SPACE CENTER
Roundup

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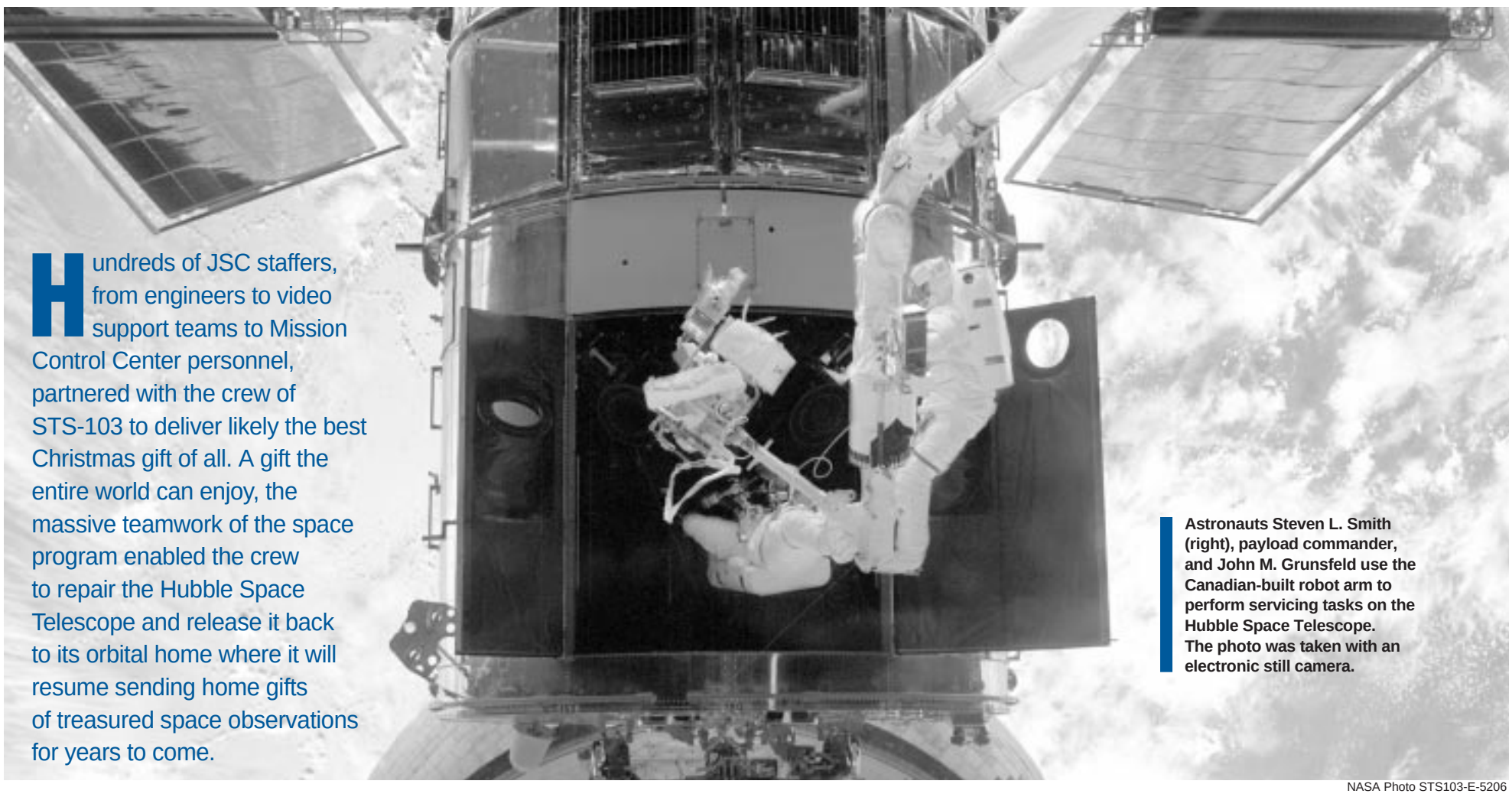
Christmas wish comes true for Hubble team



Hundreds of JSC staffers, from engineers to video support teams to Mission Control Center personnel, partnered with the crew of STS-103 to deliver likely the best Christmas gift of all. A gift the entire world can enjoy, the massive teamwork of the space program enabled the crew to repair the Hubble Space Telescope and release it back to its orbital home where it will resume sending home gifts of treasured space observations for years to come.

Astronauts Steven L. Smith (right), payload commander, and John M. Grunsfeld use the Canadian-built robot arm to perform servicing tasks on the Hubble Space Telescope. The photo was taken with an electronic still camera.

NASA Photo STS103-E-5206

The STS-103 crew, comprised of Commander Curt Brown, Pilot Scott Kelly and Mission Specialists Steven Smith, Jean-François Clervoy, John Grunsfeld, Michael Foale and Claude Nicollier, began its successful eight-day mission with a breathtaking night launch from Kennedy Space Center Sunday, December 19, at 6:50 Central time. The first two days of the mission allowed *Discovery*, traveling at 17,500 mph, to catch up with the serene HST. Hubble had been operating in safe mode since mid-November when a fourth gyroscope became inoperable. The HST needs at least three of its six gyroscopes to maintain its precise pointing ability. When the fourth gyroscope failed, the HST went into safe mode ensuring the telescope received sunlight to maintain operation of its electrical systems.

On rendezvous day, Brown manually piloted the 110-ton orbiter to within 35 feet of the delicate telescope. Clervoy, European Space Agency astronaut, captured the telescope using the shuttle's robotic arm and maneuvered it into the payload bay where it could be accessed for the maintenance and hardware replacement activities.

The remaining four mission specialists divided into two teams to conduct three EVAs during the next three days.

During the first space walk, Smith and Grunsfeld completed the two highest priority objectives for the mission – installing six new gyroscopes into the aimless telescope as well as six Voltage/Temperature Improvement Kits. The pair completed those objectives but a few minor hindrances extended the EVA beyond its scheduled duration.

The gyroscopes were installed in three Rate Sensor Units, each housing two gyroscopes. A tight fit in a stowage container caused difficulty preparing one of the old RSUs for its return flight home. Additional time also was needed for opening valves and removing caps on the Near Infrared Camera and Multi-Object Spectrometer. The EVA lasted eight hours and 15 minutes, exceeding Tammy Jernigan's and Dan Barry's seven-hour and 55-minute EVA during STS-96 last year to become the second longest space walk in history.

