cosmic objects not visible to human eyes. The first space walk lasted 6 hours, 42 minutes.

The second space walk began at 9:25 p.m. Friday and lasted 7 hours, 27 minutes. Harbaugh and Tanner replaced a degraded Fine Guidance Sensor and a failed Engineering and Science Tape Recorder with new units, and installed another new unit known as the Optical Control Electronics Enhancement Kit, which will further increase the capability of the new guidance sensor.

It was the second team of space workers that first noticed the cracking and wear on Hubble's thermal insulation.

The third space walk began at 8:53 p.m. Saturday. It took Lee and Smith 7 hours, 11 minutes to remove and replace a Data Interface Unit that connects Hubble's data man-

agement system and other subsystems; one of four Reaction Wheel Assembly units that use spin momentum to point the telescope toward a target and maintain it in a stable position; and an old reel-to-reel-style Engineering and Science Tape Recorder with a new digital Solid State Recorder that will allow simultaneous recording and playback of data.

Harbaugh and Tanner began the fourth space walk at 9:45 p.m. Sunday, and wrapped it up 6 hours, 34 minutes later. They replaced a Solar Array Drive Electronics package which is used to control the arrays' position, then ventured to the top of the telescope to replace covers over Hubble's magnetometers, which sense the telescope's position in relation to the Earth. Harbaugh and Tanner also made the first thermal blanket repairs.

*Discovery* is scheduled to land at 12:48 a.m. today if weather at Kennedy Space Center allows.

## EAA offers cruises to Alaska, islands

JSC employees will have the opportunity to cruise to Alaska this summer or the western Caribbean in November.

The Employee Activities Association is sponsoring a seven-day cruise to Alaska May 23-31 or June 20-28. The package includes round trip airfare from Houston to Seattle, overnight hotel in Seattle and motorcoach transfer to Vancouver.

Employees may select an inside cabin for \$1,294 per person or an outside cabin for \$1,477 for the May trip. For the June trip, inside cabins cost \$1,521 and outside cabins are \$1,705.

In November, the EAA will help launch the Norwegian Cruise Line from the Houston Ship Channel. This maiden voyage is set for Nov. 23-30 and will feature three ports of call including Cozumel, Calica and Roatan. Prices vary from \$977 to \$679 depending on cabin choice, plus a \$115.50 per person port charge and taxes.

For more information on either cruise call Dick McMinimy at x34037 or VIP Supertravel at 666-1800.

## Linenger prepares for space walk

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The Optical Properties Monitor is the first instrument of its kind. "What makes it unique," Davis explained, "is that it is capable of relaying information to Earth from orbit." The experiment will take weekly measurements of the condition of the samples and transmit this information to scientists on Earth.

"With previous studies, measurements could only be obtained following the experiment's flight," Davis said. "With this investigation, measurements will be taken and relayed to scientists throughout the flight, providing more detailed information than gathered from any previous study of the effects of space on materials."

During its scheduled nine months on Mir, the OPM will measure nearly 100 samples.

## Goldin to address quality conference

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assurance at JSC and Sam Boyd, vice president of safety, reliability and quality assurance operations at Lockheed Martin. The keynote speaker is NASA Administrator Daniel Goldin followed by a presentation on "How Acquisition Reform is Changing the Industry," by Leonard Kwiatkowski, vice president of the Space Systems Product Center at Lockheed Martin Aerospace.

JSC civil servants may attend the conference by submitting a JSC Form 75. Employees may contact Glen Van Zandt at x33069 for registration. Contractor personnel can call Larry Shaw at x32173.



JSC Photos 97-01673 and 97-01693 by Robert Markowitz

**AIRBORNE ASCANS—Astronaut candidates take a turn in the KC-35, that simulates weightlessness. Top: Top row from left are, Steve MacLean, Christer Fuglesang, John Herrington and Sandy Magnus. Bottom row from left are, Jim Kelly, Mike Fincke, Joan Higginbotham, Mark Kelly and Pat Forrester. Bottom: Top row from left are, Duane Carey, Frank Caldeiro, Yvonne Cagle, Dan Burbank, Steve Frick and Dave Brown. Bottom row from left are, Pedro Duque, Charlie Hobaugh, Charlie Camarda, Umberto Guidoni and Laurel Clark.**



## JSC offers college support to employees

JSC is currently offering three programs to employees interested in expanding their college education.