Foale and Nicollier followed with the third longest space walk, eight hours and 10 minutes, as they installed a new advanced computer into the 9-year-old telescope. The new computer promises to increase Hubble's computing power, speed and storage capabilities. Early functionality tests showed that the new computer was operating nominally. The pair also replaced a fine guidance sensor aboard Hubble.

The third and final mission space walk continued the tradition of setting duration records. During their eight-hour, eight-minute EVA, Smith and Grunsfeld completed the fourth longest space walk. During their second EVA, the astronauts installed a new radio transmitter that Hubble will use to send scientific data to the ground. They also replaced a reel-to-reel tape recorder with a new, improved solid-state digital recorder. The new recorder provides more than 10 times the storage capability of the previous device.

> ***The Hubble Space Telescope is now orbiting freely once again and is in fantastic shape.***
>
> – John Campbell

The mission events lined up for a wonderful holiday treat for the entire space program, and the world, as the crew of STS-103 re-deployed the HST, with numerous improvements in capability, Christmas Day to continue its legendary life as an orbital observatory.

Later, the Space Telescope Operations Control Center at Goddard Space Flight Center announced that the HST was operating normally after its release. The Hubble team planned two weeks of follow-up testing to confirm all the systems were operational before initiating new observations.

"The spacecraft is being guided by its new gyros under the control of its brand new computer," Hubble Space Telescope Program Manager John Campbell said after the release. "The Hubble team is very grateful to the *Discovery* crew, to the launch and flight teams and to all those who made the mission so successful. We especially thank the families of the entire STS-103 team, who made so many personal sacrifices this holiday season, enabling the Hubble Space Telescope to resume its voyage of discovery."

The crew spent December 26 preparing the orbiter for its return to Earth the following day. The repair mission, which was a splinter mission from an original servicing mission scheduled for 2000, concluded Monday, December 27, with the 20th consecutive landing at Kennedy Space Center's Shuttle Landing Facility and the program's 12th night landing. The final touchdown at 6:01 p.m. Central time was the second of three landing opportunities for that day, the first being 'waved off' after 16-knot winds and strong turbulence exceeded weather requirements. ■

White Sands holds Safety & Total Health Day.

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Events of 1999 reviewed in pictures.

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Images from *Discovery*'s latest mission.

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White Sands holds Safety & Total Health Day 1999

At the White Sands Test Facility, where controlling chemical, explosive, and industrial hazards is a daily ritual, safety and health are serious subjects. On November 18, 1999, employees learned during the WSTF Safety & Total Health Day that they are fun subjects as well.

In years past, WSTF conducted a single Safety & Total Health Day management session for a half-day aimed at WSTF managers, supervisors, and facility health, safety, and environmental managers. The balance of time was left to individual WSTF organizations to conduct safety and health awareness activities often days after the management session. This year's activities were special. WSTF Manager Joe Fries directed that a single, integrated program be conducted where all employees could concentrate on safety and health and share the experience.

The new Safety & Total Health Day concept was a terrific success with WSTF employees. NASA Project Manager Mike Kirsch was elated. "Each year I am amazed with our ability to improve over the previous year's Safety & Total Health Day," said Kirsch. "My hat goes off once again to this year's organizers." Honeywell Laboratories employee Steve McDougle was also impressed with the new program stating, "I liked having a facility-wide event very much. I got to see things in other departments that were very beneficial." Honeywell Propulsion employee Carmon Pennington added, "[This year's] Safety & Total Health Day was the best we ever had."

If the organization of WSTF's Safety & Total Health Day resembled JSC's Safety & Total Health Day, it was no coincidence. Just weeks earlier, representatives of WSTF's Keystone Employee Safety Committee participated in the JSC Safety & Total Health Day as guests of the JSC Safety Awareness Team. The Keystone representatives brought back an appreciation for the festive educational environment at JSC and were determined to emulate the experience with an added WSTF spin. "The first thing that hit us at JSC was that the whole site took the day off to concentrate on safety and health," said Keystone Committee Chairman Holger Fischer, "and that really impressed us." Keystone Committee member Jill Rollings added, "We recognized that everybody [at WSTF] had an opportunity to participate." In addition, JSC employees including Perry Bennett, Sean Keprta, and the folks at the Public Affairs Office, contributed to the success of WSTF's Safety & Total Health Day by providing helpful advice and hundreds of promotional items.

A team was formed to plan WSTF Safety & Total Health Day made up of representatives from every organization and the Keystone Committee. They had straightforward objectives: identify and schedule programs and venues across the site; coordinate organizational plans and contributions; and implement methods to encourage maximum employee participation. WSTF Safety & Health Day Planning Team member Cheerie Patneaude described the planning experience. "There was great enthusiasm because we had common goals," she said. "We were encouraged by management to be innovative in creating a Safety & Total Health Day that everyone could participate in. That made us zealous to create something special." NASA Program Analyst and Planning Team member James Lucero added, "It was a lot of work, but it makes you feel good to know you increased safety and health awareness at work and at home."

1199-2147

Astronaut Steve Oswald has the attention of a rapt audience in the WSTF Rotunda.

Throughout the day 30 programs, activities, games, and presentations were conducted around the site, providing fun safety and health learning experiences for WSTF employees. Among the special guests at WSTF was a representative of Powerhouse Gym in nearby Las Cruces who provided guidance on diet and nutrition, exercise, and healthy lifestyle. Representatives of El Paso Electric provided a dramatic demonstration of electrical hazards and practical precautions. From the adjacent White Sands Missile Range, experts provided familiarization about regional wildlife and the dangers of unexploded military ordnance in the vicinity. Some of the most popular activities were games. "Safety Jeopardy," developed by Honeywell Laboratories employees Michelle Barragan, Brad Forsythe, and Ron Samaniego, was a hit with participants. The quiz contest featured questions developed from WSTF safety, health, and operational requirements. Games of skill

1199-2117

Honeywell Engineering employee Irene Marrufo braces for impact in the "Convincer," a seatbelt motivator provided by the Dona Ana County, N.M. Sheriff's Department.

run by the Keystone Committee were not complete without challenging questions about OSHA's Voluntary Protection Programs. When asked about game results, Keystone Committee member Sean Gates replied, "Everybody was a winner."

Yes, JSC does own and operate a fully equipped fire department. It's just 800 miles west of Houston at WSTF. Members of WSTF's proud Fire and Emergency Services Section were big contributors to Safety & Total Health Day, starting with an honorary breakfast for Fire Warden and Emergency Response Team volunteers. In addition, fire extinguisher training was conducted throughout the day, and an exciting "Fire Attack" exercise put WSTF employees to the test with emergency equipment. Lt. Eric Crespin, Honeywell Fire and Emergency Services, noted that Safety & Total Health Day is an opportunity to provide positive Emergency Services exposure to WSTF employees. "By welcoming people into the Emergency Center," said Crespin, "it provided a better understanding of our capabilities and how well

1199-2150

Honeywell Propulsion employees (left to right) Louis Lambardi, Vince Perea, and Dave Lawrence demonstrate fully encapsulating suits used to protect workers against harmful propellant vapors.

1199-2124

WSTF Firefighter Joe Leos provides fire extinguisher instruction to WSTF employees (left to right) George Aldrich, Delores Puentes, Judah Smith and Michelle Fiala.

prepared we are to protect employees and the facility."

WSTF management provided a consistent safety and health message during repeated sessions to ensure every employee had an opportunity to meet with site leadership. Fries and Honeywell Program Manager Bob Baker discussed where WSTF has been and where it is going with respect to safety performance. Noting a dramatic and continuous decrease in injuries since 1993, they emphasized that demonstrated management leadership and full employee participation is necessary to improve performance and further reduce injuries. Baker introduced the Keystone Committee, which provided familiarization with OSHA VPP concepts, highlighted safety accomplishments, and asked for employee diligence in identifying and helping resolve safety and health concerns.

A popular guest at WSTF's Safety & Total Health Day was Astronaut Steve Oswald. During several packed sessions at WSTF's Rotunda, audiences listened intently to Oswald's discussions on the importance of teamwork in safety, his shuttle mission experiences, the evolution of space travel, and the complexities of International Space Station assembly. Following his feature presentation, Oswald stayed for more than one hour talking with individual WSTF employees and autographing pictures. Oswald definitely won over WSTF folks as Raytheon SR&QA employee Allison Jones said, "Steve Oswald was great and his presence really boosted the day." L&M Engineering employee Lori Kubinski added, "What a great storyteller!"

A Fun Run/Walk under a perfect New Mexico fall afternoon sky capped off WSTF's Safety & Total Health Day. There may still be arguments brewing over the winner of the Fun Run, but as far as WSTF safety and health goes, everybody was a winner. ■

COMMUNITY NEWS

Child Care Center expansion begins

The new year brings good news for many JSC employees. An early December announcement of expansion plans for the JSC Child Care Center made official intentions to build a new facility which will open in August 2000.

"This facility will be a lasting one for the center," said Center Director George Abbey. "We're looking forward to the new child care center to serve our community as well as our employees."

NASA JSC Photo S99-15373 by James Blair

GROUNDBREAKING — Brandon Patterson (at left) digs in at new site. Above (left to right) Rod Etchberger, JSC contracting officer, Henry Wyndon, JSC project manager, Zaky S. Zaky, president of G&Z Contracting, Kristy Hirning, JSC Child Care Center director, Tim Boyes, president of JSC Child Care Center, and Center Director George Abbey break ground for the new child care facility.

NASA JSC Photo S99-15374 by James Blair

The new center is welcome news, as the popularity of the existing on-site care center has resulted in a growing waiting list. The current facility was opened in 1990, but within three years, organizers had already forecasted the need for more space and begun initiatives for expansion.

"We currently have around 100 children on the waiting list," said Kristy Hirning, Child Care Center executive director. "We have parents who call to be placed on the list as soon as they know they are expecting a child."

The existing child care center accommodates 78 children. The building, located at the back of the JSC campus near the Gilruth Center, is electrically heated and its wooden floor is beginning to weaken from the high humidity climate.

In contrast, the new site will be a near 12,000-square-foot facility that will serve up to 128 children from infancy to kindergarten and an adult staff of 28. There will be a lot more play space for each child as well, up to 50 feet per child as compared to 35 in the existing center.

It's being designed so it can be expanded easily, increasing the capacity to 224 children and 44 adults. The new building will have a full-service kitchen, whereas currently, parents have to send their children with prepared lunches. To reduce energy costs the new facility will be heated with natural gas instead of electricity.

"We'll be installing a gas line from Avenue B to the new facility," said Henry Wyndon, JSC's project manager. "Essentially, the line shall be large enough that it could also serve the Gilruth facility in the future. In the meantime, the new system will save enough money to pay for itself within the first six years."

G&Z Contracting, which also is working on several other JSC projects such as parking lot renovations, streetlight grounding and the batting cages at Gilruth, was selected as the small business contractor for the project. The firm has committed to a fast-paced construction schedule and plans to have the building completed in July 2000. The groundbreaking ceremony December 3 culminated what many volunteers have worked toward for years.

"We've been working on this for the past six years," said Bobbie Swan, an outgoing Space Family Education Board member. The Space Family Education Board is the non-profit organization that was developed to create and oversee the Child Care Center. "So you can see why tears come to our eyes when we see this center finally becoming a reality." ■

Organizers near final phase of Longhorn Project

How does an Aggie become the leader of the Longhorn Project? That's a question Don Holick frequently asks himself, but as NASA's facility architect and planner he has found himself doing exactly that.

A few years ago, Center Director George Abbey and Clear Creek Independent School District Superintendent Dr. John Wilson began discussing possibilities for an educational interface between Bay Area high schools and NASA. The outcome of those discussions is a first of its kind agricultural science learning laboratory program that will foster student education in animal care and breeding, fruit and vegetable cultivation, recycling, and soil research.

"Here at JSC, we all work to conquer challenges that will provide us with a better future," said Holick. "Likewise, this program provides a forum for students to learn about closed-loop recycling and research into synthetic and future soils, that will contribute to our sources of food in the future."

As part of the program, JSC provides the land – 60 acres adjacent to Rocket Park – and spearheads development of the facilities needed to support the project. Holick and Melody Nation, JSC's real property officer, partnered with the school district representatives to put the package together.

Now when you look out toward Saturn Lane, you'll find Longhorn cattle grazing in the field. Six bovines to be exact, including an 1,800 lb. former World Champion steer with an 83-inch horn spread and a second place International Champion who features a unique "triple twist" horn. Ranchers also loan four heifers each year for the students to groom for the upcoming Livestock Show.

All of this has been supplied without using taxpayer dollars, much of it donated from local companies, caring individuals, or funded by corporate sponsors such as Dow Chemical Company, Brown & Root Government Services, or Shell Chemicals International. Volunteers from the Houston Livestock Show & Rodeo spearheaded the fund-raising efforts.