A new graduate program, the master of science in space studies, is now available to JSC employees through the University of North Dakota's distance degree initiative. The program combines scientific, technical, medical, political and legal aspects of the exploration and development of space into a multi-disciplinary curriculum. Students can focus in areas which include planetary science, global change, international space law and treaties, and space commercialization. Through the university's unique distance degree initiative, students view videotapes of classroom instruction and then participate in regularly scheduled interactive sessions with the professor and other students via the Internet.

Admission requirements include a bachelor's degree in engineering, science, business, social science, communication or information systems; minimum grade point average

of 2.75 overall or 3.00 for the junior and senior year and courses in statistics, calculus, or a programming language, sociology, psychology, or political science and any physical science.

To find more information on the program, check out the University of North Dakota's web site at <http://www.space.edu/>

JSC again will sponsor the JSC Fellowship Program, which provides a select number of employees the opportunity to attend graduate school for one continuous year on a leave-with-pay basis. The center strongly supports such opportunities because they contribute to organizational goals through advanced academic training and enhance professional and personal growth. The criteria for this competitive program include: applicability of the chosen area of study and its effectiveness in contributing to the achievement of JSC's mission and goals, a brief statement of academic purpose, academic record, written recommendation from the division chief, and

activity level in the employee's office and the employee's own workload.

Normally, applicants also must have at least three years of JSC service which may include co-op time. Applicants are responsible for their application and acceptance to graduate school and travel expenses. JSC will pay tuition and related fees. Regular service agreements requiring a period of three times the length of the training will apply to the program.

JSC also will sponsor the Project Increased Qualifications program, which provides undergraduate college opportunities to selected employees during duty hours. Both JSC and employees benefit through opportunities for employees to improve skills, become more productive in their present jobs and increase their qualifications for future jobs. The program helps employees do this by allowing them to: attend one to three college courses per semester, go to school during duty hours for up to eight hours per week, have tuition, required fees and

books paid for by JSC.

Mileage and other costs associated with travel to the college or university are the responsibility of the participant. Courses that do not relate to the employee's current or reasonable future job or JSC's mission will not be considered for the program.

Applicants must meet these qualifications to be considered for the program: be a permanent employee with at least one year of continuous civilian service; occupy a support staff or technician position in grades GS-1 through GS-11; and have completed a minimum of six semester hours of college level work, preferably within the last two years. Employees who already possess a bachelor's degree are not eligible.

Applications for each of these programs are available in the Human Resources Development Branch in Bldg. 45 Rm. 146 and are due by March 28. For more information on any of these programs, call Kazuko Hall-Farley at x33075.

## Bldg. 3 gets new look, Exchange Store coming soon

The Bldg. 3 cafeteria is getting a new look and will house a new Exchange Store.

Renovation of the cafeteria began earlier this month and will include removal of the wall between the main dining and small dining area. Booth like-seating is currently being installed. Other improvements to the cafeteria include a raised dining/stage area, new carpet, window drapes, new wall coverings and energy efficient light fixtures.

An Exchange Store will be constructed in the northwest corner of the cafeteria. All work is being done after hours and on weekends to minimize interruption in food service.

## Time to register for spring softball leagues

Registration is now under way at the Gilruth Center for the spring softball leagues that begin March 3.

Employees may choose from several types of leagues including competitive, recreational, mixed or men's leagues. Cost is \$275 for competitive and \$200 for recreational leagues. All players are required to have an Employee Activities Association badge at a cost of \$10.

Employees may choose to play men's B competitive on Tuesday and Thursday, mixed B competitive on Thursday, men's C competitive on Tuesday and Wednesday, mixed C recreational Monday through Thursday or men's D recreational on Monday.

For more information call x33345.

## ISO review in work at JSC

(Continued from Page 1)

and procedures within various JSC organizations. Elements of the Engineering Directorate's documentation were reviewed in November. In January and February all of the ISO elements were reviewed by the Safety, Reliability, and Quality Assurance and Center Operations Directorates. Other directorates are scheduled to be part of the internal document review soon. The reviews are conducted by civil servants from a broad range of JSC organizations and contractor personnel. All auditors have completed the required, rigorous ISO training classes.