Technical consulting for the agriculture and aquaculture projects comes from Texas A&M University and its Agricultural Extension Service. EARTH College of Costa Rica provides technical expertise for the recycling and soil conservation initiatives.

The finishing touches are being made this month to the Western Heritage Pavilion donated in part by the Houston Livestock Show & Rodeo. Visible from Saturn Road, the stone and rough timber pavilion is a 26- by 50-foot open-air verandah that provides viewing of the longhorn pasture to JSC and Space Center Houston visitors.

However, the program extends beyond the longhorns. There are eight gardening beds where students can grow vegetables and areas set aside for an orchard, a greenhouse, and two aquaculture ponds to raise bass and other freshwater species.

"Our goal is to have an entirely self-sustaining farm," said Holick, a 1965 architecture graduate of Texas A&M University who has been at JSC since 1989 and claims he knew very little about farming before this project. "We'll use fertilizers that are generated from the farming process, including clippings, mulch, and other recycled materials from the garden."

Although it will be several months before everything is fully functional, students from CCISD already come to the site on a daily basis to care for the cattle. Other facilities include a barn, storage building, windmill, and water storage tank. Long-term plans call for closed-circuit video capability that will bring the experiments performed at the project to classrooms worldwide.

"All we have left to complete the project is to construct the plaza at the Western Heritage Pavilion and installation of water piping to the gardens, orchards, and aquaculture ponds," said Holick.

To help reach these final goals, the organizers are selling commemorative bricks for the pavilion through March 2000. For $25, donors can have their name or the name of a friend or loved one engraved on a brick paver which will be permanently displayed as part of the pavilion flooring. Interested parties should e-mail or call Holick at x38039. ■

NASA JSC Photo S99-15576 by Robert Markowitz

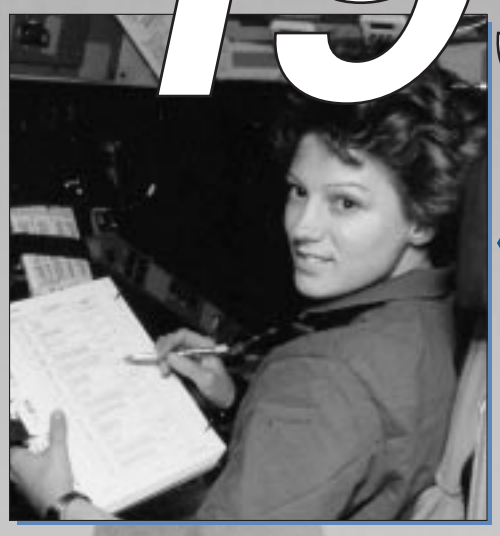
Aggie Don Holick and his longhorned friend bond at the new Longhorn Project Pavilion.

The Year in Review in Pictures 1999

January:

A four-story-tall, 12-ton test article of the International Space Station arrived at JSC to undergo acoustic testing. An exact replica of the centerpiece of the station's 356-foot-long segment called the S-zero truss was housed in the Bldg. 49 Spacecraft Acoustic Lab where it underwent a complex series of vibro-acoustic tests.

NASA JSC Photo S98-20383



July:

***Columbia* lifted the crew of STS-93 to new heights for women and astronomy. On board was the revolutionary Chandra X-ray Observatory and the program's first female shuttle commander, Col. Eileen Collins.**

NASA JSC Photo STS063-312-020

February:

The X-38 Structure Design and Manufacturing Team completed assembly of the fuselage of a full-scale prototype of the Crew Return Vehicle for the International Space Station.

NASA JSC Photo S98-20489

August:

JSC hosted more than 120,000 visitors at the 1999 Open House held August 28.

NASA JSC Photo DCP02215ag

March:

The Russian Orlan and American Extravehicular Mobility Unit spacesuits were used together in a manned vacuum test in the Space Station Airlock Test Article in Bldg. 7. Joey Marmolejo, left, and Gennady Glazov were the test subjects for the first ever EMU-ORLAN manned vacuum test.

NASA JSC Photo S99-04444

September:

Following an electrical short experienced during the launch of *Columbia* on STS-93 in July, space shuttle managers initiated comprehensive inspections and repairs of electrical wiring. With safety as a top priority, managers developed a plan that included inspecting and repairing more than 100 miles of wiring in each shuttle orbiter.

NASA KSC-99PD-812-04

April:

April 26 was a red-letter day for two girls, Amanda Clanton, 9, from Crosby, Texas, and Erica Lumas, 6, from Honduras. The two girls, who suffer from a rare skin disorder called xeroderma pigmentosum or XP, each received a special UV protection suit that was developed from space-based technology, allowing them to go outside in the sun.

NASA JSC Photo S99-05288

October:

JSC employees stood down from their daily tasks and participated in the annual Safety & Total Health Day.

NASA JSC Photo S99-13241

November:

More than 2,500 professionals from industry, business, government, community and academia attended Inspection99 to talk with NASA representatives and investigate opportunities to apply space technologies for use in their own fields.

NASA JSC Photo i9913695

May:

JSC received the coveted VPP Star Site status. The JSC Safety Action Team led the center to receiving the honor in its first attempt – an unprecedented achievement in OSHA's VPP Program.

NASA JSC Photo S99-08321

June:

Following a 4-million-mile mission to resupply the International Space Station, Commander Kent Rominger set the shuttle and his crewmates down June 6 on Runway 15 at the Shuttle Landing Facility in Florida to complete the first shuttle mission of the year.

KSC-99PP-0634

December:

The STS-103 crew completed the third servicing mission of the Hubble Space Telescope. The Space Shuttle *Discovery* was launched at 6:50 p.m. CST on December 19. Replacement of the telescope's gyroscopes will allow it to continue its groundbreaking astronomical mission.

STS-103 KSC-99PP-1336

Snapshots from *Discovery*

A visit to the Hubble Space Telescope

1 Astronaut Curtis Brown Jr. mans the commander's station during Flight Day 2 activity on board the Space Shuttle *Discovery*. [S103-E-5200]

2 Astronaut Michael Foale, mission specialist, performs a minor maintenance task on the middeck of the Earth-orbiting *Discovery*. The long rectangular structure near Foale's head is the escape pole, which has been standard equipment on the shuttle fleet since 1988. [S103-E-5184]

3 Pilot Scott Kelly looks over a copy of the STS-103 flight plan on *Discovery*'s aft flight deck. [S103-E-5198]

4 Astronaut John M. Grunsfeld uses a pair of binoculars to view the distant Hubble Space Telescope several hours prior to its capture by the Space Shuttle *Discovery*. [S103-E-5202]

5 Astronaut Steven Smith, payload commander, waves to crew mates inside *Discovery*'s cabin during the first space walk of NASA's third servicing visit to the Hubble Space Telescope. [S103-E-5248]

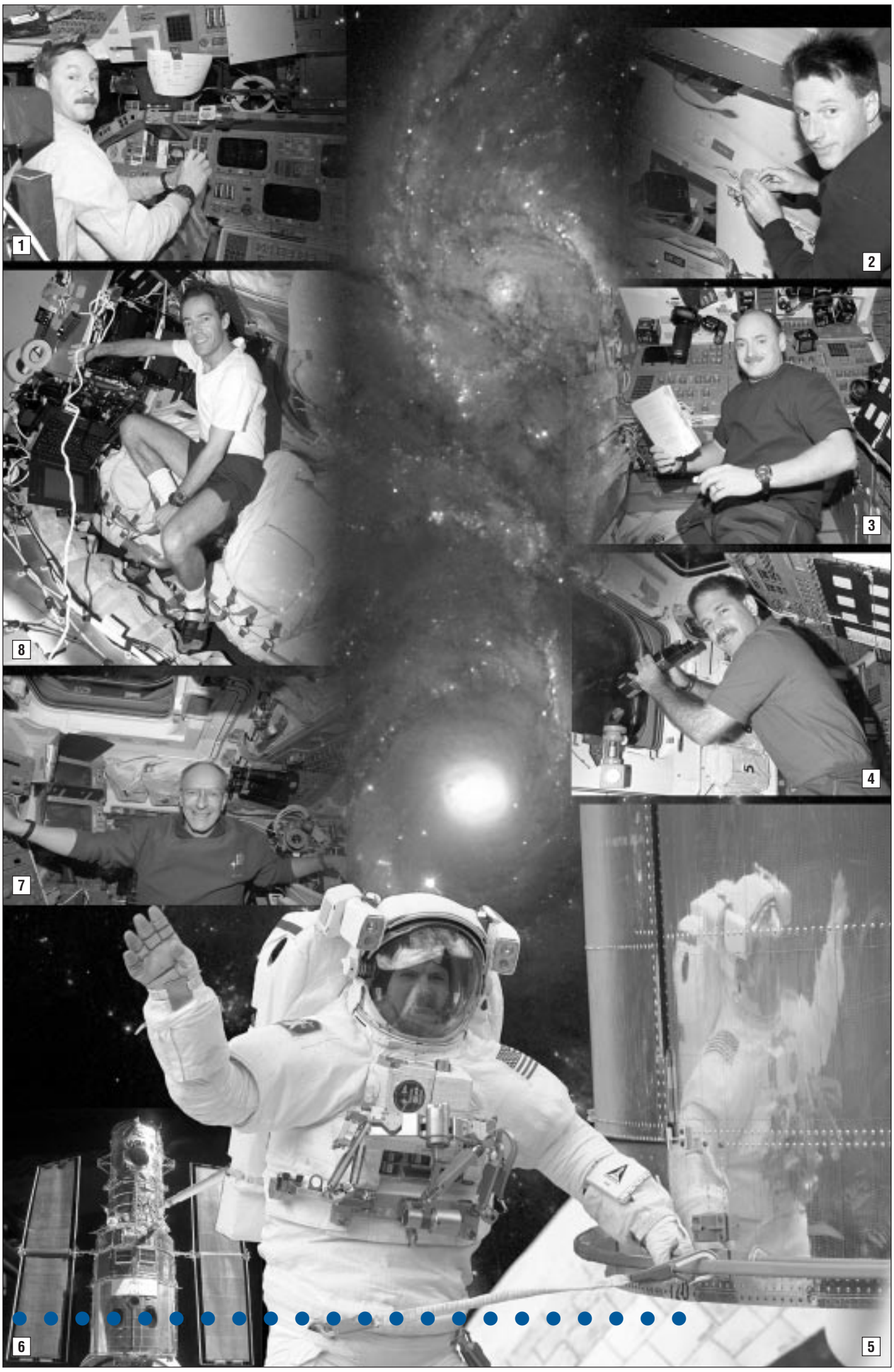
6 The Hubble Space Telescope, captured in *Discovery*'s bay by the Remote Manipulator System, received six new gyroscopes and a new computer among other improvements to the orbital observatory during the mission. [S103-E-5166].

7 Astronaut Claude Nicollier, mission specialist representing the European Space Agency, poses near the controls of *Discovery*'s Remote Manipulator System. Nicollier, who participated in the second EVA of STS-103, served as a backup operator for the RMS on this mission, as he has experience with the robotic arm from previous shuttle missions. [S103-E-5199]

8 Astronaut Jean-François Clervoy, mission specialist also with ESA, established a computer workstation on *Discovery*'s middeck. [S103-E-5188]

9 Astronaut Scott Altman, (center) spacecraft communicator for STS-103, muses with fellow controllers. Flight Directors Leroy Cain (left) and Wayne Hale are in the background. [S99-16073]

10 The flight control team monitors systems from the MCC as crewmembers Smith and Grunsfeld venture out of *Discovery* for the first EVA of the mission. [S99-15925]



Ripped from the ROUNDUP

Ripped straight from the pages of old Space News Roundups, here's what happened at JSC on this date:

1965

The Gemini spacecraft in which Astronauts Virgil I. Grissom and John W. Young will make the nation's first two-man flight this spring arrived at Kennedy Space Center Monday.

The spacecraft was moved from McDonnell Aircraft Corp., St. Louis, to the Kennedy Space Center for final flight preparation. Delivered to the Cape Kennedy skid strip by a C-124 aircraft, the spacecraft, designated GT-3, was moved by a special transporter to the pyrotechnic installation building on Merritt Island.

Three orbits are planned for the first manned Gemini flight. Recovery will take place near Grand Turk Island in the Bahamas. The manned flight will follow GT-2, an unmanned Gemini spacecraft which will be launched on a ballistic flight down the Eastern test range this month.

1985

NASA and the U.S. Air Force have agreed to delay the first shuttle launch from the West coast until January of 1986. This follows a review conducted in December which focused on the launch schedule for 1985. Elements considered in the decision were the readiness of the Vandenberg Air Force Base launch site, the Department of Defense payload to be flown on that mission and the recent problem with softening of the screed which underlies tiles on *Challenger*. After the review, both parties jointly decided to delay the launch.

The decision was based primarily on the importance of maintaining the current shuttle manifest for 1985 and on insuring adequate margin in the development of the DOD payload for the initial VAFB launch.

1990

Some 30 engineers, technicians and glaziers spent the better part of Christmas week replacing the irreplaceable in the Mission Control Center.

They installed two new 10-by-20-foot half-inch thick glass screens for the world-famous orbital tracking displays in Flight Control Rooms 1 and 2. The 25-year-old screens had become difficult to clean.

1999-2000 Combined Federal Campaign draws record

JSC employees have once again demonstrated their generosity and for the third year in a row exceeded $500,000 in contributions to the Combined Federal Campaign. Contributions through January 3, 2000, totaled $554,296 which is $44,296 above the JSC goal and $40,000 above last year's total contributions. Sixty-six percent of our employees (1,913) participated in this year's "Working Together for a Better Tomorrow" CFC.

Contributions will continue to be accepted from those employees who have not had the opportunity to participate. Employees may either contact their coordinator or Teresa Sullivan at x31034.

Although contributions are still coming in, the Engineering Directorate has given the most to date, ($138,122), and the Mission Operations Directorate has given the second largest amount ($87,154). Twelve other organizations exceeded their goal and five organizations had 100 percent participation.

JSC employees are making a difference in the lives of many people through the CFC. Your contributions will go a long way in helping those who need it most. ■

NASA offers *Essentials of Biology* course

Ever wished you knew a bit more about biology? At the request of NASA Administrator Dan Goldin, a unique training event focusing on biology will be offered at JSC on Feb. 16-17, 2000, for civil servants and contractors. Entitled *The Essentials of Biology*, the training will be a fast-paced, informative course that will integrate video, slides, and presentations.

In the next century, biology will influence our lives, the environment, and developing technologies to an unprecedented extent. Knowledge of life's biological processes is especially significant to NASA for advancing human exploration of our solar system and for influencing our search for life on other planets. NASA's *Essentials of Biology* course will provide NASA employees with an increased understanding of biology's role in tomorrow's world.

"Think of this as an opportunity to watch a live episode of the *Discovery Channel*," said Mike Kincaid, chief of the JSC Human Resources Development Branch. "The speakers are great at keeping the presentations lively, informative, and interesting,"

The Essentials of Biology course is a two-part multimedia presentation. Four speakers, all specialists in their fields, will present 20-40 minute segments using computer-generated slide shows and videotapes on subjects ranging from the origins of life to the human body to the Earth's ecosystems. The presentations are designed for those with little or no background in biology while illustrating cutting edge research and technology.

"The class is aimed at people who may not have had a biology class since high school," explained Stephen Wiggins, an employee development specialist in the Human Resources Office. "Whether you're an engineer or a secretary, we hope you'll make plans to attend."

The eight-hour course is broken up into two four-hour blocks. Part 1 will be offered on Wednesday, February 16, and Part 2 on Thursday, February 17. Each day employees may select from either a morning session beginning at 8 a.m. or an afternoon session beginning at 1 p.m. The course will be offered in the Teague Auditorium and employees will be seated as long as there is space available. Guests will have the opportunity to ask questions and interact with the presenters throughout the course, with longer question and answer sessions at the end of each day. ■

For more information about the course, please contact Stephen Wiggins in the Human Resources Development Branch at x33078.

GILRUTH CENTER NEWS

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, cash or by check, at the time of registration. No registration will be taken by telephone.

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.

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. Contact the Gilruth Center at (281) 483-3345.
http://www4.jsc.nasa.gov/ah/exceaa/Gilruth/Gilruth.htm

Nutrition intervention program: Six-week program includes lectures, a private consultation with the dietitian and blood analysis to chart your progress. Program is open to all employees, contractors and spouses. For details call Tammie Shaw at x32980.

Defensive driving: One-day course is offered once a month at the Gilruth Center. Pre-registration required. Cost is $25. Call for next available class.

Stamp club: Meets every second and fourth Monday at 7 p.m. in Rm. 216.

Weight safety: Required course for employees wishing to use the Gilruth weight room. Pre-registration is required. Cost is $5. Annual weight room use fee is $90. The cost for additional family members is $50.

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

Step/bench aerobics: Low-impact cardiovascular workout. Classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is $32 for eight weeks. Kristen Taraszewski, instructor.

Yoga: Stretching class of low-impact exercises designed for people of all ages and abilities in a Westernized format. Meets Thursdays 5-6 p.m. Cost is $32 for eight weeks. Call Darrell Matula, instructor, at x38520 for more information.

Ballroom dancing: Classes meet Thursdays from 6:30-7:30 p.m. for beginner, 8:30-9:30 p.m. for intermediate and 7:30-8:30 p.m. for advanced. Cost is $60 per couple.

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

Fitness program: Health-related fitness program includes a medical screening examination and a 12-week individually prescribed exercise program. For details call Larry Wier at x30301.

Aikido: Martial arts class for men and women meets 5-6 p.m. Tuesdays and Wednesdays. No special equipment or knowledge is needed to participate. Aikido teaches balance and control to defend against an opponent without using strength or force. Beginning and advanced classes start each month. Cost is $35 per month.

TICKET WINDOW

The following discount tickets are available at the Exchange Stores

General Cinema Theaters	$5.50
Sony Loew's Theaters	$5.00
AMC Theaters	$4.75
Moody Gardens (2 events) (does not include Aquarium Pyramid)	$10.75
Moody Gardens (Aquarium only)	$9.25
Space Center Houston . . . . . adult . . $11.00 . . . . . child (age 4-11) . . . (JSC civil service employees free.)	$7.25
Space Center Houston annual pass	$18.75
Clear Lake Coupon Books	$30.00

Please bring your driver's license to pay by personal check.

Exchange Store hours

Monday-Friday
Bldg. 3 7 a.m.-4 p.m.
Bldg. 11 9 a.m.-3 p.m.

- All tickets are nonrefundable.
- Metro tokens and value cards are available.

For additional information, please call x35350.

Not on file: *Engineer Highlight*

NASA JSC Photo S99-15922 by Robert Markowitz

Name: Heather M. Mitchell

Title: Technical Manager, EVA Project Office

Time at NASA: 19 years, including four years as a co-op student

Education: University of Michigan, B.S., Aerospace Engineering

Favorite book or movie: Too many to pick a favorite.

Favorite music: Jazz, Reggae, R&B.

When away from JSC: I enjoy travel, especially to tropical islands. I'm trying to visit at least one beach for every letter in the alphabet. I'm up to the letter J which is the James Bond Beach on the North coast of Jamaica. I've also seen L, M and O. I haven't found a beach that started with the letters Y or Z.

What you like about NASA … and your job at JSC: I really like the international aspect of my job. I get to meet people from all over the world, and have even traveled to Italy and Germany. I get a taste of a lot of different cultures while supporting the International Space Station Program.

Background: An unforgettable plane ride transporting her family from the warmth of Jamaica to chilly Michigan was forever imprinted on 8-year-old Heather Mitchell's mind. That first plane ride was the seed that led her to become an aerospace engineer.

"It was the most fascinating thing I had ever seen," says Mitchell of the experience. "From that day, I knew I wanted to work on airplanes."

Now Mitchell is a far cry from the sandy beaches of her native land. With days filled as a space shuttle flight lead for the EVA Project Office, she coordinates many aspects for planned Extravehicular Activities, including verifiying that all EVA requirements are met and coordinating what tools, stowage, equipment, training and mockups will be needed to meet them.

"The job comes with a lot of challenges," said Mitchell. "But I like it. There is simply so much that has to be done that the job comes with a lot of flexibility. You have to be a self-starter – there's no time for handholding. You have to know how to integrate all the components."

Prior to working in the EVA Project Office, she worked as a Mission Operations Directorate assembly operations lead and as a guidance, navigation and control flight controller, a position she says really helped her prepare for her current tasks. "That Mission Control Center position provided me with a lot of hands-on knowledge of the systems. You had to know how those pieces work in the event of a failure."

According to Milt Heflin, a flight director at the time, that is exactly what it takes to work the MCC. "To be a flight controller, in any position, takes a strong attitude of if you don't have the answer, you'll get it," said Heflin, deputy chief, MOD Flight Director Office. "It takes someone who not only understands the system, but is cognizant of the surroundings as well. Heather works very hard at understanding her role and is consistently good at pursuing the truth and making things happen."

Growing up in small Niles, Michigan, only miles from the University of Notre Dame, Mitchell says she didn't always have exposure to strong mentors.

"It was tough to find role models, much less African American and women role models," explained Mitchell. "And we didn't have all the opportunities that people located close to JSC have."

Mitchell's long-term plan is to go back to Jamaica one day and build a school. But for now, she's focusing on ensuring that she is projecting a healthy, solid image for the next generation of could-be engineers, including her 12-year-old son, Javian. She does that by committing time each year to Engineers Week and other educational outreach activities.

"I am where I am today because other people carved a path when there were no African Americans or women in engineering and other professions," said Mitchell, remembering the days when she says a woman engineer was like an exhibit at the zoo. "Astronaut Ron McNair and Congresswoman Barbara Jordan were great role models. Finding a path for the next group – that is what I try to keep in mind." ■

Correction

The article regarding STS-99 in the December 17 issue incorrectly listed the crewmembers. The STS-99 crew includes Commander Kevin Kregel; Pilot Dom Gorie; and Mission Specialists Janet Kavandi, Ph.D.; Janice Voss, Ph.D.; Mamoru Mohri, Ph.D. (NASDA); and Gerhard P. J. Thiele (ESA).

Taking a STEP forward in safety

It's new. It's interactive. It's fun! It's the Safety Through Everyone's Participation Program, or STEP, the newest innovation in safety learning at JSC. Those who have already had benefit of this dynamic one-day course say it's both educational and entertaining.

Each class features a motivational speaker to set the tone, and the remainder of the day involves employees directly, an approach highly recommended by OSHA. And, to reinforce learning, the day ends with a game show, complete with prizes.

STEP is mandatory for civil servants, but also highly recommended for contractor personnel. For more information on STEP, contact your training coordinator or Stacey Menard at x45660. ■

Faces in the crowd

What do you think would be an exciting next step in the space program?

NASA JSC Photo 99e12624

Price Lewis
USA, Software Engineer

Planetary exploration and the interface between man and machines. There is still a great deal we just don't know yet about our local solar system. Man and machine interfaces developed for planetary exploration could be of great benefit here on Earth.

NASA JSC Photo 99e12625

Keith Medina
USA, Flight Design Manager

The most exciting next step would be a manned mission to Mars. I've been working in the human space flight program for 16 years and to get people to Mars presents a very big challenge. There's a lot still to learn about Mars' water and geology from a scientific aspect. We could find its history is similar to ours.

NASA JSC Photo 99e12628

Matt McCurdy
NASA Co-op

A self-sustaining base on the moon. I believe the moon's resources and close proximity to Earth make a lunar base the next logical step in human space exploration.

NASA JSC Photo 99e12631

Dennis Miller
Lockheed Martin, Mechanical Engineer

Asteroid exploration for mineral and natural resources. We could pursue mining the asteroids, which has always been really popular in science fiction.

JSC Photos by James Blair

PEOPLE on the MOVE

Human Resources reports the following personnel changes:

Key Management Assignments

Kristin Ingram was selected as chief, Information Science Branch, Information Products and Services Division, Information Systems Directorate.

David Harris was selected as chief, Propulsion Test Office, White Sands Test Facility.

Patricia Bahr was selected as chief, Planning and Integration Branch, Flight Projects Division, Space and Life Sciences Directorate.

Promotions

Nancy Hawkins was selected as a management analyst in the Procurement Policy and Systems Office, Office of Procurement.

Todd Pryor was selected as lead, Center Transportation Group, in the Transportation Branch, Logistics Division, Center Operations Directorate.

Nilda Reyes was selected as an administrative assistant in the Office of the Chief Financial Officer.

Becky Stinson was selected as a financial management specialist in the Financial Services Branch, Financial Management Division, Office of the Chief Financial Officer.

Renee Hasson was selected as Space Flight Awareness program assistant, Safety, Reliability, and Quality Assurance Office.

Additions to the Workforce

Kirk Hummel joins the Environmental Office, Center Operations Directorate, as an environmental engineer.

Reassignments Between Directorates

Debra Bulgher moves from the Mission Operations Directorate to the Space and Life Sciences Directorate.

Resignations

Dave Gerlach of the Flight Crew Operations Directorate.

Rich Dinkel of the Safety, Reliability, and Quality Assurance Office.

Karen Peterson of the International Space Station Program Office.

DATES & DATA

January 14

Astronomers meet: The JSC Astronomical Society will meet at 7:30 p.m. January 14 and February 11 at the Center for Advanced Space Studies, 3600 Bay Area Blvd. For more information, call Chuck Shaw at x35416.

January 19

Astronomy seminar: The JSC Astronomy Seminar Club will meet at noon January 19 and 26 and February 2 and 9 in Bldg. 31, Rm. 248A. For more information, call Al Jackson at x35037.

Scuba club meets: The Lunarfins will meet at 7:30 p.m. For more information, call Mike Manering at x32618.

Spaceland Toastmasters meet: The Spaceland Toastmasters will meet at 7 a.m. January 19 and 26 and February 2 and 9 at the House of Prayer Lutheran Church. For more information, call George Salazar at x30162.

Spaceteam Toastmasters meet: The Spaceteam Toastmasters will meet at 11:30 a.m. January 19 and 26 and February 2 and 9 at United Space Alliance, 600 Gemini. For more information, call Patricia Blackwell at (281) 280-6863.

January 20

Communicators meet: The Clear Lake Communicators, a Toastmasters club, will meet at 11:30 a.m. January 20 and 27 and February 3 and 10 at Freeman Library, 16602 Diana Lane. For more information, call Allen Prescott at (281) 282-3281 or Mark Caronna at (281) 282-4306.

Directors meet: The Space Family Education board of directors will meet at 11:30 a.m. in Bldg. 45, Rm. 712D. For more information on this open meeting contact Lynn Buquo at x34716.

January 24

Alzheimer's support group meets: The Clear Lake Alzheimer's Caregiver Support Group will meet at 7:30 p.m. to 9 p.m. in the first floor conference room, St. John Hospital West building, Nassau Bay. For more information, contact Nancy Malley at (281) 480-8917 or John Gouveia (281) 280-8517.

January 27

Radio Club meets: The JSC Amateur Radio Club will meet at 6:30 p.m. at the Piccadilly, 2465 Bay Area Blvd. For more information, call Larry Dietrich at x39198.

January 29

Judges needed: Volunteers are needed to judge National Engineers Week Future City Competition at the San Jacinto College – central campus. Please visit www.futurecity.org or www.ghgcorp.com/ieeegbs/futurecity-houston/ or contact Dr. Taqvi at Z.Taqvi@ieee.org for more information.

February 1

Quality society meets: The Bay Area Section of the American Society for Quality will meet at 6 p.m. at the Ramada King's Inn on NASA Road 1. No reservations are required. For more information, contact Ann Dorris at x38620.

Payload Safety Conference

The Nassau Bay Hilton, Houston, will be the site of a Payload Safety Conference on February 23-25, 2000. The conference theme is "Mission Success Starts with Safety."

The objectives of the conference are to provide payload organizations with a common, accurate understanding of payload safety technical and process requirements, to foster synergy within the payload safety community, and to promote payload safety as the foundation for mission success. The conference is primarily intended for personnel responsible for the design and safety certification of International Space Station and shuttle payloads, including payload safety engineers, project managers, and technical support specialists.

General sessions will include presentations on payload safety challenges in the ISS era, the payload safety Data Management System, and process and technical requirements for both ground and space flight safety. More specialized sessions will be offered on technical topics, including pressure systems and pressure vessels, batteries, materials, structures, fracture control, fire detection and suppression, extravehicular activity, toxicology, electrical power distribution, and bonding and grounding.

Dr. Bonnie Dunbar will address attendees at the conference luncheon on February 24.

The conference Web site is located at www.rsis.com/nasa/conference/intro/

If you have any questions, contact Michael Ciancone at x38848 or e-mail at mciancon@ems.jsc.nasa.gov.

NASA BRIEFS

CHANDRA PLOUGHS UP A SNAKE IN HYDRA A

NASA's Chandra X-ray Observatory image of the Hydra A galaxy cluster has revealed a possible solution to a Herculean puzzle about the fate of the largest objects in the universe.

For years astronomers have been searching unsuccessfully for large quantities of matter they believed must be flowing into the central regions of galaxy clusters. The Chandra image of Hydra A displays for the first time long snake-like strands of 35 million degree gas extending away from the center of the cluster. These structures show that the inflow of cooling gas is deflected by magnetic fields produced by explosions from a central black hole.

The X-ray image also reveals a bright wedge of hot multimillion degree gas pushing into the heart of the cluster. Like the legendary Hercules, who had to contend with the multiple heads of the monstrous Hydra, astrophysicists now know they must deal with the effects of magnetic fields, star formation, rotation and black holes if they are to understand what is happening in the inner regions of the galaxy cluster.

As the largest gravitationally bound objects in the universe, galaxy clusters provide crucial clues for understanding the origin and fate of the universe. Each large cluster such as Hydra A contains hundreds of galaxies and enough gaseous material to make a thousand more galaxies. One intriguing question has been the ultimate fate of this colossal gas reservoir. Early X-ray observations indicated that the gas in the inner regions of Hydra A should be cooling and slowly settling into the center of the cluster to form new galaxies of hundreds of trillions of dim stars. As astronomers began searching for this cool matter, they were puzzled to find that the new galaxies and stars were not detected in sufficient numbers.

The Chandra results on Hydra A, which is 840 million light years from Earth, may point to a resolution of this problem. The inflow of cooling gas may be deflected by magnetic fields, and even pushed back into the cluster by explosions from the vicinity of a black hole at the core of the central galaxy.

"In Hydra, you can see the whole cycle," said Brian McNamara of the Harvard-Smithsonian Center for Astrophysics. "You have the hot gas cloud, the disk of material feeding the black hole, and the evidence that the explosion from the gas near the black hole is pushing the hot gas around."

MULVILLE NAMED ASSOCIATE DEPUTY ADMINISTRATOR

NASA Administrator Daniel S. Goldin selected NASA's Chief Engineer, Dr. Daniel R. Mulville, as the space agency's Associate Deputy Administrator, effective January 1, 2000. He replaces General John R. Dailey, who is leaving to head the National Air & Space Museum.

As Associate Deputy Administrator, Mulville will plan, direct and manage the daily operations and reinvention activities of the Agency.

As the Agency's Chief Engineer since 1995, Mulville has been responsible for overall review of the technical readiness and execution of all NASA programs, ensuring that development efforts and mission operations of the agency are conducted on a sound engineering basis.

SPACE CENTER Roundup

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